

“Master’s Thesis – Master Sustainable Business and Innovation”

Ex post assessment of SME’s expected and realised collaborative innovation benefits

innovencio



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Date: July 25, 2022

ACKNOWLEDGMENT

I want to thank Matthijs for the great supervision of my thesis. I already knew Matthijs as a supervisor from another, shorter project. Though, even after nine months of intensive supervision, I can say: never hesitate to ask Matthijs to be your master's thesis supervisor!

Moreover, I want to thank all my colleagues at Innovencio for the great times. Especially, Liesbeth and Kees should be thanked for the opportunities I got to learn as much as I did in the last six months. I could not think of a better company to be an intern at. Lastly, thanks to all clients of Innovencio that were voluntarily willing to participate in my research.

ABSTRACT

Innovation is crucial for firm performance and society at large. Small and medium enterprises (SMEs) are often seen as the backbone of our economy, yet they are relatively likely to face innovation-hampering resource scarcity. An effective way to overcome this is to collaborate with other companies and knowledge institutes. However, little research has been done on the accuracy of SME's expectations in this respect. Early signs show discrepancies between expected and realised benefits, which creates ambiguity around the actual benefits of collaborative innovation. Finding clarification around the expectation-realisation discrepancy and the factors that create this discrepancy might lead to more effective collaborative innovation. To study this, an exploratory research design is applied in the context of Dutch policy-supported collaborative innovation projects. A total of 15 project participants have been interviewed about expected and realised benefits and factors explaining possible discrepancies.

SMEs participating in policy-supported collaborative innovation projects do primarily participate either because of the required expertise of their partner or to access a new or bigger market segment via their partner. Remarkably, those high-priority expected benefits are not co-occurring. Complementary expected benefits are cheaper, faster, and more environmentally friendly innovation development; knowledge gain; the influx of human capital. In the interviewed population those come in combination with one of the high-priority expected benefits, where knowledge gain and the influx of human capital are solely co-occurring with expertise of the partner. Besides delivering on expected benefits, interviewees from successful projects also report unexpected benefits related to the human capital influx, knowledge gain and access to new or bigger markets are present in successful projects. In unsuccessful projects, unmet expectations mainly relate to cheaper and faster innovation and partners' expertise. External, technological, motivational, and contractual factors might create this discrepancy. The findings suggest that successful collaborative innovation can be realised through trust, an open work environment, the right motivation, and selecting a competent partner in the first place.

Considering the results might clarify what SMEs can realistically expect from collaborative innovation, which avoids under- or overestimations by SMEs, intermediary institutions, and governments. To account for hindsight bias, future research can extend the current study by following projects from the moment they emerge. Moreover, more correlative and causal relationships between company characteristics, expectations, and expectation-realisation discrepancies need to be researched.

EXECUTIVE SUMMARY

SMEs face resource scarcity that hampers their innovation performance. Collaborative innovation can overcome this scarcity and increase innovation performance. Discrepancies in SMEs' expectations and realisations of the benefits of policy-supported collaborative innovation, lead to a sub-optimal decision-making process for SMEs on whether or not to participate in collaborative innovation projects. As collaborative innovation is one of the best solutions to overcome resource scarcity, it is necessary to find SMEs' reasoning for participation in such projects. This data can be used by Innovencio, which consults SMEs in their subsidy application for collaborative innovation projects to better advise their clients and generate more successful collaborative innovation projects. Obtaining data to find clarification on this topic is done by interviewing 15 managers of SMEs that have run a policy-supported collaborative innovation project.

Analysation of the data obtained from the interviews revealed that SMEs do apply for a subsidy because of the financial support. Moreover, the goal of the projects is to innovate and increase the firm's performance. Aside from the subsidy and the goal, SMEs seem to participate in collaborative innovation projects because of two high-priority expected benefits, namely overcoming the lack of expertise and getting access to a new market segment to exploit innovations. Those expected benefits do not co-occur in the same project. Further, five complementary expected benefits are found. Cheaper, faster and more environmentally friendly innovation development, influx of human capital, and knowledge gain are complementary expected benefits.

Not all expected benefits are realised in collaborative innovation projects, which more often leads to an unsuccessful project outcome. The expected cheaper and faster innovation development was not always realised, just as the expected beneficial expertise of the partner. Those discrepancies might originate from external, motivational, contractual or technological factors. On the contrary, some realised benefits were not even expected before starting the project, which more often seems to end in a successful project outcome. This discrepancy might originate from biases and lower expenses. Also, a non-discrepancy between expected benefits and realised ones leads to more often leads to a successful project outcome.

Successful collaborative innovation have higher levels of trust, motivation, capabilities and an open environment. Thus, those factors can be seen as potential success factor of collaborative innovation. More specifically, in successful collaborative innovation projects, subsidies are not the driver of collaboration but rather a helping hand. Moreover, a personal connection between the partners builds a high level of trust, which could be realised by contractual agreements as well. Also, an open environment creates the best environment for knowledge exchange and future collaborative innovation projects. Eventually, a competent partner leads to better innovation development.

Mapping the expected and realised benefits of SMEs on collaborative innovation leads to an understanding of SMEs' decision-making process towards, and beliefs on collaborative innovation. The discrepancies and factors give insight into the flaws of reasoning of the SMEs, which could be prevented when known beforehand. However, it should be noted that these results should be further researched.

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1 INTRODUCTION

Innovation is important for companies as well as for society: it is crucial for our current and future economic growth (OECD, 2003), increased well-being (Sacks, 2010), communication and education (World Bank, 2016), and environmental sustainability (De Marchi, 2012). A common definition of innovation is the improvement of a variety of possibilities, which can be based on e.g. the improvement of efficiency, performance, or cost reduction. Novelty on such accounts can be obtained by a wide variety of approaches, ranging from responding to market forces to a proactive approach and aligning internal forces (Leiringer, 2003).

Innovation in the context of large organisations has been studied more than in the Small- and Medium-sized Enterprise (SME) context (Forsman, 2011). Since SMEs differ in characteristics as opposed to large companies, specificity in the SME context is necessary to understand the drivers of SME innovation capability. On the one hand, SMEs differ in resource availability, making it harder to innovate (European Commission, 2007; Parker, 2009). According to the Resource Based View (RBV) strategically allocating resources creates a competitive advantage (Barney, 1991). Therefore, the resource-scarce position of SMEs might lead to less competitive advantage and firm performance. On the other hand, SMEs are often flat and flexible structured organisations, which could be beneficial when aiming to adopt new and creative innovative strategies (Hudson, 2001; Rothwell, 1991; Almeida, 1997; Jenkins, 2009). Overall, however, SMEs typically possess firm characteristics that hamper innovation performance relatively more than their bigger counterparts (Woschke, 2017). Yet, innovation is deemed the most important capability for firm performance (O'Cass & Sok, 2014; Oura, Ziber, & Lopes, 2016; Zhang & Hartley, 2018), making innovation crucial for SMEs' success. This also legitimises policy support for SME innovation.¹

Collaboration is seen as a major driver for SMEs to innovate (Keizer, 2002). According to the Relational View, collaboration helps to find unique resource combinations which create a competitive advantage over companies that do not collaborate (Wong, 2011). Finding unique resource combinations may successfully compensate for SME's lacking financial capital, human capital, and managerial capabilities (Jørgensen, 2010). Eventually, collaborative innovation is among others linked to increased productivity, increased number of patents, increased market impact, and increased human capital (Hilkenmeier, 2021). Moreover, absorptive capacity is necessary to efficiently use the knowledge spillovers that come with collaborative innovation (Zahra, 2002). Yet, trust, communicative capabilities, and commitment are necessary to reap the benefits of collaborative innovation (Blomqvist, 2006).

The understanding of potential benefits often represents the goals and motives of SMEs, which could lead to more successful collaborative innovation (Frankel, Whipple, & Frayer, 1996). Nevertheless, the current poor understanding of the potential benefits potentially leads to a societally suboptimal level of SME involvement in collaborative innovation and to more less-successful projects. Moreover, it seems that those expectations are not always met. Realised benefits might not always be similar to the expected benefits. The expectation-realisation discrepancy in collaborative innovation projects has hardly been researched yet (Corsaro, Cantù, & Tunisi, 2012). Some early signs of why this discrepancy might occur are found in other research disciplines. The phenomenon might be there because of valuation uncertainty (Lin & Pervan, 2003) or cognitive biases (Das & Teng, 1999). Further, this discrepancy might differ for various types of innovation (Triguero, Moreno-Mondéjar, & Davia, 2013) or the type of policy instrument (Könnölä & Unruh, 2007) that is being used to financially support a collaborative innovation

¹ The idea that the lack of capabilities or resources can be overcome by different policy instruments goes way back (Arrow, 2015). Given the fact that policy makers can influence innovation through policy interventions, like tax benefits, innovation credits, grants, or stimulating collaboration networks, governments play a key role in driving the development and application of new products, processes or services. Some of such policies may be devoted to the interface of collaboration on the one hand, and SMEs on the other hand. These policies are typically motivated by the idea that SMEs are by themselves not able or willing to collaborate, while they in fact might experience benefits from doing so. It is for this reason that a company (Innovencio) helping SMEs to find new opportunities in collaborative innovation via policy-supported instruments is connected to this research.

project. How and why this discrepancy emerges and whether or not this discrepancy leads to problematic situations is not clear. To examine this phenomenon, the following research question is posed:

“How and why do the expected vs. realised benefits of SME participation in collaborative innovation projects differ?”

The potential benefits themselves can be deduced from literature research and be compared to the expected benefits from the interviewees. However, to understand why realisations might differ from expectations, an explorative research design will be adopted. In-depth knowledge about the coherence between multiple benefits and possible moderating factors will be obtained from 15 interviews with SME entrepreneurs involved in collaborative innovation projects. The findings add to the currently available literature on SME collaborative innovation in a way that a comprehensive list of benefits of collaborative innovation for SMEs is formulated. Moreover, the importance of the factors creating the expectation-realisation discrepancy are mapped. Finally, this information gives SMEs, policy-makers, and intermediary institutions working on collaborative innovation a more complete understanding of collaborative innovation. This helps optimising the decision-making process for SMEs, which creates the right motives and expectations of collaborative innovation. Moreover, intermediary institutions and governments might optimise the collaborative innovation circumstances and policy.

2 THEORY

The literature review starts by outlining the research field on collaborative innovation for SMEs, in section 2.1. Zooming in on the core topic of this research proposal, the benefits for SMEs to perform collaborative innovation are discussed in section 2.2. Section 2.3 dives deeper into the possibility of SMEs ultimately experiencing different benefits than the ones expected before participating in collaborative innovation. Finally, section 2.4 discusses various factors that might influence the difference between expected and realised benefits. Together, these sections eventually lead to the conceptual framework discussed in section 2.5.

2.1 COLLABORATIVE INNOVATION

2.1.1 Collaborative innovation – an introduction

It is long known that organisations do not innovate in isolation (Propris, 2002). During the eighties and nineties, research on collaborative innovation started. Back then the concept was seen as a tool to increase the competitive market position (Harrigan, 1985). Later, sharing of costs and benefits of innovation (Celeste, 1996), and diversifying towards new unknown business areas were added to the expected outcomes (Glaister & Buckley, 1996). Organisations collaborate internally and externally by, respectively, using multiple internal departments ranging from marketing to R&D and by collaboration with external organisations ranging from customers to competitors. The European Commission (2017) says that half of the SMEs already work in collaborative innovation. Multiple authors underlined the fact that companies focusing on collaboration are performing better. For example, (Brouwer, 1999) was one of the first to find that propensity to patent is higher in firms that focus on R&D collaboration as well.

Firms' external networks have grown over the years to a cornerstone of the firm's technological strategy (Duysters, 1999). According to the Relational View, firms that combine resources in unique ways might create relational rents that create a competitive advantage over those that act individually (Wong, 2011). Collaboration is performed by SMEs to exploit economies of scale, gain low-cost entry into a new market, learn from competitors, manage uncertainty, and manage costs and risks (Barney & Hesterly, 1996). Increased productivity, sales growth, increased number of patents, increased market impact, more R&D projects, increased human capital, and many more are seen as positive outcomes that come with collaborative innovation (Hilkenmeier, 2021). Those outcomes are mainly realised by increased resource availability (Dittrich & Duysters), increased absorptive capacity (Hilkenmeier, 2021), and finding the 'right' collaborating partner (Hilkenmeier, 2021).

On the contrary, literature poses interesting drawbacks associated with collaborative innovation and R&D. First, there are the costs of searching for partners, building up trust, and coordinating and monitoring projects (Hottenrott, 2016). Those increased costs do not fit the picture of the transaction costs theory that tries to minimise the sum of production and transaction costs. Moreover, the spreading of knowledge is a positive aspect for the collective, however, it might be counterproductive for single actors. Thereby, the risk of opportunistic or free-riding behavior of one actor cannot be ignored.

2.1.2 Potential success factors for collaborative innovation

The rapidly changing and dynamic markets that companies are working in, make sure that external incentives, like financial gain, alone are not sufficient for successful collaboration (Blomqvist, 2006). A lack of tradition, bad past experiences, large power asymmetries, lack of mutual trust, uncertainty about the distribution of costs and benefits, and failure of managing risks are seen as drawbacks to collaborative innovation (Gray, 1989; Ansell, 2007). However, scholars do believe collaborative innovation is potentially beneficial to SMEs when done in the right environment and with the right partner.

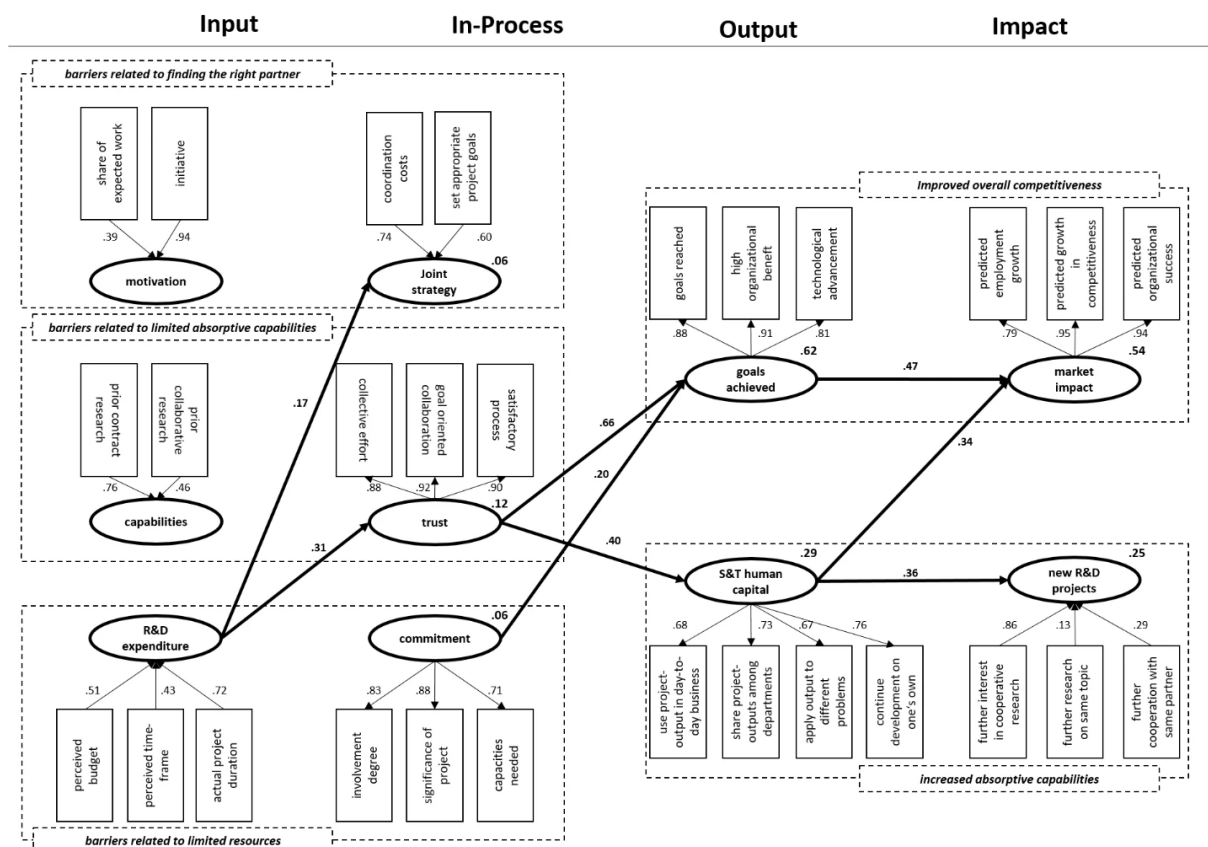


Figure 1: Summary of collaborative innovation process in SME-knowledge institution collaborations (Hilkenmeier, 2021)

Collaborative innovation can be seen as a form of social interaction. This logically means that the concept cannot be considered without interaction with other parties. Collaboration in this specific context can be seen as voluntary. Therefore, internal motivators for collaboration, like trust, communication, and commitment are pressing for successful collaboration (Blomqvist, 2006). Frankel and colleagues (1996) underline this with the finding that successful collaboration is regardless of whether or not formal written contracts were included in a collaboration.

Idea creation and dissemination comprise the first step in innovation. For this step trust, communication and commitments are seen as success factors. The second step comprises the transformation of an idea into something valuable and new. In this second step, intensive exchange of resources, like knowledge is necessary to achieve a mutually beneficial innovation goal within a limited period (Liu L. C., 2015; Graça, 2017). Even more, some say knowledge sharing is the most important driver for collaborative innovation (Bogers, 2012). Although knowledge access is deemed important, some mention that intensive exchange of knowledge is only beneficial if the company can use and process this knowledge by their absorptive capacity. This is necessary to efficiently use available knowledge and transform this into an innovation (Zahra, 2002). Najafi-Tavani and colleagues (2018) show the dependency on absorptive capacity as a means for successful collaborative innovation. This indicates that having internal capabilities to capitalise on external resources is crucial for innovative capacity in collaborative firms. This logically adds to one of the main contributors of collaboration, namely tapping into accessible knowledge and information resources that exist at the partners' site (Luzzini, Caniato, Essig, & Ronchi, 2015).

Hilkenmeier and colleagues (2021) combined this information into a conceptual model (see Figure 1). They believe that SMEs can improve their overall competitiveness and absorptive capabilities by overcoming the barriers of not being able to find the right partner, having limited absorptive capacity, and possessing limited resources. Although they proposed a tested conceptual framework of the

effectiveness of SMEs' collaborative innovation, the framework holds for SME-knowledge institution-relationships, which is only one form of collaboration innovation among SMEs. Moreover, the underlying benefits of collaborative innovation are still to be researched (Hilkenmeier, 2021; Wang, 2020).

2.2 POTENTIAL BENEFITS OF COLLABORATIVE INNOVATION

As benefits might represent the firms' goals for collaborative innovation, they might form the fundament for successful collaborative innovation (Frankel, Whipple, & Frayer, 1996). Franco and colleagues (2003) formulated fifteen potential benefits and tested them amongst several Portuguese SMEs. Moreover, they used a principal components factor analysis to find overarching factors. Since Franco and colleagues did test the factors they used, the same division of factors is used in this study. The following factors are categorised based on this study (Franco, 2003)

- F1: Innovation and organisational learning: coordination of activities and a close relationship of collaborating firms are of importance to intensify knowledge exchange
- F2: Development and market power: entering new or foreign markets is in general expensive, difficult, and time-consuming, yet this could be eased by collaboration (Contractor & Lorange, 1988)
- F3: Resource dependence: resources that are otherwise not available to a company working in isolation do become available while collaborating.
- F4: Risks and costs sharing: more efficient cost structures or reducing uncertainty because of collaboration might increase innovation capabilities.
- F5: To reinforce production capacity: focusing on own resources and competencies reduces excesses in production processes (Roig, 1989).

Linked to those factors are the set of fifteen benefits to collaborative innovation. Those can be found in table 1. Some benefits were added to the list of Franco and colleagues. Narula (2004) tested collaborative-related motives in the hardware industry and found six, mainly overlapping motives that can be seen as perceived benefits for collaboration. Those are: 1) reduction of costs, 2) reduction of risks, 3) reduction of innovation time, 4) access to markets, 5) access to complementary technology, and 6) setting standards. Those six benefits are combined with the fifteen benefits of Franco and colleagues in table 1. Moreover, the World Economic Forum (WEF) (2015) found several interesting benefits for

Factors	Potential benefits	Source
F1. Innovation and organisational learning	To improve the level of innovation / successful scaling up innovation	Franco (2003) / WEF (2015)
	To share resources and competencies	Franco (2003)
	To improve the quality	Franco (2003)
	To achieve some experience	Franco (2003) / WEF (2015)
	Technology transfer	Franco (2003)
	To foment the learning process	Franco (2003)
	To obtain regulatory knowledge	WEF (2015)
F2. Development of market power	Entering new markets	Franco (2003) / Narula (2004)
F3. Resource dependence	Facilitate international expansion	Franco (2003)
	Faster payback on investment	Franco (2003)
	To share superiors and techniques staff / hiring qualified and relevant human resources	Franco (2003) / WEF (2015)
	To obtain financing	Franco (2003) / WEF (2015)
	Access to complementary technology	Narula (2004)
F4. Risk and cost-sharing	To obtain value networks	WEF (2015)
	To create economies of scale	Franco (2003)
	Risk sharing	Franco (2003) / Narula (2004)
	To reduce costs	Narula (2004)

F5. To reinforce production capacity	To increase production capacity	Franco (2003)
	To improve the lead times	Franco (2003)
	Reduction of innovation time	Narula (2004)
	Setting standards	Narula (2004)

Table 1: Potential benefits of SME collaborative innovation derived from literature

SMEs to collaborate with large, established companies. These are 1) successful scaling up innovation, 2) achieving some experience, 3) obtaining regulatory knowledge, and 4) obtaining financing. Those four benefits are added to table two as well.

2.3 EXPECTATIONS VERSUS REALISATIONS

Lin & Pervan (2003) found that organisations have difficulties identifying the “right” benefits upfront. The inability to value different benefits as they are might hinder the decision-making process to collaboratively innovate. Uncertainty and a lack of information about certain beneficial factors negatively influence the decision-making process (Kochenderfer, 2015). This might lead to several problematic situations in which; 1. companies underestimated the expected benefits and thus refrain from (societally desirable) activities, 2. companies overestimate the expected benefits and become disappointed afterward, which might undermine their willingness to engage in collaborative innovation projects again. Expectations might differ from reality because of several factors described below. The factors are closely related to each other and have strong links to the field of psychology. Moreover, this section is here to highlight the possible differences between expected benefits and realised benefits and will therefore only be shortly touched upon.

Valuations are about judgments and determining the hypothetical ‘price’. Valuations are hard to measure and valuation uncertainty is a real challenge in economics (Torfing, 2019). Because of those uncertainties, reality might not always turn out the way expected. Expectations can be defined as those that are regarded as likely to happen. Reality, on the other hand, can be defined as the state of things as they exist. Collaborative innovation has some possible benefits as can be seen in table 1. Partly because of valuation uncertainty those benefits can be expected differently than they are realised.

Moreover, cognitive biases and heuristics, which run unconsciously, create differences in expectations versus reality (Das & Teng, 1999). Expectations strongly influence the way we perceive the world (de Lange *et al.* 2018) and our brains try to predict how the world works based on past experiences. Normally, expectations help people to predict what is going to happen and therefore ease our stress levels (Epel, *et al.*, 2018), which is seen as a highly beneficial function throughout evolution. However, this same function indirectly creates biases and heuristics as well (Sterzer, Frith, & Petrovic, 2008). Those biases and heuristics arise from prior knowledge which thus influences our perception. Koza & Dant (2007) note that partners are biased about their own and partner’s role within collaborative innovation activities based on earlier experiences. According to Busenits & Barney (1997, p. 12), “biases and heuristics are decision rules, cognitive mechanisms and subjective opinion that can make a search process more efficient”. Biases and heuristics are dependent on decision uncertainty and complexity and could be the right strategy to deal with these situations. Biases and heuristics try to answer the questions that arise with uncertain and complex situations and shape our expectations.

Humans are still deciding on the strategy of the firm, and whether to collaboratively innovate or not. Some examples of biases and heuristics are overconfidence and representativeness, which are common for entrepreneurs (Specht, 2002). One’s cognitive biases might lead to different interpretations and decision-making than another. Expected benefits might thus not work out like realised ones because of individual perception and this plays a role in the differences between expected benefits versus realised ones.

2.4 FACTORS POTENTIALLY INFLUENCING BENEFIT EXPECTATION- REALISATION DISCREPANCIES

Multiple factors might be influencing the collaborative innovation process. Those factors are not yet researched in a collaborative innovation context, however, with the explorative approach of this research, those factors will be researched. Current literature already shows some signs of factors that potentially influence the discrepancy between benefit expectation and realisation. Those factors could be influencing the discrepancies since they provide the overestimation or underestimation of the benefits that are possible to be realised.

2.4.1 Types of innovation

Innovation itself is a rather broad and unfocused terminology. It can happen on multiple levels of the firm and multiple more specific innovation types are known, like product innovation (Dougherty, 1992), process innovation (Davenport, 1994), business model innovation (Crossan, 2010), and strategic innovation (Tushman M. &, 2004). Those distinct types of innovation do have their driving forces. For example, it is known that supply-side factors seem to be more important for process and organisational innovations than for product innovations in sustainability-related industries (Triguero, Moreno-Mondéjar, & Davia, 2013). Therefore, R&D-intensive companies, which do more fundamental research, technology development, pre-development activities, and product- and process development, could face different potential benefits than non-R&D-intensive companies, which are more focused on product and market introduction (Specht, 2002).

2.4.2 Policy instruments

Governments in most of the Western European countries have recognised the need for supporting 'their' firms to stay innovative and created various policy instruments (Tiwari, 2007). This form of targeted policy support eases the resource constraints of SMEs (Foreman-Peck, 2013); (Hewitt-Dundas, 2009). Policy support was often focused on creating financial incentives for SMEs to innovate; however, literature questioned the effectiveness of only financially compensating SMEs to boost their innovation capability (Birchall, Chanaron, & Soderquist, 1996). Therefore, some argue that public bodies must use different kinds of policy instruments that focus on stimulating collaboration networks, explorative activities, and the creation of organisational capabilities to increase radical innovation as well as incremental innovation (Könnölä & Unruh, 2007). Thus, distinct types of instruments may be influencing collaborative innovation and could be seen as a factor that explains the discrepancy between expectation and realisation.

2.5 CONCEPTUAL FRAMEWORK

A literature review allowed the identification of the most prominent collaborative innovation theories, more specifically for SMEs, differences in expectations and reality, and possible moderating factors. The concepts of these theories are integrated into a novel conceptual framework (see figure 2). It became apparent that the benefits of collaborative innovation lie in five factors, namely: innovation and organisational learning, development of market power, resource dependence, risk and cost-sharing, and reinforcing production capacity. Those five overlapping factors combine multiple benefits that are not visualised in this conceptual framework. Yet, those factors can be found in table 1.

The conceptual framework can be read from left to right. On the left hand, the expected situation is visualised. The white arrow visualises the process of collaborative innovation. On the right hand, the realised situation is depicted. A comparison between the expected situation and the realised situation will be made to answer the research question.

Moreover, the black arrow visualises the unknown factors that might influence the expectation-realisation discrepancy of collaborative innovation. Multiple factors could be of influence, like the different types of innovation or different policy instruments. Yet, more factors that could be of influence will be studied via an explorative research method. The whole process finds itself within the boundaries of a policy-supported environment. Public bodies formulate a set of instruments that support collaborative innovation. Because of this specific environment, a certain level of collaborative innovation is assured.

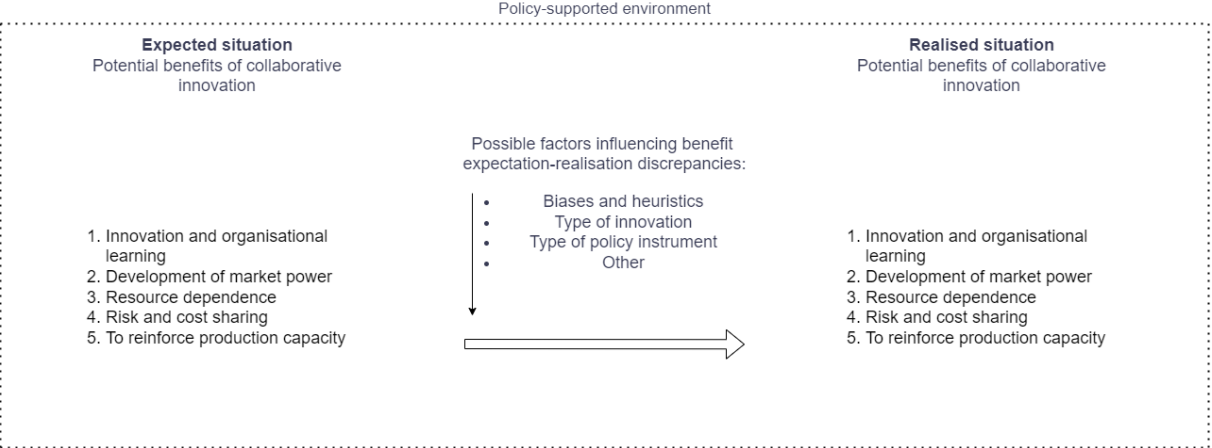


Figure 2: Conceptual framework

3 METHODOLOGY

This study explores the differences between the expected versus realised drivers of SME collaborative innovation are, and how they can be explained. Section 3.1 describes the empirical background of this study, including the motivation for collaborating with Innovencio. Subsequently, the research design, data collection and analysis, operationalisation, and sampling strategy are explained.

3.1 BACKGROUND

Innovencio is an innovation consultancy company that works as an intermediary for subsidy applications. Companies are often missing the expertise, experience, or resources to do the subsidy applications themselves, therefore they come to Innovencio. After a decade of advising in subsidies for innovation and sustainability-related topics, Innovencio established itself in this related network of actors. Collaborating with Innovencio allows for a sufficient amount of willing participants to participate in this study. The collaboration with Innovencio creates the notion to mention that the scope of this research lies within the boundaries of the Dutch policy-supported collaborative innovation market, in which Innovencio is working.

INTERVIEWEE (#)	ROLE WITHIN COMPANY	TYPE OF COMPANY	SECTOR/ INDUSTRY
1	Director	SME	Medical Equipment Manufacturing
2	Director	SME	Food & Beverages Manufacturing
3	CEO	SME	Shipbuilding
4	CFO	SME	Environmental Services
5	Project lead innovation	SME	Industrial Machinery Manufacturing
6	CEO	SME	Industrial Machinery Manufacturing
7	Director	SME	IT Service & Consulting
8	Manager	SME	Renewable Energy Semiconductor Manufacturing
9	Co-founder	SME	Medical Equipment Manufacturing
10	CEO	SME	Computer & Electronics Manufacturing
11	CEO	SME	Medical Equipment Manufacturing
12	Director	SME	Chemical Manufacturing
13	Director	SME	IT Service & Consulting
14	CFO	SME	Motor Vehicle Parts Manufacturing
15	Director	SME	Shipbuilding

Table 2: Interviewee selection

3.2 RESEARCH DESIGN

The goal of this study was to find insights into the reasoning of entrepreneurs regarding whether to start a collaborative innovation project or not. This was ought to be done by finding their expectation around the benefits of such a project. Moreover, by finding the realised benefits as well, discrepancies between those expectations and realisations were mapped. The factors causing those discrepancies were ought to be found as well.

To answer the research question, potential benefits for SME collaborative innovation were deduced by theories of multiple scholars. Explanatory factors that might create discrepancies between expectations and realisations were tried to be found in a explorative way based on multiple theories. This was done by literature research that has been performed to find the potential benefits of collaborative innovation. This literature has been used to create a list of benefits, which were sub-divided into five factors of collaborative innovation (see table 1). Moreover, the desk research formulated the foundation of the research design, which was used to create the conceptual framework. This conceptual framework gave a visualised overview of the research. This was integrated into a conceptual framework, which can be found in figure 2. A conceptual framework explains the path of research and ground it in theoretical constructs (Adom, Hussein & Agyem, 2018). Within this conceptual framework, the existing theories that support the topic of the research are visualised. This framework has functioned as a guide in connecting the research to the existing theory and to answering the research question.

Possible explanations for the research question were found by obtained data. In-depth data can be obtained by qualitative research (Bryman, 2012). The data for this research was obtained via a developed interview guide, which was based on the existing theories around the topic. Questions regarding the expectation of the project, as well as realisations after the project were asked to map the thought process of the interviewee before and during the project. Moreover, those questions ought to find factors creating discrepancies between the expectations and realisation. The full interview guide can be found in Appendix A. To goal of this interview was to exploratively find a possible explanation of the factors creating discrepancies between the expected benefits that were linked to collaborative innovation and the benefits that were realised afterward. Explorative research has an open character and tries to generate initial insights which can be further researched afterwards (Marlow, 2005).

3.3 SAMPLING STRATEGY

A non-probability approach opted as a sampling strategy for explorative research. Logically, not every individual had an equal chance of participating in this research since there is no need for generalisability for a complete population (Brick, 2014). The focus lied on a specific sample and a real-life phenomenon ought the be researched (Yin, 2003). Individuals with specific characteristics needed to be the topic of the research since a low understanding of a certain topic was ought to be increased. A specific population was interviewed based on a purposeful sampling strategy. Depending on Innovencio's network, participation in collaborative innovation projects, and willingness to participate in the research, respondents was chosen. Purposive sampling strategies are non-random and try to guarantee a specific representation of particular characteristics in the final sample of the research (Robinson, 2014). Specific viewpoints and understanding of the to-be-researched topic were ensured because of purposive sampling (Mason, 2002). Moreover, individuals were voluntarily interviewed. Table 2 gives an overview of the interviewees, sample size, role of the interviewees within the company, type of company, and the industry the company is operating in.

Adequate sample size is necessary to overcome errors and biases of individuals (Taherdoost, 2016). According to Braun and Clarke, twelve respondents are sufficient for theoretical saturation while performing qualitative research (Braun & Clarke, 2013). Therefore, this number was reached and even increased by executing fifteen interviews.

3.4 DATA COLLECTION AND ANALYSIS

The data for this research was collected via interviewing the interviewees of the sampling size. An interview guide was formed to discover the thought patterns of the interviewees around the topics of collaborative innovation. More specifically, the interview guide was the roadmap to find data around the expected benefits of collaborative innovation, the realised benefits, discrepancies between, those, and, possible factors that might influence the discrepancies between expected and realised benefits.

Coding scheme		
Parental node	Child node	Sub-child node
Expected benefits		
	Access to bigger market segment	
	Cheaper innovation realisation	
	Faster innovation realisation	
	Influx of human capital	
	Knowledge gain	
	More environmentally friendly	
	Benefitting from partner's expertise	
Realised benefits		
	Access to bigger market segment	
	Knowledge gain	
	Benefitting from partner's expertise	
	Human capital influx	
Factors influencing discrepancies		
	Contractual factors	
	External factors	Covid-19
		Obtaining medical certificat
		Bankrupt partner
	Motivational factors	Material scarcity
		Goal
	Technological factors	Priority
		Technological difficulties
	Biases	Partner's capabilities
Potential success factors for collaborative innovation		
	Clear agreements	
	Clear point of disconnection	
	Expectation management	
	Good access to elaborate network	
	Location	
	Low number of partners	
	Managerial capabilities	
	No competition	
	Open atmosphere	
	Partner's expertise	
	Personal relationships with partner	
	Possibility to work independent	
	Shared goals	
	Subsidy should not be the driver	

Table 3: Summarized coding scheme derived from NVIVO

The interviews were recorded and transcribed by the interviewer. Recording of the interviews was made with the consent of the interviewee since the interviewees participated voluntarily. For the data analysis NVivo software was used. According to Bryman (2012) NVivo, which can be used as a tool for assistance in processing qualitative data, is one of the most significant improvements in qualitative research. For data analysis in NVivo, three main categories, or parental nodes were created. Those nodes represent those categories that were expected to find data, based on the research design. "A node is a collection of references about a specific theme, case or relationship." (QSR International). Those nodes were; expected benefits realised benefits, and factors influencing discrepancies. For the first two nodes, non-hierarchical organised nodes were used. For the last one, a hierarchical node was used. Connected to those nodes were the child nodes that were derived from the interview transcriptions. Those child nodes were given the name of the

overarching theme of the quotes (e.g. for the code "access to bigger market segment" a quote like "you do this together with a potential customer to create new exploitation channels" was used). Child nodes were in the case of the parental node 'factors influencing discrepancies' link to sub-child codes. The data analysis of this research was an iterative process, in which the codes are repeatedly revisited by going back and forth in the data and using the theory (Kekeya, 2016). A complete overview of the coding scheme can be found in table 3.

3.5 OPERATIONALISATION

To measure the expected and realised benefits of SMEs, those first were needed to be identified. For this research, the benefits were derived from the literature. The conceptual framework of this study (see figure 2) was operationalised into a list of benefits.

An interview guide was developed, through which a more in-depth view of the benefits was ought to be generated via the data obtained via experiences of experts. 15 interviews were held to increase exploratory power. Those 15 interviewees were all working in SMEs that were working on a subsidy called the MIT R&D. The desk research allowed semi-structured interviews to be formulated. First general questions were asked to create an informal atmosphere in which the interviewees felt comfortable talking. Eventually, insights into the expectations, and progress of the project were discussed. Also, the in-depth analysis, the differences, and interconnectedness of the expected and realised benefits were analysed. Possible factors influencing the expectation-realisation discrepancies were researched. Moreover, possible success factors of collaborative innovation were ought to be found and connected to the discrepancies. The interview guide provided the base for the interviews. Interviews were recorded with the consent of the interviewee and were optionally anonymised. Transcriptions of the interviews allowed finding connections between overlapping themes, which eventually were linked to the theoretical framework and other theories.

The participants of the interview were SMEs that partner or have partnered with Innovencio. Via Innovencio it was easier to find SMEs that were willing to participate in this study because of the professional connection.

The transcriptions of the interview were analysed with NVIVO. This helped to highlight or code certain sentences that were important for the understanding of the data as a whole. The codes were categorised as highlighted in the conceptual framework. By doing so the overview of expected benefits, factors influencing the discrepancy between expectation and realisation, and success factors for successful collaborative innovation were structured. Moreover, an overview of all interviews was created as the starting point for the results section. The software allowed for linking the codes to individual interviewees, making sure specific data remained connected to certain individual cases.

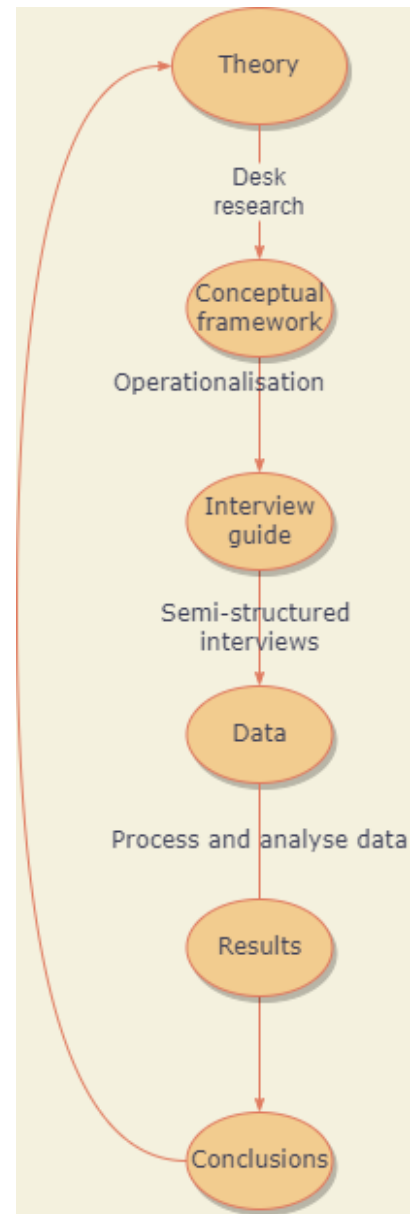


Figure 3: Research design

4 RESULTS

In this section, the findings of this research will be discussed. The findings are derived from the data of the interviewees' insights. The section will start with a combination of the expected benefits of collaborative innovation, which will give insights into the beforehand situation. Afterward, the discrepancies between the expected and realised situation will be highlighted. The discrepancies will be highlighted and factors explaining these discrepancies were linked to those. This final section shortly touches upon some characteristics of successful collaborative innovation.

4.1 EXPECTED BENEFITS OF COLLABORATIVE INNOVATION

The expected benefits of SMEs entering a collaborative innovation project might create the motives for SMEs to participate in collaborative innovation projects. This stretches the importance of right expectation management for effective collaborative innovation.

Generally, there are seven observed expected benefits of collaborative innovation projects. However, two of them are primarily occurring. There seems to be a division between SMEs who are participating in collaborative innovation with the expectation that a partner is beneficial for the technical development of the innovation, and those that expect their partner to be beneficial for the commercialisation of the innovation. As those two benefits are vital for the development of this specific innovation project, without those expected benefits, there would be no innovation development and thus no collaborative innovation project.

The remaining five expected benefits are not directly related to the realisation of this specific innovation project, yet they can optimise the process development or the company's position. Further, it is important to mention that interviewees generally mentioned multiple expected benefits per project. The high-priority expected benefits do not co-occur in the same project, while complementary expected benefits do co-occur. Moreover, high-priority expected benefits and complementary expected benefits do co-occur in the same project.

4.1.1 Benefitting from partner's expertise

First, it seems that almost all interviewees talk about the resources scarcity they face. Their expertise is specific, however outside this specific field they tend to have rather little expertise. SMEs tend to stick to their core business strategy since this might be the best strategy to keep their competitive advantage.

“Naturally, we are powerful in building robots. Our quality is better than our competition and eventually, you do not need to do everything on your own. If it essentially does not have to do with the core of a robot, then we should leave it to others” (Interviewee #13).

This is underlined by the RBV, where the reasoning behind the right allocation of resources can lead to a competitive advantage. More specifically, the interviewees find themselves in a situation in which time, human capital and financial capital are scarce. Since both human capital and financial capital are scarce financial capital cannot cover the limited amount of human capital. Therefore, SMEs cannot afford to hire experts or get in-house expertise.

This makes them decide on collaborating with partners that have expertise in those areas the company itself is missing since this saves financial capital that otherwise should be spent on human capital. For example, interviewee #3 was working on an expensive rotating axis that should be able to handle big forces. One of the project partners developed a new production process. The second partner did the stress calculations that allowed them to calculate the stress resistance of the materials to be used. This expertise was not available at the interviewee's site, so the expertise of the partners was a major expected benefit of the collaborative innovation project.

Worth mentioning is a hypothetical situation in which SME's resources are not scarce. In this case, one interviewee mentioned rather investing in human capital himself than collaborating to find external expertise.

“For a start-up, it is impossible to set up twenty different disciplines in-house. Otherwise, you should find someone who gives you 20 million euros and plenty of time to build up a team and learn from it”
(Interviewee #8).

Additionally, in a situation with enough financial resources and time, companies still want to collaborate. However, their expectations shift from benefitting from the expertise of the partner to benefitting from partners' new and innovative ideas. Although large companies are not within the scope of this research, it is interesting to see the motives of participation shift in collaborative innovation when a company matures.

“Philips surely did create this ecosystem [High Tech Campus Eindhoven] for a reason. For them, the presence of start-ups is really important, since Philips' employees are often close-minded. The open-innovation atmosphere can help them find new innovative ideas.” (Interviewee #10).

4.1.2 Access to a bigger market segment

A different expected benefit for collaboration is to access another or bigger market segment via the partner. This could be because the innovation comprises a smaller part of an existing product. Because of this, the partner could be chosen because it already produces the existing product and has market power.

“By partnering with them, we try to develop our innovation quicker and directly have a new market segment to sell to.” (Interviewee #3)

Moreover, some interviewees are not primarily focussing on commercialising or marketing their products on their own. They do innovate and create a product, however, the sector their innovations and product end up in are unknown beforehand. They do partner with a specific company within a specific market segment that seems interesting and worth investing in. By combining the ideas of both partners, the innovation will be suitable for that particular market segment and the partner will make sure it will end up with their customers. The partner will be chosen, based on the potential of the market segment, the market power, and the exploitation channels of the partner. Individually, the SME can develop its products, yet they cannot specify their product sufficiently for a niche market.

“The bigger industries [...] who can offer our solution as a piece of their complete solution to their client and therefore help in exploitation to the market. Someone who can sell the stuff to their clientele. That is what we are looking for more and more.” (Interview #13)

4.1.3 Cheaper creation of innovation

The first complementary expected benefit of collaboration is cheaper innovation development, which compensates for the expensive raw materials, building of prototypes, or technical processes. Raw materials are getting more scarce, which has a direct increasing effect on the prices of the products in the whole supply chain. This is due to several reasons, like external factors, market forces, or new regulations. Those factors create a lower supply of certain resources, making them more scarce and thereby more expensive. Scarcity is a common concept in economics, however, for certain industries, this is a bigger problem than for others. For this reason, SMEs are looking for collaborations in which they can obtain materials via their partner.

“Well, mainly material-wise. Company X is cheaper than the materials that we bought previously. That is the only material that was available at that time, but very expensive.” (Interviewee #4)

Building prototypes is an expensive part of innovation development. When innovating individually, companies need to build their prototypes themselves or via a third party. According to the interviewees,

this could be quite expensive. Partnering up with a company that builds prototypes, allows the company to save costs for innovation development. Like building prototypes, outsourcing any part of the development process could be expensive. Forming a collaboration with a partner that takes on this part of the developing process, could lead to a major decrease in costs for innovation development.

4.1.4 Faster innovation development

Aside from cheaper innovation development, one interviewee named the role of access to testing facilities for the development of the innovation. Their artificial intelligence software can be tested on partners' vehicles. Via collaboration, the SME is granted access to a location that serves as a testing facility for their innovation. In this way, the data collection process is speeded up. Eventually, this data collection is being used for optimising the software.

“Mainly through collaboratively speeding up the product realisation [...] in this way, we try to develop our product as soon as possible.” (Interviewee #3)

Although faster innovation development could potentially be highly beneficiary to a company, this expected benefit was only mentioned by one interviewee.

4.1.5 Knowledge gain

“You will always look for knowledge gain and you always want to know whether or not your partner can reach market success.” (Interviewee #3)

Gaining knowledge from the collaboration is named by multiple interviewees as an expected benefit. As discussed in the theory section, open innovation networks' knowledge sharing is seen as a major benefit since partners together create knowledge spill-overs. Sufficient levels of absorptive capacity can lead to effective use of these spill-overs. Effectively using knowledge spill-overs leads to increased innovation capability. Thus operating in knowledge-sharing networks, like collaborative innovation as well as having sufficient absorptive capacity leads to increased innovation and firm performance. To some scholars, knowledge sharing is the main driver of collaborative innovation. However, free-riding behaviour might be a risk in knowledge sharing. Therefore, some interviewees pledge to agreements about knowledge sharing and the valorisation of knowledge with their partners.

“We have agreements about the valorisation of the results via our company.” (Interviewee #13)

To some scholars, knowledge gain is the most important motive for SMEs to collaboratively innovate. It, therefore, is remarkable that this benefit is not expected by all interviewees. This might be because the interviewees did not think about long-term benefits. The interviewees that had participated in collaborative innovation projects more often were the ones that mentioned knowledge gain as a potential benefit. One interviewee mentioned knowledge gain as a realised benefit, but not an expected benefit. Although his innovation development was not successful, the interviewee did value the knowledge gained during the project. Eventually, knowledge gain is a complementary expected benefit. Although it might contribute to the specific collaborative innovation project, it mainly contributes to organisational-wide performance.

4.1.6 Influx of human capital

The influx of human capital was only named once. Specifically, collaborations with knowledge institutions can lead to an influx of human capital.

“For the influx of knowledge and employees to companies like ours, collaboration with universities are important”. (Interviewee #13)

As mentioned in chapter 4.1.1 SMEs have a resource-scarce position by nature. SMEs often do not have the financial capabilities to hire an employee with specific expertise for a specific project. However, in this case, a collaborative innovation project with a knowledge institution was set up, in which there is

an influx of Ph.D. students that are still on the payroll of the university. To cover this expense for the university agreements on the valorisation of the results of the specific project were made upfront.

The expected benefit ‘influx of human capital’ is co-occurring with the expected benefit ‘need of partner’s expertise’. In both cases, the human capital of the partner is deemed beneficial to the company because of the expertise the partner brings to the collaboration. However, an influx of human capital could be higher valued because of the long-term agreement. The expected benefit ‘need for partner’s expertise’ is project specific, while ‘influx of human capital’ is not since a suitable employee starts working at the partner’s site (as well). Although this expected benefit seems of greater advantage to the company, it might not occur too often since it’s only mutually beneficial in a very specific situation. In this case, it is mutually beneficial in an SME-knowledge institution collaboration, where agreements around knowledge-valorisation are made upfront.

4.1.7 Becoming more environmentally friendly

Interviewee #2 is active in rubber recycling. This SME bought its materials in Denmark, which was expensive due to its transportation costs. By partnering with a Dutch company, they enabled themselves to have access to cheaper materials. Multiple interviewees mentioned the lack of access to (raw) materials. By participating in a collaborative innovation project they obtained access to material via their partner. More specifically, one interviewee mentioned the possibility of getting access to local resources instead of the same kind of resources from another country, making it more environmentally friendly, which he highly valued.

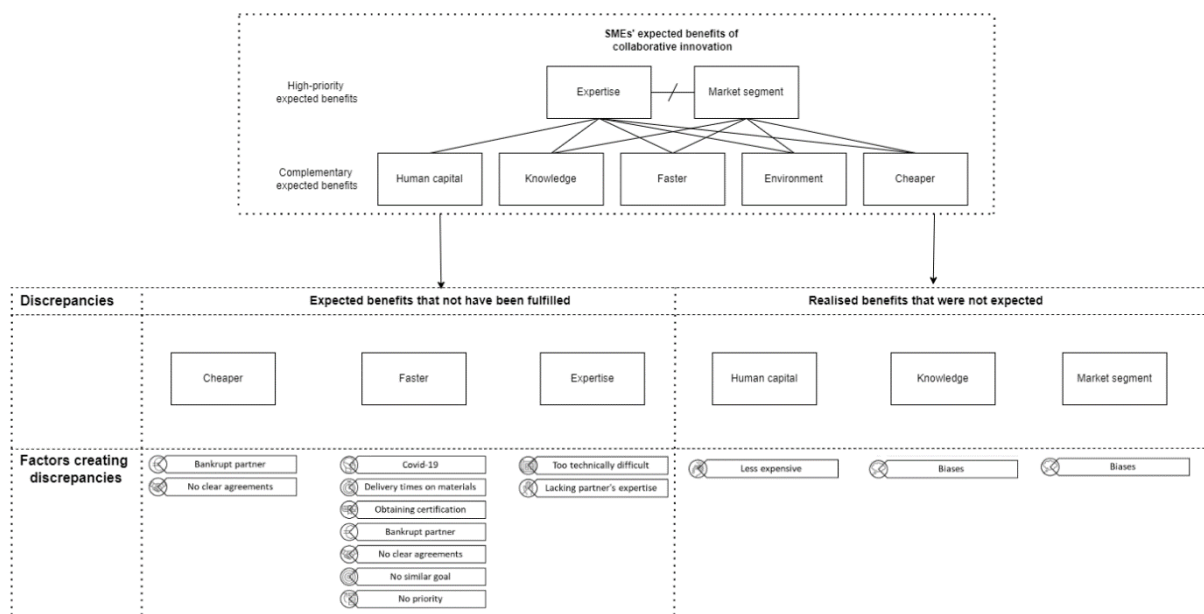


Figure 4: Overview of expected benefits, discrepancies, and factors creating discrepancies

4.2 DISCREPANCIES AND EXPLANATORY FACTORS

In the following section, the expectation-realisation discrepancies are highlighted. It seems that not every expected benefit is different from the realised situation. There seem to be multiple factors that create such a discrepancy. There are two ways in which a discrepancy can be existent, namely expected benefits that have not been fulfilled or realised benefits that were not expected. Both lead to a level of discrepancy (see figure 4). The cases in which realised benefits were not expected, were often found successful projects. This might be due to a more positive outcome than expected, which creates a feeling of success. Moreover, the cases in which expected benefits were realised were deemed successful as well. On the other hand, in projects with expected benefits that have not been fulfilled, the general feeling was that projects were less successful or even unsuccessful. This might be due to a natural feeling of disappointment with an expectation that has not been met, which can create friction,

misunderstanding, and frustration (Brennan, 2021). Feelings of failing might change the before made biases around a topic like collaborative innovation. This could be beneficial for future collaborative innovation projects. However, more problematic is a quick decline in the firm performance of organisations with unrealistic expectations (Littunen, 2000).

Remarkably, cases in which the companies are R&D-intensive do seem to have a more opportune view on the level of success than those companies that are less R&D-intensive. This is probably arranged from the goals of both that is fundamentally different. Companies that are less focussed on R&D do prioritise their current customers often such projects. They sell their services and products and when entering a collaborative innovation project the goal is to produce a new product or service. Opposing are those companies that are continuously innovating and working on an R&D project. Their priority of the collaborative innovation project is higher. Further, more innovation projects are running simultaneously. Their goal is often bigger than the project only. For example, one company's goal is to build autonomous ships. However, this goal is tried to reach by executing multiple follow-up projects which are all parts of this bigger goal. This results in a bigger general feeling of success of a collaborative innovation project than the companies focussing on sole products or services. If a part of the innovation development or R&D has succeeded even if this is not the final goal of the project, the companies tend to be content with the result of the project. For those R&D-intensive companies, it might be that the consequences are lower as well. There is more at stake for the companies that need to develop their product out of this single project. Thus, if the product or service is not developed or commercialised, the feeling of a successful project is little.

In the following section, the factors influencing the discrepancy will be discussed per expected benefit (as discussed in chapter 4.1). The created discrepancy per expected benefit is highlighted. Moreover, a division between expected benefits that have not been fulfilled and realised benefits that have not been expected is highlighted. The possible factors creating this discrepancy will be discussed after each expected benefit.

4.2.1 Expected benefits that have not been fulfilled

An overestimation of an expected benefit might lead to disappointment in the project, which in this case might lead to no participation in future collaborative projects. In the following section the discrepancies in the expected benefits of partner's expertise, cheaper innovation development and faster innovation development are discussed. Note that not for every expected benefit a discrepancy has been found.

4.2.1.1 Partner's expertise

4.2.1.1.1 Higher expectations of partner's expertise than realised

One of the primary expected benefits is benefitting from the partner's expertise, however, this expectation cannot always be realised. On some occasions, partners are not able to fully cover the expected expertise.

"It is a new market and you believe the stories, knowledge, and expertise of the partner. This seemed not to be the case and because of this the result is not reached. This was not as expected."

(Interviewee #2)

In multiple cases, it seems to be happening that the partner is enthusiastic and wants to collaborate with the company, even though their expertise might not be of a sufficient level to finish the project and develop the innovation.

"They (referring to the partner) were enthusiastic and wanted to collaborate. Yet, they could not finish the project. (Interviewee #10)."

There seems to be a level of trust among the companies that are going to collaborate. However, this trust cannot be translated into a decent collaborative innovation project.

“Sometimes, some things seem to be too good to be true. And that seemed to be the case since we were just curious and partnered up. It is a new market and you almost believe all the stories, knowledge, and expertise of the potential partner. Unfortunately, they could not live up to the expectations and the project goals were not reached.” (Interviewee #2).

In both above standing cases, the partner was “really enthusiastic” or it “seems to be too good to be true”. Both cases, found the technological assignment too difficult to execute by the partner. However, this only was found after the project.

“That is the real difficult part, to estimate someone’s competencies. That is why we, eventually, chose another partner.” (Interviewee #10).

The lack of expertise does not lead to the desired goal of finishing the collaborative innovation project in a successful manner where a commercialised product has been reached. However, some interviewees mentioned the lack of expertise not as a real problem. This partly lies in the nature of the subsidy, which creates an obligation to make effort rather than to perform. Moreover, some interviewees see unfinished innovation development as a new challenge. A “failed” collaborative innovation project still had been developed to a certain extent, this development could be used for later innovation development without the original partner.

4.2.1.1.2 Too technically difficult

Aside from a lower level of expertise than expected, there could be inherent uncertainty in the projects as well. Logically, the outcome of an innovative development project is uncertain by nature. This could make the technical assignments more difficult to perform than was expected upfront. The technological difficulty can lie at the partner’s site, however, it might happen at the own site as well. According to this interviewee, the uncertainty of whether or not the technological assignment will succeed is always there in R&D.

“Whether you reach your goals or not, always remains uncertain.” ... “Recently, we had a safety issue with the battery that did not allow us to take our robot to the testing facility. This has to be fixed before we could enter the testing field again.” ... “In that sense, there always are technological uncertainties.” (Interviewee #5).

4.2.1.2 Cheaper innovation development

Another discrepancy was found in the costs of innovation developments. It was mentioned often that projects were more expensive than planned.

“It is in our best interest to successfully finish collaborative innovation projects. I believe that we had two finished projects that both had an overshoot in costs. This is mainly because we did not want to leave an unfinished project and because we proceeded as long as it eventually worked out for us. That is just it, we valued it more to have a finished project” (Interviewee #1).

4.2.1.2.1 Partner went bankrupt

In some cases, the project did not finish with the original partner due to the bankruptcy of the partner. This company “*was in financial troubles without our knowledge, since they did not tell us their situation. In early 2019, this led to the situation that they are made bankrupt.*” (Interviewee #8). A part of the financials was transferred to the to-be-bankrupt partner. This money could not be retrieved from the bankrupt company. This made the financial possibilities for the remainder of the project decrease. While a new partner had to be found the size of the project was somewhat downscaled to make it financially possible. Moreover, the remaining company was keener on finding a financially healthy partner.

4.2.1.2.2 No clear agreements beforehand

Some interviewees mentioned the problematic collaboration due to a lack of clear agreements upfront. Those can mainly be found in the lack of agreed rights about royalties or intellectual property after the

project is finished. If those agreements are not made before the project starts, this leads to a situation in which somewhere during the project the discussion starts. The interviewees mention that this problem cannot be overcome, thus the timing of this discussion is crucial. Eventually, this leads to situations in which the deal is less favourable for the SME and costs do rise, or a situation in which even a judge had to decide on the topic.

4.2.1.3 Faster innovation development

Due to several reasons, the development time of innovation can be longer. Several interviewees mentioned the global pandemic as the cause for delaying the innovation development process. It seems that the factors leading to a discrepancy in the expected benefit of faster innovation development are partly complementary to those of the expected benefit of cheaper innovation development. Though, SMEs seem to value their financial capital more than their time. The coping strategy that has been used by most interviewees is to save their financials by taking more time to develop their innovations

4.2.1.3.1 Covid-19

Multiple factors might be the reason for causing a level of delay in the innovation development or even hinder the innovation development. Since most of the projects took place somewhere between 2019 till 2022, the project developments were executed during the Covid-19 pandemic. During these years of the pandemic, multiple societal lockdowns were called, leading to a lowering of physical human interactions and such. Multiple interviewees mentioned Covid-19 as a burden to collaborative innovation development.

“This [referring to the project] was in the middle of the pandemic, so everything came to a stillstand.”
(Interviewee #8).

This interviewee refers to multiple aspects of the supply chain of the industry he is working in that came to a stillstand.

Multiple interviewees referred to the lack of gatherings and meetings for the progress of the project because of the pandemic. Further, the pandemic was partly responsible for the lack of resources. This combination led to the situation in which online meetings were possible, yet key moments to perform tests for innovation development could not be executed.

“Testing in the field has been difficult for a long time” (Interviewee #3)

“We had to go to England to test our product. That was not possible, unfortunately.” (Interviewee #11)

“A part of the research are the tests we need to perform on users of the prosthesis, that, of course, is not possible on 1.5m distance (referring to one of the government's measures to combat the virus). This led to a major delay.” (Interviewee #1)

4.2.1.3.2 Obtaining certification

Another project took place within the medical industry. The company tried to develop a medical apparatus. However, as the procedure of medical devices took more time than expected, the project was delayed. Moreover, this particular project had to be tested in England, however, due to the Covid-19 pandemic, this could not take place which created another delay in finishing the project. (Interviewee #11)

4.2.1.3.3 Bankrupt partner

As has been mentioned in chapter 4.2.1.2.1, in some cases there was a fear of an actual bankrupt partner. This situation led to a more expensive project. Though, the project timeline was extended as well. The project needed another partner. The recent collaboration led to a hesitant quest for a new partner. The

SME wanted to be sure the new partner was financially healthy. This quest took over half a year, which delayed the project.

4.2.1.3.4 No clear agreements

For the application for an MIT R&D subsidy, multiple documents need to be handed in for assessment. This includes a project plan, however, property rights and royalties are often not discussed. Eventually, this led to a discussion about the royalties during the project. This discussion did not come to an agreement and led to a termination of the collaboration. For this reason, a new partner needed to be found, which took longer than expected.

4.2.1.3.5 No clear goals

Not having set a clear goal, or not making clear to the partner what the goal is, might create a discrepancy between expectation and realisation. Moreover, not having the same goal might lead to problematic situations as well. Interviewee #2 faced a situation, in which the partner only was in the partnership for a financial benefit while the interviewee wanted to solve a technological problem. This led to a major delay in the project. Not having the same goal within the project, might lead to motivational issues. One partner might value the collaboration more than the other, which leads to a sub-optimal project. A lack of clear goals leads to a project which is prone to not made deadlines and an unsuccessful ending.

4.2.1.3.6 No priority

“Look, if the period of project preparation, execution, and evaluation is more than 1.5 years, it could be that the priority of the participating companies might shift. You might be unlucky here.”

(Interviewee #5)

There might be several reasons why priority is shifting during the project. This could be because of current customers that have an emergency call, other possibly commercially viable projects, or practical difficulties (Interviewee #3). A lower priority means less effort in the collaborative innovation project. This happened both at the partner’s site as well as at the company’s site. Regardless of at which site the priority is lower, a disbalance of priority leads to an unnatural situation that delays the progress of the project.

4.2.2 Realised benefits that were not expected

As an overestimation of expected benefits might lead to ineffective collaborative innovation circumstances, so do underestimations. An underestimation of expected benefits might steer the decision-making process of the entrepreneur towards a sub-optimal position in which the company is not willing to participate in collaborative innovation projects. Upfront understanding of the to-be-expected benefits might lead to estimation of the benefits of collaborative innovation and therefore could lead to another consideration about the participation in collaborative innovation projects.

4.2.2.1 Influx of human capital

The resource-scarce nature of SMEs does not allow for hiring specific expertise since it is deemed too expensive. Moreover, drifting from own core strategy and expertise might lead to a lessened competitive advantage. Those characteristics might be the reason why the influx of human capital is not recognised by SMEs. However, one interviewee mentioned the influx of human capital that is of major advantage to the company. Their connection with a knowledge institution leads to a situation in which a human capital influx is exchanged for knowledge valorisation. Possibly because of the specific characteristics in which the influx of human capital is mutually beneficial for both partners, this benefit was not expected. In this specific collaboration, human capital remains on the payroll of the partner, which makes it less expensive to hire an expert for researching a niche topic. Without collaboration, the company could not afford to hire the same human capital.

4.2.2.1.1 Less expensive

Since the agreements upon knowledge valorisation and human capital exchange was discussed beforehand, the SME is able to benefit from the influx of human capital. Normally, this company would not have the financial capabilities to allow for influx of human capital, however the employee is still on the payroll of their partner making it less expensive.

4.2.2.2 Knowledge gain

Knowledge spreading is known as a major benefit of collaborative innovation projects. In many cases, knowledge gain is an expected benefit. Remarkably, knowledge gain is not an expected benefit in all cases. In some cases, knowledge gain is seen as a realised benefit after the project. Aside from the fact whether or not the collaborative innovation project eventually was deemed successful or not, there seems to be a common understanding about the beneficial aspect of the knowledge gained. In the cases in which knowledge gain was not an expected benefit, entrepreneurs found themselves having acted in the unknown market and unknown industries. This formed a realised benefit afterward. Whether or not this knowledge gain leads to a direct benefit for the SME, it helps to better understand unknown markets and brings the experience of collaborative innovation projects that helps to be better prepared for future projects.

4.2.2.2.1 Biases

What really drives this discrepancy remains to be unclear. Though it is clear that this realised benefit was not expected. This could be because of a biases in the expectations about knowledge gain. Apparently, the interviewee did not find himself in a position in which knowledge gain seemed to be beneficial in this specific case. Whether this benefit was known by the interviewee, yet not expected in this specific case, or the interviewee did not thought of a knowledge gain at all, remains unclear.

4.2.2.3 Benefitting from a new or bigger market segment

Benefitting from the market power of the partner is an important factor to overcome the lack of market power of SMEs. However, some interviewees did not expect potential benefits as helpful in this particular project. For example, one interviewee mentioned that their partner sells a certain product. The innovation of the collaboration is complementary to the product, however, selling products with the innovation was not the initial reasoning of the collaborative innovation project.

4.2.2.3.1 Biases

This might be a based on a bias, as no this benefit was not expected by the entrepreneur. The replacing partner was way smaller of size, and had a less extending network than the original partner. Because of the difference in size, the entrepreneur did not expect the new partner to be capable to deliver the same benefits as the original company.

4.3 EXTENSION: POTENTIAL SUCCESS FACTORS OF COLLABORATIVE INNOVATION

While looking at what explains the expectation-realisation discrepancies, we see multiple factors having a positive impact on this phenomenon.

4.3.1 Trust

Successful collaboration starts with a level of trust in the partner and the project. A collaboration built on trust creates a suitable environment for successful collaboration. In essence, collaborative innovation is an unpredictable process that might bring feelings of uncertainty and insecurity. As there can only be guesses about what innovation will look like, it is not assured that the innovation will succeed eventually. In those situations where factual information about the future is missing, having trust in the project might help overcome feelings of doubt and insecurity. Believing in the ability of someone or something might also help overcome the obstacles of the process of collaborative innovation.

“[...] a project like MIT, that takes two years. That is like living together, you are not going to live together after your first Tinder match.” (Interviewee #7)

Most likely, trust is a predictor of successful collaborative innovation if it is built naturally. This can be obtained via an existing relationships with the potential partner. Finding a mutual, trusted connection might help increase the levels of trust as well. Eventually, knowledge about a partner’s existence, capabilities, expertise, and vision and mission helps build this level of trust.

“I believe it is good that Innovencio suggest possible partners. We do not know them by then, but because of the connection and a first acquaintance.” (Interviewee #2)

If trust cannot be built by a personal or mutual connection this should be built externally and should be formulated in a contractual form. Multiple interviewees mentioned a problematic situation during the project in which clear agreements were not made upfront. This led to situations in which discussions about property rights were an ongoing issue during the whole project, up and until the level of terminations of the project and collaborations.

“I learned to always discuss the IP rights upfront. If not, you come to a miserable situation in which the project will not progress” (Interviewee #10)

4.3.2 Open environment

As trust is fundamental to successful collaborative innovation, so is the work environment. Working in an environment with many like-minded people seems to speed up the innovation process.

“You need something that brings it all together. All sorts of companies could be of help for a start-up. A company that develops a specific part, entrepreneurs that have very specific expertise, that you need while working on your start-up. Or maybe an accountant that is specifically focussed on helping start-ups.” (Interviewee #8)

A specific environment is the High Tech Campus in Eindhoven.

“Since you all each other, like in a small village, it helps to speed up the innovation development process. You are all clustered within the same expertise. [...] You get inspired by the open atmosphere that makes you see and talk to so many people”. (Interviewee #10)

There seems to be a kind of mindset which enables altruistic behaviour in which companies are all willing to help each other and share their ideas to improve all innovation.

“All people here just want to help. It is some kind of excessive altruistic behaviour. And later you can help me again”. (Interviewee #10)

Because of this open atmosphere, access to an enormous network of SMEs works as a catalyser as well. Knowledge exchange is done continuously, which leads to a generation of new ideas for innovation an collaboration. Moreover, collaboration with partners at the same geographical location works on the efficiency of the process as well. It saves traveling times and enable entrepreneurs to just enter the office of the partner when necessary, which speeds up the collaboration project as well.

4.3.3 Motivation

The major factors of the distinction between successful vis-à-vis unsuccessful projects seem to be the motivation of the project and the mindset towards the subsidy. In successful projects the subsidy is seen as a tool to obtain innovation, whereas unsuccessful projects used the subsidy as a starting point of the project.

“I believe you should start with having a research project and a partner and eventually look at the subsidy, not the other way around. The subsidy should not be leading. You should not start there and then look for your research goal.” (Interviewee #1)

Moreover, SMEs in successful projects mentioned doing the project regardless of the subsidy.

“I do not start a project because there is a subsidy. I do not collaborate or develop an innovation and then look at the possibilities of subsidising the project. [...] This is usually not how it goes in business. The subsidy always is an add-on and should be looked upon as an extra rather than a necessity. If we do not get the subsidy, the project continues.” (Interviewee #7)

Further, the collaboration is based on the shared goal both the partners have. Discrepancies in the goal, or ‘the bigger picture’ of the project might hinder the progress, and thereby decrease the level of success of the collaboration.

“That is, in my opinion, another key factor. That the partner has the same interest in the goal you are trying to reach.” (Interviewee #1)

Several other named factors are; a low number of participating partners, the project planning, and a clear point of disconnection during the project.

“I think three partners is a lot. [...] It does costs energy. The people of the organisation need to have some experience and are willing to participate.” (Interviewee #6)

“Since we do a lot of projects, we developed some kind of dexterity to schedule the activities and keep in contact about the progress to make sure we can act independently. We always try to find some kind of contingency strategy so both partners can proceed and you do not have to wait for six months.”
(Interviewee 5)

“It really helps and that is why the collaboration with Company X is really good, we know the point of disconnection we have set. What they are doing, what we are doing, we need each other for now.”
(Interviewee #5)

For an R&D-intensive company, innovation development is an ongoing process. In comparison to low R&D-intensive companies, which are highly focused on their clients and providing the best services for them, innovation development is less of a priority.

“It is not in our DNA, the innovation project. We are continuously busy with projects that our clients provide us with, rather than determining the position in the market ourselves.” (Interviewee #14)

This interviewee admits to having a low priority for innovation development, which is opposite to R&D-intensive companies like the following interviewee.

“Was the innovation a commercial success? Not always, but did it add to our intellectual property rights and assets, sure it did! [...] It always is useful.” (Interviewee #13)

R&D-intensive companies seem to have a bigger goal than just this collaboration project. Innovation never stops, therefore those companies are trying to optimise their products and services in the industry they are operating in. An illustrative example is the case where autonomous shipping is the goal of the company. Though, this is a long-term goal. In the meantime, this company is continuously innovating small steps of this bigger goal.

4.3.4 Entrepreneurial capabilities

Another reason could be that SME managers or entrepreneurs possess characteristics like optimism that fade out the realisation of the difficulties of creating an innovation. Moreover, this optimism might lead to the situation in which disappointments always happen, however since entrepreneurs are used to these slight disappointments they tend to ignore the feeling of disappointments and find a way to make the project finish successfully. Eventually, this creates more feelings of success. Success, thus in itself is reached by the way entrepreneurs overcome the obstacles they face along the way of innovation.

“Look, a developer always believes in his or her project for 100%. He or she even thinks that it will be finished tomorrow, however, it is different. Although we knew this, we still did not value it enough”
 (Interviewee #2)

“Entrepreneurs are optimistic by definition, otherwise they would have become civil servants. Because of this they start new things but do not always want to see how difficult it is. However, if they did they would not even start, so there always will be obstacles along the way.” (Interviewee #7)

The mindset of an entrepreneur is different than this of non-entrepreneurs. Not only are they optimistic in even the most uncertain situations, but they also stay optimistic when the process is not as expected.

“Nothing in the hard- and software branch goes like you expect it to go” (Interviewee #10)

“Actually, all my projects are going well in that sense the I do realise that projects never run according to plan. One goes faster, one goes slower but I never had a project that was a complete failure.” (Interviewee #7)

It does not seem to bother the entrepreneurs how well the project succeeds. They always seem to find a lead that can be of future success to them although the current innovation project did fail.

Eventually, the expertise and specific knowledge the partner possesses is an important factor for successful collaborative innovation. It might be the most important expected benefit for entrepreneurs to even start the collaboration.

“Experienced people, that is what we need.” (Interviewee #8)

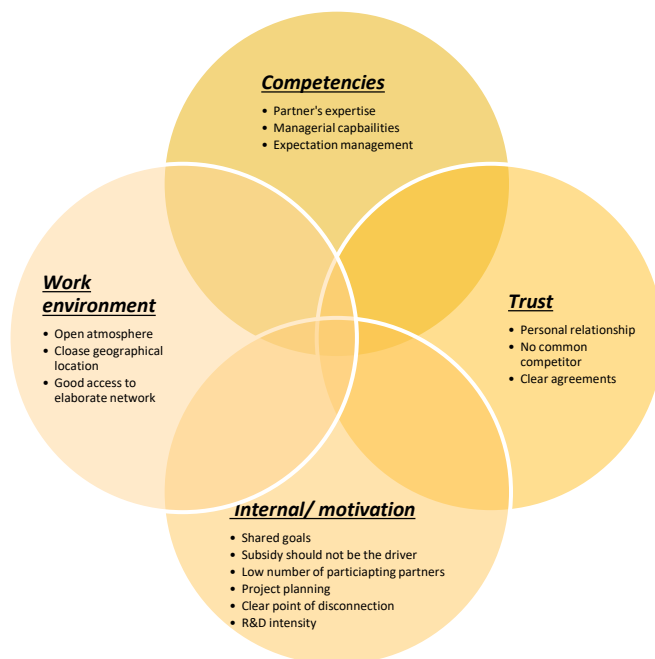


Figure 5: Potential success factors of collaborative innovation for SMEs

5 DISCUSSION

This section starts by comparing the expected benefits of collaborative innovation within this research with those derived from the literature. This is followed by a discussion of how and why the expected and realised situation might differ and how to optimise the circumstances for successful collaborative innovation, including the policy around the topic.

5.1 COMPARING EXPECTED BENEFITS TO POTENTIAL BENEFITS OF THE LITERATURE

SMEs' drive to innovate cannot be met by acting in isolation. The reason for this mainly stems from a lack of resources that does not lead to a competitive advantage if the company remains acting in isolation. Relational rents that originate can only be obtained through collaboration and do lead to competitive advantages (Wong, 2011). Interviewees were asked to formulate their expectations on collaborative innovation initiatives. Those expectations seem to be different per case.

First, it is necessary to know that all collaborative innovation projects in this research are connected to a policy-supported subsidy (MIT R&D). This creates a financial incentive for those projects for the SMEs participating and their partners. For this reason, an expected benefit of those policy-supported collaborative innovation projects could be a financial gain. Though, this expected benefit could be dedicated to the subsidy rather than the collaborative innovation. Financial incentives come with a certain, often found positive, pressure since there are financial consequences for the companies if a project is not finished. Moreover, since reaching an innovation development is the goal in collaborative innovation projects, in this research we looked at the expected benefits of collaboration rather than innovation development.

5.1.1 High-priority expected benefits

Multiple expected benefits of collaboration are mentioned, some more often than others. In this research, two expected benefits were primarily mentioned. First, new partners might pave the way to unknown markets. Unlike big companies, SMEs do not possess the market power they can use for the exploitation of their innovation efforts (Wenke, Zapkau, & Schwens, 2021). Connecting the SME to another company that operates in a certain field or industry might raise the opportunity to sell the product to a new market segment. Another expected beneficial collaboration strategy works by connecting the SME to a partner that normally would buy your innovation. Implementing the innovation in an already existing product, making sure that the innovation can be used as a new feature to an existing product, makes the partner sell the partner's product and license the software, which was found by multiple scholars as well (Gilmore, Carson, & Grant, 2001)

The second high-priority expected benefit is the need for the expertise of the partner. Logically, this is necessary for the external knowledge, experience, and expertise in a certain field if the company itself does not possess it. According to the RBV, resources are necessary to obtain competitive advantages, yet those resources are not all available to a company acting in isolation. Interviewees confirm this theory by agreeing on the lack of resources. Therefore, SMEs are often willing to collaborate. This willingness is formulated in the Relational View (Dyer & Singh, 1998). This theory underlines the relational rents that could be obtained only when external resources become available (Lavie, 2006). This could be done by collaboration with a partner that possesses these.

Ansoff (1957) created a strategic planning tool for organisations to decide on their general strategic direction, which could explain the existence of the two high-priority expected benefits and the lack co-occurrence of those. Ansoff's tool consists of a quadrant that has four growth strategies, of which the outcome is based on the market (new/existing) and the product (new/existing). In the case of a situation

in which the expected benefit is accessing a new or bigger market segment, the individual partner would face a new product (the innovation) and a new market segment. This would lead to the outcome 'diversification'. Diversification has the highest risk of the four outcomes since it touches a new line of doing business and selling the product (Hussain, Khattak, Rizwan, & Latif). Therefore, by collaborating with a partner that is familiar and operating in the new or bigger market segment, the strategy shifts from new markets to existing markets, making the outcome move from diversification to product development.

The same reasoning holds for the expected benefit 'need for partners' expertise'. If the first is innovating individually, it does not possess the resources and knowledge to develop a new innovation or product which makes the company stuck in the outcome 'market penetration'. This growth strategy is effective if the quantity of sales increases, however, this might be hard since there is no new market to sell the product to. By collaborating with a partner with the right expertise, the company can develop and sell a new product to their existing market. This creates a shift from the outcome 'market penetration' toward 'product development'.

Product development includes selling a new product to existing customers. In this strategy, it is crucial to understand your customers' needs to develop the right solutions to fulfil their needs. According to Porac and colleagues (2004) mention that the strategy 'product development' is closely related to firm growth. Moreover, it is a less risky strategy than 'diversification' and a more opportunistic strategy than 'market penetration' thus a more advantageous strategy (Hussain, Khattak, Rizwan, & Latif). Yet, SMEs do tend to base their strategy on competition, customer needs, and consumer behaviour. They are acting more reactive than proactive, which might form a lack of growth strategy at SMEs' sites. However, research shows that SMEs do implement certain types of growth strategies making the Ansoff-matrix a compatible tool of analysis for the actions of SMEs (Veseli, Aziri, & Vesli, 2012)

Both expected benefits are known in the existing academic literature. Moreover, both expected benefits seem to be an acceptable explanation of the fulfilment of SMEs' needs. 'Need for partner's expertise' can solve the lack of resources that SMEs face. 'Access to new or bigger market segment' might solve the lack of market power that SMEs possess. This study contributes to the literature in a way that in this study, all cases do stress that in SME's collaborative innovation both high-priority benefits are not co-occurring. Also, it does not happen that one of the two is not present at all. However, this is only explorative research and further research has to be done to confirm these claims. There might be other possible reasons that explain this occurrence. For example, it might be thinkable that SMEs do not possess the resources to enter a new market with a new product, so the outcome 'diversification' for SMEs is impossible. If this is the case, it is obvious that the expected benefits 'access to new or bigger market segment' and 'need of partner's expertise' do not co-occur.

5.1.2 Complementary expected benefits

Aside from those two high-priority expected benefits, there are complementary expected benefits. These are; faster innovation development, cheaper innovation development, knowledge gain, the influx of human capital, and more environmentally friendly innovation development. The high-priority expected benefits seem to be beneficial project specific. The complementary benefits can be beneficiary in a broader sense, allowing for project execution as well as a better resource position after the project. All complementary expected benefits are deemed to be important for SMEs. However, the complementary expected benefits do not exist without the high-priority expected benefits. For example, faster innovation development is deemed as an expected benefit, however, without the partner's expertise this project would not have taken place.

Multiple interviewees mentioned the competition that simultaneously is working on the same innovation as them. Therefore, speeding up the innovation process, might lead to a better position. According to scholars, increasing the speed he innovation development leads to a first-mover advantage (Suarez & Lanzolla, 2005). Fast innovators are more likely to market the innovation, find a big market share and,

generate profit out of it. Eventually, those innovators are stronger and more disruptive as opposed to slow innovators (Ringel, Taylor, & Zablitz, 2015). Logically, cheaper innovation development is deemed beneficial. Also, results show that cheaper innovation is a realised benefit of collaborative innovation. Remarkably, SMEs do value cheaper innovation over faster innovation, even the huge potential benefits of faster innovation. This might be due to the limited position SMEs are in. Possibly, they are rather risk-averse when it comes to their investments, which is counterintuitive to entrepreneurial risk-taking behaviour. It seems that SMEs are not gamblers nor risk-averse (Dominguez & Raïs, 2012), which does not explain this behaviour. This might be because of the uncertainty related to the outcome of innovation development, yet should be further researched.

Of important notice is the expected benefit “influx of human capital”. This particular benefit was not found in SME-SME collaborations, yet it originated from a SME-university collaboration in which agreements were made between the two parties. Moreover, this expected benefit does occur only with the primary benefit ‘need for partner’s expertise’. The valorisation of the results of the study as well as the exchange of human capital were discussed and agreed upon. The latter is most likely an exchange from the university to the SME, not the other way around. As SMEs are naturally hesitant in hiring human capital for innovation projects, this expected benefit only exists because of agreements around the payroll position of the human capital making it less expensive for the SME to hire this employee. However, it strongly increases the competitive position of SMEs by influx of new knowledge (Serrano-Bedia, 2012). Yet, SMEs still tend to feel themselves unable to find collaborations with universities (Laursen & Salter, 2004).

Remarkably, “more environmentally friendly innovation development”, a potential benefit not yet named in the existing literature, was named during the interviews. This fairly specific benefit is linked to a specific industry in which resources were transported from abroad. By partnering with a Dutch company, the SME was enabled to more environmentally friendly develop their innovation. This new potential benefit should be further researched since this could be an addition to the known potential benefits of collaborative innovation. Though, there still seems to be diffusion barriers related to SMEs which hampers the customer uptake of environmentally friendly innovation (Naor, Bernardes, & Druel, 2015)

5.2 HOW AND WHY DO EXPECTED AND REALISED BENEFITS OF COLLABORATIVE INNOVATION DIFFER?

Over- and underestimation of expectations of collaborative innovation lead to a suboptimal position for participation in collaborative innovation projects. Overestimations lead to project outcomes that are deemed less beneficiary than expected, which might lead to renouncing of future collaborative innovation projects. Underestimations might lead to project outcomes that are deemed more beneficiary than expected, however, the decision-making process can lead SMEs to refrain from collaborative innovation projects beforehand. Which causes explain this over- and underestimation will be discussed below. Seemingly, the feeling of a successful finished project seems to be an indicator of a lack of discrepancies or only realising benefits that were not expected. Collaborative innovation projects that faced difficulties during the project generally found more discrepancy between the expected and realised benefits. This phenomenon might be caused by a biased view on own capabilities. Naturally, the interviews were held after the project was finished, which might lead to a blurred vision of the expectations beforehand. This phenomenon, at least, is present when retrospectively asking partners about their willingness to have their kids (Rosenzweig & Wolpin, 1993). Possibly, entrepreneurs do not remember their exact expectations anymore as parents do after they had their children. This is specifically occurring when realisations are positive. Moreover, entrepreneurial characteristics like optimism and self-confidence might lead to a situation in which entrepreneurs believe their skills are responsible for the non-discrepancy of the project. It might even be the case that humans are instinctively disliking admitting their mistakes (Detsky, Baerlocher, & Wu, 2013).

Overestimations of expected benefits can be found in partners' expertise, faster innovation development, and cheaper innovation development. Benefitting from the expertise of the partner is seen as a high-priority benefit and therefore highly valued by entrepreneurs. In reality, the expertise of the partner is not always sufficient to reach the goal of the project. In some cases, it seems that the technological level of the project was higher than expected. Surely, this could be the case since both partners have their niche expertise. Combining those niche expertise might create an innovation which cannot be brought together, since this is where the expertise of both partners stops (Rösler, 2015). This might lead to a situation in which the partners are not able to develop the to-be-developed innovation. In the other cases, the partner gave too high expectations and made the partner believe the company was able to live up to the expectations. However, this was not always the case. The partner did not seem to have the capacity to develop the innovation along the way. They did not seem to have the expertise they believed they had, which could have been prevented by good preparation and scouting of the partner (Rösler, 2015). This fundamentally differs from the level of technical difficulty, in which an inherent uncertainty sticks to the innovation development process. In cases where the partner's expertise was lacking, the technological difficulty did not differ from what was expected. The partner just could not live up to the level of difficulty. This often was united with convincing words from the potential partner.

Speeding up the process of innovation development ought to be an important expected benefit. However, many factors might hinder the speed of the process. External factors like a global pandemic and scarcity of materials by supply chain inefficiencies are major factors leading to slower innovation development. Moreover, lack of agreement, goals, and priority lead to inefficient collaborative innovation and thereby slows down the development process. Further, a bankrupt partner and obtaining certification both lead to slower innovation development.

Bankrupt partners and no upfront agreements are major factors for hindering the cheaper innovation development process as well. Other factors that hinder speeding up the innovation development process, might lead to a project with increased costs as well. Yet, SMEs tend to rather slow down the process than go for extra expensive choices. It seems that SMEs do not offer their financial position for innovation development. Although, this might lead to missing out of the first-mover advantage. This might be because of their limited financial resources. However, some scholar do advice SMEs to not make the first move but rather exploit the market development efforts of large companies (Lee, Lim, & Tun, 1999). Moreover, multiple SMEs indicate their other ongoing innovation development projects which they are rather focused on as a collaborative innovation projects comes to a temporary stillstand.

Underestimations of expected benefits can be found in human capital, knowledge gain, and market segment. The influx of human capital is a highly valued benefit for SME innovation (Ostergaard, Timmermands, & Kristinsson, 2011; Söllner, 2012). However, human capital is costly (Hodgson, 1998) and is not widely available to SMEs. It could be for this reason that an influx of human capital is not expected per se when collaboratively innovating. Though, SME-knowledge institution collaborations create a possibility for human capital influx for SMEs.

Access to bigger market segments is highly valued since SMEs generally do not possess the market power like big firms do (Yoshino & Taghizadeh-Hesary, 2016). Finding this quality in a partner is overall highly valued by SMEs. Overall, access to a new market segment is an expected benefit in most cases.

5.3 OPTIMISING THE CIRCUMSTANCES OF COLLABORATIVE INNOVATION AND POLICY-INSTRUMENTS

Governmental subsidies for collaborative innovation seem to be effective in two ways. First, it might financially help SMEs that nonetheless want to do the project. Secondly, it might 'force' collaboration between companies who otherwise did not collaboratively innovate. It appears to be that 'forcefully' creating collaboration is not always the right design for a successful collaborative innovation project.

The operating environment of collaborative innovation can be created in such a way that it will be more likely to succeed. This can be done by creating a high level of trust, an open work environment, finding a partner that has the right internal focus and motivation, and finding a competent partner. These explorative results do confirm the findings of Hilkenmeier and colleagues (2021), however, the results hold for a broader population than SME-university collaborations. Logically, an intersection of those four factors might lead to the optimal situation for successful collaboration. Whether or not this optimal situation could be realised by less than those four factors should be further researched.

Creating perfect circumstances for collaborative innovation is the starting point for successful collaborative innovation and the successful use of policy instruments. Nonetheless, innovation itself might not be the biggest burden for SMEs. As shown in this research, the expected benefits of starting collaborative innovation are either ‘the need for partner’s expertise’ or ‘access to new or bigger market segments’. The latter is a striking example of the misfit of the policy towards SMEs. According to multiple interviewees, the technological development of innovation is often not decisive for a company’s success, but overcoming the valley of death is. The commercialisation of innovation is often what entrepreneurs find a real challenge. Multiple interviewees indicated this as a bigger challenge than innovation development. This is confirmed by multiple scholars as well (Mcintyre, 2014; Klitsie, Price, & De Lille, 2019). Moreover, this seems to be the reason why some innovations will never be marketed. Right now, governmental policy instruments are being used inefficiently. Interviewees mention the need for external expertise that is necessary for their innovation development. The other interviewees mention the need for exploitation of their to-be-developed innovation, however, this is not what the subsidy is meant for. “The MIT R&D is a Research & Development project with collaborations between companies and/or knowledge institutions, of which none of the participants more than 70% of the subsidiary costs possess. The project consists of industrial research or experimental development or a combination of both.” (Provincie Utrecht, 2022, p. 1). Although the MIT R&D is only one example of a governmental instrument, almost all instruments are focused on innovation, R&D activities, early stage financing, feasibility studies, and such. There is a need for subsidies for further development of the innovations of SMEs, rather than the early-phase development only.

5.4 IMPLICATIONS

5.4.1 Science

The findings of this study add to the current academic literature on collaborative innovation. Specifically, it highlights SMEs’ attitude toward collaborative innovation processes, including the expected benefits, (factors creating) discrepancies that hinder successful collaborative innovation, and potential success factors for collaborative innovation. Moreover, this study specifically focussed on policy-supported innovation through subsidies, giving new insights into the role of the government. It shows the beneficiary aspects of subsidies, however, it touches upon the flaws of the instruments as well.

The main literature gap was focused on the expectations to participate in and the realised benefits of collaborative innovation projects. Especially the unclarity about the factors that influence the expectation-realisation discrepancies was missing, which are exploratively researched in this study. Moreover, suggestions for optimising the circumstances for SMEs to collaborate are researched within a broader scope than only SME-knowledge institutions. However, those are exploratively researched and no correlative or causal relationships can be linked yet.

New insights on the expected benefits of policy-supported collaborative innovation in SMEs were found, namely that there is a twofold high-priority expected benefits for SMEs to participate in such projects, namely because of the expertise of the partner or access to new or bigger market segments. The latter potentially arranges from a lack of governmental support in the further development of innovation opposite to early development. Moreover, the factors influencing discrepancies between expected and

realised benefits have become clear, which could be used to optimise the collaborative innovation process.

Lastly, potential factors of successful, policy-supported collaborative innovation are captured. Those factors are categorised into four major items; high level of trust, open environment, good motivation, and entrepreneurial competencies. Those factors could be further researched to create an optimal environment for SMEs to innovate in.

5.4.2 Society

SMEs allegedly form the backbone of many economies, making up for the vast majority of the businesses in Europe. SMEs face limited resources and exploitation power for their innovation making them dependent on collaborative innovation. As collaborative innovation is seen as one of the best remedies for the lack of innovation possibilities amongst SMEs, this tool should be more optimally used. However, over- and underestimation of expectations regarding the effect of collaborative innovation lead to a lower percentage of SMEs that collaboratively innovate. Gaining insights into and acting on the expected benefits, discrepancies between expected and realised situations, and factors leading to these discrepancies lead to a better understanding of collaborative innovation for SMEs, intermediary institutions, and governmental bodies. This better understanding might lead to more collaborative innovation activity amongst SMEs. Moreover, their understanding of collaborative innovation and open innovation networks might lead to more altruistic behaviour, optimising the circumstances for SMEs to thrive and collaboratively innovate. More specifically, this understanding might contribute to solving more structural issues SMEs are facing, like resource scarcity and lack of market power. Also, the Dutch government does spend billions of euros on innovative companies each year (Rijksoverheid, 2022). The gained clarity around collaborative innovation projects might be beneficiary to the governmental decision-making process since subsidies should be more directed to overcome the valley of death rather than the early-stage innovation developments. Further, specifically selecting potentially successful projects leads to more efficient spending of money on those projects.

Innovencio is founded with the main goal to enhance the quality of the role of grant proposal advisor. The current study adds to their goal by gaining insights into the expected benefits, successful collaborative innovation, and factors influencing the expectation-realisation discrepancy. Innovencio could adopt an advisory role in which more selectively will be looked at collaborations between partners. They can provide the potential factors of successful collaborative innovation to their partners. Moreover, Innovencio can use the factors influencing discrepancies to steer the collaboration and project in the right direction to increase the number of successful innovation developments.

5.5 LIMITATIONS AND FURTHER RESEARCH

The current research comes with some limitations that should be discussed. First, qualitative and explorative research is harder to replicate than experimental research. To obtain a high level of internal reliability the research design, interview guide, and social role of the interviewer could be used to find the highest level of replicability of the data. Moreover, internal reliability is to be questioned because of the individual execution of this research. Hereby, the inter-observer consistency is lacking. The internal and external validity respectively ought to realise by going internal at a company working in the same social setting as the content of the research, and creating a thick description of the specific context of the research topic enabling the researcher to make judgements about the transferability of the conclusions of this research.

Moreover, the nature of an *ex-post* interviewing strategy might lead to conflicting answers regarding the expectations. Expectations might become more ambiguous by doing interviews only after the projects have been finished. Further, within the scope of this study, only companies participating in policy instruments were included. More specifically, only companies connected to the MIT R&D subsidy were included in this research. Besides, all participatory SMEs were clients of an intermediary company that

consulted the application process or even helped look for a suitable partner. This led to a situation in which all participants were located in the Southern provinces (Limburg, Noord-Brabant, and Zuid-Holland) of the Netherlands. The generalisability of this study might not hold for other Dutch regions, since in two out of three provinces a technical university is located. This can increase the density of more technological SMEs and spin-offs of those universities. Also, this can be seen in the industries the interviewed SMEs acted in.

Future research could follow the SMEs participating in collaborative innovation projects and interview them beforehand about their expectations and afterward for their realisations. Moreover, it can include a broader spectrum of SMEs acting in more different industries. As this research was mainly exploratory to find factors explaining the expectation-realisation discrepancy, those factors could be used for performing a quantitative study to find and explain correlative and causal relationships amongst the firm characteristics, expectations, and factors.

6 CONCLUSION

It becomes evident that SMEs do expect several benefits from participation in collaborative innovation projects. Those benefits seem to be linked to the typical characteristics of SMEs. Resource scarcity and lack of market presence seem to be the most pressing factors hampering the innovation development of a SME. To overcome this, SMEs either engage in collaborative innovation to use the partner's expertise for their innovation, or to access the partner's exploitation channels. Those two high-priority motives for collaborative innovation are only present separately, depending on the motives for collaborative innovation. High-priority motives can appear combined with complementary expected benefits, like cheaper, faster, or more environmentally friendly innovation development, knowledge gain, and human capital influx.

Successful collaborative innovation is characterised by a non-discrepancy between expected and realised benefits or underestimations of the expected benefits versus the realised ones, whereas unsuccessful collaborative innovation is exemplified by an overestimation between expectations and reality. Underestimations seem to be rather incidental than structural, whereas unsuccessful collaborative innovation discrepancies seem to be more structural and caused by the following factors; external, motivational, technological, and contractual.

Factors of success that have been found are mostly to be seen as fundamentals of good collaboration in general. A personal connection or an existing relationship between the partners is linked to high levels of trustworthiness and therefore to be linked to successful collaboration. Especially, the absence of trust within a collaboration might lead to a problematic situation and have to be solved by external motivations and contractual agreements upfront. When zooming out, on a macro-level, collaborations do thrive in environments with an open atmosphere. Open and approachable atmospheres make a good environment for SMEs to innovate. Increasing altruistic behaviour in knowledge sharing and helping others out do help finding new ideas for innovations and collaborations. Moreover, internal motivations positively influence collaborations, especially using the subsidy as a tool rather than the driver, and having similar goals does work positively on collaborative innovations. Eventually, the competencies of the manager of both the company and the partner are important. Positive and optimistic traits of an entrepreneur are linked to successful project management. Even though a project might not lead to success directly, an entrepreneur can often see the benefit of the project and work towards future success.

Taking the results into consideration leads to a clarification of SME collaborative innovation which could overcome the ineffective use of the instrument by SMEs, intermediary institutions, and governments. Future research can be done parallel to the project development making sure interviewees are not biased because of the *ex-post* nature of this research. Moreover, more correlative and causal relationships between company characteristics, expectations, and expectation-realisation discrepancies need to be researched.

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APPENDIX

Interview guide

Naam interviewee:

Bedrijf interviewee:

Datum:

Welkom. Allereerst bedankt voor het deelnemen aan dit interview. Het interview zal ongeveer een half uur duren. In dit interview zullen we verscheidene onderwerpen rondom innovatie-samenwerking behandelen. Innovatie-samenwerking is een proces waarbij meerdere partijen bijdragen aan het creëren van innovatie. Dit gesprek zal gaan over de vraag hoe en waarom de voordelen van “innovatie-samenwerking” kunnen verschillen. Het interview wordt slechts gebruikt voor het verzamelen van data voor dit specifieke onderzoek. De antwoorden zullen anoniem blijven. Verder bestaan er in dit interview geen goede of slechte antwoorden, dus voel je vrij om uitgebreid antwoord te geven.

Zijn er op dit momenten vragen voordat we het interview starten?

Heb ik uw toestemming om het interview te starten en op te nemen zodat het gebruikt kan worden voor het achteraf transcriberen en analyseren van de data?

Allereerst heb ik een aantal algemene vragen, gerelateerd aan de MIT R&D Samenwerkingsregeling.

1. In welke sector/industrie bent u actief?
2. U heeft gebruik gemaakt van de MIT R&D Samenwerking. Welk project heeft u gerealiseerd naar aanleiding van deze regeling? Gelieve een korte omschrijving te geven.
3. Hoe kwam u bij deze regeling? Heeft u dezelfde regeling eerder gebruikt?

Dan nu een aantal vragen over de situatie voorafgaand aan het meedoen aan de MIT R&D Samenwerkingsregeling.

4. Hoe ging het zoeken naar een partij om mee samen te werken? Wie vond wie (en waar/hoe?) In het geval uw organisatie actief op zoek was: Waar zocht u naar? Wat waren leidende factoren voor een geschikte partner?
5. Wat verwachtte u te behalen uit deze regeling?
6. Wat verwachtte u te behalen uit de samenwerking met de partner (niet Innovencio) in project X.
 - a. Voor uw project
 - b. Voor uw organisatie

Dan nu naar de situatie gedurende het project.

7. Hoe verliep de samenwerking met de partner (niet Innovencio)?
8. Wat was voordelig aan de samenwerking?
9. Waar liep u tegenaan gedurende de samenwerking?

Dan nu naar de situatie na voltooiing van het project.

10. In hoeverre heeft het project u vooruitgeholpen in het realiseren en vermarkten van innovaties?
11. Hoe bleek de samenwerking achteraf? Welke voordelen zijn daadwerkelijk gerealiseerd?
12. Ziet u ook positieve uitkomsten (van de samenwerking, dus niet enkel het project zelf) die u NIET verwacht had?

13. Kunt u een verklaring geven waarom de uiteindelijk gerealiseerde voordelen verschilden van de verwachte voordelen? In hoeverre heeft dit verschil achteraf gezien te maken met onterechte verwachtingen, en met ontwikkelingen tijdens het project?
- a. Ontwikkelingen in het onderzoek
 - b. Ontwikkelingen in de relatie met de samenwerkingspartner
 - c. Ontwikkelingen binnen de eigen organisatie
 - d. Ontwikkelingen in het type innovatie
 - e. Ontwikkelingen in de markt
 - f. Ontwikkelingen in het beleid
14. In hoeverre beïnvloedt de innovatie-samenwerking in project X uw belangstelling voor dit soort samenwerking?
15. Denkt u dat het goed zou zijn als de subsidie-bepalingen en/of subsidie-adviseurs u vooraf een accurater beeld hadden gegeven van waarom samenwerking in project X interessant voor uw organisatie zou kunnen zijn. In hoeverre acht u dit haalbaar?