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Bilateral Innovation Partnerships as a policy tool to foster innovation on a public and private level

A case study of the Swedish-German Innovation Partnership

Jeffrey Fleischle

M.Sc. in Innovation and Industrial Management program

Graduate School

Supervisor: Daniel Ljungberg

Institute of Innovation and Entrepreneurship
University of Gothenburg

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Abstract

In recent years, the topics of societal challenges and innovation have become increasingly present, often in connection with digitalisation and ongoing globalisation. Sustainable solutions are needed – and governments as shapers of innovation systems must take up their responsibility. As geographical boundaries increasingly blur, also resulting from digitalisation and globalisation, new collaborative efforts are needed between countries to shape together a desirable socio-technological future. Bilateral Innovation Partnerships (BIPs) might fill in a gap here. While two countries discuss their individual approaches towards a common goal, accompanied by 'hands-on' projects, a cross-border environment of learning and knowledge generation is created, that can serve as a reference point, from which other countries, e.g. on EU level, can be onboarded. The Research Objective was twofold: conceptualising BIPs and examining its features such as perceived benefits and challenges by stakeholders.

An inductive research strategy has been used to examine Bilateral Innovation Partnerships in an exploratory way, thereby generating theory as a result. A case-study design helped in studying the research phenomenon in a lively, dynamic manner – with the goal to draw generalisations from the specific case of the Swedish-German Innovation partnership. Grounded theory as a methodology helped in structuring and narrowing down the research iteratively, where data collection and data analysis worked in a synchronized way. The analysis of contextual, case-relevant data paved the way for a semi-structured interview guide. Interviews were conducted with a variety of stakeholders from different organisational entities that had strong linkages to the partnership.

As a result of the research, BIPs could be framed with theory around Schumpeterian view, Open Innovation, Ecosystems, National Innovation System and Innovation Policy. A conceptual model was drawn that let the functionality, and the different activities and linkages of actors in such a partnership appear clearer. The analysis also revealed that different criteria should be fulfilled before countries agree to a partnership (such as an existing strong relation, accompanied by trust as it can catalyse the further process). There were also Success factors of a BIP identified which can be differentiated between 'Shaper/Policy-maker view' and 'Ecosystem/Multi-actor view'. While the government as a shaper needs to provide the architecture/infrastructure from a macroeconomic or innovation system point of view, the latter are contributing to a rather political agreement from a microeconomic or ecosystem point of view with industry, government and academia as actors. Operational activities that are characteristic within a BIP can be joint iterations on a policy-maker level or Open Innovation activities, delegation visits and roundtables on the Ecosystem level.

In the future, it will be interesting to see whether BIPs can help in solving the current challenges on a global scale. In practice, for the case-specific partnership, integrating the voice of society stronger, especially when it comes to discussing a desirable socio-technological future, is a recommendation that was given by the author, which comes in line with theory that underlines this aspect as important for future-oriented innovation policy. Concerning future research, it would be interesting to apply quantitative research such as testing or verifying different success factors within BIPs, but also measuring potential contribution of BIPs as a policy tool to foster innovation.

Keywords: Innovation partnership, Bilateral cooperation, Open Innovation, Ecosystems, National Innovation System, Innovation policy, Triple Helix, Cross-national collaboration

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List of Abbreviations

AI *Artificial Intelligence*

BIP *Bilateral Innovation Partnership*

EC *European Commission*
EIS *European Innovation Scoreboard*
EU *European Union*

GT *Grounded Theory*

NIS *National Innovation System*

OECD Organisation for Economic Co-operation and Development
OI *Open Innovation*

R&D *Research & Development*

SDGs *Sustainable Development Goals*
SMEs *Small- and Medium-sized Enterprises*

1. Introduction

In times of societal challenges, ongoing globalisation, increasing digitalisation and ever short product-life cycles, there is a rising need in finding new, sustainable solutions on a multinational scale. Governments are in the position to shape economies within their national socio-political system, with e.g. welfare policy or innovation policy as instruments. However, there is certain consensus, for example between member states of European Union (EU), that there is unified, common action needed to tackle such complex challenges.

Governments can not tackle complex challenges, that go beyond national borders, unilaterally. Researchers such as Mazzucato (2018) argue that cross-border and cross-sectoral collaboration are important in these times. This means, besides governments, also academia, industry and society need to be part of the process of designing a desirable, socio-technological future. A model emphasising cross-sectoral collaboration is the so-called Triple Helix Model (Etzkowitz & Leydesdorff, 1995), where government, academia and industry, or, in other words, public and private sector interact together.

A factor contributing to the status quo is that neither digitalisation nor societal challenges stop at national borders. Hence, cross-border collaboration is needed more than maybe ever before. In the late 1980s, it was described that governments are acting in so-called National Innovation Systems (NIS) (Freeman, 1987, Lundvall, 1988), with the goal of creating an innovation-friendly climate to its stakeholders, thereby stimulating economic growth. Instruments within the policy-mix can be e.g. regulations, standardisations or financial support (Edler & Fagerberg, 2017). With common, borderless challenges such as Artificial Intelligence or climate change, the view might need to be changed from a national to a multinational angle, especially in EU.

Another factor that needs to be adressed in this regard is the rapid speed of technological advancements in recent years. Arguably, constant change is something natural in growth-oriented economies, when citing Schumpeter (1942) who used the term ‘creative destruction’ as a means for economic development. However, the life cycle spans of new transformative changes in economies are becoming ongoingly shorter. As a practical example from automotive industry, the life span of Volkswagen Golf generations I and V has been shortened from 9 to 5 years (-45%) between 1974 and 2008 (Losbichler, 2012). For firms, this development, also linked to globalisation, can result in an increased uncertainty and a constant innovation pressure.

The combination of the beforementioned factors lead to a new complexity, but also ambiguity on the governmental side. For example, before regulating the field of ‘Ethics in Artificial Intelligence’ inside EU, it is important to understand first how this technology can be applied, including its risks and its potential opportunities (European Commission, 2020a). So, on the one hand, the future needs to be shaped in a sustainable way, but on the other hand, the time to keep up with rapid speed of change is very limited. This demands new solutions of cooperation.

A cross-border, cross-sectoral knowledge exchange platform might facilitate and catalyse this process of change. Bilateral Innovation Partnerships (BIPs) might fill in a gap here. Within a BIP, two countries agree to working closely together, adressing common challenges and

trying to solve them by learning from each other in a complementary way. There is a link to recognize to Mazzucato (2018), who advocates 'an entrepreneurial state', that proactively shapes the future in a mission-oriented way, instead of 'fixing' market failure. This conviction, which is also part of the upcoming innovation agenda *Horizon Europe* of EU (Mazzucato, 2018), demands a thorough understanding of governments about the complex international challenges. As mentioned before, these challenges are intertwined, not only between countries, but also across sectors. Therefore, the roles of government, academia and industry, but also society with regard to problem-solving are expected to be more inclusive and equalized in future-oriented policies and collaboration setups towards innovation.

Purpose Statement

This study aims to explore different aspects of bilateral collaboration towards innovation, exemplified with the case study of the Swedish-German partnership for innovation. Swedish Prime Minister Löfven and German Chancellor Merkel have signed a 'Joint Statement of Intent about Innovation and cooperation for a sustainable future' in 2017 and renewed it in 2019 during Hanover fair. The partnership is aimed at "tackling societal challenges" in areas where Sweden and Germany already "have strong positions". It is based on the "need for cooperation" in times of "increasingly fast changes" on a global scale. The partnership might have potential for development on EU level in terms of strategic direction for a future-oriented European industrial strategy.

There have been six focus area defined within the partnership; each is coordinated by different stakeholders such as Ministries of Economic Affairs or Public Research Institutes while the contributing stakeholders are from Government, Academia and Industry. The strategic focus areas are: Batteries, Artificial Intelligence (AI), Electric roads systems, Test beds, eHealth and Innovation and cooperation of SMEs. This research study will focus exclusively on AI, eHealth and Innovation and cooperation of SMEs by empirically executing and analysing interviews with participants in these areas.

The assumption is that such cross-border, bilateral innovation partnerships are highly linked to the concepts of open innovation, ecosystems and national innovation system. As an instrument in an innovation policy mix, a BIP aims at fostering innovation, having national, bilateral and potentially multi-national (such as EU) impact. In other words, concrete results that stem from such a 'small scale' collaboration, might serve as a reference point and speed up decision processes on a multinational level. One unique feature of 'modern' innovation policies is the integration of growth-oriented, techno-industrial strategies as well as societal goals, leading to some ambiguity, raising the need for sustainable solutions, designed in an inclusive way (e.g. Mazzucato, 2018).

Cross-border innovation partnerships could be of increasing relevance in near future, looking at the SDGs or the Grand Societal goals that let all economies and innovation policy-makers unite in their mission towards a sustainable future. A BIP might provide a chance for policy-makers to test and experiment how a mission-oriented approach (Mazzucato, 2018) can be implemented in practice. Overall, the potential role of a BIP to catalyse or structure this sought change on various layers needs more detailed examination by research.

Research Question

The main research interest is reflected in the following overarching research question:

(i) How can a bilateral innovation partnership foster innovation on a (multi-)national level - exemplified with the case study of the Swedish-German Innovation partnership?

To understand this rather descriptive research interest better, it is first important to review the theoretical concepts that are related to bilateral innovation partnerships. This guides the sub-questions:

(ii) How can bilateral innovation partnerships be conceptualised, by framing them with existing theoretical concepts?

As bilateral innovation partnerships are a rather unexamined research interest, the empirical research aims towards specifically finding out:

(iii) What are features within the Swedish-German innovation partnership such as perceived benefits and challenges and which generalisations can be drawn from the case?

To sum it up, in order to answer a rather broadly defined research question (i), it is necessary to first (ii) conceptualize the research phenomenon in order to (iii) specify the functionality of the Swedish-German Innovation partnership with its benefits and challenges which can then be drawn back to (i). As the main research interest (i) has the aim of making general statements, it will be important to look at the contextual specificities of the case study. This allows a better classification of the findings in the case study regarding generalisation.

The analysis and discussion shall reveal simple points that have the character of an evaluation which goes beyond the rather descriptive research question. As the following delimitations show, these points do not reflect an expectation of general validity, but they might bring the discussion on innovation-policies forward in an exploratory way.

Delimitations

So far, innovation partnerships between countries are only barely touched upon in literature.

A delimitation of this study is for sure that framing bilateral innovation partnerships thematically already takes some space and capacity in the research process. In total, (new) theory might emerge by classifying BIPs and by listing benefits and challenges in such a partnership. This inductive approach means at the same time that empirical testing or empirical significance will be limited. The case study is an exemplification of an innovation partnership, that e.g. implies hindrances about generalization of results, some would argue. However, the usage of a case study can be seen as a strength (Flyvbjerg, 2006, p. 12) as there is some “force of an example”, suitable for generalization and theory building. As already stated, the contextual data (chapter 4) around the case study helps in classifying the extent of generalisation in the analysis.

The goal of the study is not to evoke claims for empirical validity but to provide first answers or ‘hints’ on the research interest, an overall ‘motion picture’ about the status quo, with implications for theory, future research and practice. Especially in times of rapid changes,

with digital transformation affecting all organisational types and layers, this study is aimed to serve as an orientation around the researched phenomenon in the thematic fields of Open Innovation, Innovation Ecosystem, National Innovation System and Innovation policy.

2. Theoretical framework

The theoretical framework consists on the one hand out of the literature review (Ch. 2.1), which builds the basis for a categorization of the research topic ‘bilateral innovation partnership’. On the other hand, a critical discussion (Ch. 2.2) helps in classifying if and how well the latest research has described this phenomenon and which gaps this study can fill in.

2.1 Literature Review

The literature frames the research phenomenon, thereby ensuring the most relevant aspects are integrated, in order to answer the Research Question. Economic growth theory (Schumpeter, 1942), the concepts of Open Innovation (Chesbrough, 2003), Ecosystems as well as National Innovation Systems are discussed in the following.

2.1.1 Economic growth theory (Schumpeterian view)

A first important question to answer is why the phenomenon of innovation is from such a huge importance for relevant stakeholders in global economies. According to Schumpeter (1942), an invention alone does not create value. Inventions can be paraphrased as generation of ideas.

The crucial step according to Schumpeter (1942) is to translate an invention into value, going the step from invention to innovation, and if possible, to diffusion of innovation. That means in other words, ideas need to be developed in way that they come to market in forms of products and/or services, available to as many people who might profit from it.

The Schumpeterian growth theory claims that establishing new industries is a decisive factor of change in the process of economic growth and development. The famous term ‘creative destruction’ of industries that no longer create economic value is therefore important to mention. In other words, the only constant in a growth-oriented economy must be change – ensuring development and growth by market-oriented value creation (Schumpeter, 1942).

Schumpeter (1942) also differentiated between the entrepreneur as the ‘true’ driver of innovation and the manager of large firms. According to him, there is a correlation between the firm type and the stage within the industrial life cycle. In times where there is a lot of change and uncertainty, new firms are likely to be the main innovators and large firms are more the followers, that seize the innovations with their market power, with ongoing time and maturity of the industrial era (Malerba & Orsenigo, 1995).

The idea and concept of Schumpeter, based on economic growth and innovation, is very relevant in today’s times – maybe even more than in recent decades. Due to globalisation, digitalisation and linked developments such as increased mobility, a transformation is currently ongoing, letting Schumpeter’s concept emerge again in order to understand and to classify the complexity of the status quo in its reduced core – with change as a constant for growth.

In practice, countries might adopt some of Schumpeter’s notions and support innovation-led growth. E.g., the Nordic, socio-political model, follows amongst others the principle of ongoing economic efficiency or profitability in its industrial sectors. At the same time, laws are actively supporting business transformation (Henrekson & Jakobsson, 2000).

In summary, it can be noted that ‘creative destruction’ means creative re-newal from within, including various practical challenges, but also considerable chances for stakeholders.

2.1.2 Open Innovation – Wrap-up and conceptualisation

Companies usually act within given boundaries, that can be national economic or innovation systems (e.g. Freeman, 1987), meaning governments could be themselves follower of the described economic growth theory, setting up rules, structures and policies, thereby encouraging companies to act profit- and growth-oriented. But this is usually beyond a firm’s direct influential sphere. Rather, companies can determine boundaries when it comes to the degree of internal/external orientation within innovation processes. So, there is the question ‘How can a company set up its organisational Research & Development (R&D) structure concerning innovation processes in a best possible way to create value and growth?’

Chesbrough (2003) looked deeper into this phenomenon at play. He starts with a wrap-up of the situation in the early 20th century where companies had a comparable mindset when it comes to organizing their R&D departments. At the same time, there was kind of ‘persistence’ in the research landscape, where universities acted very theoretically, without having strong ties to industry. The government was usually small in size these days and not very involved in establishing linkages between different actors or setting up funding initiatives. This led to an enormous amount of industrial investment into R&D, while companies acted internally oriented. Vertical integration of the value chain was the standard, leading to the fact that R&D was something that happened behind “fortified castles”, letting external observers tap in the dark which ideas companies were working on (Chesbrough, 2003, p. 14). The result was a concentrated pool of few, big companies that scaled up, enhanced efficiency and explored new opportunities.

A first change in the US was to recognize when the decentralized university system gained relevance. The single states started to strengthen connections between their local corporations and their local universities through funding of such cooperation. The corporations were able to recruit better qualified talents as a result while increased linkages between academia, industry and government were built. This development was even amplified by the conditions World War II brought up, leading to a timely pressure for governments, here especially the US government, to develop innovations, often in form of weapons at that time. The government initiated fundings for R&D, letting the role of universities emerge in innovation processes (Chesbrough, 2003).

But after WW II, first factors were slowly coming up which were leading to a processual erosion of the earlier benefits of a so-called ‘closed innovation system’. Researchers in R&D departments were from their nature explorative, less structured and needed time. The developers could deliver more certainty in terms of time or budget and built upon the ideas of the researchers. With time going by, there was for example an increased availability, but also mobility of workers to recognize so knowledge was more and more diffusing between companies. The linkages between Research and Development started to lose grip and there was more leakage of knowledge when researchers increased their networks or moved on to supplier companies in the ‘boom’ era in the 1950s (Chesbrough, 2003).

These developments led to a changed environment, a changed knowledge landscape, where also the timely perspective gained new importance. With diffusing knowledge exchange, there was no more time for a company to wait until a development team builds upon researchers’

ideas. With the implementation of an ‘open innovation concept’ in many companies, there was also coming up the chance to deploy on external ideas or to share own ideas where other firms can then capitalize on. Chesbrough (2006, p. 1) combines the concept of sharing and receiving ideas implicitly with value and growth, by naming “purposive inflows and outflows of knowledge” as suitable to “accelerate internal innovation” and “expand external use of innovation”. Hereby, both, knowledge inflow and outflow are perceived as being equivalent in terms of value or significance for a firm.

Research shows that in practice, Open Innovation activities are mostly taking place in domestic, i.e. national markets while large firms are disproportionately making use of Open Innovation activites in comparison to SMEs. Hence, there is room for improvement, e.g on the governmental side, which could be exploited by incentivizing a stronger international orientation of firms or facilitating Open Innovation for SMEs by stimulating their network activities (Herstad et al., 2008).

It can be concluded at that point that companies today, in seek of innovation, are acting more and more in interactive surroundings, trying to learn, trying to benefit through knowledge exchange, thereby expanding their boundaries. The main idea is to leverage on plenty of ideas, may they be internally or externally created, if they can increase a firm’s innovation capacity.

However, as discussed, the decision of a company to apply Open Innovation paradigm can not be viewed at seperately from the (macro-)economic sphere in which companies act. This is in line with Chesbrough (2003) who strongly ties the advantages of Open Innovation to the recent socio-political or economic developments (such as increased mobility of workforce) that let the concept seem to be advantageous over Closed Innovation.

Gassmann (2013) describes the three core modes of Open Innovation, namely *outside-in innovation*, *inside-out innovation* and *coupled innovation*. Outside-in innovation means that external ideas are integrated, so there is an outside-in stream, e.g. crowdsourcing with customers is an example here. Inside-out innovation is the opposite when internal ideas are leaving the internal boundary. This can happen e.g. via out-licensing or corporate venturing/spin-offs (Gassmann, 2013). The third variant, coupled innovation, stands for a more long-term oriented partnership between parties on ‘eye-level’, with complementarity as an asset. R&D partnerships or Open source are practical implementation setups for this mode according to Gassmann (2013). He closes his remarks with the statement that the crucial question is not whether but how to ‘open’ innovation processes.

In practice, especially the process of finding the right partner or ‘match’ is a common challenge for companies (Gassmann, 2013).

Success factors of Open Innovation activities

A source that is examining success factors of open innovation processes, is Durst & Stahle (2013). In their systematic literature review, they reveal e.g. “*Relational* factors” such as trust, openness or an understanding for the functionality of collaboration to be crucial in the open innovation process. Moreover, *People* factors as diversity (in gender, age but also skills), commitment or the right attitude are mentioned. A third group of facilitating aspects is summarized in *Governance*, meaning the strategic direction, including structure, coordination, and evaluation mechanisms.

The success factors listed from Durst & Stahle (2013) contain individual aspects (attitude) and strategic factors (governance, diversity), relevant for shapers of Open Innovation processes.

In the following, the ecosystem concept gives insights whether there is a relation between Open Innovation and Ecosystems and where a delineation can be drawn.

2.1.3 Ecosystems – Definition, Delineation and Success factors

Note: 'Ecosystem' and 'Innovation Ecosystem' are treated equally in the following as there is no strict distinction to notice between terms in research.

Adner (2006, p. 98) defined *Innovation Ecosystems* as "collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution." Ecosystems can be meaningful for companies since they can "create value that no single firm could create alone." (Adner, 2006, p.100).

One author who contributed much towards a 'standard definition' of ecosystems was Moore (1993). According to him, interactions in such ecosystems are not aimed at economic aspects exclusively but can also be stimulating in building up *capabilities* (Moore, 1993, p. 76). So, the author placed emphasis on the balance between competition and collaboration.

Over the years, there were a wide range of different definitions about Ecosystems to recognize that somehow led to disorientation in the research community about a common standard. Granstrand and Holgersson (2019) analyzed all diverging definitions that were coming up over an extended timespan and compared them regarding most noticeable patterns. As a result, they presented a more 'objective', comprised definition that leaves the business angle (as Adner, 2006) behind towards a rather holistic one (more in the understanding of Moore, 1993). According to Granstrand and Holgersson (2019, p. 3), an Innovation Ecosystem "is the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors."

It can be stated at this point that innovation ecosystem research in the early 2000s (as Adner, 2006) described ecosystems more from a company perspective, similarly to *business networks*. There was an increased focus coming up in recent years towards more holistic or broader concepts, leaving the narrow firm angle to an institutional one while balancing out competition and collaboration.

Tsujimoto et al. (2018) conducted a systematic literature review about conceptualisation of Ecosystems, similarly to Granstrand and Holgersson (2019). The authors (Tsujimoto et al., 2018) differentiate between four different *perspectives* of Ecosystems. One of them is the so-called *Multi-actor Network* perspective that combines a broad range of different actors out of government, industry, academia and society. Tsujimoto et al. (2018) stress the diverging expertise of actors, with each having different purposes, but also the limitlessness concerning national borders in such ecosystems. This setup is expected to promote insights and learning in an innovation process. However, such an ecosystem, with each actor following different objectives, can be highly dynamic and necessitates ecosystem designers to foresee potential conflicts in a proactive way, when "orchestrating" the ecosystem (Tsujimoto et al., 2018, p. 55).

A **delineation** that should be looked at is Ecosystems vs. Open Innovation. Open innovation activities cover a processual company view towards innovation, while the focus is on the boundary of the firm (internal - external). Ecosystem theory is conceptualized on a systems approach, meaning there is a focus on the actors, their activities and artifacts, but also their relations towards innovation (according to Granstrand & Holgersson, 2019, p. 3).

Both concepts are not expected to be mutually exclusive. For the research interest of a bilateral innovation partnership, it is imaginable that both concepts could be combined, depending on the context.

Risks of Collaboration within Innovation Ecosystems

Going back to Adner (2006), innovation ecosystems imply risks for participating stakeholders as well, such as various uncertainties along the cooperation – these can be initiative risks, interdependence risks or integration risks. If two or several stakeholders discuss a potential cooperation, initiative risks are caveats or uncertainties of stakeholders before agreeing to a collaboration. Interdependence risk means that one collaboration partner does not meet committed goals or timelines so that the overall innovation output within a partnership is at risk. In contrast, integration risk is the potential failure of a stakeholder in 'adopting' e.g. its supply chain processes concerning the innovation output (Adner, 2006). As Iansiti and Levien (2004) describe, one risk that is related to initiative risks and uncertainty is an imbalance in the partnership so that one party might profit more than the other at the end of the collaboration.

Success factors within Innovation Ecosystems

Concerning the overall outcome of such partnerships, Adner (2006) concludes that the expectations of a company towards cooperations within ecosystems are a decisive factor – if these expectations are realistic and holistic, the innovation output will be more successful.

Durst & Poutanen (2013) analyze in this regard specific success factors of innovation ecosystems. In their systematic literature review, they select e.g. the following categories as supporting factors in innovation ecosystems: *Resources* (Resource availability, Resource allocation, funding possibilities), *Governance* (Continuous investments in infrastructure, Architectural control, Timing, Clear role assignment), *Strategy and Leadership* (Clarity of purpose, Distant view on innovation), *Partners* (Heterogeneity/diversity of actors and organisations) and *Organizational culture* (Innovation culture).

The publication of Durst & Poutanen (2013) contains strategic/directional factors only and is therefore mainly relevant for shapers of an ecosystem. Personal factors such as attitude are not listed here.

Modelling a collaborative innovation network – company perspective

Now to get a better understanding how a collaborative innovation partnership can be set-up in a functioning way, a project team at World Economic Forum (WEF) (2015), consisting of policy-makers, government and company representatives, have developed an idea which has been visualized (Figure 1).

Chesbrough's *open innovation* concept is the main driver of this model, while different success factors such as a win-win partnership (as Iansiti and Levien (2004) described)) are building a fundus. Also, it is described that shaping and building up a partnership is not enough (*a. Prepare and b. Partner*), the dynamics need to be managed ongoingly (*c.*

Pioneer). Figure 1 is from its scope designed for an inter-firm partnership between a small enterprise and a large company; although a BIP integrates more stakeholders, as from academia and government, this Open Innovation-related concept remains relevant for the further research process.

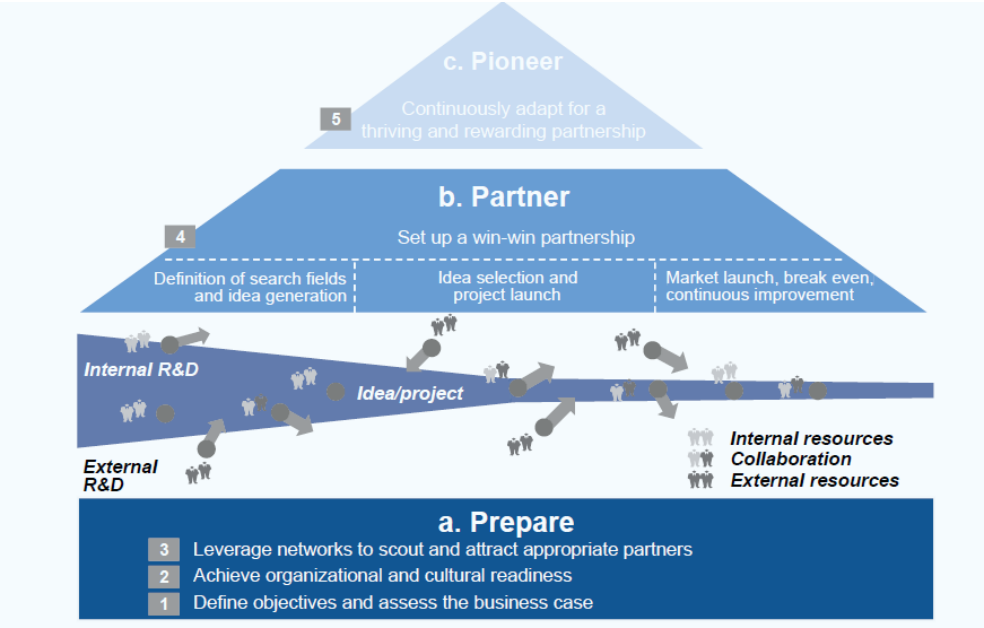

Figure 1: *Collaborative innovation model (Source: WEF, 2015)*

The assumption in this research is, as mentioned in the previous sub-chapter, that an Open Innovation activity can e.g. take place within an Innovation Ecosystem. That means, two or several stakeholders within an Ecosystem undergo a collaboration that affects the boundary (internal - external) of their R&D activities towards innovation. E.g. in the case study of the bilateral innovation partnership, where several stakeholders meet and discuss in roundtable discussions (*Innovation Ecosystem*), there are matchmaking activities taking place in the SME focus area, bringing complementary partners together towards a cooperation that might lead to innovative output (*Open Innovation activity*).

In a next step, the environment of political governance, including policies will be reviewed, to develop a better understanding about BIPs. As a main research interest, BIPs are set up and shaped by government and ministries who might follow certain economic goals with such a partnership. The angle changes therefore from a rather microeconomic perspective towards a macroeconomic level.

2.1.4 Innovation policy and National Innovation System

Fagerberg & Srholec (2008) examined the role of *capabilities* for economic development. As a motivation of their research, they wanted to find out why certain economies develop much better than others. They differentiated between four different capabilities in this context: development of the National Innovation System (NIS), quality of governance, degree of openness and character of political system. As a result, the NIS and quality of governance have been identified as the most important ‘set screws’ when it comes to economic development. Closely linked to governance are so-called policies, here innovation policies.

According to Kuhlmann (2001, p. 954), Innovation policy can be understood as an "integral of all state initiatives regarding science, education, research, technological policy and industrial modernization, overlapping also with industrial, environmental, labor and social policies."

In detail, innovation policies can follow different goals such as a) increasing the innovation capacity on a system level (System-oriented policies), b) finding new concepts that work in practice, as an answer on specific challenges (Mission-oriented policies) and c) supporting research and science (Invention-oriented policies) (Edler & Fagerberg, 2017). Possible innovation-policy instruments to reach such goals can be 'Standards' (e.g. DIN Standards), 'Entrepreneurship policy' or 'Policies to support collaboration'. Usually, a wide mix of such instruments is applied in parallel (policy-mix). Therefore, it can be difficult to measure which instrument reaches which effect(s) (Edler & Fagerberg, 2017).

Schot & Steinmüller (2016) describe in this regard, that *system-oriented policies* are usually applied within a given frame or boundary, e.g. a national one. This can be reflected in the term *National Innovation System (NIS)*, as first described by Freeman (1987) and Lundvall (1985, 1988). It needs to be mentioned that there are also supra-systems (as EU level) but also sub-systems like Regional innovation systems (e.g. McKelvey & Saemundsson, 2018).

Edler & Fagerberg (2017, p. 9) name NIS as "more than frameworks for interaction" as they are "repositories of various resources" on which companies rely on in their seek on innovations. Resources can be e.g. skilled workforce or financial and regulatory support. In times where Freeman (1987) and Lundvall (1985, 1988) defined this term, the national level was more of a boundary than it is today, where geographical borders increasingly blur. Still, companies rely on national policy-makers today and national research and innovation systems are measured against their strengths & weaknesses as in the European Innovation Scoreboard (European Commission, 2019a).

Lundvall (1996, p. 17) emphasises regarding NIS the meaningfulness of capabilities. He states that the generation of "knowledge increasingly takes place in networks". Knowledge generation is not a passive process, but rather something happening in between interaction and exchange. Direct effects of knowledge can be innovation and competence. So, the ability to generate knowledge and to learn in times of rapid change is seen as a success factor and as a resource in a NIS (Lundvall, 2016).

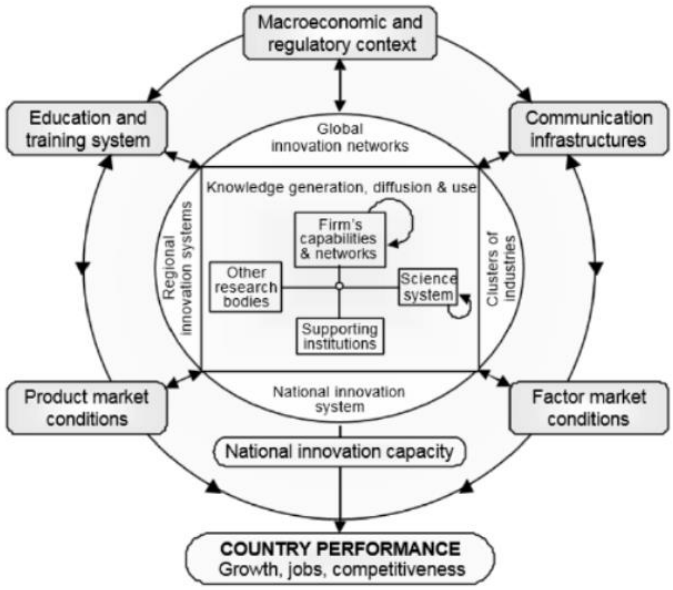

Figure 2: *Actors and linkages in National Innovation Systems (Source: OECD, 1999)*

A delineation between Ecosystems and NIS can now be made. While Ecosystems have their emphasis on actors, activities, artifacts and their inter-relations (inner quadrant in Figure 2), National Innovation Systems have their special emphasis in providing the right resources to (national) actors via innovation policies so that innovation can take place (more a macroeconomic perspective).

2.1.4.1 Modelling a collaborative innovation network – governance perspective

How can a National Innovation System that focuses on learning by collaboration look like in practice? Etzkowitz & Leydesdorff (1995, 2000) described the so-called *Triple Helix* structure, meaning a strong interaction between Government – Academia – Industry, which evolved over time as a concept (see Figure 3, Ranga & Etzkowitz (2013)). According to Leydesdorff & Zawdie (2010, p. 2), a delineation can be made in comparison to NIS: "While NIS is ultimately an institutional program focused on wealth creation at national -or mutatis mutandis, regional- level, Triple Helix provides a model of structure and dynamics *underlying* the innovation system functioning at various levels." Gibbons et. al. (1994) see the main benefits of this model in an alignment of interests between different institutions while it also provides guidance to all kinds of institutions on how to make such a NIS more effective.

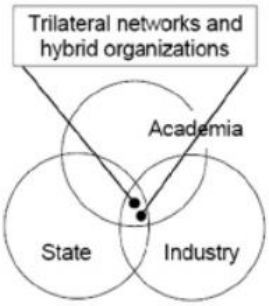

Figure 3: *The balanced Triple Helix model (Source: Ranga & Etzkowitz, 2013)*

A modification of the Triple Helix model has emerged in literature which is called the *Quadruple Helix model* (Carayannis & Campbell, 2009). In this framework, the society is

integrated in this interactive ecosystem as well. For Schuetz et al. (2019), this approach can be more inclusive as national innovation systems can be democratized (see Figure 4). However, in their paper, they claim that the role of society needs to be specified. Scientists, the authors have interviewed, would not welcome if society is directly involved in decision-related aspects, but they see a beneficial role of including society in open discussions about "desirable, socio-technological futures" (Schuetz et al., 2019, p. 140).

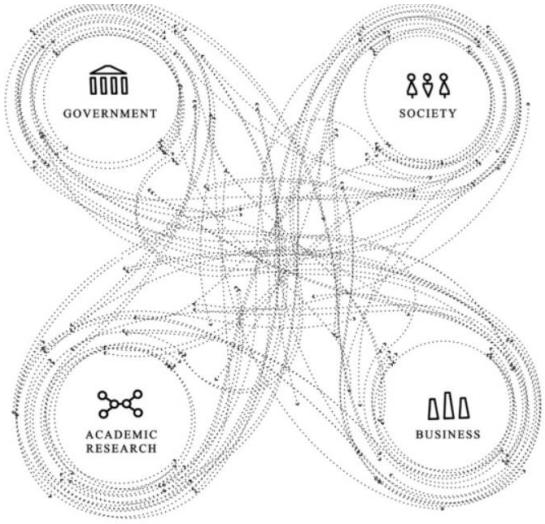

Figure 4: *Quadruple Helix concept, integrating Society (Source: Schuetz et al., 2019)*

This is an interesting aspect since Kuhlmann & Rip (2018) regard Grand Societal Challenges as a major factor in future-oriented innovation policy. Schuetz et al. (2019) can specify a possible role society could undertake in innovation systems, namely debating about a desirable socio-technological future. To which extent this participatory approach is integrated in the case study of the Swedish-German innovation partnership, will be reflected upon in ch. 6, Analysis.

2.1.4.2 Digitalisation as a major challenge

Apart from societal challenges, digitalisation is a major challenge policy-makers have to deal with in current times. OECD (2019a, p. 63) formulates a list of recommended actions, raised by digitalisation, in the context of innovation policies. These reach from

- ensuring access to data for innovators
- ensuring anticipatory, responsive and agile policies over
- supporting interdisciplinarity to
- developing and promoting collaborative innovation ecosystems as well as
- supporting technology adoption by firms, particularly SMEs or
- framing national innovation policies to a global context.

Another OECD report (2019b, p. 3) explains in this context, that governments need to shape a digital innovation framework, incentivizing innovation which is beneficial for society, at the same time avoiding unintended effects. Due to the massive speed the technology is developing, the high level of "technical expertise involved", but also the "uncertainty surrounding digital developments", the authors encourage governments to engage intensely with a broad range of stakeholders. Moreover, they warn that digital solutions do not know

borders, and therefore they see the need for cross-border cooperations when it comes to regulations and policies.

To sum it up, it is clearly visible that collaboration has become an anchor point in innovation policies, especially in times of rapid changes, connected with uncertainties. Policy makers need to shape the future with a policy-mix, taking today's and future challenges into account. The Triple Helix concept by Etzkowitz & Leydesdorf (1995, 2000) is one possible solution in practice as it fosters interdisciplinary knowledge exchange between stakeholders (Ranga & Etzkowitz, 2013). However, a Quadruple concept could even integrate societal view stronger (Carayannis & Campbell, 2009). Lastly, OECD report (2019b) could show the need for a more intense cross-border cooperation when it comes to regulating the digital economy.

2.1.4.3 Bilateral partnerships as a policy tool

The literature review served the goal to 'frame' Bilateral Innovation Partnerships. Strong linkages were found to Schumpeterian's growth theory, Open Innovation concept, Innovation Ecosystem and National Innovation System (with Innovation policies). As a brief sum-up, the central importance of innovation is the uniting factor in all concepts. However, the innovation process can be quite complex and challenging for actors. The following quotation of OECD (2010, p. 196) underlines the need for cross-border collaboration towards innovation again:

"As no single actor has the knowledge and resources to tackle the innovation challenge unilaterally, all countries – in one way or another – face the task of better co-ordinating actors in formulating and implementing policy."

2.2 Critical reflection and classification

The literature review mainly revealed three points:

(i) Change and (disruptive) Innovation spur economic growth (Schumpeter, 1942)
(ii) The 'Open Innovation' paradigm underlines the benefits for firms of opening up R&D-related boundaries on their strive for innovation (Chesbrough, 2003, 2006) whereas ecosystems lay a focus on the inter-relations between different actors, their activities and artifacts, also with the goal of fostering innovation (e.g. Granstrand & Holgersson, 2019)
(iii) Governments mainly act as policy-makers within National Innovation Systems (Freeman, 1987 and Lundvall, 1988). Promoting collaborative networks within an innovation ecosystem (e.g. Triple Helix structure) can be part of an innovation-policy mix, fostering knowledge exchange, innovation and thereby growth (e.g. Ranga & Etzkowitz, 2013)

It can be stated at this point that the research object *Bilateral innovation partnership* as a concept to spur innovation can be framed and somehow be categorized from an innovation policy perspective. It becomes obvious that the surrounding aspects such as *Open Innovation*, *Innovation Ecosystems* and *National Innovation Systems* are phenomena that are highly linked to such a partnership while the partnership itself can be categorized as a policy tool or instrument to strengthen national innovation capacity. Collaboration, e.g. in form of open innovation, is the driving force in the process of knowledge exchange, letting new knowledge emerge by connecting different stakeholders (e.g. with the triple helix structure), thereby building up innovation capacity. A bilateral innovation partnership might ensure a cross-border functionality in this process which can be seen as kind of unique, as the literature so

far mainly discusses national or multinational innovation systems (such as EU), while to a certain degree, the potential power of bilateral innovation partnerships as a policy tool or instrument to spur innovation is not or barely touched upon in literature.

3. Methodology

This chapter aims to answer the different aspects on how this research was conducted. With its qualitative nature, the focus laid on understanding the research phenomenon "with words rather numbers" (Bryman & Bell, 2015, p. 392). The following chapters include the decision process of the author with a reasoning for the methodological choices that were made.

3.1 Research Strategy and Research Design

The research strategy is an inductive one, meaning the research area, in this case 'Bilateral Innovation Partnerships', is not covered very much so far. Inductive research strategy is suitable for 'new' research areas as testable hypotheses need to be created first (Bryman & Bell, 2015). The goal in this study is therefore to let hypotheses and theoretical ground for future research emerge, by using the case study approach according to Eisenhardt (1989). This concept allows a more thorough understanding of "dynamics present within single settings" (Eisenhardt, 1989, p. 534).

The case study of the Swedish-German Innovation partnership, first signed in 2017 by Swedish Prime Minister Löfven and German Chancellor Merkel and re-newed at Hanover fair 2019, has been selected as it (i) includes a variety of different stakeholders from government/ministries, academia/research and industry incl. startups, SMEs and corporates; (ii) tackles societal challenges relevant for both countries but also on EU level and (iii) includes six defined, strategic focus areas which enable a structured and systematic review.

However, a single case study has its specificities as the question if or to which extent general statements can be drawn from a single case. This is discussed quite controversial in research with some critical voices claiming a generalisation is not possible with a single case. For Flyvbjerg (2006), such a 'myth' or misconception needs to be debunked. First, practical, context-dependent knowledge is something bringing more value to research than theoretical, context-independent knowledge, according to the author. Second, generalisation is something that can also be reached via case studies, while overall, the power of an example is underestimated whereas the power of generalisation in a formal sense is overestimated (Flyvbjerg, 2006). Apart from these two points, a potential bias has been reduced by applying different quality criteria (as presented in ch. 3.5). For example, contextual factors of the case study were looked at (see ch. 4). This transparent approach of classification enabled both the author in generating theory in the analysis part (ch. 6) and the reader in building an opinion about the extent of generalisation that can be made from this case.

Moreover, grounded theory as a methodology was applied, securing with its iterative approach a 'learning process' the author underwent, reducing further bias about the case and the research topic.

Grounded Theory as a methodology

The information publicly available about the functionalities of such an innovation partnership were very limited – from the given literature as well as from the case. This is a reason why an exploratory, inductive approach was chosen which can come with Grounded Theory methodology, including iterative learning cycles (Bryman & Bell, 2015). Grounded Theory (GT) was first described by Glaser and Strauss (1967) in order to examine social processes within social sciences. In the late 1960s, it was an era where positivism was dominating,

meaning reality was equivalent to ‘measurable’ observations based on natural sciences. Glaser and Strauss (1967) were challenging this view and were giving reasons to inaugurate a new era, where systematic qualitative research gained importance (Suddaby, 2006).

Mills et al. (2006, p. 26) describe Grounded Theory as a process “to construct theory about issues of importance to peoples’ lives” (based on Glaser, 1978; Glaser & Strauss, 1967, Strauss & Corbin, 1998). The method consists of two aspects: ‘constant comparison’ and ‘theoretical sampling’ (Suddaby, 2006, based on Glaser & Strauss, 1967). Constant comparison stands for a non-linear, iterative process where data collection and data analysis function simultaneously. It contradicts viewpoints that both research steps must be executed separately one after another. Theoretical sampling is the decision after each iteration which data to collect next, which is based on both an ongoing construction of theory and an interpretation of participants’ perceived reality that is constantly emerging. Hence, a hypothesis is not existing *a priori* but becomes generated and narrowed down within the research process (Suddaby, 2006). In other words, the researcher usually has no underlying idea which he wants to test or prove. Instead, theory or findings usually come up during this non-linear process (Mills et al., 2006).

Besides constant comparison and theoretical sampling, GT integrates two more ‘tools’ (according to Bryman & Bell, 2015): *Coding* as a technique for data analysis (see ch. 3.4) as well as *theoretical saturation*, according to which data collection ends as soon as there are no new insights generated from interviews with participants.

There are three different GT directions or understandings discussed in literature:

The constructivist (Charmaz, 2000) and the evolved approach (Strauss & Corbin, 1998) are to be delineated from the so-called traditional GT methodology, as described by Glaser (1978).

All three approaches make use of the described tools, but they differentiate in some details, e.g. in the aspects of *epistemology* and *theoretical sensitivity*. In the constructivist approach, the writing style is more literary than scientific. It develops a narrative in line with participants’ sayings. As a result, the researcher uses creative writing to reflect how participants construct their worlds. Studying relevant literature early in the research progress, so-called sensitizing with theory, is explicitly allowed in evolved/constructivist GT (Strauss & Corbin, Charmaz) approaches, as it can ‘stimulate’ the research process (Mills et al., 2006).

In contrast, traditional GT (Mills et al., 2006, p. 29 based on Glaser, 1992) follows a rather ‘objectivism’ view that places emphasis on the “need not to review any of the literature in the substantive area under study” for fear of constraining the research. As the topic of a bilateral innovation partnership is more a political initiative, where contents are in parts sensitive and participants are expected to speak in parts for their organisations (participants might be constrained), the author decided not to over-emphasize the aspect of constructing a meaning by looking intensely at mood or liveliness of words within the interaction with participants, as suggested by the constructivist approach (Charmaz, 2000).

Instead, the approach of traditional GT to be more a neutral observer or interviewer, who does not develop too much theoretical sensitivity before the data analysis, was favored over the post-positivist and constructivist GT approach that openly allow it, seeing it as stimulating. The researcher wanted to keep thoughts and reflections quite ‘open’ as long it was possible. An early immersion with theoretical frameworks might have been constraining in this regard.

However, Charmaz (2000) with her view on constructivism describes an aspect that speaks against traditional GT. Glaser's view (1978) consists of one reality while Charmaz (2000) trusts in multiple perspectives on reality. The researcher came to the conclusion to apply elements of traditional GT, where feasible (here: the systematic process of collecting data, especially regarding theoretical sensitivity as well as coding) and constructivist GT (the act of classifying the end result/theory as an interplay between researcher and participants that is not mutually exclusive). Especially the aspect that the research is done via a single case-study does not allow a pure 'objectivism' view as the contextual factors are very complex. Also, a bias could not be excluded, but only reduced to a certain extent (see ch. 3.5.), so that 'objectivism' (traditional GT) seemed to be non-reachable in its core.

Several rounds of iteration took place between literature review, data collection and pre-data analysis (Bryman & Bell, 2015) – this means, after each data collection (or interview), results have already been pre-analyzed which led to a) partly new insights relevant for the literature review part but also b) slight adaptations in the interview guide in the data collection part.

This important methodology led the research interest become much more accurate. It contained learnings for the author to understand the research interest better, with direct impacts for the literature review and the data collection. Therefore, this iterative methodology of connecting data collection with literature review and data analysis is seen as symbolic for the dynamic learning process the author faced and as crucial for the qualitative outcome of this research.

3.2 Literature review

In order to classify the research interest from a theoretical perspective, a literature review (Ch. 2) was conducted. The literature review was a necessary step to answer the research sub-question ii of framing a bilateral innovation partnership with theory. The application of GT methodology let theory constantly emerge with direct influence on the literature review.

Specifically, theoretical framing of such a bilateral innovation partnership, based on a single case study, could not be advanced extensively before the specific features (actors, activities) and requirements (on which both countries based their decision on to agree to a partnership) were examined from a contextual perspective – as well as with first interview results. Data collection (primary as well as contextual) and data analysis narrowed down the research interest and led the focus of the study become clearer. Thus, majority of the literature review was carried out at the end of the research process, with ongoing refinements.

While the literature review started more in a narrative-written style with looking back at the development of the term 'innovation' in relation to economic growth, there were clear linkages made but also delineations between the different theoretical concepts. The result was a rather systematic literature review that was built in close bond to the research interest.

Inclusion criteria were Schumpeterian's Growth Theory, Open Innovation, Ecosystems and National Innovation Systems as all these concepts have been noticed as strongly related towards a BIP. Moreover, success factors for a 'secured functionality' of such concepts in practice have been looked at as there was a direct link to the research interest (e.g. Durst & Stahle, 2013). Exclusion criteria were literature about collaboration that was too broad and not directly applied to the above-mentioned concepts. Moreover, the focus was not on looking into network theory or concepts about knowledge economy as these concepts are already

touched upon in parts within the presented concepts such as Ecosystems (or National Innovation Systems (e.g. Lundvall, 1996 with his view on knowledge as a capability)).

3.3 Data Collection process

The initial step in this exploratory research was to screen publicly available documents such as the case study of the Swedish-German innovation partnership, governmental policy papers about industrial strategy, conference and fair reports but also websites of related stakeholders such as RISE, Vinnova or German counterparts. This contextual data is presented mainly in Ch. 4.

Overall, these insights served the purpose of receiving a better understanding about bilateral innovation partnerships. It was a first way of 'immersing' with the research interest and to see where the boundaries are of publicly available data. Ethnographic research as observations were not possible here as BIP roundtables or workshops usually take place in 'official' settings, not open for the interested public.

Contextual data revealed hints for the literature review, but also potential interviewees could be identified. In single cases, some loose questions were asked to stakeholders, such as organisational or functional ones to understand the research interest better. Moreover, relevant contextual data was analyzed, in line with Grounded Theory approach, which paved a way for the semi-structured interview design.

Flick (2019) describes in this regard the combination of different data sources (here: contextual data and interviews) within GT as a form of *within-method triangulation*, where GT is understood as a method and different data collection strategies are applied. The result can be a better comprehensiveness or understanding about the research phenomenon.

3.3.1 Semi-structured interviews

Semi-structured interviews were considered as the right method to collect primary data since they allow flexibility, at the same time provide necessary structure (Bryman & Bell, 2015). The interview guide was designed, based on three different categories or themes: 1) *General* personal attitude towards collaboration in innovation processes; 2) *Specifics* about the Swedish-German Innovation partnership (organisational role; personal attitude) and 3) *Overall* Evaluation of bilateral innovation partnerships (personal attitude). While the first part of the interview guide serves as a general introduction into the research topic, the second part (as main part) is a mix out of the organisational role and the personal perception such as benefits and challenges, to name two. The third part reflects an overall evaluation, that leaves the specificity of the case again to a broader angle.

An argument that specifically justifies the choice of a semi-structured interview design was the mentioned change of perspective; interviewees who e.g. work for an organisation or company that participates in the partnership, were expected to evaluate benefits and challenges for both organisation (micro-level) and country (macro-level – e.g. evaluating if the partnership is a win-win). In single cases, it was foreseeable, that insights of participants would not be sufficient to evaluate the partnership from both perspectives.

The semi-structured interview design (Appendix A) enabled the needed flexibility throughout the data collection phase. Especially the main part, where different variables were examined, was kept flexible, depending on the context (focus area and expertise of interviewee).

Moreover, slight adaptations were made after pilot-phase and first interviews, as a result from iterations between data collection, pre-data analysis and literature review.

3.3.2 Sampling

Three out of six focus areas were examined (AI, eHealth, SMEs), reflected in the choice of interviewees, representing those.

The focus areas eHealth and SMEs are already part within the BIP since its initiation in 2017; Therefore, first presentable results were expected here. AI focus area was selected since there is a focus on research/startups/ministries while SME area is mainly shaped by industry (SMEs)/ministries. The eHealth focus area is well-mixed with different stakeholders. Overall, these three focus areas represent a decent variety of possible collaboration setups (e.g. matchmaking events between companies, roundtables with a mix of stakeholders) and topics.

A reductive choice of only three areas within the single case study limits the numeric size of the sampling group further. Still, this concentration is seen as advantageous over covering all six areas since a main scope of the research is to understand the functionality of a BIP better and looking into three different areas within the case study is considered to be sufficient – reflecting the variety of collaboration setups and themes. Moreover, this reduction allows certain comparability in an overall manageable framework.

The list of organisations that are participating in the partnership was only to a certain degree published – either in the case study itself or on web publications, listing participants of panel discussions of Hanover fair where the partnership was presented to the public in 2019. Due to the nature of exploratory, qualitative research, making use of GT methodology, and a recognized uniqueness of the individual focus areas with a restricted number of different actors in each, following a random sampling approach was not feasible.

Instead, a mix out of theoretical and snowball sampling was chosen (Bryman & Bell, 2015). The case study itself with a differentiation in focus areas, each having different stakeholders from both countries, eased the process of dividing interviewees into sub-groups. So, a diverse mix of interviewees was pre-given by the nature of the case that then required active seeking for suitable representatives in a second step. The goal of the author was that each actor type (ministry – company – research) and both countries in a focus area are represented to reach a representative sample. First interviewees could be recruited actively by contacting organisations that play a key role in the partnership.

The interviews itself have been used by the author to ask interviewees whether a recommendation can be given for other candidates that could present a different organisational angle, adding further value to the research (*snowball sampling*). Value in this case was connotated to having an important role in the partnership that might contribute to the research interest.

Overall, sampling happened in a processual way. Starting with defined sub-groups, certain criteria were defined such as a high degree of involvement in the partnership. As a central factor of Grounded Theory approach (Bryman & Bell, 2015), iterative pre-analysis after each interview helped in defining requirements for next candidates that were supposed to add value and match with pre-defined criteria (*main element of theoretical sampling*). The snowball sampling approach helped in executing this. The interview process ended when first theoretical saturation was to recognize.

Flick (2019) argues in this regard that different data sources, here different viewpoints from different organisational spheres and focus areas, are a form of *data triangulation* (based on Denzin, 1970) while the idea comes very close to Glaser & Strauss (1967, p. 65), who spoke of "slices of data". Such diversity of data can increase the overall comprehensiveness in GT approaches (Flick, 2019).

In total, 2 participants from the industry side, 3 interviewees from the ministry side and 3 participants from the public sector/academia sector could be recruited for interviews. Some interviewees had insights into more than one focus area so that a mixed sample, representing different angles within the three focus areas could be generated. Heterogeneity was also ensured by reaching a somewhat balanced ratio of Swedish and German representatives (3:4, without pilot interview) in phone/video interviews. All representatives had clear ties to the partnership, being able to speak for their organisations or to express their personal view, where needed in the interview.

Table 1

Overview of Interviewees and related info

Respondent Number	Interviewee's Entity	Position	Format	Date	Duration	Country
1	Ministry	Advisor	E-Mail	February	n.a.	German
2	Company	Director	Video	March	30 min	Swedish
3	Research Institute	Manager	Phone	March	23 min	German
4	Research Institute	Divisional Head	Phone	March	22 min	Swedish
5	Company	CEO	Phone	March	20 min	German
6	Ministry	Project Manager	Phone	March	38 min	Swedish
7	Ministry	Deputy Head	Phone	April	29 min	German
8	University Incubator	CEO	Phone	April	16 min	German

Contextual literature about the BIP provided only general information but did not go very much in detail. Interviews as a main source served the purpose of receiving an in-depth understanding about the different roles of stakeholders in such BIPs, their individually perceived benefits, challenges or limitations, ended by an overall evaluation of the partnership. Interviews 2-8 were conducted online via video or phone and lasted between 16 and 38 minutes each (25 minutes on mean), depending on the context and the degree of involvement of the interviewee in the partnership. The listed interview 1 helped in designing the semi-structured interview guide together with secondary research (pilot stage) but was kept mainly separate from interviews 2-8 in the final data analysis.

Interviews - practicalities

Due to the virus-related situation in 2020, there were no physical face-to-face interviews possible; otherwise, this method of conducting interviews might have been prioritized over video and phone. One reason is that face-to-face interviews would have offered the possibility

to observe body language. However, phone interviews can be beneficial when e.g. asking sensitive questions as interviewees might be less concerned when answering such questions via phone. Moreover, the nature of the case study with Swedish and German participants would have required extensive travel to conduct face-to-face interviews (which was not even possible in early 2020), so phone interviews were a practical choice. (Bryman & Bell, 2015). Nearly all interviews were recorded and transcribed. The process of recording and transcribing collected data is seen as the most appropriate choice in conducting documentation of interviews, since they allow repeated examination of interviewees' answers (Bryman & Bell, 2015). To first interviewees, a summary has been sent after the interviews to re-check whether the findings can be used in a non-anonymized way. As one interviewee did not give consent, the decision was taken in midst of the data collection process to anonymize all findings. This led to a slightly changed approach for the last interviews, letting the interviewees know that the findings will be anonymized.

3.4 Data Analysis

Data analysis can be divided into two parts: a) coding of interviews as primary data and b) elaboration on results of coding by synchronizing primary data, literature review and contextual data.

a) First, within the iterative process of data collection and data analysis, different stages of coding were executed, using NVivo software (ch. 5.3). The suggested Coding approach of Glaser (1978) was followed which consists of three different steps, namely *1) Open Coding*, *2) Selective Coding* and *3) Theoretical Coding*.

The stage of open coding included allocating text references into nodes. The building of thematic nodes in NVivo took place mainly *a priori* through designing the semi-structured interview guide. In the so-called pilot stage, where first contextual data and an unstructured interview (respondent 1) were analyzed, the themes for the semi-structured interviews were defined, and the interview guide was designed. During open coding, notes, here memos, were taken when there were certain peculiarities to recognize that could have impacted the further data collection or analysis process within GT methodology. For example, if there were answers that could not clearly be allocated to *a priori* themes, or here 'nodes', a new theme was defined and added.

A 'core theme' could be identified within selective coding. All references or relevant text sequences of open coding were reviewed and cross-analyzed concerning possible links and commonalities (patterns). So-called framework matrices were generated with NVivo software, where different interviewees (1-8) are placed on the y-axis and the thematic nodes are on the x-axis. Then, all coded references could be compared on one sheet and patterns were found. Especially the method of framework matrices helped in identifying the core theme.

After completion of data collection, theoretical coding was executed where a storyline was built around the identified core theme, by re-checking on emerged categories of the earlier coding process. The result was a 'Grounded Theory', that integrated all main findings of the research.

The process of coding as part of GT and qualitative research can be subjective, so that certain measures can be undertaken to reduce bias and increase reliability. For example, one strategy can be to let other persons code additionally and agree on certain criteria via a codebook

('Intercoder agreement') (Campbell et al., 2013). This measure was considered as not feasible in this case due to timely restriction of this thesis project, but mainly due to an expected different level of context-related knowledge. In other words, a second or third researcher would have needed to be onboarded from the beginning of the research to ensure similar prerequisites. As discussed in chapter 3.1, especially in Grounded Theory, a comparable level of context-related knowledge is considered as important. This could not be guaranteed in practice. Instead, two rounds of open coding with line-by-line coding were applied where a focus was laid on data completeness, allocating as much information as possible to nodes, to avoid 'information gets lost' or incorrectly assigned. Moreover, the a priori nodes were thematically delineated with few overlaps only, so that a more distinct allocation was possible.

b) The second part of analysis happened simultaneously to the last two stages of coding – where the core theme was defined and a storyline was built. Besides the evolved features of a BIP (the 'why', the 'how' and the 'what'), a conceptualisation of a BIP, the defined research question ii, was implemented.

The discussion on features of a BIP and its conceptualisation were conducted in a synchronized way, as an interplay between results of coding, literature review and contextual data. This within-method triangulation increased the comprehensiveness (Flick, 2019) and enabled linkages between theoretical concepts and practical implementation (BIP). The process of coding led the theory constantly emerge. Accordingly, the concept of a BIP is strongly related to theoretical concepts such as Ecosystems, Open Innovation, and National Innovation Systems. Referring to contextual data helped in classifying the case-specific findings and allowed a clearer statement about the possible extent of generalisation that can be drawn. To come back to the beforementioned limitation, bias could not be fully excluded but reduced, as the following quality criteria in 3.5. show.

3.5 Quality criteria

The classical quality criteria validity, reliability and replicability are mainly applicable to quantitative research (Bryman & Bell, 2015). As this is a qualitative study, Bryman & Bell (2015) suggest making use of alternative instruments instead such as authenticity and *trustworthiness* (based on Guba & Lincoln, 1994). They divide trustworthiness into four parts:

- Credibility, which equals internal validity
- Transferability or external validity
- Dependability, that stands for reliability
- Confirmability, which can be used for objectivity

Credibility, according to Bryman & Bell (2015), is strongly linked to acceptability of others. Acceptability can be reached for example by showing good practice, sharing findings of the research or checking back with interviewees for respondent validation.

This has been applied in this research process, e.g. by explaining the interviewees the motivation of the study, being transparent of the scope of the interview beforehand. During interviews, statements that might have been not clear to the interviewer, were asked back for reconfirmation. After interviews were conducted, a summary was sent to participants where it was agreed on (in 5 of 7 cases). In this regard, integrity was a value that was emphasised by sticking to the words said. This started with meeting timelines or sharing documents such as

interview summaries. And integrity does not end when submitting the master thesis, but it goes beyond through sharing the final master thesis where it was promised to respondents.

Moreover, making use of theoretical sampling ensured that a variety of different viewpoints were integrated into the study while theoretical saturation was a hint that a comprehensive examination was reached.

Transferability is related to the question whether research-specific context can somehow be generalized or used in other contexts. Therefore, Bryman & Bell (2015) use a term of Geertz (1973), namely 'thick description', that can help others to evaluate to which extent findings can be transferred towards their specific context.

As this research interest is closely related to the Swedish-German Innovation partnership as a case, the author provides a detailed contextual view on the specific case study in chapter 4. This includes socio-economic information allowing the reader to evaluate the country-specific relation and possible complementarities. Moreover, the interviews themselves contained a question aimed to examine whether the concept of a bilateral innovation partnership can be somehow summarized as beneficial or whether there need to be certain pre-criteria met in order to allow this hypothesis. These aspects together with the delimitation in the introduction and the presented views on the case study design in Methodology (ch. 3.1) help the reader in an overall evaluation concerning transferability.

Dependability or replicability can be reached, according to Lincoln & Guba (1985), by establishing an 'auditor' structure through collecting and keeping notes throughout the research process. The goal is to check to which degree theoretical 'inferences' by the author can be retraced by others. This perspective was followed by a) sharing 'in-between' results and ideas with the supervisor of this thesis as well as with a peer of the study program and by b) trying to develop kind of a critical 'self-assessment' auditor perspective e.g. by following certain principles, implemented at the beginning of the thesis process, such as being 'open' to an end result, being non-judgemental and asking open questions in the semi-structured interviews. Following these principles helped in increasing dependability. Apart from that, notes such as memos were taken throughout the research, to e.g. document the decision process of the author.

Confirmability or objectivity are very much in line with 'openness' and 'transparency'. It was the willingness of the author in this qualitative study to let the result emerge from a rather non-judgemental perspective, setting up criteria within theoretical sampling that build a representative starting point, at the same time keeping the process open, letting emerging theory decide over next interviewees. The ongoing exchange with supervisor and peer(s) helped in reaching this. Moreover, the view of Glaser as a traditionalist of GT, to not screen theoretical concepts before data collection is advanced in the research process, is seen as important and was followed as this ensured exactly the mentioned 'openness' and flexibility towards an end-result. Another factor that increased confirmability, was a granular presentation of results, very close or equal to original sayings of interviewees. This ensured a comprehensiveness from the reader's side and enabled a judging view whether the conclusions drawn in analysis are in close relation to collected data. The research interest of a bilateral innovation partnership was overall a phenomenon explored during the master studies program by 'chance' and there were no specific ties or interests behind that could have somehow impacted the direction of this research.

4. Empirical context

In the following, the countries' individual national innovation strategies and -systems will be shortly presented and compared in order to assess the peculiarities of the case study (ch. 4.1). The goal is to answer questions like: "Are there complementarities between both countries? And where are overlaps?" Also, the multinational level will be observed, here especially the European Union and its innovation and industrial policy that affect both countries, Sweden and Germany.

After that, the case study of the Swedish-German Innovation partnership is presented and shortly reflected upon (ch. 4.2).

4.1 (Multi-)national innovation strategies – a classification

A national innovation strategy is important to look at as it can contain implications how a country aims to expand its innovation capacity. Therefore, such strategies are considered important to look at as they are expected to reveal insights about linkages between the BIP and national strategies.

When looking more closely at National Innovation strategies, Sweden has formulated long-term strategy programs such as 'Produktion 2030' and 'Swedish Innovation strategy' while Germany has its 'High-Tech strategy 2025' and 'National Industrial strategy 2030.'.

'Produktion 2030' is a strategic research and innovation program from 2013, funded by Vinnova, that works as a public-private partnership and is built on strong collaboration between industry, academia and research associations. The goal is to "make Sweden a frontrunner in investments in sustainable production by 2030" (Klitou et al., 2017, p. 3). So, interorganisational collaboration is here a main facilitator for reaching a strategic, national goal.

Moreover, 'Swedish Innovation strategy', first published in 2012, contains several challenges such as *societal challenges* that deal with e.g. smart transport, clean energy, or climate, to name three. Additionally, *long-term productivity*, a part of Sweden's political welfare system, is seen as an important enabler for growth and future prosperity. The third challenge lies in *public sector with demographic challenges* such as an altering population. All three challenges shall be tackled e.g. with open and user-driven innovation, but also by building up new linkages between different industries and "fields of knowledge" (Swedish Government, 2015).

However, a Swedish national innovation strategy can not be designed separately from international challenges. Within the paper, it is clearly underlined that the main challenges are international and cross-sectoral, affecting different societal layers. This requires a 'holistic' view in terms of collaboration (Swedish Government, 2015).

Germany's 'National Industrial Strategy 2030' tackles this ambiguity of national and multinational interests by combining a national with a multinational (EU) agenda. According to the publication (BMWi, 2019, p. 9), the aim of the National Industrial Strategy 2030 is to "work together with the stakeholders in the business community to help safeguard and regain commercial and technical expertise, competitiveness and industrial leadership at national, European and global level in as many areas as possible."

A strategy that comes along with this is Germany's 'High-Tech strategy 2025' that combines an industrial strategic program with a national innovation strategy. It builds a strategic framework of Germany's research and innovation policy. It is aimed towards helping in finding answers to societal challenges around e.g. "Health and Care", "Mobility" and "Climate", to name three. There is one central goal formulated (BMBF, 2019, p. 4): "shaping the economy, working life and lifestyles in such a way that competitiveness, preservation of the natural life-support systems, and social equity become compatible." One principle to reach this goal is the coordination of activities of all stakeholders: government – academia – industry, by integrating the civic/societal voice as well (BMBF, 2019).

Drawing the link back to national innovation systems (ch. 2.4), there is strong interdependence and linkage between industrial strategies and innovation policies to recognize. National strategies somehow integrate mid-or long-term goals while innovation policies shape the way how to reach these goals (e.g. Mahroum, 2012). The following overview (Table 2) compares both countries with relevant economic indicators that give insights about individual strengths and possible complementarities.

Table 2

Comparison of Sweden and Germany from a socio-economic view

	Sweden	**Germany**
Socio-economic model[1]	Nordic model, or Swedish model	Social market economy
GDP per capita (PPS)[2]	36,100	36,500
Population size[2]	10.0 m	82.5 m
R&D spendings in % of GDP[2]	3.40% - target: 4.0%	3.02% – target: 3.5%
Exports to equivalent ctry as a share (%) of total [rank][3]	11% [1]	2.1% [13]
Imports from equiv. ctry as a share (%) of total [rank][3]	19% [1]	1.5% [18]
EU Innovation Scoreboard 2019[2]	ranked #1 (2019)	ranked #3 (2019)

Sources. 1-Government Offices of Sweden (2017) and BMWi (2019), 2-European Innovation Scoreboard (EC, 2019a), based on Eurostat (Avg. 2015-2017), PPS = Purchasing Power Standard as a Currency Exchange rate against Euro, 3-OEC in 2017

Sweden and Germany both place emphasis on open economies and social welfare. The form or extent of governmental influence into market economy can differ between both. Concerning social welfare, Sweden follows the goal of an equal distribution of prosperity (Table 2) (Government Offices of Sweden, 2017).

Moreover, it can be concluded from Table 2 that Sweden and Germany are comparable in terms of their economic strength, while Sweden seems to have more Innovation capacity, reflected in their higher R&D spendings and their no. #1 ranking in the European Innovation Scoreboard (EIS). Germany, on the other hand side, is bigger in its market size with around 80m inhabitants, being itself a strong innovator, ranked on position #3 in the EIS (European Commission, 2019a). Both Sweden and Germany are export-oriented countries, as their long-

term innovation strategies indicate (BMWi, 2019, Swedish Government, 2015). When looking at trade relations between countries, Sweden exported 11% of its products and services to Germany in 2017 which equalled the top rank, when comparing this share with other countries that Sweden exported to in that year. Vice versa, 2.1% of German exports went to Sweden in 2017 which equalled rank 13 on a global scale (OEC, 2017). Overall, Sweden and Germany maintain intense trade relations (Table 2).

Innovation strategies and goals on multinational layer (EU – UN)

On a multinational layer, Sweden and Germany both act as member countries of the EU where there are coordinated innovation activities as well. E.g. there is the Horizon 2020 Research and Innovation program, that has provided funding of nearly 80bn € between 2014 and 2020 (EC, 2020b).

An EU-wide, innovation system-related evaluation tool that has already been presented in Table 2, is the European Innovation Scoreboard. There, recommendations for the national innovation systems are given to boost an innovation-friendly system. For Germany, it was recommended by the Commission to "strengthen innovation performance and foster productivity growth by identifying smart specialisation areas [..]" or "to build synergies and joint projects with other [..] Member States" (European Commission, 2019b, p. 76). For Sweden, one recommendation was to "support the development of regional, interregional, and international networks to disseminate knowledge, create partnerships, and promote further innovation and global value chains". Another point was to "exploit the potential of Swedish SMEs and innovative start-ups better." (European Commission, 2019b, p. 151).

These aspects are already partly integrated within the Swedish-German BIP, as ch. 4.2 will show. So, the Swedish-German cooperation can be a promising partnership, pointing in the right direction, when looking at it from an EU perspective.

The EU stands from its industrial structure and size in a global competition to China and the United States which is reflected in the EU industrial policy (e.g. BMWi, 2019). One challenge in the EU's industrial policy is for example how the EU can stay competitive in digital transformation. One prominent solution approach is the creation of a European data platform concept with 'Gaia X', aiming towards retrieving back data sovereignty in a global competition where data is be spoken of 'new gold' (EC, 2011, 2020c). E.g. Sweden and Germany could potentially contribute to such multinational initiatives with their Innovation Partnership, presented in ch. 4.2.

On EU level, the seven Grand Societal Challenges (as mentioned in Horizon 2020 (EC, 2020b)) and on United Nations (UN) level, the 17 Sustainable Development goals (SDGs) (UN, 2015) need to be mentioned that both unite member countries in their innovation policy efforts, putting the major societal goals at its core. This trend is confirmed by looking into latest innovation policy research, having societal goals increasingly integrated, gaining central relevance (e.g. Kuhlmann & Rip, 2018). Climate change or global inequalities such as an uneven distribution of wealth and resources are major challenges that have a direct influence on national innovation policies, e.g. by embedding UN's 'Agenda 2030' into industrial strategy programs such as 'Produktion 2030' (Klitou et al., 2017).

4.2 The case study of the Swedish-German Innovation partnership

Sweden and Germany agreed in 2017 to go into an innovation partnership where they want to tackle societal challenges in a sustainable way. First, the partnership was based on strategic areas Electric road systems, Testbeds, eHealth and SMEs while focus areas AI and Batteries were added in a re-newal of the partnership in 2019 at Hannover fair. Also, it is claimed in the Joint Declaration of Intent, that the partnership might "develop the role of the EU" in key areas such as climate, digitalisation or health (Government Offices of Sweden, 2019, p. 1).

The parties mention in their statement that there are already strong ties between them, while "common values" such as inclusiveness and innovative societies are amplified by the cooperation. The speed of global changes is a factor explaining the motivation of both to seek cooperation. Also, the industrial competition the EU is facing with other powerful players in the world, demands closer bonds and a strong, common European voice, according to both. Therefore, the partnership is not formulated as being exclusively bilateral, the linkages and possible impacts on EU governance are clearly drawn. Sweden and Germany see themselves in the position to somehow 'pioneer' for Europe by combining their individual strengths (Government Offices of Sweden, 2019).

All six defined focus areas are of strategic importance, while Artificial Intelligence, eHealth and Innovation and cooperation of SMEs will be examined more closely in the following.

AI

Both countries follow already national initiatives within the sector of Artificial Intelligence. Within the partnership, the relevant research institutions and universities are called to intensify their already existing relationships for further knowledge exchange. Stakeholders here are from the Swedish side *Research Institutes of Sweden (RISE)*, several *Universities (KTH, Linköping, Chalmers)* and on the German side *Applied AI/UnternehmerTUM* together with *Universities of Munich* and *Berlin* as well as *German Research Centre for Artificial Intelligence*.

In this focus area, it is expected that the partnership has an impact on EU level, executed by best-practice sharing in research and development. There is a coordination function formulated as well, executed by *German Ministry for Economic Affairs and Energy (BMWi), German Ministry of Education and Research (BMBF)* and their Swedish counterparts from the *Swedish Ministry of Enterprise and Innovation* and the *Swedish Ministry of Education and Research.*

This focus area was added in 2019 during Hanover fair where Sweden was the official partner country.

eHealth

The eHealth focus area is integrated within the Joint Declaration of Intent since its initiation in 2017. There were different delegation visits made in 2019 with a variety of stakeholders such as ministries, service providers, startups/scaleups or researchers. Four different themes are currently discussed while there is a focus on AI/Big Data within eHealth. One specific project is cross-border ePrescription that has a potential impact on EU level. The coordinating actors are *German Ministry of Health, German Ministry for Economic Affairs and Energy (BMWi)* and *Swedish Ministry of Health and Social Affairs*.

Innovation and cooperation of SMEs

As the eHealth focus area, ‘Innovation and cooperation of SMEs’ as a focus area is already part of the BIP since 2017. In April 2020, there were already three joint calls made between the Swedish side (Vinnova) and the German side (ZIM-BMWi). The goal is twofold: supporting matchmaking between small and medium-sized companies and providing funding for joint R&D projects that fulfill certain criteria. *Swedish Innovation Agency Vinnova*, *Swedish Agency for Economic and Regional Growth* and *BMWi* are the main coordinators.

There are planned follow-up meetings integrated that entail connections to innovation-related work on EU level (Government Offices of Sweden, 2019).

Overall, it is a contract initiated on political level, combining high-level meetings with very practical-based projects such as matchmaking events between SMEs/startups. The integration of both societal goals and growth-oriented industrial strategies is a hint that this is a modern, future-oriented innovation partnership (in the sense of Kuhlmann & Rip, 2018). The Joint Statement of Intent serves as an orientation point, mentioning the motivation for the partnership besides its strategic direction.

5. Results

This chapter starts with 5.1 Overview, providing some general information concerning the presentation of results. In 5.2 to 5.4, the results are presented accordingly to the themes within the semi-structured interview guide. Moreover, different viewpoints and angles are applied, such as focus area or organisational entity (industry, academia, government).

5.1 Overview

In the following heatmap (Table 3), it is to recognize that the semi-structured interviews had slightly different approaches, depending on the role of the interviewee in the partnership. The aim was to make use of the individual expertise of the interviewee, at the same time ensuring that interviewees have the necessary insights to answer a specific question in detail. E.g. a company that participated in a call in the SME focus area brings in a different perspective on the partnership than a ministry/governmental agency who has set up the funding scheme within the SME area.

Table 3

Heatmap, Respondents and Focus of questions (more focus  *less focus)*

Themes / Respond.	1-General Attitude Collabor.	2-1 Role in Partnership	2-2 Perceived Benefits	2-3 Perceived Challenges	2-4 Impact on EU level	2-5 Win-Win for both?	3-Overall Evaluation
Respondent 1							
Respondent 2							
Respondent 3							
Respondent 4							
Respondent 5							
Respondent 6							
Respondent 7							
Respondent 8							

While most interviews were quite outbalanced with questions, few were a bit more concentrated in specific parts. Overall, the differences were small; they were manageable to a good extent.

As mentioned above, interviewees had, depending on their role, diverging angles/insights about the partnership. While the introductory question 1 was aimed to be very broad, question 2-1 was more narrow with a focus on the role within the partnership and the focus area itself. Therefore, themes 2-2 and 2-3 (perceived benefits; challenges) are very much dependent on the individual role of the interviewee within the partnership. A differentiation between two different viewpoints (multi-stakeholder ecosystem or micro-level; national innovation system or macro-level) was therefore made in the presentation of 2-2 and 2-3. Questions 2-4, 2-5 and 3 had to be answered by all interviewees from a rather broad NIS perspective (country level).

The findings presented in the upcoming section are mainly comprised, due to anonymization of respondents. There shall no conclusions to be drawn about specific organisations. This means, the specific role(s) of organisations will not be presented but more general info.

5.2 General Attitude towards collaboration

This question, the interview process revealed, was a bit challenging, as the outcome deviated slightly from the intended purpose. In some cases, the answer quickly led from a general to a specific answer, talking about the partnership itself. There could be one main reason identified: As the topic of the Swedish-German Innovation partnership was introduced beforehand via e-mail, the interviewees already received some introduction and had this specific partnership as a topic in mind.

Therefore, the amount and variety of answers to Q1 are limited. Among interviewees, there was consensus that collaboration is about learning, specifically about learning from each other.

> *"In order to learn, one must be humble, a 'true receiver' but one who is also willing to share" (Respondent 2)*

Moreover, it was generally agreed that collaboration is important because everyone has its own competence which is limited to some extent. In order to achieve great results, some complementary views and different competences are necessary. This is underlined by an interviewee:

> *"An important factor is 'Sharing the same goals while having different approaches to reach them'." (Respondent 7)*

5.3 Specificities about the partnership

5.3.1 Role within the partnership/focus area

This sub-section was aimed towards the role within the partnership and the specific focus area. As the publication of the Joint Declaration of Intent (Government Offices of Sweden, 2019) only contains some basic info, it was important to understand how workshops/seminars/roundtables are executed and organised, which roles the interview partners have and which focus area-specific results so far were achieved.

In the following, the different initiatives ongoing in the different focus areas are presented, as stated by the interviewees.

Focus area eHealth:

There are frequent delegation visits taking place between the German and the Swedish side. E.g. in October 2019, there was a roundtable in Berlin organised with Swedish and German stakeholders, followed by a concentrated expert commission talk on AI/health in Stockholm in December 2019. Participants usually reflect a wide range of stakeholders: ministry/government, service providers (public and private), research institutes, startups and big companies.

Four different thematic fields have been chosen to work on more closely in this focus area: Cross-border eHealth, Telemedicine/mHealth, Big Data/AI and Digital Health Startups/Businesses.

The role of participants varies: It is about sharing information, presenting own experiences and listening, thereby learning. Apart from that, it is of course also about networking.

The ambiguity of the partnership, consisting out of a political layer (ministries) and an ecosystem layer (ministries, industry, academia) is good to see here, as the interview in the pilot stage revealed:

> *"The workshops are not exclusively about policy questions, but also about concrete common research projects." (Respondent 1)*

In 2020, further events are planned such as a Startup competition in Sweden.

Focus area AI:

While eHealth is integrated within the partnership since the start of the cooperation in 2017, AI was added in 2019 during the Hanover fair. Participating stakeholders are, as presented in the case study (ch. 4.2), mainly research institutes, universities, and responsible ministries.

Concretely, after stakeholders defined pain points and challenges commonly, two different 'tracks' were agreed upon:

- Research, based on a long-existing partnership between Swedish and German universities/research institutes
- Startups/SMEs within AI, e.g. Startup Ecosystem Landscapes

Interviewees cross-referenced in this regard the German-French and the Swedish-French innovation dialogues on AI where synergies are seen with regard to the work within the Swedish-German partnership. As a side note, the (intermediary) goals within the French-German partnership are structured via a roadmap that is currently not applied within the Swedish-German partnership. In general, the focus within AI lies on academia that currently shapes with governments an agenda to further work on projects with an impact on the EU level, such as digital AI platforms (e.g. integrating use cases) or startup ecosystem mapping. In other words, the partnership is about "bundling resources" in order to advance within relevant, thematic fields in AI (Respondent 8).

Focus area: Innovation and cooperation of SMEs

Here, it was considered as valuable to receive information both from a company that went through the process of 'application for SME funding' and from a ministry/governmental agency that has set up the program of 'joint calls'. Swedish *Vinnova* and German counterpart *ZIM* are the main coordinators.

The company angle reveals that trust is an important factor when it comes to matchmaking. The second important component is seeing complementarities with a possible cooperation partner. Within research projects, the financing part can be very challenging, especially for SMEs. Therefore, funding opportunities for common research projects are very welcomed.

While the interviewee already had an established contact with the counterpart before the funding opportunity was explored (Respondent 5), Vinnova and ZIM also offer matchmaking opportunities for interested companies that have an idea or product/service, but not the right complementary partner yet.

There are two different possibilities offered within the partnership, depending on the type of call: Either bringing two SMEs together or to connect a SME/startup with a large company/ corporate. E.g. at Hanover fair, there were matchmaking events taking place between startups

and corporates. In a competition before the event, startups competed against each other to win a participation for the actual matchmaking with corporates (Respondent 6).

5.3.2 Perceived Benefits within the partnership

Now, as the differentiation between focus areas was made, it became clear that there is an ambiguity between the shaper/governmental view and the participant/ecosystem view. Therefore, the results will be presented now with differing angles, covering both NIS perspective and stakeholder (ecosystem) perspective.

NIS/Ministry view:

There are country-specific benefits mentioned by interviewees. For the Swedish side, internationalisation is very important since Sweden is a very small market on a global scale. This includes strengthening exports but also attracting inward foreign direct investments. Apart from products and services, a focus is also on mobility within research or for company representatives that learn new skills and competences abroad. A BIP can help in strengthening these efforts towards internationalisation (Respondent 6). For the German side, which is also export-oriented, Sweden is a "*gateway*" to the Nordic market (Respondent 7). In eHealth for example, it is recognized that Sweden is very advanced in this field when it comes to digital services. Both countries can learn from each other and build on their existing relations.

BIPs might also impact the development of national innovation policies, but this is a country-specific factor that can not be generalized.

Ecosystem/Multi-Stakeholder view:

The company angle within eHealth revealed some benefits, in parts also valid for other stakeholders.

> *"It's about learning from each other. I mean, sharing the knowledge. First, you want to scale up. And second, you want to avoid doing the same mistakes as others. And then I also learned, I mean you can have the inspiration, you can take a solution, but you always need to adjust it." (Respondent 2, Company, eHealth focus area)*

This view 'takes a bit wind out of sails' of potential caveats that such a partnership could imply high risks concerning Intellectual Property or similar. The national markets, or here, health systems, function differently, so the elaborations and discussions on solutions have always to be seen contextual. A simple transfer of business models from one country to another is therefore not the reality.

At the same time, it is to recognize that the benefits of such a collaboration are highly linked with the right attitude. People need to be in an environment where they want to share, where they recognize that it can be a win-win, if everyone shows 'openness'. The factor of economically 'scaling up' might not be directly transferable to academia, still, complementary effects that lead to 'growth' in terms of learnings, new networks or advancements can be beneficial there, as the following excerpt shows:

> *"Our organisation can learn, it can have new ecosystems and also, we can understand [..], what is needed for example, […], how we can contribute […]." (Respondent 4, Research Institute, AI focus area)*

The respondent outlines with this view as well that benefits arise on a 'common basis' that needs to be defined at the beginning of a partnership. For example, by providing an understanding about the ecosystem within a country (e.g. delegation visits with different stakeholders) and discussions about so-called common pain points and challenges, there can be clear goals defined on which can be worked together in a complementary way so that both parties learn and profit.

One aspect, complementarity, is further underlined by an interviewee in the SME focus area:

> *"The main benefit is to complement each other. It [note: the cooperation with partner company] is a mutual exchange on eye level."* (*Respondent 5, Company, SME focus area)*

In the SME focus area, complementarity between parties results for example in a strengthened product portfolio. In the SME example, one party (supplier) has expertise in chemical, industrial niche products, while the demand side, that acts in the medical industry, needs such specialised, tailor-made products to complement their existing product portfolio. If both parties communicate on eye level and trust each other, it can enable more speed, e.g. when handing in application documents in the joint call for funding.

5.3.3 Perceived Challenges within the partnership

In collaborative partnerships, challenges and pain points will occur besides the beneficial aspects.

NIS/Ministry view:

According to Respondent 7, the biggest challenge lies in concretely working together since there must exist a "*thorough understanding about the (innovation) system"* of the other country. E.g. the ministries and the administration are organised differently between countries. Also, after elections, there can be new contact points so it can happen that these contacts have to be identified first. This is underlined by Respondent 5 who sees "*channeling information to the right contacts"* as a challenge.

In the pilot stage (Respondent 1), there was also mentioned that "*personnel and financial resources"* can be a constraint since such a BIP is usually running besides the day-to-day work.

Ecosystem/Multi-Stakeholder view:

An aspect that was raised in the eHealth area by a participant was transparent communication about goals. According to this person (Respondent 2), it would be helpful to receive a better understanding about overall goals of the BIP (NIS level) but also towards expectations in terms of stakeholder collaboration on ecosystem level within the BIP.

In AI, a specific challenge is the huge amount of different initiatives in both countries that raise the need for better coordination. In Sweden, there are for example *AI Innovation of Sweden, Ignite Sweden,* initiatives from *RISE* and *Vinnova*, a lot of different *startups* and events while on the German side, there are also many different initiatives ongoing.

In the SME focus area, one aspect that emerged was the technical understanding about what the other company is doing. As mostly companies are partnering up that have a different

portfolio, it can be challenging and time-consuming to understand the product or service of the counterpart in necessary detail including technical specifications.

5.3.4 Impacts on EU level

All respondents agree that this partnership has a positive impact on EU level. Concrete results of the BIP can serve as a reference point in discussions/projects at the EU. Therefore, a BIP can speed up specific projects of the EU.

It is mentioned in this regard that there are also other BIPs inside the EU where sometimes, there are synergies such as the German-French or the Swedish-French partnership. When using these synergies, more and more countries can sucessively become onboarded.

Respondent 7 underlines that countries inside EU must think both at national and European level. As part of the EU industrial policy, a unified position of the EU is seen as very important.

5.3.5 Win-win for both countries within the partnership

Most participants argue on this question that they see a win-win where both countries benefit a lot. The socio-economic complementarity, with Sweden being a rather small country aiming towards internationalisation, at the same time very innovative and Germany being a large market in Europe, also a strong innovator, is recognized as an important pre-requisite for a balanced partnership.

However, there is also a remark that such a BIP is designed to work long-term so it might be too early to evaluate the actual outcome at this point. Both countries might also follow a slightly different purpose with the innovation partnership. Therefore, it can be noted that there are several hints that this is a balanced partnership where both parties profit; however, a valid or truthful evaluation is not fully possible at this point.

5.3.6 Findings not directly related to a priori themes

Due to the nature of a semi-structured interview with some flexibility, participants brought up information that could not be directly allocated to the asked questions. So, some results could not distinctly be assigned to *a priori* defined themes.

For example, the strong, long-term relations between Sweden and Germany were mentioned by respondents as a reason why this BIP functions very well. There is a direct linkage to trust which is already enabled in this BIP. Another point that was mentioned was the ambiguity or interdependence within this partnership. According to Respondent 4, it is crucial that someone ‘fills in’ a rather political agreement with ‘tangible things’. This statement reflects the distinction that was made by the author between NIS and ecosystem angle.

Moreover, a statement was done that such BIPs shall be designed in a sustainable way. That means for example, that concrete projects emerge out of a BIP while there is also follow-up and successive action.

5.4 Overall Evaluation of the partnership

This evaluation aimed at leaving the specific case study perspective, widening now the view whether there is some transferability of the idea of the Swedish-German Innovation partnership to other country combinations.

As this is a rather political question, this evaluation could mainly be done via interviewees with insights to NIS. Some respondents answered that both countries, Sweden and Germany, already have established partnerships with other countries, especially Sweden, with e.g. India and France. Germany for example has more concentrated partnerships on sectors (AI) with France which was mentioned before. There is general agreement that each partnership is somehow specific, may it be from the strategic direction, the cultural aspect or in how strong complementarities are. But the most prominent finding here is that there should already be a well-working, trustful relationship established on which such a partnership can be built upon.

This is underlined by Respondent 4 who argues that a collaborative partnership should be designed in a sustainable way, so that concrete projects emerge out of it, accompanied by follow-up action. As a BIP runs beside the usual day-to-day business of ministries (Respondent 1), a clear setup of connecting various participants, that either already know each other or learn to know each other in workshops, is seen as a first step. Then, the participants are expected to mainly decide themselves who could be promising, potential partners for collaboration (Respondent 1). Follow-up meetings on a political level secure that intermediate results are tracked and ministries are aware of the different cooperations that are ongoing.

Overall, a BIP is nothing that can be set up ‘on scratch’, it really takes time according to interviewees.

6. Analysis

The analysis of results consists of two different steps. First, in 6.1, the coding process as part of GT is presented. As a result of coding, a 'storyline' or narrative was built around the research phenomenon.

Second, this narrative is elaborated on in more detail in ch. 6.2 (*Conceptualisation of a BIP*) and ch. 6.3 (*Features of a BIP*) as an interplay between RQ (ch. 1), literature review/ contextual data (ch. 2, 4) as well as primary data (ch. 5, 6.1).

6.1 Coding process as part of Grounded Theory

Coding as an integral part of Grounded Theory was applied during data analysis. As explained in methodology (ch. 3.4), the traditional GT approach according to Glaser (1978) with stages *1) Open Coding*, *2) Selective Coding* and *3) Theoretical Coding* has been chosen. The application of the single steps and the outcome are described in the following.

6.1.1 – *Step 1:* Open Coding

The main procedure of open coding contained allocating references of transcribed interviews to so-called themes or 'nodes'. The a priori defined thematic nodes within coding were not ultimate, but nodes emerged as well during open coding. In the following (Figure 5), the different nodes as well as the number of coded references are displayed (final version after open coding was completed).

It was to recognize that number of references were quite limited for some themes e.g. Theme 3 with n=4. The reason was in this case that the semi-structured interview guide was adapted in between, as first interviews revealed that it is quite difficult for participants to give an exact answer on this question. Instead, new nodes emerged such as *Pitfalls within the partnership* and *Success factors*. Node 2-2, 'Benefits within the partnership' and the newly emerged one 'Success factors' had most codings with n=21 each.

Open Coding	*Node Layer 1*	*Node Layer 2*	*References (n=x)*
Topic area BIPs	Theme 1: Importance of Collaboration (Motivation)		n= 5
	Theme 2-1: Specificities of SME focus area		
		Strategic Direction	n= 4
		Operational Activities	n= 4
	Theme 2-1: Specificities of eHealth focus area		
		Strategic Direction	n= 5
		Operational Activities	n= 4
	Theme 2-1: Specificities of AI focus area		
		Strategic Direction	n= 3
		Operational Activities	n= 3
	Theme 2-2: Benefits within the partnership		n= 21
	Theme 2-3: Challenges in the partnership		n= 12
	Theme 2-4: Benefits on EU layer		n= 10
	Theme 2-5: Evaluation if partnership is balanced		n= 6
	Theme 3: Overall Evaluation BIP		n= 4
	emerged 'node': Pitfalls in the partnership		n= 2
	emerged 'node': Success factors of the partnership		n= 21

Figure 5: *Stage 1 of Coding process with different thematic Nodes*

6.1.2 – *Step 2:* Selective Coding

Selective coding as a second step had the goal of identifying a ‘core’ theme that comprises the main findings.

Out of the open coding process, there could be some categories identified such as *complementarity* and *trust*. These factors were characteristics at the initial stage before both parties agreed towards a partnership. Inside the partnership, these were factors of importance as well, since e.g. two partners seek for a cooperation, e.g. in matchmaking events within the SME focus area, to share complementary competences and viewpoints. Trust can be a facilitator and catalyser in such processes.

Apart from looking into categories, it was quickly to recognize that one challenge in the analysis were different perspectives within the interviews. As presented in the results chapter, some participants were closer to the NIS perspective (e.g. “solving common challenges with partner countries”) while some spoke more from the Ecosystem perspective (e.g. “technical aspects as a challenge in the work with a partner company”). Moreover, some switched between perspectives (which was partly intended with the interview guide), while each of the three focus areas had its specificities in design (e.g. SMEs had a focus on concrete matchmaking, eHealth had a focus more on roundtable/expert discussions). So, it became clear that a differentiation between angles and focus areas will be a factor that needs to be considered throughout further analysis.

The process of selective coding was facilitated with so-called framework matrices (Appendix B). It was necessary to identify a category or theme to which all other findings can be related to. As a result of looking into themes again from an ‘eagle perspective’ with framework matrices, two findings emerged:
- A bilateral innovation partnership should fulfill certain criteria to function in an optimum way (complementarity, sustainable design, trust, etc.)
- At the same time, it is important to distinguish between the 'shaper' view (innovation system) and the 'stakeholder– or multi-actor view' (ecosystem)

Even though ‘Success factors’ were not explicitly asked for in the first 5 of 7 interviews, it turned out that this is actually the ‘core’ theme the content of the interviews brought forth. In other words, some participants mentioned success factors actively on their own during the interviews while others did it more implicitly, e.g. by talking about their role within the partnership and their perceived benefits and challenges.

According to Glaser and Strauss (1967), the core theme has big explanatory power and is most persistent or recurring within the data. In Figure 6, there are the two perspectives of the Core theme displayed: a) the ‘Shaper’ view, linked to NIS, that is ‘setting the stage’ by setting up the partnership and its infrastructure, and b) the ‘Multi-actor’ view, connected to an Innovation Ecosystem, where e.g. ‘Openness’ as an Attitude is an important factor.

Moreover, the different categories such as internationalisation and complementarity that emerged out of the process of analysing framework matrices are visualised in boxes, between the core theme (success factors) and the a priori defined themes 1-3 (Figure 6).

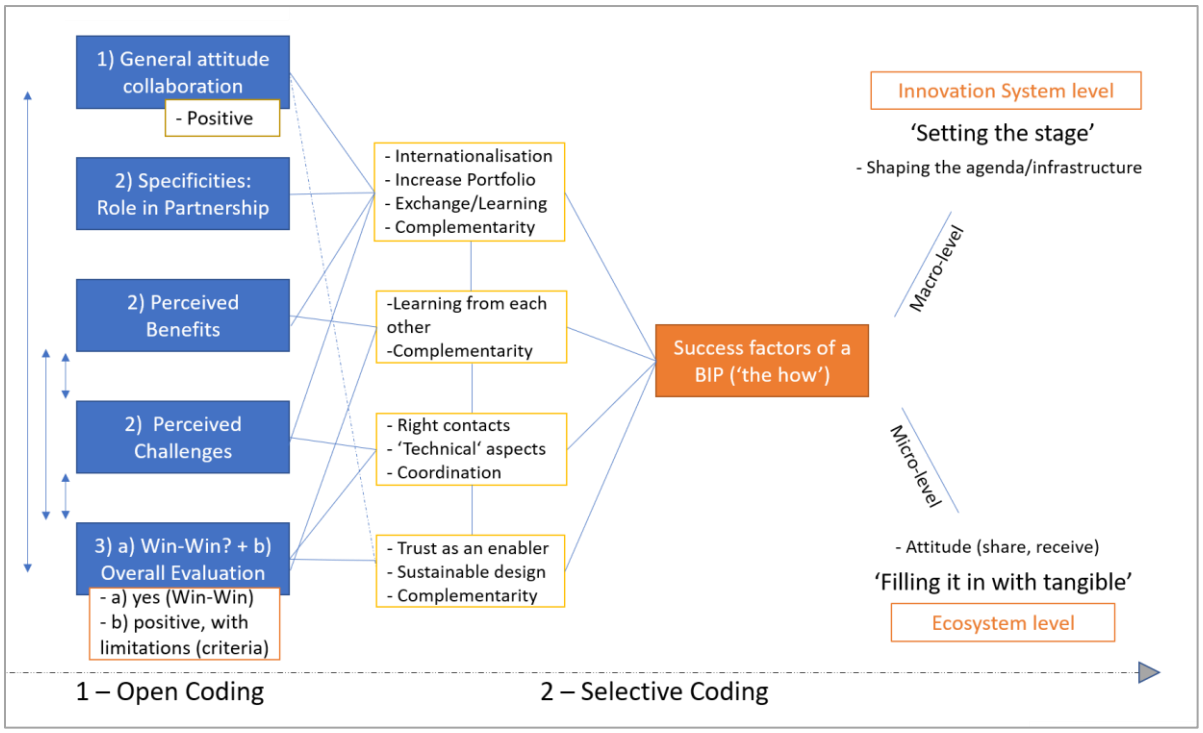

Figure 6: *Stages 1 and 2 of Coding within GT*

6.1.3 – *Step 3*: Theoretical Coding

The third step in the coding process was to build a narrative, ensuring coherence by integrating categories of the 'earlier' coding process, that generate together 'grounded theory'.

As described in step 2 (selective coding), 'success factors' is the core theme. However, when looking at data again in step 3, it was to recognize that success factors alone do not tell a comprehensive story. There are, in fact, two more aspects (the motivation to undergo a BIP and the activities within a BIP) of importance that are only scratched upon within the core theme. Therefore, a narrative was built around the *'How'* (Success factors) that starts with the *'Why'* (Motivation to agree to a BIP) and comes along with the *'What'* (Activities within a BIP), as elaborated on in the following:

1) 'Why' do countries agree to partner up in the form of a BIP? (*normative-strategic layer*)
2) 'How' can a BIP function in a best possible way? (*strategic layer*)
3) 'What' are concrete activities, taking place within the BIP? (*operational layer*)

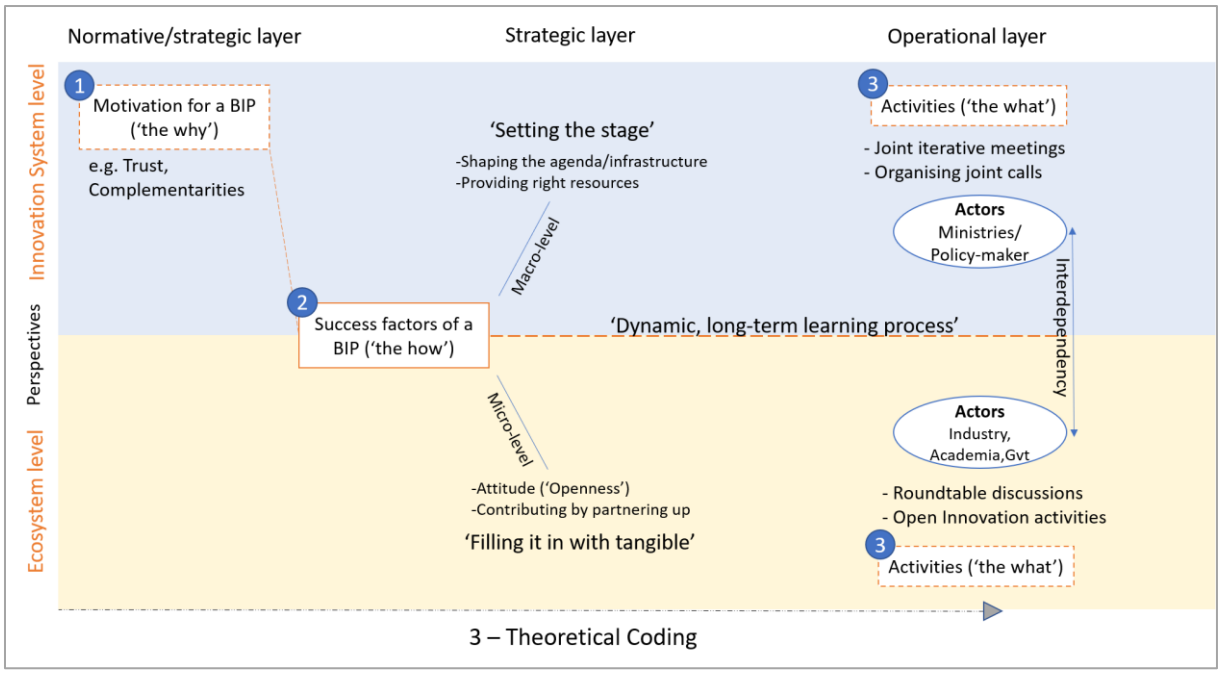

Figure 7: *Stage 3-Theoretical coding (building a storyline) (Source: own elaboration)*

In detail, it can be seen in Figure 7 that the *Motivation* (the 'why') to agree to a BIP needs to be answered first in a positive way so that a partnership arises. Certain criteria should be fulfilled, such as evaluating whether there is complementary learning or a win-win expected with common challenges to solve. Having an existing, trustful relation already is considered as a big 'bonus' that has the power to catalyze the decision for a partnership. Overall, normative values and strategic considerations might play a role here at the innovation system level where representatives of ministries decide whether to undertake a BIP.

The specific *Activities* (the 'what') are taking place throughout the partnership which are highly linked to success factors. This can be either roundtables, joint iterative meetings but also the organisation of matchmaking events or open innovation activities between e.g. SMEs/startups and corporates. Classifying the activities further, these can be regarded as an operational layer of the BIP.

Overall, it seems feasible in this research study to differentiate between the NIS or policy-maker perspective and the Ecosystem perspective which comprises all different stakeholders participating within e.g. roundtables, delegation visits etc. While the NIS perspective is rather composed of political decision-makers who manage the agenda and the infrastructure (strategic layer), the Ecosystem with actors out of industry, government and academia has its emphasis more on the process of ongoing collaboration towards innovation itself, with different activities taking place (operational layer).

6.1.4 Coding - Overview of final themes

The following overview (Table 4) underlines the different perspectives. Each interviewee had a tendency in the interview to either answering questions more from a NIS perspective or from an Ecosystem perspective, depending on the role of the interviewee within the partnership. Still, 5 out of 7 interviewees switched angles in between the interviews and answered questions partly from both perspectives. The answers were analyzed in framework matrices (see Appendix B) and then categorized.

Both perspectives (NIS and Ecosystem) and three themes are comprised in Table 4, showing commonalities but also differences.

Table 4

Comprised summary of relevant categories and its aspects

Category / Angles	Motivation to undergo a BIP ('why')	Success factors within a BIP ('how')	Activities within a BIP ('what')
NIS/Shaper view	• Sweden: *Internationalisation, increasing mobility* Germany: *Internationalisation, learning* e.g. in digital (eHealth) • Already good, established relationship → enables learning in a *trustful* setting • BIPs provide *Alignment* (Overview of activities ongoing on all layers, better *coordination*) • BIP as enabler on EU level (having positive examples), *synergies* to other BIPs, so other countries can be "onboarded"	• *Trust* (basis), countries should follow similar goals while having different approaches (enables learning) • *Sustainable design* (structured, systematic, iterations (follow-ups), *complementary* partners, *funding* schemes) • *Organisational*: Having right contacts, channeling information to right contacts • *Attitude* towards learning: e.g. Understand structure/system of other country	• General: long-term projects with *activities on different layers* with different goals/ perspectives • Iterative *high-level meetings,* Organising and participating in roundtables, delegation visits, calls, matchmaking
Ecosystem view	• *Internationalisation, Financial* support • *Learning* from others' experiences, *Network creation*, *Exchange* on trends, *understanding* market better, *Strengthening* portfolio • be "*on board*" with high-level initiative (expected benefits, insights, projects), driven by ministries	• *Culture of learning, sharing, receiving* where *trust* is very important, sharing leadership styles • Receiving *goals in transparent way*, *Financial support for R&D projects*, Mutual Exchange • *Complementarity*, *filling* a political agreement in with '*tangible things*', based on commonly defined challenges	• Taking part in different activities (*roundtables, delegation visits, calls*) depending on focus area • e.g. SME calls (company - company), eHealth (different stakeholders), AI (focus on ministry, academia, startups currently)

The Ecosystem perspective (Table 4) is mainly shaped by the industry side when looking at respondents in interviews. While ministries rather spoke from a NIS perspective, Research Institutes had a tendency as well to speak more from a NIS perspective while also bringing partly in 'practical' success factors for collaboration on Ecosystem level.

While the focus in the NIS perspective lies on increasing national innovative capacity (macro-level), the focus in the Ecosystem perspective is more on collaboration itself in an innovation process (micro-level perspective), with practical insights, mainly driven from companies, amplifying their direct needs and expectations.

Trust is the basis and the specificity of this Swedish-German innovation partnership. There is a long-lasting, good relation existing between both countries on which can be built on.

Concerning the "**Why**", there seems to be unity between actors. Both angles (and both countries) name internationalisation as an important reason. Moreover, both angles see big potential (e.g. strategic importance of partner country, degree of expertise in digitalisation) when it comes to 'learning from each other'.

The "**How**" is more complex. Here, it becomes clear that success factors are only to a limited degree manageable by the ecosystem itself. The NIS/shaper perspective needs to design the partnership sustainably (in a structured and systematic way, with the right stakeholders, integrating follow-ups). Challenges as "having right contacts" or "channeling info to right contacts" show both potential for improvement and a risk that needs to be managed.

Ecosystem level brings in a perspective from direct experience that can be partly understood as *feedback* to NIS. Interviewees see it as important that the stakeholders have the right attitude ('openness'), which might be promoted by setting the right 'culture' mode, sharing leadership styles or being more transparent when it comes to sharing goals and intermediate results. The ecosystem level considers the definition of common pain points and challenges as crucial, in order to act on a meaningful basis where a rather 'political' agreement can be filled with 'tangible' things.

Overall, complementarity and mutual exchange (win-win) are considered as success factors as well. Incentives for stakeholders can be financial support (here esp. SMEs) or strengthening the network by matchmaking which can lead to an enhanced product portfolio.

In the "**What**" area, Open Innovation activities have been taking place in the SME focus area. In eHealth, currently, there is a bit more focus on collaboration in roundtables and knowledge exchange itself within four sub-areas (a balanced mix of work on Ecosystem level with effects on NIS). AI as a focus area is existing for one year, currently more taking place on a concentrated level with strong integration of academia, government (and startups).

A direct comparability is therefore limited in this case due to sectoral specificities. But it is possible to show the variety of answers to paint a holistic picture about the 'bandwidth' of viewpoints.

In the following, a direct link of the coding process is drawn to the RQ and its two subquestions.

6.2 Conceptualising BIPs

The RQ (i) consists of two subquestions where the conceptualisation of a BIP builds the first one. By making use of the literature review and contextual data (ch. 2, 4) as well as the results of interviews and coding (ch. 5, 6.1), a conceptual model could be drawn (Figure 8) that is explained in more detail further down.

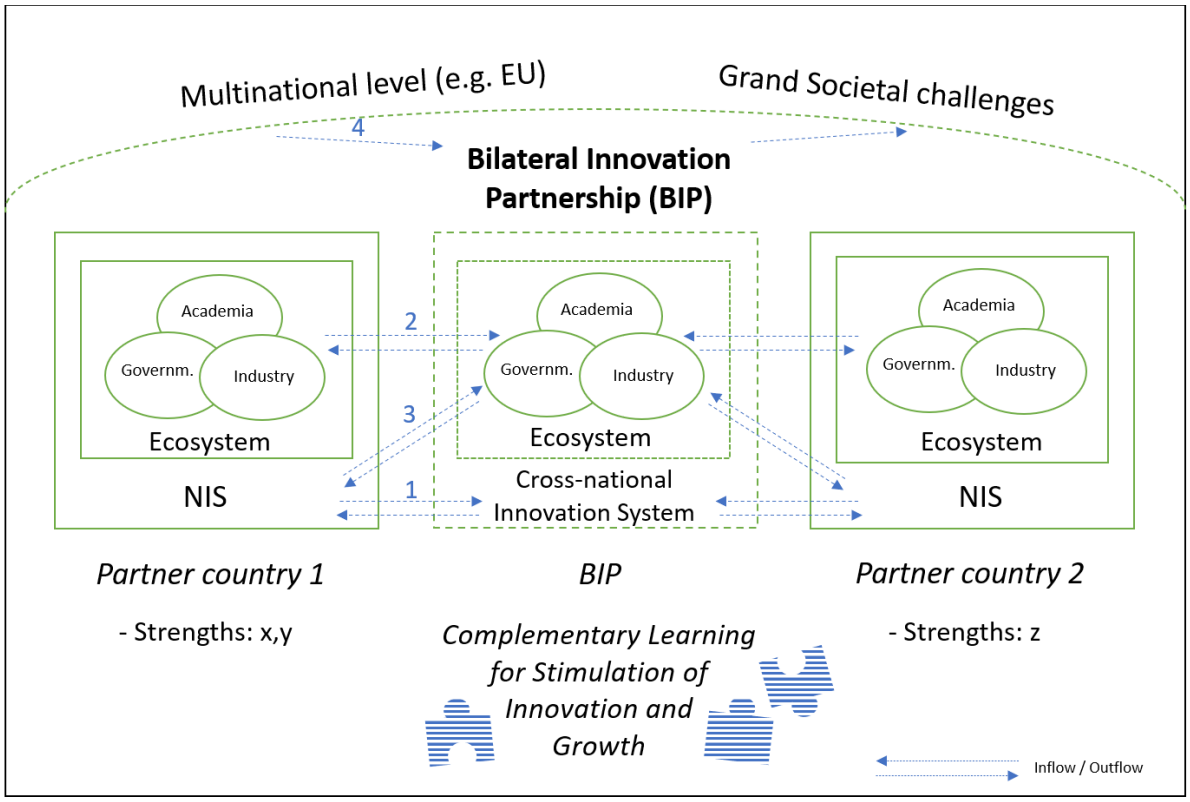

Figure 8: *Modelling a Bilateral Innovation partnership (BIP) (Source: own elaboration)*

In Figure 8, there are few assumptions made for simplification. In general, the National Innovation Ecosystems can be very diverse and of course the BIP itself can also be structured differently. In this case, it is assumed that both partner countries follow a balanced Triple-Helix model inside their National Innovation System and within the temporary partnership. Moreover, 'design' elements as e.g. High-level political meetings within the partnership are taken over of the specific case study but are exchangeable.

1 Inflow NIS → Cross-national Innovation System: This can be named the first step where two countries decide on a high political level to agree on a bilateral innovation partnership.

Outflow Cross-national Innovation System → NIS: In between the partnership, there can be ongoing, iterative high-level meetings established on a political level. They take place in the frame of the partnership and it is a coordinative action that results in a *feedback loop* to the own NIS.

2 Inflow National Ecosystem → BIP Ecosystem: The inflow is done in the form of participating at roundtable meetings; sharing and discussing ideas as well as project results, finding partners, or filling joint initiatives with 'tangible things'.

Outflow BIP Ecosystem → National Ecosystem: Inside the National Ecosystem, stakeholders can now have strenthened networks, with new partners which might result in a strengthened product or service portfolio in mid-term.

3 Inflow NIS → BIP Ecosystem: The infrastructure for the partnership is provided from there, such as deciding on focus areas (strategic direction), bringing stakeholders together at roundtables or providing funding e.g. for SME projects.

Outflow BIP Ecosystem → NIS: A strengthened national innovation capacity can be the result, with stakeholders who are having new ideas, new partners, and/or a strengthened product portfolio.

4 BIP – Societal challenges (*vice versa*): There is a link between this 'overarching' level and the BIP. Societal challenges, as the description shows in the case study, are relevant and somehow influence the long-term strategic direction, also in terms of national innovation strategies.

Multinational level – BIP (*vice versa*): Moreover, a multinational level such as EU can frame such a partnership and the partnership itself can be a 'facilitator', a 'role model' as e.g. projects between two countries that are in line with EU agenda can be a reference for meetings on EU level.

Inside the whole partnership, there is a strong interdependency to recognize between the NIS and the Innovation Ecosystem. At the same time, both profit from each other (see Appendix C for a visualisation about different roles of both NIS and Ecosystem).

Overall, the partnership mainly integrates Academia, Government and Industry – also referred to as Triple Helix structure (Etzkowitz & Leydesdorff, 1995). The theoretical review has shown, there are models existing that integrate society stronger (Schuetz et al., 2019). Within the empirical context (ch. 4.2), the societal challenges are named as an important part of the partnership, but coding of interviews revealed there is potential to take greater account of this aspect.

The Quadruple Helix structure could function as a 'test model' within the BIP where e.g. methods such as hackathons, crowdsourcing could be used to integrate the perspective of the society stronger. It is a finding *ex post,* resulting out of interviews and literature review. As Schuetz et al. (2019) showed, society could be 'useful' in answering the question about a desirable 'socio-technological future.' The adaptation could for example lead to the following model (Figure 9).

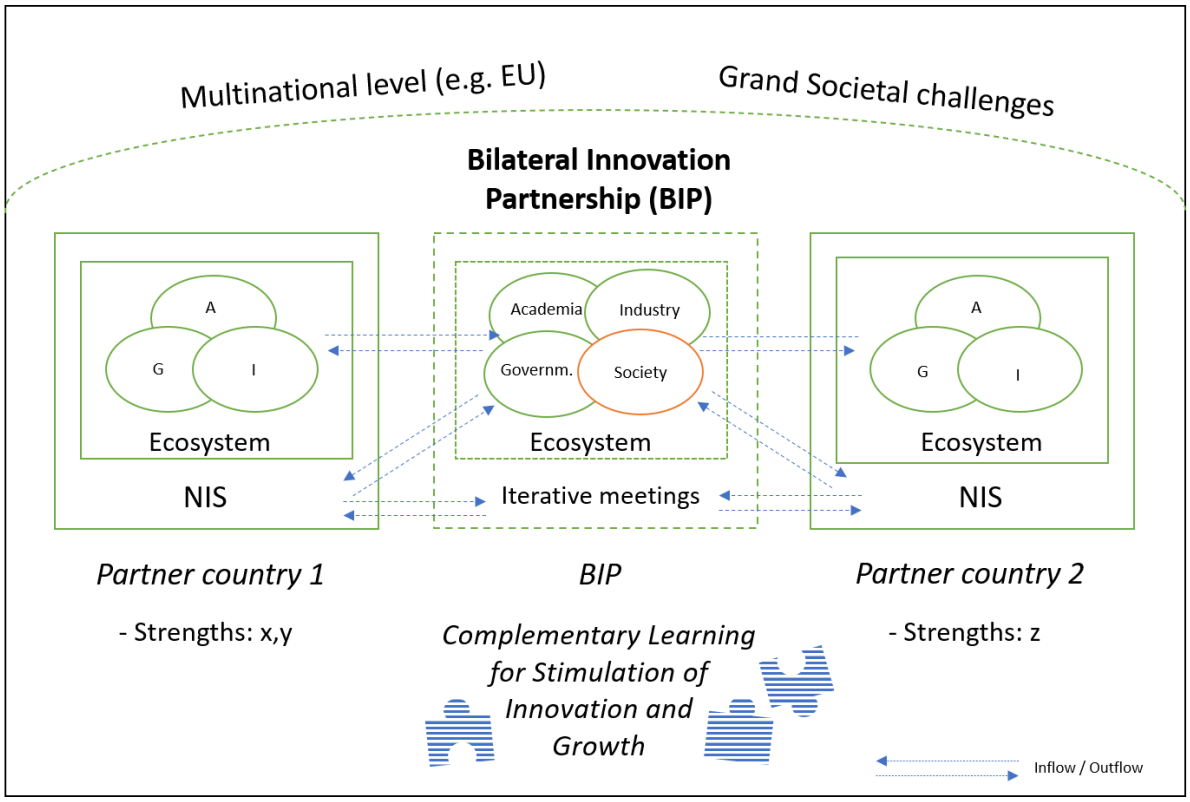

Figure 9: *Modelling an alternative Bilateral Innovation partnership (BIP), integrating Society stronger (Source: own elaboration)*

As research of Kuhlmann & Rip (2018) has proven, Societal challenges will be a main part of future-oriented innovation policy. Especially a BIP as a cross-border knowledge platform, designed for learning, might be beneficial for 'testing' a model where the 'voice of society' is integrated more strongly.

6.3 Features of a BIP

The second part of the research question was about characteristics that explain the full spectrum of a BIP. These are, in this case, the emerged 'themes' out of theoretical coding as part of GT (ch. 6.1):

- motivation for participating countries to agree to a BIP ('the why')
- success factors regarding a BIP ('the how')
- activities within a BIP ('the what').

These three factors are now looked at from a more holistic perspective, triangulating between literature review, contextual factors and interview findings.

6.3.1 Motivation to undergo a partnership (*'the why'*)

An important finding of the research was the 'why' or the motivation to undergo a bilateral agreement aimed at innovation. In the 'Declaration of Intent' within the case study (Government Offices of Sweden, 2019, p.1), there are already some explanations around the 'why' included that need to be mentioned:

“The partnership tackles societal challenges within key areas where Germany and Sweden already have strong positions, and holds potential to develop the role of the EU. […] Germany and Sweden are close partners and share common values […] The partnership reflects the need for cooperation at a time of increasingly fast changes globally. Both governments share the view that Europe must pool its strengths and be more united than ever.”

Summarizing that, it is about amplifying strengths and finding innovative solutions in turbulent times by utilizing an existing strong relation, with effects on EU level. Time as a factor (rapid changes) has certain importance while the existing close bonds serve as a catalyser that allows ‘hands-on’ work.

Interviews revealed more specific insights, reaching from “solving common challenges” over “having same goals but different approaches in how to reach them” to “learning from each other”.

The factor “learning from each other” guides then also back to the literature review, where e.g. Lundvall (1996, 2016) saw knowledge generation and diffusion, i.e. learning as a main *capability* in a National Innovation System. The diffusion of knowledge can enhance National Innovation Capacity, thereby stimulating growth. The tools or methods to learn can be Open Innovation activities where firms increase their boundaries, collaborative ecosystems where stakeholders share their artifacts, conduct projects together and strengthen their relations. A model as Triple Helix (Etzkowitz & Leydesdorf, 1995) can help in stimulating knowledge diffusion, innovation activities and consensus.

In conclusion, the ‘why’ can be answered from different perspectives.

NIS/shaper view: The overarching goal in a National Innovation System is in line with Schumpeterian view – economic growth. But this would be overly simplified to see it that unilateral without considering intermediate goals. As the Purpose Statement in the Introduction has shown, today’s challenges are very complex, with ‘rapid changes’ so government or policy-makers need to make sure that they have the *capabilities* such as knowledge (Lundvall, 1996) about latest developments which sets them in the role *to take the right decisions, providing the right resources* to their stakeholders (such as mobility of researchers/industrial employees, funding for SMEs, etc.). OECD graph (Figure 4) (1999) visualized that knowledge generation, diffusion and use between actors within an ecosystem is linked to national innovation capacity, with the goal of improving a country’s economic performance. It becomes apparent that this process of collaboration, combined with inclusiveness of actors, can tackle the beforementioned complexity, which national economies and deciders face.

Moreover, such a bilateral innovation partnership extends the boundaries from a national perspective to a cross-national one, *experimenting* with practical projects that can serve as a positive example on a multinational level (such as EU) (e.g. cross-border ePrescription or AI ecosystem landscapes). As the interviews revealed, by having a bilateral reference project, other countries can be onboarded so that a solution gets more and more advocates on EU level. It can be concluded that bilateral *learning* happens in a *long-term process* where a lot of exchange, experimentation and collaboration are taking place, with effects on different layers (regional – national – multinational).

Ongoing digitalisation is an aspect that unites countries in their challenges. As OECD report (2019a) has shown in the literature review, policymakers need to develop responsive, agile policies in terms of digitalisation. An exchange on 'eye level' between partner countries ensures a meaningful, dynamic process of learning from each other. It can be avoided that one country does the same mistakes than the other, provided the fact that both complement each other, e.g. by having different maturity levels in some fields as digitalised healthcare.

This complementarity was given in the Swedish-German partnership as contextual data revealed (ch. 4.1). E.g. the different size of countries leads to different national innovation strategies. Here, Sweden lays special emphasis on internationalisation, by actively supporting SMEs/startups in their strive for scaling up. At the same time, Sweden as a leader in the European Innovation Scoreboard (EC, 2019a) has a well-developed digitalised health system while in Germany, this is more in the initial stage. Besides complementarities, there were uniting factors such as societal challenges, shared values and an existing, close relation. The interviews underlined that the aspect of 'shared goals while having different approaches in reaching them' is of great importance in this BIP.

Ecosystem view: Academia, Government and Industry as main stakeholders within a NIS need to have the right resources to innovate. Apart from financial support, a functioning collaboration ecosystem is crucial. As the literature about Open Innovation showed (Chesbrough, 2006), institutions as firms need to widen their boundaries to constantly innovate, to make use of relevant ideas. An ecosystem that is based on collaboration and knowledge exchange increases the capacities of firms to innovate, as it e.g. strengthens their product portfolio and helps them in finding new partners who complement them. Interviews (e.g. in the SME field) have proven that this can function in practice and that the ministries can support and shape this process, by providing coordinated funding opportunities and matchmaking.

This guides then to the next research interest – 'the how'.

6.3.2 Success factors of a BIP *('the how')*

Given the fact that both parties agreed to cooperate in form of a BIP, there could be multiple factors identified that ensure shaping a successful, beneficial partnership.

NIS/shaper view: First, interviews have shown, the factor *trust*, as described in the previous subchapter, is of highest importance in a BIP, especially in current times of rapid change where time can be a critical factor. Countries benefit if they can quickly start working without first agreeing on 'rules' or structures and setting up a working relationship. In a *sustainable* approach, policy-makers need to design and structure the infrastructure of such a BIP, e.g. deciding on beneficial goals or focus areas, setting up iterative follow-up meetings and finding diverse partners that 'fill in' the agreement with their input.

This is in line with Durst & Poutanen (2013), who describe *Resources* (e.g. availability, allocation), *Governance* (e.g. Timing, Role assignment), *Strategy and Leadership* (e.g. Clarity of Purpose) and *Partners* (e.g. Heterogeneity) as central success factors when setting up Ecosystems.

Challenges in the day-to-day work of ministries and policy-makers, interviews revealed, were the aspects of having appropriate resources (financial and personnel), the right contacts of the

counterpart, or taking the time to understand the structure/system of the other country better. So, in the case study, *Resources*, *Leadership* and *Governance* were identified as factors that can still be improved.

Ecosystem view: The mentioned factors Leadership and Governance were underlined by the stakeholders of the ecosystem in interviews when some respondents raised the aspect of transparency in terms of goals within the BIP. Participants named also '*Culture of learning*' with '*Openness*' as important success factors that can be improved. Policy-makers who are setting up the infrastructure in such partnerships could promote such an attitude by actively sharing diverging, country-specific leadership styles.

This argument is strengthened by the literature review of Durst & Stahle (2013) about success factors in Open Innovation activities (e.g. Durst & Stahle, 2013) as between firms. While there are some overlaps to the previously mentioned study about success factors within ecosystems (Durst & Poutanen, 2013), '*Relational factors*' such as 'openness' are a new aspect in the OI-related research.

Overall, the aspect of *Complementarity* needs to be mentioned as well. This is important on all layers of the partnership – the countries should complement each other on a system level (NIS) but also within the ecosystem (academia, industry, government). This functions very well in the case study of the BIP but is a factor that should not be taken for granted, as interviews revealed. Also, here, the close bonds (trust) are the enabler of making use of these complementarities.

Closely related is the statement of several interviewees who emphasize the given balance or win-win within this partnership, for example in the SME area. This is important since the literature review (e.g. Iansiti & Lewien, 2004 or Adner, 2006) revealed various risks industry-related stakeholders face when entering partnerships. E.g. firms might face interdependence risks such as uncertainties in the aspect of coordinating the cooperation. Both governments act as facilitators within the BIP, somehow monitoring that both parties (Sweden and Germany) profit, for example by setting up joint funding mechanisms.

6.3.3 Activities within BIPs (*the 'what'*)

As mentioned in ch. 6.1, Activities here reflect the operational perspective, where actors collaborate, share and discuss.

NIS/shaper view: Contextual data, here the case study (ch. 4.2), provided already hints such as 'High-level follow-ups', executed via joint high-level meetings where mid-term goals and results are reflected on. This was seen as important by interviewees since resources of ministries/policy-makers are limited and such partnerships need to be managed besides the day-to-day work. So, planned, iterative meetings are an important activity. A 'tool' that was discussed by single interviewees as well were roadmaps in this regard. These can for example help in structuring such partnerships, but at the same time, they imply risks, such as a certain lack of flexibility. E.g. in focus areas where there is a lot of uncertainty at the beginning, where the pain points and challenges are not defined yet, a roadmap might limit the solution space.

Ecosystem view: The contextual review showed that both Sweden and Germany are export-oriented countries, that strive for free trade markets, which is labeled in their national

innovation strategies (BMWi, 2019 and Swedish Government, 2015). This means, many of their domestic companies aim to be internationally present and cross-linked. Gassmann (2013) mentioned that the process of finding right partner companies is a big problem in Open Innovation activities for firms. Herstad et al. (2008) discussed in this regard that especially SMEs face problems in increasing their innovation-related network. The interviews revealed that the shapers are aware of these problems as they are enabling and actively supporting this process of connecting companies with each other. There are different activities taking place such as matchmaking between startups/SMEs or between SMEs and corporates with the goal of e.g. strengthening the portfolio of these companies, but also to improve mobility between skilled personnel. Different opportunities for funding secure the financial support, especially relevant to SMEs, to execute R&D-related projects. Moreover, delegation visits are taking place such as in AI and eHealth focus areas. Here, expert groups with different stakeholders visit their partner country and learn to know the ecosystem of that country, accompanied by talks and presentations, e.g. in form of roundtable discussions.

With ongoing length of such a partnership, such collaboration setups might change and be shifted to more concentrated roundtables, as in eHealth focus area where there was in early 2020 a focus on expert discussion in the field of AI/Big data. Also, more concrete projects can be expected, based on a progressing refinement in the definition of common pain points that can be solved together.

7. Conclusions and Future Research

The goal of this study was to find out more about the phenomenon 'Bilateral Innovation Partnership' that was not described or categorized very much so far with existing theory. An inductive, exploratory research approach was therefore chosen, linked to a case-study design – aimed towards examining the RQ in a lively manner, moving from the specific to the general. With collaboration being a main aspect of the research interest, the Grounded Theory methodology served as a framework to structure the research process in an iterative way. Data Collection and Data analysis worked in a synchronized way, where Coding of Interviews brought forth a 'Grounded Theory' about the research phenomenon. The findings were then related to the identified literature as well as to the contextual aspects of the case study.

The key theoretical findings are as follows:

A BIP is an agreement between two countries to cooperate in areas of strategic importance, with the overarching goal to stimulate economic growth, while seeking together for innovative solutions to common challenges. Especially the rapid speed of change (e.g. globalisation, digitalisation) has led to the need of new forms of cooperations, where time is a critical factor. Governments must fulfill the role of shaping innovation policies, within the frame of their innovation systems, in order to provide the necessary resources to the participating stakeholders. In the case study, a cross-sectoral ecosystem with stakeholders out of government, academia and industry secures a dynamic learning environment. Accordingly, a BIP can enlighten governments on technological advancements through knowledge generation and diffusion, and speed up the learning process, so that governments can take the right or better decisions in an agile, responsive way. Apart from the national or bilateral aspect, a BIP might have positive impacts on multinational levels, such as EU, as interviews revealed.

Several success factors could be identified that let the BIP appear to be a promising instrument for policy-makers within the policy mix. First, *complementarity* is important when it comes to finding the right partner for a BIP. Also, it is important for policy-makers to enable complementarities between stakeholders, so that they can combine individual strengths and a win-win situation is created. *Trust* is the basis that can catalyse a BIP, but also, it can promote '*Openness*', an attitude of participants that is a success factor in practical activities. The policy-maker should design the partnership in a *sustainable* way, i.e. a BIP requires the handling of related aspects such as Strategy/Leadership, Governance or Resources in an ongoing way while the right foundation/architecture should be set from the start.

Activities such as iterative high-level follow-ups are perceived as important as they ensure that results are somehow aligned, and the knowledge can be 'absorbed'. For companies, matchmaking activities, combined with funding opportunities, can be stimulating in finding the right partner for R&D-related projects. Roundtable discussions or delegation visits are other activities taking place within the case study, fostering collaboration with different stakeholders. Concrete, common projects with selected stakeholders, e.g. in the field of AI represent the 'hands on' mentality within this BIP where an impact on EU level is expected.

In summary, the Research Question how such a Bilateral Innovation Partnership can foster innovation on a public and private level, has been answered by 'framing' a BIP first with theoretical concepts, before looking into case-related features. Accordingly, BIPs seem to be a promising instrument to spur innovation with both NIS/Policy-makers and Ecosystem/Multi-

stakeholders as actors. The Policy-makers are the architects of a BIP who need to manage the dynamics of a BIP ongoingly, while the stakeholders contribute with knowledge exchange and their 'hands on' mentality in concrete projects.

However, BIPs can differ from each other in practice, may it be concerning overall strategic direction, underlying motives of participating countries, or cultural backgrounds. The case-related findings have therefore to be interpreted together with the presented, contextual framework of a future-oriented partnership where both countries uniquely trust each other and mainly follow equal goals. By having identified the case-specific factors within the Swedish-German partnership, a basic conceptual framework and typical features of BIPs could be concluded.

Practical implications and Future research

The findings brought forth hints for practical improvements as well. As discussed within the presentation of the case study, societal challenges were an aspect mentioned as a central factor of the BIP. However, research results revealed this aspect could be integrated stronger. Literature review (Schuetz et al., 2019) integrated the Quadruple Helix concept where society might participate in innovation processes by e.g. discussing a desirable socio-technological future. Practical activities might be Hackathons or Crowdsourcing. In the analysis (Ch. 6.2), this idea was presented and conceptualised by the author. A limitation here is that this idea was not tested with stakeholders of the partnership in interviews, as it is a finding ex post. Still, as there is an increasing importance of societal challenges to expect in future-oriented policies (Kuhlmann & Rip, 2018), such an idea might have certain relevance in the near future.

Apart from this rather practical implication, there can also several implications be made for future research.

1) As seen in the case study, the exchange of complementary competences and knowledge happened in a (small scale) setting between two countries. A BIP is more a temporary 'phenomenon' while it is aimed to work in a long-term timeframe. In the case study, the BIP was partly used for 'experimentation' where learning from each other is one aspect.

A BIP can widen boundaries on different layers such as on a national innovation system level. It might serve as a catalyser or anchor point, as interviews have shown, with implications on both national level and multinational level. Examples were cross-border prescription in eHealth (bilateral project with relevance on EU level) or startup landscape mapping in AI (from a national solution to a bilateral project with implications on EU level). So, the hypothesis can be drawn, that BIPs are expected to fulfill a leverage function for both national and multinational level.

This implies the question for future research, to test the following hypothesis empirically: "*Can a BIP be used to catalyse innovation processes on different layers (national – multinational), that goes beyond 'inspiration' by integrating concrete projects and results in an experimental setting?*" So far, there are only the described implications that this is the case. However, testing this hypothesis might be challenging as the literature review of Edler & Fagerberg (2008) has shown. According to them, instruments within an innovation policy-mix are usually applied in parallel, so it can be difficult to examine them in an isolated way, by assessing the efficiency of single instruments.

2) Another aspect that is strongly related to the recent hypothesis is about the potential role of a BIP in future policies. As discussed by Mazzucato (2018), mission-oriented policies have certain importance in these times. As Fagerberg & Srholec (2008) categorized it, such mission-oriented policies are usually applied to tackle challenges that require new solutions. Kuhlmann & Rip (2018) see these mission-oriented policies, combined with societal challenges on a rise. Besides this aspect, governments need to implement industrial/technological strategies as seen in Ch. 4.1 that are more related to system- and innovation-oriented policies.

As the Swedish-German innovation partnership revealed, the future can be co-created together. The impression out of the empirical findings is that this ambiguity of societal challenges and sustainable industrial solutions is implemented here. However, as mentioned before, the inclusive aspect, by integrating the society stronger, in the question about a desirable socio-technological future, should be elaborated on.

The hypothesis generated out of these findings is: “BIPs are pointing to the future by integrating different aspects of innovation policies.”

3) Success factors within a BIP were a central finding within this study. The literature review discussed two studies about success factors, within Ecosystems and with regards to Open Innovation activities. However, there were certain aspects identified within the BIP that could not directly be related to these studies, such as the importance of trust and complementarity.

This raises the question if future research might bring forth more studies related to success factors and BIPs. That could lead to a certain comparability which would underline the findings of this research. So far, the hypothesis is: “Trust as a basis and a holistic understanding of complementarities between countries and stakeholders are outstanding success factors that characterise BIPs.”

Policy-makers are then responsible to manage and “orchestrate” the dynamics within the BIP ongoingly, to reach the intended objectives and make the partnership a successful endeavor.

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Appendix A

Interview guide

[Name of Interviewee and Organisation] [Date]

Thank you for taking time for the interview. As introduced in the e-mail, I am currently writing my master thesis around the Swedish-German Innovation Partnership. I want to answer the question how such Bilateral Innovation Partnerships can spur innovation on a public and private level.

I would like to start with a more general question, before diving into the specific case.

Theme 1: General attitude towards importance of collaboration

1-0: What do you see as general benefits or advantages gained by collaboration and networks when it comes to innovation from an organizational perspective?

Theme 2: Specificities around the Swedish-German Innovation partnership

2-1: Can you say more about the partnership and the role of your organisation?

2-2: How can your organisation profit from such an innovation partnership? And how does your organisation contribute to the goals of the innovation partnership?

2-3: Where do you see challenges in this partnership or limitations?

2-4: How would you evaluate this partnership with regards to EU level? Does it have an impact on the work and projects ongoing within the EU?

2-5: Taking now Sweden and Germany. Two countries with similar interests but differentiating for example in market size, number of inhabitants but also innovativeness such as in the European Innovation Scoreborad. Sweden is known for its very high innovativeness and digital savviness while Germany is known as well for its innovativeness, its competence in some industries like automotive engineering and the possibility for Swedish companies to scale up. Do you think the partnership is a feasible way for both countries or is it maybe an imbalanced partnership, where one party could profit more than the other?

Theme 3: Overall Evaluation about Bilateral Innovation Partnerships

3-0: Would you say the idea of such bilateral innovation partnerships is a good one for today's challenges, from a rather political perspective with societal challenges, rapid speed of change, digitalisation?

Thank you again for the interview.

[Note: if feasible, follow-up questions were asked for more details, or questions where a clarification of arguments was seen as helpful, i.e. respondent validation]

Appendix B

Framework matrix

Table A1

Example of a framework matrix

	1-0: Attitude towards Collabo-ration	2-1: Role of the org. within the BIP	2-2: Benefits within the BIP	2-3: Challenges within the BIP	2-4: Impact on EU level	2-5: Ba-lanced partner-ship?	3-0: Overall Evaluation	New: Success factors within a BIP	New: Pitfalls within a BIP
R1									
R2									
R3									
R4									
R5									
R6									
R7									
R8									

The framework matrix helped in finding patterns within the process of Selective Coding as part of Grounded Theory methodology. The analysis led to the identification of a core theme.

Appendix C

Architecture of a BIP

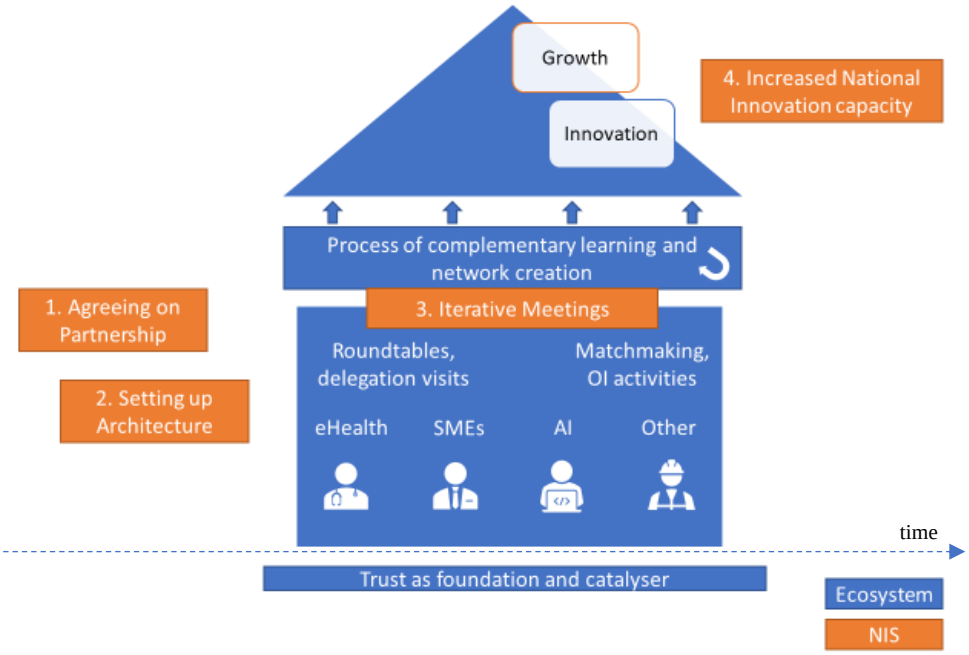

Figure A1: Modelling a BIP from both Ecosystem and NIS perspective (own elaboration)

This figure is an alternative, simplified visualisation about the functionality of a BIP. The different roles of NIS as a shaper, setting the infrastructure of a BIP and the Ecosystem as a participatory stakeholder are reflected upon.