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Activating an entrepreneurial ecosystem through mapping and value creation

A design science approach

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Activating an entrepreneurial ecosystem through mapping and value creation:

A design science approach

Department of Industrial Engineering and Innovation Sciences

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By

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Management Summary

Startups have a high failure rate compared to more mature companies, which creates additional problems for startups. In order to combat these problems, startups have increasingly located in entrepreneurial ecosystems. In entrepreneurial ecosystems, different organizations create a cohesive social and economic system that supports the formation and growth of new firms (Stam & Spigel, 2016). Literature has found that startups that participate in an entrepreneurial ecosystem have a higher chance to succeed than startups that are not participating (Stam & Spigel, 2016).

Within entrepreneurial ecosystems, entrepreneurial support organizations (ESO) aim to support startups by offering services and connecting them to the entrepreneurial ecosystem (van Weele et al., 2017). To use the entrepreneurial ecosystem in favor of the startups, the ESO should develop a thriving entrepreneurial ecosystem and know how to activate the individual organizations (Roundy, 2021; Rampersad, 2016). The activation process identifies, attracts, and engages participants in the entrepreneurial ecosystem, resulting in a denser network that fosters the flow of information and resources, which can favor the chance of success for startups.

However, within the context of ecosystems, a framework for activating the entrepreneurial ecosystem participants is absent, making it unclear for ESOs how to execute this process. One such ESO struggling to activate its entrepreneurial ecosystem is The Gate, an incubator active in the Brainport entrepreneurial ecosystem. In order to address this problem, this study focuses on how an incubator can activate its entrepreneurial ecosystem. Based on this, the following main research questions were developed:

"How can an incubator activate its entrepreneurial ecosystem by creating value for startups?"

Methodology

In order to answer the main research question, this study used a design science methodology (DSM) as developed by Keskin & Romme (2020). DSM helps to bridge the gap between practice and science by creating a solution. A literature review was conducted to identify how entrepreneurial ecosystems are characterized and how an entrepreneurial ecosystem can be mapped. Subsequently, empirical data was collected by conducting semi-structured interviews with startups, The Gate's employees, and ecosystem actors, observations, and documentation. Based on the theoretical and empirical analysis, design principles were developed according to the CAMO logic (Denyer et al., 2008). The design principles were used as input to develop a solution design. The solution design was created through two iterations based on semi-structured interviews, which led to the development of the activation framework that The Gate can use to activate its entrepreneurial ecosystem to facilitate incubated startups. The activation framework was evaluated with a focus group and semi-structured interviews. Finally, the conclusion and limitations are presented together with an answer to the main research question.

Theoretical analysis

In the literature review, three processes were found that can help activate the entrepreneurial ecosystem: (1) map the entrepreneurial ecosystem, (2) Create value in the entrepreneurial ecosystem that is higher than the value created in other entrepreneurial ecosystems, (3) value is captured on startup level and ecosystem level (Cavallo et al., 2021). Every process involves a set of steps to execute, and in order to properly execute these steps, the incubator should be deeply embedded in the entrepreneurial ecosystem. Also, the incubator should try to coordinate the entrepreneurial ecosystem in order to be able to map the ecosystem and create value for the participants (Roundy, 2021). The literature review revealed four activities that can decrease the search costs in the entrepreneurial ecosystem: cognitive, social, structural, and cultural (Colombo, 2019; Roundy & Fayard, 2020).

Empirical analysis

The empirical analysis showed what the current entrepreneurial ecosystem looks like, which elements are present, and its strengths and weaknesses. Also, the specific objectives of The Gate and the service offers are presented. Next, the analysis showed that the startups recognize the decreased search cost as a reason to locate and participate in an entrepreneurial ecosystem. Also, barriers and challenges for

activating the entrepreneurial ecosystem were identified by investigating the four activities and current barriers and challenges for executing them. Furthermore, the analysis only found support for cognitive, social, and structural activities. No support was found for the cultural activities. Finally, the mechanisms that cause the entrepreneurial ecosystem to be activated through entrepreneurial ecosystem mapping and value creation were presented.

Solution Design

In the solution design phase, the design principles were developed by synthesizing both theoretical and empirical analysis. The design principles served as the foundation for creating the activation framework. Three concept solutions have been developed based on the design principles and requirements. The first solution was an activation framework that helped The Gate to activate its entrepreneurial ecosystem. The second solution supports The Gate to execute the cognitive activity by organizing an event for The Gate and the startups in the alpha building. The third solution helps The Gate to strengthen the entrepreneurial ecosystem by extending the preferred partner network and tapping into the student pool of Brainport. The three concept solutions were presented to the three different stakeholders in which they had to score the solutions with criteria that were developed based on the design requirements. The first solution scored the most points and was therefore selected to be developed further. In order to choose between the final design, the simple additive weighting method was used (Afshari et al., 2010).

The activation framework was further developed by incorporating the entrepreneurial mapping and value creation processes. After completing the first iteration, two semi-structured interviews with The Gate employees were held to reflect on the solution design. Based on the outcome of the interviews, it was chosen to increase practical usability by creating a roadmap for activating the entrepreneurial ecosystem. The roadmap shows step-by-step how The Gate should activate the activation process by presenting four distinctive processes: coordination, mapping, value creation, and activation. Every process elaborates on the activities grounded in theoretical and empirical analysis and what is needed to execute them. The solution is developed as a design. Therefore the evaluation is performed ex-ante, meaning that the evaluation of the solution is performed before it is implemented. The evaluation revealed that the solution design is expected to help The Gate activate its entrepreneurial ecosystem.

Conclusion and Discussion

This research presented a roadmap for activating the entrepreneurial ecosystem, thereby contributing to the current body of literature. This research validated the entrepreneurial ecosystem mapping process and synthesized the elements of an entrepreneurial ecosystem. Furthermore, this research contributes to the literature by providing empirical support for how an incubator can activate its entrepreneurial ecosystem and presenting the mechanisms that activate it.

Besides contributing to the literature, this research presents several managerial recommendations for The Gate to implement the solution design better. First, The Gate should see the entrepreneurial ecosystem as dynamic and as something that can be coordinated and developed. This helps to shift their perspective on how to coordinate and use its entrepreneurial ecosystem. Second, by clearly communicating the potential benefits to the stakeholders, they can be engaged in the entrepreneurial ecosystem. Third, The Gate should transform from an incubator towards an incubator that is also an entrepreneurial ecosystem coordinator. Finally, The Gate should offer its services with an assertive approach. By incorporating the activation roadmap and considering the recommendations, The Gate can execute the processes and activities for activating its entrepreneurial ecosystem.

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Abbreviation	Term
EE	Entrepreneurial Ecosystem
ESO	Entrepreneurial Support Organization
CAMO	Context, Action, Mechanism, Outcome
RBV	Resource-based view
IP	Intellectual Property
AI	Artificial Intelligence
TU/e	Eindhoven University of Technology
BOM	Brabantse Ontwikkelings Maatschappij
TRL	Technology Readiness Level

1. Introduction

On 30 October 2020, the then minister of Economic Affairs, Mona Keijzer, presented a letter about the 'vision of the future of the industry in the Netherlands' to the Dutch House of Representatives (Mona Keijzer, 2020). Above others, the ministry of Economic affairs' prime goal is to ensure a favorable business climate and sustainable economic growth. A critical recommendation to achieve this goal is by "developing and maintaining well-functioning ecosystems where companies, capital, and universities closely cooperate" and to form a "coherent approach between R&D, innovation and upscaling, and education in order to support startups and scale-ups (Mona Keijzer, 2020)

This recommendation can be seen as part of a trend in ecosystem literature. Since Moore (1993) first coined the term ecosystem, literature on ecosystems has increased exponentially (Scaringella & Radziwon, 2018). Scholars have distinguished multiple concepts within the broader ecosystem term. Nowadays, scholars have acknowledged four streams of ecosystem concepts: business ecosystems, innovation ecosystems, knowledge ecosystems, and entrepreneurial ecosystems. What differentiates entrepreneurial ecosystems (EE) from other types of ecosystems is the central role of entrepreneurs within a specific community of associated actors, which is different than in other ecosystems where the ecosystem centers around an overarching common offering (Adner, 2017; Stam & van de Ven, 2021). The term 'ecosystem' originates from biology, describing the community of living and nonliving components that interact together to survive (Acs et al., 2017). In innovation sciences, this metaphor explains how companies, institutions, and employees work together to produce a specific economic output. The term entrepreneurial refers to entrepreneurship, which means opportunities for creating new goods and services are explored, evaluated, and exploited (Stam & Spigel, 2016). With entrepreneurship, all forms of productive entrepreneurship are indicated, such as startups, scale-ups, and entrepreneurial employees, which are a source of innovation (Stam & Spigel, 2016). By combining the concepts of entrepreneurship and ecosystem, this term is defined as *"an independent set of actors that cooperate to create productive entrepreneurship within a particular network"* (Stam & Spigel, 2016).

Within EEs, ESOs are recognized as playing an essential role in startup support and EE development (Spigel, 2016). Other research has assigned ESOs the role of coordinators within the EE by governing the ecosystem and facilitating relationships in the community (Colombo et al., 2019; Roundy & Fayard, 2020). An important activity to perform when governing the EE is activation, in other words, performing the process of "identifying and attracting participants for the community and configuring and structuring the EE" (Rampersad, 2016). Community activation is essential because it can result in a greater degree of interconnectedness among startups and increase community awareness (Wickizer et al., 1993). Within the context of EEs, activation entails *"the process of identifying, attracting and engaging participants to the EE to make the network denser, which fosters the flow of information and resources."* However, a framework of how an ESO can activate its EE is absent and existing research has only investigated the governance of an EE but not the specific step in governance, which activation is part of (Colombo et al., 2019; Cunningham et al., 2019; Rampersad, 2016).

This master thesis is written at The Gate, a university business incubator located on the Eindhoven University of Technology (TU/e) campus. This thesis follows the design science methodology, which is grounded in both science and practice and valuable when dealing with a practical business problem. The research aims to investigate how a university business incubator can activate its EE, which challenges inhibit the incubator from activating the EE, and which services it can offer to facilitate startups better and strengthen the EE.

1.1 Empirical Context

This research is conducted in the context of a university business incubator, The Gate, located at the TU/e campus. The Gate is active within the Brainport region, which is well known for its number of high-tech companies cooperating with the government and education institutes in the triple-helix of the region. The Brainport ecosystem has proliferated over the past 20 years and is expected to grow. Entrepreneurs, such as startups and spin-offs, are important contributors to this growth. The region recognized this and aimed to attract and support more startups in this region. One of the sources of

entrepreneurship is the TU/e. The TU/e is embedded in the Brainport ecosystem and part of the triple helix, which is the cooperation between the TU/e, the local government of the Brainport, and large companies from the Brainport ecosystem.

Universities nowadays have been moving towards entrepreneurial universities that support academic entrepreneurship to stimulate economic development, which implies that the TU/e has three objectives: education, research, and valorization. The latter implies that universities actively support students and faculty to pursue entrepreneurial ambitions. Because entrepreneurial support at the TU/e was fragmented, The Gate was established. Five regional organizations, which are the Brabantse Ontwikkelings Maatschappij (BOM), Brainport Development, Fontys University of Applied Science, the Summa College, and the TU/e itself, established The Gate in January 2021.

The Gate is seen as a university business incubator and a technology transfer office (TTO) combined. The Gate is located in the Alpha building on the TU/e campus. This building is seen as the startup hub on the TU/e campus, and many startups reside there. The TU/e remains the formal owner of the building, and TWICE, which is officially owned by the TU/e, is exploiting the Alpha building.

The Gate aims to support three types of tech startups in the region: faculty and researchers of the TU/e, students of the TU/e, Fontys, and Summa, and other Brainport tech entrepreneurs. Their mission is to help entrepreneurs become independent organizations. This is done by focusing on three core aspects: Quality, Direction, and connecting. The quality entails creating high-quality and structured incubation programs and dedicating resources to the core tasks of The Gate. Direction includes guiding startups and enabling them to "fly out," meaning they should leave The Gate when ready. The final aspect is connecting, meaning that The Gate should connect all partners that can help startups and that The Gate must also direct the startups to the right partner.

The main objectives of The Gate are valorization and supporting startups to become independent organizations. The Gate is embedded in the EE of the TU/e and the Brainport, which helps them to leverage their community in favor of startups. The long-term strategy for The Gate is to start coordinating the EE by making the elements of the community more visible, controlling the in-and outflow of the startups in the system, and identifying and attracting resources and partners. This will help The Gate better facilitate the startups in Brainport.

1.1.1 Startups

Although The Gate is seen as a startup incubator, The Gate is not supporting all types of startups. Within Brainport, The Gate aims to facilitate three types of startups: startups created by TU/e students, TU/e faculty entrepreneurship, and Brainport startups. These startups must be at the beginning of their existence but already have some experimental proof of concept. The Gate uses the Technology Readiness Level (TRL) to indicate which startups they address (European Commission, 2020). The Technology NASA officially developed Readiness Level to indicate when a technology is "flight proven", see figure 1. Technology at TRL 1-3, known as fundamental research, is often done by universities. The Gate addresses startups at TRL 4-6, also known as applied research. Then, when startups achieve TRL 7-9, they will flow to other organizations, like the BOM, Eindhoven Engine, or Startup Delta.

The TU/e has established a connective chain on the campus based on the Technology Readiness Levels. The TU/e itself starts with TRL 1 because of the research it performs. When this research progresses toward TRL 4, The Gate is the successor in the funnel and will support the entrepreneurs toward TRL 6. When startups reach TRL 6, the startups will be connected to another organization that will support startups through TRL 7-9. These organizations are also linked in the funnel because Eindhoven Engine is located on the TU/e campus and maintains relations with The Gate and the TU/e. Also, the BOM, one of the five partners that established The Gate, is connected in the funnel and maintains relations with The Gate. This enables startups to flow through different phases of their existence logically.
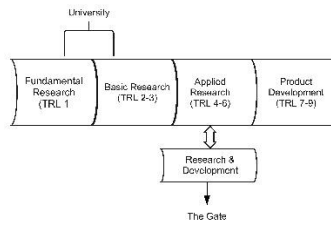
Figure 1- TRL funnel TU/e

In the TRL 4-6 phase, startups experience difficulties like a lack of money for acquiring all the necessary knowledge, a lack of management and commercial knowledge, and difficulties obtaining housing. The Gate's objective is to help these startups overcome their challenges by offering business development, organizing startup events, connecting startups, referring startups to important stakeholders within their ecosystem, providing guidance with business developers, providing guidance in the IP procedure, and helping to acquire funding and subsidies. The Gate's support is tailored to the needs that startups require in this phase of existence, so services that the startups require less in this phase, such as research labs.

Technology Readiness Level (TRL)

Technology Readiness Level (TRL)
TRL 0 - Idea. Unproven concept, no testing has been performed
TRL 1 - Basic Principles Observed and Reported
TRL 2 - Technology Concept and/or application Formulated
TRL 3 - analytical and experimental critical function and/or characteristics proof-of concept
TRL 4 - Component and/or breadboard validation in laboratory environment
TRL 5 - Component and/or breadboard validation in relevant environment
TRL 6 - System/subsystem model or prototype demonstration in a relevant environment
TRL 7 - system prototype operating in operational environment at pre-commercial sales
TRL 8 - First of a kind commercial system. Manufacturing issues solved
TRL 9 - Full commercial application, technology available for consumers

Figure 2- Technology Readiness levels (European Commission, 2020)

1.2 Problem definition

Theoretical Relevance

EEs are recognized as an important means to stimulate entrepreneurship (Stam, 2015). Within the EE, many different elements are cooperating in order to support and stimulate entrepreneurs. Research has found that thriving EEs tend to be coordinated by an EE leader (Roundy, 2020). This EE leader or coordinator can be an ESO because this element is usually embedded in the ecosystem and closely related to the startups (Roundy, 2020; Spigel, 2016). An important activity to perform when coordinating the EE is activating. Activating is the most critical activity governing the EE (Rampersad, 2016). This activity helps the coordinator identify the participants needed for developing the network, helps select partners, and facilitates relationships between the ecosystem actors (Rampersad, 2016; Roundy & Fayard, 2020). Besides, activating the EE helps increase the ecosystem's interconnectedness and community awareness (Wickizer et al., 1993). Both activities help make the community denser, leading to a more successful EE (Roundy & Fayard, 2020).

One way to attract startups and ecosystem actors to the EE is by value creation and capturing (Nylund et al., 2019). The value creation process in an EE is described by (Cavallo et al., 2021). There are three steps to follow: first, analyze the EE by mapping the system. The second step is creating value

in the ecosystem, and the third step is enabling actors and startups to capture that value (Cavallo et al., 2021). However, one important issue within EE activation is the need to understand how to activate an EE. Research has described the different processes separately but has yet to investigate how these processes come together in order to activate the EE. Knowing how to activate an EE is essential because it can help an incubator to facilitate startups better, strengthen the EE, and attract other startups and ecosystem actors to the EE (Roundy & Fayard, 2020; Tiba et al., 2020). Therefore, the theoretical objective of this research is to investigate how an incubator can activate its EE by mapping the ecosystem and then using this as the foundation to create value for the ecosystem and, by this, activate it.

Practical Relevance

As previously described, successful EEs are usually coordinated by a leader. Activation is an important activity to perform when coordinating the EE. The Gate wants to coordinate its EE more efficiently by activating it. However, there are some problems with why The Gate cannot activate the EE.

No entrepreneurial ecosystem mapping

The Gate is relatively new, which causes some important processes to be underdeveloped. First, The Gate needs a more precise overview of its EE and the relations between different ecosystem actors. This makes it difficult to find startups, ecosystem actors, and resources. A detailed mapping of the EE can help The Gate to identify required actors or resources easily. The mapping can also help startups find actors and resources easier.

The absence of an ecosystem mapping also prevents The Gate from effectively using and developing the EE. The Gate should develop the EE based on the needs of the startups. Currently, The Gate is not developing or strengthening the EE. Startups require, for example, service providers and financial and human resources. However, startups mention that the service providers' network is absent and needs help acquiring financial and human resources.

The lack of an ecosystem mapping also causes problems in efficiently connecting the startups with the ecosystem. As the Managing director of The Gate calls it, The Gate should act as the 'VVV van de Brainport ecosystem,' implying that The Gate should act as a tourist office where startups can go for information about the EE. In other words, The Gate should link the needs of the startups with the available means of the ecosystem. Ideally, The Gate knows all relevant Brainport ecosystem actors and can connect them with the startups. Not having a clear overview of the EE is currently disrupting this process.

Not governing the entrepreneurial ecosystem

Another problem that The Gate faces is the fact that it has difficulties governing its EE. This is partly caused by the lack of a clear overview of the EE itself but also because The Gate does not know some of the processes of governing the EE, causing The Gate not to be able to engage startups and ecosystem actors in the EE. One activity in governing the EE is activating the EE. This activity is crucial because it can help attract startups and ecosystem actors to the community (Rampersad, 2016). Because startups are the central focus of the EE and are seen as the fuel that EEs can consume to sustain and grow, performing this activity is essential (Stam & van de Ven, 2018). Activation can also help increase the interconnectedness among startups and ecosystem actors and increase community awareness (Wickizer et al., 1993). Interconnectedness and community awareness are essential characteristics of the thriving EE, leading to a high network density (Stam & Spigel, 2016).

Combining theoretical problem with the practical problem

When combining the theoretical problem, which is the lack of a framework for activating the EE, and the practical problem of The Gate, which is not knowing how to activate the EE, it can be concluded that both perspectives overlap. Therefore, this research tries to overcome both problems by investigating how an incubator can activate its EE by first developing an EE mapping and second by investigating how an incubator can use this mapping to create value for the startups. In order to combine the theoretical and theoretical perspectives, this research will use the design science

methodology (DSM) of Keskin & Romme (2020). The DSM links practice and science by designing a solution.

1.2.1 Problem Statement

The Gate aims to better govern the EE by activating the EE. The Gate faces difficulties efficiently governing the EE because there is no framework in place that can support The Gate to activate the EE. Furthermore, The Gate has difficulties overseeing the EE because there is currently no mapping of the ecosystem developed.

Therefore, the problem statement is formulated as:

> *The Gate wants to use its entrepreneurial ecosystem better by activating it. Consequently, the EE should be structured better by developing an entrepreneurial ecosystem mapping and investigating how The Gate can create value for startups. Currently, The Gate does not have a framework for activating the entrepreneurial ecosystem that describes how The Gate can create a mapping of the ecosystem and uses this as the foundation to create value for the startups, which helps The Gate to further strengthen the ecosystem by activating the actors and startups*

1.3 Research Question

The primary objective of this research is to develop a design solution that enables The Gate to activate its EE to better address startups' questions and problems. This research will be conducted at The Gate, which is currently struggling to connect startups with the Brainport EE. Therefore, the following research question is developed:

"*How can an incubator activate its entrepreneurial ecosystem by creating value for startups?*"

1.3.1 Sub-Research Questions

To answer the main research question, multiple sub-questions are formulated. These sub-questions help in covering all aspects that the main research question entails. The first research question aims at discovering how EEs are characterized and what the Brainport EE currently looks like. This is done by first taking a theoretical perspective and then combining this with the empirical findings from the case company. The theoretical perspective investigates the current stance of the literature on EEs. The empirical perspective will focus on what The Gate's EE currently looks like and what The Gate's position is within this ecosystem. When combining both perspectives, the first sub-research question can be answered.

> SRQ 1: *How are entrepreneurial ecosystems characterized?*

The second question explores the incubator's barriers and challenges when using its EE. This question is answered by empirical data, which will enable us to discover the barriers and challenges for incubators when activating the EE and possible problems when collaborating with EE stakeholders.

> SRQ 2: *What are the barriers and challenges for incubators to activate its entrepreneurial ecosystem?*

The third question identifies the interventions that exist for incubators in order to create value for startups in the EE. This question is answered by conducting a literature review which is then used for input for the empirical data collection with the business developers, startups, and ecosystem actors.

> SRQ 3: *How can incubators create value for startups in the entrepreneurial ecosystem?*

The fourth question combines the insights of the previous questions to develop a solution design that helps The Gate activate its EE. This question synthesizes the literature review and empirical data to develop a solution design. This question helps describe how The Gate can activate its EE by overcoming the barriers and challenges identified and using the mapping steps and value creation actions found in the previous sub-research questions.

> SRQ 4: *How can an incubator design a tool to activate its entrepreneurial ecosystem by creating value for the startups?*

1.4 Structure of the Report

This research is structured as follows. In this chapter, the case company is introduced, followed by the problem description and the research questions. In chapter 2, the methodology is explained, followed by Chapter 3, in which the results of the literature review are presented. Next, in chapter 4, the empirical analysis is presented, and chapter 5 synthesizes the results of the literature review and the empirical analysis into the design principles. Finally, in chapter 6, the solution design is presented with the evaluation, and Chapter 7 presents the conclusion and discussion.

2. Methodology

This chapter outlines the methodology of this study. First, the general idea of the design science methodology is provided. Then the specific approach followed to execute this study is provided, followed by explaining how the data collection and analysis are performed. Finally, the steps taken to design and evaluate a solution are explained.

Design Science Methodology

This study starts with a practical problem within a company, which leads to implementing the design science methodology (DS). A design science approach is a qualitative research approach in which the object of study is the design of a process, which implies that the knowledge generated is simultaneously used to design an artifact. This thesis adopts the DS framework developed by (Keskin & Romme, 2020), which builds on other DS frameworks developed within the management field by van Aken (2004), Romme & Endenburg (2006), and Holmström et al. (2009). This framework enables simultaneously solving real-life business problems and developing generalizable theoretical design knowledge from practical experiences and interventions (Keskin & Romme, 2020). This methodology entails a combination of design and research activities involving exploration of the problem context, synthesizing data and theories, creating solutions, and evaluating the designed solutions (Keskin & Romme, 2020).
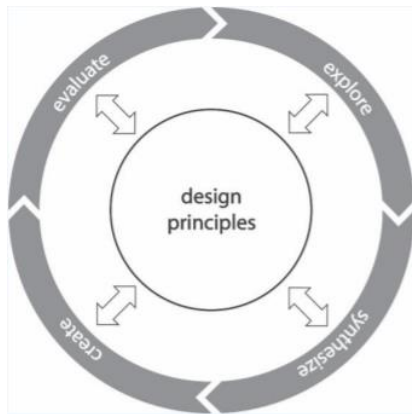
Figure 3- Design science research cycle

Design principles take a central role within this framework and are continuously updated and reflected throughout the Design Science research process. This process is highly iterative and involves four steps: exploration, synthesis, creation, and evaluation. Because this thesis aims to bridge the gap between the problems found in an empirical context and solutions found from theoretical frameworks, the design science methodology of is suited for this research. Because the research of Keskin & Romme (2020) is building on different taxonomies of DS methodologies for developing an integrative framework that is appealing to students at undergraduate and graduate levels, their DS methodology fits best to this thesis. This thesis uses an existing theoretical framework combined with data gathered through company documents, interviews, observations, and focus group. Thus, this research will use both existing literature but also acquires its own data, which makes the qualitative exploratory research approach the most feasible research approach for answering the research question.

2.1 Research design

This study follows the design science approach from Keskin & Romme (2020) that combines science with practice. The specific approach this study takes is presented in figure 4, based on the DS methodology. The iterative approach entails four steps that are outlined below.
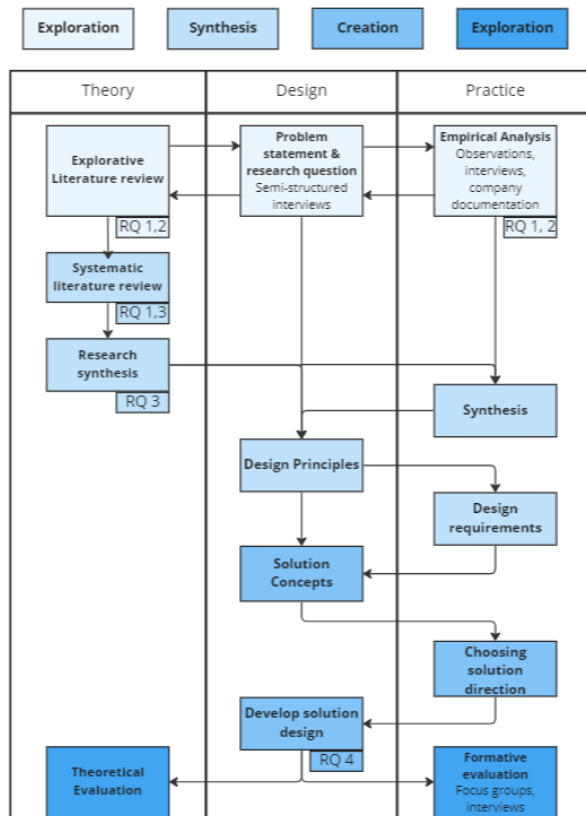
Figure 4- research approach based on design science

The first step is exploration. In this step, it was essential to set the boundaries for the problem. Creating an in-depth understanding of the practical and theoretical problem is important in this phase. In the exploration step, this research's first and second sub-question is answered by conducting a literature review, in which EEs are explored, and potential problems and causes for activating EE are identified. Subsequently, empirical data was gathered using observations and interviews with representatives of The Gate, The Gate's stakeholders, and startups in the alpha building. An overview of who is interviewed is presented in chapter 2.2, data collection. Combining the literature review and knowledge obtained from the interviews, a clear insight into the problem was developed, and the first and second sub-question could be answered. The literature review and the discussions with The Gate's employees provided in-depth knowledge about the stance of the literature on the EE and what the EE of The Gate looks like.

The second step is synthesis. In this step, the vast amount of data collected in the theoretical and empirical analysis is synthesized. In this step, two types of synthesis were used: research and design. The journal articles retrieved from the systematic review were synthesized into coherent design principles in the research synthesis. The design principles were developed according to CAMO logic, see appendix C. This logic entails four dimensions, meaning that an actor and its actions (A) that trigger a particular mechanism (M) toward achieving the desired outcome (O) in a specific context (C) (Denyer et al., 2008; Keskin & Romme, 2020). The design requirements developed from the theoretical analysis were used as input for the empirical analysis. In the empirical analysis, the existing design principles were validated, and information was gathered to input new design principles.

The second part is design synthesis, which involves extracting meaning from the empirical data into a set of design requirements. In the previous step, empirical data was acquired through observations, meetings, and interviews with The Gate employees, startups from the alpha building, and stakeholders of The Gate's EE. This data served as input for the design requirements because insights were obtained about what the design should do and what not. The results of the empirical analysis are presented in chapter 4. The empirical analysis, combined with the systematic literature review

conducted in this step, was used to answer sub-question three. Subsequently, the data was then used to inform the design of a new solution in the next step.

The third stage is creation. In this step, a solution design is created, solving the problem described earlier. Based on the synthesis step, three possible solutions were developed, from which one solution was chosen that was further developed. The solution was chosen by developing solution design criteria. These criteria were based on the requirements formulated in the synthesis step. Five interviews were held in which the three solutions were presented, which will be further elaborated in Chapter 6. After one solution design was chosen, this was further developed into the first iteration. The first iteration was discussed with two employees of The Gate, which served as input for iteration 2. After this iteration was completed, the final solution design was evaluated, which is presented in the next step.

The fourth and last step is the evaluation step. In this step, the solution design that had been developed was evaluated, implicating that the designed solution was tested and evaluated by checking its practicality and fit with the organization. The solution is tested from two points of view: practical and theoretical. The practical point of view tested whether the solution worked by conducting a focus group with a startup and an ecosystem actor and by having two interviews with employees of The Gate, explained in chapter 2.3. The other point of view, the theoretical point of view, is tested by identifying the mechanisms that can explain how the designed solution generates the outcomes of the solution (Keskin & Romme, 2020). The theoretical evaluation was done by reflecting on the formulated design principles. The focus group and the interviews with two employees of The Gate served as input for the theoretical evaluation presented in chapter 6. The goal was to demonstrate the solution's relevance within the theory and assess whether the designed solution resulted in the desired outcome. The solution must add something to the existing literature, and the literature gap must be bridged. The gap between researchers and practitioners is bridged when the solution works from a practical and theoretical stance. The evaluation was ex-ante, meaning that the evaluations were carried out before the design was implemented (Venable et al., 2016). In this research, the ex-ante evaluation entailed evaluating the solution prior to the construction, which had some time advantages. However, this also meant that the use of the solution had to be consistently and rigorously evaluated based on its feasibility and usability.

| Chapter 1 Introduction Problem Statement Research Questions | → | Chapter 2 Methodology | → | Chapter 3 & 4 Systematic literature review and empirical analysis | → | Chapter 5 Design Prinples Design requirements | → | Chapter 6 Solution design & Evaluation | → | Chapter 7 Conclusion & Discussion |
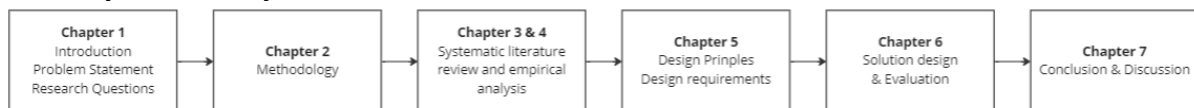
Figure 5 - Structure of thesis

2.2 Theoretical analysis

The theoretical analysis consists of two parts: an explorative literature review and a systematic literature review. In the explorative literature review, the main concepts of this study are defined and investigated. The systematic literature review is used to answer Research Questions 1 and 2.

2.2.1 Systematic literature review & synthesis

In this research, literature is used in order to answer the main research question and also to answer sub-question one and three. By answering the sub-questions, it should be possible to answer the main research question. From these sub-questions, keywords are developed and defined, enabling the researcher to find relevant articles. Scopus is used to systematically search literature while simultaneously assessing the quality of the literature found. Google Scholar is not a sufficient search engine to incorporate in the literature search because it does not have the extensive quality assessment capabilities that Scopus possess.

Search strings are developed with synonyms to cover all different terms scholars may use for specific concepts. See table 1 for an overview of the search string used to answer sub-question one and three.

Research Question	Search Sting
RQ1 How are entrepreneurial ecosystems characterized?	"use" OR "apply" OR "activate" OR "employ" AND "Entrepreneurial ecosystem"
	"elements" OR "Pillar" OR "factor" OR "Constructs" AND "entrepreneur" OR "startup" OR "venture" AND "ecosystem" OR "community" OR "network"
RQ3 How can incubators create value for startups in the entrepreneurial ecosystem?	"incubator" AND "university" AND "types " OR "roles" OR "characteristic" AND "startup" OR "start-up" AND "entrepreneurial ecosystem"

Table 1 - search strings

Including and excluding of articles

The initial search yielded many articles. In order to maintain only high-quality articles, it was chosen to subject the articles to predetermined standards, see table 2. In order to only include articles that are published in a relevant subject area, it was chosen only to use articles published in the following areas: business, management, and accounting; decision sciences; economics, econometrics, and finance. The source had to be a journal article or a book. Other source types were excluded.

Furthermore, the language in which the source is published must be English. All languages other than English are not allowed. Another standard is that the articles must be published after 1993, the year that James Moore published his article that first coined the term ecosystem (Moore, 1993). Finally, the sources must be published by a high-quality journal, which was done by checking the score of all journals on Gesamtliste - vhbonline.de. This journal ranking was selected since the TU/e provided it. Only journals with quality A+ or A were selected because these journals are deemed to be of the highest quality. Journals with a lower score than A were excluded. Having only high-quality journals is essential for the credibility of the results found in the literature (Negahdary, 2017). Because this is a literature review with the foundation primarily built on literature, it was chosen to start with the highest quality articles only. Finally, there are two inclusion criteria related to the content of this research. First, in the literature review, it was identified that there are two types of ecosystems: ecosystem-as-affiliation and ecosystem-as-structure. Both types have inherent different concepts and mechanisms, so it is important to distinguish between them. Because EEs are part of the ecosystem-as-affiliation literature, it is chosen to only include these articles in the literature review. Finally, there are also different types of ecosystems. The EEs consist of different elements and mechanisms than the other types of ecosystems, and therefore only the EEs are included in the systematic literature review.

Criteria	Inclusion criteria
Year published	All articles after 1993
Subject Area	Business Management and Accounting; decision sciences; economics, econometrics and finance
Source title	Only titles with ranking A+ or A
Source Type	Journal articles and books
Language	English
Part of ecosystem literature	Ecosystem-as-affiliation
Type of ecosystem	entrepreneurial ecosystem

Table 2 - Inclusion criteria

Besides inclusion criteria, articles were also subjected to some criteria that could exclude them from the population. These criteria were based on the explorative literature review. The explorative literature review found that the literature on ecosystems can be separated into two parts: ecosystem-as-structure and ecosystem-as-affiliation. The ecosystem-as-affiliation is the part to which the EE belongs. See the exclusion criteria in table 3.

Criteria	Exclusion criteria
Type of ecosystem literature	Ecosystem-as-structure
Type of ecosystem	Business ecosystem, innovation ecosystem, knowledge ecosystem

Table 3- Exclusion criteria

After subjecting the results to the inclusion and exclusion criteria, the articles selected for reading can be found in table 4. All these articles were ready completely to see whether they were relevant to incorporate into the research. When reading the articles, the references were read in order to see if there were some other interesting papers. This process is described in the next part.

Research Question	Search Sting	Results after filtering
RQ1	"use" OR "apply" OR "activate" OR "employ" AND "entrepreneurial ecosystem"	14 articles
	"elements" OR "Pillar" OR "factor" OR "Constructs" AND "entrepreneur" OR "startup" OR "venture" AND "ecosystem" OR "community" OR "network"	28 articles
RQ3	"incubator" AND "university" AND "types " OR "roles" OR "characteristic" AND "startup" OR "start-up" AND "entrepreneurial ecosystem"	8 articles
Results		50 articles

Table 4 - Results search strings

Snowballing

Snowballing refers to the process in which every article retrieved from the initial search is used by reading the references. The references that seemed relevant were selected and read to see if they were indeed relevant. The references were read and checked on relevance, which was repeated until no new relevant articles were discovered (Randolph, 2009). Eventually, the point of saturation was reached after finding another 81 relevant articles through snowballing. After these 81 articles, no new articles were directly found, which led to the conclusion that saturation was reached. Some interesting articles came to light after the data collection, but these were not included since this can create a lot of extra workload because of the need to restart the whole process (Randolph, 2009).

Overview of the approach of systematic literature review

The approach of the literature review is visualized in figure 6. First, a literature review was conducted on EEs. Two search terms were used, which can be found in figure 6. The first search term yielded fourteen articles, and the second search term also yielded 28 articles. After snowballing, 68 articles were selected for the systematic literature review on EEs. For the literature review on incubators, one search term was used in which eight articles were selected. After snowballing in total, 29 articles were selected for the systematic literature review. When combining both results, 97 articles were selected for the systematic literature review, which can be found in Appendices A and B.
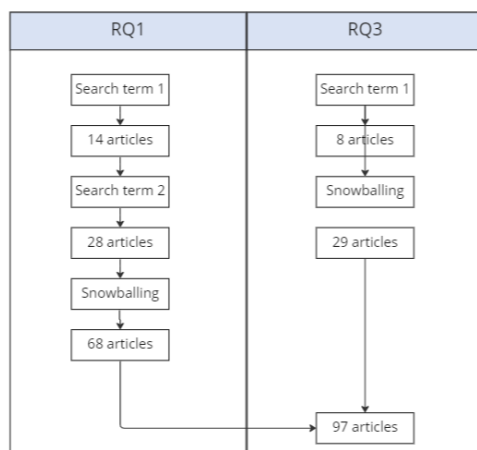
Figure 6 - Overview of systematic literature review approach

Systematic Procedure

After the literature search, the articles were stored in Mendeley (MacMillan, 2012). Mendeley can store all the selected articles in the program and highlight and write comments on the article. With this

program, a systematic literature review was performed for research questions one and two. Every article was read entirely, and elements or services of an incubator were highlighted in the Mendeley program. To illustrate this, for research question 1, the elements found in the selected articles were highlighted in the text, and comments were written in the program which elements the article mentioned. A table was developed in which all listed elements were included, and the article's reference was added. This table can be found in Appendix L. For research question 2, the services an incubator offers were highlighted in the article, and a comment was written about which services were listed, which are listed in table 13.

Research Synthesis

In order to translate the knowledge obtained from the theoretical and empirical analysis into design principles, CAMO logic is used. This approach helped to construct design principles that were used for the input of the solution design. As described in section 2.1, CAMO stands for context, intervention, mechanism, and outcome (Denyer et al., 2008). In this research, interventions are identified that can solve the problem of this research, which is how to activate the EE. These interventions are first identified in the literature. In order to synthesize the interventions found in the literature, an overview of specific interventions was developed together with the CAMO logic, seen in appendix C. These interventions are then validated in the empirical analysis through interviews. The interviews were developed based on the interventions identified in the literature.

Furthermore, some interventions were also identified in the empirical analysis. To illustrate this process, four activities were identified in the literature review that can decrease search costs in the EE. These activities were validated in the empirical analysis by asking whether these activities can indeed decrease the search costs.

The design requirements are based on the empirical analysis. The design requirements present the practical demands and restrictions of the solution design. By analyzing the interviews, some requirements that the solution should adhere to were identified. The design requirements found through a quote of the interviews are listed in appendix D. The requirements not listed in the table are developed through the interpretation of the data.

2.3 Empirical Analysis

In this chapter, the empirical data collection will be described. Empirical data was obtained for answering research questions one, two, and three. This research uses various data collection methods, like interviews, focus groups, and company documents. The data method in which the retrieved data was analyzed will also be elaborated on, together with the development and evaluation of the solution design. Finally, the quality of the research is described. In table 5 the overview of the data collection methods is explained.

DS Step	RQ	Type of data	Participants and Sources
Exploration	1	Documentation	The Gate's website, The Gate's business plan, mission vision documents
Exploration	1,2	Semi-structured interviews	The Gate's employees, startups, ecosystem actors
Synthesis	3	Semi-structured interviews	The Gate's employees, startups, ecosystem actors
Create	3,4	Semi-structured interviews	The Gate's Business developers, 1 startup, 1 ecosystem actor
Evaluation	4	Focus group	The Gate's business developers, 1 startup, 1 ecosystem actor
Evaluation	4	Semi-structured interviews	The Gate's business developers and employees

Table 5 - Data collection methods

Interviews

Interviews were the primary source of data collection for the empirical analysis. The explorative nature of this research, together with the research questions, resulted in a qualitative design because the data obtained was also qualitative. Interviews were also used for the evaluation of the design.

Interview sample

The information collected from the interviews should be from multiple perspectives because this provides insights from different points of view and a better depth of the problem (Aken van. et al., 2012). Conducting the interviews from multiple perspectives also increases generalizability. This is important because this research is written for The Gate and other incubators that aim to activate its EE. Therefore, it was chosen to interview multiple stakeholders with different roles in the EE, see table 6. Based on the notion on stakeholders by Bischoff et al. (2018), this research deals with internal and external stakeholders. The internal stakeholders are the startups and the incubator, whereas the external stakeholders deals with the EE of The Gate which are the ecosystem actors. Therefore, the interviews should incorporate at least the incubator, ecosystem actors, and startups.

Company/institute	Function	Role in EE
The Gate	Managing Director	Incubator
The Gate	Business developer	Incubator
The Gate	Business developer	Incubator
The Gate/TU/e	Business developer (student entrepreneurship)	Incubator
The Gate	Business Incubation Officer	Incubator
The Gate	Business manager ecosystem partners and funding AI	Incubator
TU/e Participations	Managing Director TU/e participations	Ecosystem Actor
TU/e	President of the Executive Board (and initiator The Gate)	Ecosystem Actor
Innovation Space	Employee	Ecosystem Actor
Twice (office rent, alpha building)	Account manager	Ecosystem Actor
BOM	Manager product development	Ecosystem Actor
Gritd	Startup support	Ecosystem Actor
Round One	Venture Capital	Ecosystem Actors/Startup
Aristotle Cognitive Training (startup)	founder	Startup
Inventors Company	Founder	Startup
Goal3	Founder	Startup
Eso-X	Founder	Startup

Table 6 - List of interviewees

In order to determine the total number of interviews, saturation had to be achieved (van. Aken et al., 2012). Saturation means no new knowledge or insights are gathered from the data. For the interviews, saturation was achieved when consensus was reached in the interview over the codes. Seventeen interviews were held that served as input for the empirical analysis.

Type of interview

The interviews that were conducted were semi-structured. This type of interview was chosen because this gives some control to the researcher but also creates the opportunity to gather new insights that were not known to the researcher yet (Longhurst, 2003). The interviews were held individually so the participants could talk freely and discuss sensitive discussions (van. Aken et al., 2012). The interview questions were open-ended and relatively broad, enabling the participants to answer them based on their perspectives. By carefully listening to the participant, it was also possible to ask several follow-up questions to gain a deeper and more detailed insight into what they actually think.

Interview preparation

In order to retain as much information as possible, interview guides were developed, see appendix E,F, and G. In the interview guide, a set of open-ended and broad questions were listed for every specific topic. Because, in total, thirteen elements were found to be part of an EE, a list with these elements was also developed so that the researcher could tick an element of the box when this was mentioned by the interviewee so that the researcher knew that no questions were necessary for that specific element. In order to assess the quality of the questions, a pilot interview was conducted. The

pilot interview was conducted with a startup, and the interview results were analyzed to improve the questions.

The semi-structured interview that was used for developing an EE mapping process was prepared by developing an interview guide, see Appendix H. In this interview guide, the five-step process of Kreuzer et al. (2018) was presented, followed by information about the results of the literature review on EEs. Also, a table was made in which the business manager of ecosystem partners and funding AI had to follow the process of Kreuzer et al. (2018) and had to provide answers on which specific information is needed to answer the process.

The semi-structured interviews used for the solution design decision were also prepared by developing an interview guide, see Appendix I. In this interview guide, the three solution directions were presented, and also the scoring method was explained. Also, the criteria developed to compare the three solution directions were listed so the participant could write his score.

Process of the interviews

The interviews aim to achieve saturation, implying that no new information is obtained. In order to achieve this, three different rounds of interviews were conducted. In every round, at least one startup, one ecosystem actor, and one employee of The Gate had to participate. After every round, all the interviews were transcribed and coded to see which topic needed further evaluation and to obtain more knowledge about new insights. After the third round and in a total of fifteen interviews, it was concluded that saturation was achieved because no new insights were gathered, and the most important topics were discussed thoroughly.

Confidentiality and recording

Before the start of every interview, the confidentiality of the participants was ensured by guaranteeing that the interviews were anonymous and that the answers given in the interview were processed discretionally. Besides, the participants were asked to give consent for recording the interview.

Focus Group

A focus group was used to evaluate the second iteration and assess whether the solution solved the practical problem. A focus group enables the researcher to include different types of users and thereby gather insights from multiple perspectives on how they feel or interact with the solution (Nyumba et al., 2018). Initially, the focus group was held with the three types of stakeholders as identified in the theoretical analysis: startup, ecosystem actor, and incubator. However, due to time constraints and planning problems, the focus group was held with two representatives of one startup and two representatives of one ecosystem actor. This ensured that the minimum required number of participants for focus groups was reached (Nyumba et al., 2018). Two semi-structured interviews with business developers from The Gate were held to compensate for the absence of the incubator perspective within the focus group. This ensured that the solution was evaluated from the three different perspectives that the solution was targeting.

Before the focus group, the participants explained the goal of the focus group, how the solution design works and what the solution is intended to solve. The solution was shared with the participants one day before the focus group with a brief explanation of how the solution should work. The structure of the actual focus group is presented in table 7.

Part of the focus group	Method	Time
Introduction	Presenting the solution	10 minutes
Part 1 – entrepreneurial mapping	Discussion	15 minutes
Part 2 – value creation process	Discussion	15 minutes
General discussion	Discussion	10 minutes
Closing	Thanking participants	3 minutes

Table 7 - Structure of focus group

A focus group guideline was developed to prepare the questions that were asked during the focus group, see appendix J (Nyumba et al., 2018). The focus group started with an introduction in which the solution was presented. The participants could ask if something was unclear. Then the discussion

about the first part of the focus group was held, which was about the EE mapping, followed by the discussion on part two, which was the value creation part. This was followed by the general discussion in which more specific open questions were asked about whether the process would activate the EE and the solution. The focus group was closed by asking if the participants had anything to say and thanking them for their time.

The focus group was facilitated, which meant that it was tried to create a relaxed and comfortable environment in which the participants felt safe to express their opinions (Nyumba et al., 2018). The focus group was recorded with the consent of all participants, but during the discussions also, notes were made about a particular behavior and interesting cues. In order to avoid interruptions, sometimes notes were made about interesting discussion points which could be asked later in the focus group.

After the focus group, the recording was transcribed, and the transcription, together with the notes, was used to derive the main feedback points. These feedback points were interpreted to see whether this could be included in the solution and to find limitations of the solution. The solution design was developed by incorporating some of the feedback points.

Company Documentation

In order to acquire company-specific information, such as the mission and vision statements, services offered, and strategic objectives, company documentation is used. These documents were acquired by asking employees of The Gate about specific information and if they had documents or records. The documentation provided insight into The Gate, which helped in knowing the organization, the colleagues, and the ecosystem partners.

Company Documents requested from The Gate
Mission/Vision document
Budgets/Subsidies
Valorization document
The Gate's Participations document
One Stop Shop TU/e eindrapport
Technology Readiness level TU/e

Table 8 - Company documents

Observation

By observing The Gate's employees, startups in the alpha building, and joining events of The Gate, data was generated by observation. The Gate is organizing incubation programs with startups from all over Brabant. The startups are taught about interesting topics of entrepreneurship, and there is also the opportunity to network. Some additional information was obtained by supporting the incubation program and attending the workshops. This also created the opportunity to assess the data obtained from the interviews and see whether this holds in practice. Besides the workshops, the researcher was also physically present three days a week for about nine months, which enabled the researcher to speak with The Gate's employees, visitors of The Gate, and startups. Interesting findings from these observations were noted and recorded in a separate file.

2.3.1 Data analysis

The data acquired from the interviews and focus group were analyzed using content analysis. Analyzing qualitative data might be seen as subjective, leading to biased interpretations by the researchers (van. Aken et al., 2012). In order to overcome this problem, an objective method should be used to analyze the qualitative data. The content analysis enables the researcher to systematically collect and analyze data and diminish the risk of subjectivity from the researcher. Therefore content analysis is used as the method to collect and analyze data. Content analysis helps to organize and extract meaning from the data collected and to draw meaningful insights from it (Bengtsson, 2016). Content analysis requires a qualitative research strategy, and the main goal is to achieve credibility and trustworthiness of the outcomes. The data collection methods used in this research, like interviews and focus groups, are appropriate for the content analysis method. The sample is usually between 1 and 30 informants, which is in the range of this research. With content analysis, it is

possible to categorize the information into meaningful groups that are similar, which reduces the total amount of data.

This is done by following four steps: 1) decontextualization, 2) recontextualization, 3) categorization and 4) compilation (Bengtsson, 2016). In order to make the coding process easier and faster, the Nvivo coding program was used.

The decontextualization

This first step is decontextualization, which means that the researcher is familiar with the data. The data that was retrieved from the interviews are transcribed. All interviews and focus groups were recorded. These records were transcribed by using an online software tool. By reading the transcribed text multiple times, an idea was obtained about what was going on. After a thorough understanding of the data was gathered, the data was broken down into meaningful units (Bengtsson, 2016). The meaningful units were the smallest units possible that contained some value or insights the researcher needed. Every meaningful unit was labeled with a code. This process is also called the "open coding process." A coding list was developed inductively, meaning that the coding scheme will be developed throughout the thesis. The coding list can be found in Appendix K.

The recontextualization

In this step, every interview was re-read to see if new insights could be extracted from the interviews that were not noticed before the coding process. After re-reading and extending the codes, the unmarked text was re-read with the main research question in mind. This text was deleted if the unmarked text had no relation to the research question. This process provided a thorough understanding of the empirical data and yielded large chunks of data (Bengtsson, 2016).

The categorization

In this step, all the codes that were created from the first two steps were categorized, which was done by trying to link several codes together. This process is started by matching the codes to either sub-research question 1 or sub-research question 2, which can also be seen in the coding table in Appendix K. Furthermore, when performing the interviews, the questions were divided into particular topics, which were treated as one group of questions. This also made it easier to code and divide the codes within meaningful groups. These groups were based on concepts that were discovered in the literature. Then the codes were grouped based on their overarching domains. This process was repeated in every domain to group specific codes with certain themes. These themes had to be internally homogeneous but externally heterogeneous (Bengtsson, 2016). This process was repeated until a reasonable explanation for every problem had been reached, which was in this research when all the codes were part of a third-order code.

The compilation

In this step, the analysis and writing process was performed. Every theme or category was presented by quotations. A summary of all themes and categories was presented in tables, which provided the reader with a quick overview of the results, see Appendix X (Bengtsson, 2016). After the results were presented, the findings were checked in the literature to see whether the result was logical. After this was done, the results were validated with the respondents by using interviews with two business developers, in which the results were discussed to get validation.

2.4 Data evaluation

Solution justification

After the solution design was created, the quality of the solution was assessed by evaluating whether the solution design would solve the business problem. This evaluation was performed by checking if the solution design met the design requirements. The focus group and the semi-structured interviews were used as input to evaluate the design principles and requirements. The data gathered from the focus group and semi-structured interviews were analyzed to find support for the design principles and requirements

2.5 Quality of the research

The quality of this research is assessed based on the description of van Aken et al. (2012). There are three crucial criteria on which the quality of the research can be analyzed: controllability, reliability, and validity.

Controllability

The first criterion is controllability. This quality criterion is achieved by thoroughly explaining the method in which this study is conducted, which enables others to replicate this study (Aken van. et al., 2012). The way in which this is done is explained in chapter 2, methodology.

Reliability

The second criterion is reliability and refers to the level at which the results were independent of the researcher (Aken van. et al., 2012). There are four criteria that can harm the reliability: the researcher, the instruments, the respondents, and the circumstances. The researcher's reliability is achieved by having weekly feedback meetings with the academic supervisor. Furthermore, the literature review was conducted systematically, a research protocol was developed, and the interviews were transcribed and coded in a standardized way. The second criterion is instrument reliability which is ensured by using triangulation, implying that different types of sources are used. These sources are semi-structured interviews, systematic literature reviews, and company documents. The third criterion is respondent reliability which was achieved by interviewing participants from different backgrounds in the EE, like startups, incubators, and ecosystem actors. The final criterion is circumstance reliability which was achieved by holding the interviews in three different rounds, each round during approximately one week, and these rounds were conducted over a period of two months.

Validity

Validity is achieved when the way a study is conducted is justified (Aken van. et al., 2012). There are three types of validity a study must achieve: construct validity, internal validity, and external validity. Construct validity is the extent to which a measuring instrument measures what it is intended to measure. In order to ensure construct validity, the semi-structured interviews were prepared by developing an interview protocol with predetermined questions and some open questions which enable the participants to elaborate their answers. Internal validity is ensured by analyzing the problem from a theoretical and empirical perspective and by trying to reach saturation, which means that no new insights are gathered from new data collected. The final validity criterion is external validity, which refers to the generalizability to other contexts. This is ensured because this research is not explicitly written for The Gate but for other incubators that aim to activate their EE. By including participants from different roles in the EE, this research might be generalizable to other research as well.

Recognizing the problem

Finally, the organization should recognize the identified problem (Aken van. et al., 2012), which was done by having a meeting with the academic and company supervisor after the initial problem was formulated. In this meeting, the recognition of the problem was validated.

3. Literature Review

This chapter outlines the results of the systematic literature review. This study examines how a university business incubator can activate its EE. Therefore, the first part presents the results of the literature review about EEs, which helps answer sub-research question 1, "How are EEs characterized?" from a theoretical perspective. This chapter starts with defining the ecosystem literature, outlining how an EE can be coordinated and activated, and ends with presenting the elements of an EE. The second part presents the literature review results about university business incubators. This chapter answers the third sub-research question, "How can incubators create value for startups in the EE?". This chapter presents different types of incubators, defining the role of incubators in an EE, and ends with defining how incubators can create value for the EE.

3.1 Entrepreneurial ecosystems in the literature

Thinking about EEs touches on various topics of literature that encompass work on clusters, innovation systems, economic geography, supply chains, social capital, and networks (Spigel, 2017). Although these perspectives are conceptually different, they share the common belief that ventures are embodied in a network of specific attributes within a particular region that contribute to the venture's competitiveness.

The EE concept belongs to the ecosystem body of literature. Within this literature, a distinction can be made between two general views: (I) ecosystem-as-affiliation and (II) ecosystem-as-structure (Adner, 2017). The first view sees the ecosystem as a community with interdependent actors defined by their networks and platform affiliations. The second view can be seen as an activity-centric view which sees ecosystems as configurations of an overarching common offering defined by a value proposition (Talmar et al., 2020). The ecosystem-as-structure stresses that specialized actors are interdependent in accomplishing an ecosystem value proposition. The composition of the network usually starts with a value proposition, followed by identifying the set of actors that are required to interact for the proposition to be applied (Adner, 2017).

The ecosystem-as-affiliation view is an actor-centric view in which a heterogeneous set of companies and other actors depend on each other for their effectiveness and, as such, must be located in close proximity (van der Borgh et al., 2012). The ecosystem-as-affiliation view emphasizes on access and openness of the ecosystem and continuously interacting with actors and by attracting more actors to the ecosystem. These ecosystems are usually a network of interdependent actors that focus on a mutual goal, which is usually centered around a focal actor or platform (Jucevičius et al., 2021). This type of ecosystem tends to evolve more decentralized and emerge naturally but can be influenced by the focal actor or platform.

The ecosystem-as-affiliation view is often characterized by its geographical dispersion and the ecological concept implying that the ecosystem is created naturally with actors located in the same geographical area (Ander, 2017). The ecosystem-as-affiliation looks beyond the traditional firm and industry boundaries by focusing on access and openness of the network (Adner, 2017). The strategy of the ecosystem-as-affiliation tends to focus on strengthening the ecosystem by increasing the number of actors, increasing its centrality and expected power. The ecosystem-as-affiliation often takes a macro view of the ecosystem, and therefore ecosystems such as the "Silicon Valley ecosystem" or the "EE" fall into this strategy (Adner, 2017).

Difference	Ecosystem-as-affiliation	Ecosystem-as-structure	Sources
Start with	Community of actors affiliated to focal actor or platform	Value proposition	Adner (2017)
Context	Regional	Global	(Acs et al., 2017)
Value	Aggregate regional performance	Value creation and capture by individual firms	(Acs et al., 2017)
Leadership	No central leader, but coordinator or facilitator which can be the government, knowledge institutes or corporations	Focal firm or platform	(Acs et al.,2017)

Table 9 - Typology of ecosystems

Within the ecosystem literature, generally, four different types of ecosystems exist (I) Innovation Ecosystems, (II) Business ecosystems, (III) Entrepreneurial ecosystems, (IIII) Knowledge ecosystems (Scaringella & Radziwon, 2018; Thomas & Autio, 2020). The ecosystem-level output differentiates them from one another (Scaringella & Radziwon, 2018; Thomas & Autio, 2020). EEs differ from other ecosystems in some essential aspects. First, EEs have no common offering. Although EEs share some characteristics with the other types of ecosystems, such as knowledge-sharing and the creation, delivery, and capture of value, EEs differ because the ecosystem does not develop a mutually shared product or value proposition (Thomas & Autio, 2020). The focus of an EE is thus on the individual and not, as in other types of ecosystems, on a common offering or product. Within EEs, various stakeholders, such as individuals, entrepreneurs, firms, and institutions, work together to create productive entrepreneurship (Scaringella & Radziwon, 2018).

3.1.1 Stakeholders in the entrepreneurial ecosystem

EEs are a network of organizations that collaborate to stimulate regional entrepreneurship (Stam, 2015). Within EEs, a variety of different stakeholders co-exist that have their roles and support initiatives (Cao & Shi, 2021). Within EEs, stakeholders are defined as "those groups without whose support the startups would cease to exist" (Erina et al., 2017). The involvement of different stakeholders is existential for optimal startup support and value creation (Bischoff et al., 2018).

To manage the different stakeholder groups, it is essential to identify which stakeholders are present in the EE. According to Bischoff et al. (2018), stakeholders can be divided into internal and external stakeholders. Within EEs, the external stakeholders refer to the external network, whereas the internal stakeholders refer to the startups and their direct networks, such as universities or ESOs. Once the stakeholders are identified, it is important to analyze the stakeholders in order to identify the stakeholder's behavior, intentions, relations, agendas, interests, and resources (Erina et al., 2017). Different stakeholders also bring in different objectives and interests. In order to effectively align different interests, it is important to identify different interests, goals, and needs, which can be done by observing and asking this (Erina et al., 2017).

3.1.2 Entrepreneurial ecosystem coordination

EEs, as part of the ecosystem-as-affiliation literature, focus on attracting more actors toward the EE (Adner, 2017). Therefore, EEs often contain many stakeholders, which might have conflicting interests and no common goal. In order to overcome this problem, the EE can be coordinated, which is found to be a critical mechanism for EEs' functioning (Bischoff et al., 2018; Roundy, 2020). Coordination or leadership in EEs is different from leadership in organizations. In organizations, leadership is based on formal titles and roles, whereas in EEs, leadership is reflected in the degree to which they are involved in the community (Roundy, 2020). Coordination in the EE is focused on creating deliberate connections between participants that can strengthen the community. If coordination is low in an EE, the extent to which connections are created between participants tends to be lower, which can severely harm the necessary interconnectedness condition of EEs (Roundy & Fayard, 2020).

Research has found that thriving EEs are coordinated, meaning that participants of the EE try to organize, develop and promote an ecosystem. Coordination within an EE can be divided into coordinator and group characteristics (Roundy, 2020). The coordinator characteristics are focused on a collectivist orientation, which represents the extent to which the personal interests are aligned with the goals of the larger group. Two, group identification represents the perception of oneness with a group. Finally, empowering leadership style means that the leader is able to communicate that the group can accomplish ambitious collective goals. All three coordinator characteristics have a positive relation to coordination in EEs. Group characteristics are related to the goal alignment between the participants (Colombo, 2019; Roundy, 2020).

Besides the specific coordinator characteristics, the coordinator should coordinate the different stakeholders and enable them to collaborate (Bischoff et al., 2018). One effective way to coordinate the EE is through stakeholder engagement (Bischoff et al., 2018). Stakeholder engagement can induce stakeholder participation by harnessing intrinsic motivation, fostering attitudes and beliefs about the

ecosystem, and encouraging voluntary contribution. Stakeholder engagement can overcome conflicting interests by increasing trust and mutual awareness (Bischoff et al., 2018). Stakeholder engagement can be achieved by stakeholder participation (Bischoff et al., 2018). In stakeholder participation, stakeholders interact with each other through a broker (van Rijnsoever, 2020). The coordinator facilitates the interaction by establishing a collective action to pursue a shared vision (Bischoff et al., 2018). This can be done by setting a common agenda, sharing measurement systems, reinforcing activities and events, and continuous communication.

Finally, an important aspect of coordination in the EE is developing and strengthening the EE (Roundy, 2021). The coordinator can develop the EE in several ways. First, by supporting entrepreneurs with resources that can help accelerate the growth and success of startups (Roundy, 2021). The search for resources by the coordinator can also expand the EE because new relations have to be developed for acquiring resources in a resource-constrained context. Another way that the coordinator can develop the EE is by setting an ecosystem vision (Bischoff et al., 2018). An ecosystem vision can help communicate and align the goal of the participants (Roundy, 2021). Finally, the coordinator should establish and expand networks and culture, which can increase connectivity between participants and helps individuals outside the ecosystem to recognize the ecosystem, which can help the coordinator expand the network again (Roundy, 2021). The coordinator can expand the network by developing a mapping of the ecosystem and then identifying individuals that need to be included (Roundy, 2021). Performing these activities can help develop and coordinate thriving EEs.

3.1.3 Activating entrepreneurial ecosystems

Coordination is an important activity for the functioning and success of ecosystems-as-affiliation, to which EEs belong (Adner, 2017; Roundy, 2021). Successful EEs can attract other actors. One governance mechanism that can lead to thriving EEs is network activation (Rampersad, 2016). Activation within the context of EE refers to *"the process of identifying, attracting and engaging participants to the EE to make the network denser, which fosters the flow of information and resources."* (Rampersad, 2016; Wickizer et al., 1993). Activating the EE is regarded as the most important step in ecosystem governance because it uses all elements like resources and actors and integrates them into the EE, which requires knowing the ecosystem in detail (Rampersad, 2016). Executing the activation process results in existing actors being engaged with the EE and new actors being attracted. This corresponds with the motion of Adner (2017), who argues that EEs, as part of the ecosystem-as-affiliation, are characterized by the interaction between members and attracting new members. Therefore, activation is an existential process for creating thriving EEs.

Activating an EE requires an open and accessible network which can result in many different actors (Adner, 2017; Roundy, 2021). Coordinating the ecosystem can help to create coherence between the actors and set an overarching mission and vision (Roundy, 2021). An EE mapping can help make the community visible and form the foundation for using the community to further strengthen the EE (Cavallo et al., 2021; Isenberg, 2010; Kreuzer et al., 2018; Roundy & Fayard, 2020). Research has stressed the importance of developing an EE mapping because it can help policymakers develop and coordinate their regional EE. Furthermore, the mapping can also be helpful for startups to identify actors and find resources (Roundy & Fayard, 2020). Therefore, having a mapping of the EE can be valuable for activating the community but also for the participants individually.

By creating value for the community, other startups and ecosystem actors can be attracted to the EE (Nylund et al., 2019). Attracting startups and ecosystem actors to the EE, selecting partners, and determining relationships are essential tasks for activating the EE. One way to attract startups to the EE is to create value for startups already located in the EE (Tiba et al., 2020). When startups in the EE perform well because the EE is functioning well, this can attract other startups to the EE with the so-called lighthouse effect (Tiba et al., 2020).

When the value is created in the EE, startups must be able to capture a portion of this value. Describing thoroughly in the ecosystem-as-structure literature, the value that the firm's capture should be higher than firms could reap in other ecosystems, creating a lock-in effect (van der Borgh et al., 2012; Vanhaverbeke & Cloodt, 2014). However, competition over the value created in the EE plays a

less prominent role than in ecosystems-as-structure literature because the ecosystem-as-affiliation is more oriented toward creating productive entrepreneurship and less on a competitive offering (Acs et al., 2017). Therefore, value capture will play a less prominent role in this research and will be treated as an activity that will automatically follow after value creation. That being said, the total value created by the EE should be higher than the value created in other ecosystems since this will attract startups and ecosystem actors to the community (Tiba et al., 2020).

Combining these three insights, there are three steps to take when activating the EE (Cavallo et al., 2021). First, a clear overview of the EE and the relationships between actors should be mapped. Second, the value should be created in the EE, which should be higher than the value created in other ecosystems. Third, the value should be captured by startups and by ecosystem actors. When these steps are performed, startups can identify the EE and acknowledge that moving to and participating in the EE will create value for themselves that is higher than when the startups would not located in the ecosystem, ultimately activating the EE (Rampersad, 2016; Vanhaverbeke & Cloodt, 2014).
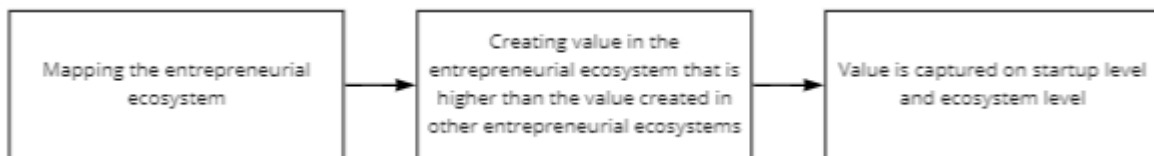
Figure 7 - Activation Process (Cavallo et al., 2020)

3.1.4 Mapping the entrepreneurial ecosystem

EEs have recently grasped the attention of researchers and policymakers (Malecki, 2018). EEs can be helpful mechanisms to stimulate startup development and boost regional economic growth. Therefore, many local governments have seen the potential of an EE in their region and have looked for ways to build one (Isenberg, 2010; Stam, 2015). This section explains why it is important to develop a mapping of the EE and how the mapping can be developed.

As explained earlier, identifying the stakeholders in the EE can help identify the behavior, intentions, relations, agendas, interests, and resources within the ecosystem (Erina et al., 2017). One way to identify the stakeholders is by creating an EE mapping. Being able to map the EE requires intensive knowledge about the specific actors and elements that are present in the ecosystem (Isenberg, 2010). Most EEs tend to have stakeholders that are similar in characteristics, so knowing who these actors generally are can help governments to map their ecosystems. Because the mapping requires extensive knowledge about the stakeholders and elements, the mapping can only be created by an organization that is embedded in the network (Roundy, 2021).

As input for the EE mapping, the elements of an EE can be used as a starting point (Kreuzer et al., 2018). According to Stam & Van de Ven (2021), identifying the elements in the EE helps measure and qualify the EE. However, researchers have yet to reach an exhaustive list of all the elements that are part of an EE (Spigel, 2017).
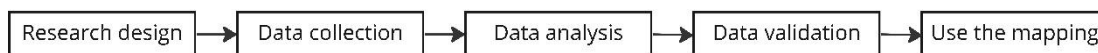
Figure 8 - Entrepreneurial ecosystem mapping process (Kreuzer et al., 2018)

According to Kreuzer et al. (2018), there are five steps to follow when mapping an EE. The first step is developing a research design, which implies developing an operational framework for the mapping process. Some important aspects need to be defined, such as the target group, scope of the mapping, geographical boundaries, and data collection methods. The second step is data collection. How is the data collected about the EE, and what type of data will be collected?

The third step is to analyze and visualize the data by developing a graph of the EE. The fourth step is data validation, in which some of the actors and experts from the field will validate the results of the EE. Finally, the fifth step uses the results as a starting point to improve and further develop the EE. By following these five steps, the EE can be mapped.

Important to remember is that EEs are complex and dynamic systems that change over time (Stam & van de Ven, 2021). Actors can enter the EE and also leave the EE, but also individual actors' roles change over time (Kreuzer et al., 2018). Mapping the EE can be very difficult and should consider the dynamics of the particular EE. Because the EE can be very complex with many different actors, ecosystems require a leader or coordinator embedded in the EE, which can mobilize different ecosystem components (Roundy, 2021). Because this leader is embedded in the EE, this leader is also suited to develop the EE mapping.

Elements of an entrepreneurial ecosystem

EEs generally tend to reflect the specific needs of the startups situated in the ecosystem and therefore consist of elements that are aimed at supporting the development and growth of startups, such as social, political, economic, and cultural elements (Spigel, 2017). It is generally believed that every region has three resources that contribute to increased entrepreneurship: (1) shared cultural understandings and institutional environments which make cooperation more manageable and enable knowledge sharing, (2) the existence of social networks which enable knowledge spillovers and information flow between firms and universities, (3) the government's policies and regulatory framework that support the culture and networks (Spigel, 2017; Tiba et al., 2020). Based on these three assumptions, Spigel (2017) developed its framework of EEs, consisting of three attributes: cultural, social, and material. The cultural attributes are all the region's beliefs and stances towards entrepreneurship. The social attributes represent all the resources that can be acquired through the social network in the region. In contrast, the material attributes can be seen as the actors that are physically present in the region.

The three attributes should not be seen in isolation but rather in combination that, helps to influence and develop each other (Stam & Spigel, 2016; Tiba et al., 2020). One attribute can positively influence another attribute. An example is the community's belief about the social status of entrepreneurship, which can influence entrepreneurial actors to support startups (Spigel, 2017). Therefore, cultural attributes can positively influence social attributes, eventually contributing to the EE by creating denser networks among various ecosystem actors (Stam & Spigel, 2016).

The three attributes can not only support each other but can also help reinforce one another (Spigel, 2017). The development and success of material attributes can, in turn, reinforce cultural attributes and strengthen resource attributes. Developing these attributes can enhance the success of the whole EE, implying that every EE is inherently different and countless configurations exist. Because every EE is different, mapping the ecosystem should start with clarifying which elements are present in the entrepreneurial (Isenberg, 2010; Kreuzer et al., 2018).

In total, there are 13 elements found in the literature that all belong to one of the three attributes, which can be found in table 10. Together, the thirteen elements constitute an EE. As discussed earlier, to effectively coordinate different stakeholders and elements, it is crucial to identify their roles, objectives, and interests (Erina et al., 2017). Therefore, their roles and objectives are presented for every element and stakeholder.

Material Attribute	Roles	Objective
Government	- Shape regulatory framework - Stimulating local economy - Financial capital provider	- Stimulate regional economy - Provide subsidies or grants to startups
Universities/Other Higher Educational Institutes	- Educator - Researcher - Valorization - Technology catalyst	- Educating workforce - Discover new technology - Bring IP to the market
Large Corporations & SMEs	- Research & Development - Spin-in & Spin-out	- Generate revenue - Spin-in promising IP within business model - Spin-out promising IP out of business model
Entrepreneurial Support Organizations	- Incubator - accelerator	- Define and build new ventures

	Role	Objective
	- Funding - Network builder - Venture builder - Housing - Alumni, Faculty, Mentors/Role Models	- Commercialize university research - Faculty-industry collaboration - Job creation - Encourage entrepreneurship
Service Providers	- Accountant - Notary - Lawyers - IP experts - Tax specialist - Marketing & Communication - Insurance Companies	- Generate Revenue/Profit - Help startups - Promise of large potential client in future
Leadership	- Universities - Governments - Entrepreneurs - Support organizations - Large companies	- Creating an ecosystem mission and vision - Distributing resources among entrepreneurs - Connecting actors together - Align goal among ecosystem actors
Resource Attribute	**Role**	**Objective**
Human Capital & Market	- Demand and workforce - Talent pool - Market openness - Market potential	- Presence of skilled workers - Availability of skilled workers - Local market is well-connected to other national and international markets - The local market presents sufficient customer base
Financial capital	- Funds - Loans - Subsidies - Grants - Gifts - Crowdfunding	- Provide monetary support for startups to establish and upscale their business - Provide incentive to continue - Manage entrepreneur towards maturity
Other physical resources	- Housing - Research facilities and labs - Machinery and Equipment	- Have a central office for employees, clients, partners - Perform research - Develop prototypes or products
Intellectual Property	- IP rights - R&D transfer	- Provide incentive to commercialize technology - Provide incentive to perform research
Infrastructure	- Physical infrastructure - Digital infrastructure - Commercial and legal infrastructure - amenities	- Enabling businesses to perform daily operations - Connect venture with the outside world
Network	- Formal network - Informal network - Social network	- Support entrepreneur - Provide funding to startup - Connect entrepreneur to community
Cultural Attribute	**Role**	**Objective**
Culture and norms	- Supportive entrepreneurial culture - Attitude towards failure - History of entrepreneurship - Culture of sharing and cooperation	- Is entrepreneurship supported by society - Is risk-taking positively valued - Is failure seen as a way to learn - Entrepreneurship is always promoted

Table 10 - Entrepreneurial ecosystem elements

3.2 Incubators creating value for startups

This study examines the EE, the role the university business incubator plays in the EE, and how a university business incubator can activate its EE. This part will present the literature review results about the university business incubator, its services, and its role within the EE.

3.2.1 The incubator

Entrepreneurship is seen as an essential driver of economic development, job creation, and innovation (Bosma et al., 2018). However, entrepreneurs and startups have a higher chance of failing, which also increases the risk for investors to invest in startups (Stam & van de Ven, 2021). This problem has attracted interest from scholars, who found that startups face the 'valley of death (Barr et al., 2009). The valley of death refers to the time between the formation of the company and the moment the company starts to generate revenue. This so-called 'valley of death has sparked attention from policymakers and other organizations. Organizations and governments have established incubators to increase the survival rate of startups.

Research has shown that incubators can increase the survival rate of startups (Sansone et al., 2020). Incubators seek to facilitate startups at the beginning of their existence by linking technology, capital, and knowledge (Grimaldi & Grandi, 2005). Successful incubators can leverage entrepreneurial talent, accelerate the development of startups, and support technology commercialization by offering a wide array of services, support, and assistance (Fernández Fernández et al., 2015). Therefore, incubators are an important instrument for helping startups to create and grow their businesses.

Existing literature has already examined the concept of incubators (Sansone et al., 2020). Incubators reflect a heterogeneous range of organizations depending on financial structure, sectors, types, and geographic regions. Because of their different structure, multiple definitions of incubators exist. That said, the literature has agreed on the types of business incubators (Barbero et al., 2012). This is important because different types of incubators show different types of performance. Therefore, it is crucial to assess which type of incubator is dealt with to effectively develop a business model that fits the goal of the specific incubator (Grimaldi & Grandi, 2005).

Although there are no specific boundaries in which phase incubation typically ends, literature seems to agree that incubation mainly focuses on the early phase of a firm's life (Bergek & Norrman, 2008). In contrast, all types of incubators typically have the same goal: "support the foundation and growth of new firms" (Chan et al., 2022; Hausberg & Korreck, 2020; Sansone et al., 2020). These firms typically have an idea that has yet to be developed into a business plan and are yet to be viable countries.

Table 11 presents the types of incubators found in the literature. The incubators can be distinguished based on their type of governance or by their tenants. For example, a corporate business incubator is set up by large companies to create and support new independent business units (Grimaldi & Grandi, 2005). Another example is the economic development incubator, which is often a publicly funded incubator with the purpose of stimulating regional economic development (Barbero et al., 2012).

Types of incubator	Definition	Type of tenant	References
Business innovation centers	"The incubating activity of BICs consists in offering a set of basic services to tenant companies, including the provision of space, infrastructure, communication channels, and information about external financing opportunities, visibility"	Profit focused startup	(Grimaldi & Grandi, 2005)
Independent private incubators	"Incubators that help ventures with the sole focus of generating revenue from these companies"	Profit focused startup	(Carayannis & von Zedtwitz, 2005; Grimaldi & Grandi, 2005; von Zedtwitz & Grimaldi, 2006)

Corporate private incubators	"Incubators owned and set up by large companies with the aim of supporting the emergence of new independent business units"	Internal departments, employees that develop internal research into business departments	(Barbero et al., 2012; Carayannis & von Zedtwitz, 2005; Fernández Fernández et al., 2015; Grimaldi & Grandi, 2005; Theodoraki, 2020; von Zedtwitz & Grimaldi, 2006)
University Incubator & university business incubators	"The university business incubator are offering resources and mentor services to promote student and faculty entrepreneurship activities as well as promoting regional entrepreneurship"	Student and faculty from related university & other startups from the region not related to the university	(Barbero et al., 2012; Carayannis & von Zedtwitz, 2005; Chan et al., 2022; Grimaldi & Grandi, 2005; Theodoraki, 2020; von Zedtwitz & Grimaldi, 2006)
Regional business Incubators	"Publicly funded incubators that aim to strengthen the regional economic development"	Startups located in a region	(Aernoudt, 2004; Barbero et al., 2012; Carayannis & von Zedtwitz, 2005; Theodoraki, 2020; von Zedtwitz & Grimaldi, 2006)
Virtual Incubators	"For-profit incubator that focusses on online services with no physical location"	No tenants	(Carayannis & von Zedtwitz, 2005; von Zedtwitz & Grimaldi, 2006)
Basic Research	"Incubator that is linking research to the production of intellectual property"	Academic or research focused startups	(Aernoudt, 2004; Barbero et al., 2012)
Technology business incubators	"Incubators that focus on the development of technology-oriented firms"	Tech startups	(Aernoudt, 2004; Lamine et al., 2018; Phillips, 2002; Theodoraki, 2020)
Social incubators	"Incubators that focus on creating and maintaining high-potential social-focused firms"	Social startups	(Aernoudt, 2004; Sansone et al., 2020; Theodoraki, 2020)

Table 11 - Types of incubators

3.2.2 Incubators as coordinators in the EE

In the section' EE coordination,' the importance of coordination within an EE was elaborated. Successful coordination can contribute to a vibrant EE, which improves the social embeddedness of the entrepreneurs, which can help them draw the resources they require for the start and growth of their ventures (Spigel, 2016). For successful coordination, the coordinator should be deeply integrated into the community (Roundy, 2020).

Since it is recognized that thriving EEs are often coordinated, literature has tried to describe who these coordinators can be (Roundy, 2021; Spigel, 2016). First, in an ideal situation, the entrepreneurs themselves would coordinate their EE (Spigel, 2016). However, coordinating an EE requires effort and time, something entrepreneurs often lack (Pitelis, 2012). Therefore, the coordinator should have a high connectedness with the entrepreneurs while also being able to dedicate time and resources to coordinate the EE. Based on this, Spigel (2016) concludes that ESO should coordinate the EEs.

Incubators, a type of ESOs, are found to do more than provide resources to entrepreneurs (Roundy, 2021). Incubators possess some of the characteristics that the EE requires, such as integration into the community and interconnectedness with the community (Roundy, 2020; Spigel, 2016). Incubators can coordinate the EE so that the community serves startups more efficiently and participants are motivated to contribute to the ecosystem.

Incubators take a central position in the EE and are closely related to startups because they bridge the gap between startups and the external environment (Theodoraki, 2020). Startups often reside in buildings where incubators also reside. Due to this proximity and the fact that startups and incubators have to cooperate by nature, incubators can identify precisely what startups need at different life cycle phases (van Weele et al., 2017).

Another reason incubators might be well suited for being the coordinator in the EE is that they can develop and strengthen the ecosystem. As described in the 'EE coordination' section, coordination entails expanding the ecosystem by searching for and identifying resources that startups need (Roundy, 2021). One of the main activities of incubators is the process of searching for resources. By performing this activity first, incubators will develop extensive knowledge about the ecosystem, which can also help them perform the coordination role. Subsequently, incubators are identified as performing services that are essential for the overall functioning of the ecosystem (Spigel, 2016). This positions the incubator in the center of the EE and makes them an appropriate candidate for coordinating the EE.

3.2.3 How incubators create value for startups

Incubators are essential organizations that can help startups start and grow by offering resources and services. In other words, incubators are creating value for startups by supporting the entrepreneurs with activities they cannot perform individually. In order to support startups efficiently, incubators should first identify the needs of the startups (van Weele et al., 2017). Knowing what startups require and being able to provide this to the startups is found to improve incubators' performance (van Weele et al., 2017).

Identifying the needs of startups can be difficult because inexperienced entrepreneurs often need to learn which resources they lack (van Weele et al., 2017). In order to overcome this, the incubator could take the resource-based view (RBV) as a starting point to define the needs of the startups. The RBV sees firms as a bundle of tangible and intangible resources (van Weele et al., 2017). Firms achieve their competitive advantages based on rare or inimitable resources. Startups often have underdeveloped resources, called the 'liability of newness. Incubators can help startups overcome the liability of newness by providing the resources directly or indirectly through the incubators' network (van Weele et al., 2017). Based on this perspective, incubators could identify the needs based on tangible and intangible needs. These needs are presented in table 12.

Startups' needs based on resource-based view			
Tangible resources	Incubator support to fulfill resource needs	Intangible resources	Incubator support to fulfill resource needs
Physical capital	- Office Space - University equipment and library	Knowledge	- Provide technological knowledge through proximity to university groups and laboratories - Provide business knowledge through coaching and training
Financial capital	- Seed capital in exchange for equity - Access to investors	Social capital	- Facilitate the creation of external networks by organizing events, creating partnerships and making introductions
		Legitimacy	- Association with an established incubator

Table 12 – Startup's needs based on resource-based view (van Weele et al., 2017)

After identifying the needs of the startups, incubators can develop their services based on these needs (van Weele et al., 2017). An incubator's services can be distinguished between broad and functional services (Spigel, 2016). Functional support services create value for startups by facilitating them throughout their entrepreneurial journey by providing resources and training. The broad support services create value for the EE by networking and community building, for example. Although the broad support services are not directly creating value for the startups, they will create value for the startups indirectly because they benefit from a more robust and interconnected EE (Roundy, 2020).

The services that incubators offer to create value for the startups and EE are investigated through a literature review. The results of this literature review can be found in table 13.

	Types of services	Definition	References
F u n c t i o n a l	Access to physical resources	Incubators offer office space, furniture, sports facilities, computer network, 24-h security, shared labs, 3D printing possibilities and other amenities and facilities	(Bergek & Norrman, 2008; Carayannis & von Zedtwitz, 2005; Fernández Fernández et al., 2015; Khodaei et al., 2022; McAdam & Marlow, 2008; Phillips, 2002; Sansone et al., 2020; Spigel, 2016; van Rijnsoever, 2020; von Zedtwitz & Grimaldi, 2006)
	Access to financial resources	Incubators offer access to funding by searching for subsidies, grants, funds, and connecting them to venture capital and other investors	(Bergek & Norrman, 2008; Carayannis & von Zedtwitz, 2005; Fernández Fernández et al., 2015; Khodaei et al., 2022; McAdam & Marlow, 2008; Phillips, 2002; Sansone et al., 2020; Spigel, 2016; van Rijnsoever, 2020; von Zedtwitz & Grimaldi, 2006)
	Support services	Providing support to startups by offering a range of administrative, accounting, legal, educational and other services to incubates	(Bergek & Norrman, 2008; Chan et al., 2022; Phillips, 2002)
	Legal support & intellectual property	Providing legal services and arranging and managing IP	(Fernández Fernández et al., 2015; Phillips, 2002; Sansone et al., 2020)
	Business development & advice	Helping to develop a business plan, providing valuable management coaching support, helping entrepreneurs to develop and apply leadership and management skills	(Bergek & Norrman, 2008; Carayannis & von Zedtwitz, 2005; Fernández Fernández et al., 2015; Khodaei et al., 2022; McAdam & Marlow, 2008; Phillips, 2002; Sansone et al., 2020; Spigel, 2016; van Rijnsoever, 2020; von Zedtwitz & Grimaldi, 2006)
B r o a d	Networking	Identifying and leverage key individuals and organizations, and linking the startup to other startups, big companies, clients, and support network	(Bergek & Norrman, 2008; Carayannis & von Zedtwitz, 2005; Chan et al., 2022; Fernández Fernández et al., 2015; Khodaei et al., 2022; McAdam & Marlow, 2008; Sansone et al., 2020; Spigel, 2016; von Zedtwitz & Grimaldi, 2006)
	Supporting technology transfer	Inventions and knowledge that stems from research and transferring this to the market. Also, commercialization of technology.	(Phillips, 2002; Sansone et al., 2020; Smith & Zhang, 2012)
	Community Building	Connecting startups with other startups and ecosystem actors and organizing events and activities to strengthen the community	(Antunes et al., 2021; Chan et al., 2022; McAdam & Marlow, 2008; Roundy, 2021; Spigel, 2016; van Rijnsoever, 2020)

Table 13 - Overview of Incubator's services

While incubators must offer these services to facilitate startups sufficiently, the services are only helpful when used by startups. The potential problem is that startups are often led by inexperienced entrepreneurs who cannot identify what they need and therefore do not use all services offered by the incubator (van Weele et al., 2017). Another reason that contributes to this problem is that entrepreneurs might be hesitant to step out of their comfort zone. This might cause them to not explicitly ask for the required resources, leaving the incubator's resources unused (van Weele et al., 2017).

These problems might be solved by incubator assertiveness, implying that the incubator starts operating proactively and is not demand-driven (van Weele et al., 2017). This implies that the incubator starts demanding participation and engagement from the startup and forces the startup to have regular contact with the incubator, not when the startup thinks it is necessary. The incubator could schedule regular meetings with fixed milestones that the startup must deliver. This creates the incentive to explicitly ask for help or resources when the startup requires this to reach the milestone.

Incubator assertiveness is more necessary for inexperienced entrepreneurs than more experienced ones (van Weele et al., 2017). Experienced entrepreneurs might be better able to identify what resources they need. Since they have already experienced the entrepreneurial journey, they might be less hesitant to ask for support or resources. Therefore, the incubator might choose to treat them in a more demand-driven approach where the entrepreneurs should become proactively themselves. Also, in the later stages of the incubation trajectory, the incubator can become more demand-driven. This can prepare the startups to eventually leave the incubator (van Weele et al., 2017).

Network building

Connecting startups to the external network in an EE is an important activity that incubators perform (van Rijnsoever, 2020). Startups cannot find resources and organizations individually because of time and resource constraints. Therefore, incubators often help startups leverage or connect to the EE. However, the network should be developed before connecting the startups to the EE. This can be done by looking at the external and internal networks (van Rijnsoever, 2020).

First, the incubator should try to develop a solid EE by including external participants based on the intensity of the community (Antunes et al., 2021; van Rijnsoever, 2020). The external network can be developed by building social capital by creating relationships with organizations and connecting the startups to these external organizations. Value is created when the incubator gathers skills by selecting external organizations that successfully complement the incubator's activities (Antunes et al., 2020). When developing the external network and connecting startups accordingly, additional value can be created through collaboration, knowledge sharing, and legitimacy (van Rijnsoever, 2020).

Another part of the EE the incubator should try to develop is the internal network (van Rijnsoever, 2020). The internal network is related to the network of startups. The incubator can develop the internal network deliberately, by connecting startups with each other, for example, through events or selecting new members, or by accident, for example, by offering a shared working space to startups (Antunes et al., 2020; van Rijnsoever, 2020). Deliberately connecting startups to each other is called community-building and can be done by co-working, hosting social events within the incubator, and actively introducing tenants to each other (van Rijnsoever, 2020). Startups can be connected based on their technical domain or life phases. Facilitating networking in the internal network can create value, such as synergies, knowledge sharing, and relationships.

EE building is beneficial for incubators because it fosters the network and creates value for the startups, which also improves the reputation of the incubator (van Rijnsoever, 2020). Therefore, the incubator should first develop the internal and external networks and then connect the startups to these networks.

Decreasing transaction costs by coordinating the entrepreneurial ecosystem

As outlined in the previous section, the incubator should aim to develop the EE to facilitate the startups sufficiently. As found in the section about coordinating an EE, one way the incubator can coordinate the EE is by expanding and strengthening the community. This section will outline the value creation process for the startups and ecosystem by decreasing transaction costs through coordinating the EE. As described earlier in the literature review, activating an EE requires an EE mapping and then using this mapping to create value for the EE.

Decreasing search costs in the EE is a way to create value for the startups and the ecosystem. The created value can attract startups and ecosystem actors to the EE if this value is higher than the value created in other ecosystems and the value the startups and ecosystem can capture is higher than the value they would produce individually (van der Borgh et al., 2012; Vanhaverbeke & Cloodt, 2014).

The incubator can decrease search costs by coordinating the EE by performing three activities: cognitive, social, and cultural activities (Roundy & Fayard, 2020). The cognitive component implies that the actors should believe that an EE exists, drawing attention and serving as a basis for the actors' commitment to the EE. The social component implies that the EE is a dense and highly connected network of actors, which makes it easier for actors to match entrepreneurs with the right actors.

Finally, the cultural component implies that the actors in the EE share the same cultural values and norms, which makes it easier for the actors to interact with each other.

Colombo et al. (2019) also investigate how the coordinator of an EE can govern the ecosystem by considering three pillars. First, the leader should consider whom to include, also called participation. Second, the leader should enable a structure that fosters entrepreneurship, which implies, for example, which actor is connected with another actor. Finally, the leader must coordinate and motivate entrepreneurial activities by setting the rules and norms in the ecosystem, also called governance. The EE leader must consider these three pillars when coordinating an EE.

Combining the insights of Roundy & Fayard (2020) and Colombo et al. (2019), four activities can be deduced from the framework: cognitive, social, structural, and cultural. These activities have their own mechanisms, which can be found in table 14. When successfully performing four activities, the search costs in the EE can be decreased. Search costs are defined as "the cost of identifying entrepreneurial opportunities, information, business models, customers, resources and investors" (Roundy & Fayard, 2020).

Ecosystem Mechanism	Theoretical argument	Source
Dense networks foster efficient information exchange	As EE coordination increases, startups' search costs decreases because it is easier to find resources and resource providers	(Feld, 2020; Roundy & Fayard, 2020; Stam & Spigel, 2016)
Support organizations help entrepreneurs develop maps of the ecosystem and serve as connectors between entrepreneurs and resources	Having a clear map of how the EE is structured helps making resources, resource providers and ecosystem actors visible and link them with startups which will decrease startups' search costs	(Isenberg, 2010; Roundy & Fayard, 2020; Spigel, 2016)
EE events expose entrepreneurs to cultural artifacts and ecosystem values and allow entrepreneurs to receive feedback and engage in vicarious learning	As EE coordination increases, startups' search costs decreases because it is easier to find resources and resource providers	(Roundy & Fayard, 2020)
Startups participate in the EE and signal that the ecosystem is successful	As startups participate in the EE more economic output is created which will attract other startups which makes the community denser	(Colombo et al., 2019; Roundy, 2020)

Table 14 - Mechanisms for decreasing search costs

First, effective EE coordination can decrease a startup's search cost and add value (Roundy & Fayard, 2020). When the coordinator effectively coordinates the EE, the EE becomes a dense network that connects entrepreneurs, investors, and support agents. If startups can access this network, the search cost to find service providers and resources can be decreased. The decrease in search costs will create additional value from the EE and will therefore activate the actors in the ecosystem (Nylund et al., 2019).

Second, support organizations help entrepreneurs develop ecosystem maps and serve as connectors between entrepreneurs and resources (Roundy & Fayard, 2020). The ESOs can develop a map of the EE in which the resources and service providers are structured might help startups acquire these resources (Isenberg, 2010; Spigel, 2017). This map will also help ESOs to link startups with actors and resources in the EE, leading to decreased search costs.

Third, EE events will expose entrepreneurs to the ecosystem's prevalent culture and values, allowing entrepreneurs to come in contact with other entrepreneurs and actors and receive feedback (Roundy & Fayard, 2020). This can also lead to decreased search costs because startups and actors interact more easily with each other and find resources and resource providers.

Finally, startups participating in the EE will produce a specific economic output, making the EE more attractive to others outside the EE (Colombo et al., 2019; Roundy & Fayard, 2020). This might cause others to locate in the EE, making it a denser community that can foster efficient information exchange and lead to decreasing startups. This can signal to actors in and outside the community that the EE is, in fact, successful, which will plant the idea that the EE exists in people's minds. Besides,

this can also give participants the feeling that they are part of the ecosystem because the community sufficiently helps them. This makes the community, in fact, denser, and a high network density is found to be an indication of a flourishing EE because the high network density can only hold when there is a well-connected community of startups and ecosystem actors, like visible investors, mentors, and supporters (Stam & Spigel, 2016).

Below is the framework developed based on the work of Roundy & Fayard (2020) and Colombo et al. (2019). This framework shows how an EE coordinator can create value by engaging in four activities: cognitive, social, structural, and cultural. These four activities can lead to an EE in which different actors develop relations with each other, promote the EE to people in and outside the ecosystem, create structure and coordination, and enhance collaboration between parties, which can decrease the search costs for startups.

The entrepreneurial ecosystem coordinator should perform four activities for value creation

Cognitive activities	Social activities	Structure activities	Cultural activities
• Draw attention to actors • Create shared belief that the entrepreneurial ecosystem exists • Give the feeling to actors that they belong to the entrepreneurial ecosystem	• Who needs to be included • Help entrepreneurial ecosystem actors to become aware of each other • Strengthen the entrepreneurial ecosystem's network by activities and events	• decide how resources should be allocated efficiently within the boundaries of the ecosystem • Decide which ecosystem actors are in charge of organize, manage, and control the process of resource distribution • Create a uniformal way of working within the entrepreneurial ecosystem	• Setting rules and norms • Align goals of the actors • Favor cooperation instead of competition

Ecosystem Mechanisms

Participants signal the success of the entrepreneurial ecosystem to people outside the ecosystem	Denser networks with efficient information exchange	Support organizations act as boundaries objects between entrepreneurs and other organizations	Entrepreneurial ecosystem events expose entrepreneurs to cultural artifacts and ecosystem values and allow entrepreneurs to receive feedback and engage in vicarious learning

Cognitive Outcome	Social Outcome	Structural Outcome	Cultural Outcome
• Actors share the belief that the entrepreneurial ecosystem exists • Actors are committed to the entrepreneurial ecosystem	• Actors become aware of other actors and develop relations • Actors share information and resources to entrepreneurial ecosystem	• Actors know what needs to be done and what is needed • Startups know what is available in the entrepreneurial ecosystem • The structure fosters entrepreneurship	• Actors easier interact with each other • Cooperative behavior • Strengthen interdependence of actors

If successfully performed the search costs will be decreased

Figure 9 - Framework for value creation (Colombo et al., 2019; Roundy & Fayard, 2020)

Connecting startup to the extended entrepreneurial ecosystem

When the EE is developed successfully, there are two ways in which startups can find actors in the EE: meeting at random and meeting through brokerage (van Rijnsoever, 2020). Meeting at random entails startups meeting ecosystem actors by searching in the largely unknown EE. Finding ecosystem actors is highly inefficient and often only occurs in the startup community itself (van Rijnsoever, 2020). Meeting through brokerage means the startups meet a potential partner via the intermediation of an institution or organization, like incubators (van Rijnsoever, 2020). Incubators can do this by matching the startup with the ecosystem actors, called intermediating (van Rijnsoever, 2020; Antunes

et al., 2020; Bergek & Normann, 2008; van Weele et al., 2017). The incubator act as a bridge between the startup and the ecosystem actor to match the entrepreneur's need with the ecosystem's supply. The incubator can mediate between the startup and ecosystem actors by introducing them to each other (Bergek & Norman, 2008). For the incubator to perform this activity, the EE must already be developed (van Rijnsoever, 2020).

After the incubator has matched the startup with the ecosystem actor, the period of mating starts. Mating means that the startup and the ecosystem actor start developing a relationship (van Rijnsoever, 2020). Both sides should see the value of forming a relationship for a successful mating period. The incubator can enhance this process by dealmaking, which refers to the fact that the incubator can facilitate the negotiation process, for example, by advising startups or building trust between both parties (van Rijnsoever, 2020). Incubators can also mediate by helping startups interpret and support regulations, contracts, and laws or by providing legitimacy to startups (McAdam & Marlow, 2006). Providing startups with legitimacy can signal to ecosystem actors that the startup is serious about its business, something ecosystem actors often value (McAdam & Marlow, 2006). This can enhance the connection process and increase the chance of successful interaction between the startup and ecosystem actor.

After the mating period, the honeymoon period starts, which refers to the successful completion of the mating period. In practice, this often means that a venture capital firm decides to invest in a startup. Often, the honeymoon period is only temporary. A venture capital firm decides only to invest a limited amount of capital into a startup. However, the startup requires more money, and the whole process of connecting the startup to an ecosystem actor starts again (van Rijnsoever, 2020).

The honeymoon period is also essential to signal success outside the EE. When the startup is successfully connected to the EE, the chance of startup success increases which can signal to other startups that the EE is thriving and can increase their chances of success as well (Tiba et al., 2020). This can attract other startups to the ecosystem, which also contributes to the activation of the EE by increasing the density of the community (Feld, 2020; Roundy & Fayard, 2020; Spigel & Stam, 2016).

Combining the insights of the literature review

From the literature review, different insights have been gathered that can help the incubator to create value for the startups, and the ecosystem and, thus, activate the EE. Based on these insights, the following model is created.
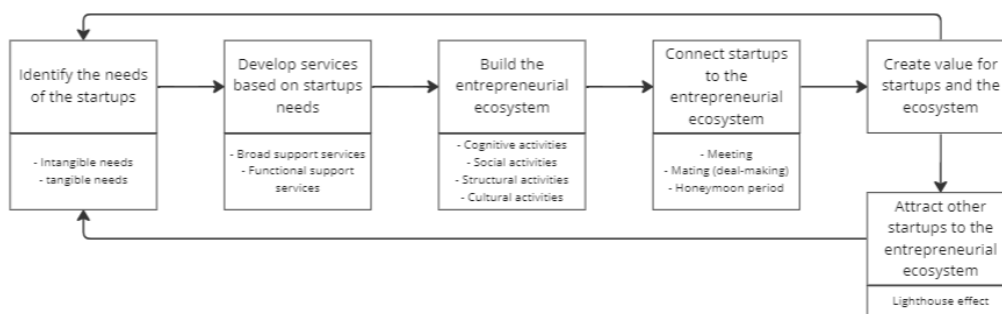
Figure 10- Framework for activating the entrepreneurial ecosystem

4. Empirical analysis

In this chapter, two sub-research questions will be answered by analyzing the data collected from observations, interviews, and documentation. This chapter will start by investigating how The Gate's EE looks like and validating the mapping of the EE. This helps to answer the first research question "How are EEs characterized?"

Then, the barriers and challenges for activating the EE are presented, which helps answer sub-question two. Finally, this chapter will conclude how an incubator can activate its EE by presenting the various processes identified and validated in the empirical analysis.

4.1 The Brainport entrepreneurial ecosystem

Based on the literature review, an EE is defined as "a group of interdependent actors that interact together in such a way that they create productive entrepreneurship" (Stam, 2015). This view on the EE was largely acknowledged by most interviewees, who agreed that the main objective of the EE is to support entrepreneurs and startups.

As one of the business developers of The Gate stated:

"Our main goal is to support entrepreneurs and provide them with the necessary funding, which enables them to become a full-grown independent company and hopefully, one day is an example for other starting entrepreneurs, just as he once was"

Mapping the entrepreneurial ecosystem

In the literature review, the process of activating an EE was described by performing three activities. The first activity was to map the EE to make relationships and actors visible, which could help create structure and coordinate the EE. The importance of having a mapping of the EE was primarily acknowledged by the interviewees. Treating the mapping as a foundation from which The Gate can depart to manage the EE was mentioned by several interviewees. One business developer saw the EE mapping as a tool to help startups find resources.

However, an interesting finding that was not found in the literature but was mentioned by several business developers is that no single EE exists. Within the Brainport region, multiple EEs can be divided into technical domains or startup life phases. One participant stated that some financial capital providers specialized in one technical domain. One ecosystem actor mentioned that they are providing office space based on the startup's technical domain or life phases.

"At - company X – we offer office space to startups based on a technical topic. We have the building "Twinning," which is only available for startups active in Data Science, AI, Blockchain, ICT, and Software. By grouping specific themes, we try to stimulate cross-fertilization between the companies and enable them to learn from each other."

This is an example of the specialization of certain technical domains of ecosystem actors. Therefore, it might be interesting to divide the EE based on technical domains or the startup's life phases. One business developer stated that viewing the EE in this way could make the mapping easier and increase usability for the users because the mapping would only contain relevant elements for the startup and business developer.

Process of mapping the entrepreneurial ecosystem

The literature review described five steps that guide the development of an EE. These steps are validated in an interview with the business manager ecosystems and partners of The Gate. This interview helped to develop a practical stepwise process that helps in mapping the EE. Based on the interview, a five-step process was developed to provide practical guidance for an incubator to map its EE, see table 15. The five steps found in the literature were: (1) Research design, (2) Data collection, (3) Data analysis, (4) Data validation, and (5) Use the mapping.

First, the incubator should set the scope of the mapping. The incubator should define the scope of the mapping by clarifying which EE will be mapped and where the boundaries of this ecosystem lie. Step two is about collecting data about the EE. In this step, the elements and their relations are defined.

Also, the method by which the data is acquired needs to be defined. Step three is visualizing the EE. In this step, it is essential to decide which tool will be used and which tool is most useful for the users. Step four is about validating or testing the EE mapping. In this step, it should be decided who will be used for validation, how the mapping can be improved and if it is useable for the users. The final step is using the mapping. The map will be used in this step as input for business activities or as a foundation for other activities.

Step	Questions to ask
1. Scope of the mapping	- Which EE will I map? - Where are the exact boundaries of my EE - Who will be my target population? Who will be included or excluded?
2. Defining the elements present in the EE	- Which elements are present in my EE? - How will I approach these elements for data collection? - What are the relationships between these elements?
3. Visualizing the EE	- Which tool or software can I use to visualize the EE? - Which tool is best for visualizing the relationships between the elements? - How can the visualization be most useful for the users?
4. Validating the EE mapping	- Who will be contacted for validating the results? - What is missing in the entrepreneurial mapping? - What are the strong points? - Does the mapping visualize what it intends to map? - Is the usability sufficient for the users?
5. Using the mapping	- For what will the mapping be used? - How can the mapping be used? - Is it possible to develop a format of the mapping to use it in other EEs? - Can the mapping be adapted in the future?

Table 15 - process for mapping the entrepreneurial ecosystem

The elements of the Brainport entrepreneurial ecosystem

As input for the mapping of the EE, first, the elements that are part of the ecosystem should be identified. From the interviews, there were, in total, fourteen elements found, eight from the material attribute, five from the resource attribute, and one from the cultural attribute. An overview of all elements is presented in table 16. The description of every elements is presented in appendix M. together with a description of the elements as found from the findings and an illustrative quote. After the table, some interesting findings are presented together with similarities and differences in the literature review.

Element	Description of the findings	Illustrative Quote
Material Attribute		
Government	The government is part of the triple helix and is recognized as an important organization with the power to change regulations and policies. Some regulations should be reformed, such as tax legislation, that could be more stimulating toward entrepreneurship.	*"I think that in the Brainport region, the government, especially the local government, has a perfect feeling about what is happening in the ecosystem and tries to improve the business climate. This can also be seen by the triple helix, where the government proactively collaborates with educational institutions and corporations."*
Higher educational institutes	There are three HEIs in Brainport with the main focus of educating the workforce. The TU/e is seen as the most important because it is also performing research and actively commercializing technology, which makes the TU/e a so-called entrepreneurial university. The TU/e is embedded in the ecosystem and has	*"The university is the beating heart of Brainport and is part of the triple helix. The TU/e has three objectives: education, research, and valorization."*

	developed a chain of organizations to support entrepreneurship through various phases.	
Large corporations & SMEs	Large corporations are seen as a source of innovation and entrepreneurship. Furthermore, they can also be a partner and mentor for the startups by helping with funding and resources, business model validation, and finding new clients.	*"We signed a cooperation agreement with – large company – and they helped us with business model validation, product development, funding, and finding new clients."*
Entrepreneurial Support Organizations	Two types ESOs are present in the Brainport EE: incubators and accelerators. ESOs are recognized as vital organizations for startup support and EE building. However, there are thirteen ESOs in Brainport, which is a lot, but no ESO focuses on Brainport startups without a commercial goal in mind.	*"What you see is that because The Gate focuses on TU/e startups, another startup support in this domain is virtually non-existent. So these startups go to private incubators and have to give up control and stocks. Thus, it is better as a startup to ask for support in Tilburg or Breda than in Eindhoven unless you are from the TU/e."*
Service providers	Many different service providers exist in the Brainport EE. They are recognized as critical because startups need a wide array of services, such as legal, accounting, and tax advice. However, the pool of service providers is unstructured, and there is a lack of preferred partners in the Brainport ecosystem.	*"We need an accountant for our salary administration, but they are costly, and finding the right accountant in the region is difficult. Maybe it would be better if there was a preferred partner accountant to which we could go at a discounted price."*
Leadership	Leadership in the EE is recognized as necessary. However, according to the interviewees, leadership within the Brainport EE is currently absent, which leads to an unstructured ecosystem.	*"I think that there are many actors already present, but because there is no leader who connects and structures everything, people still feel that certain actors are missing."*
Media	Some startups have used media, such as television shows and newspapers. The startups benefitted from the media through increased exposure and attention.	*"We participated in a Dutch tv show called Dragons Den in which we had to pitch our idea, and in return, the dragons granted us an offer for funding. The most beneficial was the publicity, more than one million people watched the episode, and many people recognized us."*
Experienced entrepreneurs	Experienced entrepreneurs are a valuable source of information and experience for startups. However, startups mention that not only can successful entrepreneurs be valuable, but there could also be more emphasis on entrepreneurs that failed to learn from their mistakes.	*"I think it is far more valuable and efficient to talk with an entrepreneur who has extensive knowledge about the market than to search through the market for two weeks behind the laptop."*
Resource Attribute		
Financial Capital	Financial capital is seen as the most important resource for startups because with financial capital, and startups can acquire other necessary resources and equipment. Some startups did not experience problems with attracting funding, while others did have problems.	*"Our most important resource is money, and money is a necessary evil. Without money, it is impossible to hire people, access good legal advice, and most important, product development."*
Other physical resources	Other physical resources are recognized as important for startups, specifically office space but also research labs and machinery and equipment. Startups mentioned that there is sufficient quantity and quality of housing available. Some ecosystem actors, like the TU/e, have set up organizations specifically aimed to provide housing to startups, which is deemed to	*"I really like that we have an office space, just a cheap office space. I think that Twice is doing an excellent job with offering the cheap office spaces on the campus."*

	contribute to the positive stance towards office space availability.	
Human Capital	An important resource for startups. However, in the Brainport EE, it is very hard to find skilled personnel. Most startups and business developers mentioned that there is a shortage of human capital.	*"It is a big problem to find the right people because most engineers are going to large companies like ASML. What we can do to attract personnel is the stock option plan, giving stocks to employees."*
Intellectual property	Is used by startups to safeguard technology. Startups that do not have valuable technology or readily available ideas tend to use IP less.	*"We have safeguarded our IP with the partner company. I think we have secured the IP really well."*
Infrastructure	Both physical and digital infrastructure was recognized. The physical infrastructure in the Brainport is perceived as good because The Gate is located close to a train station. Digital infrastructure was also perceived as good. Startups had access to high-quality internet via the TU/e network and via Twice. One startup required speed computing which he could also use on the TU/e campus.	*"The location of The Gate is great. It is centrally located in Eindhoven and close to the train station. This is important because we have employees from Utrecht, Den Bosch, and Helmond."*
Culture Attribute		
Culture and norms	Positive culture towards entrepreneurship within the Brainport EE. Interviewees mentioned that within the Brainport, a history of collaboration and entrepreneurship is embedded, which can also be seen in the importance of the triple helix in the Brainport. The attitude towards failure is relatively positive, meaning people see it as a chance to learn.	*"We have an extremely enterprising region with a lot of successful companies. What is established around these large corporations has historically been cooperation. The DNA of the region is great, and I think the top of the Netherlands and maybe even of the world."*

Table 16 - elements of the entrepreneurial ecosystem

Interpretation of results

When comparing the results of the empirical analysis to the literature review, it seems that both are mainly similar. Starting with the framework of Spigel (2017), the three main categories of attributes that every EE included were also found in the empirical analysis. The material, social and cultural attributes are identified, and the fact that the attributes should not be seen in isolation but instead in combination was acknowledged. This might have consequences for the design because the elements cannot simply be designed separately but should be mapped in relation to each other.

Another result of the empirical analysis that largely overlapped with the result of the literature review was the elements of the EE. In total, fourteen elements were identified to be part of The Gate's EE. Compared with the elements identified in the literature review, two additional elements were identified. These elements were media and experienced entrepreneurs. When analyzing the results and searching through the literature, it becomes clear that especially media is not recognized by existing literature because no article mentioned this element. However, in the interviews, three startups mentioned that they benefitted from media attention.

Another element not found in the literature review but in the empirical analysis is the experienced entrepreneur element. However, when rereading the literature, the experienced entrepreneur element was found in different papers, but the way they were mentioned was fragmented. Foster et al. (2013) categorize experienced entrepreneurs as the support system element, while Spigel (2017) categorizes successful entrepreneurs as part of the role models element. This is interesting because Foster et al. (2013) categorize role models not as a separate element but as part of the cultural support element. Another popular article lists experienced entrepreneurs as part of the success stories element (Isenberg & Global, 2011), while Stam & van de Ven (2021) categorize successful entrepreneurs as part of the network of startups. The contradictory results from the literature mean that existing literature has failed to classify experienced entrepreneurs within the EE elements correctly. Because from the interviews, experienced entrepreneurs were mentioned by startups, business developers, and

ecosystem actors as valuable actors in the EE, the experienced entrepreneurs are treated as a separate element in the EE.

Needs of the stakeholders in the ecosystem

Based on the theoretical analysis, three types of stakeholders were identified to be relevant in this study: startups, ecosystem actors, and incubators (Bischoff et al., 2018). In order to manage different types of stakeholders, it is important to identify their needs, interests, and objectives (Erina et al., 2017). Therefore, in the interviews, the needs and objectives of the startup and ecosystem actors are identified.

The research by van Weele et al. (2017) found that the needs of startups can be identified by using the RBV. Based on the interviews with startups, this theory indeed largely explains the needs of the startups. Startups mentioned that they required resources and support to achieve their objectives. One uniform objective that all startups mentioned was that they wanted to grow and survive. For this goal, they require multiple resources that are listed in table 12. The Gate was mentioned as an organization that is already helping startups with finding the resources and providing necessary support to overcome specific challenges. Interestingly, startups mentioned that acquiring resources is one of the most important reasons why they would locate in an EE. Some startups mentioned that they think that they are not able to acquire all resources individually and therefore locate in an EE.

The ecosystem actors also mentioned their needs and objectives. Three main objectives were identified: making a profit, creating regional impact, and supporting startups. Ecosystem actors mentioned that locating in an EE increases the chance of finding startups. They mentioned that the reasons to participate in an EE are to find startups, make it easier to find finance and subsidies, and make it easier to find complementary organizations for supporting startups.

4.1.1 Strengths and Weaknesses of the entrepreneurial ecosystem

As outlined in the theoretical analysis, every ecosystem has its own characteristics that make it different from other ecosystems (Stam & Spigel, 2016). In order to find the characteristics of The Gate's EE, it was decided to investigate its strengths and weaknesses. These strengths and weaknesses are used as input for the solution design because both resemble practical directions that can help The Gate to improve its ecosystem and use it more efficiently. The strengths and weaknesses can be found in table 17.

Strengths		
First-order codes	**Second-order codes**	**Illustrative quotes**
Collaboration	Actors are in close contact	*"So all actors are connected, and I think in Brainport, actors really are extremely well connected in this fashion, which is great because we see the prosperity of the region is clearly rising, so."*
	Unified theoretical framework	*"We are the owners of the theoretical frameworks on startup support and we have unified these frameworks across ESOs in Brabant, which is unique in the Netherlands."*
	Willingness to collaborate	*"The Gate is the paragon for collaboration in Brainport. In no other region would the university establish an incubator together with five other partners, including three other educational institutions, whom all contribute with funding and fte's. Not to mention that startups outside the TU/e can also use The Gate. I think that this would not be possible in other regions."*
Variety of resources in ecosystem	Availability of cheap office space	*"We are renting office space from Twice. The office space is great! Cheap rent and good facilities."*
	Enough funding available	*"I do not think that money is a problem for startups now. Startups can acquire money from different sources, and there is a lot of money available."*
	Extensive IP knowledge	*"The Gate has a lot of expertise on IP, and I think they need to have a lot of expertise on this topic anyway, kind of supposedly by mandate. And that is logical"*

First-order codes	Second-order codes	Illustrative quotes
	Wide array of facilities	*"There are a lot of facilities on the TU/e campus. If I need a 3d printer, I have access to a printer. If I need facilities for speed computing, I can have access to it. And also the varieties of finance and other resources are great, especially for the startups."*
Weaknesses		
First-order codes	**Second-order codes**	**Illustrative quotes**
Lack of structure	Hard to find funding	*"It is very hard to find funding because I do not know where to go. I think most startups have difficulties getting finance."*
	Many individual ESOs	*"I followed the incubation program at The Gate. After that, I got referred to an incubation program at the BOM, which was offering basically the same program as The Gate with the same trainers."*
	No preferred service partners	*"A notary office is very expensive for establishing a company. If there would be a reliable party in the ecosystem, that would be great."*
	Unclear how the relation between The Gate and its partners is settled	*"When I requested additional funding, the business developer sent me to the BOM. When I went to the BOM, they said I could not yet request funding because I was yet to be eligible. They also said that the BOM was one of the establishers of The Gate, which is odd because The Gate never told me that. I think that is why they send me to the BOM and not to another VC."*
Not enough knowledge in ecosystem	No knowledge about funding	*"I see a load of new business developers who do not understand the role of finance and which instruments are present to arrange finance for startups. So startups are supported in the finance trajectory, but oftentimes something goes wrong."*
	Not knowing what every actor is doing	*"Most important is knowing what every actor in the ecosystem is doing. Right now, organizations do not know what everyone is doing"*
Shortage human capital	Not enough human capital available	*"Most questions I get right now is how to find people. It is not about finance anymore but more about personnel."*
Wrong incentivizing	Claim to fame	*"The entrepreneurial support organizations are focused too much on who gets the thick mark. However, there is a saying that for every success, there are an infinite amount of contributors. So, the focus should not be on who gets the thick mark but on how the EE created a successful startup."*
	Competing instead of collaborating	*"On the CEO level, ESOs are competing for funding because the more startups you serve, the more money you get. This is counterproductive because this creates the incentive to compete instead of collaborate."*
	Double accounting	*"So for entrepreneurial support, you are always double accounting because it is not clear who should get the thick mark, and that is kind of an issue in the incentivizing of ESOs."*
Lack of communication channels	No own website	*"The website of The Gate is currently under the umbrella of Brainport Development. This diminishes our visibility."*
	No WhatsApp group	*"I think the communication within the community and The Gate would already be improved by making a groups app."*
	No direct communication	*"I rarely see someone from The Gate walking through the building, coming by our office, or just having a chit-chat in the kitchen."*
	Shared agenda	*"Something like a shared agenda would be great to see when the events are taking place. Maybe with such a tool, it would also be possible to give preferences for the date of an event."*

Table 17 - strengths and weaknesses

Conflicting results

Interestingly, one strength was the availability of finance. At the same time, another weakness was the difficulty of acquiring funding, which seems contradictory because some startups mentioned that finding financial capital was no problem whatsoever. In contrast, others stated that finding financial capital was very difficult. Although these findings seem contradictory, the expert interview did find a plausible explanation.

> *"My personal experience is that startups tend to have difficulties attracting funding because they did not sufficiently validate their business and market. If startups start to develop both, others outside the startup start to realize the potential of the startup, which can attract capital. So I think that you should look at this."*

When analyzing the startups with this expert statement in mind, it seemed that the business developer was, in fact, correct. The startups that said they did not have difficulties acquiring funding are already more mature. In contrast, the startups who acknowledged that acquiring funding was difficult were more immature, which was also in line with one of the EE actors who said that funding from venture capitalists and subsidies are prevalent. However, the problems with funding are the small tickets and vouchers. Beginning entrepreneurs need these to develop their business plan and target market to acquire more considerable funds.

4.1.2 Continue the development of the entrepreneurial ecosystem

Based on the interviews, The Gate's EE is examined. The elements of the ecosystem have been validated, and specific strengths and weaknesses are outlined. As described in the theoretical analysis, the EE coordinator should coordinate the ecosystem by developing and expanding the EE (Roundy, 2021). Continuing the development of the EE is also identified in the empirical analysis as an important characteristic of the EE coordinator. Different interviewees mentioned that the ecosystem coordinator should further enhance the ecosystem's strengths and improve and resolve certain weaknesses. What is interesting to see is that some of the improvements mentioned in the interviews largely align with certain weaknesses.

The lack of a preferred service partner network was seen as a weakness because it created confusion for startups. After all, they did not know which party was best to resolve specific issues. Developing a network of preferred partners is also mentioned as something that has to be done in the future to further develop the EE.

Another area for improvement was that most startups needed help finding skilled personnel. Every startup and most business developers mentioned that finding personnel with specific knowledge was difficult. Some startups mentioned that students from the TU/e, Fontys, or Summa could fill this gap. Because students are educated in different commercial and technical fields, they can bring much-needed knowledge to startups. Therefore, the EE should try to enable startups to find students willing to work for them. Another possibility is that higher educational institutes would develop a program enabling students to earn ECTS in return for working at a startup. As one of the business developers states:

> *"We have a large pool of students in the Brainport. Why not use an employment agency to match students with startups? I am certain that most startups are eager to use one or more students."*

Finally, the EE coordinator should develop processes in the EE that would provide structure to the ecosystem. The Gate is already trying to set up certain processes, for example, by creating a coherent incubation program, which helps in improving startup support. The Gate could further improve this by establishing specific processes aimed at developing the EE. The lack of processes could be related to the absence of an ecosystem coordinator. In the future, the EE should establish a coordinator, which could benefit the EE's structure, decrease the search cost for startups, and improve the ecosystem in general.

Concluding, an incubator aiming to develop its EE should try to identify the strength and weaknesses of the ecosystem and leverage the strengths of the EE and resolve weaknesses. By performing these

activities, the incubator will be better integrated into the EE, which helps in coordinating the EE but also will help in creating a more successful EE (Roundy, 2021).

4.1.3 The Gate's position in the Brainport entrepreneurial ecosystem

According to the interviews, The Gate is embedded in the EE and has a significant role in the community and startup support. Therefore, it is interesting to see where in the ecosystem The Gate is exactly operating. Furthermore, from the literature review, two types of services were found to be essential for university business incubators to offer which could support startups and strengthen the EE. In this chapter, the position of The Gate in the EE and the services offered by The Gate are elaborated.

The position of The Gate in the entrepreneurial ecosystem

Within the Brainport EE, the TU/e is seen as a catalyst of entrepreneurship. According to the president of the executive board of the TU/e, the TU/e has three objectives: education, research, and valorization. The latter has demanded extra attention from the university lately because this objective entails that students and employees that want to start a venture from their research or projects are actively supported by the TU/e, also called valorization.

The president of the executive board of the TU/e recognized that there was a need for a central organization to answer all questions regarding entrepreneurship on the TU/e. As the president of the executive board of the TU/e said:

> *"Entrepreneurial students and employees needed help knowing where to go, and entrepreneurial support needed to be more cohesive. I saw the possibility of creating a central institute on the TU/e campus that would bring everything regarding entrepreneurship together, which was The Gate."*

As a paradigm for the culture of collaboration mentioned by multiple interviewees, the TU/e did not create The Gate individually but joined forces with other vital actors in the Brainport ecosystem. Together with Brainport Development, the (BOM), Fontys University of Applied sciences, and Summa College, The Eindhoven University of Technology created the Gate in January 2021. The TU/e, Fontys University of applied sciences, and Summa College are the most important higher educational institutes in the Brainport region. Brainport Development and The BOM are the two biggest development agencies in the Brabant and Brainport regions. With these five parties involved, The Gate was directly embedded in the Brainport region and at the forefront of innovation and development.

The Gate is part of a funnel that represents the entrepreneurial journey of TU/e startups, see figure 11. According to a TU/e researcher, the TU/e has established a funnel with multiple organizations that aim to support startups through various phases. As the researcher of the TU/e stated:

> *"The EE must be seen as a funnel, in which an entrepreneur at the TU/e either starts from research from the faculty or students at Innovation Space, then continues to The Gate, and after The Gate can go to Eindhoven Engine."*
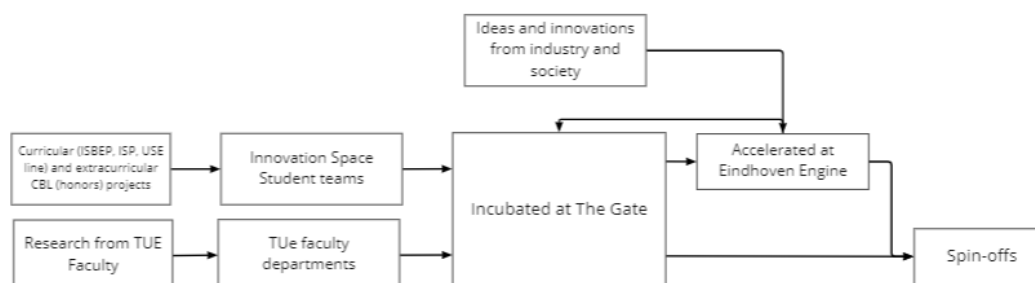
Figure 11 - TU/e funnel

This funnel is also supported by other interviewees, who mention that there is a good connection between The Gate and the TU/e. Because most startups are originally from the TU/e, either as a student or as an employee, having an efficient scouting network at both Innovation Space and the

faculty departments is necessary. An example is a scouting network that The Gate has at Innovation Space, where two business developers of The Gate are often present to establish the connection between The Gate and Innovation Space. An employee of Innovation Space illustrated this:

"I think that the connection between Innovation Space and The Gate cannot be better than it is right now in the sense that since – 2 business developers of The Gate – are hired, the visibility of The Gate has been improved, and the flow of startups is excellent."

Finally, The role of the Gate and the need for an organization such as The Gate is recognized. Although most interviewees admit that The Gate is relatively new and that some processes are not developed optimally, they see the value of The Gate in the EE and think that The Gate can help strengthen the EE in the future. Different ecosystem actors acknowledged that the EE required an ESO that would centralize certain parts of entrepreneurship in the Brainport region.

Strategic objectives

According to the president of the executive board of the TU/e, The Gate is established to bring together all different aspects of entrepreneurship. Before The Gate was established, support for and knowledge about entrepreneurship was fragmented. Because of this core objective, The Gate has three strategic pillars derived from data from expert interviews and meetings with business developers of The Gate. These three strategic pillars facilitate valorization, economic and social regional impact, and stimulate and support entrepreneurship.

Facilitation of the valorization process

The first strategic objective of the Gate is facilitating the valorization task of the TU/e. Valorization means that knowledge that is obtained from research at the university must be commercialized. The Gate is facilitating this process by making knowledge and insights gained from scientific research useful for society in the form of spin-offs. The Gate facilitates the valorization process by helping students and faculty from the TU/e to establish startups and spin-offs and guiding them through the entrepreneurial journey.

Creating economic and social regional impact

The second strategic objective of The Gate is that The Gate makes a positive economic and regional social impact. By stimulating employment opportunities and improving the innovation power in the region, the region becomes more attractive for others to locate, which boosts the regional economy.

Stimulating and supporting entrepreneurship

The final strategic objective of The Gate is that entrepreneurship is stimulated and entrepreneurs are supported. The Gate does this by guiding entrepreneurs through various stages of their entrepreneurial journey by offering various services. The Gate is a central hub for everything related to entrepreneurship and, by this, tries to stimulate entrepreneurship in the region.

Service offering

The three strategic objectives of The Gate are translated into concrete actions. By offering a complete service offering, The Gate can achieve its strategic objectives. The strategic objectives are categorized based on the findings of Spigel (2016), who grouped the services of ESOs into broad and functional support types. The services offered can be found in table 18.

Broad Support Services		
Technology transfer	**One clear entry and linking to network partners**	**Participations**
- Stimulate Valorisation- Bring research and technology to the market	- Scouting and screening for other startups - developing network of preferred partners - Access to finance & physical resources	- Division between TU/e participations and The Gate - TU/e participates in TU/e spinoffs by owning stocks - acting as a shareholder in TU/e spin-offs
Functional support services			
Intellectual property & patent office	**Physical co-location**	**Entrepreneurial programs & training**	**Business development**
- Experts on payroll on intellectual property - Helping startups to safeguard IP	- Events - Alpha building - Offering office facilities in The Gate - Housing and office facilities - Lab and research facilities	- Frame-Load-Launch program Gritd - Unify theoretical domain with other entrepreneurial support organizations	- business developers with expertise in technical domain - Control over facilitation of startups - Link with faculty departments & innovation space

Table 18 - The Gate's service offering

As can be seen from table 18, The Gate offers seven service blocks, three broad support services, and four functional support services. When comparing the results of the empirical analysis with the results of the literature review on services offered by a university business incubator, it becomes clear that The Gate offers almost all types of services found in the literature review. The Gate offers access to financial and physical resources, legal support & intellectual property, access support services, business development, networking, technology transfer, and community building. Therefore, it might be concluded that The Gate offers a good range of services, which does not necessarily say anything about the service quality.

Looking at both types of services, interviewees acknowledged that both types of services are essential and should be executed by the university business incubator. The functional support services were important to offer startups sufficient support by helping them develop and upscaling their business. Supporting startups with this is crucial because it can increase the chance of success, eventually attracting other startups to the EE, which is called the lighthouse effect (Tiba et al., 2020). The broad support services were seen as important because they can strengthen the EE, enable the actors to find each other, and make the ecosystem denser. One business developer stated:

"If The Gate wants to set the next step, we should look beyond startup support. We need to investigate the ecosystem and try to develop it further by thinking about what is needed in the ecosystem and how we can more effectively connect the ecosystem. So I agree that we need to offer more services than direct startup support."

Some weak points are identified when assessing the quality of the services offered by The Gate. First, The Gate is sometimes not able to identify what startups need. One important issue that has been neglected by The Gate so far is that startups want to increase their interconnectedness but recognize that The Gate is not facilitating this. Another need not addressed by The Gate is that The Gate does not offer extensive personal contact or act as a sparring partner. Two startups mentioned that they would like to have more personal contact to air their heart. One other startup adds to this that they sometimes would like to have personal contact to exchange ideas and to know what an entrepreneurial export would think about something. However, the startup has mentioned that there is currently no room for personal contact or informal conversations. Also, one of the broad support services that were not recognized in the theoretical review but did come forward was that the startups wanted The Gate to offer a buzzing or thriving community. Possible services that The Gate could offer would be a WhatsApp group or a monthly returning startup lunch at The Gate.

The linking of startups to the network service offered is also deemed insufficient, which both startups and business developers recognize. The primary reason why linking the startups is not sufficiently executed is that after The Gate has linked the startup with an ecosystem actor, The Gate is not facilitating this process. Interestingly, this process is described in the literature review and is called mating. The incubator can facilitate this process by providing advice and support or by providing credibility to the startups. This can significantly improve the chance that the linking of the startup is successful (van Rijnsoever, 2020).

Incubation process

The theoretical analysis found that an assertive incubator can proactively facilitate startups with resources that can be especially helpful for inexperienced startups. The Gate targets starting entrepreneurs in the early phase of the entrepreneurial journey. Therefore, most startups are first-time entrepreneurs who do not have experience with entrepreneurship.

From the empirical analysis, it can be concluded that how The Gate supports startups is more demand-driven, meaning that The Gate is not providing the resources and support proactively. However, startups should instead ask for the resources themselves. This might pose a problem because inexperienced entrepreneurs are found to have problems with identifying what and when they need specific resources. This can lead to startups not using the resources they actually need and therefore diminishing their performance (van Weele et al., 2017). Additionally, inexperienced entrepreneurs might be more reluctant to ask for the resources and support they require, leading to entrepreneurs operating more individually, which can harm their performance (van Weele et al., 2017).

Another way the demand-driven approach resembles is that The Gate is not forcing participation from startups. Once startups enter the incubation process at The Gate, there is no mandatory participation from The Gate, which results in low attendance at The Gate's physical office and at events which may be one of the reasons why the alpha building is not a thriving startup community yet.

Interestingly, some startups mentioned wanting The Gate to be more proactive, which would stimulate them to participate more in the community. One startup that has been at The Gate in the past mentioned that it would only use resources or support from The Gate if it were more proactive. Currently, they are operating individually without ESOs.

The Gate is already extensively facilitating startups through support programs and resources. The Gate could further improve its facilitation by becoming a more assertive incubator, which entails developing a tighter incubation program with mandatory participation, fixed milestones, and proactively asking what startups require. This can improve the performance of the startups because they can exploit the resources of The Gate, but it can also improve the performance of The Gate because it can improve startup facilitation.

Coordination

In the theoretical analysis, it was found that EEs benefit from coordination. Specific characteristics and principles were found that can help coordinate the EE. In the empirical analysis, EE coordination was indeed found as an important way to increase the functioning of the network. Interestingly, startups and ecosystem actors mentioned that coordination primarily ensures that stakeholders are identified, motivated, and engaged. This finding predominantly accumulates with the findings of the theoretical analysis, which found that stakeholder engagement can lead to stakeholder participation, which is essential when activating the EE (Bischoff et al., 2018; Rampersad, 2016). Some crucial activities when coordinating an EE are aligning the goals and objectives in an EE, communicating and promoting events, agendas, and accomplishments, and establishing a feeling of coherence and group identity. Comparing these results to the findings of the theoretical analysis, it seems that these activities do overlap with the findings of Bischoff et al. (2018) and Roundy (2020) outlined in chapter 3.1.2 because these papers also stress the importance of communication and creating a feeling of group identification.

When looking more in detail at the activities that can establish stakeholder engagement, most are currently not adequately executed. The Gate connects startups and ecosystem actors but is not

facilitating this process. In addition, The Gate still needs to set an ecosystem vision and has yet to set a common agenda. The Gate organizes reinforcing activities and events, but these events are not yet vivid and suffer from a low attendance rate. Finally, although The Gate tries to communicate with startups and ecosystem actors, It lacks some communication channels, making communicating more challenging. When asked about the coordination in the current EE, the interviewees unanimously mentioned that the EE is currently lacking sufficient coordination. Although some actors are trying to perform some of the activities for coordination, such as EE promotion, no actor is currently sufficiently trying to coordinate the EE by identifying, attracting, and engaging stakeholders. What is interesting is the fact that the interviewees see The Gate as a potential candidate for coordinating the EE. Ecosystem actors agree that The Gate is embedded in the EE and closely located to the startups, making it a suitable organization to coordinate the EE. In contrast, some startups see The Gate also as a central organization in the EE because it has close ties to the university, government, and financial capital providers. This makes The Gate a suitable coordinator. However, this process should be executed cautiously because of sensitive political issues between different ecosystem actors. Claiming that The Gate is the coordinator could provoke other ecosystem actors who can disrupt the collaboration and goal alignment in the EE, which is very important for a thriving EE. Therefore, it would be better if The Gate started coordinating the TU/e part of the EE by expanding this part of the network and assigning the ecosystem actors' objectives and roles. Once this is successful, The Gate could try to copy this to the Brainport part of the network without explicitly mentioning that they are the coordinator of the Brainport EE.

4.2 Barriers and Challenges to activate the entrepreneurial ecosystem

In this section, the barriers and challenges found from the empirical data could disrupt the process of creating value in the EE by decreasing search costs. This part helps to answer the third sub-research question.

4.2.1 Four activities for decreasing the search costs in the entrepreneurial ecosystem

In order to activate the EE, four activities are recognized that an EE coordinator should perform: cognitive, social, structural, and cultural. When not correctly performed, these activities can increase the search costs for startups in the EE. Therefore, the empirical analysis tried to find barriers and challenges to activate the EE based on these four activities. From the empirical analysis, three out of the four activities were recognized as necessary for decreasing search costs in the ecosystem, and barriers and challenges for performing these activities are presented in this chapter.
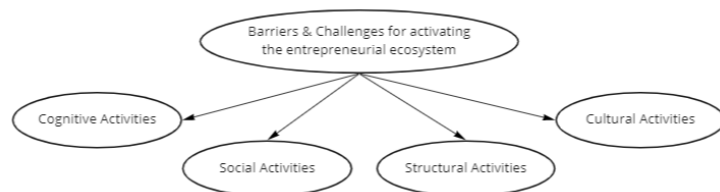
Figure 12 - barriers and challenges for activating the entrepreneurial ecosystem

4.2.2 Cognitive barriers to decreasing search costs in the entrepreneurial ecosystem

The first activity that the EE coordinator should perform is a cognitive activity. The cognitive activities help establish the EE in the minds of people, and it helps give the feeling to actors and startups that they are part of the EE. Cognitive activities are essential for decreasing search costs in the EE. However, three barriers are identified that might inhibit the EE coordinator from sufficiently performing the cognitive activities required to activate the EE, which can be found in table 19.

Cognitive barriers and challenges				
Barrier	**Description**	**Disturbing mechanism from literature**	**Illustrative quote**	**How to address this barrier**
Not having a relation with startups	Startups have the feeling that The Gate is not developing a relationship with them and is focusing more on TU/e startups than on other startups.	Does not commit the startups to the EE resulting in less startups participating in the ecosystem leading to lower economic output	*"Is it not kind of odd that there are so many innovative startups, and almost no one has established a link with The Gate? You see, there is a difference between being physically present in this building and creating social cohesion, and I think that The Gate is leaning more towards the first one, which is a shame because I think there are many startups in this building who could use and want to use The Gate."*	- Regularly walk by the office - assign a business developer to the startups - Introduce new employees of The Gate to the startups - introduce new startups to other tenants and The Gate
Startups not sufficiently helped	Startups are not sufficiently helped by The Gate or ecosystem actors. For example, being helped takes too long, startups are not helped with funding and market validation or are receiving wrong information.	Does not commit the startups to the EE resulting in fewer startups participating in the ecosystem leading to lower economic output	*"When setting up our company I reached out to "an entrepreneurial actor" with help for the company structure I could choose. The entrepreneurial actor said that it is best to start directly with a private company (besloten vennootschap) structure. Looking back, this was the worst advice I have ever had because with a private company I am obliged to pay salary, but I did not even make any profit at the time."*	- Identify what startups need - Have follow ups after meetings
Startups start operating independently	Startups are looking for other ecosystem partners than The Gate or are handling things independently, such as funding and housing.	Gives the feeling that the EE does not exist, resulting in fewer startups participating in the ecosystem leading to lower economic output	*"When my partner and I needed legal advice, we asked for a lawyer in the region. Eventually, we got linked to Blatter Legal, but they were so immensely expensive that we started looking for legal advice ourselves. We found one which was way cheaper, and they have become our permanent lawyer."*	- Involve startups in the community - Regularly ask to startup if incubator/business develop can do something for startup - Share success stories to startups and ecosystem

Table 19 - cognitive barriers and challenges

Effect of cognitive barriers on the activation process

When looking at the three barriers' effects, it might be concluded that the ecosystem mechanism described by Colombo et al. (2019) can be disrupted when not sufficiently performing cognitive activities. First, startups mention that they feel The Gate is not developing a relationship with them. Especially startups that are not directly related to the TU/e mention this. This can also have implications for The Gate when coordinating the EE. When The Gate is not developing a relationship with the startups, they will also not be engaged in the entrepreneurial ecosystem (Bischoff et al., 2018). The second barrier is that startups mention that they are not sufficiently helped, which is caused by the fact that startups are not helped with acquiring funding and market validation, receive the wrong information, or that being helped takes too long. Finally, the third barrier is the fact that startups start operating individually. Because they do not receive the help they want or The Gate is not

developing a relationship with them, startups might feel that they are not part of the EE and start operating individually outside the EE.

The third barrier could indicate that the cognitive activities found in the article of Roundy & Fayard (2020) are indeed caused by the ecosystem mechanism found by Colombo et al. (2019). Startups mention that they start operating individually because thus not participate in the EE and therefore do not feel part of the EE. Therefore, the EE coordinator should aim to resolve the cognitive barriers so that the cognitive activities will lead to the cognitive outcomes described in the literature review by trying to engage startups in the EE.

4.2.3 Social barriers to decreasing search costs in the entrepreneurial ecosystem

The second activity that the EE coordinator should perform is a social activity. The social activities are essential because they might help create awareness of startups and actors that are present in the ecosystem and might help to develop relations between them. However, the interviews identified two barriers that might inhibit the EE coordinator from performing the social activities required for activating the EE. Both barriers will be elaborated on in this section.

Social barriers and challenges				
Barrier	**Description**	**Disturbing mechanism from literature**	**Illustrative quote**	**How to address this barrier**
Low actor and startup awareness	Startups and ecosystem actors do not know each other well because startups are not linked to each other, and ecosystem actors and The Gate does not know every startups.	Actors do not become aware of each other and do not develop relationships which leads to a less dense network resulting in a less efficient exchange of information.	*"We did not know some of the people we needed, but we were also not linked to some of these people. In the end, we did most searching by ourselves, and that took quite some time."*	- Create a group WhatsApp - Create a canteen where everybody can have lunch
No buzzing community	Startups in the alpha building mention that there is no buzzing community because there are no interesting events, The Gate is invisible, and socializing is not stimulated.	Actors do not become aware of each other and do not develop relationships which leads to a less dense network resulting in a less efficient exchange of information	*"We could locate to The Gate once a week, but this would make no sense because of there are not coming twenty startups on a daily basis, we are wasting time and it is better for us to stay where we are. If, in fact, those twenty startups are coming daily, I would definitely reconsider moving a couple of days to The Gate."*	- Create monthly events for the startups - more people should walk in and out the building

Table 20 - Social barriers and challenges

Effect of social barriers on the activation process

When looking at the two barriers found, there might be an indication that both can disrupt the process of achieving a dense network by actors becoming aware of each other. The first barrier is the fact that there is a low actor awareness in the EE. Startups mention that they do not know every actor present in the EE and are not directed by an ecosystem coordinator who directs them to the actor they need. A high actor awareness is important when coordinating the EE because this helps to capitalize on stakeholders' resources and knowledge. Besides, actor awareness is also an important mechanism to activate the EE. Therefore, the first barrier can disrupt the activation process and should be resolved. The second barrier concerns the community and the fact that it is not thriving. Especially startups located in the alpha building, where The Gates resides, are not a vivid place where actors and startups are co-locating and cooperating. Both barriers can affect social outcomes, in which the actors do not become aware of each other and share information.

When looking at the process described in the literature review, there might be support for social activities that can lead to social outcomes helping decrease search costs (Roundy & Fayard, 2020). As

found in the empirical analysis, startups and business developers mention that the EE should be a dense network where ecosystem actors and startups can find each other easily. However, this is currently not the case because there is no dense and thriving community, and actors are unaware of each other.

4.2.4 Structural barriers to decreasing search costs in the entrepreneurial ecosystem

The third activity the EE coordinator should perform is structural activities. Structural activities are important because they might help create a coherent way of working and assigns roles to EE actors. However, two barriers were identified that might inhibit the EE coordinator from sufficiently performing the structural activities needed to activate the EE. These barriers will be elaborated on in this section.

Structural barriers and challenges				
Barrier	**Description**	**Disturbing mechanism from literature**	**Illustrative quote**	**How to address this barrier**
No coordination	There is no coordination in the EE because processes are not developed, the ecosystem is not monitored, and it is not chosen which startups are supported.	Actors do not know what needs to be done and what is needed. Startups do not know what is available in the EE and how to acquire certain resources.	*"We are not coordinating the flow of startups. We do not monitor which startups are in the system and we do not manage the inflow and outflow of the startups. Also, the process of startup business development is not developed: do we have milestones? Which resources need to be dedicated in this phase, and which partners are needed when? No, all these processes are still missing, which makes it very complicated to uniformly operate*	- Become more integrated in the EE - Aim at goal alignment between startups and participants - Set an ecosystem vision
Not linking external network	The Gate is not linking startups sufficiently to the external network because there are missing links in the external networks, or there is no fit between startup and actor, or the linking process is unstructured.	Actors do not know what needs to be done and what is needed. Startups do not know what is available in the EE and how to acquire certain resources.	*"When using preferred partners, The Gate should remember that we do not have an abundance of money. When we needed a legal expert, we got linked to – Legal Company – but they were so expensive we could not afford them. So this preferred partner was useless for us."*	- Actively support the connection process - Give advice to startups - Determine what startups need from the network - Provide credibility to startups

Table 21 - Structural barriers and challenges

Effect of structural barriers on the activation process

Two barriers are identified that might obstruct the structural activities from activating the EE. The first barrier is insufficient coordination in the EE. This is partly because there is currently no EE coordinator present, which is found to be a critical component in thriving EEs (Roundy, 2020). Although The Gate is trying to establish itself as a coordinator, political issues have halted this ambition. This has led to different actors trying to coordinate the EE, which eventually harms the structure of the EE and limits coordination. The absence of effective coordination makes it challenging to engage stakeholders and attract others to the ecosystem. Besides, the absence of one coordinator recognized by the EE might also explain why there is currently no common agenda, shared measurement systems, exciting activities and events, and continuous communication. This disrupts startup and ecosystem actor participation and disables activation (Bischoff et al., 2018; Rampersad, 2016). Another reason coordination is insufficient is that there is no up-to-date mapping of which startups and stakeholders are present in the EE, which phase of existence they are operating

in, and which actors should be included in that specific phase. As found in the literature, mapping the EE is helpful for the EE coordinator to use and extend the community and bring structure to the ecosystem (Isenberg, 2010; Roundy & Fayard, 2020).

The second barrier is that the startups are not sufficiently linked to the external network. Startups mentioned that sometimes they are linked to partners that do not fit the startups' profile, such as asking too high prices for their services which startups cannot afford. Although The Gate already tries to link startups to the EE by making the connection, The Gate could improve this process by facilitating the whole connection process as described by van Weele et al. (2017). Another reason why the startups might be insufficiently linked to the external network because the preferred partner network is incomplete and fragmented. As the theoretical analysis shows, the EE coordinator should facilitate the connection process by mediating between the startup and ecosystem actors (van Weele et al., 2017). Again, The Gate has already established a preferred partner network, but this partner network is not complete yet. By examining what startups need and comparing this with the missing links in the preferred partner network, The Gate could further improve the preferred partner network, thereby enhancing the connection process.

When looking at the process of the structural activities, there seems to be proof that structural activities lead to the structural outcomes by the ecosystem mechanism described by Roundy & Fayard (2020). In the interviews, startups, business developers, and ecosystem actors all mentioned that structure is missing in the EE, which causes actors not to know what to do and startups not to find the resources they need. Some interviews mentioned that having a mapping of the EE could benefit the startups and ecosystem actors in finding actors and resources. Therefore, there seems to support that the EE coordinator should try to perform the structural activities, remove the barriers found in the empirical analysis and try to map the EE.

4.2.5 Cultural barriers to decreasing search costs in the entrepreneurial ecosystem

The fourth and final activity that the EE coordinator should perform is cultural activities. Cultural activities are important because they enable actors to interact more with each other through shared culture and cooperative behavior. However, two barriers were identified that might inhibit the EE coordinator from performing the cultural activities required to activate the EE. Both barriers will be elaborated on in this section.

Cultural barriers and challenges			
Barrier	**Description**	**Disturbing mechanism from literature**	**Illustrative quote**
Not enabling cooperation	The Gate is not enabling cooperation in the EE because it is not developing trust between actors, a uniform ecosystem goal is absent, not all information is shared, and a uniform culture is not created.	Actors do not easily interact with each other, and competition instead of cooperation is stimulated.	*"The Gate should try to communicate their goals and translate them in uniform goals that are accepted by the whole community. I know that one of their goals is valorization with TU/e startups, but what are other goals that we should pursue?"*
Events have low attendance rate	The events organized in the EE have a low attendance rate. This might be caused by uninteresting events and that the events organized required too much commitment from the startups.	EE events expose entrepreneurs to cultural artifacts and ecosystem values and allow entrepreneurs to receive feedback and engage in vicarious learning.	*"I usually do not go to events. When I do, I have a specific question and think that I can get an answer at the event or workshop. Networking is not really my thing. If The Gate organized something, I would join, just to know The Gate better and some of the other startups."*

Table 22 - Cultural barriers and challenges

Effect of cultural barriers on the activation process

Two barriers were found that might disrupt the cultural outcomes. The first barrier that might interrupt the cultural activities leading to decreased search costs is that The Gate is not enabling cooperation in the EE. Several interviewees mentioned that some actors are not cooperating and that no EE coordinator is trying to resolve this problem. According to startups and ecosystem actors, The Gate as an EE coordinator, could enable cooperation by developing trust between actors by serving as a network broker, which was also found in the literature (van Rijnsoever, 2020). Currently, cooperation is not sufficiently promoted in the EE, which might lead to opportunistic or competitive behavior, disrupting the ecosystem mechanism and leading to less cooperation. Another cultural barrier that might disrupt the ecosystem mechanism is that events have a low attendance rate in the EE. Several startups mention that there are not enough exciting events organized for the startups or that the events require too much commitment from the startups, which demotivates them to participate.

When looking at the empirical data, no support was found for the ecosystem mechanism that EE events might expose the actors to the overall ecosystem values and allow entrepreneurs to receive feedback and engage in vicarious learning. Although startups and business developers mentioned that participation in the events is low, no interviewee stated that this could lead to disrupting the cultural outcome. Many interviewees mentioned the positive culture prevalent in the Brainport region. Furthermore, there was no link between entrepreneurial events and cooperative behavior. From the interviews, it seems that startups and business developers see the events as a tool to expand their network and acquire knowledge but do not see them as a way to receive feedback or engage in vicarious learning. Startups and business developers mentioned vicarious learning, but more in a way that startups are directly connected to experienced entrepreneurs and not through events. Therefore, it can be concluded that cultural activity is not leading to cultural outcomes by the ecosystem mechanism.

4.3 Final framework for activating the entrepreneurial ecosystem

In the previous section, the theoretical framework from chapter three is validated. First, the steps to make an EE mapping were validated, followed by the elements that are part of The Gate's EE. Business developers and startups acknowledged that the EE mapping could improve the structure and visibility within the EE. The mapping could also help to coordinate the EE better.

Then, the role of The Gate within the EE was analyzed. It was found that The Gate is currently performing as an incubator but could, in fact, take the role of EE coordinator. Ecosystem actors acknowledge that The Gate is embedded in the EE and closely related to the startups, which are both important characteristics of the ecosystem coordinator. However, if The Gate wants to perform this role, it should be cautious because of sensitive political issues between certain ecosystem actors.

Moving further, The Gate is currently offering various services and both broad and functional support services. Both types of services are essential to facilitate startups sufficiently. However, the method in which The Gate offers its services might not be best suited to the types of startups it is currently facilitating. The startups The Gate facilitates are predominantly led by inexperienced, first-time entrepreneurs. Although not explicitly mentioned by the interviewees, this might create the risk that startups are not using the resource and service offerings of The Gate optimally. Therefore, it would be better if The Gate switched to a more assertive and proactive approach to facilitate the startups, which can increase the chance that startups use the support and resources of The Gate and also can enhance a thriving community in the alpha building.

Moving toward the EE building, the four activities that an EE coordinator should perform were analyzed by looking at the barriers that can disrupt the process. Support was found for three of the four activities, namely the cognitive, social, and structural activities. If the incubator coordinates the EE by performing the three activities, the search costs can be decreased for the startups and the ecosystem (Roundy & Fayard, 2020).

When looking at the three activities, it seems that decreased search costs might be a logical outcome. First, by performing the three activities, decreased search costs can be achieved by different mechanisms. First, the ecosystem mechanism that can create cognitive outcomes is by providing the

feeling to startups and ecosystem actors that they are part of the EE. Through this, they start participating in the EE. Second, the network becomes denser when actors become aware of each other. A high network density indicates that the actors are well-connected to ecosystem actors (Stam & Spigel, 2016). Decreased search costs seem to be a logical outcome because well-connected startups do not have to search extensively for ecosystem actors. Finally, when there is a good structure within the EE, actors know what to do, and startups know where to find actors and resources, which can be caused by developing EE maps and the EE coordinator serving as connectors between startups and resources. The decreased search costs also seem to be a logical outcome of the structural activities since startups are connected to actors and resources, and there is an increased structure and visibility in the EE by making an EE mapping.

Moving further in the process, it might be concluded that the decreased search costs lead to an activated EE. Based on the empirical analysis and literature, creating value in the EE can engage startups and participants in the community. However, the decreased search costs do not lead automatically to an activated EE. A necessary process the incubator should perform is ensuring that startups can benefit from the strengthened EE by connecting them (van Rijnsoever, 2020). If the incubator does not sufficiently connect the startups to the EE, the value created by expanding and strengthening the EE cannot be captured. Therefore, the incubator should actively facilitate the connection process by matching the startup and ecosystem actor based on the startup's need and the ecosystem actor's demand (van Rijnsoever, 2020).

When the connection between the startup and the ecosystem actor is successful, the honeymoon period arrives (van Rijnsoever, 2020). This is, for example, the case when a venture capital firm decides to invest in a startup, which can increase the chance of success for startups. This can be an important mechanism because this success can signal to startups outside the EE that the ecosystem is, in fact, successful and can increase their chances of success as well. This can attract startups to the EE, which makes the EE denser and can enhance the flow of information in the EE (Feld, 2020; Roundy & Fayard, 2020; Spigel & Stam, 2016).

This mechanism is also found in the empirical analysis, where startups and business developers mentioned that an activated EE depends on actors that are committed to the EE, attract new entrants to the network, have a high network density, and is a vivid community. What is interesting is that business developers and startups themselves mention that creating value from the EE is the primary reason why startups would participate in the EE, which might be explained by looking at value creation and capturing innovation ecosystems. In this style of literature, the reason why organizations are joining and committing to an ecosystem is because of the value that is created and distributed among the ecosystem actors. Every ecosystem actor must receive an amount of value higher than other ecosystems' value and is fair enough to keep the actors committed to the ecosystem (Vanhaverbeke & Cloodt, 2014). By using this explanation and projecting this to the EE, evidence can be found for the fact that the framework can indeed activate the EE.

When the value is created successfully by decreasing the search costs and startups can benefit from this value by successful network connection, the startups might be inclined to commit to and engage in the network because startups and ecosystem actors mentioned that an important reason to locate in an EE is benefitting from additional value. If the incubator shares this success with others in and out of the EE, new entrants can be attracted to the EE via the so-called lighthouse effect (Tiba et al., 2020). This so-called lighthouse effect can communicate to others that the EE exists and is, in fact, successful, which can attract others towards the EE. Therefore, promoting success is an important activity that The Gate should execute.

To conclude, if the incubator wants to activate its EE, it should coordinate it. By identifying the startup's needs and developing its services accordingly, the incubator can develop and expand the EE, thereby decreasing the ecosystem's search costs. Finally, the startups should be connected to the strengthened EE, which can signal the startup's success to startups outside the EE and thereby activate the EE by identifying, attracting, and engaging the participants in the EE, which makes the network

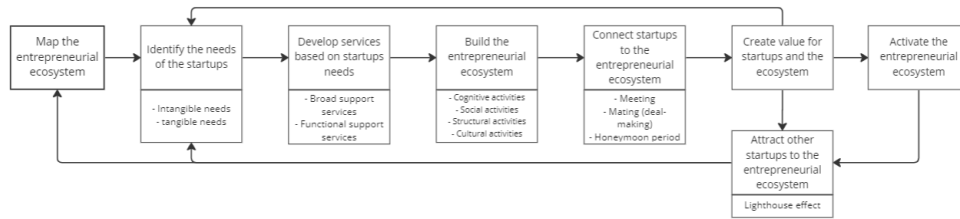denser which fosters the flow of information and resources. The final framework can be found in figure 13.

Figure 13 - final activation framework

5. Design Principles

This chapter presents the developed design principles and design requirements following the design science methodology of Keskin & Romme (2020) as described in chapter 2. The design principles are used as input for the final solution design. The design principles are based on both the theoretical and empirical analysis, as explained in section 2.2.1. The interventions found in the literature were validated in the empirical analysis. This chapter answers the fourth sub-research question "How should the framework of The Gate look like that it can activate its EE?

5.1 Design Principles

The fourth sub-research question is answered by developing a solution design, based on the knowledge gathered from the literature review and empirical analysis. The literature review and empirical analysis provided insights in how an EE coordinator can activate the EE by developing an EE mapping and use this mapping to perform four activities and offering two types of services that create value for the startups and ecosystem. From these insights eight design principles are developed based on the CAMO logic. CAMO stands for an actor and its actions (A), which trigger a particular mechanism (M) toward achieving a desired outcome (O) in a particular context (C).

1. **Mapping the entrepreneurial ecosystem**

This principle is related to the mapping of the EE. From both the theoretical and empirical analysis, it was found that mapping an EE can help the incubator to coordinate and make better use of the EE because the mapping provides visibility and structure (Roundy & Fayard, 2020; Cavallo et al., 2021; Isenberg, 2010). This mapping can be used as the foundation for creating value in the EE (Cavallo et al., 2021). Therefore, the next design principle will focus on the important of creating an EE mapping.

C: An incubator that wants to activate its EE,
A: should create a mapping of the EE
M: to create visibility, structure and awareness
O: which helps to make better use of the EE

2. **Interaction between the elements**

This principle is related to identifying the elements for the mapping of the EE. According to Spigel (2017), the relationships between the elements are very important, which implies that the elements should not be seen in isolation but rather in relation to each other. The elements can also influence and develop each other and therefore it is important to identify the elements in combination to each other.

C: When the incubator wants to develop a mapping of the EE,
A: the elements should be regarded in combination with each other
M: to increase the understanding of the dependencies between the elements
O: which allows the incubator to map the EE.

3. **Coordination**

Based on the theoretical analysis, the importance of coordination within the EE was stressed (Roundy, 2020; Colombo et al., 2019). Coordination within an EE can help to motivate the participants to engage in the community and help develop and strengthen the EE by creating new relationships (Roundy, 2021; Colombo et al., 2019; Spigel, 2016). One way to coordinate the EE is by stakeholder engagement (Bischoff et al., 2018). Stakeholder engagement can induce participation by harnessing intrinsic motivation, foster attitudes and beliefs about the ecosystem, and encourage voluntary contribution. This can be done by facilitating collective action and pursue a shared vision, which can be done by set a common agenda, reinforcing activities and events, and continuous communication (Bischoff et al., 2018) Therefore, the next design principle will focus on coordination within an EE.

C: An incubator that wants to activate its EE,
A: should involve the stakeholders by stakeholder engagement
M: to create trust and aligning objectives
O: leading to more effective coordination in the EE

4. Identify startup´s needs

Based on the theoretical and empirical analysis, it is concluded that the incubator should identify the needs of the startups in order to better support and facilitate them (van Weele et al., 2017). However, entrepreneurs are often not capable of identifying what they specifically need and which resources they are lacking. Therefore, the incubator can use the RBV as a starting point to identify the needs of the startups. This enables the incubator to better identify what startups' need and improve their service offering which can improve incubator's performance (van Weele et al. 2017). Based on this, the next principle focuses on identifying the startups' needs.

C: An incubator that wants to activate its EE,
A: should view startups through the resource-based view
M: to identify the needs of the startups
O: leading to a service offering that is better tailored to the needs of the startups

5. Develop service offering

Based on both the theoretical and empirical analysis, it was found that incubators can create value for startups by offering functional and broad services to the EE and the startups (Spigel, 2016; van Weele et al., 2017). However, incubator's services and resources are often left unused by startups because startups are not able to identify which resources they need or are hesitant to ask for resources they need (van Weele et al., 2017). Therefore, the incubator should use an assertive approach by setting regular meetings with milestones and making participation mandatory (van Weele et al., 2017). This can increase the use of resources which can help startups performing better. Based on this, the next design principle will focus on incubator assertiveness.

C: An incubator that wants to activate its EE,
A: should become more assertive in providing startups support
M: which eliminates the distance between the incubator and startups
O: thereby increasing the use of incubator's resource

6. Network building

Based on the theoretical analysis, it was found that when the incubator wants to connect the startups to the EE, first the network should be developed (van Rijnsoever, 2020; Antunes et al., 2020). This network exists out of an external and internal network. The external network can be developed by building social capital by associating startups to organizations outside the incubator (Antunes et al., 2020). The incubator creates value when it gathers skills by selecting external organizations that can successfully complement the incubator's own activities. The internal network is related to the network of startups. The incubator can develop this network by deliberately connecting startups to each other, for example with co-working, hosting social events or actively introducing tenants to each other, which can create value for the startups such as synergies, knowledge sharing and relationships (van Rijnsoever, 2020). Based on this, the following two design principles are formulated.

Desing principle 6A

C: An incubator that wants to activate its EE,
A: should establish a relation with external organizations that complement the incubator's service offering and activities
M: creating value for startups and ecosystem actors through collaboration, knowledge sharing, and legitimacy
O: leading to an larger and thriving external network

Design Principle 6B

C: An incubator that wants to activate its EE,
A: the incubator should connect startups to each other by co-working, hosting social events, and introducing tenants to each other
M: creating value for the startups through synergies, knowledge sharing, and new relationships
O: leading to a larger and thriving internal network

7. Cognitive activities

From both the theoretical and empirical analysis, it was found that the incubator should perform cognitive activities. The cognitive activities can draw on the belief that the EE exists and give the feeling that the participants of the EE are actually part of the ecosystem. This can help promoting the EE outside and inside the community (Roundy & Fayard, 2020). Based on this, the following design principle outlines the importance of executing cognitive activities.

C: An incubator that wants to activate its EE,
A: the incubator should execute cognitive activities by promoting the EE and give the feeling to participants that they are part of the community
M: to create the belief that the EE exists and that actors are part of the community
O: leading to decreased search costs in the EE.

8. Social activities

From both the theoretical and empirical analysis, it was found that the incubator should perform social activities. The social activities identify who needs to be included and helps to create awareness between ecosystem actors (Roundy & Fayard, 2020). This can help making the EE denser and actors' willingness to share information and resources, helping to foster information and resource exchange, increasing community awareness (Roundy & Fayard, 2020; Stam & Spigel, 2016; Wickizer et al., 1993). Based on this, the following design principle is focused on performing social activities.

C: An incubator that wants to activate its EE,
A: the incubator should perform social activities by coordinate the right match between startups and ecosystem actors
M: creating denser networks that foster information exchange
O: leading to decreased search costs in the EE.

9. Structural activities

From both the theoretical and empirical analysis, it was found that the incubator should perform structural activities. The structural activities refer to deciding how resources should be allocated efficiently in the EE and assigning roles and responsibilities to actors (Colombo et al., 2019). This helps in identifying the resources and actors knowing what to do, improving the structure and coordination of the EE, leading to better connection between entrepreneurs and resources (Isenberg, 2010; Roundy & Fayard, 2020; Spigel, 2016). Based on this, the following design principle is focused on performing structural activities.

C: An incubator that wants to activate its EE,
A: the incubator should perform structural activities by deciding the roles of the participants and how resources are allocated
M: creating structure and coordination thereby better connecting entrepreneurs and resources
O: leading to decreased search costs in the EE.

10. Connecting to the **entrepreneurial ecosystem**

In order to connect the startups to the EE, it is important that the incubator act as a mediator between the startup and the ecosystem (van Rijsnoever, 2020, Bergek & Normann, 2008). The incubator can connect startups sufficiently by first connecting the startup and ecosystem actor in the meeting period. Then facilitate the mating period by dealmaking, which the incubator can do by advising startups or providing legitimacy to startups (McAdam & Marlow, 2006). Startups often have an inherent risky nature which can pose a threath to financial providers seeking to invest in startups. When an incubator provides legitimacy to startups this can signal capital providers that the startup is credible.

C: An incubator that wants to activate its EE,
A: the incubator should connect and mediate between the startup and the ecosystem actor
M: to facilitate the meeting and mating period
O: enhancing the process of connection and increasing the chance of startup and ecosystem actor getting to the honeymoon period.

Conceptual framework for activating entrepreneurial ecosystems

The design principles are constructed in such a way that some design principles are related to the same outcome, or the outcome of one design principle is an intervention of another design principle. In order to prevent lack of clarity, the design principles are visualized in an overview. For a larger overview of the figure see appendix N.
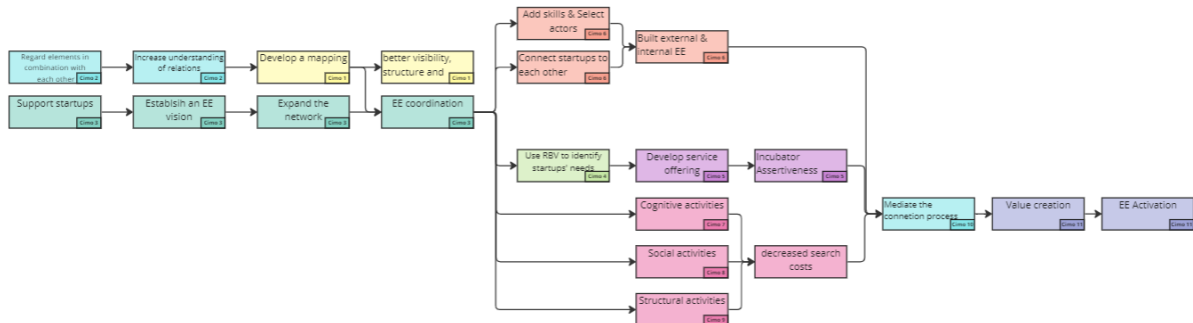

Figure 14 - Framework from design principles

5.2 Design Requirements

In this section the design requirements are listed. The design requirements present the practical demands and restriction of the solution design. The design requirements are developed based on the theoretical and empirical analysis and one interview with a business developer of The Gate. The interview had only a few open-ended questions with the four types of requirements listed as listed by van Aken et al., (2012). The main objective of the interview is to identify what is important for the solution to do and also what not to do. The solution design should support The Gate with activating the EE. From the literature review it was found that for activating the EE having a map of the ecosystem is important, so the solution design should also incorporate a mapping of the EE. Furthermore, it was also found that the EE coordinator should perform three activities in order to create value for the EE, which is also important when activating the EE.

Following the Design Science Methodology, the requirements are categorized into functional requirements, user requirements, boundary conditions, and design restrictions (van Aken, 2004). The requirements are developed based on the empirical analysis, found in appendix D. The functional requirements describe what the solution should do so that The Gate knows what to do so that the EE is activated. The user requirements are focused on the user of the solution and are developed based on informal discussions with The Gate's business developers and other employees. The boundary conditions are requirements that the solution design should adhere to, and these are based on informal meetings with The Gate's business developers and other employees. Finally, the design restrictions are the requirements that present the solution spaces as stated by The Gate, which means that the solution design should be supported by The Gate and its partners.

Functional requirements
F1) The design should show how The Gate can map its EE
F2) The design should incorporate every type of stakeholder and the relation between various stakeholders
F3) The design should describe the roles and activities every EE actor is performing
F4) The design incorporates the different type of startups according to the different themes of the TU/e faculty
F5) The design should describe how The Gate should perform the ecosystem coordination activities
F6) The design should decrease the search cost for startups in the EE
F7) The design should describe how The Gate can connect the startups to the entrepreneurial ecosystem
F8) The design should help in activating the EE

User Requirements

U1) The design should be clearly described and understandable by all users
U2) The design should be easy to use so that The Gate can explain it to startups
U3) The potential value of the design should be explained so that the user embraces the design

Boundary Conditions

B1) The design should be compatible for future developments in The Gate's EE
B2) The design should only include elements from the Brainport EE
B3) The design should be supportive to the Gate's business activities

Design Restrictions

D1) The design should be supported by the business developers
D2) The design should be supported by the five founders of The Gate

6. Solution Design

This chapter elaborates on the solution design of this thesis, which is based on the synthesis of theory and practice. In this part, the fourth sub-research question, "How should the framework of The Gate look like it can activate its EE?" is answered. The design principles formulated in chapter 5.1 will be used as input for the solution design presented in this chapter. A focus group and expert interviews will evaluate the solution design. The results of the evaluation are also presented in this chapter.

6.1 Alternative solution concepts

In this section, three different solution concepts are developed and presented. The three solutions are based on the design principles formulated in chapter 5. The two main processes for activating an EE are reflected in the design principles, the EE mapping and the value creation part. Therefore, all three alternative solution designs will incorporate both components in some way. Because the EE mapping is the foundation for the value creation part, which is reflected by design principle one, it is chosen to take this part as a starting point for all three solutions.

Solution design 1 – Activation Framework

The first solution is mapping the EE and a framework for The Gate to activate it by creating value for the startups and their EE. The EE mapping will be explained by the five-step process as explained in the empirical analysis. The mapping will be the foundation from which The Gate can depart to create value, as described in design principle 1. The framework for value creation will have specific guidelines on how The Gate can decrease search costs for the EE by performing the three activities – cognitive – social – structural – which will create value for the ecosystem, which can, in turn, help activate the EE, as described in design principle 7, 8 and 9. Then, the framework will explain how to connect the startups to the EE (design principle 10) because this will help to activate the EE, as described in design principle 11.

Solution design 2 – supporting the cognitive activity by organizing an event

The second solution will start with the same mapping of the EE according to the five-step process. The mapping will be used as input from which The Gate can depart to develop value for the EE (design principle 1). After mapping the EE, the social activity is chosen to be developed further and put into practice, as described in design principle 8. The social activity is chosen to put into practice because, in the empirical analysis, it was found that the social activity is currently not executed sufficiently, which causes low actor awareness and inhibits the community to become thriving and buzzing. This might disrupt the search costs from decreasing. The social activity is performed by organizing an event for the startups located in the alpha building specifically aimed at increasing the social feelings in the EE. This event will be organized at The Gate, which is located in the alpha building. Every startup would receive an invitation in person by walking by their office and inviting them to the event. The event would have food and beverages, and a presentation by a (motivational) speaker would be given. Also, groups of startups would be made, which force them to cooperate and talk with each other. By this, it is hoped that the social feelings between the startups and The Gate will be increased and that new relationships will be formed. As described in design principle 8, social activities can enable startups to become aware of each other and develop relations, making the EE denser and fostering efficient information exchange. When this activity is performed, the overall process continues by describing how The Gate can perform the structural and cognitive activities (design principles 7 and 9), followed by connecting the startups to the EE (design principle 10).

Solution design 3 – performing The Gate's business activities by assisting to extend the preferred partner network and tapping into the student pool of Brainport

The third solution also starts with mapping the EE based on the five-step process described in the empirical analysis. The mapping will be used as input from which The Gate departs to develop value for the EE (design principle 1). When the mapping is created, this mapping will be used as the foundation to perform the structural activity (design principle 9). This is done by performing The Gate's business activity by resolving two business problems identified in the empirical analysis that disrupt the structural activity. The first business activity is extending the preferred partner network of

The Gate. The empirical analysis found that the preferred partner network was underdeveloped; therefore, some links were missing in the EE. By developing the preferred partner network, the structure of the EE is improved, and The Gate can offer a complete preferred partner network that startups can use. This unburdens startups because they do not have to search for these organizations themselves but can simply use the network of The Gate. This can help decrease search costs and thereby create value for the startups. The other part of the solution is to tap into the student pool of the TU/e by using EuFlex, which is a matchmaker between students and companies in Brainport. Because many startups mentioned having problems finding human capital, EuFlex is contacted to enable startups to use the student pool of EuFlex. Both parts of the solution should create additional value for the startups, which is found to help activate the EE (design principle 11).

6.2 Selection Criteria

In order to choose between the three solution directions, the Simple Additive Weighting Method (SAWM) was used (Afshari et al., 2010). This method helps to make a rational decision between the three solutions. The three solutions are discussed in interviews with three business developers, one startup, and one ecosystem actor. The interview protocol can be found in appendix I. The participants had to rate every solution based on predefined criteria, see table 23. These criteria are based on the requirements formulated in chapter 5.2. The last four criteria, starting from 'total cost to implement the solution,' are not based on the design principles but are also included to make the decision based on the total costs, implementation time, and feasibility because The Gate listed these design criteria as important reasons why an organization would choose to implement a solution or not. Every participant had to rate the three solutions and could assign a number between 1 and 3. The solution with the most points would be selected.

	Solution direction		
Criteria	**Solution 1**	**Solution 2**	**Solution 3**
The design will activate the EE	2	2	2
Ease of use for the startups	2	1	2
Ease of use for business developers	3	3	3
Solution is supported by the business developers	3	3	3
Solution is supported by the five founders of The gate	3	2	3
The design is compatible for future developments	2	2	2
The potential value of the design is clearly explained	3	2	1
Total cost to implement solution	3	2	1
Implementation time	3	2	1
Effectiveness of solution	3	1	1
Feasibility of solution	2	2	1
Results	29	22	20

Table 23 - Selection criteria for solution design

Based on the interviews and the outcome of the SAWM, the first solution, "the activation framework," was chosen. The first solution scored exceptionally high on implementation time, strategic fit, and implementation chance.

6.3 Selected solution design: the activation framework – the first iteration

This section presents the selected solution design, which is the activation framework. The activation framework helps The Gate activate its EE by developing an EE mapping and using it to create value for the startups and ecosystem. The framework represents the different processes that should be performed when activating the EE and can be found in figure 15.

The activation framework is based on design principles. The design principles describe two sequential processes that an incubator should follow when activating its EE. The first process is developing an EE mapping. This process is highlighted in purple in figure 15. This mapping is then used as the foundation to perform the second process, which is creating value for startups. The second process describes four steps that an incubator should follow to create value for the startups. This process is highlighted in blue in figure 15. When properly executed, the created value can activate the EE, attracting other startups and ecosystem actors to the EE.

Developing the EE mapping is a fundamental process (Design principle 1), highlighted in purple in figure 15, and can be used as a starting point for the value creation process. The EE mapping provides an overview for the incubator, startups, and ecosystem actors about the EE's structure, relationships, and capabilities. Following the design principles, fourteen elements were identified as part of The Gate's EE. These elements are not mapped in the framework because this would harm the clarity of the framework, but they will be discussed in this chapter. The circle represents the elements of the EE, and the three smaller circles represent the three attributes the elements are part of.

After the mapping of the EE is developed, the incubator can start to create value for the startups and the EE. This process is highlighted in blue in figure 15. The incubator should start by identifying the needs of the startups because this enables the incubator to tailor its functional support services based on these needs. The incubator should also develop its broad support services to facilitate and strengthen the EE. As found in the theoretical analysis and validated in the empirical analysis, the incubator can develop and strengthen its EE by coordinating the EE, which entails performing three activities: cognitive, social, and structural. Once this is done, the incubator can connect the startups to the EE. The connecting process is done through three stages: meeting, mating, and honeymoon. If the connection is successful, the startup and ecosystem actor lands in the honeymoon period, which results in value creation for both parties. This can help activate the EE because the startup becomes engaged with the ecosystem and attracts new startups and ecosystem actors through success stories, which is highlighted in red in figure 15. This process is visualized by the arrows, representing that existing startups are engaged in the EE, which can attract new startups to the EE that will follow the same process.

The coordination part of the framework is highlighted in green. As described in design principle 3, successful EE is usually coordinated by a participant. Coordination can be done through stakeholder engagement and by developing and strengthening the EE by facilitating new relationships. The coordinator should try to encompass group characteristics and coordinator characteristics which are visualized in figure 15. Besides, the coordinator should also set an ecosystem vision that helps to create uniformity in the community, set a shared agenda, organize reinforcing activities and events, and have continuous communication. In the following three sections, the different parts of the activation framework will be further elaborated in detail.
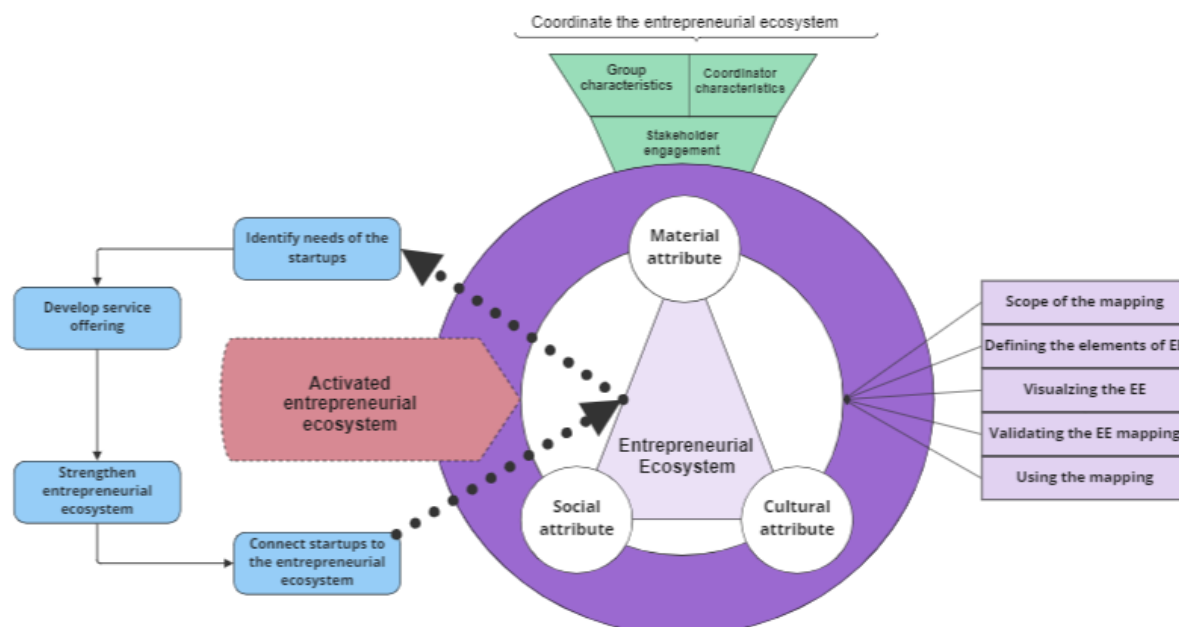

Figure 15 - Framework for activating the entrepreneurial ecosystem

6.3.1 Coordinating the entrepreneurial ecosystem

Coordination is an important characteristic of a successful EE and a critical component of EE functioning (design principle 3). In order to accomplish this, The Gate should try to develop its coordinator and group characteristics. The Gate should try to execute the role of EE coordinator because it is embedded in the EE and closely related to startups. This implies that The Gate should start coordinating the EE by increasing stakeholder engagement. This can be done by performing different activities to strengthen the EE through communication, organizing events, and fostering the attitudes and beliefs of the ecosystem.

The first activity that is important when coordinating the EE is creating a collectivist orientation, meaning that the interests and goals of the EE members are aligned. This can best be accomplished by developing and setting these goals and then clearly communicating this. From the empirical analysis, the three main goals of The Gate are identified, which are: (1) facilitation of the valorization process, (2) creating economic and social regional impact, and (3) stimulating and supporting entrepreneurship. The Gate should communicate these goals to the EE to align their goals. Another way The Gate can do this is by organizing reinforcing activities and events aimed at creating community awareness in the EE.

The second coordinator activity is group identification. This characteristic refers to the perception of oneness with a group. This group characteristic is related to participation and collaboration in the EE. This group characteristic resembles creating ties with the startups. Therefore, The Gate should try to actively develop relationships with the startups. This was something that was found to be lacking in the empirical analysis. Therefore The Gate should actively try to implement this group characteristic by having more personal contact with the startups and proactively engaging with them. This can also give them the feeling that they are part of the EE which can help them engage with the community.

The final coordinator activity is empowering leadership style. This characteristic refers to the ability to communicate to the group that the community can accomplish collective goals by collaborating. This leadership style entails that The Gate stresses that collaboration is the foundation of why the EE works. Another essential aspect that The Gate should resemble is the fact that they know that the EE is larger than The Gate is, which is called humility. One way The Gate can communicate this is by sharing success stories in which multiple ecosystem actors are involved in the EE and simultaneously stressing that this success is due to the collaboration of multiple institutes, not solely by The Gate's efforts.

One important activity that The Gate should always remain focused on is stakeholder engagement. Stakeholder engagement can increase stakeholder participation by involving the startups and ecosystem actors in the EE. Practically, The Gate should set a shared agenda, organize reinforcing activities and events specifically aimed at increasing stakeholder awareness, and continuously communicate. Besides, The Gate should develop and strengthen the EE. This can help The Gate become more integrated into the EE, enabling them to better coordinate the ecosystem. Besides, this can also help The Gate create a successful and interconnected EE, leading to an efficient flow of information and resources. Practically, The Gate should pursue the identification of new resources within the EE, primarily because The Gate is operating in a resource-constrained environment. By performing this activity, The Gate automatically expands the EE by creating new relationships with organizations and startups respectively. Another important aspect of this is that The Gate should always try to create new connections between the ecosystem members because this can increase interconnectivity, which is an important characteristic of EEs.

6.3.2 The entrepreneurial ecosystem mapping

In the literature review, five steps were found that should be performed when creating an entrepreneurial mapping. These steps were validated with an interview with the ecosystems manager of The Gate. Based on this, a five-step approach is a design that should be regarded when creating an EE mapping.

1. Scope of the mapping

In this stage, The Gate should define the scope of the mapping. Which EE will be mapped, and what will be the target population of the EE? Also, the geographical boundaries of an EE are fuzzy, so it is very important to define the boundaries of the EE and where the mapping will end. Otherwise, it is possible to keep including new parts of the EE, which makes it very difficult to map the ecosystem. By setting the scope of the mapping, The Gate can more effectively start the mapping process.

2. Defining the elements present in the entrepreneurial ecosystem

The second stage entails defining the elements in the EE. The Gate should see this as the starting point from which the roles of the elements and the relationships between the elements can be identified. Besides, identifying which actors are present in the EE also helps approach them for data collection about relationships and roles. The elements of The Gate's EE can be found in table 24.

Elements of The Gate's entrepreneurial ecosystem		
Material attributes	**Social attributes**	**Cultural attributes**
1. Government 2. Higher educational institutes 3. Large corporations & SMEs 4. Entrepreneurial support organizations 5. Service providers 6. Leadership 7. Media 8. Experienced entrepreneurs	1. Financial capital 2. Other physical resources 3. Human capital 4. Intellectual property 5. Infrastructure	1. Culture and norms

Table 24 - elements of the entrepreneurial ecosystem

3. Visualizing the entrepreneurial ecosystem

The third step is visualizing the data collected. The Gate should define which model best suits the EE. The data collected about the EE should be represented in a visualization tool. There are many different ways the EE can be visualized. The tool visualization model should be based on the visualization's usability and level of detail.
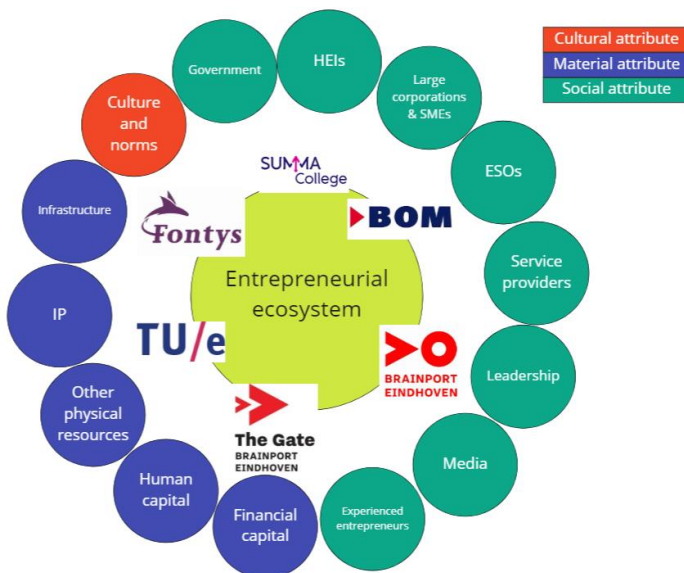
Figure 16 - Visualization of the entrepreneurial ecosystem

4. Validating the entrepreneurial ecosystem mapping

In step four, The Gate should validate the EE mapping by identifying if the mapping is missing certain elements or relationships. This can be done by validating the results with the ecosystem actors, startups, or other elements. Another important point is validating if the mapping is visualizing what it intends to map. In this step, it is also possible to improve the mapping and increase the usability for

the target population. This will also increase the usability of the value-creation process after the mapping is completed.

5. Using the mapping

In the first step, it is defined for what purposes the mapping will be developed. In this step, it might be decided how the mapping can be used in the future. In step five, the way the mapping is used will be defined. The Gate should describe how the mapping is presented to startups and ecosystem actors and identify how it can be most effectively used for the value creation process.

Step	Questions to ask
1. Scope of the mapping	- Which EE will I map? - Where are the exact boundaries of my EE - Who will be my target population? Who will be included or excluded?
2. Defining the elements present in the EE	- Which elements are present in my EE? - How will I approach these elements for data collection? - What are the relationships between these elements?
3. Visualizing the EE	- Which tool or software can I use to visualize the EE? - Which tool is best for visualizing the relationships between the elements? - How can the visualization be most useful for the users? - How much detail should the visualization entail?
4. Validating the EE mapping	- Who will be contacted for validating the results? - What is missing in the entrepreneurial mapping? - What are the strong points? - Does the mapping visualize what it intends to map? - Is the usability sufficient for the users?
5. Using the mapping	- How is the mapping be presented to the target population? - How can the mapping be used? - Is it possible to develop a format of the mapping to use it in other EEs? - Can the mapping be adapted in the future?

Table 25 - the process for mapping the entrepreneurial ecosystem

6.3.3 Value creation process

As described before, after mapping the EE, the incubator can start creating value for the startups. As formulated in the design principles, the incubator should go through a stepwise process that enables the incubator to create value for the startups and the EE. These steps are visualized in figure 17.
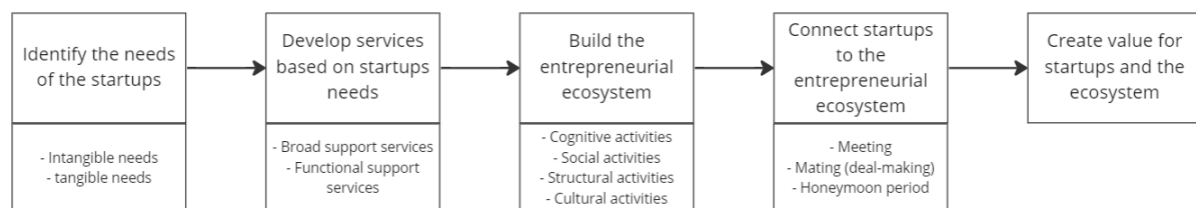
Figure 17 - value creation process

Identify the needs of the startups

In this step, the incubator should identify the startups' needs (Design Principle 4). However, since the startups often cannot identify which resources they are missing, The Gate should take the RBV as a starting point. This means that startups need tangible and intangible resources to become independent firms. The RBV might be an interesting lens for incubators to view the needs of the startups since startups often have an underdeveloped resource base. Therefore, the RBV enables the incubator to identify possible weaknesses of the startups, which the incubator can try to solve. The incubator can provide the resources directly, but it often provides them indirectly by using its network.

In the empirical analysis, besides the needs found by van Weele et al. (2017), two other important needs were identified that an incubator should address: guidance and personal contact. Startups mentioned that they required guidance through their entrepreneurial journey. The guidance resembles

many different aspects. First, the startups required assistance for navigating through the EE. Simply offering a network is not sufficient. Startups want to be connected and supported through this process. Another need that is identified in the empirical analysis is personal contact. Startups require personal contact for psychological counseling or for exchanging ideas. Most entrepreneurs are still young and inexperienced, and managing a startup can be stressful. Therefore, having contact about all aspects of life with experienced individuals can benefit these entrepreneurs. Based on these two insights, the needs of the startups that are identified are presented in table 26.

Startup's needs based on RBV	
Tangible resources	**Intangible resources**
Physical capital	Knowledge
	Social capital
	Legitimacy
Financial capital	Guidance
	Personal contact

Table 26 - startup's needs based on resource-based view

Develop services based on needs of the startup

Once the needs of the startups are defined, the incubator should tailor its services based on the startup's needs (Design principle 4). The incubator can offer two types of services: broad and functional support services. The Gate should offer both types of services to facilitate the startups. The functional support services are services targeted to the startups directly, such as incubation programs and training. The broad support services are more centered on the EE. Both types of services Taking the needs of the startups as a starting point, the services the incubator should offer can be developed accordingly. Also, the services that The Gate offers are presented in the empirical analysis, and it was found that these services addressed most of the startups' needs.

Startups' need	Incubator service offering	Broad or functional support services?
Physical resources	Access to physical resources	Functional support service
Financial capital	Access to financial resources	Functional support service
Knowledge	Business development & Advice	Functional support services
Social capital	Networking & Community building	Broad support service
Legitimacy	Business development & Advice	Functional support services
Guidance	Business development & Advice	Functional support services
Personal contact	Physical co-location	Functional support services

Table 27 - service offering

Currently, The Gate is offering these services based on a demand-driven approach. However, since most startups that are incubated by The Gate are inexperienced and first-time entrepreneurs, The Gate should switch to a more assertive approach. This approach can increase the use of The Gate's support and resources by the startups, which can increase The Gate's performance.

This assertive approach can be achieved by setting regular meetings with fixed milestones in every meeting, which has two benefits (Design principle 5). First, the startup must maintain regular contact with The Gate and build a relationship, which can also decrease the barrier for asking explicit resources and support. Second, the meeting creates a moment in which the startup can ask for resources and support, but also for the business developer to identify specific needs or problems, which can improve the service offering and the use of these services.

Another way in which The Gate can improve the use of its services is by requiring mandatory participation from the startups. Once startups enter the program, they should be forced to attend training, meetings, and events, which can benefit the startups directly but can also benefit the whole startup community. Especially the events are deemed to have a low attendance rate which has a detrimental effect on the vividness of the community. By making attendance mandatory for events,

the events could be more vivid, and startups will make relations with each other, which can also benefit the community.

Decreasing search costs in the entrepreneurial ecosystem

Based on the design principles, the incubator should perform three activities to strengthen the EE, which can decrease the search costs in the EE. These activities are social, cognitive, and structural activities. For the incubator to execute these activities, concrete interventions are identified for every activity.

Cognitive activities
• Draw attention to organizations outside the EE • Develop a sustainable relation with startups • Create the shared belief that the EE exists • Give the feeling to the startups that they belong to the EE • Involve the startups in the community • Share success stories • Have a good reputation in the EE
Social activities
• Search for new startups • Introducing new startups to other tenants in the building • Introduce new employees of The Gate to the startups • Organize events in the EE that aim to increase awareness • Be proactive in the community by asking • Facilitate contact between the startups • Being visible in the EE • Create groups of startups based on technical domain
Structural Activities
• Decide how resources should be allocated efficiently in the EE • Decide which actors are in charge of organizing, managing and controlling the process of resource distribution • Identify missing links and address these in the EE • Develop the preferred partner network • Create a uniform way of working in the EE • Become more integrated in the EE • Align the goals between the startups and participants • Set an ecosystem vision • Give advice to startups • Identify what startups need from the EE

Table 28 - activities for decreasing search costs

Cognitive activities

Executing cognitive activities concerns promote the EE outside and inside the community. According to design principle 7, cognitive activities are essential for creating the belief that the EE exists and that the startups and ecosystems are part of it. The first part of the cognitive activity is creating the belief that the EE exists. The incubator can do this by improving the reputation of the EE by signaling success. By sharing success stories, a lighthouse effect can occur, which can signal to startups and ecosystem actors outside the community that the EE is capable of sufficiently supporting the entrepreneurial journey of startups toward independent firms, which can create a strong signal which will promote the EE in the internal and external network.

The other part of the cognitive activity is that the incubator should give the feeling to startups that they are part of the EE. The incubator can achieve this by developing a sustainable relationship with the startups and involving the startup in the community. Business developers should be matched with startups and responsible for developing relationships with them. Spontaneous talks by simply walking by the startup's office can foster the relationship, which can signal to the startups that they are part of the EE, which is sometimes not the case.

If both are appropriately executed, the cognitive activity can attract startups and organizations to the EE and commit existing actors to participate in the EE, which can increase the density of the EE, which is an essential characteristic of EE success.

Social activities

Performing social activities concerns creating awareness between the EE members and ensuring that the actors are willing to share resources and information with the community, which is in line with design principle 8. To properly execute this activity, the incubator should be deeply embedded in the EE and act as a network facilitator. By introducing startups to each other and enabling them to create and maintain relations, the actors become aware of each other (design principle 6B). The incubator can do this by organizing events, having a physical co-location, creating a WhatsApp group, and creating a more vivid community. Also, The Gate should try to make the alpha building more open, enhancing personal contact. Currently, the building has only closed offices and The Gate is located on the second floor which harms the connectivity in the building.

The Gate itself should be more visible in the EE. The Gate should act more as a coordinator of the EE than as an incubator (design principle 3). First, The Gate should also proactively engage with startups by initiating contact regularly, which can be done by simply walking by the startup's office and having an informal conversation. Second, the communication channels of The Gate should be updated. Currently, The Gate has no official website, limiting its online visibility. Furthermore, The Gate is not maintaining a shared agenda with the startups, which limits their ability to coordinate and organize certain events. Effectively communicating with the startups can enhance the social activities The Gate should perform.

Another way The Gate could enhance the social aspect of the startups is by creating groups of startups based on their technical domain. The Gate is dividing business developers based on the technical domain. This creates the possibility of creating groups of startups based on their technical domain. By creating a WhatsApp group and facilitating a meeting with the startups, they could be introduced to each other, thereby helping them to learn from each other because sometimes entrepreneurs are the most valuable source of information for entrepreneurs (Spigel, 2016).

Social activities are important for creating more denser communities that foster the flow of information in the EE. By actively facilitating new relationships, the distance between members of the EE becomes smaller, improving the flow of information and resources, which is vital because community awareness is an essential characteristic of activated networks (Wickizer et al., 1993).

Structural activities

Performing structural activities refers to deciding how resources will be allocated efficiently in the EE and assigning the roles and responsibilities of the actors, followed by design principle 9. An EE mapping will make this activity easier to execute (design principle 1). In this step, the mapped EE should be thoroughly analyzed: where can resources be found, the different roles of the ecosystem actors, and how to align the goals of every ecosystem member are questions that should be addressed.

In doing so, first, some weaknesses in the EE should be addressed. First, many individual ESOs want a piece of the pie, increasing competition for the limited available public funding, negatively affecting entrepreneurial cooperation. Some initiatives are set in place, but The Gate should act as the coordinator of the EE that can assign roles to every element. Second, the preferred partner network remains underdeveloped, leading startups to search for partners independently, which is time-consuming and stressful. The Gate should talk with startups about which partners they are currently missing and develop the preferred partner network accordingly. For the structural activities, it is critical to ensure cooperation between ecosystem actors to support startups most efficiently.

The structural activities are essential for connecting startups effectively to the EE. The EE becomes more structured because actors have a clear responsibility and startups know where to find specific resources. Having an EE mapping is crucial since this improves visibility within the EE which helps decrease the search costs.

Connect startups to the entrepreneurial ecosystem

Once the EE is strengthened, the startups should effectively be connected to the EE. The Gate should coordinate this process by initiating, facilitating, and intermediating the connection process (design principle 10). Connecting the startups to the EE runs through three stages: meeting, mating, and honeymoon. The Gate should proactively facilitate all three stages to increase the chance of successful connection.

Meeting

In this step, The Gate should connect its network to the startup. In the previous section, the incubator has performed cognitive, social, and structural activities, which are important for successfully performing the meeting process. First, the incubator should know what the startups require, when the startups require this, and who in the ecosystem can provide this. To successfully execute this, The Gate should have a well-developed relationship with the startup, know the startup's needs, and have a relationship with the ecosystem actor that can provide this, which will help The Gate to successfully initiate contact between both parties. The Gate can do this by introducing the startup to the ecosystem actor, for example, at The Gate's office, or by informing startup where to go.

Mating

In this phase, the startup and ecosystem actor start developing a relationship. To facilitate this process, The Gate should clearly communicate the potential value for both sides and try to help address potential problems. The Gate should have regular contact with both parties to measure the progress and identify where it can potentially facilitate between them. In a negotiation process, The Gate can act as a dealmaker by advising the startup and helping to interpret contracts or regulations. Another option is that The Gate provides legitimacy to the startups, which can help overcome certain risks that the startups may have. By giving every startup the stamp that it is incubated by The Gate, and the ecosystem actors recognize this as a legitimate signal that the startup is sufficiently developed, the stamp can remove specific trust issues.

Honeymoon

The final phase means that the startup and ecosystem actors are successfully connected. This means, for example, that a venture capitalist has decided to invest in a startup. The Gate remains in contact with both parties but stops as a facilitator. However, because the startups and the ecosystem actor are successfully connected, The Gate should communicate this story to others in the EE, which improves the reputation of the EE and The Gate, which can attract others to the community and The Gate.

6.3.4 Final solution design: Roadmap for activating the entrepreneurial ecosystem – the second iteration

The final solution design, as described above, was presented to two business developers of The Gate. During these interviews, it was explained how the solution would work, followed by some open-ended questions about the useability of The Gate. The framework was presented, and every step of the value-creation process was elaborated. What came forward was the fact that the solution lacked practicality. The solution design is too prescriptive and not very vivid or practical. Another problem with the solution design is that different types of startups are not considered. In order to overcome this problem, the existing solution design is transformed into a roadmap for activating the EE.

As a starting point, the coordination characteristics present an overview of the steps that The Gate should take to activate its EE.
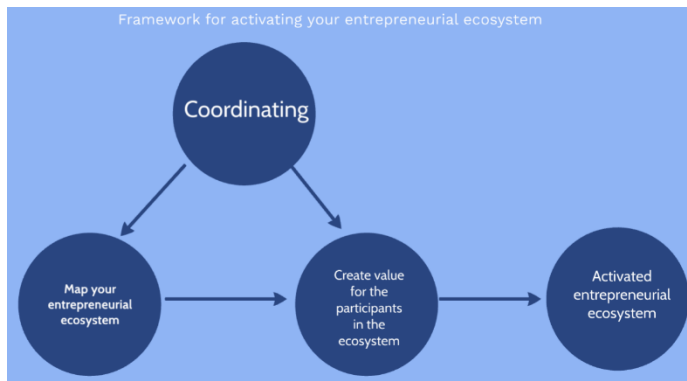
Figure 18 - Roadmap for activating the entrepreneurial ecosystem

This slide can be seen as the starting point from which The Gate should depart. First, The Gate should start with the coordinating activities listed in figure 19. The Gate should take on the role of coordinator in the EE because it is embedded in the network and closely located to the startups. This gives them an excellent position to become the coordinator of the EE.
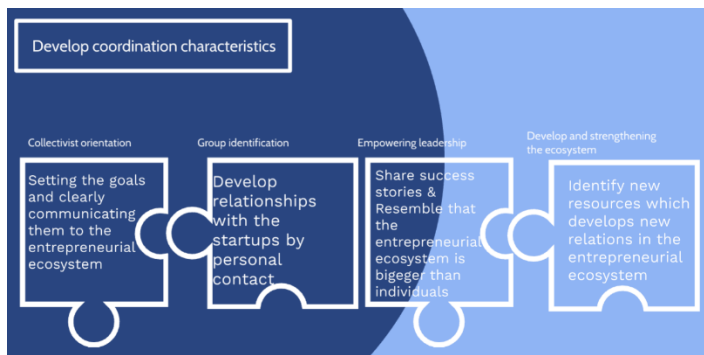
Figure 19 - Coordination characteristics

After the coordination part, the slides return to the starting point from which the process starts at the 'map your EE.' Then the process of creating the EE mapping is elaborated. This process is started by choosing the type of startup: Faculty startup, student startup, or Brainport startup, see figure 20. However, during the empirical analysis, it became clear that The Gate is not yet targeting and supporting Brainport startups in such a way as the TU/e startups. Because some processes and resources are not yet in place to support this group of startups, it is chosen not to incorporate them into the roadmap.

The different types of startups are included so the user can map its EE more precisely without incorporating the whole EE. The steps after choosing the startups are indeed the same, but the results will be different because startups will have different types of VCs or housing options depending on their life phase or technical domain.

Figure 20 - Types of startups

In case there is dealt with a faculty startup, another slide is shown with the different technical domains for the business developers of The Gate, see figure 21. This is done because it was found that the EE can be different between technical domains, and mapping all participants could become unclear for the users.
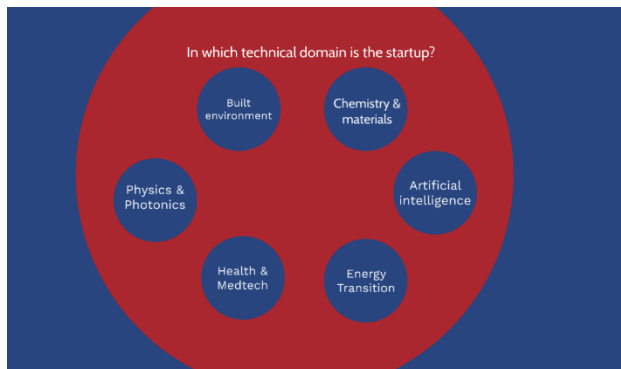
Figure 21 - technical domain of startups

Once the technical domain is chosen, the following slides show the process of developing the mapping. This process is identical to the process in iteration 1, so this will not be elaborated in detail. An overview of these slides can be found in appendix O**.**
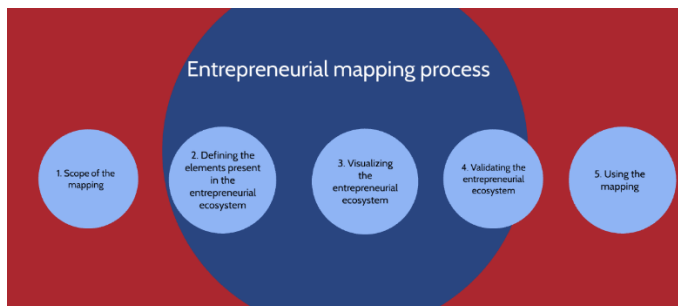
Figure 22 - Entrepreneurial mapping process

After this process is completed, the EE mapping is created. Then, the mapping can be used as the foundation for the value-creation process. The process goes back to slide one where the 'create value for the participants in the ecosystem' process starts. Then the overview of the value creation process is provided, see Figure 23**.** Because this process is already elaborated on in the previous section, this part will not be further discussed.
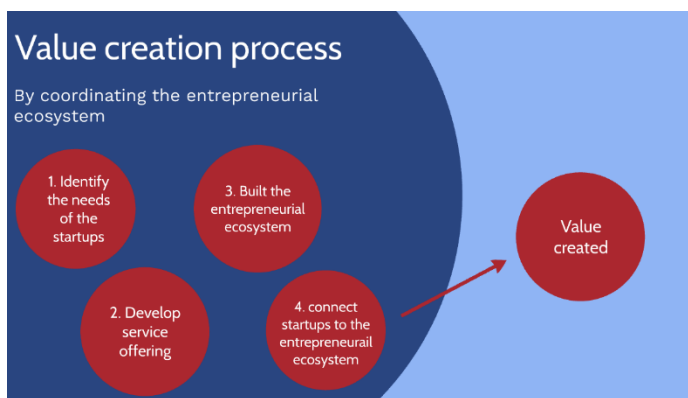
Figure 23 - value creation process

After the value creation process is completed, value is created for the stakeholders of the EE. Based on the scope of this research, the types of stakeholders that benefit from the activation framework: startups, ecosystem actors, the incubator, and the EE itself. The value reaped is outlined per stakeholder type, see figure 24.
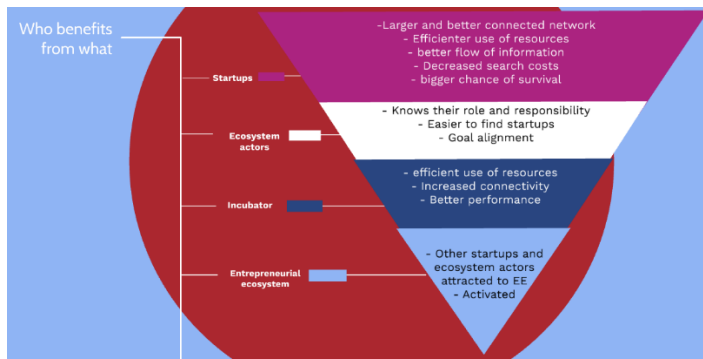
Figure 24 - value creation per stakeholder types

When the ecosystem actors and startups benefit from the EE, the EE can be activated. In design principle 10, it was described that to engage and attract startups and ecosystem actors to the EE, they must benefit from the value created by the EE. By following this process, the incubator can create value for the startup and ecosystem actors, thereby activating its EE.

The activation roadmap represents a continuous process that starts when the EE is activated. Because a thriving EE can attract new entrants to the community, The Gate should update the ecosystem mapping based on the developments that reshape the EE. Besides, new startups also mean that The Gate should reconsider their needs and connect them to the EE. Therefore, the roadmap should be considered a continuous process without a final destination.

6.4 Evaluation

In this section the results of the evaluation of the solution design will be discussed. In this section the focus group and the semi-structured interviews that are used for the evaluation are presented. This is followed by reflecting on the design principles and requirements.

6.4.1 Evaluation of Solution design

In this section, the results of the evaluation of the solution design will be discussed. In this section, the focus group and the semi-structured interviews used for the evaluation are presented, followed by a reflection on the design principles and requirements.

The evaluation of the solution design was initially planned with three business developers, one ecosystem actor, and one startup. In order to evaluate the designed solution from the three perspectives that are part of an EE, a focus group was initially planned to use. In a focus group, it is possible to include different types of users to gather insights from different perspectives. However, planning difficulties made it impossible to execute the focus group as initially planned. Therefore, the focus group was divided into a focus group with two representatives from one startup and two representatives from one ecosystem actor, presented in appendix J. With the business developers, two separate meetings were held where the solution design was presented and evaluated, presented in appendix J.

Solution evaluation – focus group

The focus group was held with four individuals, two from a startup and two from an ecosystem actor. In general, the participants liked the structure of the roadmap and acknowledged the potential benefits of the solution to the EE and the startups. The startups and ecosystem actors both think that the solution can work and that they can have benefits for them. To illustrate this, one quote from an ecosystem actor that participated in the focus group is presented:

"I agree that having a mapping of the network can bring structure and presents the actors of the network clearly. This can certainly serve as a starting point to better use the network."

The participants also agreed that the roadmap could create value for the startups and the EE by decreasing search costs. This value can also attract startups to an EE, as is illustrated by a quote from the startup:

"One of the reasons I would participate in this community is to benefit from the value I would not have elsewhere."

However, some feedback points for the solution were identified. These feedback points are reflected upon and explained how to address this.

Feedback point 1: What do you mean by activating? It is not clear from the roadmap.

This was a valid point since this was not addressed in the roadmap. In order to better clarify to the users what is meant by activating the EE, the definition used in this thesis is also presented in the framework, see figure 25.

Feedback point 2: Why is the EE activated? I do not understand why the roadmap activates the EE.

The participant understandably did not know how the roadmap could create an activated EE. Since communicating the value of the roadmap is important for the acceptance and adoption of the solution, it is chosen to explain better how the roadmap will activate the EE by providing the three main reasons. This is also added to the extra slide, which is called 'activated EE', see figure 25.
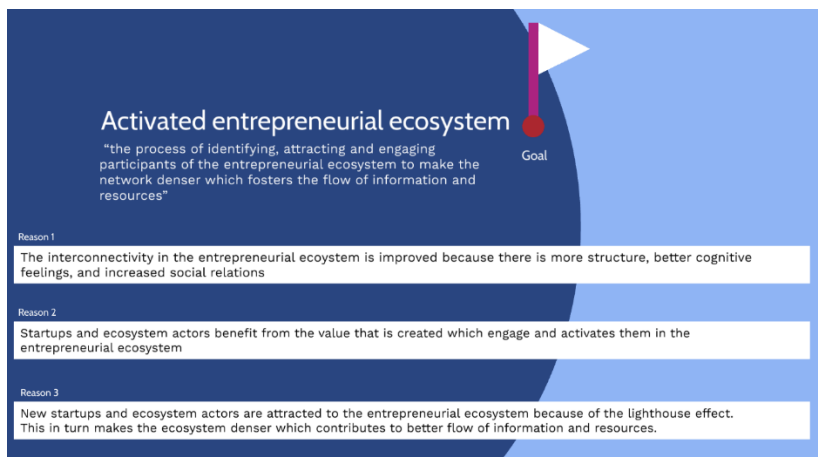
Figure 25 - Activated entrepreneurial ecosystem

Feedback point 3: is the roadmap also usable for someone who is not an incubator? I think that the roadmap is only designed from the perspective of an incubator, so I – an ecosystem actor - can probably not use the solution to create value for my ecosystem.

This feedback refers to one of the limitations of this framework. The solution is primarily designed within the scope of an incubator and, therefore most likely not applicable for an ecosystem actor. That does not necessarily say that the solution is useless for an ecosystem actor. Especially the part of the EE mapping is applicable for an ecosystem actor. However, the value creation part is more focused on coordination which is more applicable to an incubator than other actors. Other research could try to make the solution more useful for other types of ecosystem actors, but that is not the scope of this research.

Feedback point 4: What is precisely the value that is created? Is the value measurable and how exactly can I use this value as a startup?

This point shows a potential shortcoming of the solution design. This research has not investigated the value from a specific monetary point but primarily by describing the potential value. From a practical point of view, the value might be ambiguous, and the exact monetary value is not clear and will not be examined in this research due to time constraints. Thus, the exact value in measurable units is out of the scope of this research but can be a valuable point for future research to investigate.

Solution evaluation – interviews business developers

Because the focus group was not held with employees of The Gate, it was chosen to hold two additional semi-structured interviews to incorporate this perspective in the evaluation. In order to increase generalizability, it was chosen to have the same setup as in the focus group. Therefore, the protocol is the same as in the focus group and can be found in appendix J. In general, the participants were optimistic about the solution and thought the solution could help The Gate activate its EE. The participants also recognized the useability of the solution design. However, as in the focus group, some feedback was provided, which are summarized in feedback points.

Feedback point 1: After choosing a type of startups, the roadmap is similar for all types of startups. Is there a point in the solution to choose between types of startups?

The steps after choosing the startups are indeed the same, but the results will be different because startups will have different types of VCs or housing options depending on their life phase or technical domain. In order to address this point better, this explanation is added to the solution description in iteration 2. The different types of startups are included so the user can map its EE more precisely without incorporating the whole EE.

Feedback point 2: The mapping and the value creation process involve different steps. However, it is unclear to me when to move from one step to another.

This is a valid feedback point because this is not addressed in the solution design. Setting milestones to be reached when completing a particular step would increase the implementation of the solution. However, it is chosen not to incorporate this in the final solution design because of time constraints. Therefore, it would be best to move from one step to another if the user thinks the step is executed correctly.

Feedback point 3: Can we measure the impact of the solution? Do you have metrics to support your solution?

This feedback point is already addressed in the feedback points of the focus group.

Feedback point 4: When is the EE activated? Is there a hard line when it is activated?

This feedback point is already addressed in the feedback points of the focus group.

Feedback point 5: It is not completely clear when the solution ends. When the EE is activated, what should be done then?

The activation roadmap represents a continuous process that restarts when the EE is activated. Because a successful EE can attract new entrants to the community, The Gate should update the ecosystem mapping based on the developments that reshape the EE. Besides, new startups also mean that The Gate should reconsider their needs and connect them to the EE. Therefore, the roadmap should be considered a continuous process without a final destination. In order to make this clear, this explanation is added to the explanatory text in iteration 2.

6.4.2 Evaluation of design principles and requirements

The solution design was based on the design principles and requirements. The following section will evaluate the extent to which the solution design adheres to the design principles and requirements. The evaluation is based on the outcomes of the focus group and the two semi-structured interviews.

Design principles

Design principle 1 is based on EE mapping which can create structure in the community. This design principle is indeed reflected in the solution design and supported by the focus group's outcomes, which was illustrated by the quote presented in section 6.4.1:

> "*I agree that having a mapping of the network can bring structure and presents the actors of the network clearly. This can certainly serve as a starting point to better use the network.*"

Design principle 2 covered the interaction between the elements of an EE. There was no support found for this design principle in the focus group and in the semi-structured interviews. Reflecting on

the final solution design, it can be concluded that this design principle is not implemented in the solution.

Design principle 3 refers to coordinating the EE. Support was found in the semi-structured interviews in which the importance of coordination in an EE is acknowledged. The solution design also implemented this design principle, which is found to contribute to the activation process.

> *"Coordination in ecosystems is very important. I think that we should put more emphasis on coordinating the ecosystem because it is so important when using and connecting a network"*

Design principle 4 refers to identifying the needs of the startups in order to develop its service offering. This design principle was supported in the focus group and the semi-structured interviews. The startup acknowledged that it is possible that they cannot identify the resources they are missing and that inexperienced entrepreneurs may be hesitant to ask for things they need. The RBV was found to be a starting point for identifying the needs of the startups.

Design principle 5 refers to an incubator developing a broad and functional service offering and ensuring that startups use these services by being assertive. Interestingly, mixed results were found for this design principle. In the focus group, incubator assertiveness was stated as too dominant and that this could demotivate startups. In the semi-structured interview, it was supported that incubator assertiveness could help in better facilitating startups. Therefore, this design principle is partially supported.

Design principle 6 refers to network building by focusing on the internal and external network. Both in the focus group and the semi-structured interviews, no support was found for this design principle. Reflecting on this design principle, it might be concluded that this design principle is not sufficiently implemented in the solution design and that building the internal and external network is not addressed by the solution design.

Design principles 7, 8, and 9 refer to the cognitive, social, and structural activities that help decrease the search costs in the EE. Support was found for all three design principles because the three activities can lead to decreased search costs, which is illustrated by a quote:

> *"I can follow the logic that the outcomes of the three activities will lead to decreased search costs"*

Design principle 10 refers to connecting startups to the EE. In the evaluation, it was acknowledged that connecting the startups to the EE is essential to facilitate the startups and enable them to benefit from the community. This design principle was also sufficiently implemented in the solution design. Therefore, design principle 10 was supported.

Design principle 11 refers to the necessity of creating value in order to activate the EE. Although this design principle was supported by the focus group and semi-structured interviews, especially during the focus group, the meaning of activating and the exact value of the roadmap were still unclear. This feedback point was addressed by adding new slides to the roadmap to better explain the activation part. Therefore, support was found for design principle 11.

Design requirements

In table 29 the evaluation of the design requirements are presented. The solution is evaluated based on the requirements that were developed in chapter 5.

Requirement	Justified	Reason
F1	✓	Five-step process explains how The Gate can map its EE
F2	**X**	The relation between ecosystem actors is not clearly explained in the solution
F3	**X**	The roles and activities of every ecosystem actor is not clearly explained in the solution
F4	✓	The different types of startups and the different themes of the TU/e faculty are incorporated in the solution
F5	✓	The coordination activities are explained
F6	✓	The design explains how the search costs can be decreased by performing the three activities
F7	✓	The connection process is explained in the solution
F8	✓	From the evaluation it was concluded that the design indeed helps in activating the EE
U1	✓	In the evaluation the solution was described as clearly and understandable
U2	✓	In the evaluation the solution was found to be easy to use
U3	✓	From the evaluation it was found that the potential value is sufficiently explained, however, the exact value that is generated is not explained because it is not in the scope of this research
B1	✓	The solution is found to be adaptable to future developments of The Gate and its EE
B2	✓	The design only included elements from the Brainport EE
B3	✓	From the evaluation it was concluded that the solution supports The Gate's business activities
D1	✓	From the evaluation it was concluded that the solution is supported by The Gate's business developers
D2	/	This requirement was not tested because the solution is not evaluated with the five founders of The Gate

Table 29 - Reflection on design requirements

7. Discussion and Conclusion

This chapter concludes the research investigating how an incubator can activate its EE by creating value. First, the research question is answered, followed by the theoretical and practical implications. Finally, the limitations and recommendations are presented.

7.1 Answer the research question

Activating the EE refers to "the process of identifying, attracting and engaging participants to the EE to make the network denser, which fosters the flow of information and resources." The Gate aims to make more efficient use of the EE for facilitating startups. In order to do this, The Gate wants to activate its EE. Therefore, the problem identified in this research is that it is not clear how an incubator can activate its EE to facilitate startups better. To address this problem, this research started with the research question, "How can an incubator activate its EE by creating value for startups?" This research question is answered by taking a design science approach and formulating four sub-research questions, which will be answered in this paragraph.

1. *How are entrepreneurial ecosystems characterized?*

Within the ecosystem literature, two groups can be distinguished: ecosystem-as-structure and ecosystem-as-affiliation (Adner, 2017). EEs belong to the ecosystem-as-affiliation part of the literature. These ecosystems are characterized by access and openness towards actors and try to enhance continuous interaction between actors in the EE. The success of the EE is typically established by attracting more actors to the EE. However, attracting many actors to an EE can result in different interests and objectives, disrupting the ecosystem's success (Roundy, 2021). Therefore, successful EEs are usually coordinated by actors embedded in the EE. Coordination in the EE requires stakeholder engagement (DP3). Because many different startups and ecosystem actors are active in the EE, a coordinator should focus on creating a uniform identity and goal. Certain activities can help in achieving stakeholder engagement. These activities can be divided into group and coordinator characteristics (Bischoff et al., 2018; Roundy, 2020). The coordinator's characteristics focus on collectivist orientation, group identification, and empowering leadership style. The group characteristics focus on the goal alignment between the participants. Furthermore, coordination focus on increasing interconnectedness between participants and motivating them (Roundy, 2020; Spigel, 2016). An EE can be coordinated by expanding and strengthening the network, making deliberate connections between and outside the ecosystem, and searching for resources (Roundy, 2021). An essential way in which the participants of the EE can be attracted and motivated by activation. Activation within the context of EEs refers to identifying, attracting, and engaging participants to the EE to make the network denser, which fosters the flow of information and resources (Rampersad, 2016; Wickizer et al., 1993). Activating the participants can be done by creating value for the participants and communicating this value to actors in and outside the ecosystem (Cavallo et al., 2021; Nylund et al., 2019). However, to create this value, the coordinator should know the ecosystem in detail, which can be done by creating an EE mapping (Cavallo et al., 2021). The mapping process of Kreuzer et al. (2018) was used as a foundation to develop the EE mapping process. The theoretical analysis identified a five-step process that provides guidance when mapping an EE (Kreuzer et al., 2018). This five-step process was validated in the empirical analysis to arrive at the following process: (1) scope of the mapping, (2) defining the elements present in the EE, (3) visualizing the EE, (4) validating the EE mapping, (5) using the mapping. Following these five steps, the incubator can map the EE and visualize ecosystem actors, resources, and their relationships. These insights serve as the foundation from which The Gate can create value for startups and the EE (Cavallo et al., 2019). When mapping the EE, it is crucial to identify the elements that are present (Erina et al., 2017). In the empirical analysis, two additional elements were found: media and experienced entrepreneurs. Interestingly, existing literature does not address media, while multiple startups mentioned it as a way to increase exposure and new clients. The other element, experienced entrepreneurs, was addressed by existing literature but not in a fragmented way. Foster et al. (2013) categorize experienced entrepreneurs as the support system element, while Spigel (2017) categorizes successful entrepreneurs as part of the role models element. Another article lists experienced entrepreneurs as part of the success stories element (Isenberg & Global, 2011), while Stam & van de Ven (2021) categorize

successful entrepreneurs as part of the network of startups. This implies that existing literature has failed to classify experienced entrepreneurs correctly, making it challenging to identify the role of experienced entrepreneurs in the EE and efficiently use them. In order to address this problem, this research has treated experienced entrepreneurs as a separate element.

2. *What are the barriers and challenges for incubators to activate its entrepreneurial ecosystem?*

In the theoretical analysis, four activities were found essential to decrease the search costs, which can activate the EE: cognitive activities, social activities, structural activities, and cultural activities (Colombo et al., 2019; Roundy & Fayard, 2020). The empirical analysis found that the cultural activity is not as important as the other activity because the interviewees see the culture in an EE as given. Therefore, the coordinator cannot adapt to the culture in an EE quickly and therefore think that the coordinator should give its focus on the other three activities. Based on this, cultural activity is excluded from the solution design. Regarding the other three activities, barriers and challenges were identified that can disrupt the activation process. For the cognitive activities, three barriers were identified (DP6).

Regarding the literature, support was found for two out of three barriers that can disrupt the activation process. The barrier of not developing a relationship will lead to stakeholders' disengagement, thereby violating an essential part of the activation process (Bischoff et al., 2018). The second barrier supported by literature is that startups start operating independently and, therefore, leave the EE. This can have a detrimental effect on the density of the EE and therefore damage the success of the EE (Colombo et al., 2019; Stam & Spigel, 2016). The barrier that startups are not sufficiently helped was not explicitly found in the literature but is an essential barrier in the activation process. This barrier can be caused by not identifying the needs and problems of the startups, which can lead to startups not being sufficiently helped.

For the social activity, two barriers were revealed by the empirical analysis (DP7). The first barrier is the fact that there is low actor and startup awareness. This barrier disrupts the activation process because community awareness is an important mechanism for increasing EE density (Stam & Spigel, 2016; Wickizer et al., 1993). The other barrier, not having a buzzing or thriving community, is not found in the literature but contributes to explaining the barriers of the activation process. As described in the theoretical analysis, dense networks seem to foster the flow of information and resources. This process is vital for activating the EE because it contributes to the general performance of the EE. Therefore, this barrier is essential to resolve when activating the EE.

For the structural activity, two barriers were identified by the empirical analysis (DP8). The first barrier is that there is no coordination in the EE, which is found to be a critical barrier in the activation process. As extensively explained in chapter 3.1.2, coordination can contribute to the success of the EE in several ways (Bischoff et al., 2018; Roundy, 2021). The absence of a coordinator can explain why the EE lacks a shared agenda and exciting activities. Therefore, this barrier can disrupt the activation process. The other barrier is that startups are not explained to the external network. This barrier is also identified as a critical barrier for the activation process. Van Weele et al. (2017) explained that the incubator should facilitate the connection process to increase the chance of successful connections between the startup and ecosystem actors. Not linking the startups to the external network makes it difficult for startups and ecosystem actors to find each other, thereby limiting the usability of the EE in the first place (Roundy & Fayard, 2020).

When trying to activate the EE, the coordinator should identify the potential barriers and challenges that can cause problems. The barriers identified reflect a deeper view of the current activation process not addressed by the literature. By addressing these problems, the activation process can become smoother, but also the EE can be strengthened and expanded because startups and ecosystem actors are better engaged and connected (Bischoff et al., 2018).

3. *How can incubators create value for startups in the* entrepreneurial ecosystem*?*

Creating value for the startups and EE was identified in the theoretical analysis as a fundamental reason why startups and ecosystem actors would locate and participate in an EE, which is found to activate the EE (Nylund et al., 2019; Rampersad, 2016; Tiba et al., 2020). In the empirical analysis,

startups and ecosystem actors acknowledged that value creation is an important reason they would locate and participate in an EE, which is an essential aspect of activating the EE. Based on this perspective, the value creation process was developed.

The value creation process is developed based on theoretical and empirical analysis findings. This process starts by identifying the needs of the startups because an incubator must be able to identify what startups require to create value for them (DP3) (van Weele et al., 2017). When the needs of the startups are identified, the incubator can develop its service offering accordingly (DP4). These services can be categorized into functional and broad support services (Spigel, 2016). The available support services aim to facilitate the startups directly, while the broad support services focus on developing and strengthening the EE. When these services are developed accordingly, the incubator can decrease search costs by coordinating the EE (Colombo, 2019; Roundy & Fayard, 2020). The incubator can do this by performing three activities: cognitive, social, and structural (DP 6, 7, 8). Finally, when these activities are performed, the incubator should try to connect the startup to the EE (DP9) (van Rijnsoever, 2020).

4. How can an incubator design a tool to activate its entrepreneurial ecosystem by creating value for the startups?

The information acquired through the theoretical and empirical analysis was used to develop a solution design. The information obtained was synthesized into design principles. The solution design was developed through two iterations based on the design principles. The solution design entails a roadmap for activating the EE. The roadmap describes how The Gate can start coordinating the EE by explaining the three coordinator and group characteristics and how to create stakeholder engagement (DP3). Another critical activity identified in this research is that The Gate should identify the strengths and weaknesses of the EE and try to leverage its strengths and resolve its weaknesses, thereby continuing the development and expansion of the EE. After explaining how The Gate can coordinate the EE, the roadmap continues by enabling the user of the roadmap to distinguish between the types of startups, which was identified in the empirical analysis as an important way to use the mapping more effectively. After selecting the type of startups, the roadmap describes the five-step process for mapping the EE. Once this process is completed, the roadmap continues by describing the different processes that are identified for creating value for the EE: (1) identify the needs of the startups, (2) develop the service offering, (3) decrease search costs by performing three activities, and (4) connecting startups to the EE (DP 3, 4, 5). The roadmap explains the theoretical foundation of the processes and how The Gate can practically perform these processes. In addition, after the value creation process, the roadmap shows the specific value that can be generated for the different types

of stakeholders of the EE. Moreover, at the end of the roadmap, it explains why and how the EE is activated to guide the three types of stakeholders to better understand the activation process. When the EE is activated, new entrants will enter the EE, and the whole process will start again.

In conclusion, EEs are a valuable phenomenon that can help startups transition to independent and sustainable organizations. By activating the EE, the incubator can better facilitate startups in this transition, thereby improving its and the EE's performance. By investigating how EEs are characterized, identifying barriers and challenges to activate the EE, and investigating how incubators can create value for startups in the EE, an answer can be given to the main research question of this research:

"*How can an incubator activate its entrepreneurial ecosystem by creating value for startups?"*

Entrepreneurial ecosystems are not a static group of single elements but rather a dynamic network of different actors aiming to support entrepreneurship. The incubator should try to leverage this network by actively attracting and engaging actors, which helps to activate the network, thereby creating a thriving entrepreneurial ecosystem. This research helps incubators activate their entrepreneurial ecosystem by creating a roadmap that shows how an incubator should execute a different process. Through this research, The Gate has the knowledge and processes available to improve its startup's facilitation. The Gate has an exciting future ahead regarding entrepreneurship within a very entrepreneurial region.

7.2 Theoretical contributions

The topic of EEs has been gaining considerable attention lately among researchers, practitioners, and policymakers (Cao & Shi, 2021). This study contributes in several ways to the growing body of literature on EEs. This thesis contributes to the literature in several ways, which this section discusses.

First, this research has addressed a neglected issue within the EE literature, and that is the fact that multiple EEs can exist within a region (de Brito & Leitão, 2021). Research so far has studied EEs by seeing them as one whole region. This research shows that multiple EEs in a region can exist. A distinction on EEs in a region can be made based on the startups' technical domain or life phase. Some ecosystem actors are specialized in a particular technological field or life phase of a startup because this requires different knowledge capabilities and resources (Malecki, 2018). Considering these startups' characteristics, the EE mapping can become more effective and structured because irrelevant elements can be omitted from the mapping.

Another way this research contributes to the existing literature is by investigating how EEs can facilitate startups. Existing research has become redundant by only describing certain elements of an EE without considering how the EE can be leveraged to create value (Cavallo et al., 2019; de Brito & Leitão, 2021; Stam & Spigel, 2017). This research has addressed this issue by developing a value-creation process that leverages the EE to create value for startups and the participants of the EE. By developing a value-creation process, this research extends the model of (Cavallo et al., 2019) with a specific value-creation process for the EE. The developed solution also adds to the growing but still small body of literature on using the EE for value creation.

Third, this research provides more insights into the specific activities an incubator can perform to create value for the startups by decreasing the search costs in the EE (Roundy & Fayard, 2020). By synthesizing the work of Colombo et al. (2019) and Roundy & Fayard (2020), four activities were found that an incubator should perform to decrease search costs. The four activities were partly supported by the findings of the empirical analysis and therefore contribute to the insights of the literature on value creation in the EE. Furthermore, barriers and challenges were identified of the activities in the case company that also contributes to the existing literature by helping to improve the conceptual development of these activities, which is much needed because transaction cost economics is a neglected perspective for value creation in EEs (Roundy & Fayard, 2020). The three activities apply to EEs in particular since, in EEs, the goal is to increase the number of relations and the number of participants, thereby improving the density of the network, which fosters the flow of information, which is the primary mechanism that explains the three activities.

Another theoretical contribution is that this research provides new insights into governance and coordination in the ecosystem-as-affiliation part of the literature (Adner, 2017; Colombo et al., 2019). While research is gradually acknowledging that ecosystem-as-affiliation, which EEs are part of, can be coordinated or governed by individual ecosystem actors, this perspective is still underdeveloped (Colombo, 2019). This research showed that individual actors could try to coordinate and develop the EE by performing deliberate actions that help develop, structure, and expand the network. The presented solution develops a value-creation process that entails shaping the EE that leverages its strengths and resolves its weaknesses, which is in line with other EE coordination theories that highlight the EE's continued development (Roundy, 2021).

Fifth, this research expands the literature on the role of an incubator in an EE. Existing research has mainly focused on the role of incubators as support organizations in the EE by describing their functions and services (Spigel, 2016). While this research also takes the functions and services as a starting point for investigating the incubator in an EE context, it also takes a more holistic approach by investigating how incubators can become coordinators of an EE by providing resources and support to the startups and EE, which fills in an important gap identified by Spigel (2016) that calls for a more holistic perspective on the role of the EE. Furthermore, the solution also shows how incubators can create value in the EE by following the value-creation process. This study extends the current understanding of the incubator by exploring how an individual actor can better use the

ecosystem around them, which is much needed because existing research has largely ignored how individual actors behave and create value in the EE (Tabas et al., 2020).

Finally, this research provides insights into the mechanisms that activate an EE. The process of activation within the context of an EE is an underdeveloped theme within the ecosystem literature. Therefore, no studies to date have focused on the drivers behind EE activation, while activation is acknowledged to improve the interconnectedness of a community and thereby improve the flow of information and resources (Roundy & Fayard, 2020; Stam & Spigel, 2016; Wickizer et al., 1993). This study contributes to the literature on activating EEs by creating a solution that links value creation to activation. Therefore, this study fills in an important gap by yielding new insights into how EEs can be used and activated. One example of value creation that leads to activation is a connection process facilitated by an incubator that links the startup to the EE and communicates the value to both stakeholders, thereby inclined to commit themselves to the EE. By clearly communicating this success, other startups and organizations can be attracted to EE, which is identified as a critical component in EE activation. This is also in line with other research that stresses the importance of an EE to attract new entrants to the community (Rampersad, 2016).

7.3 Practical contributions

This research has used a practical problem of The Gate to investigate and design a solution to solve this problem. The design solution is a roadmap for activating the EE. This section presents the practical contribution of this thesis and describes how The Gate can implement the solution.

This study represents a shift in how EEs should be treated by presenting a roadmap that uses the EE to create value and facilitate startups. Currently, The Gate sees the EE as static and is not actively trying to develop and use the EE. Furthermore, The Gate does not see the EE as a potential competitive advantage, thereby gaining a preference from startups when choosing The Gate as an incubator. When implementing the solution, The Gate should try to shift its perspective on the EE by viewing the EE as a dynamic system that can be developed and used as a capability to improve its startup support. Therefore, The Gate should actively promote, develop and expand its EE and incorporate this into its resource base, which it can use for its startup support. This way, it could help leverage the EE within their business activities, improving The Gate's performance.

Second, one potential problem is that the role and relation between the five founders of The Gate are not evident to the startups and ecosystem actors. Furthermore, in the empirical analysis, it became clear that the specific roles and objectives of the founders are still not completely clear, which results in wrong expectations and disrupts the cooperation process. Because the founders have an extensive network, possess valuable resources, and have much knowledge about startup support, the founders are valuable to include in the value-creation process. Furthermore, by clearly communicating the involvement of other organizations, The Gate can remove potential trust issues and leverage the capabilities of the other founders, thereby improving startup facilitation. In order to do this, The Gate and the founders should first assign roles and responsibilities to each other and decide how startups can best be supported. The Gate currently sees the EE as a network that startups can use to address specific problems without the intervention of an incubator. This study has emphasized that EEs can, in fact, be coordinated by individual organizations like incubators in order to use them more effectively for facilitating startups. Therefore, The Gate should focus more on ecosystem development and facilitating the process of connecting startups to the EE. Once this is decided, The Gate and its founders should communicate this to the EE.

Another implication for The Gate is that it should transform from an incubator into an EE coordinator. The Gate was recognized as deeply integrated into the EE and simultaneously closely related to the startups, which are important prerequisites for being the EE coordinator. This entails that The Gate strengthens and expands the EE and decides which roles and objectives the ecosystem actors should pursue. However, as found in the empirical analysis, The Gate operates in a power vacuum in which sensitive political issues exist. Therefore, The Gate should start coordinating the EE that is centered around the TU/e startups and adapts their mission and vision by stating that The Gate is the incubator that is focussing on TU/e startups. This mission and vision would be easier accepted by other parties because The Gate is already accepted as the incubator of the TU/e EE, making it easier to coordinate

this. Once The Gate successfully coordinates the TU/e EE, The Gate could slow progress toward other Brainport startups by trying to coordinate this part of the EE in accordance with other important Brainport ecosystem actors and ESOs.

Fourth, an important implication of the value creation process is that The Gate communicates the created value towards actors in and outside the EE. Because actors are aware of the value created, they can be attracted and committed to the EEs and therefore activate the EE. However, in the empirical analysis, some interviewees mentioned that The Gate could not effectively communicate with the EE because it lacks specific communication channels, which would also pose a threat to effectively communicating the created value, which could disrupt the activation process. Therefore, it is strongly advised to The Gate to develop communication channels that enable them to communicate more effectively. Practically, The Gate should try to develop its website, create WhatsApp groups, and create shared online agendas.

Finally, when implementing the solution, The Gate should create a uniform way of working with the value creation process. The roadmap guides the users to progress from one step to another in order to create value. However, when to move from one step to another can leave room for interpretation. Therefore, if The Gate would set fixed milestones for when to progress from one step to another, the uniformity of the outcomes could be increased, thereby improving the understanding and acceptance of the solution.

The solution could be used within the broader context of entrepreneurial ecosystems because the solution is tailored explicitly toward startups. Because startups are the central focus within EEs, the solution might be helpful for other incubators that want to activate their EE. However, when trying to implement the solution in other EEs, it should be taken into account that this solution is developed within a thriving and well-connected EE with abundant resources and actors. The solution might have implications when implementing it in a more resource-constraint context. Taking a broader perspective, it is not easy to use the solution in other types of ecosystems because this solution focuses on startups. In contrast, other ecosystems tend to have a focus on a common offering (Adner, 2017). This limits the generalizability of the solution towards other ecosystems because this solution is specifically aimed at startups and not, as in other ecosystems, to a common offering or economic output.

7.4 Limitations and recommendations for future research

Although this study sets out some interesting findings, this study is not without its limitations. These limitations can serve as avenues for future research. First, this study is conducted within one incubator, which may lead to results applying to the specific context of this case company. Although the research process has tried to increase generalizability by incorporating different types of data and sources, results may be influenced by the context of the case company. The roadmap for activating the EE is usable for a broader view that other incubators can use. Although the specific interventions are tailored to the context of The Gate, future research could use the foundational processes of the solution and validate this in the context of other incubators.

Second, in the evaluation, it became clear that the solution users would like to know when to progress from one step to another. Deciding when to progress from one step to another includes fixed milestones and operationalized metrics that indicate when a particular step is accomplished. However, this was not investigated in this research, so not enough data has been acquired to incorporate this in the solution design. This can have implications for the outcome of the solution because the solution is prone to interpretation which can create different outcomes and thereby limit the generalizability of the solution. This problem can present an exciting avenue for future studies to investigate when to progress from one step to another by setting fixed milestones and creating metrics that indicate when a step is accomplished.

Third, the researcher was responsible for contacting and arranging interviewees for the data sample. Although the participants were selected from the three types of stakeholders listed in the methodology to incorporate different types of perspectives in the data collection, the sample may be prone to the researchers' bias which can have consequences for the internal validity of the outcomes of the

empirical data. Although saturation is achieved based on the interviews, which give confidence to the trustworthiness of the outcomes, more interviews might lead to more substantial outcomes (Van Aken et al., 2012).

Fourth, the methodology describes how the quality of this research is ensured. To ensure reliability, it was mentioned how the data is coded. However, after the coding process was initially completed, the researcher reread the interviews and recorded specific data. This was done because the researcher wanted to obtain more information about coordination in the EE. Although not according to the standardized coding process, the initial codes were untouched. Only some new codes were developed specifically for the coordination part of the thesis. This might have consequences for the reliability, albeit relatively small because it only impacts the coordination codes.

Fifth, the solution design presented in this study identifies the value created in EEs. To extend the solution design, work is needed to identify specific empirical instruments to measure this value. This is a crucial step because this study does not show how the value can be measured and does not present potential metrics, which therefore harms one of the insights of the solution direction, that is, communicating the value and benefits to the startup and ecosystem actor when facilitating the connection process. Therefore, future research should further develop the solution design by identifying specific instruments to measure this value.

Another limitation of this study concerns the existing body of literature. During the literature review, no studies were found that had already developed a framework for mapping the EE and adhered to the applicable standards of the methodology. In order to overcome this problem, the study of Kreuzer et al. (2018) was chosen to incorporate into this study. This study did propose a framework for mapping the EE, and therefore, this study was selected to incorporate into the solution. In order to increase the reliability of this framework, the process was validated in a semi-structured interview with an employee of The Gate that is an expert on ecosystems. Based on the outcomes of this interview, the mapping process is incorporated into the solution design. However, this process is based on only a small collection of data, and the quality of the study by Kreuzer et al. (2018) poses some potential issues which might harm the quality and generalizability of the solution design. Therefore, this part of the solution should be used cautiously, and more qualitative and quantitative data is needed to support the EE mapping process.

In addition, while describing in the methodology that only studies within the ecosystem-as-affiliation body of literature will be used, this study has made one exception. Because of the limited available research on activation within EEs, no research was found to validate findings that explain the drivers behind activation. However, the article of Vanhaverbeke & Cloodt (2014) highlights a plausible explanation of why value creation could lead to activating an ecosystem. However, this article presents the ecosystem-as-structure perspective on ecosystems. As outlined in the literature review, both perspectives have inherently different dynamics that constitute an ecosystem. Therefore, it might be that the findings of this article do not apply to the results of this research, which indicate that the results of this study should be treated cautiously. Another limitation based on the existing literature is that only a few studies have used activation in a network context (Rampersad, 2016). This research tried to address this gap in the literature by developing an activation framework. However, due to the limited research on this topic, the interpretation of what activation is within the EE and when EEs are activated is only based on a study. Therefore, based on the limited available research on the EE in combination with activation and mapping, this study should be seen as an explorative study that calls for action for more research on this topic and tries to validate the results of this study by using more and different data.

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9. Appendix

Appendix A – Results of systematic literature review on entrepreneurial ecosystems

Nr.	Reference	Method
1	Kapturkiewicz, A. (2021). Varieties of entrepreneurial ecosystems: A comparative study of Tokyo and Bangalore. Research Policy. https://doi.org/10.1016/j.respol.2021.104377	Initial search
2	Hollow, M. (2020). Historicizing entrepreneurial networks. Strategic Entrepreneurship Journal, 14(1), 66–88. https://doi.org/10.1002/sej.1345	Initial search
3	Masucci, M., Brusoni, S., & Cennamo, C. (2020). Removing bottlenecks in business ecosystems: The strategic role of outbound open innovation. Research Policy, 49(1). https://doi.org/10.1016/j.respol.2019.103823	Initial search
4	Chang, S. J. (2004). Venture capital financing, strategic alliances, and the initial public offerings of Internet startups. Journal of Business Venturing, 19(5), 721–741. https://doi.org/10.1016/j.jbusvent.2003.03.002	Initial search
5	Rice, M. P. (n.d.). Co-production of business assistance in business incubators An exploratory study.	Initial search
6	Minguzzi, A., & Passaro, R. (2000). THE NETWORK OF RELATIONSHIPS BETWentrepreneurial ecosystemN THE ECONOMIC ENVIRONMENT AND THE ENTREPRENEURIAL CULTURE IN SMALL FIRMS. In Journal of Business Venturing (Vol. 16).	Initial search
7	Vedula, S., & Kim, P. H. (2019). Gimme shelter or fade away: The impact of regional entrepreneurial ecosystem quality on venture survival. Industrial and Corporate Change, 28(4), 827–854. https://doi.org/10.1093/icc/dtz032	Initial search
8	Guerrero, M., Liñán, F., & Cáceres-Carrasco, F. R. (2021). The influence of ecosystems on the entrepreneurship process: a comparison across developed and developing economies. Small Business Economics, 57(4), 1733–1759. https://doi.org/10.1007/s11187-020-00392-2	Initial search
9	O'Kane, C., Cunningham, J. A., Menter, M., & Walton, S. (2021). The brokering role of technology transfer offices within entrepreneurial ecosystems: an investigation of macro–meso–micro factors. Journal of Technology Transfer, 46(6), 1814–1844. https://doi.org/10.1007/s10961-020-09829-y	Initial search
10	Endres, H., Huesig, S., & Pesch, R. (2022). Digital innovation management for entrepreneurial ecosystems: services and functionalities as drivers of innovation management software adoption. Review of Managerial Science, 16(1), 135–156. https://doi.org/10.1007/s11846-021-00441-4	Initial search
11	Song, Y., Escobar, O., Arzubiaga, U., & de Massis, A. (2022). The digital transformation of a traditional market into an entrepreneurial ecosystem. Review of Managerial Science, 16(1), 65–88. https://doi.org/10.1007/s11846-020-00438-5	Initial search
12	Bouncken, R. B., & Kraus, S. (2022). entrepreneurial ecosystems in an interconnected world: emergence, governance and digitalization. Review of Managerial Science, 16(1). https://doi.org/10.1007/s11846-021-00444-1	Initial search
13	Wei, Y. (2022). Regional governments and opportunity entrepreneurship in underdeveloped institutional environments: An entrepreneurial ecosystem perspective. Research Policy, 51(1). https://doi.org/10.1016/j.respol.2021.104380	Initial search

14	Johnson, E., Hemmatian, I., Lanahan, L., & Joshi, A. M. (2022). A Framework and Databases for Measuring entrepreneurial ecosystems. Research Policy, 51(2). https://doi.org/10.1016/j.respol.2021.104398	Snowball method
15	Andrews, R. J., Fazio, C., Guzman, J., Liu, Y., & Stern, S. (2022). The Startup Cartography Project: Measuring and mapping entrepreneurial ecosystems. Research Policy, 51(2). https://doi.org/10.1016/j.respol.2021.104437	Snowball method
16	Bertello, A., Battisti, E., de Bernardi, P., & Bresciani, S. (2022). An integrative framework of knowledge-intensive and sustainable entrepreneurship in entrepreneurial ecosystems. Journal of Business Research, 142, 683–693. https://doi.org/10.1016/j.jbusres.2021.12.054	Initial search
17	Cobben, D., Ooms, W., Roijakkers, N., & Radziwon, A. (2022). Ecosystem types: A systematic review on boundaries and goals. Journal of Business Research, 142, 138–164. https://doi.org/10.1016/j.jbusres.2021.12.046	Snowball method
18	Pankov, S., Velamuri, V. K., & Schneckenberg, D. (2021). Towards sustainable entrepreneurial ecosystems: examining the effect of contextual factors on sustainable entrepreneurial activities in the sharing economy. Small Business Economics, 56(3), 1073–1095. https://doi.org/10.1007/s11187-019-00255-5	Snowball method
19	Volkmann, C., Fichter, K., Klofsten, M., & Audretsch, D. B. (2021). Sustainable entrepreneurial ecosystems: an emerging field of research. Small Business Economics, 56(3), 1047–1055. https://doi.org/10.1007/s11187-019-00253-7	Snowball method
20	Sahut, J. M., Iandoli, L., & Teulon, F. (2021). The age of digital entrepreneurship. Small Business Economics, 56(3), 1159–1169. https://doi.org/10.1007/s11187-019-00260-8	Snowball method
21	O'Shea, G., Farny, S., & Hakala, H. (2021). The buzz before business: a design science study of a sustainable entrepreneurial ecosystem. Small Business Economics, 56(3), 1097–1120. https://doi.org/10.1007/s11187-019-00256-4	Snowball method
22	Fuster, E., Padilla-Meléndez, A., Lockett, N., & del-Águila-Obra, A. R. (2019). The emerging role of university spin-off companies in developing regional entrepreneurial university ecosystems: The case of Andalusia. Technological Forecasting and Social Change, 141, 219–231. https://doi.org/10.1016/j.techfore.2018.10.020	Snowball method
23	Elia, G., Margherita, A., & Passiante, G. (2020). Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. Technological Forecasting and Social Change, 150. https://doi.org/10.1016/j.techfore.2019.119791	Snowball method
24	Elia, G., Margherita, A., & Passiante, G. (2020). Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. Technological Forecasting and Social Change, 150. https://doi.org/10.1016/j.techfore.2019.119791	Snowball method
25	Neumeyer, X., Santos, S. C., & Morris, M. H. (2019). Who is left out: exploring social boundaries in entrepreneurial ecosystems. Journal of Technology Transfer, 44(2), 462–484. https://doi.org/10.1007/s10961-018-9694-0	Initial search
26	Song, A. K. (2019). The Digital entrepreneurial ecosystem—a critique and reconfiguration. Small Business Economics, 53(3), 569–590. https://doi.org/10.1007/s11187-019-00232-y	Snowball method
27	Cao, Z., & Shi, X. (2021). A systematic literature review of entrepreneurial ecosystems in advanced and emerging economies. Small Business Economics, 57(1), 75–110. https://doi.org/10.1007/s11187-020-00326-y	Initial search
28	Hechavarría, D. M., & Ingram, A. E. (2019). entrepreneurial ecosystem conditions and gendered national-level entrepreneurial activity: a 14-year panel study of GEM. Small Business Economics, 53(2), 431–458. https://doi.org/10.1007/s11187-018-9994-7	Snowball method

29	Brem, A., & Radziwon, A. (2017). Efficient Triple Helix collaboration fostering local niche innovation projects – A case from Denmark. Technological Forecasting and Social Change, 123, 130–141. https://doi.org/10.1016/j.techfore.2017.01.002	Snowball method
30	Bischoff, K., Volkmann, C. K., & Audretsch, D. B. (2018). Stakeholder collaboration in entrepreneurship education: an analysis of the entrepreneurial ecosystems of European higher educational institutions. Journal of Technology Transfer, 43(1), 20–46. https://doi.org/10.1007/s10961-017-9581-0	Initial search
31	Colombelli, A., Paolucci, E., & Ughetto, E. (2019). Hierarchical and relational governance and the life cycle of entrepreneurial ecosystems. Small Business Economics, 52(2), 505–521. https://doi.org/10.1007/s11187-017-9957-4	Initial search
32	Auerswald, P. E., & Dani, L. (2017). The adaptive life cycle of entrepreneurial ecosystems: the biotechnology cluster. Small Business Economics, 49(1), 97–117. https://doi.org/10.1007/s11187-017-9869-3	Initial search
33	Neumeyer, X., Santos, S. C., Caetano, A., & Kalbfleisch, P. (2019). Entrepreneurship ecosystems and women entrepreneurs: a social capital and network approach. Small Business Economics, 53(2), 475–489. https://doi.org/10.1007/s11187-018-9996-5	Initial search
34	Nicotra, M., Romano, M., del Giudice, M., & Schillaci, C. E. (2018). The causal relation between entrepreneurial ecosystem and productive entrepreneurship: a measurement framework. Journal of Technology Transfer, 43(3), 640–673. https://doi.org/10.1007/s10961-017-9628-2	Snowball method
35	Corrente, S., Greco, S., Nicotra, M., Romano, M., & Schillaci, E. (2019). Evaluating and comparing entrepreneurial ecosystems using SMAA and SMAA-S.	Snowball method
36	Bischoff, K. (2021). A study on the perceived strength of sustainable entrepreneurial ecosystems on the dimensions of stakeholder theory and culture. Small Business Economics, 56(3), 1121–1140. https://doi.org/10.1007/s11187-019-00257-3	Snowball method
37	Brown, R., & Mason, C. (2017). Looking inside the spiky bits: a critical review and conceptualisation of entrepreneurial ecosystems. Small Business Economics, 49(1), 11–30. https://doi.org/10.1007/s11187-017-9865-7	Snowball method
38	Godley, A., Morawetz, N., & Soga, L. (2021). The complementarity perspective to the entrepreneurial ecosystem taxonomy. Small Business Economics, 56(2), 723–738. https://doi.org/10.1007/s11187-019-00197-y	Snowball method
39	Tiba, S., van Rijnsoever, F. J., & Hekkert, M. P. (2020). The lighthouse effect: How successful entrepreneurs influence the sustainability-orientation of entrepreneurial ecosystems. Journal of Cleaner Production, 264. https://doi.org/10.1016/j.jclepro.2020.121616	Initial search
40	Maroufkhani, P., Wagner, R., & Wan Ismail, W. K. (2018). entrepreneurial ecosystems: a systematic review. In Journal of Enterprising Communities (Vol. 12, Issue 4, pp. 545–564). Emerald Group Holdings Ltd. https://doi.org/10.1108/JEC-03-2017-0025	Snowball method
41	Wright, M., Siegel, D. S., & Mustar, P. (2017). An emerging ecosystem for student start-ups. Journal of Technology Transfer, 42(4), 909–922. https://doi.org/10.1007/s10961-017-9558-z	Snowball method
42	Acs, Z. J., Estrin, S., & Mickiewicz, T. (2017). Institutions, entrepreneurship and growth: the role of national entrepreneurial ecosystems. https://ssrn.com/abstract=2912453Electroniccopyavailableat:https://ssrn.com/abstract=2912453Electroniccopyavailableat:https://ssrn.com/abstract=2912453	Snowball method
43	Audretsch, D. B., Heger, D., & Veith, T. (2015). Infrastructure and entrepreneurship. Small Business Economics, 44(2), 219–230. https://doi.org/10.1007/s11187-014-9600-6	Initial search

44	Miller, D. J., & Acs, Z. J. (2017). The campus as entrepreneurial ecosystem: the University of Chicago. Small Business Economics, 49(1), 75–95. https://doi.org/10.1007/s11187-017-9868-4	Initial search
45	Neck, H. M., Meyer, G. D., Cohen, B., & Corbett, A. C. (2004). An Entrepreneurial System View of New Venture Creation. In Journal of Small Business Management (Vol. 42, Issue 2, pp. 190–208). Blackwell Publishing Ltd. https://doi.org/10.1111/j.1540-627x.2004.00105.x	Snowball method
46	Cunningham, J. A., Menter, M., & Wirsching, K. (2019). entrepreneurial ecosystem governance: a principal investigator-centered governance framework. Small Business Economics, 52(2), 545–562. https://doi.org/10.1007/s11187-017-9959-2	Initial search
47	Acs, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, institutional economics, and economic growth: an ecosystem perspective. Small Business Economics, 51(2), 501–514. https://doi.org/10.1007/s11187-018-0013-9	Initial search
48	Sussan, F., & Acs, Z. J. (2017). The digital entrepreneurial ecosystem. Small Business Economics, 49(1), 55–73. https://doi.org/10.1007/s11187-017-9867-5	Initial search
49	Cohen, B. (2006). Sustainable valley entrepreneurial ecosystems. Business Strategy and the Environment, 15(1), 1–14. https://doi.org/10.1002/bse.428	Snowball method
50	Spigel, B. (2017). The Relational Organization of entrepreneurial ecosystems. Entrepreneurship: Theory and Practice, 41(1), 49–72. https://doi.org/10.1111/etap.12167	Snowball method
51	Xie, Z., Wang, X., Xie, L., & Duan, K. (2021). entrepreneurial ecosystem and the quality and quantity of regional entrepreneurship: A configurational approach. Journal of Business Research, 128, 499–509. https://doi.org/10.1016/j.jbusres.2021.02.015	Initial search
52	Theodoraki, C., Dana, L. P., & Caputo, A. (2022). Building sustainable entrepreneurial ecosystems: A holistic approach. Journal of Business Research, 140, 346–360. https://doi.org/10.1016/j.jbusres.2021.11.005	Snowball method
53	Audretsch, D. B., & Belitski, M. (2017). entrepreneurial ecosystems in cities: establishing the framework conditions. Journal of Technology Transfer, 42(5), 1030–1051. https://doi.org/10.1007/s10961-016-9473-8	Snowball method
54	Pitelis, C. (2012). Clusters, entrepreneurial ecosystem co-creation, and appropriability: A conceptual framework. Industrial and Corporate Change, 21(6), 1359–1388. https://doi.org/10.1093/icc/dts008	Snowball method
55	Liguori, E., Bendickson, J., Solomon, S., & McDowell, W. C. (2019). Development of a multi-dimensional measure for assessing entrepreneurial ecosystems. Entrepreneurship and Regional Development, 31(1–2), 7–21. https://doi.org/10.1080/08985626.2018.1537144	Snowball method
56	Acs, Z. J., Stam, E., Audretsch, D. B., & O'Connor, A. (2017). The lineages of the entrepreneurial ecosystem approach. Small Business Economics, 49(1), 1–10. https://doi.org/10.1007/s11187-017-9864-8	Snowball method
57	Colombo, M. G., Dagnino, G. B., Lehmann, E. E., & Salmador, M. P. (2019). The governance of entrepreneurial ecosystems. Small Business Economics, 52(2), 419–428. https://doi.org/10.1007/s11187-017-9952-9	Snowball method
58	Cohen, S., Fehder, D. C., Hochberg, Y. v., & Murray, F. (2019). The design of startup accelerators. Research Policy, 48(7), 1781–1797. https://doi.org/10.1016/j.respol.2019.04.003	Snowball method
59	Schaeffer, V., & Matt, M. (2016). Development of academic entrepreneurship in a non-mature context: the role of the university as a hub-organisation. Entrepreneurship and Regional Development, 28(9–10), 724–745. https://doi.org/10.1080/08985626.2016.1247915	Snowball method

60	Huang-Saad, A., Fay, J., & Sheridan, L. (2017). Closing the divide: accelerating technology commercialization by catalyzing the university entrepreneurial ecosystem with I-CorpsTM. Journal of Technology Transfer, 42(6), 1466–1486. https://doi.org/10.1007/s10961-016-9531-2	Snowball method
61	Muñoz, P., & Kimmitt, J. (2019). Rural entrepreneurship in place: an integrated framework. Entrepreneurship and Regional Development, 31(9–10), 842–873. https://doi.org/10.1080/08985626.2019.1609593	Snowball method
62	Guerrero, M., & Urbano, D. (2017). The impact of Triple Helix agents on entrepreneurial innovations' performance: An inside look at enterprises located in an emerging economy. Technological Forecasting and Social Change, 119, 294–309. https://doi.org/10.1016/j.techfore.2016.06.015	Snowball method
63	Neumeyer, X., & Santos, S. C. (2018). Sustainable business models, venture typologies, and entrepreneurial ecosystems: A social network perspective. Journal of Cleaner Production, 172, 4565–4579. https://doi.org/10.1016/j.jclepro.2017.08.216	Snowball method
64	Isenberg, D., & Global, B. (2011). The Entrepreneurship Ecosystem Strategy as a New Paradigm for Economic Policy: Principles for Cultivating Entrepreneurship	Snowball method
65	Foster, G., Shimizu Project Leaders, C., Ciesinski, S., Davila, A., Zahoor Hassan, S., Jia, N., Plunkett, S., Pinelli, M., Cunningham, J., Hiscock-Croft, R., McLenithan, M., Rottenberg, L., & Morris, R. (2013). entrepreneurial ecosystems Around the Globe and Company Growth Dynamics.	Snowball method
66	Bell-Masterson, J. (2015). Dane Stangler Kauffman Foundation Research Series on City, Metro, and Regional Entrepreneurship.	Snowball method
67	Han, J., Ruan, Y., Wang, Y., & Zhou, H. (2021). Toward a complex adaptive system: The case of the Zhongguancun entrepreneurship ecosystem. Journal of Business Research, 128, 537–550. https://doi.org/10.1016/j.jbusres.2019.11.077	Snowball method
68	Hayter, C. S. (2016). A trajectory of early-stage spinoff success: the role of knowledge intermediaries within an entrepreneurial university ecosystem. Small Business Economics, 47(3), 633–656. https://doi.org/10.1007/s11187-016-9756-3	Snowball method

Appendix B – Results of systematic literature search on incubators

Nr.	Reference	Method
1	Dalmarco, G., Hulsink, W., & Blois, G. v. (2018). Creating entrepreneurial universities in an emerging economy: Evidence from Brazil. *Technological Forecasting and Social Change*, *135*, 99–111. https://doi.org/10.1016/j.techfore.2018.04.015	Initial search
2	Markman, G. D., Phan, P. H., Balkin, D. B., & Gianiodis, P. T. (2005). Entrepreneurship and university-based technology transfer. *Journal of Business Venturing*, *20*(2), 241–263. https://doi.org/10.1016/j.jbusvent.2003.12.003	Initial search
3	del Bosco, B., Mazzucchelli, A., Chierici, R., & di Gregorio, A. (2021). Innovative startup creation: the effect of local factors and demographic characteristics of entrepreneurs. *International Entrepreneurship and Management Journal*, *17*(1), 145–164. https://doi.org/10.1007/s11365-019-00618-0	Initial search
4	Lamine, W., Mian, S., Fayolle, A., Wright, M., Klofsten, M., & Etzkowitz, H. (2018). Technology business incubation mechanisms and sustainable regional development. *Journal of Technology Transfer*, *43*(5), 1121–1141. https://doi.org/10.1007/s10961-016-9537-9	Initial search
5	van Stijn, N., van Rijnsoever, F. J., & van Veelen, M. (2018). Exploring the motives and practices of university–start-up interaction: evidence from Route 128. *Journal of Technology Transfer*, *43*(3), 674–713. https://doi.org/10.1007/s10961-017-9625-5	Initial search
6	Miranda, M. G., & Borges, R. (2019). Technology-based business incubators: An exploratory analysis of intra-organizational social networks. *Innovation and Management Review*, *16*(1), 36–54. https://doi.org/10.1108/INMR-04-2018-0017	Initial search
7	Khodaei, H., Scholten, V. E., Wubben, E. F. M., & Omta, S. W. F. O. (2022). The Role of Academic Spin-Offs Facilitators in Navigation of the Early Growth Stage Critical Junctures. *Ientrepreneurial ecosystemE Transactions on Engineering Management*, *69*(4), 1769–1780. https://doi.org/10.1109/TEM.2020.2995361	Initial search
8	Bandera, C., & Thomas, E. (2019). The Role of Innovation Ecosystems and Social Capital in Startup Survival. *Ientrepreneurial ecosystemE Transactions on Engineering Management*, *66*(4), 542–551. https://doi.org/10.1109/TEM.2018.2859162	Initial search
9	Aernoudt, R. (2004). *Incubators: Tool for Entrepreneurship?* (Vol. 23). Kluwer Academic Publishers.	Snowball method
10	McAdam, M., & Marlow, S. (2008). A preliminary investigation into networking activities within the university incubator. *International Journal of Entrepreneurial Behaviour and Research*, *14*(4), 219–241. https://doi.org/10.1108/13552550810887390	Snowball method
11	Sansone, G., Andreotti, P., Colombelli, A., & Landoni, P. (2020). Are social incubators different from other incubators? Evidence from Italy. *Technological Forecasting and Social Change*, *158*. https://doi.org/10.1016/j.techfore.2020.120132	Snowball method
12	Barr, S. H., Baker, T., Markham, S. K., & Kingon, A. I. (2009). Bridging the Valley of Death: Lessons Learned from 14 Years of Commercialization of Technology Education. In *Management Learning & Education* (Vol. 8, Issue 3). https://about.jstor.org/terms	Snowball method
13	Carayannis, E. G., & von Zedtwitz, M. (2005). Architecting gloCal (global-local), real-virtual incubator networks (G-RVINs) as catalysts and	Snowball method

	accelerators of entrepreneurship in transitioning and developing economies: Lessons learned and best practices from current development and business incubation practices. *Technovation*, *25*(2), 95–110. https://doi.org/10.1016/S0166-4972(03)00072-5	
14	Fernández Fernández, M. T., Blanco Jiménez, F. J., & Cuadrado Roura, J. R. (2015). Business incubation: innovative services in an entrepreneurship ecosystem. *Service Industries Journal*, *35*(14), 783–800. https://doi.org/10.1080/02642069.2015.1080243	Snowball method
15	Chan, Y. E., Krishnamurthy, R., & Sadreddin, A. (2022). Digitally-enabled university incubation processes. *Technovation*. https://doi.org/10.1016/j.technovation.2022.102560	Snowball method
16	Nicholls-Nixon, C. L., Valliere, D., Gedeon, S. A., & Wise, S. (2021). entrepreneurial ecosystems and the lifecycle of university business incubators: An integrative case study. *International Entrepreneurship and Management Journal*, *17*(2), 809–837. https://doi.org/10.1007/s11365-019-00622-4	Snowball method
17	Grimaldi, R., & Grandi, A. (2005). Business incubators and new venture creation: An assessment of incubating models. *Technovation*, *25*(2), 111–121. https://doi.org/10.1016/S0166-4972(03)00076-2	Snowball method
18	Hausberg, J. P., & Korreck, S. (2020). Business incubators and accelerators: a co-citation analysis-based, systematic literature review. *Journal of Technology Transfer*, *45*(1), 151–176. https://doi.org/10.1007/s10961-018-9651-y	Snowball method
19	Bergek, A., & Norrman, C. (2008). Incubator best practice: A framework. *Technovation*, *28*(1–2), 20–28. https://doi.org/10.1016/j.technovation.2007.07.008	Snowball method
20	Cooper, C. E., Hamel, S. A., & Connaughton, S. L. (2012). Motivations and obstacles to networking in a university business incubator. *Journal of Technology Transfer*, *37*(4), 433–453. https://doi.org/10.1007/s10961-010-9189-0	Snowball method
21	Antunes, L. G. R., de Castro, C. C., & da Costa Mineiro, A. A. (2021). Network orchestration: New role of business incubators? *Innovation and Management Review*, *18*(1), 51–68. https://doi.org/10.1108/INMR-12-2019-0151	Snowball method
22	Hernández-Chea, R., Mahdad, M., Minh, T. T., & Hjortsø, C. N. (2021). Moving beyond intermediation: How intermediary organizations shape collaboration dynamics in entrepreneurial ecosystems. *Technovation*, *108*. https://doi.org/10.1016/j.technovation.2021.102332	Snowball method
23	Barbero, J. L., Casillas, J. C., Ramos, A., & Guitar, S. (2012). Revisiting incubation performance. How incubator typology affects results. *Technological Forecasting and Social Change*, *79*(5), 888–902. https://doi.org/10.1016/j.techfore.2011.12.003	Snowball method
24	Narasimhalu, D. (2012). *Science and Technology Parks as an Open Innovation catalyst for Science and Technology Parks as an Open Innovation catalyst for Valorization Valorization*. https://ink.library.smu.edu.sg/sis_research/1672	Snowball method
25	Phillips, R. G. (2002). Technology business incubators: how effective as technology transfer mechanisms? In *Technology in Society* (Vol. 24). www.elsevier.com/locate/techsoc	Snowball method
26	Smith, D. J., & Zhang, M. (2012). Introduction: The Evolution of the Incubator Concept. *The International Journal of Entrepreneurship and Innovation*, *13*(4), 227–234. https://doi.org/10.5367/ijei.2012.0096	Snowball method
27	von Zedtwitz, M., & Grimaldi, R. (2006). *Are Service Profiles Incubator-Specific? Results from an Empirical Investigation in Italy**.	Snowball method

28	van Weele, M., van Rijnsoever, F. J., Eveleens, C. P., Steinz, H., van Stijn, N., & Groen, M. (2018). Start-EU-up! Lessons from international incubation practices to address the challenges faced by Western European start-ups. *Journal of Technology Transfer*, *43*(5), 1161–1189. https://doi.org/10.1007/s10961-016-9538-8	Snowball method
29	van Weele, M., van Rijnsoever, F. J., & Nauta, F. (2017). You can't always get what you want: How entrepreneur's perceived resource needs affect the incubator's assertiveness. *Technovation*, *59*, 18–33. https://doi.org/10.1016/j.technovation.2016.08.004	Snowball method

Appendix C – CAMO Principles based on literature

	context	Action	mechanism	outcome
Adner (2017)	Entrepreneurial ecosystem	Increase the community and attract actors to the region	To make the ecosystem better visible	Leading to a successful entrepreneurial ecosystem
Roundy (2020)	The entrepreneurial ecosystem coordinator	should try to become embedded and interconnected in the EE	To increase the connectivity in the EE	Leading to a denser entrepreneurial ecosystem
Roundy (2021)	The entrepreneurial ecosystem coordinator	Should exert group and coordinator characteristics	To have a collectivist feeling and goals in the EE	Leading to more effective coordination
Stam & Spigel (2016)	The entrepreneurial ecosystem coordinator	Identify and attract startups and ecosystem actors to the EE	which makes the EE denser	Which fosters the flow of information and resources
Rampersad (2016)	The entrepreneurial ecosystem coordinator	Configure and structure the EE and decide the roles of the participants	to engage and commit startups and ecosystem actors to the EE	Which activates the entrepreneurial ecosystem
Wickizer (1993)	The entrepreneurial ecosystem coordinator	Should increase the interconnectedness between startups and ecosystem actors	to increase community awareness	Which activates the entrepreneurial ecosystem
Isenberg (2010)	In an entrepreneurial ecosystem	an entrepreneurial ecosystem mapping should be made	that makes the elements in the EE visible	which helps to make more efficient use of the EE
Kreuzer et al. (2018)	In an entrepreneurial ecosystem	the five steps should be executed	that provide guidance when mapping the EE	leading to a better mapping of the EE
Spigel (2017)	In an entrepreneurial ecosystem	The three attributes should be seen in combination to each other	to identify the dependencies between the attributes	leading to a better understanding of the relationships between single elements
Pitelis (2012)	The entrepreneurial ecosystem coordinator	should dedicate resources and time for coordinating the EE	to become more interconnected in the EE	leading to better EE coordination
van Weele et al. (2017)	The entrepreneurial ecosystem coordinator	should use the Resource-based view for helping startups	to identify startups' needs	to facilitate startups more effectively
Spigel (2017)	The incubator in an EE	should use the Resource-based view for helping startups	To faciliate startups and the EE	creating value for the startups
van Rijnsoe-ver (2020)	The incubator in an EE	should build the internal community of the EE	helping startups to be connected to each other	Leading to synergies, knowledge sharing, and new relationships for startups
Bischoff et al., (2018)	The entrepreneurial ecosystem coordinator	should involve stakeholders through stakeholder engagement	To create trust and aligning objectives	Leading to more effective coordination in the EE
Colombo (2019)	The entrepreneurial ecosystem coordinator	Should identify three pillars: participation, structural, and governance	helping to motivate the EE	Leading to better coordination
Roundy & Fayard (2020)	The entrepreneurial ecosystem coordinator	Should perform cognitive, social, and cultural activities	which helps coordinating the EE	Leading to decreased search costs for startups and ecosystem actors

Design Requirements	Quote from empirical analysis
F1	"There is currently no playbook how we can make the actors of the entrepreneurial ecosystem visible but we need such thing."
F3	"If I want to look at the entrepreneurial ecosystem, I need to know who is doing what and what everyone's role is in the entrepreneurial ecosystem."
F4	"The mapping will be most useful for us when you consider the different types of startups. As a developer who is serving the field of AI I am not really concerned with actors active in the energy domain."
F5	"Practical recommendations how we can execute some of the processes you explain are helpful."
F7	"Practical recommendations how we can execute some of the processes you explain are helpful."
F8	"Your goal is to describe how to activate the entrepreneurial ecosystem. So I think you want to create something that is doing precisely that."
B1	"After you are gone, I want to have a tool or something that is adaptable to future developments. Not something that is useless. Especially in the dynamic environment The Gate is active."
B2	"Do not try to create something for the whole ecosystem. There are too many players with own interests. BP, the BOM and other players have their own thoughts about the entrepreneurial ecosystem, so try to tailor it to The Gate and its environment."
D2	"I understand this might be difficult but try to come up with something that can also be accepted by the The Gate's partners."

Interview Protocol Startups

Date:

Time:

Place:

Interviewee:

Introduction

The aim of this interview is to identify how The Gate's entrepreneurial ecosystem looks like by identifying all relevant entrepreneurial ecosystem partners, investigating how an entrepreneurial ecosystem mapping would be valued, what the drivers are for startups and ecosystem actors are to locate to an ecosystem and using an incubator, and how an entrepreneurial ecosystem can be activated. An entrepreneurial ecosystem "group of interdependent actors that work interact together in such a way that they create productive entrepreneurship" (Stam & Van de Ven, 2018). In other words, multiple stakeholders in local region are cooperating in order to enable starting entrepreneurs to grow and survive. Activating an entrepreneurial ecosystem means: *"identifying and attracting participants for the community and configuring and structuring the entrepreneurial ecosystem" (*Rampersad, 2016). Community activation is an important process for governing an entrepreneurial ecosystem because it can result in a greater degree of interconnectedness among startups and increases community awareness (Wickizer et al., 1993).

Self-Introduction

I am Edward Staadegaard, 25 years old and currently living in Eindhoven. I am a student of the Innovation Management Master Program at the Eindhoven University of Technology. As part of my master, I am writing my thesis at The Gate on entrepreneurial ecosystems.

Aim om the Study

This study aims to investigate how an incubator can activate its entrepreneurial ecosystem. An entrepreneurial ecosystem can be activated by performing two steps: (1) create a mapping of the entrepreneurial ecosystem, (2) create value in the entrepreneurial ecosystem. An entrepreneurial ecosystem is a network that is focused on creating and helping startups. The Gate is an incubator that facilitates startups by providing office space, mentoring services, incubation programs, and connecting them with the Brainport network. This research will investigate how The Gate can better activate the entrepreneurial ecosystem to facilitate startups by investigating which stakeholders are present in this ecosystem, which processes are disrupting the value creation process and activation for The Gate.

The results of this interview will be used to develop the solution design that enables The Gate to activate its entrepreneurial ecosystem to better facilitate startups.

Confidentiality

Every participant of this interview will remain anonymous. Answers given in this interview will be processed discretionally.

This interview will be recorded, please notify the interviewer if you do not want this interview to be recorded.

This interview will now start

Questions

Theme: General Questions

1. Can you tell me something about your startup?

2. How do you know The Gate?

3. How does your relation with The Gate looks like?

4. What is your role in the local startup scene/ entrepreneurial ecosystem?

Theme: The Gate's entrepreneurial ecosystem – Material Attribte

What is according to you an entrepreneurial ecosystem? And how can it be valuable for startups to locate to an entrepreneurial ecosystem?

Do you have an entrepreneurial ecosystem mapping? Do you think this would be helpful for you? Do you feel part of this entrepreneurial ecosystem?

Why?

What are the main drivers why you would locate to an entrepreneurial ecosystem? And what are the drivers for you to go to an incubator?

Are you sometimes reaching out for help to anyone outside your own company?

To who? For what?

Are these actors situated within the brainport?

Who are the most important partners for you in the startup ecosystem?

Are you able to find other ecosystem actors in the entrepreneurial ecosystem? Do you know other startups in the ecosystem?

What is according to you an activated entrepreneurial ecosystem? When is an entrepreneurial ecosystem activated and what is needed to activate an entrepreneurial ecosystem?

Social Attribute

What kind of resources do you need for your everyday business activities?

From who?

How do you get access to these resources?

Does Brainport possess all the necessary resources you need?

What are the most important resources for startups in general?

Cultural Attribute

To what extent do you feel rewarded as an entrepreneur?

By who?

To what extent do you feel well-connected to other organizations or startups in the ecosystem?

➔ Regulatory framework

What do you think about leadership in an entrepreneurial ecosystem? Who might be the leader of the ecosystem?

How is the culture in the entrepreneurial ecosystem with regards to entrepreneurship?

The Gate

What is according to you the role of The Gate in the entrepreneurial ecosystem?

With which things did The Gate help you with, if any?

In what way is The Gate or an other organisation coordinating the entrepreneurial ecosystem?

What is important when leading or coordinating an entrepreneurial ecosystem?

How would you define the support that The Gate is providing to startups?

How can The Gate create value for you in the entrepreneurial ecosystem? And for other ecosystem actors?

How well is The Gate connected to the entrepreneurial ecosystem?

How can the inflow of startups to The Gate be improved?

How can The Gate increase their visibility in the entrepreneurial ecosystem?

How easy is it to access/contact someone from The Gate?

Future Situation

How can you get better access to other stakeholders outside your own company?

How can you get better access to resources that you do not possess yourself?

How can The Gate better facilitate you?

How can The Gate provide better access to their network?

What do you think as an entrepreneur would be more helpful to have here in the ecosystem/region?

Closing

- Is there anything that you would like to add?
- Do you have any further questions?
- Can I contact you if I have any questions later?

Interview Protocol ecosystem actors

Time:

Place:

Interviewee:

Introduction

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This interview will now start

Questions

Theme: General Questions

A) can you tell me something about the organization that you work for?

B) What is the role of your organization within the Brainport entrepreneurial ecosystem?

C) What is the specific relation between Innovation Space and The Gate?

D) What is the objective of your organization in the entrepreneurial ecosystem?

entrepreneurial ecosystem – Material attribute

What is according to you an entrepreneurial ecosystem? And how can it be valuable for startups to locate to an entrepreneurial ecosystem?

How does your organization support or facilitate startups in this entrepreneurial ecosystem?

Who are the most important stakeholders in the entrepreneurial ecosystem for startups in general?

Does your organization have an entrepreneurial ecosystem mapping? Do you think this would be helpful?

What are the main drivers why startups would locate to an entrepreneurial ecosystem? And why would they go to an incubator?

Are startups able to find other ecosystem actors in the entrepreneurial ecosystem? And is there enough awareness between ecosystem actors and startups?

What is according to you an activated entrepreneurial ecosystem? When is an entrepreneurial ecosystem activated and what is needed to activate an entrepreneurial ecosystem?

Social attribute

What kind of resources are most important for startups in general?

Which resources does your organization possess that startups may need?

To what extend are you or your organization willing to share your resources with other partners in order to help startups?

Cultural attribute

What do you think about entrepreneurs?

What do you think about the regulatory framework, specifically around starting a business and doing business?

What do you think about leadership in an entrepreneurial ecosystem? Who might be the leader of the ecosystem?

How is the culture in the entrepreneurial ecosystem with regards to entrepreneurship?

The Gate

How can The Gate create value for startups in the entrepreneurial ecosystem? And for other ecosystem actors?

In what way is The Gate or an other organisation coordinating the entrepreneurial ecosystem?

What is important when leading or coordinating an entrepreneurial ecosystem?

How can the inflow of startups to The Gate be improved?

What is according to you the role of The Gate in the entrepreneurial ecosystem?

How can The Gate increase their visibility in the entrepreneurial ecosystem?

Closing

- Is there anything that you would like to add?
- Do you have any further questions?
- Can I contact you if I have any questions later?

Interview Protocol The Gate's employees

Date:

Time:

Place:

Interviewee:

Introduction

The aim of this interview is to identify how The Gate's entrepreneurial ecosystem looks like by identifying all relevant entrepreneurial ecosystem partners, investigating how an entrepreneurial ecosystem mapping would be valued, what the drivers are for startups and ecosystem actors are to locate to an ecosystem and using an incubator, and how an entrepreneurial ecosystem can be activated. An entrepreneurial ecosystem "group of interdependent actors that work interact together in such a way that they create productive entrepreneurship" (Stam & Van de Ven, 2018). In other words, multiple stakeholders in local region are cooperating in order to enable starting entrepreneurs to grow and survive. Activating an entrepreneurial ecosystem means: *"identifying and attracting participants for the community and configuring and structuring the entrepreneurial ecosystem" (*Rampersad, 2016). Community activation is an important process for governing an entrepreneurial ecosystem because it can result in a greater degree of interconnectedness among startups and increases community awareness (Wickizer et al., 1993).

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The results of this interview will be used to develop the solution design that enables The Gate to activate its entrepreneurial ecosystem to better facilitate startups.

Confidentiality

Every participant of this interview will remain anonymous. Answers given in this interview will be processed discretionally.

This interview will be recorded, please notify the interviewer if you do not want this interview to be recorded.

This interview will now start

Questions

Theme: General Questions

Can you tell me something about your role within The Gate?

What is your relation with startups?

What is the role of The Gate within the startup ecosystem?

Theme: The Gate's entrepreneurial ecosystem

Material attribute

What kind of organization is most important for a startups in the entrepreneurial ecosystem?

What kind of stakeholders are you sometimes using when trying to help startups?

What is according to you an entrepreneurial ecosystem? And how can it be valuable for startups to locate to an entrepreneurial ecosystem?

How does The Gate support or facilitate startups in this entrepreneurial ecosystem?

Does The Gate have an entrepreneurial ecosystem mapping? Do you think this would be helpful?

What are the main drivers why startups would locate to an entrepreneurial ecosystem? And why would they go to an incubator?

Are startups able to find other ecosystem actors in the entrepreneurial ecosystem? And is there enough awareness between ecosystem actors and startups?

What is according to you an activated entrepreneurial ecosystem? When is an entrepreneurial ecosystem activated and what is needed to activate an entrepreneurial ecosystem?

Social Attribute

What kind of resources are most important for startups in general?

Which resources does The Gate possess that startups may need?

To what extend are you or The Gate willing to share your resources with other partners in order to help startups?

Cultural attribute

What is the biggest challenge concerning the startups networking?

Probing question: Unsuitable network? Network not willing to help?

What do you think about entrepreneurs?

What do you think about the regulatory framework, specifically around starting a business and doing business?

What do you think about leadership in an entrepreneurial ecosystem? Who might be the leader of the ecosystem? What are important activities for leading an entrepreneurial ecosystem?

How is the culture in the entrepreneurial ecosystem with regards to entrepreneurship?

The Gate

How do you see the entrepreneurial ecosystem around The Gate?

Probing question: are there enough network partners in order to adequately facilitate startups?

How do you use/ integrate your regional network to support the startups regarding their business strategy?

In what way is The Gate or an other organisation coordinating the entrepreneurial ecosystem?

How does the incubator support regional network partners in their means to facilitate the startups' strategy development?

Probing Question: brokering role or scanning the market environment

How do you integrate The Gate's regional network partners in their means to facilitate the startups?

How can The Gate increase their visibility in the entrepreneurial ecosystem?

Closing

- Is there anything that you would like to add?
- Do you have any further questions?
- Can I contact you if I have any questions later?

Interviewee: Business manager ecosystem partners and funding A.I.

Start interview:

Op basis van de literatuur studie heb ik 5 stappen gevonden die kunnen helpen bij het mapping van het entrepreneurial ecosysteem. De 5 stappen heb ik hier gevisualiseerd:
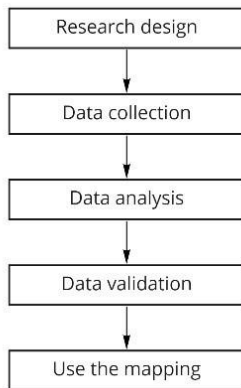
Vragen: Hoe interpreteer jij de 5 stappen en hoe zou jij het mappen van The Gate's entrepreneurial ecosystem uitvoeren?

- Welke informatie is er benodigd voor de 5 fases:
1. Research design
2. Data collection
3. Data analysis
4. Data validation
5. Using the mapping
- Welke vragen zou je kunnen stellen om de 5 stappen te doorlopen?
- Van wie heb je informatie nodig om de data collection te doen? En wie voor de data validation?
- Voor welke doeleinden zou de mapping gebruikt kunnen worden?

Voor de data collection heb ik al een literatuur studie gedaan voor de entrepreneurial ecosystem elements, ik heb daarbij de volgende elementen gevonden. Deze ga ik in het empirische gedeelte valideren.

1. Financial capital providers
2. Government
3. Higher educational institutes
4. Large Corporations & SMEs
5. Entrepreneurial support organizations
6. Service Providers
7. Leadership
8. Human Capital & Market
9. Financial capital
10. Other physical resources
11. Intellectual property
12. Infrastructure
13. Network
14. Culture and norms

Interview Protocol Selecting Solution

Introduction

This research aims to investigate how an incubator can activate its entrepreneurial ecosystem. From the literature it was found that there are 2 steps to perform that can help activating an entrepreneurial ecosystem:

1. An entrepreneurial ecosystem mapping
2. Value creation for the entrepreneurial ecosystem

The value creation for the entrepreneurial ecosystem can be achieved by decreasing the search costs for the startups. It was found that an ecosystem coordinator can decrease search costs by performing four activities:

1. Cognitive activities
2. Social activities
3. Structural activities
4. Cultural activities

During the interviews, both steps were validated. The entrepreneurial ecosystem mapping was validated, and the elements of an entrepreneurial ecosystem were synthesised. The mapping of the entrepreneurial ecosystem is based on the lifecycle model of Steve Blanks because The Gate is using the theoretical frameworks of the BOM, and I want to develop a solution that fits within this framework.

The value creation for the entrepreneurial ecosystem by decreasing search costs were also validated. It was found that the startups indeed wanted to receive value when participating in an entrepreneurial ecosystem and that this value should be higher than they could reap in other ecosystem and should be higher than when operating independently.

The four activities were also validated and from the interviews support was found for three of them: 1. Cognitive activities; 2. social activities; 3. structural activities

Also, some important problems were identified that could interrupt the value creation process.

Based on the input from the literature review and the empirical analysis, three solutions were developed.

Every solution starts with the mapping of an entrepreneurial ecosystem based on the five-step process found in the literature and validated in the empirical analysis:

Step	Questions to ask
1. Scope of the mapping	- Which entrepreneurial ecosystem will I map? - Where are the exact boundaries of my entrepreneurial ecosystem - Who will be my target population? Who will be included or excluded?
2. Defining the elements present in the entrepreneurial ecosystem	- Which elements are present in my entrepreneurial ecosystem? - How will I approach these elements for data collection? - What are the relationships between these elements?
3. Visualizing the entrepreneurial ecosystem	- Which tool or software can I use to visualize the entrepreneurial ecosystem? - Which tool is best for visualizing the relationships between the elements?

	- How can the visualization be most useful for the users?
4. Validating the entrepreneurial ecosystem mapping	- Who will be contacted for validating the results? - What is missing in the entrepreneurial mapping? - What are the strong points? - Does the mapping visualize what it intends to map? - Is the usability sufficient for the users?
5. Using the mapping	- For what will the mapping be used? - How can the mapping be used? - Is it possible to develop a format of the mapping to use it in other entrepreneurial ecosystems? - Can the mapping be adapted in the future?

Solution 1 – Activation framework

For this solution I would develop a framework that would be integrated into the ecosystem mapping. In every stap an explanation would be provided so that The Gate knows how to perform the three activities that can help decrease the search costs. It will also be explained how The Gate can connect the startups to the entrepreneurial ecosystem in order to enable the startups to capture the created value.

Solution 2 – Supporting the cognitive activity by organizing an event

In this solution an event will be organized specificallly for the residents of the alpha building to increase the awareness between them. Some employees/business developers of The Gate would also be present so that the startups and The Gate would also get to know each other better. From the interviews it was found that most startups are operating individually and do not know the other residents in the building. This harms the cognitive and social activities that The Gate should perform to decrease search costs.

Twice, the housekeeper of the building would be asked permission to formally ask startups to be present at the event. Because from observations and interviews it was found that attendence at the events is often low, by formally asking startups to be present at the event it is possible to increase the attendence rate.

The event would be specifically aimed at getting to know each other. This would be done by organizing activities with groups of startups and employees of The Gate.

Solution 3 – Strengthen the entrepreneurial ecossytem by extending the preferred partner network and tapping into the student pool of Brainport

In this solution I would advise or support The Gate with improving and extending the preferred partner network. From the interviews, startups and ecosystem actors mentioned that the preferred partner network is underdeveloped, and some missing links should be included in the network. By advising or supporting The Gate with this, the preferred partner network would be improved.

Another part of the solution would be that it is tried to establish a relation with EUflex, the labor matching organisation of the TU/e. Euflex has a large pool of TU/e students. From the interviews it became clear that almost every startup had difficulties finding enough human resources. The idea is to use the student pool of EUflex and match this with the startups. This might help the startups find human resources easier.

Solution decision based on Simple additive scoring method

Below a table is provided with all criteria, based on the design requirements. Could you please score every solution based on the criteria? The scoring works as follows: for every criteria, the three

solutions should be scored from 1 to 3. For example, solution 1 received two points, solution 2 receives 1 point, and solution 3 receives three points. The more points, the better the solution.

Criteria	Solution direction		
	Solution 1	Solution 2	Solution 3
The design will activate the entrepreneurial ecosystem			
Ease of use for the startups			
Ease of use for business developers			
Solution is supported by the business developers			
Solution is supported by the five founders of The gate			
The design is compatible for future developments			
The potential value of the design is clearly explained			
Total cost to implement solution			
Implementation time			
Effectiveness of solution			
Feasibility of solution			
Results			

Future development of solutions

Are there any remarks from your side?

And do you have tips for improving the solutions?

Focus group and semi-structured interview guide

1. **Introduction**

Ask permission for recording the focus group and guarantee anomity for the participants.

Presenting the solution – roadmap for activating the entrepreneurial ecosystem.

Ask if there are any general questions regarding the solution design? Is everything clear?

2. **Part 1 – entrepreneurial ecosystem mapping**
- Do you have questions regarding the structure of the mapping process?
- What do you think about the entrepreneurial ecosystem mapping?
- Do you have questions about the elements that are part of the entrepreneurial ecosystem?
- What do you think about using the entrepreneurial ecosytem mapping as a foundation for creating value in the entrepreneurial ecosystem?
3. **Part 2 – value creation process**
- Do you have questions regarding the value creation process?
- Do you have questions about the value that is created?
- Do you have questions about identifying the startups´ needs?
- What do you think about the three activities for decreasing search costs?
- What do you think about the process of connecting the startup to the entrepreneurial ecosystem?
- Do you have questions about activating the entrepreneurial ecosystem?
4. **General discussion**
- Do you think that the entrepreneurial ecosystem will be activated after the entrepreneurial ecosystem mapping and the value creation process?
- Can the solution be improved?
- Is the roadmap helpful for your organization?
- Does your organization reap value from the roadmap?
5. **Closing**

Ending the session, thanking the participants for participating in the focus group. Explain what will be done with the results and ask if it is possible to contact them if anything is unclear or to confirm certain feedback points.

This appendix shows the coding schemes used to answer sub-research question 1 and 2.

Coding scheme for answering sub-research question 1

Aggregate code	Second-order code	First-order code	Definition	Files	References
entrepreneurial ecosystem elements	Material attribute	Entrepreneurial support Organizations	Two types ESOs are present in the Brainport entrepreneurial ecosystem: incubators and accelerators. ESOs are recognized as vital organizations for startup support and entrepreneurial ecosystem building. However, there are thirteen ESOs in Brainport which is a lot, but no ESO is focusing on brainport startups without a commercial goal in mind.	14	48
		Experienced entrepreneurs	Experienced entrepreneurs are a valuable source of information and experience for startups. However, startups mention that not only successful entrepreneurs can be valuable, but there could also be more emphasis on entrepreneurs that failed to learn from their mistakes.	8	18
		Government	The government is part of the triple helix and is recognized as an important organization that has the power to change regulations and policies. Some regulations should be reformed, such as tax legislations, that could be more stimulating towards entrepreneurship	5	9
		Higher educational institutes	There are three HEIs in Brainport with the main focus of educating the workforce. The TU/e is seen as the most important because it is also performing research and actively commercialize technology, which makes the TU/e a so called entrepreneurial university. The TU/e is embedded in the ecosystem and has developed a chain of organizations aimed to support entrepreneurship through various phases	13	38
		Large corporations & SMEs	Large corporations are seen as a source of innovation and entrepreneurship. Furthermore,	6	19

			they can also be a partner and mentor for the startups by helping with funding and resources, business model validation, and finding new clients.		
		Media	Some startups have used media, such as television shows and newspaper. The startups benefitted from the media by increased exposure and attention.	3	4
		Leadership	Leadership in the entrepreneurial ecosystem is recognized as important. However, according to the interviewees leadership within the Brainport entrepreneurial ecosystem is currently absent which leads to an unstructured ecosystem.	7	13
		Service providers	Many different service providers exist in the Brainport entrepreneurial ecosystem. They are recognized as important because startups need a wide array of services, such as legal, accounting, and tax advice. However, the pool of service providers is unstructured and there is a lack of preferred partners in the Brainport ecosystem.	7	21
	Social attribute	Financial resources	Financial capital is seen as the most important resource for startups because with financial capital startups can acquire other necessary resources and equipment. Some startups did not experience problems with attracting funding, while other did have problems.	15	36
		Human Capital	Important resource for startups. However, in the Brainport entrepreneurial ecosystem it is very hard to find skilled personnel. Most startups and business developers mentioned that there is a shortage of human capita	5	8
		Infrastructure	Both physical and digital infrastructure were recognized. The physical infrastructure in the Brainport is perceived as good, because The Gate was located close to a train station. Digital infrastructure was also perceived	4	6

			as good. Startups had access to high quality internet via the TU/e network and via Twice. One startup required speed computing which he could also use on the TU/e campus.		
		Intellectual Property	Is used by startups to safeguard technology. Startups that do not have valuable technology or readily available ideas tend to use IP less.	5	6
		Other Physical Resources	Other physical resources are recognized as important for startups, specifically office space but also research labs, and machinery and equipment. Startups mentioned that there is sufficient quantity and quality of housing available. Some ecosystem actors, like the TU/e, have set up organizations specifically aimed to provide housing to startups, which is deemed to contribute to the positive stance towards office space availability.	10	23
	Cultural Attribute	Culture and norms	Positive culture towards entrepreneurship within the Brainport entrepreneurial ecosystem. Interviewees mentioned that within the Brainport a history of collaboration and entrepreneurship is embedded, which can also be seen in the importance of the triple helix in the Brainport. The attitude towards failure is relatively positive, meaning that people see it as a chance to learn.	6	13
Entrepreneurial ecosystem coordination	Coordination	Coordination benefit entrepreneurial ecosystem	Interviewees mention that entrepreneurial ecosystems benefit from coordination because it increase interconnectedness, allocating resources, and promoting the ecosystem.	5	9
		Stakeholder identification	The coordinator should identify startups and stakeholders that should be engaged to locate and participate in the entrepreneurial ecosystem.	3	5
		Motivation	A coordinator should try to motivate startups and stakeholders to participate in the	3	5

			entrepreneurial ecosystem. This can also engage them and motivates them, which benefit the whole entrepreneurial ecosystem.		
		Align goals and objectives	The coordinator is tasked with aligning the interests of the stakeholders. Currently, there are conflicting interests resulting in counterproductive behaviour. This can also harms startups performance.	4	4
		Communication	An important activity that should increase coordination is better coordination. When one central actor is communicating the agenda or events this can improve structure and awareness in the ecosystem	5	6
	The Gate's coordination	The Gate is embedded in the entrepreneurial	Interviewees mention that they think that the coordinator should be embedded in the ecosystem and having close relations with many actors and startups. The Gate is seen as such actor.	4	4
		Lack communication channels for setting the agenda	The Gate is trying to set the agenda by communicating events, stories and others. But because there are no sufficient communication channels, The Gate is unable to set the agenda properly and therefore leading to unstructured and scattered agendas.	3	3
Stakeholders needs	Startup's needs and objectives	Resources	Startups require resources for executing their business activities. The resources represent a variety of different resources that are represented by the resource-based view.	6	13
		Survive and growth	Startups mention that one of their main objectives is to survive and grow. This resembles growing into a mature company, acquiring a larger market share, and making a profit in the long-run.	4	6
		Profit	Startups mentioned that an important objective of theirs is to make a profit in the future. Currently, no startups that were interviewed already made a profit.	3	3
		Help others	Two startups mentioned that they want to help others with their company. They do not necessarily want to make a profit, but rather	2	3

			break-even and solve problems for others.		
	Ecosystem actors needs and objectives	Profit	Some ecosystem actors mentioned that they do not receive any subsidies and that their main objective to survive is by making a profit. Therefore this was, above others, their main objective	4	9
		Help startups	Some ecosystem actors said that their main concern is to support startups by surviving and growing.	6	22
		Create regional impact	Ecosystem actors mentioned is that they want to support the regional economy by supporting and facilitating entrepreneurship.	3	4
		Finding startups	Ecosystem actors mentioned is that it must be find easier to find startups and to communicate with them	2	2
		Financial capital	Financial capital is needed for helping startups with funding. Other ecosystem actors mentioned that they require subsidies for their own business activities	5	11
Strength and weaknesses of the entrepreneurial ecosystem	Strengths	Collaboration	Collaboration is prevalent in the entrepreneurial ecosystem.	4	10
		Variety of resources in ecosystem	There is an abundance of different types of resources in the entrepreneurial ecosystem that startups need.	9	15
	Weaknesses	Lack of structure	There is not structure in the entrepreneurial ecosystem which prevents effective coordination.	7	17
		Not enough knowledge in the entrepreneurial ecosystem	Startup expertise is lacking of some topics.	2	2
		Shortage of human capital	There is not enough human capital available in the entrepreneurial ecosystem. Also, the entrepreneurial ecosystem that is available is too expensive.	6	11
		Wrong incentivizing	The way in which the public financial capital is distributed by the government and respective organization is stimulating competition and individualistic behvavior.	3	10
		Political issues between	Political issues between Brainport organizations exist about funding,	6	9

		organizations in entrepreneurial ecosystem	deciding who can support which startups, and who can claim startups' success.		
The Gate's position in the entrepreneurial ecosystem	The Gate's competencies and services	Good support	The Gate is offering good support to startups.	2	2
		High expertise on IP	The Gate has expertise and enough IP specialists available for the startups.	3	3
		Good incubation program	The incubation program that The Gate hosts is good and helpful for the startups.	1	1
		Specific knowledge about entrepreneurship	The Gate posses important knowledge about entrepreneurship that it uses sufficiently to support starting entrepreneurs.	2	3
		Demand-driven incubator	The Gate is not actively identifying resources and The Gate is not forcing participation from startups. This results in a distance between The Gate and the startups.	3	4
		Refering startups to partners	The Gate is refering startups to the ecosystem actors and is making the connection between them.	3	8
		Not facilitating the linking process	The Gate is not facilitating the connection process between startups and ecosystem actors.	6	
		Physical location	The Gate offers a physical location that the startups can use for business and social activities.	3	5
	The Gate is embedded in the entrepreneurial ecosystem	Good connection with organizations in Brainport	The Gate has an extensive network with many organizations in the Brainport entrepreneurial ecosystem.	7	21
		Good connections to TU/e	Th Gate has good connections with different departments of the TU/e.	3	4
		Good flow between Innovation Space and The Gate	There is a good flow of startups and entrepreneurs from Innovation Space to The Gate.	3	5
		The Gate is needed in the ecosystem	The Gate is recognized as an necessary organization in the entrepreneurial ecosystem.	3	3
	Strategic objectives	Technology Transfer	The Gate is executing its technology transfer objective sufficient.	2	2
		Creating economic and social impact	The Gate boost the regional economy by stimulating entrepreneurship and innovation.	4	5

Aggregate code	Second-order code	First-order code	Definition	Files	References
		Support entrepreneurs	The Gate supports entrepreneurs by guiding them through their entrepreneurial journey.	8	15

Coding scheme used for answering Sub-research question 2 and 3

Aggregate code	Second-order code	First-order code	Definition	Files	References
Barriers and Challenges for activating the entrepreneurial ecosystem	Cognitive barriers and challenges	Not having a relation with startups	Startups have the feeling that The Gate is not developing a relation with them and is focusing more on TU/e startups than on other startups.	7	22
		Startups not sufficiently helped	Startups are not sufficiently helped by The Gate or ecosystem actors. For example being helped takes too long, startups are not helped with funding and market validation, or are receiving wrong information.	5	11
		Startups start operating independently	Startups are looking for other ecosystem partners than The Gate or are handling things independently, such as funding and housing.	4	14
	Social barriers and challenges	Low actor and startup awareness	Actors do not become aware of each other and do not develop relationships which leads to a less dense network resulting in less efficient exchange of information.	6	19
		No buzzing community	Actors do not become aware of each other and do not develop relationships which leads to a less dense network resulting in less efficient exchange of information.	4	18
	Structural barriers and challenges	No coordination	Actors do not know what needs to be done and what is needed. Startups do not know what is available in the entrepreneurial ecosystem and how to acquire certain resources.	3	12
		Not linking external network	Actors do not know what needs to be done and what is needed. Startups do not know what is available in the entrepreneurial ecosystem and how to acquire certain resources.	7	19
	Cultural barrier and challenges	Events have low attendance rate	The events organized in the entrepreneurial ecosystem have a low attendance rate. This might be caused by uninteresting events and that the events organized required too much commitment from the startups.	6	8

		Not enabling cooperation	The Gate is not enabling cooperation in the entrepreneurial ecosystem because it is not developing trust between actors, an uniform ecosystem goal is absent, not all information is shared, and a uniform culture is not created.	4	9
Activating entrepreneurial ecosystem	What is an activated entrepreneurial ecosystem?	Actors are committed to the entrepreneurial ecosystem	An activated entrepreneurial ecosystem means that actors and startups are engaged to the entrepreneurial ecosystem and actively participate in the entrepreneurial ecosystem by developing relations and contribute resources to entrepreneurial ecosystem.	4	8
		High network density	Many actors and startups are active in the entrepreneurial ecosystem.	3	3
		Abundance of resources and knowledge	Good availability of resources and knowledge and startups are able to acquire them.	7	8
		Vivid community	The entrepreneurial ecosystem is a vivid community with events are taking place and people recognize the community as vibrant and successful.	4	5
	Creating value from the entrepreneurial ecosystem	Ecosystem actor become active in entrepreneurial ecosystem	When actors can create and capture value in the entrepreneurial ecosystem they will locate to the entrepreneurial ecosystem and participate in the entrepreneurial ecosystem.	4	6
		Startups generate value from entrepreneurial ecosystem	Startups reap value from locating and engaging in the entrepreneurial ecosystem.	5	6
		Startups locate to entrepreneurial ecosystem	Startups will locate in the entrepreneurial ecosystem when they can capture value in the entrepreneurial ecosystem.	8	14
Incubator	Demand-driven	Not proactive	The Gate is not actively asking or providing resources to startups.	2	2
		Distance between The Gate and startups	The Gate is not proactive in developing relationships with startups. This creates a distance between the incubator an the startups.	3	4
		No quality selection	There are no quality criteria and standards a startup or idea must adhere to when scouting new startups. This can lead to dedicating resources to unmotivated or incompetent startups.	3	3

		No fixed milestones	The Gate has not set fixed milestoneds within their incubation programs. This leads to incubator providing support based on their own vision, which harms the uniformity in startups support but also creates a distance between startup and the incubator.	1	3
		Not matching resources to startup's needs	Some resources are not dedicated or matched to the needs of the startups in specific phases.	2	2
		No mandatory participation	The Gate is not forcing startups to participate in certain events or programs. This leads to lower participation in the incubation program.	3	4
	Incubator assertiveness	Would improve startups support	Startups mention that they think that they would benefit from an incubator that behaves more assertive.	3	3
		Remove barriers	The assertive incubator can remove barriers for startups that are hesitant to ask for support or resources because they would have a closer relation and would be forced by nature to ask for resources or support	2	2

Appendix L – Element frequency table

Nr	Element	Frequency	Reference
1	Financial Capital	38	*Acs et al., 2017, 2018; Bertello et al., 2022; Bischoff et al., 2018; Breznitz & Zhang, 2019; Chang, 2004; Cohen, 2006; Cohen et al., 2019; Colombelli et al., 2019; Colombo et al., 2019; Cumming, 2019; Cunningham et al., 2019; Feldman et al., 2019; Foster et al., 2013; Fuster et al., 2019; Ghio et al., 2019; Guerrero et al., 2021; Guerrero & Urbano, 2017; Han et al., 2021; Hechavarría & Ingram, 2019; Huang-Saad et al., 2017; Isenberg & Global, 2011; Kapturkiewicz, 2021; Liguori et al., 2019; Maroufkhani et al., 2018; Minguzzi & Passaro, 2000; Neumeyer et al., 2019; Neumeyer & Santos, 2018; Nicotra et al., 2018; O'Kane et al., 2021; Pustovrh et al., 2020; Schaeffer & Matt, 2016; Spigel, 2017; Stam & van de Ven, 2021; van de Ven, 1993; Vedula & Kim, 2019; Wright et al., 2017; Xie et al., 2021)
2	Government	31	(Acs et al., 2017, 2018; Audretsch & Belitski, 2017; Bertello et al., 2022; Bischoff et al., 2018; Brem & Radziwon, 2017; Brown & Mason, 2017; Cohen, 2006; Cohen et al., 2019; Colombelli et al., 2019; Colombo et al., 2019; Corrente et al., 2019; Cunningham et al., 2019; Foster et al., 2013; Fuster et al., 2019; Guerrero et al., 2021; Guerrero & Urbano, 2017; Hechavarría & Ingram, 2019; Isenberg & Global, 2011; Johnson et al., 2022; Liguori et al., 2019; Maroufkhani et al., 2018; Neumeyer & Santos, 2018; Nicotra et al., 2018; O'Kane et al., 2021; Sahut et al., 2021; Spigel, 2017; Stam & van de Ven, 2021; van de Ven, 1993; Wei, 2022; Xie et al., 2021)
3	Entrepreneurial Support Organizations	31	(Bertello et al., 2022; Bischoff et al., 2018; Breznitz & Zhang, 2019; Cohen, 2006; Cohen et al., 2019; Colombelli et al., 2019; Colombo et al., 2019; Cumming, 2019; Feldman et al., 2019; Foster et al., 2013; Fuster et al., 2019; Guerrero et al., 2021; Han et al., 2021; Hayter, 2016; Isenberg & Global, 2011; Johnson et al., 2022; Kapturkiewicz, 2021; Liguori et al., 2019; Maroufkhani et al., 2018; Mason & Brown, 2017; Neumeyer et al., 2019; Neumeyer & Santos, 2018; O'Kane et al., 2021; Pustovrh et al., 2020; Rice, 2000; Schaeffer & Matt, 2016; Spigel, 2017; Stam & van de Ven, 2021; van Rijnsoever, 2020; Vedula & Kim, 2019; Wright et al., 2017)
4	Higher Educational Institutes	29	(Acs et al., 2018; Audretsch et al., 2015; Audretsch & Belitski, 2017; Bertello et al., 2022; Bischoff et al., 2018; Brem & Radziwon, 2017; Cohen, 2006; Colombelli et al., 2019; Colombo et al., 2019; Cunningham et al., 2019; Foster et al., 2013; Fuster et al., 2019; Ghio et al., 2019; Guerrero et al., 2021; Guerrero & Urbano, 2017;

			Han et al., 2021; Hayter, 2016; Huang-Saad et al., 2017; Johnson et al., 2022; Miller & Acs, 2017; Neumeyer & Santos, 2018; Nicotra et al., 2018; Pustovrh et al., 2020; Rice, 2000; Schaeffer & Matt, 2016; Spigel, 2017; Stam & van de Ven, 2021; Wei, 2022; Wright et al., 2017)
5	Culture and Norms	19	(Audretsch & Belitski, 2017; Cohen, 2006; Corrente et al., 2019; Feldman et al., 2019; Foster et al., 2013; Ghio et al., 2019; Guerrero et al., 2021; Hechavarría & Ingram, 2019; Huang-Saad et al., 2017; Isenberg & Global, 2011; Liguori et al., 2019; Maroufkhani et al., 2018; Mason & Brown, 2017; Miller & Acs, 2017; Minguzzi & Passaro, 2000; Spigel, 2017; Stam & van de Ven, 2021; Vedula & Kim, 2019; Wei, 2022)
6	Humand Capital & Market	17	(Audretsch & Belitski, 2017; Cohen, 2006; Feldman et al., 2019; Foster et al., 2013; Guerrero et al., 2021; Han et al., 2021; Isenberg & Global, 2011; Kapturkiewicz, 2021; Liguori et al., 2019; Maroufkhani et al., 2018; Miller & Acs, 2017; Minguzzi & Passaro, 2000; O'Kane et al., 2021; Spigel, 2017; Stam & van de Ven, 2021; Vedula & Kim, 2019; Xie et al., 2021)
7	Infrastructure	12	(Audretsch et al., 2015; Audretsch & Belitski, 2017; Brown & Mason, 2017; Cohen, 2006; Foster et al., 2013; Guerrero et al., 2021; Hechavarría & Ingram, 2019; Huang-Saad et al., 2017; Sahut et al., 2021; Spigel, 2017; Stam & van de Ven, 2021; Xie et al., 2021)
8	Large corporations & SMEs	10	(Bertello et al., 2022; Bischoff et al., 2018; Brem & Radziwon, 2017; Cohen, 2006; Cohen et al., 2019; Colombo et al., 2019; Cunningham et al., 2019; Fuster et al., 2019; Johnson et al., 2022; Maroufkhani et al., 2018)
9	Network	9	Cohen, 2006; Colombelli et al., 2019; Guerrero et al., 2021; Hollow, 2020; Minguzzi & Passaro, 2000; Neck et al., 2004; Nicotra et al., 2018; Spigel, 2017; Stam & van de Ven, 2021)
10	Intellectual Property	6	(Audretsch & Belitski, 2017; Guerrero et al., 2021; Han et al., 2021; Hechavarría & Ingram, 2019; Kapturkiewicz, 2021; Pustovrh et al., 2020)
11	Service providers	5	(Bischoff et al., 2018; Breznitz & Zhang, 2019; Cohen, 2006; Foster et al., 2013; Spigel, 2017)
12	Other Physical resources	3	(Audretsch & Belitski, 2017; Cohen, 2006; Hechavarría & Ingram, 2019)
13	Leadership	2	(Huang-Saad et al., 2017; Stam & van de Ven, 2021)

Actors

Financial capital providers

Startups require financial capital in order to establish and grow their business. However, due to their risky nature, many financial capital providers are hesitant to provide loans or other funds (Isenberg & Global, 2011). Therefore, in an entrepreneurial ecosystem, other types of financial capital providers provide the necessary supply of funding to startups. Financial capital providers are, therefore, crucial for startups' growth and survival (Stam & van de Ven, 2021). Many different capital providers are present in an entrepreneurial ecosystem.

Because financial capital is central to the entrepreneurial ecosystem, it is also closely connected to other elements. For example, governments, incubators, and large corporations are part of the entrepreneurial ecosystem, but they can also be a source of financial capital. Furthermore, the government has an essential task in structuring the financial markets.

Government

Governments play a critical role in the entrepreneurial ecosystem (Stam & van de Ven, 2021). The government can often be seen as an instigator, feeder, and organizer of the entrepreneurial ecosystem. Governments view entrepreneurial ecosystems as a tool to improve regional economic development, which caused many (local) governments to establish or stimulate entrepreneurial ecosystems (Cohen, 2006; Colombo et al., 2019; Foster et al., 2013). Moreover, the government can allocate resources to the entrepreneurial ecosystem and can be an entrepreneurial ecosystem leader (Colombo et al., 2019; Roundy, 2020). Governments can thus play various important roles in an entrepreneurial ecosystem, which makes it closely connected to other ecosystem actors. An example is the triple helix model, in which the government, large companies, and higher educational institutes collaborate (Brem & Radziwon, 2017).

Higher Educational Institutions

Many startups found their origins at higher educational institutes. Startups are often led by entrepreneurs who have followed education at higher educational institutes, or their technology was initially created from the research of higher educational institutes. Although the primary objective of higher educational institutions remains education and research, they have been tasked with a third goal, which is the commercialization of technology (Colombelli et al., 2019; Nicholls-Nixon et al., 2021). Because universities have shifted towards entrepreneurial universities, they have slowly evolved towards a catalyst of entrepreneurship. Therefore, higher educational institutes, like universities, have an essential role within the entrepreneurial ecosystem. Besides, the presence of a university or other higher educational institutions within an entrepreneurial ecosystem is important because they increase the stock of knowledge among the regional population (Nicotra et al., 2018).

Higher educational institutes are embedded in the entrepreneurial ecosystem because they are an essential source of knowledge, talent, research and technology, and entrepreneurship. Therefore, higher educational institutes are closely linked to human capital because the primary objective of educational institutes is to educate the local workforce. Furthermore, because they are a source of research and technology, they are also closely linked to the technology and R&D element.

Entrepreneurial Support Organizations

Startups are often led by young or inexperienced entrepreneurs. Startups have a high-risk profile that prevents some banks and investors from providing loans or investing, which poses different problems because startups require financial capital to establish and grow the venture. Some organizations have established support organizations, such as incubators, to combat these problems. These support organizations aim to support startups with existential problems such as lack of commercial and managerial problems and lack of funding by offering services such as housing, developing business plans, acquiring funding, and many other services (Bertello et al., 2022; Cohen 2006; van Rijnsoever, 2022; Vedula & Kim, 2019).

Support organizations are an essential element. They are closely related to startups because they tend to bridge the gap between startups and other actors in the entrepreneurial ecosystem (Theodoraki, 2020). Furthermore, support organizations tend to know what startups require to survive, which gives them specific knowledge about the entrepreneurial ecosystem and its strengths and weaknesses.

Large corporations & SMEs

Large corporations are an important element of entrepreneurial ecosystems because they can foster innovation in several ways. Large corporations often perform R&D, which benefits the entrepreneurial ecosystem in two ways: educating, training, and skill-building of local employees; and fostering entrepreneurship by enabling spin-off formation (Bischoff et al., 2018; Cohen, 2006). Moreover, the latter makes large corporations a vital source of startups.

Another role of large corporations & SMEs is a capital provider (Bischoff et al., 2018; Cunningham et al., 2019). Large corporations & SMEs looking for useful technology can scan the entrepreneurial ecosystem for interesting technology startups. When a promising startup is found, the companies can either acquire or finance it and remain close to the source of the technology (Bischoff et al., 2018). Because of the diverse roles large corporations & SMEs can play in entrepreneurial ecosystems, they are important elements closely connected to other elements.

Service Providers

Startups also require ancillary services that mature companies need (Spigel, 2017). Companies require many different services, from notary to legal services and from accounting to financial services. These service providers should not only be present in the entrepreneurial ecosystem but should also be attainable. Some of these service providers can ask for fees outside startups' financial capabilities. Although service providers are often not directly connected to other parts of the entrepreneurial ecosystem, they are still a necessity for startups as they are for other companies.

Leadership

Thriving entrepreneurial ecosystems tend to be coordinated and governed by an entrepreneurial ecosystem leader (Roundy, 2020). Leadership directs the entrepreneurial ecosystem toward collective action (Stam & van de Ven, 2021). entrepreneurial ecosystem leaders usually actively try to build, grow, and promote the entrepreneurial ecosystem (Stam & van de Ven, 2021). The leadership of entrepreneurial ecosystem is voluntary, without any direct monetary benefits. Leaders have informal authority and are usually seen as a leader based on their characteristics, such as expertise, reputation, network, and resources (Roundy, 2020). That being said, building and governing an entrepreneurial ecosystem still depends on the active participation of many actors. The entrepreneurial ecosystem leader can only try to involve the actors, create a mission, align their goals, and enable them to cooperate (Roundy, 2020; Spigel, 2016).

Social attribute

Human Capital

Startups need skilled employees that have either knowledge about the technological domain of the startup or have specific experience with working in a small firm (Spigel, 2017). Therefore, skilled employees must be available, and wages should not be too high that discourage individuals from becoming an entrepreneur because of higher opportunity costs that want to work for startups, and startups must be able to pay this kind of employees (Audretsch & Belitski, 2013, 2017; Vedula & Kim, 2019).

Besides the availability of skilled labor, there must also be a potential customer base in the entrepreneurial ecosystem. Without customers, selling products or services will be challenging, so startups tend to locate in larger markets because this can reap economies of scale (Xie et al., 2021). Another essential characteristic of the local market is that it must be open and well-connected to other national and international markets (Corrente et al., 2019; Foster et al., 2013).

Financial Capital

Startups require finance and funding in order to sustain themselves. There are some critical actors that provide financial capital, which is already outlined in the first part. Financial capital can be provided in different forms to startups. entrepreneurial ecosystems should try to establish financial capital sources tailored for startups. Because of their risk profile, startups tend to have difficulties acquiring traditional loans and investments (Isenberg & Global, 2011). entrepreneurial ecosystems should have other types of financial capital that startups can acquire, such as subsidies, grants, prizes, and venture capital. This type of financial capital is specifically aimed at startups and helps them overcome difficulties in acquiring funding.

Other Physical Resources

Startups require various physical resources depending on the inherent nature of products and technologies. Some startups require research and lab facilities to develop and test their technology. Other startups need specific machinery and equipment to develop and produce their products (Ratten, 2020).

A more general type of physical resource, most startups require our office facilities. Within a particular region, office facilities must be present that fit the startup's budget. Most startups operate on a limited budget and thus require cheap office facilities (Cao & Shi, 2021).

Intellectual Property

Research and development are essential catalysts for innovation. Companies, universities, or other research labs performing R&D can spur innovations. Intellectual property (IP) can enhance R&D in multiple ways. First, IP lets companies or universities protect their innovations and technology against theft by other companies. Second, IP can be a new revenue source by sourcing their valuable IP to other companies and startups (Narasimhalu, 2012). Both characteristics of IP can be valuable for startups because they can protect their valuable idea or technology against other firms who may possess more resources. IP also plays an important role in the valorization process. Today, universities are increasingly tasked with commercializing the technology that originates from the research it performs, and IP can enable universities to perform this task. All in all, intellectual IP can be a valuable resource for startups.

Universities often perform much research, but commercializing it is outside their scope. However, universities today are transitioning to entrepreneurial universities, which entails that universities are actively involved in technology transferring and supporting university spin-offs (Brem & Radziwon, 2017). Also, universities can transfer R&D and knowledge to startups. Therefore, many startups find their origin at the university with technology that was once part of the university's research.

Infrastructure

A well-developed infrastructure connects the entrepreneurial ecosystem to other regions worldwide. Infrastructure is generally divided into physical and informational parts (Audretsch et al., 2015). The physical infrastructure refers to the road and railways within a region. Excellent physical connectivity enhances interaction among ecosystem members, increasing the flow and exchange of ideas (Audretsch et al., 2015). Another part of the physical infrastructure is the amenities and cost of housing (Audretsch & Belitski, 2013; Cohen, 2006). Thriving cities often offer a diverse array of attractive amenities for their local residents. These amenities include varieties of green spaces, theatres, museums, cinemas, coffee shops, art galleries, sports facilities, and so on (Audretsch & Belitski, 2017). entrepreneurial ecosystems that possess these amenities are much more appealing to potential residents and are better able to attract and retain human capital. Finally, the entrepreneurial ecosystem must have reasonable access to basic utilities like water, electricity, and gas.

Secondly, the information infrastructure is a vital part of the total infrastructure within an entrepreneurial ecosystem (Audretsch et al., 2015). The digital infrastructure entails telecommunication networks and the internet (Audretsch & Belitski, 2017; Foster et al., 2013; Spigel, 2017). Today, businesses often rely solely on digital technologies for production and communication.

Fast and reliable internet access is crucial for everyday operations. Therefore, well-developed physical and digital infrastructure is necessary for entrepreneurial ecosystems.

**Cultural Attribute**

Culture and norms

The community's norms and culture can substantially impact the entrepreneurial ecosystem (Audretsch & Belitski, 2017). Although culture and norms represent a very important element of an entrepreneurial ecosystem, it is perhaps the most challenging element to create, manage or replicate (Cohen, 2006). A supportive entrepreneurial culture values entrepreneurship and encourages risk-taking, collaboration, and knowledge-sharing (Stam & van de Ven, 2021; Vedula & Kim, 2019). Furthermore, a culture of trust and safety contributes to the willingness of people and institutions to share resources, information, and knowledge among the ecosystem members (Vedula & Kim, 2019).
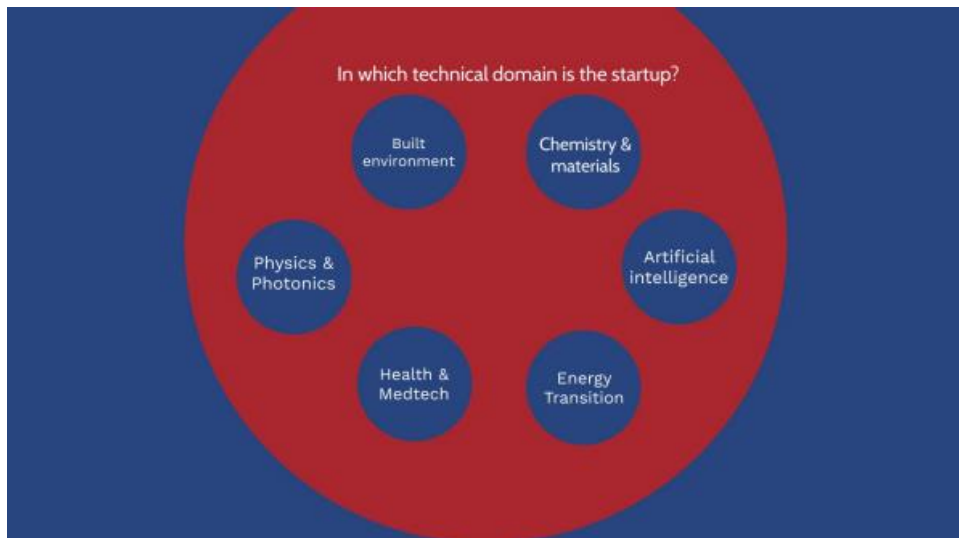
Appendix N – Large image of DS overview
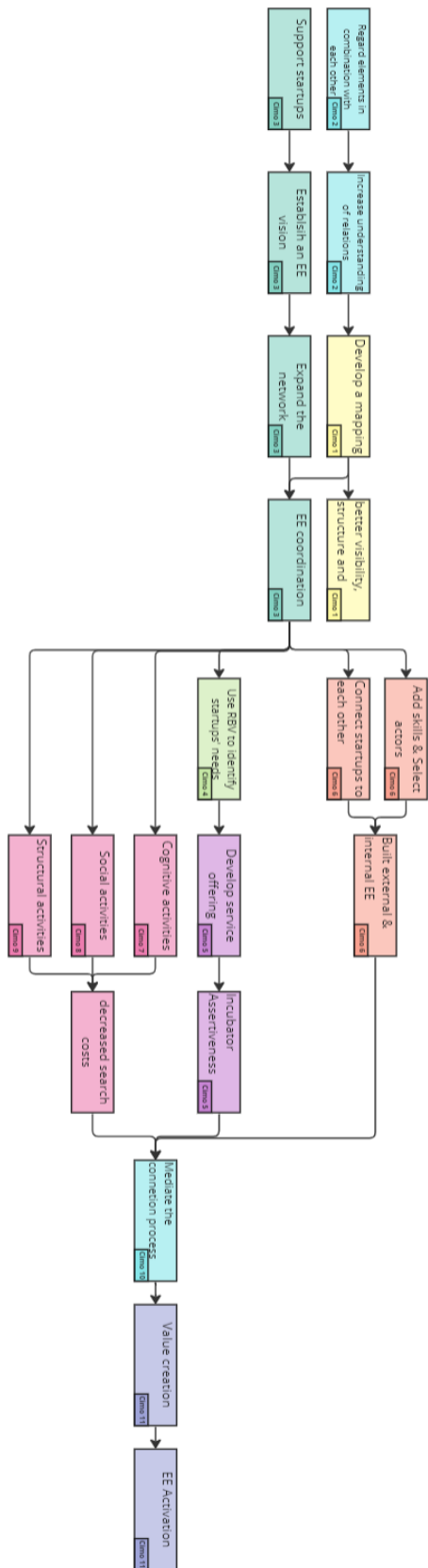
Appendix O – Solution design: Roadmap for activating the entrepreneurial ecosystem
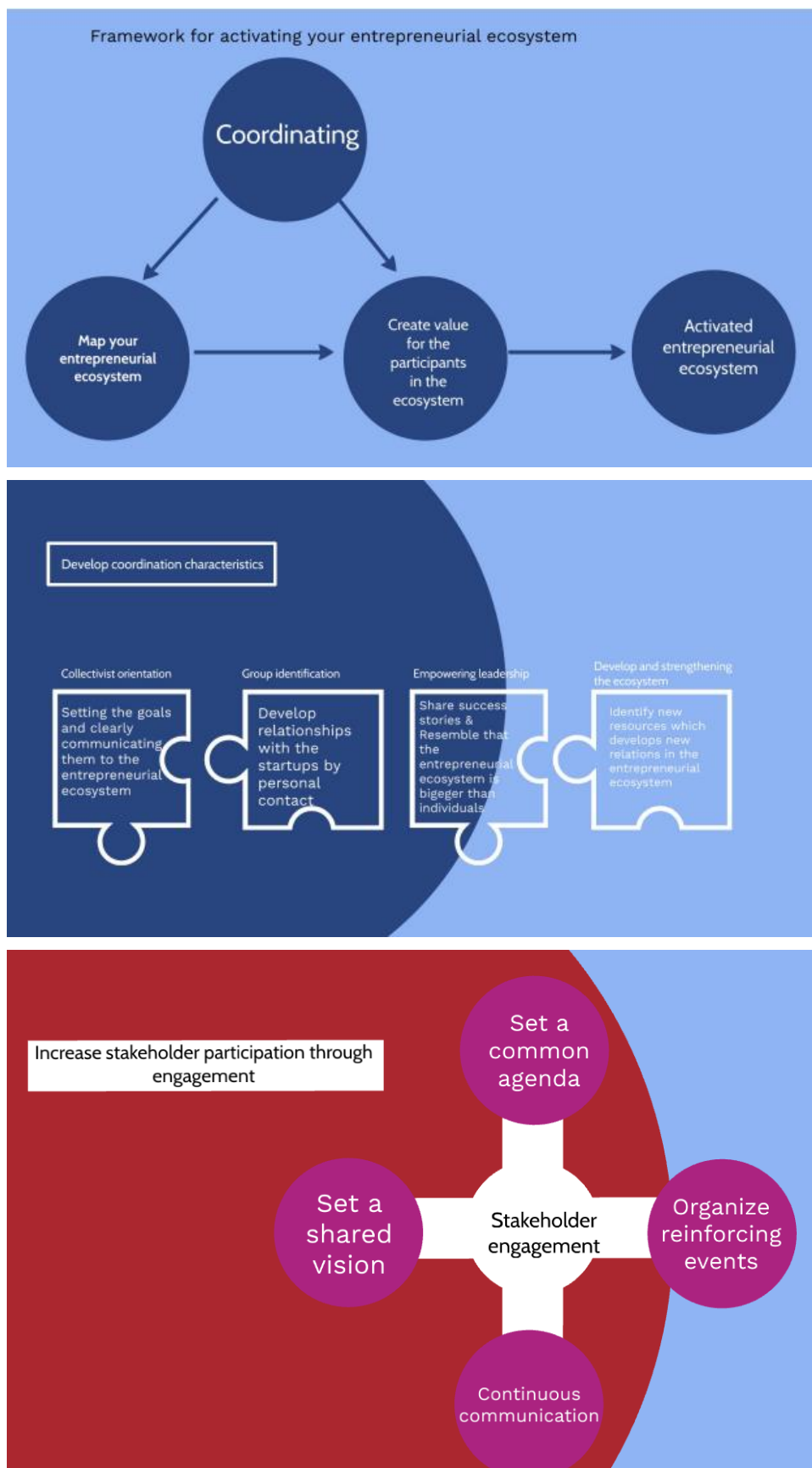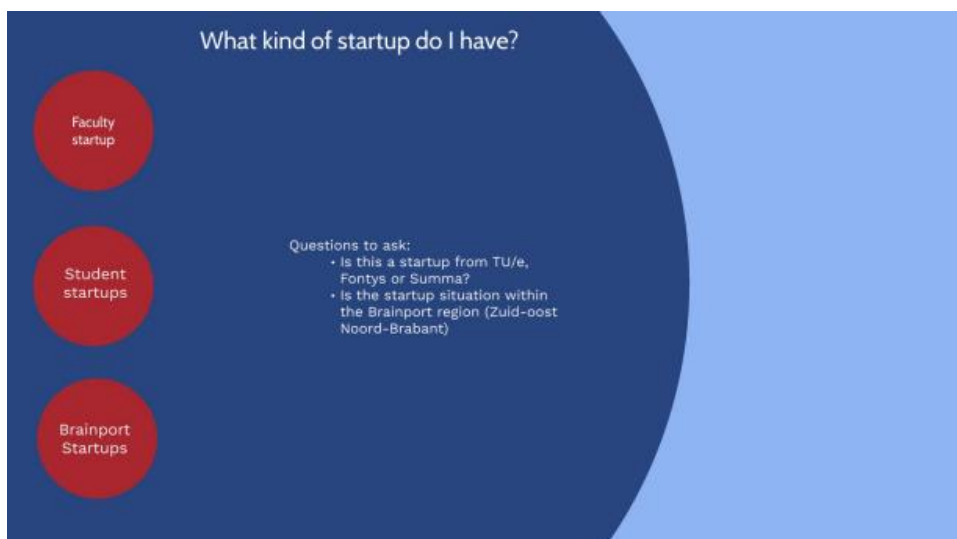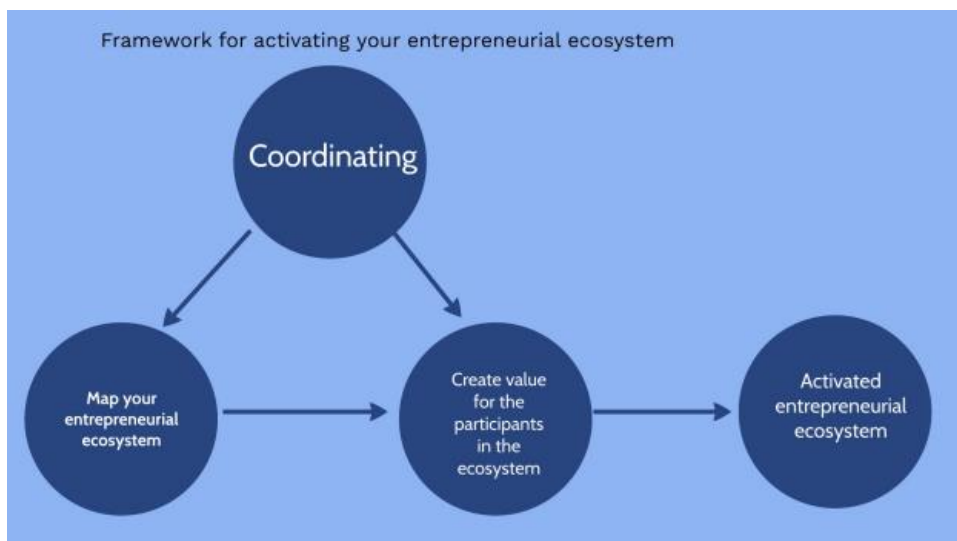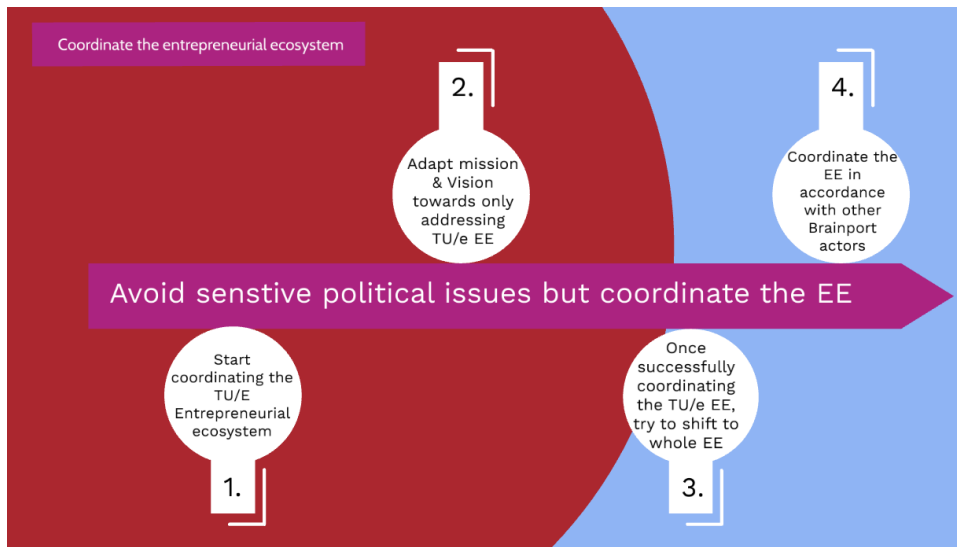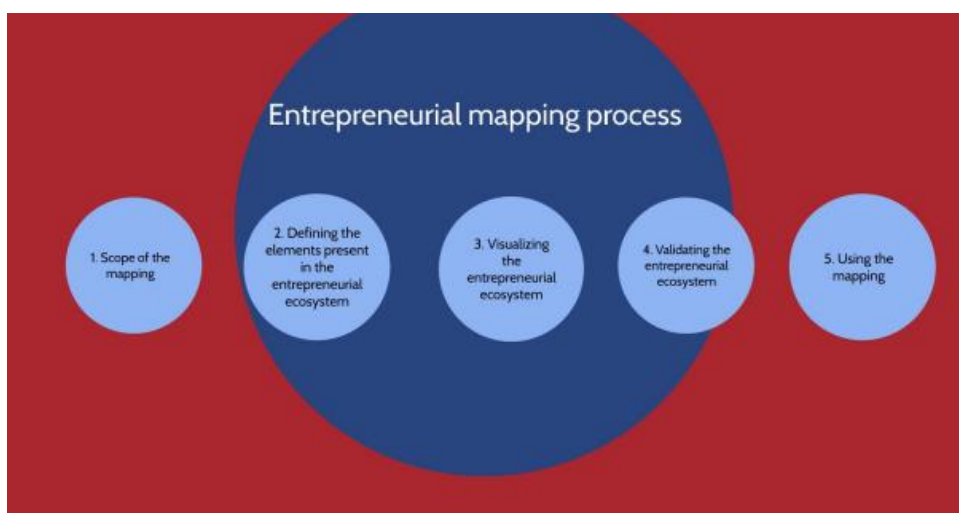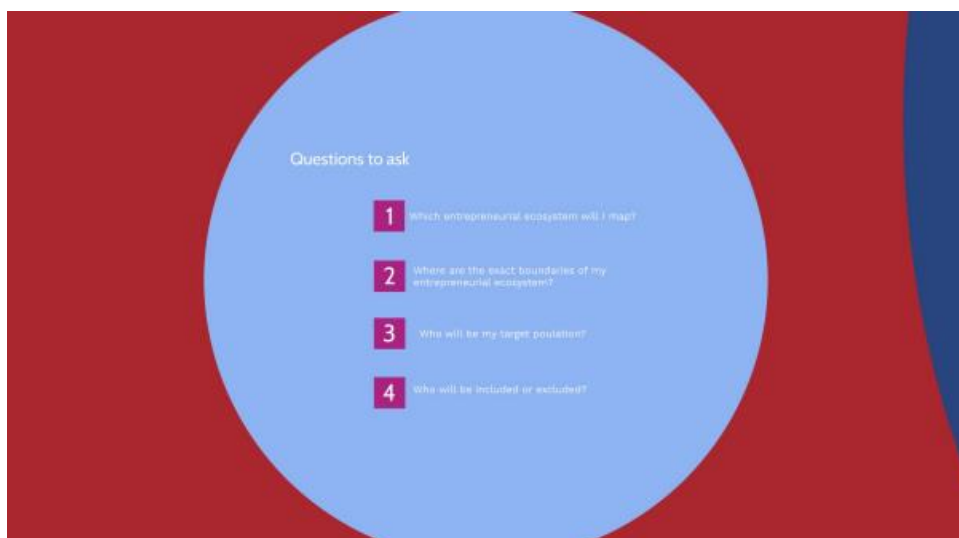
Activity list

1. Which elements are present in my entrepreneurial ecosystem?
2. How will I approach these elements for data collection?
3. What are the relationships between these elements?

Elements of The Gate's entrepreneurial ecosystem

| Material attributes	Social attributes	Cultural attributes
1. Government	1. Financial capital	1. Culture and norms
2. Higher educational institutes	2. Other physical resources	
3. Large corporations & SMEs	3. Human capital	
4. Entrepreneurial support organizations	4. Intellectual property	
5. Service providers	5. Infrastructure	
6. Leadership		
7. Media		
8. Experienced entrepreneurs		

Questions to ask

1. Which tool or software can I use to visualize the entrepreneurial ecosystem?
2. Which tool is best for visualizing the relationships between the elements?
3. How can the visualization be most useful for the users?
4. How much detail should the visualization entail?
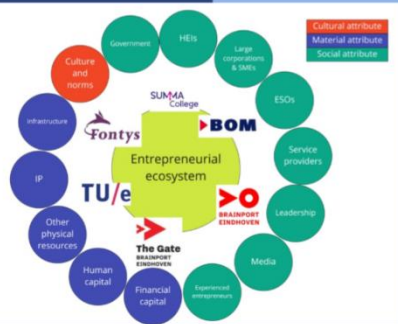
Questions to ask

1. Who will be contacted for validating the results?
2. What is missing in the entrepreneurial mapping?
3. What are the strong points?
4. Does the mapping visualize what it intends to map?
5. Is the usability sufficient for the users?

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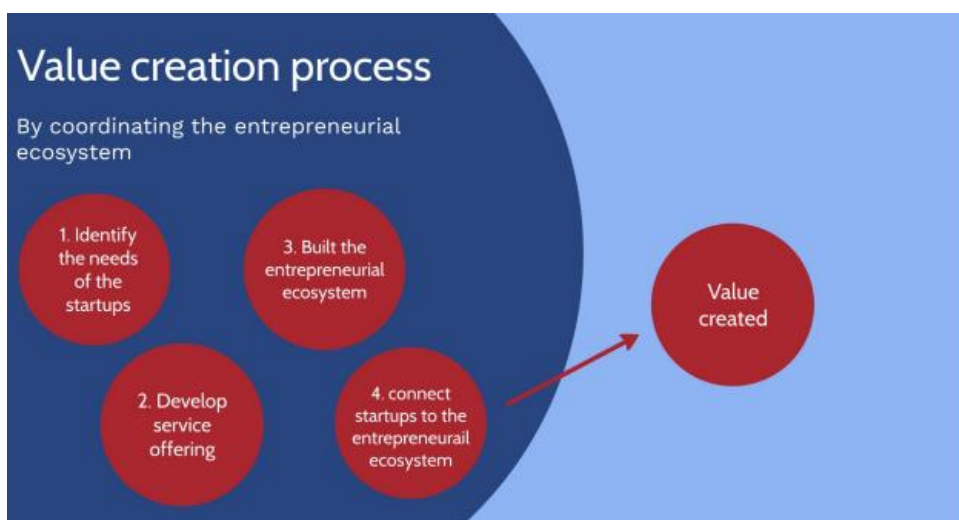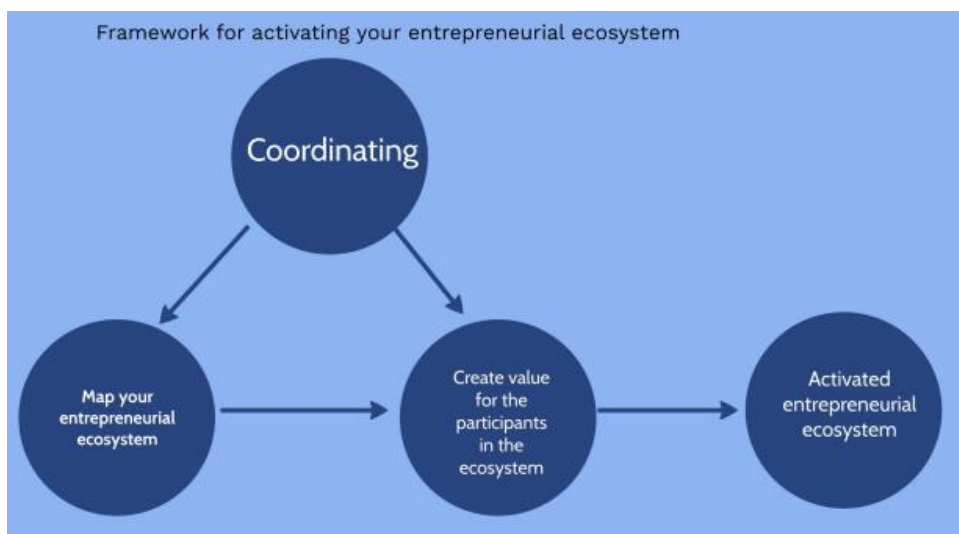
Identify the needs of the startups

- Explicitly ask what startups need
- Observe what startups need
- Take the resource-based view as a starting point

Startups needs based	
Tangible resources	Intangible resources
Physical capital	Knowledge
	Social capital
	Legitimacy
Financial capital	Guidance
	Personal contact

Develop service offering

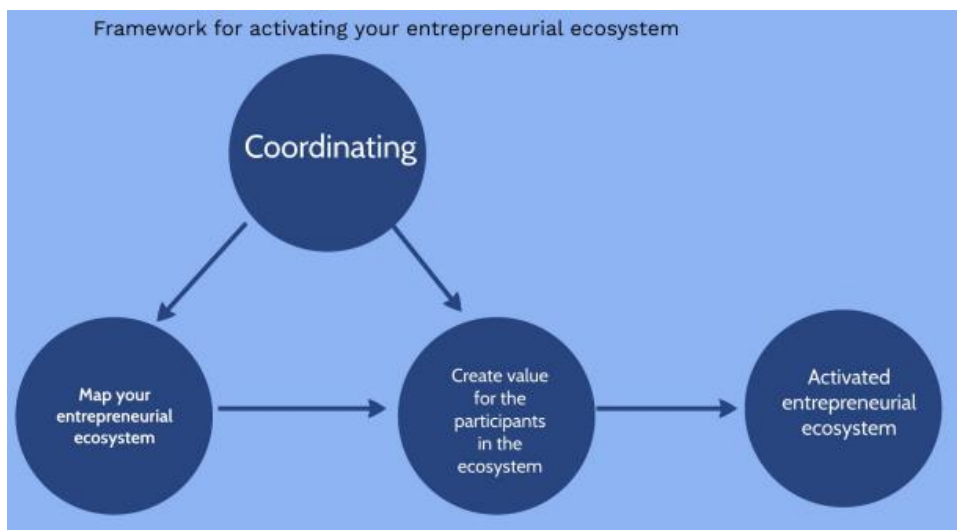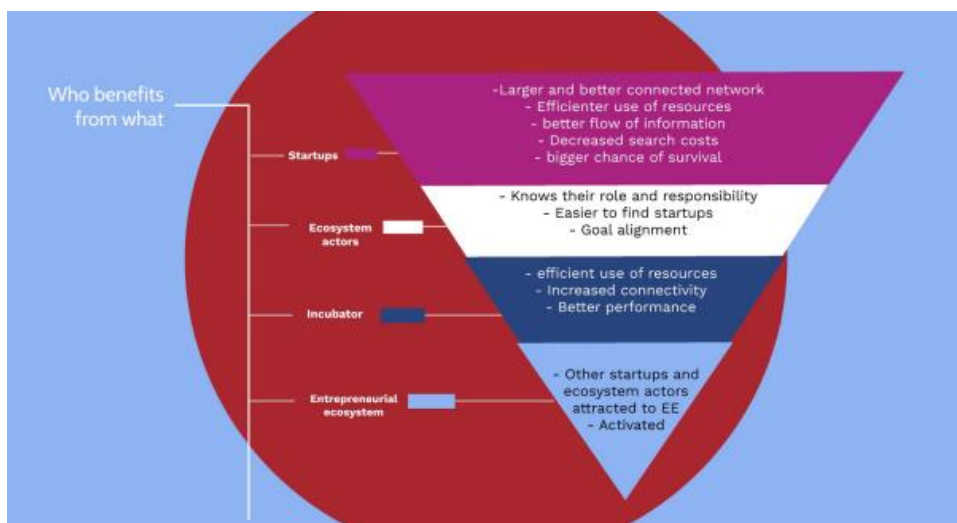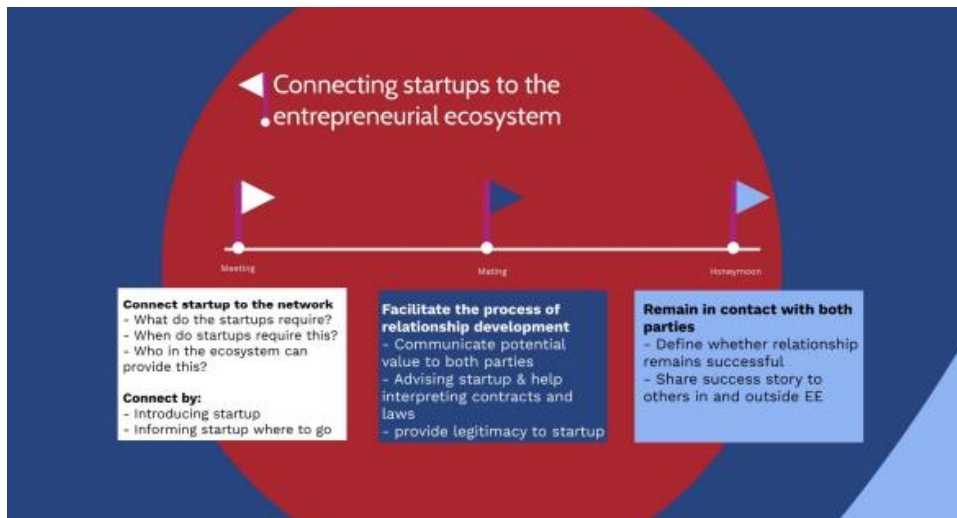| Functional support services	Broad support services
Access to physical resources	Networking
Access to financial resources	Supporting technology transfer
Support services	Community buidling
Legal support & Intellectual Property	
Business development & advice	

Demand-driven Incubator

Be proactive - Set regular meetings

Make attendance mandatory

Assertive Incubator

Strengthen the entrepreneurial ecosystem and decrease search costs

Cognitive Actitvities	Social Activities	Structural activities
Draw attention to organizations outside the EE	Search for new startups	Decide how resources should be allocated in the EE
Create the shared belief that the EE exists	Introducing new startups to other tenants in the building	Decide which actors are in charge of organizing, managing and controlling the process of resource distribution
Develop relations with startups	Introduce new employees of The Gate to the startups	Identify missing links and address these in EE
Inolve startups in the community	Organize events in the EE that aim to increase awareness among members	Develop preferred partner network
Give the feeling to statups that they belong to the EE	Be proactive in the community by asking	Create a uniform way of working in the EE
Have a good reputation in the EE	Facilitate contact between startups	Become integrated in the EE
Share success stories	Be visible in the EE	Align the goals between EE members
	Create groups of startups based on technical domains	Give advice to startups
		Set an ecosystem vision

Activated entrepreneurial ecosystem

"the process of identifying, attracting and engaging participants of the entrepreneurial ecosystem to make the network denser which fosters the flow of information and resources"

Goal

Reason 1

The interconnectivity in the entrepreneurial ecosystem is improved because there is more structure, better cognitive feelings, and increased social relations

Reason 2

Startups and ecosystem actors benefit from the value that is created which engage and activates them in the entrepreneurial ecosystem

Reason 3

New startups and ecosystem actors are attracted to the entrepreneurial ecosystem because of the lighthouse effect. This in turn makes the ecosystem denser which contributes to better flow of information and resources.