

MASTER

Aligning partners from different markets

An innovation ecosystem design

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Award date:
2023

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Aligning partners from different markets:

An innovation ecosystem design

A master thesis by Jimmy van Zichem

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Eindhoven, August 14, 2023

Keywords: start-up, innovation ecosystem, design science research, joint value creation, strategy-as-practice

Acknowledgements

With this thesis I am officially concluding my life as a student at the Eindhoven University of Technology. My journey started as a first-year bachelor student in Psychology & Technology. After obtaining this degree I felt I still lacked some hands-on knowledge to enter the 'real' world, and I enrolled in the master's program Innovation Management. Finally, as I am now completing this master's program, I am surely well prepared to start my professional career. For this final project I was able to work on a topic that interests me; innovation ecosystems, and was allowed to implement methods that puts social contact on the forefront. This is what energizes me, and I will be forever grateful for this opportunity.

First, I would like to thank Maurits Overmans, who presented me with the opportunity to do my graduation project at Aristotle Cognitive Technologies. He approached me based on the person I am, and not on my credentials, which I really appreciated. Also, this opportunity gave me valuable insights in the inner workings of an innovative start-up, working hard to help the world.

Second, I want to thank my supervisor, Rianne Valkenburg. She gave me the freedom to pursue the project of my liking. Our weekly meetings provided me with the guidance I needed, and at times when I was not sure what to do, her advice helped me tons. This helped in giving me the self-belief I needed to deliver. Then, I would also like to thank my second supervisor Arjan Markus, whose feedback supported me in making the final touches on this paper.

Third, I want to thank my friends and family, who were part of this seven-year journey. I would like to express my deepest gratitude for not only the support in my educational career, but also for the fun we have experienced during my free time. This has made my time as a student one to remember.

Thank you!

Jimmy van Zichem

Management Summary

Introduction

As a result of globalization, digitalization and rapid market changes, firms have been forced to rethink their organizational boundaries and business models to maintain a competitive edge (Kelly, Schaan & Joncas, 2002; Wu et al., 2022). Instead of the traditional linear order of events where firms individually contribute to a product it is now possible for multiple stakeholders to integrate and apply their resources (Koch & Windsperger, 2017). The trend of increased connectivity, interdependence and co-evolution of actors has given rise to the innovation ecosystem approach in strategic-, innovation- and technology management literature (Adner, 2006; Adner & Kapoor, 2010; Aarikka-Stenroos & Ritala, 2017). In ecosystems, firms coevolve capabilities and work cooperatively around an innovation (Moore, 1993). Companies combine their individual offerings as such to create value that they otherwise would not have been able to (Adner, 2006). Innovation practices cannot be conducted in isolation anymore and new value propositions must be created collectively.

For innovation ecosystems to be successful it is key for all involved actors to be aligned in their motivation to jointly create a value proposition (Adner, 2017). Firms that initiate and lead innovation ecosystems have a central role in realizing the alignment of ecosystem actors towards the envisioned business- and technological goals (Ritala et al., 2013). Recent literature shows that entrepreneurial effectuation principles may apply in the development of ecosystems (Radziwon et al, 2022; Keskin & Markus, 2022). However, these studies emphasize established firm, while the focal firm in question in this study is a start-up.

This paper describes the study conducted at Aristotle Cognitive Technologies; a software start-up that develops cognitive training tools in order to improve peoples' working memory, spatial awareness, and reaction time among others. Their tools are applicable in a range of markets and Aristotle's vision is to create an ecosystem to enable joint value creation with their respective partners. Because their partners hail from different markets, it is not immediately clear how they may benefit from this envisioned ecosystem. Therefore, it is firstly important to find the factors that may possibly align the involved actors. There are numerous challenges coupled with ecosystem development initiatives already, such as partner selection, investment balancing, resource allocation, and alignment of activities (Visscher, Hahn & Konrad, 2021). Additionally, since Aristotle is a start-up, they also have to face the challenges that come with their 'liability of new- and smallness' (Comi & Eppler, 2009). This study aims to support Aristotle in their strategic decision-making, thereby maneuvering efficiently through the initial stages of their ecosystem developmental efforts. It was found that extant ecosystem literature lacks in actionable knowledge that can be employed to aid companies in developing an ecosystem. Thus, there seems to be a need to bridge the gap between theory and practice. This resulted in the following research question to be developed:

How can a start-up develop an innovation ecosystem through the development of a joint value proposition with their partners in multiple markets?

Method

The research objective of this thesis is to design an innovation ecosystem for Aristotle, by which this process will provide actionable knowledge for future companies to employ.

To achieve the goal of bridging the gap between theory and practice surrounding ecosystem development tools and –strategies, the design science research (DSR) approach has been employed in this study (Denyer, Tranfield & Van Aken, 2008). This DSR approach aims to develop the knowledge professionals can use to design solutions for the problems they face (Van Aken, 2005).

As such, this study sets off with research-based approach to map and synthesize existing knowledge surrounding ecosystem development and joint value creation in ecosystems, and translate this knowledge into actionable points of attention. This was done through a theory-based research. Then, a practice-based approach was employed to align Aristotle’s partners, develop a solution to their problem, and extend the research-based results. In this process of designing a solution, the Value Flow Model, as proposed by Den Ouden (2012), was employed. This adopted visual approach enables the visualization of the design decisions in the business models for ecosystems.

Theoretical context

The ‘ecosystem’ concept, adapted from biology, was first introduced in a business context by Moore in 1993. An ecosystem a company resides in refers to the institutions, organizations and individuals that impact both an enterprise itself and its customers and suppliers (Zahra & Nambisan, 2011). Innovation ecosystems are characterized by innovation-driven goals and often include both private and public organizations as well as societal actors (Aarikka-Stenroos & Ritala, 2017). The purpose of innovation ecosystems is to develop novel value propositions through the successful combination of individual firm contributions (Walrave et al., 2018).

In this study, a distinct view to regard ecosystems with, *ecosystem-as-structure*— as proposed by Adner (2017), is employed. This view consists of four elements (activities, actors, positions and links) which collectively characterize the arrangement of actors and activities for value to be created. This approach begins with the focal innovation and considers the activities necessary for the value proposition to come to fruition, after which it ends with considering the actors that need to be aligned. The success of jointly creating a value proposition in ecosystems thus depends on how partners can be aligned and work together (Adner, 2012). The ecosystem strategy that is employed by the focal firm describes the way alignment is structured and assures its position in the ecosystem (Adner, 2017). Throughout the years, several strategies to realize or improve actor alignment have been identified (Walrave et al., 2018). Additionally, various models have been developed to visualize value creation processes in ecosystems (Adner, 2012; Den Ouden, 2012; Talmar et al., 2018), but these lack actionable knowledge ready for managers to employ. This denotes the gap between theory and practice.

The current literature focuses more on high-level constructs to map, manage and design ecosystems. While these models support strategic decision-making in developing and managing ecosystems, there is no research dedicated to how a firm can transform their existing relationships in order to develop an ecosystem. As such, that is the gap that is addressed through this study. By means of supporting Aristotle throughout the design process of their envisioned innovation ecosystem, actionable knowledge shall be produced, which can subsequently be employed by firms in similar situations.

Results

To gather the required data for this theory-based aspect of this, a systematic literature review, and interviews with several academic experts in the field of innovation ecosystems have been conducted. The results of this part of the research propose several clusters of factors, by means of a conceptual model. These clusters contain the actionable points of attention in ecosystem development, which managers can employ in their value creative efforts. These clusters are: *leadership, shared vision, alignment, governance model, collective identity, trust, knowledge sharing, learning capability, collaboration, and risk analysis*. By implementing these factors in their practices, managers will be able to make more well-informed decisions in their ecosystem development.

Then, for the practice- and case-specific part of this research, multiple interviews with Aristotle's partners have been conducted to get insight in their organizational values, motivations, future visions, and business networks. This data was subsequently used in a co-creation workshop with Aristotle's CEO, to develop a joint value proposition which visualizes the intended alignment structure, hence the concept ecosystem.

Finally, the created artefacts, the conceptual model, and the joint value proposition were evaluated. Regarding the conceptual model it was found that the birth phase of ecosystem development, where Aristotle currently finds themselves in, can be subdivided. This was realized as not all clusters of factors were applicable at this stage. This corresponds with the findings of Dedehayir & Seppänen (2015), who propose the subdivisions of *invention* and *start-up* of the birth phase. The invention phase entails the discovery of a new technology, and the assessment of its technical feasibility. Here, actor connection and ecosystem configuration is focused on. As Aristotle is currently in the invention phase, it was found only the clusters of *leadership, shared vision, collective identity, governance model, and alignment*, are relevant at this point.

By means of evaluation of the developed joint value proposition, it was found that initial intrigue of at least one partner was reached, but the lack of concretization of actions made it difficult to act. This was due to no clear ecosystem strategy being in place yet. In the start-up stage of the birth phase, according to Dedehayir & Seppänen (2015), the operationalization of the technology, improving technological performance, and the resolution of bottlenecks is emphasized. In this phase it is important to implement strategies to concretize the envisioned plans. The employed ecosystem strategy involves the deliberate approach of activities to subsequently entice actor collaboration, propagate knowledge exchange, maintain relationships, and facilitate value creation (Visscher, Hahn & Konrad, 2021). This strategy is therefore key to enter the start-up phase and operationalize the developed vision. In this case, the strategy has yet to be developed and implemented, which is why concretization of actions was not possible. The respective factors in the clusters of *collaboration, knowledge sharing, learning capability, and trust* seem to correspond more to the start-up phase, since these factors entail predominantly operationalization-based action points.

The developed conceptual model thus provides actionable knowledge to employ in the sub-phases of the birth stage of ecosystems. Specifically, the model also gives insight in the order of processes in this birth stage, by manner of the aforementioned sub-divisions. Here, it not only provides insights to ecosystem theory, but also contributes to the strategy-as-practice literature stream.

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1. Introduction

As a result of globalization, digitalization and rapid market changes, firms have been forced to rethink their organizational boundaries and business models to maintain a competitive edge (Kelly, Schaan & Joncas, 2002; Wu et al., 2022). Untraditional organizational structures have to be adopted to capitalize on the non-linear flows of (in)tangible resources the twenty-first century technologies have given rise to. This has led to a shift in perspective on competition, which is no longer defined by time, space and resource bundles. Firms now turn to the network in which they operate for resources, alliance partners and critical market information (Zahra & Nambisan, 2012). Instead of the traditional linear order of events where firms individually contribute to a product it is now possible for multiple stakeholders to integrate and apply their resources (Koch & Windsperger, 2017). The modern competitive context requires organizations to engage with a wide range of external partners, from suppliers to customers, competitors and research centers in order to acquire both resources and ideas from the external environment (Bigliardi, Ferraro, Filipelli and Galati, 2020). The trend of increased connectivity, interdependence and co-evolution of actors has given rise to the innovation ecosystem approach in strategic-, innovation- and technology management literature (Adner, 2006; Adner & Kapoor, 2010; Aarikka-Stenroos & Ritala, 2017).

Through the ecosystem lens, a firm is viewed not as a single entity but as part of an ecosystem crossing a variety of industries (Moore, 1993). In ecosystems firms coevolve capabilities and work cooperatively around an innovation (Moore, 1993). Companies combine their individual offerings as such to create value that they otherwise would not have been able to (Adner, 2006). The ecosystem perspective has focused attention on new models of value creation and –capture (Adner, 2017). Where companies used to emphasize control and focus on internal R&D in ‘closed’ business models, Chesbrough (2003) noted that firms now commercialize in- and external ideas through deploying outside (and in-house) paths to the market in a model of ‘open’ innovation. Innovation practices cannot be conducted in isolation anymore and new value propositions must be created collectively.

Organizations thus need to effectively make use of their relationships with their customers, partners and/or competitors following the increased pace of markets and technology complexity that asks for an interconnected web of actors (Anggraeni, Den Hartigh & Zegveld, 2007). For innovation ecosystems to be successful it is key for all involved actors to be aligned in their motivation to jointly create a value proposition (Adner, 2017). Therefore, in the design of such ecosystems it is critical to strategically select the involved actors to create this alignment towards the new proposition. To create, shape, navigate through and exploit ecosystems firms are required to have entrepreneurial insight coupled with strategic thinking (Zahra & Nambisan, 2012). Firms that initiate and lead innovation ecosystems have a central role in realizing the alignment of ecosystem actors towards the envisioned business- and technological goals (Ritala et al., 2013). This comes with various challenges, when concerning the strategic decisions that must be made regarding who to cooperate with, who to compete with, balancing investments, and how to align internal- and external activities (Visscher, Hahn & Konrad, 2021).

Aristotle Cognitive Technologies is a software start-up that develops cognitive training tools in order to improve peoples' working memory, spatial awareness and reaction time among others. The company has noticed that people's functioning can be hindered following informational overload. Hence, through their tools they wish to assist organizations that aim to improve people's cognitive abilities. Hereby they provide people the handles they may need to perform better in stressful- and uncertain situations. These people range from athletes, to students, or physically injured people. Their tools are applicable in a range of markets and Aristotle's vision is to create an ecosystem to enable joint value creation with their respective partners.

Currently they have partnered up with a professional Dutch football club, a physical therapy clinic, and a neurological institute. This neurological institute, among others, emphasizes special education. The common denominator of the involved parties is that the performance (in either professional sports, physical recovery or education) of the end-users can be enhanced by working on their cognitive abilities. Aristotle not only provides their software, but together with their clients develops, iterates and adjusts their tool based on uncovered user needs. On the one hand this allows for mutual learning, while on the other hand the goal is to continuously increase product-user fit. While the individual relationships between Aristotle and the aforementioned partners are proof of the added value their innovation provides, managerial staff aims to set up cooperative bonds between their respective partners. By way of this collaborative structure resources, information and data can be shared. As such future innovations can be co-created and derivative products can be developed. Aristotle aims to develop an ecosystem with their partners in order to foster this cooperation and further innovate. Technology start-ups have gained increased attention throughout the years as they are a big source of innovation and drive economic growth. However, these start-ups generally also suffer high failure rates due to their new- and smallness, comprising general uncertainty of product quality, lack of reputation in the market and scarce in-house resources (Comi & Eppler, 2009). Besides the benefits from an innovation perspective, the ecosystem can also help Aristotle overcome their 'liability of new- and smallness'.

However, in this case, it is not immediately clear how the involved actors besides Aristotle may benefit from this envisioned ecosystem, and why they would engage in a cooperative relationship. Aristotle has the goal of setting up an innovation ecosystem, with partners active in different markets, and clear commonalities being absent. For the development of this new ecosystem to succeed, it is firstly important to find the factors that may possibly align the involved actors. In other words, it is necessary to find the fuel that allows the engine of innovation to run.

Concluding, the problem in this context is how Aristotle is going to transform the existing 1-to-1 relationships with their individual partners into the innovation ecosystem they aim to reach. Which strategic decisions must be made to align the partners, and how will long-lasting commitments be ensured? Are there certain guidelines or tools that can be employed to support this transformation process and the development of the envisioned ecosystem? Recent literature shows that entrepreneurial effectuation principles may apply in the development of ecosystems (Radziwon et al, 2022; Keskin & Markus, 2022). These principles are applied in entrepreneurial settings and emphasize observing, measuring, experimenting and adapting, opposed to careful planning and execution of actions (Radziwon et al., 2022). Keskin & Markus (2022) pose the effectuation lens to be useful in emerging ecosystems, due to the uncertainty surrounding ecosystem actors, diverging objectives, and

possible fit with a certain value proposition. This perspective may thus be valuable in answering the abovementioned questions. The current research is developed to investigate these questions and aid Aristotle in the process of setting up their innovation ecosystem.

In the following chapters, we will first discuss the main theoretical concepts surrounding ecosystems, after which the problem statement and research questions will follow.

2. Theoretical Background

2.1 What are Innovation Ecosystems?

The ‘ecosystem’ concept, adapted from biology, was first introduced in a business context by Moore in 1993. He indicated the parallels with natural ecosystems in the sense that interdependent species co-evolve with one another in an endless reciprocal cycle. An ecosystem a company resides in refers to the institutions, organizations and individuals that impact both an enterprise itself and its customers and suppliers (Zahra & Nambisan, 2011). The increased attention on the ecosystem perspective in business management literature over the years has been accompanied by various conceptualizations and definitions of ecosystems. These include business-, platform-, industrial- and innovation ecosystems. Innovation ecosystems differ from these other conceptualizations as they are characterized by innovation-driven goals and often include both private and public organizations as well as societal actors (Aarikka-Stenroos & Ritala, 2017). In this research the following definition of innovation ecosystems shall be employed:

An innovation ecosystem is a multilateral set of interdependent organizations, organized around a focal firm or platform, combining specialized yet complementary resources, incorporating both producer and end-user, aimed at jointly creating value through innovation (Adner, 2006; Adner & Kapoor, 2010; Autio & Thomas, 2014; Walrave et al., 2018).

This definition comprises various ecosystem characteristics as noted in ecosystem literature and incorporates three important factors. Firstly, the involved partners are interdependent in the sense that a value proposition cannot be developed by the resources of one firm alone (Adner & Kapoor, 2010; Moore, 2006). Secondly, the ecosystem is organized around a focal firm where organizations combine their individual resources to create a coherent, customer-facing solution. Ecosystems could be seen as an extension of traditional value chains comprising only of suppliers and distributors. As such they can include participants such as financial institutions, regulatory bodies, competitors and customers as well (Autio & Thomas, 2014). Third, through the performance that is achieved when the individual contributions are combined successfully the goal of an innovation ecosystem is to develop a novel value proposition (Walrave et al., 2018).

2.2 Ecosystem Views

Within the ecosystem literature Adner (2017) proposed the distinction between two general views: *ecosystem-as-affiliation* and *ecosystem-as-structure*. The ecosystem-as-affiliation view regards the ecosystem participants to be loosely interconnected, depending on each other for their mutual effectiveness and survival (Iansiti & Levien, 2004). It places emphasis on increasing the number of actors linking to a focal firm or platform, thereby increasing its centrality. Due to this increasing number and intensity of actors the focal firm increases its

bargaining power, which in turn positively affects system value through both direct- and indirect network expansion (Adner, 2017). This approach begins with the actors and the links among them to subsequently consider the possible value propositions that can be generated by the ecosystem. It offers a description to look at interactions on a macro level, but in terms of the strategy guidance it provides limited insight into how value is created.

The ecosystem-as-structure approach consists of four elements (activities, actors, positions and links) which collectively characterize the arrangement of actors and activities for value to be created. Contrary to the former view, the structuralist approach begins with the focal innovation and considers the activities necessary for the value proposition to come to fruition, after which it ends with considering the actors that need to be aligned (Adner, 2017). This alignment comprises whether R&D investments are mutually supportive, and capital investments and operating processes are in concordance with each other (Moore, 2006). Whether or not the actors are able to effectively align affects the extent to which they can create value for the end-user (Jacobides, Cennamo & Gawer, 2018). Both perspectives include all organizations that contribute to the value proposition, but where the ecosystem-as-affiliation view is focused around one or more focal firms, the structuralist approach revolves around the ecosystem value proposition. In terms of strategy the approaches are contrary to one another.

The case can be made for both approaches to be applied in the case of Aristotle and its ecosystem, as on the one hand the emphasis of the envisioned ecosystem is placed on the focal firm/platform, which increases its value and bargaining power through increasing the number and intensity of the involved actors. As such it would make sense to employ the ecosystem-as-affiliation approach. On the other hand, however, it can be said that the ecosystem value proposition is the focal point around which the ecosystem is to be developed. As the ecosystem-as-structure approach extends its strategic view to include both activities and actors over which the focal firm has no control, this perspective shall be used going forward.

2.3 Value Creation

As argued previously, innovation ecosystems serve to create, deliver, and capture value. What gives rise to the creation of value is the understanding of a real customer dealing with a problem in need of a solution. Depending on the perspective (e.g., economical, psychological, sociological etc.) that is taken the perception of value may change. The marketing perspective on value is that it exists in-use. Value propositions should increase the benefits/reduce the relevant sacrifices made by customers while utilizing company competences and resources, and be sufficiently unique to create a competitive edge (Den Ouden, 2012). The customer value provided through such propositions should be developed around the following dimensions: the price, the offered solution(s), use-experience, and meaning. Here, value does not reside solely in the object of consumption, but also in the experience of using it (Marcos-Cuevas et al., 2016). Where value creation and -capture were once regarded as being either provider- or customer-centric, there has been a shift towards seeing these concepts in a more relational or dyadic light. Value creation in open business models include both the expertise of the provider and the operational knowledge of the customer, which are key in delivering higher value to the customer over time. In this sense, value creation encompasses all activities enabling providers, and customers in realizing this value (Sjödín, Parida & Visnjic, 2019).

Thus, value is co-created in interaction between customers, providers and other actors in the ecosystem (Marcos-Cuevas et al., 2016). Value capture (or –appropriation) refers to the ability a firm has to actualize profit-taking, which is how companies realize their own competitive advantages and reaping the related profits (Ritala et al., 2013).

In the world of innovation ecosystems the success of jointly creating a value proposition depends on how partners can be aligned and work together to transform a winning idea to market success (Adner, 2012). Attaining alignment is a critical challenge when considering resource allocation on the road to value creation in ecosystems. As such it is crucial to consider not only the challenges faced by the focal firm but those faced by the various ecosystem participants as well (Adner, 2010). These challenges do not solely have to be of technological nature, but can stem from opportunity discovery, design and development or scaling up as well (Overholm, 2015). The ecosystem strategy that is employed by the focal firm describes the way structures the alignment and assures its position in the ecosystem (Adner, 2017). A key difference between traditional- and ecosystem strategy is the need to develop strategies that recognize and manage indirect links. All individual firms can define their own ecosystem strategy considering its structure, individual roles, and ecosystem risks. The chances of success rise in proportion with the consistency in strategy among the various ecosystem partners, to which the alignment is assessed relatively (Adner, 2017). Several strategies to either realize or improve actor alignment have been identified in previous ecosystem literature, including defining the respective modularity, the coordination of value creation processes, establishment of technological standards and mechanisms for value capture (Walrave et al., 2018).

The shift from firms being perceived as autonomous entities, towards the ecosystem perspective where value propositions depend on individual pieces coming together successfully, has increased the importance of collaboration. However, this increase in collaboration also comes with an increase in interdependence, which can cause problems with the subjectivity of risk perception (Adner & Feiler, 2019). Adner (2006) mentions the importance of a strategy to be developed to mitigate the risks arising due to technical difficulties, issues concerning coordinating innovations across the system or the market not emerging fast enough. In crafting such strategies it should be decided where-, when- and how to compete. For this to be achieved it is crucial for individual motivation, efforts and resources to be aligned, further denoting the interdependent structure of innovation ecosystems.

Throughout the years, various models to visualize the value-creation processes in ecosystems have been developed. For instance, the Value Blueprint, as proposed by Adner (2012). This simplified schematic of an ecosystem includes the ecosystem actors and –components, and serves as a template primarily to assess the risks related to the value creation process. It visualizes the relations between the focal firm, complementors, and suppliers, thereby showing how value is created and delivered to the customer. Additionally, risks are indicated through dots in this template. Adner (2012) also proposes multiple actions to mitigate, or eliminate those risks; individual components can be added, subtracted, relocated, separated or combined. There is also the Ecosystem Pie Model (Talmar et al., 2018), which, in comparison to the Value Blueprint, is more extensive. This circular-shaped tool visualizes multiple design elements in ecosystems value creation, such as resources, activities, value proposition, actors, user segments, value addition and –capture, risk, and dependence.

Through the inclusion of these elements in the model, it provides a more complete understanding to how value is created. In her book *Innovation Design* (2012), Den Ouden proposes the Value Flow Model. This tool offers a visual depiction of how a value proposition is created out of the offerings from different organizations, and how this value flows through the ecosystem. This way it displays the value creation and –capture within the ecosystem. Through visualizing the actor roles and relationships between the respective ecosystem actors the model gives insight in the various value streams in the ecosystem. Additionally it displays individual actors' motivations and relative compatibility, thereby indicating the level of alignment between the various actors in the ecosystem. The Value Flow Model could be a useful tool in trying to reach the alignment within an emerging ecosystem. When actors' visions of value creation are shared within an ecosystem, accompanied by sustained network effectiveness novel joint value offerings can be created successfully (Overholm, 2015).

The importance of developing and employing ecosystem strategies has been made apparent throughout the years. However, as of yet not much is known regarding strategy-as-practice that can be employed by Aristotle in transforming their partner-relationships in order to develop their ecosystem.

2.4 Ecosystem Evolution

Moore (1993) indicated the evolution of ecosystems to be consisting of four stages: birth, expansion, leadership and self-renewal— or death, if not self-renewal. In the first stage the emphasis lies on what customers want, developing a value proposition around it and decide on the best form to deliver it. In this stage cooperation is key in order to realize common understanding of the product and service requirements by all ecosystem members (Moore, 1993; Dedehayir, Mäkinen & Ortt, 2018). This is also the phase that will be emphasized in the current study.

The second phase is pronounced by ecosystems expanding into other territories of application. For this expansion to happen it is necessary that the business concept is valued by a large number of customers and scale-up potential must be present. During expansion it is possible for rival ecosystems to enter the same realm of application, which is why it is critical to develop and maintain strong ties with customers, suppliers and complementors (Dedehavir, Mäkinen & Ortt, 2018). Maintaining healthy relationships with suppliers is also important for firms in their preparation for future leadership, as this constrains other followers from becoming leaders in the next stage (Moore, 1993).

Stage three is marked by a period of determining leadership within the ecosystem and reaching stability in its systems and processes. Coupled with a clear vision for future development this enhances the commitment of suppliers and producers, thereby truly cementing a network of cooperators (Dedehavir, Mäkinen & Ortt, 2018). By taking the leadership role you have the chance to craft the ecosystem to your own strengths. Though it should also be considered that this position comes with risks concerning resource investments over a prolonged period of time (Adner, 2006).

The final stage occurs when a mature ecosystem is threatened by novel emerging ecosystems and/or innovations. Additionally, threats may also arise from shifts in governmental regulations, changes in customer behavior or other external conditions (Moore, 1993). How the ecosystem's leader responds will lead either to the self-renewal or death of the respective ecosystem. Self-renewal entails either slowing down the development of new ecosystems,

generating new innovations or the restructuring of their own ecosystem. If this cannot be put into practice, death is inevitable (Dedehavir, Mäkinen & Orrt, 2018). This further denotes the importance of a coherent ecosystem strategy across the board.

3. Research Gap & Research Question

As Aristotle aims to set up an innovation ecosystem with their existing partners, the current proposed research will focus on the birth-stage of an ecosystem lifecycle. The goal here is to, by means of this ecosystem develop a joint value creation model, enabling the collaboration of the involved firms and co-creation of shared value. This study will be a valuable addition to the existing literature as it will produce actionable knowledge for managers in their journey to design and develop their innovation ecosystem.

The current literature focuses more on high-level constructs to map, manage and design ecosystems. For example, the Value Blueprint (Adner, 2012) emphasizes helping ecosystem actors in discovering, assessing and eliminating bottlenecks within their value creation processes. Or the Ecosystem Pie Model, developed by Talmar et al. (2020); this visual strategy tool helps managers in mapping, analyzing and designing innovation ecosystems. Also, the Value Flow Model (Den Ouden, 2012), which visually supports the development of ecosystems and new value propositions, lacks in actionable knowledge.

While these tools support strategic decision-making in developing and managing ecosystems, there is no research dedicated to how a firm can transform their existing relationships in order to develop an ecosystem. The importance of the ecosystem strategy for risk mitigation, partner aligning and ultimately value creation has been indicated in various articles (Adner, 2006; 2017; Jacobides et al. 2018; Walrave et al., 2018). Recent studies have shown the effectual approach, where learning and experimentation is prioritized over prediction, to be an effective approach in ecosystem emergence and value creation. The effectuation principles have specifically proven useful in ecosystem partner alignment, uncertainty reduction and value creation in the airline industry (Radziwon et al., 2022) and the smart city context (Duygu & Markus, 2022). Valuable takeaways can be drawn from these studies to support nascent ecosystems in joint value creation, though their domain contexts differ drastically from the current research and emphasize established companies. The fact that the focal firm in this study is a start-up is a key takeaway. While having to deal with the challenges coupled with ecosystem development, like partner selection, investment balancing, and aligning internal- and external activities (Visscher, Hahn & Konrad, 2021), Aristotle also has to face their liability of new- and smallness. The general lack of in-house resources, uncertainty of product quality, and lack of reputation pose additional challenges for Aristotle. Therefore, it is both interesting and valuable to investigate how they maneuver this stage of the development of their prospected ecosystem.

Where the current literature falls short is the notion of strategy-as-practice, there is a lack of actionable knowledge that can be used in this particular case. As such, that is the gap that is addressed through this study. By means of supporting Aristotle throughout the design process of their envisioned innovation ecosystem, actionable knowledge shall be produced, which can subsequently be employed by firms in similar situations.

Therefore, it will be investigated how actors from multiple markets can be aligned in order to cooperate and coordinate their resources/capabilities around a value proposition to foster innovation. In doing so this study will answer the following research question (RQ):

How can a start-up develop an innovation ecosystem through the development of a joint value proposition with their partners in multiple markets?

As the answer to this question is unlikely to be found in one go, it shall be answered by means of several sub-questions (SQ):

SQ-1: Which factors influence joint value creation in innovation ecosystems?

SQ-2: How can we align the partners from various markets to facilitate strategic collaboration?

It is not sufficient to solely discover the abovementioned factors through answering sub-question one. In line with the purpose of this research, the pragmatic value of said factors must be assessed as well. Therefore, it is critical to answer the third sub-question as well;

SQ-3: How can the influencing factors for joint value creation support the facilitation of strategic collaboration of partners from various markets?

4. Methodology

The research objective of this thesis is to design an innovation ecosystem for Aristotle, by which this process will provide actionable knowledge for future companies to employ. As in any study the research methods chosen are affected by the context and the envisioned goal. In this chapter the applied research methods of this thesis will be outlined. Firstly, the design science approach will be elaborated on as a means to solve the business problem at hand. Then, the research design will be discussed, including the rationale behind the chosen research methods, sequence of the included steps and the respective data collection and – analysis methods.

4.1 Design Science Research

In attempting to solve a business problem researchers may employ different approaches. When considering these approaches Van Aken (2004) made the distinction between ‘explanatory sciences’ and ‘design sciences’. The former is aimed at knowledge development to explain, describe and predict phenomena whereas the latter emphasizes developing knowledge to solve real-world problems. The relevance of organization and management research has been questioned due to it being considered too emphasized on producing descriptive knowledge and based on the approach of explanatory sciences (Van Aken, 2005). The design science research (DSR) paradigm has the potential of improving the relevance and practical application potential of this research base. In doing so differentiating between knowledge for theoretical- and field problems is key (Denyer, Tranfield & Van Aken, 2008). The DSR approach aims to develop the knowledge professionals can use to design solutions for the problems they face (Van Aken, 2005). Seeing as the research topic of this thesis is a real-life problem, the design science approach was deemed the most appropriate to not only analyze, but also design a real-life solution.

Keskin & Romme (2020) offered an integrative design science framework where they explicate a generic design science research cycle consisting of four steps. Below these four steps are shortly explained.

- 1) **Exploration**. The intended outcome in the first step is the definition of the problem space and to create an in-depth understanding of the business problem.
- 2) **Synthesis**. Reducing the previously obtained information into meaningful and actionable knowledge. This phase entails defining the design propositions, which are subsequently used for creating generic/particular solutions.
- 3) **Creation**. This step is about creating the solutions to the problem and trying to achieve the outcomes previously desired.
- 4) **Evaluation**. Assessing the practical value of the proposed solution and reflecting on the results from the design science project. Both the pragmatic value and the theoretical relevance of the solution are being reflected on in this step.

As indicated before this proposed framework of the design science research cycle is particularly generic. These steps provide an overall guideline through which a design science process can be performed. The nature of this process is highly iterative and a variety of research- and design methods can be applied throughout (Keskin & Romme, 2020). In search of the answers to the sub-research questions various methods were applied, where distinct data-sources were consulted per question respectively. Sub-question one was tackled through a theoretical and research-expert approach, where the generated answer is more general for

the field of innovation ecosystems as a whole. Sub-question two was answered in a case-specific and more context-related manner. The answer to sub-question two is therefore initially also more case-specific, while relevant lessons for those involved in innovation ecosystems can still be deducted. Judging by the differences of the questions in both approach and outcomes it was decided to present the respective processes in two distinct design science cycles. The third sub-question was answered in the general evaluation phase of this research. The evaluation was done through empirical research, upon completion of both design cycles. Typically, in design science research, the created artefacts are evaluated in their respective design cycles. However, due to the interrelatedness of the artefacts in the current research, it was chosen to postpone evaluation until after the completion of both cycles, and dedicate a separate chapter to this process. Below the general goals and applied methods of both cycles, and the evaluation phase, will be discussed.

4.2 Cycle 1

The section below serves as the process outline for design cycle one. This cycle employs an evidence-based approach in order to target research sub-question one, which is:

“Which factors influence joint value creation in innovation ecosystems?”

To answer this question it is necessary to investigate the concepts that constitute value creation in ecosystems. More specifically, as mentioned in chapter 3, actionable points of attention— or factors, for managers have to be deducted. Therefore, extant literature was consulted and synthesized by means of a systematic literature review. Subsequently, research-experts in the field of innovation ecosystems were interviewed, to allow for more in-depth questioning on the concepts at hand. Through discussing the various steps in the design science framework as proposed by Keskin & Romme (2020) the process of answering the abovementioned question will be elaborated on below.

4.2.1 Exploration

Seeing as the concept of ecosystems has been around for little over thirty years now, the answer to this question may not be very clear-cut and unequivocal. Going about answering this question must be done in a coherent and objective manner to ensure both validity and accuracy of the results. Therefore it is essential to thoroughly investigate current innovation ecosystem and joint value creation literature. Hence, a systematic literature review has been conducted in the exploration phase of this cycle. Systematic reviews are regarded as a method to map the evidence base in a certain field as unbiased as possible in order to assess the quality of the evidence and subsequently synthesize it (Mallett et al., 2012). For this reason the indicated method was deemed appropriate to outline the basis of the answer to the aforementioned sub-question. Systematic reviews start with the development of search queries in order to locate relevant studies, followed by an initial screening of the results and the formation and application of certain in- and exclusion criteria. Upon completion of these steps the studies were coarsely screened and their results were synthesized into factors. Factors that found common meaning or served a similar goal were subsequently clustered in a manner that the clusters display important aspects in joint value creation, with the included factors being actionable points for managers. This concludes the literature review process and the first part of the exploration step in this cycle.

The second part was the conduction of ‘expert interviews’. In order to gain knowledge not only stemming from literature, but also in the form of empirical research, it was decided to carry out these interviews. This served the purpose of on the one hand further exploring the factors important in ecosystem value creation, while on the other hand validating the previously found factors through the literature review. These were done with scientists well-versed in the field of innovation ecosystems, hence the name ‘expert interviews’. Interviews allow researchers to gather information about participants’ experiences, beliefs and views concerning a certain research topic (Ryan, Coughlan & Patricia, 2009). Accordingly they enable more in-depth knowledge collection. The interviews were semi-structured, where the first part was exploratory, in order to allow the experts to share their unbiased opinion regarding what they deemed to be critical factors in joint value creation in innovation ecosystems. The second part involved discussing the factors resulting from the literature review and discover possible gaps. This approach enabled the interview data to be compared to the literature review findings to subsequently complement the clusters and respective factors.

4.2.2 Synthesis

The synthesis step of this design science cycle entailed comparing and merging the literature review finds and the interview data. To yield valuable insights from the interview data, a thematic content analysis was done. This qualitative research method was chosen as it offers a way to identify, analyze and report either the obvious semantic meaning in a specific dataset or uncover the latent meanings behind what is explicitly stated (Braun & Clarke, 2012). When performed accurately such analyses can produce trustworthy and insightful findings (Nowell, White & Moules, 2017). First, the interviews were manually transcribed, after which the data was coded by highlighting recurrent topics and/or interesting phrases. Here, literature was used as guideline. This was done to stay close to the subject matters, and enable more efficient comparison of the interview- and literature review data. Subsequently, the codes that found common ground were grouped into themes. Thereafter, the themes were named such that they represented the overarching meaning of the incorporated codes. In naming the themes, the literature review findings were used as guideline to allow for more accessible evaluation of the data. Subsequently, the two datasets were compared and merged, to complement the factors found in the literature review.

4.2.3 Creation

In the third step of this cycle an overview of the found factors was developed. This served the purpose of being a so-called ‘*design proposition*’. In design science an intermediate step to providing a specific solution is the development of design propositions, stemming from research synthesis (Denyer, Tranfield & Van Aken, 2008). These propositions guide researchers in developing their solutions. In this research the design proposition thus stems from the previously uncovered factors, created in the form of a conceptual model. This model visually displays the interrelations between the developed clusters and the appurtenant factors. Creating the model was done by converting the clusters and their factors to a visually comprehensive model. The included relations between the clusters are based on the previously found results and their interpretations. This conceptual model serves as the design proposition in the current research as it provides part of the guideline to design the envisioned solution.

The last step, evaluation, is not part of this cycle. This is the case as the created artefact, the conceptual model, serves as actionable points of attention for managers in ecosystem design and -value creation processes. As the ecosystem design is not part of the current cycle, the evaluation of the conceptual model can only be done when the design is completed. Therefore, the model will be evaluated upon completion of design cycle two.

4.3 Cycle 2

In the section below the process of design cycle two will be outlined. In this cycle a context- and market-related approach was employed, meaning that partners in the current case were consulted as data-sources to answer sub-question two:

“How can we align the partners from various markets to facilitate strategic collaboration?”

In section 2.3, attaining alignment in ecosystems was indicated among others to be dependent on defining modularity, individual firm motivations and relative compatibility. Therefore, in order to answer sub-question two, it must be investigated what the core business entails of the respective firms and what their driving motivations are— both as individual entity as well as in their relation with Aristotle. Then their relative compatibility can be assessed. To gather this information, interviews with management staff of the partners were conducted, as well as with Aristotle’s CEO. These interviews will henceforth be called *partner interviews*. Seeing how the partners are active in different markets it was necessary to look into the respective networks they are active in, as investigating these may also uncover clues to attaining alignment. Consequently, this was also considered during the interviews. Afterwards a co-creation workshop with Aristotle’s CEO was conducted. In this workshop, the interview data was used together with a prospective value proposition to create an alignment structure by means of a concept ecosystem. The development of this concept ecosystem was the goal of this cycle, as it embodies the concretization of the alignment structure, therefore allowing for partner feedback and validation. The interview- and workshop processes will be elaborated on below.

4.3.1 Exploration

The exploration step in the current cycle served the purpose of finding out the core values of the partners’ business, their driving motivations, future visions, and their business networks. This information is key in striving to create an alignment structure, as relative compatibility and modularity can now be assessed more effectively. For this reason it was chosen to conduct interviews with the partners’ management, as this qualitative research method allows to create an in-depth understanding of the inner workings and underlying motivations of their businesses. Semi-structured interview schemes were developed, partially tailored to each customer. General questions to discover core values and motivations were consistent across the various interviews, but questions emphasizing existing business-relations discovered through preliminary investigation were tailored to each partner respectively. The latter questions were particularly aimed at discovering the motivation behind entering into those relations and the value streams generated because of said relations.

Noteworthy is that one of the desired interviews, with management of the neurological institute, could not come to fruition throughout this research. Therefore, to account for this missing interview the necessary information was primarily gathered through desk-research, where the internet was consulted.

The gathered information was subsequently complemented by Aristotle's CEO by means of existing knowledge from prior interactions with the institute's management.

4.3.2 Synthesis

Upon completion of the interviews the data was analyzed. This began with manually transcribing the audio-recordings, upon which the transcripts were read. Relevant and interesting parts were then highlighted and codes were derived based on quotations. These codes were subsequently grouped based on the respective topic the quotes were relevant to. Essentially, the analysis process was done through thematic analysis. However, the approach differed in that themes were pre-defined due to the selection of topics to be discussed. As such, the topics serve the same functions as themes in thematic analysis. Of course, it was taken into account that new themes must be defined for codes that did not fit pre-defined themes. From the analyzed data, firm-based summaries could be made containing their core values, motivations for doing business (also in relation to Aristotle), and their respective business networks including value streams.

4.3.3 Creation

Creation in this cycle was two-fold. In order to make the partner interview data deployable as subsequent input for designing the joint value model it was decided to develop visualizations of their current networks, including the respective motivations and value streams. The second creation phase of this cycle was the development of the joint value model, or the prospective ecosystem. The adopted visual approach, the *Value Flow Model*, as developed by Den Ouden (2012), enables the visualization of the design decisions in the business models for ecosystems, which in turn allows for discussion and adoption of the stakeholders. In this section, firstly, the purpose of this model and its structural elements will be discussed. Thereafter, the exact implementation and process outline in the current research will be elaborated on.

The Value Flow Model (VFM) (Den Ouden, 2012) was created as visualization method for design decisions in ecosystems. These decisions include the offerings each actor provides, the flow of these offerings between actors and the value-creating and –adding activities performed by the ecosystem actors. As such this model visualizes the interactions between each actor and links the customer needs to resource exchanges. Hereby it provides the basis to understand how value is created, and what the value is for included actors. This is consistent with the structuralist approach as described by Adner (2017), which emphasizes the value proposition as focal element and considers the actors and activities needed for this proposition to be realized. Additionally, it gives insight in the alignment of the various ecosystem actors. For this reason, the model was adopted.

A Value Flow Model consists of multiple elements, providing an overview of how a value proposition is created:

- *Actors*. These are the various roles to be fulfilled in the ecosystem (e.g. customers, goods/services suppliers, financiers etc.). It is not always possible to clearly define roles, as users may also be data providers. The level of detail in the model is dependent on the clarity and completeness needed for the project team to have logical discussions.
- *Motivations*. This element represents the intentions each actor has, or the goals they want to achieve through the ecosystem. These are important to be aligned to one another as they play a great part the stability and sustainability of the ecosystem.

- *Compatibility and influence.* Representing the compatibility between the main motivations of the actors and the value proposition. Besides the respective compatibilities it is also important to denote the relative influence of each actor on the decision-making process in the ecosystem.
- *Investment and Throughput Time.* This element roughly indicates the investment of each actor to realize their contributions to value proposition. Besides the monetary investments it is also key to estimate the throughput times of the actors.
- *Transactions.* The fifth element of the Value Flow Model represents anything that can be exchanged between actors. These transactions can consist of goods and services, money and credits, information or intangibles (e.g. experience, reputation, exposure etc.)

The remaining elements in the model are the core value proposition, complementary offerings, the supplying- and enabling network and other stakeholders. These are visually represented in the model in a clustering manner with the core value proposition at the center. This core value proposition is surrounded by the complementary offerings, which make the proposition more attractive but are not essential. The supplying- and enabling network surround the complementary offerings and consists of actors that deliver certain components for the value proposition or play a role in enabling the value proposition (e.g. governmental bodies). By employing the Value Flow Model in the current research both the customers' current networks and the newly envisioned ecosystem design could be visualized. The section below will explicate the development process of the partners' networks, after which the design of the ecosystem will be discussed.

Through the synthesis of the partner interview data, it was possible to make create the VFMs depicting their organizational networks. Because the partner interviews were strictly aimed at gaining information regarding their current networks, the respective value streams and motivations, any pre-existing value propositions were left out of consideration. The structural elements *actors*, *motivations*, and *transactions* were extracted from the interview data. Then, the visualization of the partners' current networks was carried out in Miro (version 0.7.37.0).

The aforementioned networks offer insight in how to align the partners through a joint value proposition in the development of an ecosystem. To conceptualize this value proposition and design the prospective ecosystem, a co-creation workshop with Aristotle's CEO and the first assessor of this thesis was conducted. In this workshop the partners' networks were presented and discussed, as well as their motivations and future visions. This subsequently enabled more effective collaborative elaboration of the joint value proposition, as the relative compatibility of the partners could be assessed more accurate. The Value Flow Model was then used to design this joint value model. Unlike the visualizations of the partners' networks, the novel value proposition formed the centerpiece of the designed prospective ecosystem. To develop this design, prominently discussed topics during the workshop were the goal of the proposition, the roles of the involved actors and the various value flows between them.

4.4 Evaluation Interviews

The sections below outline the evaluation processes of the created artefacts in the two design cycles; the conceptual model and the joint value proposition. Evaluation is key in design science research, as it determines how well a created artefact achieves its intended purpose (Venable, Pries-Heje & Baskerville, 2016). The purpose of cycles one and two, respectively, were to uncover actionable factors for joint value creation, and attaining alignment between the partners through the development of a joint value proposition. Therefore, it will be assessed to which extent those goals were reached. The methods of evaluating, and analyzing the evaluation results, of both design cycles, will be elaborated on in the following sections.

4.4.1 Conceptual model

In the section below, the process of assessing the pragmatic value of the findings from the design cycle one will be outlined. This assessment was done by means of an empirical approach, to find the answer to research sub-question three:

“How can the influencing factors for joint value creation support the facilitation of strategic collaboration of partners from various markets?”

Based on that the discovered factors constitute actionable points for managers to apply in joint value creation efforts, the answer to this question is dependent on the actual pragmatic value of said factors. For that reason, it was decided to conduct an interview with Aristotle’s CEO. This was done upon completion of design cycle two, such that the conceptual model was used to highlight critical points of attention. The purpose here was to bridge the gap between theory and practice, by validating the practical value of the found factors. The following paragraphs will elaborate on the methods used for preparation, execution and analysis of the interview.

In preparation for the interview it was firstly necessary to create a suitable interview guide. While any interview guide must be suitable, what is meant here is that it was considered which factors were actually relevant at this point in time. Since the ecosystem development was still in conceptualization stage at the time this research was conducted, it was not yet possible to include all discovered factors. The interview guide was developed accordingly, and was used as a check-list to see whether important aspects were addressed or at least considered by the CEO.

Upon conduction of the interview, the data was analyzed by means of thematic analysis. The interview transcriptions were read, upon which interesting phrases were highlighted. Then, codes were derived, and grouped based on the topic they were relevant to. Following this it was possible to develop themes, where the pre-defined included topics were used as guidelines for naming the themes. New themes were created for any codes that fell outside the scope of the pre-defined topics, to account for possible bias.

4.4.2 Joint Value Proposition

The evaluation of the main result of cycle two will be outlined below. The purpose of this second design cycle is to assess how alignment can be attained between the various partners. In creating the alignment structure in the developed artefact of this cycle, the joint value proposition, the partners’ individual motivations and future visions were considered. Therefore, the artefact will be evaluated by firstly assessing the partners’ intrigue of the proposed value proposition and evaluating the fit with their overall motivations and future vision.

This evaluation was done through empirical research. Specifically, by conducting an interview, with one of Aristotle's partners. Here, the joint value proposition was discussed and alignment with the aforementioned factors was assessed. Ideally, this was done with all three involved partners, but time constraints and the summer holidays led to only one interview to be conducted, with management staff of the physical therapy clinic. The employed interview guide was developed based on the joint value proposition. Included topics were the alignment with motivations and visions, openness to collaborate with other partners, and added value to current business models.

Upon conducting the interview, the audio-recordings were transcribed, and analyzed through thematic analysis. This was done by means of the included topics in the interview guides. Interesting phrases and quotes regarding alignment of motivations and visions, openness to collaboration, and the added value to current business models were highlighted. This was followed by codes being derived and grouped. Subsequently, themes were named. Subsequent to completing the analysis, the results were noted per theme respectively, after which general conclusions could be drawn.

5. First Design Cycle: Conceptual Model for Joint Value Creation

In the following chapter, the first design science cycle will be discussed in more detail. This involves the exploration, synthesis and creation step including the corresponding research- and design methods and results. As mentioned before, the evaluation step is not included in the current cycle. This is the case as the evaluation depends on combining the results stemming from the first and second design cycle. To reiterate, this cycle aims to answer the first sub-question of this research, which is:

“Which factors influence joint value creation in innovation ecosystems?”

Firstly, the systematic literature review process will be discussed below. The uncovered factors are to be discussed thereafter. Then the expert interviews will be elaborated on, including participant selection process, interview guide, coding scheme and results. This chapter concludes with the developed conceptual model, which combines insights from both the literature study and the interviews.

5.1 Systematic Literature Review

Systematic reviews are stepwise analyses whereby it is firstly key to select a list of articles to include. Therefore search queries have been developed based on keywords extracted from labels and definitions mentioned earlier in this report (see Table 1). These queries were constructed such that at least one keyword from each term was included per query. In total a number of $3 \times 2 \times 4 = 24$ unique queries could be developed by means of the keywords. However, the results of several queries were subsets of previously applied search strings, in addition to other queries showing no results at all. These were subsequently left out of consideration, leaving 12 search strings.

Term 1	Term 2	Term 3
Joint value creation	Ecosystem	Model
Value proposition	Innovation ecosystem	Framework
Value		Template
		Tool

Table 1: Keywords used for search queries.

By applying these queries in the online databases Scopus and Web of Science a total of 1867 studies were found. To find a manageable number of studies from this sample their relevance based on their title was firstly assessed. This resulted in the total pool of studies being reduced to 107. Subsequently, to decide which articles to select for further screening certain in- and exclusion criteria had to be applied. These criteria are essential for both the relevance and focus of the literature review and can be found in Table 2 below.

Inclusion criteria	Exclusion criteria
Publication after 1990	Emphasis on NGOs/social organizations
Written in English language	Literature review
Focus on (in)tangible products	Focus on service industries
Focus on commercial enterprises	No focus on value creation

Table 2: Most common applied in- and exclusion criteria.

Upon applying the criteria, a set of 50 studies was left for further screening. During this coarse screening it was decided to exclude additional studies for multiple reasons; they emphasized general success factors of ecosystems; focused on analysis of ecosystem structures while neglecting how they relate to joint value creation; development of ecosystem models or focus on value creation in contexts other than ecosystems. Only the papers that explicate the mechanisms that facilitate joint value creation within innovation ecosystems were chosen for further analysis. Including back- and forward snowballing this ultimately resulted in a list of 17 papers to be included in the review. The complete list of included articles can be found in Table 3 below.

Reference	Scopus	Web of Science	Snowballing
(Abdulkader et al., 2020)	x		
(Den Ouden, 2012)	x		
(Ritala et al., 2013)			x
(Jacobides et al., 2018)	x		
(Keskin & Markus, 2021)		x	
Ketonen-Oksi & Valkokari, 2019)	x		
(Oskam et al., 2021)	x		

(Pera, Occhiocupo & Clarke, 2016)		X	
(Adner & Kapoor, 2010)	X	X	
(Adner, 2017)	X		
(Steinbruch, Nascimento & de Menezes, 2021)		X	
(Thomas & Ritala, 2022)		X	
(Thomas, Autio & Gann, 2022)		X	
(Tsou, Chen & Yu, 2019)	X		
(Visscher, Hahn & Konrad, 2021)	X	X	
(Wajid et al., 2019)	X	X	
(Kapoor, 2018)			X
(Ben Letaifa, 2014)		X	

Table 3: Reference list systematic literature review.

To provide a concise overview of the literature review study-selection process, Figure 1 has been added.

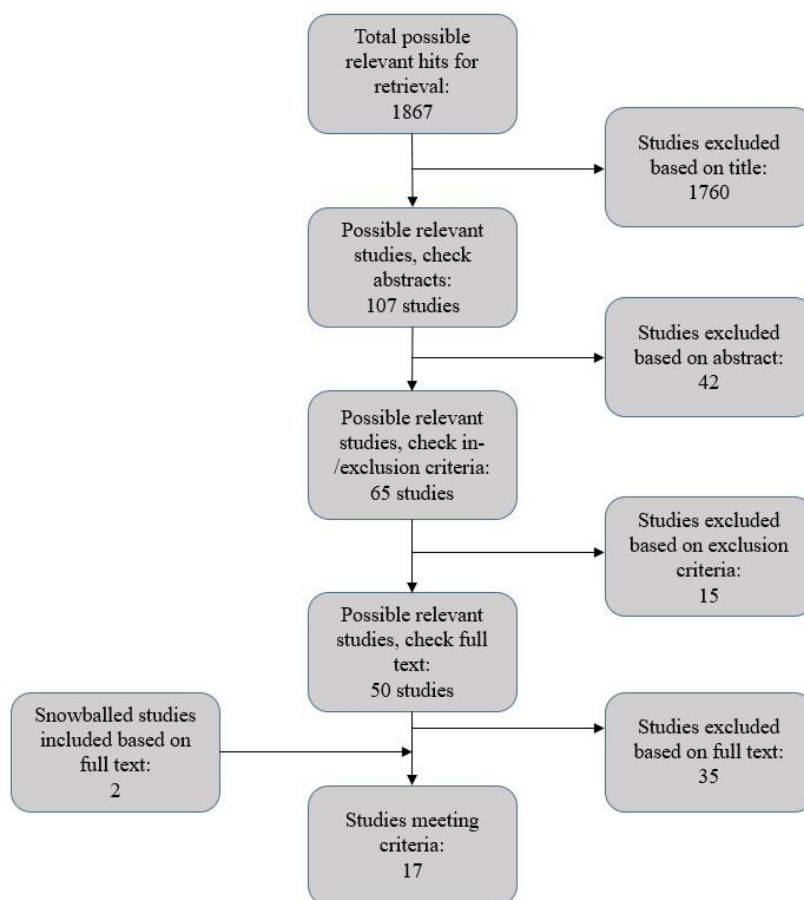


Figure 1: Literature review study-selection process.

The subsequent synthesis of the studies in pursuance of finding an answer to sub-question one started by analyzing the mentioning of mechanisms that affect joint value creation in ecosystems. These were then highlighted and interpreted by the author, in a manner that actionable points of attention could be derived from them. Subsequently, these actionable points of attention were dubbed ‘factors’. These were firstly color-coded to then be tabulated per article respectively in order to reduce bias when interpreting them. Subsequently the highlighted data was analyzed and aggregated based on meaning to form themes, or clusters. These clusters represent the overarching concepts important in joint value creation and are subjected to their respective included factors. An overview of the clusters, and included factors can be found in Appendix A.

5.1.1 Results

The next sections will elaborate on the various clusters of factors; in particular on what managers can do to utilize these factors. Noteworthy is that while the clusters are treated separately a lot of overlap and interrelatedness exists between them. Additionally, the order in which the different clusters are mentioned holds no weight in any possible relative order of importance.

Leadership

Success in the world of innovation ecosystems success depends on the alignment of partners who must work together to bring their idea to the market (Adner, 2012). The involved actors play various roles and while ecosystems are non-hierarchical in structure a leadership role is crucial, in the development phase specifically. This role is key in order to enable all members to invest in a collective future in which they can benefit together. This leader, or orchestrator, is the organization that encourages the ecosystem value proposition and reassures the participants that value will be co-created (Thomas & Ritala, 2022). The leading firm proposes its perspective regarding the prospective ecosystem structure and the included roles. The ecosystem followers, on the other hand, are those who agree and possibly adjust to the set terms (Adner, 2017). A leader should be able to provide its partners with a vision and inspire them to collaborate productively in order to create value (Den Ouden, 2012). It is crucial for the orchestrator to remember that the success depends on the other members. As such, an ecosystem management style should be adopted that emphasizes the community rather than the individual firms, while taking into account the respective members’ needs (Letaifa, 2014).

For a leader to solely proclaim a certain vision is not sufficient for co-creative initiatives to succeed, they should also be a facilitator and orchestrate such processes (Pera, Occhiocupo & Clarke, 2016). This entails setting up structures and supporting the vision by matching people and ideas in concrete ways, which can be in done the form of physical locations to meet up or online platforms (Ketonen-Oksi & Valkokari, 2019). Such infrastructures enable the involved network to set up specific knowledge flows and allows for ideas to be generated, shared, and developed (Visscher, Hahn & Konrad, 2021). However, this is only a building block for knowledge transfer and collaboration to take place. For this to occur the ecosystem orchestrator is to employ a strategy to bring about the activities necessary to instantiate the proposed value proposition (Adner, 2017). The innovation ecosystem strategy entails the deliberate approach of activities to entice actors to collaborate, propagate knowledge exchange, maintain relationships and facilitate opportunity recognition and value creation (Visscher, Hahn & Konrad, 2021). As is the case with any value proposition, regardless of the actors involved, the strategy is there to set the plans in motion and actually materialize the vision.

Alignment

The concept of alignment between ecosystem actors is critical to jointly create value. Due to the highly interdependent nature of the actors' relations in innovation ecosystems it is crucial for all parties to be on the same page. In creating an ecosystem, the emphasis is therefore placed on the actions necessary to assure the realization of the value proposition through the alignment of the actors (Keskin & Markus, 2022). In essence alignment refers to the extent to which the actors are in agreement regarding their relative positions, roles and activity flows (Adner, 2017). If the intended goal is value creation then the perceptions of what actually is valuable must be discussed and aligned. This analysis of what value is should be based around customer value, as this is the center piece that creates the shared value for the participating firms (Abdulkader et al., 2020). The value co-creation process practically starts with ecosystem actors coming together and become aware of their respective needs and expectations (Ketonen-Oksi & Valkokari, 2019). For this shared value to be created the firms then need to act in partnership, understanding and responding to the dynamic needs of the ecosystem as a whole. This reflects the importance of interconnecting the actors' activities in partner alignment efforts (Abdulkader et al., 2020). The importance of a leader employing a strategy to orchestrate and leverage the coherence of the various innovation processes becomes apparent here once again (Visscher, Hahn & Konrad, 2021).

As collaborative effort is the key to success in ecosystems it is important for firms to adjust their individual business model to align with the system-level business model (Oskam, Bossink & de Man, 2021). Stakeholder interaction is crucial for increasing alignment, where common grounds should be sought after in an attempt to understand each other (Keskin & Markus, 2022). However, due to the fact that innovation ecosystem actors more often than not have varying and sometimes opposing goals and interests, tensions can arise. This is especially the case in ecosystems with cross-sector actors, where the firms may have diverging social, economic or environmental goals (Oskam, Bossink & de Man, 2021). Those involved typically approach the solution from the angle of their business and product, thereby possibly hampering the development of the value proposition (Keskin & Markus, 2022). For example, some actors may look for cost-effectiveness, while others prioritize quality of life. Shared drivers are an important factor for the stability and sustainability of an ecosystem, which is why assessing and understanding these differences is crucial in the design of the network (Den Ouden 2012). Therefore— besides roles, positions and activities, alignment also refers to compatible motivations and incentives (Adner, 2017). Identifying and choosing parties that align in their motives is important to trigger and enhance the collaborative value creation efforts and reduce any possible tensions (Oskam, Bossink & de Man, 2021; Pera, Occhiocupo & Clarke, 2016).

Another important factor to take into consideration is the alignment with respect to the complementors; the actors producing complementary products and/or services contributing to the focal value proposition. The complementarities between the ecosystem firms originate from the fact that the functions performed by their respective offerings help to either create or enhance the proposition (Kapoor, 2018). Based on the functions these complements perform, they have varying contributions to the value proposition. Typically, the more specific a complement is the more coordination is required for it to be used in a certain way. Jacobides et al. (2018) have provided a clear understanding of the different types of complementarities. Generic complements are those that are required for a complex innovation or proposition, but

are generic in the sense that they can be purchased without giving rise to particular issues. For example, water is required in order for a new type of kettle to succeed in the market, but water nowadays generally can be purchased in generic terms such that it does not require the producers to specially coordinate for this complement. There are also unique complementarities, which can be described as such that A does not function without B, where A and B can be certain items, steps or activities (Jacobides et al., 2018). Finally, there are supermodular complements which are characterized by that “*more of A makes B more valuable*” (Jacobides et al., 2018). The differences in available complements affect the challenges firms face in creating an alignment structure for the value proposition to materialize (Kapoor, 2018). The challenges complementors face subsequently impact the value proposition, to where the focal firm may be able to offer a complete product or service, but the customer is unable to utilize it to its full potential (Adner & Kapoor, 2010). Therefore, it is important to consider the complementarity of potential partners and incumbent ecosystem actors to reduce uncertainty related to those challenges. In emerging ecosystems it is wise to focus on the available means at hand and how those means can complement each other in order to align and prioritize the uncertainties and challenges at hand (Keskin & Markus, 2022).

Due to bottlenecks being present it is evident that the distribution of challenges within ecosystems is uneven across the various roles (Adner & Kapoor, 2010). The technological architecture of the ecosystem gives rise to system-level interactions between the components, subsequently meaning that a change in one component affects another component. These changes pertain to performance measures, cost, scarcity and any factors affecting these changes (Kapoor, 2018). As such it is crucial when creating this architecture and the relative alignment structure to identify possible bottlenecks and display their effects. Besides the relationships between focal firm and its ecosystem partners this also concerns the internal stakeholders, where varying perceptions of uncertainties and challenges affect the way possible bottlenecks are addressed (Keskin & Markus, 2022). When resolving bottlenecks it is important to consider how firms allocate their resources through investments, collaborations or integrating them into the activities rooted in the bottleneck component (Kapoor, 2018). In that respect this reflects the importance of an alignment architecture regarding both components and complements, where bottlenecks can be identified and resolved in a clear manner.

Governance model

Through their ability in shaping an ecosystem’s design, identity and goals, the ecosystem orchestrator plays a central role in connecting the complementors and users, thereby laying out the foundation for value creation (Thomas & Ritala, 2022). Though this is a key position in ecosystems, there must be certain rules, standards and interfaces to shape the desired behavior for value to actually be created (Jacobides et al., 2018). This gives rise to distinct governance challenges in ecosystems, where relationships are non-hierarchically controlled (Thomas, Autio & Gann, 2022). This non-hierarchical control refers to the fact that all members retain control and claim over their individual assets and resources, meaning that no single party can stipulate, for example, certain prices and quantities (Jacobides et al., 2018). Thus, creating a governance model balancing standardization versus variety, control versus autonomy and the individual- versus collective interests can pose some challenges (Thomas, Autio & Gann, 2022). Ecosystems rely mostly on informal mechanisms such as role definitions, the complementarity and alignment— contrary to customized dyadic supplier contracts, delivery obligations and specific rewards for various participants (Thomas, Autio

& Gann, 2022; Thomas & Ritala, 2022). As such this poses the question to how the ecosystem actors come to an agreement regarding their roles, positions in the system and the outcomes. The answer to this question is generated by conscientious orchestration to persuade the firms to behave in coherence with the ecosystem vision, which is the very nature of ecosystem governance (Autio, 2021).

The roles the different actors play, their interdependencies and how value ultimately is created depends on the design of the ecosystem regarding technological architecture and the value input-output flows (Kapoor, 2018). When designing such an ecosystem architecture the 'value' must firstly be defined. This is easier when the orchestrator operates in a pre-existing market with functional pricing mechanisms already in place, as the market itself can answer this question. However, in more uncertain situations where this definition is less ready-made this calls for an approach where the orchestrator takes part in conversations with possible ecosystem participants to discover this architecture together (Autio, 2021). Facilitating the premises for value discovery can be done through tangible mechanisms to attract and connect participants, by means of structures such as forums, associations and concrete get-togethers (Ritala, 2013). When like-minded parties come together and possible complementarities become apparent through (in)formal discussions, the definition of value can be agreed upon more easily. Henceforth the interdependencies between the actors become explicit, to which roles can now be defined. It is here where an infrastructure allowing specific formalized touch-points should be developed to enable co-creation. Hereby the stakeholders are not only participants, but can become active co-creators (Pera, Occhiocupo & Clarke, 2016). The collective negotiation of the participant roles, the 'rules of the game', delivery of the value proposition and the rules of participation is what the collective governance consists of and brings clarity to the flow of knowledge and resources (Thomas, Autio & Gann, 2021).

Upon the premise that agreements are made up to this point the orchestrator is able to define the technological layer of the governance model, which sets up the foundation of ecosystem value creation. Autio (2021) indicated the actions to be taken in this stage, including the setting technological compatibility standards, developing interfaces setting up ecosystem connectivity and possible modular architectures allowing for the creation of complementary offerings. In this phase the alignment structure is to be created, where agreements around the respective business models concerning who does what, interoperability and distribution of the eventual value capture should be made (Kapoor, 2018). Mechanisms surrounding value capture may involve contractual frameworks to specify which intellectual property is used and owned by the ecosystem actors (Ritala et al., 2013). One of the most critical factors in collaborative settings is trust, which seen as a complementary mechanism to possible contracts. As one cannot predict future behavior and events, trust is key in resolving unforeseen problems and reduces the risk of partners behaving opportunistically (Ritala, 2013).

Collective identity

Bringing an ecosystem value proposition to the market requires a high degree of alignment and collaboration. As such this asks for a broader collective identity that the individual actors and respective identities can align with. Thomas & Ritala (2022) define this ecosystem identity as "*a set of mutual understandings among ecosystem participants regarding the central, enduring and distinctive characteristics of the ecosystem value proposition*". They denote the importance of the ecosystem identity to align with the value proposition to avoid conflict, as the identity entails the answers to what the ecosystem seeks to achieve, what it is

about and how it seeks to reach its goals. In order to create such an identity the ecosystem actors firstly need to have a joint value creation effort as general goal (Adner, 2017). The actors are to interact with each other actively and employ an open communication style, which will create shared meanings over time (Keskin & Markus, 2022). Oskam, Bossink & de Man (2021) indicated one of the mechanisms to resolve tensions in ecosystems stemming from divergent goals to be building a common vision and identity. This creates a ‘chicken and egg’ problem as a mechanism facilitating co-creation is the collective identity, but creating value collaboratively subsequently also improves the ecosystem identity. Nonetheless the importance of a shared identity is denoted. The role of the orchestrator is key in creating such an identity, as the community building starts with their proposed vision and requires the adoption of a governance model that focuses on this community rather than the individual firms (Letaifa, 2014). Thereafter, as reliability and trust begins to grow in the ecosystem as a whole rather than in specific members this may result in a cognitive shift leadings to a collective identity that is more than the sum of the individual actors (Thomas & Ritala, 2022).

Shared vision

Tied in with aligning partners and creating a collective identity is the formation of a vision the ecosystem actors can align themselves with. Especially in the early stages of an ecosystem, where it might not yet be clear how effective the collaboration among the prospective ecosystem actors will be, it is crucial to create shared visions and cooperatively transform ambiguity and uncertainty into opportunity (Keskin & Markus, 2022). Logically, this firstly depends on who those prospects are. The ecosystem orchestrator should reduce the possible barrier of incompatibility by selecting actors sharing mutual interests in innovation. It is advised to encourage the participating firms to actively participate and seek shared values in order to create a common vision that they can identify with (Ketonen-Oksi & Valkokari, 2019). Frequent interactions with both internal- and external stakeholders will facilitate the creation of shared meanings and values over time (Keskin & Markus, 2022). In seeking shared values the actors will generate new opportunities through sharing knowledge and information, thereby facilitating value creation (Letaifa, 2014). Eventually, when a mutual vision found this will define the common ground upon which the ecosystem goals can be built, leading to an initial value proposition (Oskam, Bossink & de Man, 2021). As motivations can change throughout the ecosystem emergence it is important to maintain the common vision. This should be done through constant open communication and ‘coaching’ the ecosystem firms (Ritala et al., 2013). The importance of the alignment structure and governance model supporting the vision is denoted here once more, as this facilitates the communication channels and allows for the orchestrator to enunciate their vision.

Learning capability

Ecosystems are defined by the high interdependencies, complementarities, and alignment structures in place to co-create value. With collaborative efforts being the crux of these value-creating systems it is only logical that there is a high amount of information and resources flowing between the involved firms. However, the sole flow of these value streams is not sufficient for effective collaboration and co-development to take place. What matters more than the facilitation of these flows is how the ecosystem actors process, integrate and absorb the knowledge and resources into their respective firms and processes. These capacities are reflected in a firm’s learning capability. Tsou, Chen & Yu (2019) indicated three areas displaying ecosystem firms’ abilities to exchange and integrate knowledge; 1) *absorptive capacity*; 2) *coordination capability* and 3) *relational capability*. The ability of a firm to

identify, understand, transform and use knowledge gained from their environment is what comprises the absorptive capacity. In other words, it is the ability to internalize and subsequently apply the knowledge learned from partners (Tsou, Chen & Yu, 2019). The coordination capability reflects the ability to not only set up a knowledge-intensive interface, but also to synchronize resources and activities to develop novel means of working together (Tsou, Chen & Yu, 2019). This capability is key in creating the alignment structure, as it enhances interactions between the actors and facilitates the knowledge exchange. Lastly, the relational capability refers to the organizational ability to integrate domain-specific expertise and tacit knowledge (Tsou, Chen & Yu, 2019). These three abilities are crucial in innovation ecosystems as they allow for the fruition of effective collaboration and reaping of the fruits of the alignment structure in place.

As mentioned earlier the availability and types of components and complements give rise to certain challenges in the ecosystem, either in opportunity discovery, creating alignment, scaling up etc. These challenges present the opportunity to learn as they might require the ecosystem firms to change their approach to problem solving and their means of doing so. Hence, the learning opportunities that present themselves can positively affect value creation through better understanding of domain-specific knowledge and resources, which ultimately may also result in a relative advantage to competitors (Adner & Kapoor, 2010). Thus, the mastering of new routines arising through collaborations is key to not only create but also deliver value. To lower the levels of uncertainty related to the challenges of the value proposition it is important to collaborate and experiment with the actors, thereby promoting collective learning opportunities and knowledge creation for those involved (Keskin & Markus, 2022).

Collaboration

The success of value creation within ecosystems depends on effective collaboration between the respective ecosystem actors. It must firstly be clear for whom this value is created, as such a deep understanding of the customer needs and desires is required. It is therefore wise to include the customers in the creation process as well as making use of personas (Den Ouden, 2012). Personas are hypothetical archetypes of customers and users, reflecting their goals and wishes. These may provide a crucial understanding of the users and their thinking-processes. In co-creative efforts in ecosystems the parties must always look for others' interests, as alignment is easier when these interests happen to be the same (Steinbruch, Nascimento & de Menezes, 2021). When interests align the strength of individual relationships increases. Relationship strength is part of actor embeddedness, Wajid et al. (2019) imply. Actor embeddedness they argue, refers to the relationships between individuals and/or groups and can be taken apart into three subgroups: structural; relational and cultural. These refer to the number of relations, their strength and the extent to which norms, values and rules are shared, respectively. This embeddedness together with actors' disposition to engage with each other shapes the way in which resource integration patterns develop, facilitated through the alignment structure and governance model in place. These resource integration patterns subsequently lead to value co-creation at the ecosystem level (Wajid et al., 2019). This happens through the co-evolution of the actors and co-specialization of the compatible offerings, thereby collectively creating value that they could not have alone (Thomas & Ritala, 2022). A firm's learning capability is key here as this enables the information absorption and resource integration.

Besides geographical proximity, which makes interactions easier, social proximity is key in collaborative efforts as well. As value creation is inherently a social process the actors must be willing to work together. Of course this also ties in with a sense of community, trust and interpersonal ties, which leverage ecosystem value creation (Letaifa, 2014).

Trust

Throughout this chapter it has become clear that ecosystem actor interaction, -participation and -cooperation are essential to effectively co-create value. While these are certainly important, they do not necessarily imply the occurrence of co-creation. Pera, Occhiocupo & Clarke (2016) indicate its explanatory power to rely on trust, inclusiveness, and openness. But why is trust, among others, such an important factor in collaboration, and how do interfirm trust-based relationships form in ecosystems? Firstly, we must define trust in order to understand its underlying mechanisms. Steinbruch, Nascimento & de Man (2021) define trust as “*a willingness to assume risk, with an expectation that the other party will act in a fair, ethical and benevolent way*”. Based on this definition it can be said that trust forms one of the building blocks of any collaboration, as confidence in the partnership is expected to grow when the other party fulfills its expectations, thereby reducing perceptions of risk of future opportunistic behavior (Ritala et al., 2013). Trust, according to Steinbruch, Nascimento & de Man (2021) involves three dimensions: 1) *ability*, 2) *benevolence* and 3) *integrity*. Ability consists of the skills, competences, and characteristics possessed by an organization to complete a certain task. This can also be described as competence or expertise. For managers it is thus critical to consider their partners’ abilities in delivering on their promises. Benevolence is more of an ethical consideration, as it describes whether the trustee is willing to do good to the trustor, such that both parties mutually benefit from the exhibited behavior (Steinbruch, Nascimento & de Man, 2021). Integrity is characterized by the perceptions of the trustor as to whether the trustee follows coherent and consistent rules and principles. This dimension relates closely to professionalism, responsibility and honesty (Steinbruch, Nascimento & de Man, 2021). Through the latter two dimensions it becomes clear that managers are not only to regard functional ability when trying to build trust, but also should look for congruent norms, values and aligned overall principles.

It is key to understand that for ecosystems to thrive the firms’ collaborations need to function regardless of the presence of the focal firm. Hence, the creation of shared meanings, a common goal/vision and a feeling of membership is key. These will form through interactions and negotiations, thereby laying the foundation for trust-building and consequently creating the drive for co-creation and learning around the value proposition in question (Keskin & Markus, 2022). In ecosystem structures where actors are involved in coherent, complementary activities the interfirm relationships are likely to develop a level of trust, making it more likely for critical information to be shared (Den Ouden, 2012). In that respect, the presence of trust-based relationships in collaborations may help in increasing information exchange, commitment of actors and reduce the perception of risk (Steinbruch, Nascimento & De Menezes, 2021). Trust cannot be demanded, but rather is the outcome of ongoing, consistent and gradual effort as time continues (Ritala et al., 2013).

Knowledge sharing

Collaborative efforts to create value are enhanced when relevant domain-specific knowledge is shared across ecosystem actors. Of course, to judge whether something is relevant or not depends on the purpose of the ecosystem. Hence, when creating a value proposition the leader is to attract actors able to align themselves with the ecosystem vision. Here the

ecosystem purpose is to be made clear through negotiations, as the clarity of this vision subsequently makes it easier to facilitate the flow of knowledge and resources (Thomas, Autio & Gann, 2022). In this process of ‘ecosystem sensemaking’ the participants share and develop insights and try to categorize the proposition components and form shared views regarding technical desires and feasibility (Thomas & Ritala, 2022). To enable such sensemaking the orchestrator should develop and implement encounter moments that allow for the necessary interactions for knowledge- and resource sharing to occur (Pera, Occhiocupo & Clarke, 2016). A thought-out alignment structure and governance model would include the structure and timing for these moments. The quantity and quality of the knowledge being shared not only depends on the facilitation of the communication channels and encounter moments, but also on the mindset of the ecosystem actors. Communicating in itself is good, but the participants are to employ an active and open communication mindset, where they emphasize collaboration. The focal firm should lead in this proactive and open knowledge sharing approach to extend the relationships beyond traditional standards, moving towards collaborative structures (Ritala et al., 2013). A great deal of trust is accompanied with knowledge sharing, as firms not only need to be sure their information is safe with their partners, but also that it will be put to good use. This once more denotes the importance of a collective identity and shared vision to create this trust.

5.2 Expert Interviews

In this section the expert interviews shall be discussed. First it is important to understand the purpose of these interviews. The explanation is twofold: the goal was on the one hand to further explore the answer to sub-question one, while they also served as validity-check to the factors previously found. This was decided to both add to- and evaluate the theoretical results with external insights from practice. The approach to conducting the interviews consisted of multiple stages. The preparation included developing an interview guide and the participant selection criteria. Thereafter the participants were invited, after which the interviews were planned and subsequently conducted. Lastly the interview data was analyzed. The following paragraphs will elaborate on this process in more detail.

In line with the intended goals a mentioned a semi-structured interview guide was developed. Questions were developed and subsequently discussed with the assessor. As the first goal was to explore, the initial part of the interviews included questions aimed at discovering the participants’ view on critical factors in ecosystem joint value creation. Then, in the second part, where evaluation was emphasized, the questions related to the previously found literature review results. The developed interview guide including a sample invitation letter can be found in Appendix B.

Of course, the aforementioned goals could only be attained when the right people are interviewed. Hence, four ‘experts’ in the field of innovation ecosystems were selected to interview. Three of the four participants currently work at the Eindhoven University of Technology, while the last is from the Vrije Universiteit Amsterdam. Their expertise ranges from analyzing innovation ecosystems, developing new business models and designing innovation ecosystems, to name a few. In Table 3 below a concise overview of the interviewees is provided.

Participant #	Profession	Educational institute	Research focus (among others)
1	Assistant professor	Eindhoven University of Technology	(Open) innovation programs & analyzing/designing innovation ecosystems
2	Full professor	Eindhoven University of Technology	Collaboration processes in innovation ecosystems
3	Full professor & chair of entrepreneurship and innovation	Eindhoven University of Technology	Designing innovation ecosystems
4	Professor	Vrije Universiteit Amsterdam	Examining platforms & ecosystems

Table 4: The interviewees' professional details.

The conducted interviews lasted 44 minutes on average and were all audio-recorded. Then, in order to generate valuable insights from the interviews the audio-recordings were transcribed manually to subsequently perform a thematic content analysis. This started with reading the individual transcriptions and highlighting relevant and interesting phrases in order to derive codes. Here the code names were based on the context of their respective highlighted sentences to reduce possible bias in interpretation. From this first round of analysis 44 codes were obtained.

A second round of analysis was subsequently performed to identify possible patterns and similarities in the data. Codes were renamed, merged and then aggregated into themes in a manner that the themes represent a higher-level construal of the codes. In order to be relevant to the sub-research question at hand, the literature review results were used as guideline to identify and name the themes. This was done to stay close to the subject matter in terms of labels and definitions. To clarify, the themes thus represent the general concepts that are important in joint value creation in ecosystems. Similar to the developed clusters in the literature review findings, these themes are subjected to their codes such that the codes constitute actionable points of attention. In that respect the codes serve the same purpose as the previously uncovered factors; they display pragmatic. The developed themes are: *alignment*, *risk-analysis*, *leadership*, *vision*, *planned action* and *trust*. See Appendix C for the table of themes, the included codes and their descriptions.

5.2.1 Results

In the following sections the findings of the expert interviews will be elaborated on by means of the developed themes. Per theme the main results will be discussed, substantiated by referring to participants by means of quotes and paraphrases. The originators of the quotes will be indicated through abbreviations, where *P1* denotes participant one, *P2* denotes participant two etc. Similar to the explication of the findings of the literature review, the order in which the undermentioned results are discussed have no implication on any possible relative importance of the themes

Alignment

The experts indicate alignment to be a critical concept in ecosystem value creation. P1 mentioned about the ecosystem structure: “... *it has a set components that need to collaborate; not only technical components, this can also be market access or retail distribution etc.*”. Thus, managers need to carefully assess and select— not only their own, but also prospective ecosystem partners’— components that allow for alignment and subsequent value creation. The alignment of not only the components, but also the activities should be structured in such a way that shared value is created. P4 complements this statement by saying: “... *there is the level of the actors: who does what? Then you also have the value streams between the actors, which have to be aligned. Everyone actor involved should gain something.*”. Then there are the complements; the individual offerings that together increase the value of the proposition. It is key for the firms involved to evaluate possible complements to strengthen the value proposition. Here it is important to seek unique- or supermodular complementarities. This was deduced from a statement P1 made: “... *When somebody is in the business of producing generic complements, you can basically put them aside.*”.

With complementarities also comes the issue of co-dependency and relationship asymmetry. These concepts basically comprise who holds the position of power in a relationship, which is why complements and the subsequent effects they may have on relationships must not be put to the wayside. P4 also made a remark about such asymmetries: “... *what is the complementarity and how is this established? Who is the adapting party? This depends on the bottleneck. Those who control the bottleneck can make sure others adapt to them.*”. Adequate complement alignment is thus key in initiating value creation endeavors, as it plays a big part in dependency and deciding the various actor roles, activity structure and value streams. Discussing and agreeing on roles and activities is also part of the governance model orchestrated by the leader, as illustrated in section 5.1.1. “*The technological architecture in place holds significant weight in the governance model*” (P4) and the subsequent alignment structure, as this architecture structures the way the components, activities and complements interact with each other.

The alignment of components, activities and complements is not possible without considering individual motivations and incentives to collaborate. Beforehand these should be discussed assessed in order to reduce possible conflicts which could undermine collaboration. Joint value creation processes are kick-started by a collaborative mindset, as P2 mentioned: “... *from the intention of wanting to do it together. Really wanting everyone to win. Increasing the pie together, instead of dividing it.*”. This collaborative mindset is crucial, but then there is also the motivation behind the mindset. These may differ between organizations as well. P1 put this eloquently when they compared possible incentives of an educational institute and a commercial organization: “... *if you collaborate with a university you almost know for sure that they would try and abuse the situation to write a scientific paper of some sorts than to provide some practical utility...*”. This illustrates the importance of considering the actors’ incentives and end-goals. Difference in incentives on an interfirm-level is apparent, but they should also be considered on an intrafirm-level. When orchestrating value creation processes it should be considered that also within organizations not everyone may be on the same page. This was indicated by P4, who mentioned: “*Within an organization you have different departments, one department may be happy while it may be problematic for the other. They have different interests and may play a different role.*”. Therefore, goals and incentives should be aligned not only between, but also within actors.

Risk-analysis

There are always costs and benefits involved when developing an ecosystem, creating a value proposition or bringing it to the market. To put simply, one may say that the course of action leading to the benefits outweighing the costs is the one to pursue. However, decision making should not only be based on these two factors, as mentioned by P1: *“Every step on this value chain is both a benefit and a risk. (...) collaboration is only beneficial if the economics of that collaboration work. In those economics it is about the cost-benefit-risk analysis.”*. For this reason managers are advised to take into account the risks related to certain actions and outcomes. These risks can be related to certain complements, actors or the value proposition as a whole. P3 exemplified: *“Imagine you have three applications, which one of those harbors the least risk and brings forth the most commercial potential?”*. In order to minimize unforeseen situations it is wise to analyze risks, both pertaining to your organization as within prospective ecosystem partners. Before anything managers should assess their partners’ willingness and ability to perform a certain task or generate a complement.

This firstly comes down to the aforementioned point of complementarity, incentives and their alignment. P1 indicated this through saying *“In this very basic risk-analysis of willingness and ability basically comes so much more to light out about the true willingness.”*. The more critical the complement, the higher the risk attached to it. As such complement-generation is a risk in and of itself (P1), due to on the one hand the willingness of the generation itself and on the other hand the associated dependency of the complement. In understanding why firms behave the way they do and getting a grasp of the internal logic P1 recommended to consider organizational economics. This offers a reasoning to why certain actions are (not) performed, by taking into account firms’ competencies, capabilities, resources and transaction costs (Silverman, 2017). Here the ecosystem orchestrator and actors should look for the path of least resistance to create value and bringing it to the market (P1).

Leadership

Creating and developing a value proposition in ecosystems starts with someone taking charge. This leader is key in assembling the right parties and resources necessary for the proposition to come to fruition. When the right parties have been aligned an adequate ecosystem management should be in place to manage the actor roles, their involvement and resource flows. The leader is to approach this management style strategically and with integrity to create and maintain vision as *“flaws herein may lead to defects further down the model”* (P3). Additionally, in conveying a vision and aligning partners it is upon the leader to motivate and encourage the actors to collaborate, as indicated by P2: *“... basically you have to enthuse people. Enthusing is what I have done for the last couple of years.”*. Having created a strategy and plans for value creation is critical in laying the foundation for subsequent ecosystem value creation, but next it is important to take action. P2 mentioned the importance hereof: *“... you have to be able to translate strategical thinking to operational action-taking. You have to know which valves to turn, constantly. In the end it all has to be operational.”*. This is important as then the ecosystem actors will see *“what the practical roadblocks are upon implementation”* (P4). How unexpected situations are handled is crucial as well. Important qualities in dealing with adverse situations for leaders, and essentially all ecosystem actors, are perseverance and resilience. P2 noted this by saying: *“Dealing with uncertainty is important. Everything is vague. Nothing is certain and you start with nothing.”*. Thus, ecosystem leaders are to gather the troops, put their words into action and do not give up when faced with adversity. Of course, not giving up does not mean blindly going forwards as risks have to be considered as well, as previously indicated.

Vision

The importance of a compelling vision to facilitate actor alignment has been denoted throughout. This was also mentioned by P4, as they stated the following: *“You need to have a vision which interests others. I think this is a very important aspect.”*. Creating a vision is not only the task of the ecosystem orchestrator; the involved actors also hold weight in this process. The process of developing a shared vision was touched on by P2: *“We continuously, from the start, conducted co-creating sessions. This means that my vision is also determined by the ones around me. I did have a certain concept in mind that I presented and then you get other input. So this is iterative and not one-directional.”*. What this indicates is that through extensive discussion and negotiation a clear vision can be created that may lead to and improve alignment as all voices are thereby heard. This in turn facilitates a collaborative mindset and may align incentives.

Planned action

As earlier mentioned, having a clear vision and strategy is important in ecosystem value creation but means nothing in the absence of an explicit plan of action. This was indicated by P2, who mentions the importance of concrete actions: *“Some have a vision, but are not competent to implement. So you also have to be able to do the practical side of things. Just having a vision is not enough.”*. P4 complemented this by saying: *“... on the one hand you have to paint your vision. Get people attached that way. But then you also have to act. Experiment concretely and create a minimum viable ecosystem so you can create your minimum viable product.”*. An important aspect to touch on is the creation of a minimum viable ecosystem (MVE). The end-goal may be grand, in the early stages ecosystem development you must first establish whether it is actually possible to create the intended value. An MVE constitutes the smallest configuration allowing value creation, where its goal is to learn, attract partners and eventually commitment (Adner, 2021).

It is only when the strategy and vision are translated into a detailed course of action that things become explicit. Through making things explicit it may *“turn out that there are different interests and the solutions may have consequences you did not consider before.”* (P4). Of course, taking action means the generation of consequences. This yields valuable feedback and creates opportunities for learning which in turn strengthens relationships through these shared experiences. The importance of turning your vision into action was once more indicated by P4: *“Those are the two main aspects, I think: the vision and doing. Do not dwell too long on your vision, and doing without a vision is impossible as well, in my opinion.”*.

Trust

In collaboration and being dependent on the deliverance of quality by external parties it may at times be difficult to surrender to the fact that not everything is controllable. Depending on the type of relationship that is established, the amount of trust needed may vary. Concerning this statement, P4 indicated the following regarding platform ecosystems: *“In ecosystems the organizations adapt to the focal firm no matter what. So there is a resource dependence. (...) Then you have to trust that this position of power will not be abused.”*. While this statement concerned platform ecosystems in particular, it does show that the significance of trust thus in part depends on the relative co-dependency between actors. This co-dependency also is decided by the position the actor holds in the ecosystem. However, regardless of an actor’s position, trust will always be crucial. The question still remains on which factors constitute trust. This was also indicated by P4, who stated: *“Trust and commitment are very important,*

you cannot force these through contracts. In some ecosystems, contracts are not even all that determinative.”. In some respects trust may be regarded as a double-edged blade, as you need it since not everything can be arranged through contracts, but trusting someone to deliver when they do not can be disastrous. P1 exemplified this concept: *“The biggest pitfall is to trust the critical complement to come through and take that risk upon yourself when it is likely that they will not come through.”*. Trust thus also ties in with the concept of risk-taking, where the biggest risks lie in the most critical complements of the ecosystem. Therefore one may say that contracts are the end-all be-all to trust, when considering those critical complements. However, this was refuted by P2, who compared contracts to their own marriage: *“... there is nothing wrong if you have good intentions. If you really ‘love each other’ and want to do things together, then a contract is no problem. However (...), if you start with contracts and IP, count me out. Then the starting point is distrust. It does not matter if you have a contract if you do not trust each other.”*. In the end what seems to be most important in building trust appears to be transparency in motivations and goals, and making sure they are aligned.

5.3 Conceptual Model

The following section discusses the development of the conceptual model, hence the creation step of design cycle one. The answer is based on the combination of the results from the literature review and the expert interviews.

To reiterate, the goal of design cycle one was to find the answer to the following question:

“Which factors influence joint value creation in innovation ecosystems?”

First and foremost it must again be understood that the general concepts crucial in ecosystem value creation are known widespread. The generated answer aims to serve managers by providing them with actionable points of attention in order to efficiently design and navigate such processes. In order to generate such an answer the findings from the literature review and the expert interviews were analyzed and compared. Then, it was decided to combine the found results into a conceptual model, as it was deemed that a visual overview would generate the most concise and understandable overview of the found factors.

In addition to the inclusion of the clusters and factors, it was decided to also visualize the interrelations between clusters, based on the interpretation of the author. It can be said that, essentially, all clusters are related to each other. However, the manner in which the relations are displayed in the model provide structure and insight to the chronological order of events, opposed to either connecting all clusters, or presenting the model as an ‘empty’ listing of clusters.

The focal firm employing the leadership role is key in pronouncing their vision, thereby aiming to attract and inspire actors to participate in their envisioned ecosystem. It is also upon them to facilitate the creation of a shared vision that the ecosystem actors can align with.

Through this shared vision, the definition of concrete goals and objectives, and working towards a shared purpose, a collective identity will be formed. In turn, this will increase trust and willingness to share knowledge and collaborate. The aforementioned factors all tie in with the concept of alignment, which is key in ecosystem value creation. Among others, the alignment structure is created by the governance model. This model is developed by the

ecosystem leader, in concurrence with the involved actors. When actors, their relationships, complementarities, and incentives are aligned it enables efficient knowledge sharing and collaboration. The firm-specific learning capability not only allows for effective knowledge sharing, but is in turn also strengthened through sharing knowledge. Additionally, all individual actors must analyze the risks, by assessing both their own capabilities, and those of the ecosystem partners, the transaction costs, and dependencies. The risk-analysis affects the alignment structure, as the outcome of this analysis is critical in firms deciding to partake, or not.

The developed conceptual model is added below in Figure 2.

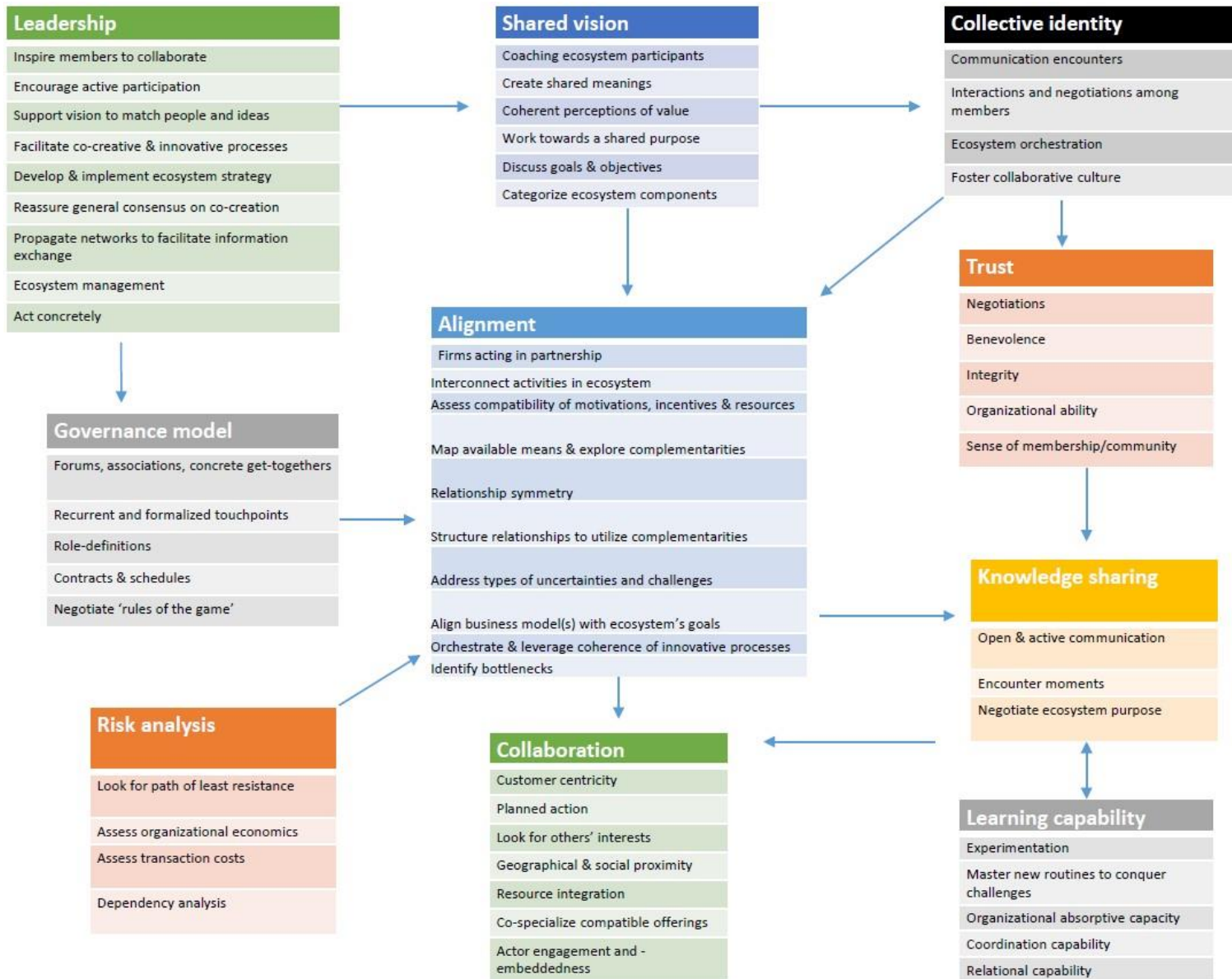


Figure 2: Conceptual model of factors affecting joint value creation

6. Second Design Cycle: Design of Concept Ecosystem

In the following chapter the second design science cycle will be elaborated on, including the exploration, synthesis, creation and evaluation steps as described in chapter 4.2. Accordingly, the applied research-, design methods, and results shall be discussed. The goal of the current cycle is to answer research sub-question two:

“How can we align the partners from various markets to facilitate strategic collaboration?”

In answering this question, partner interviews were conducted as well as a co-creation workshop. The partner interviews, including interview guide, firm-specific summaries and their networks will be discussed first. Then, the co-creation workshop shall be detailed. This comprises the workshop goal, agenda, and outcome. Lastly, the evaluation of the findings in this cycle shall be discussed.

6.1 Partner Interviews

This section shall outline the process of the conducted partner interviews. These interviews were conducted with the purpose of developing a better understanding of their businesses, in terms of; core values, motivations, future vision and networks. There lies great value in understanding what the partners' businesses represent, in which contexts these businesses reside, and which goals they are trying to attain, as this input is crucial in trying to align them. Noteworthy is that the interviews were structured such that only information relevant to Aristotle's case of cognitive training was gathered. Of course, the partners conduct business that is unrelated to the purpose of this thesis. Therefore, the scope of the interviews was structured such that only relevant knowledge was gathered. Preparatory steps for conducting these interviews included developing interview guides and inviting the participants. Then, the interviews were conducted and the gathered data was analyzed and summarized. Lastly, Value Flow Models of the respective partners were developed by means of the interview data. In the following paragraphs this process will be discussed in more detail.

Semi-structured interview guides were developed to achieve the aforementioned goal. The to-be included questions were developed, after which they were discussed and iterated with the first assessor of the thesis as well as with Aristotle's CEO. This was done to ensure the right questions were asked to achieve the set goals. The overall layout of the interview guides was kept consistent across the partners, as they all included topics such as *roles, values, activities, motivations, and future visions*. These topics were chosen to enable compatibility in the data-processing, as the data ultimately served as element-input in the various Value Flow Models. However, per partner respectively, preliminary investigation was carried out to partially tailor the interview to their current situations (e.g. existing activities, relations, visions etc.). The interview guides includes questions regarding the general values the partners' business/organization embodies, why they chose to engage with Aristotle, future visions, existing business relations, and the activities carried out in their respective business. The interviews were able to be conducted after inviting and scheduling with the partners' management. In Appendix D the developed interview guides, including a sample invitation letter has been added.

As mentioned in Chapter 1, Aristotle has found partners in various markets; professional football, physical therapy and special education (specifically, a neurological research institute), respectively. Ultimately, three interviews were conducted. One with a physical therapy clinic manager, the other with an innovation manager of a professional football club, and the last with Aristotle’s CEO. It was chosen to also include Aristotle in these interview rounds since an overview of the aforementioned aspects regarding their business was also necessary in seeking alignment. Due to persistent scheduling issues it was not possible to conduct the prospected interview with management staff of the neurological institute. How this unforeseen situation was handled will be discussed at a later stage in this chapter. Only current clients were included, since these form the core of the envisioned joint value proposition and ecosystem. Potential clients were left out of consideration, as their input was not necessary for the development of the concept ecosystem. Table 4 below provides an overview of the included participants. For discretization purposes no personal information or organizational names, besides Aristotle, have been included.

Participant #	Profession	Organization
1	Innovation manager	Professional football club
2	Owner & sports physical therapist	Physical therapy clinic
3	Co-founder & CEO	Aristotle Cognitive Technologies

Table 5: Participant details partner interviews.

The average duration of the partner interviews was 73 minutes. All interviews were audio-recorded, after which they were transcribed manually. To subsequently perform the thematic analysis, the transcriptions were firstly read thoroughly. Noteworthy is that no software was used for the analysis, this was all done manually. The analysis was done in a deductive manner, as pre-defined themes were already in place. These themes were the elements needed to ultimately create the visualizations of their networks by means of Value Flow Models; *actors*, *motivations*, and *transactions*. In addition to the themes stemming from the Value Flow Model, *future vision* was added as well. Based on the themes data was analyzed and highlighted, to find interesting phrases relevant to the pre-defined themes. Codes were derived from these phrases and quotes. This was of course done thrice, for the football club-, physical therapist-, and Aristotle interview. This analysis yielded 25, 34, and 24 codes, per respective partner interview. Appendix E includes the tables including themes, codes and their descriptions of the abovementioned interviews. Hereafter, the relevant information was summarized and the respective Value Flow Models representing the partners’ current network were created. While developing these networks, in addition to the interview data, also prior existing knowledge on connected parties and relationships was implemented.

To account for the missing interview with managerial staff of the neurological institute, desk-research was done to gather the relevant information for creating their current organizational network. Important choices were made concerning the omission of certain data, as some parts of their network were not relevant to the current thesis or the prospective value proposition. For instance, the institute also emphasizes sleep disorders. Since this is not relevant in the current study, it was decided to omit this information in the network. Only information relevant to the cognitive training was included in this network. The network was made in

collaboration with Aristotle's CEO, who complemented and validated the model where possible, based on pre-existing knowledge and prior interactions with the institute.

6.1.1 Results

The following sections contain the results from the partner interviews. They are structured per partner respectively, such that the firm-based summaries are discussed first, after which the corresponding networks are displayed. As mentioned earlier, besides Aristotle, no organizational names are explicated for discretionary reasons. All firms will be named by their functional dispositions (e.g. football club, physical therapist etc.).

Football club

One of the partners is a professional Dutch football club. Their primary focus as football club is performing better each week, in order to not only reach the Dutch-, but also the European top. In doing so they want to *"discover talent, develop them, and then perform better."* Developing talent not only increases performance, but also comes with a financial gain. By decreasing external talent acquisition and increasing sales of internally developed talent, more profit can be made. *"Professional football involves serious money, and we have to perform better. Otherwise you might lose out on millions."*

They have developed their own ecosystem which purpose is to develop and *"bring our innovations to a higher level"*, to subsequently boost player performance. As part of this ecosystem they established a project group based on football cognition. Here, players' cognitive abilities are emphasized, to enhance their environmental data-processing skills on the pitch. The associated partners range from *"business, knowledge institutions, and sports"*, among who is Aristotle, who supply cognitive- and physical training based innovations, for data-based validation and feedback in return. Also, a healthcare device developer/manufacturer is connected, using the ecosystem to test their devices: *"They are no innovation partner, but a tech-partner. They have a network and knowledge, which we can use to innovate."* Then, there are several educational institutes associated with the ecosystem, who provide the club with interns and marketing insights. Additionally, a professional cycling team is part of the ecosystem to enable collaborative learning regarding new innovations, by means of data-sharing. A neurological institute is also connected, with whom the club *"wants to do a pilot regarding concussion treatment protocols"*.

In relation to Aristotle, the football club implemented their training tool as they noticed football to be ever-evolving. This resulted in cognitive overload to be an increasing issue among players, which is the problem that Aristotle's training tool aims to tackle. New iterations of the tool are tested with young players and training staff, which results in feedback being generated and features to be validated.

The main future goal of the football club is apparent: they want to keep performing better as a club, but also as a commercial organization. One of the challenges the football club faces here is *"incorporating an open innovation-mindset throughout the club"*, to improve on their innovative capabilities. *"My principle is that open innovation is better, because when you open up, dare to be vulnerable and show the problems you face, then you might get help."* They believe this must be done to ultimately keep on improving their players' performance, and sustain revenue increases. See Figure 3 below for the Value Flow Model of their current network

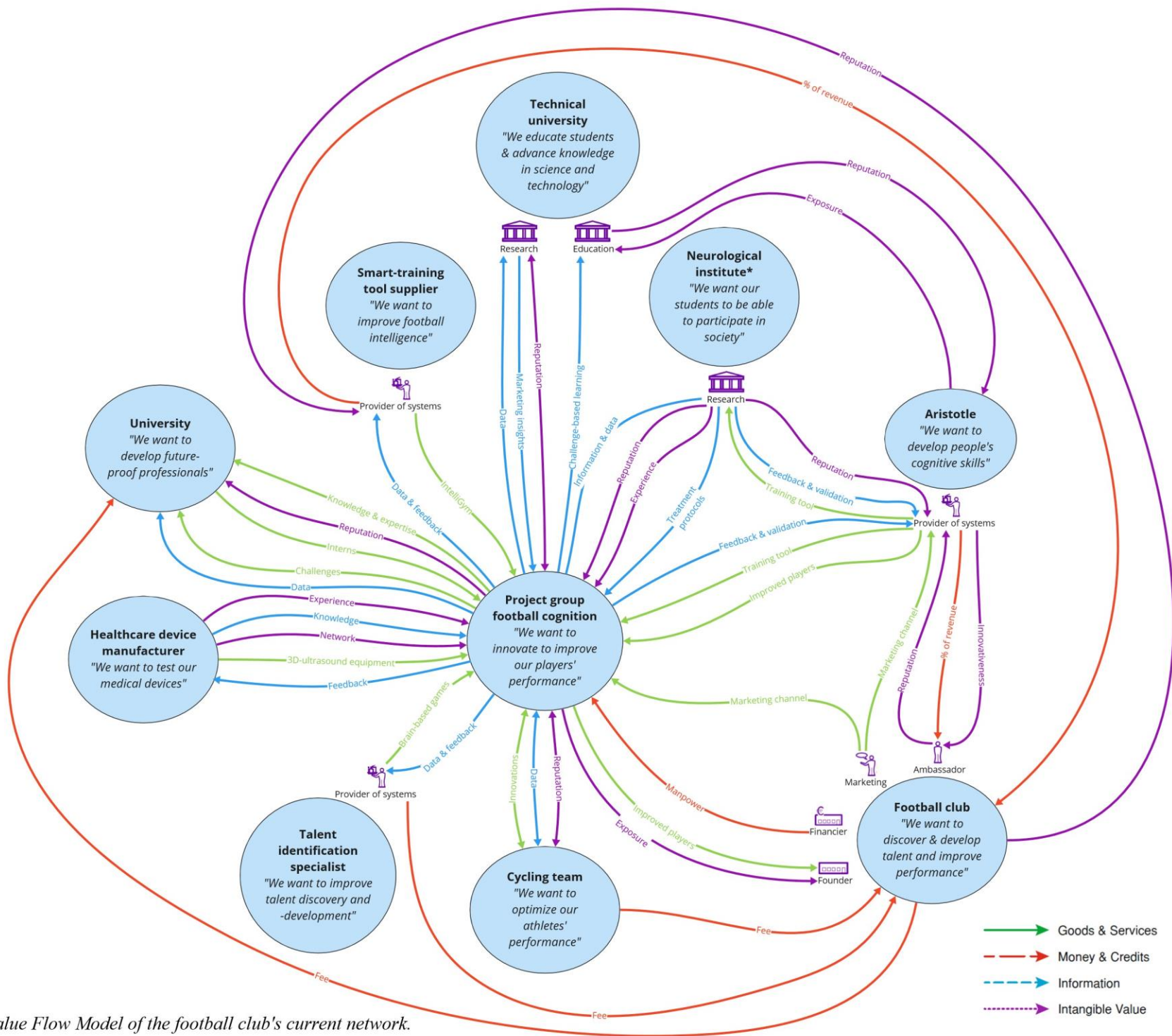


Figure 3: Value Flow Model of the football club's current network.

Physical therapist

As a physical therapy clinic the main purpose is facilitating rehabilitation programs for their clients. In recent years they have extended their service offerings to also provide overall lifestyle related care. *“This means we do not only have physical therapists, but also dieticians, lifestyle- and fit coaches.”*. These changes were made as the clinic realized that the nature of physical injuries is often related to patients’ lifestyle. In line with this train of thought, the clinic wishes to *“slowly transform to a lifestyle/health clinic, providing more products to serve our clients.”*. In this respect the clinic regards themselves as being progressive in the field of physical therapy.

In case it is noticed that *“patients’ underlying issues are too complex for the clinic, they refer to ‘colleagues’ in the area.”*. These colleagues range from general practitioners, psychologists or other physical therapists who are more suited to provide the care needed in the particular case. Collaboration herein is key for the clinic, as over the years they have realized that you need to work together to survive: *Regionally you will have to share more and more, because that is where healthcare is headed. We will not be able to handle it on our own.”*. This is the effect of increasing healthcare demands, and personnel being harder to get by. As such, they also consult other clinics when they have business-, patient- or innovation-related questions. Not only other clinics are consulted in this learning process, the clinic itself is associated with numerous networks. Hereby they gather knowledge related to new policies, business education courses and treatment licenses: *“You want to keep up with what is going on, and know what developments there are.”*. The organized meetings are online as well as in-person, thus also providing networking opportunities. This is in exchange for a membership fee. The gained knowledge is then passed on to therapists in the clinic and used to *“anticipate on changes pertaining to laws and regulations, and healthcare insurers. This helps in making the right choices for your clinic.”*.

In being a progressive clinic they not only extend their offering range, but also innovate. Among others, this entails the development of new protocols through a scientific approach, to enable *“evidence-based and a state-of-the-art treatments.”*. This is done in collaboration with a university, which provides them with scientific insights. In addition to this, there were also investments in innovative workout equipment, allowing technology-enabled and state-of-the-art workouts. This is where Aristotle comes in to play, as they provide their cognitive training tool to be used by patients.

In the future the clinic envisions *“to engrain preventive- and lifestyle-based care deeper into their DNA, and extend the range of their provided services, to serve their clients in more than one way.”*. This is accompanied by close-collaboration with Aristotle, because *“new things maybe deserve more help and guidance.”*. Thus, they want to work together more tightly, to allow for the development of business models outside the traditional relationship between the clinic and healthcare insurers. Specifically, they also see merit in selling the tool to the patients directly: *“I think there is a revenue model there, if you allow for them to do it at home.”*. Hereby, the accompanied novel training protocols can then also be sold to other clinics. *“With these developments you become less dependent on the insurer, because you determine the price yourself.”*.

Through combining this information with prior existing knowledge, the Value Flow Model of their current network has been developed. This is depicted below in Figure 4.

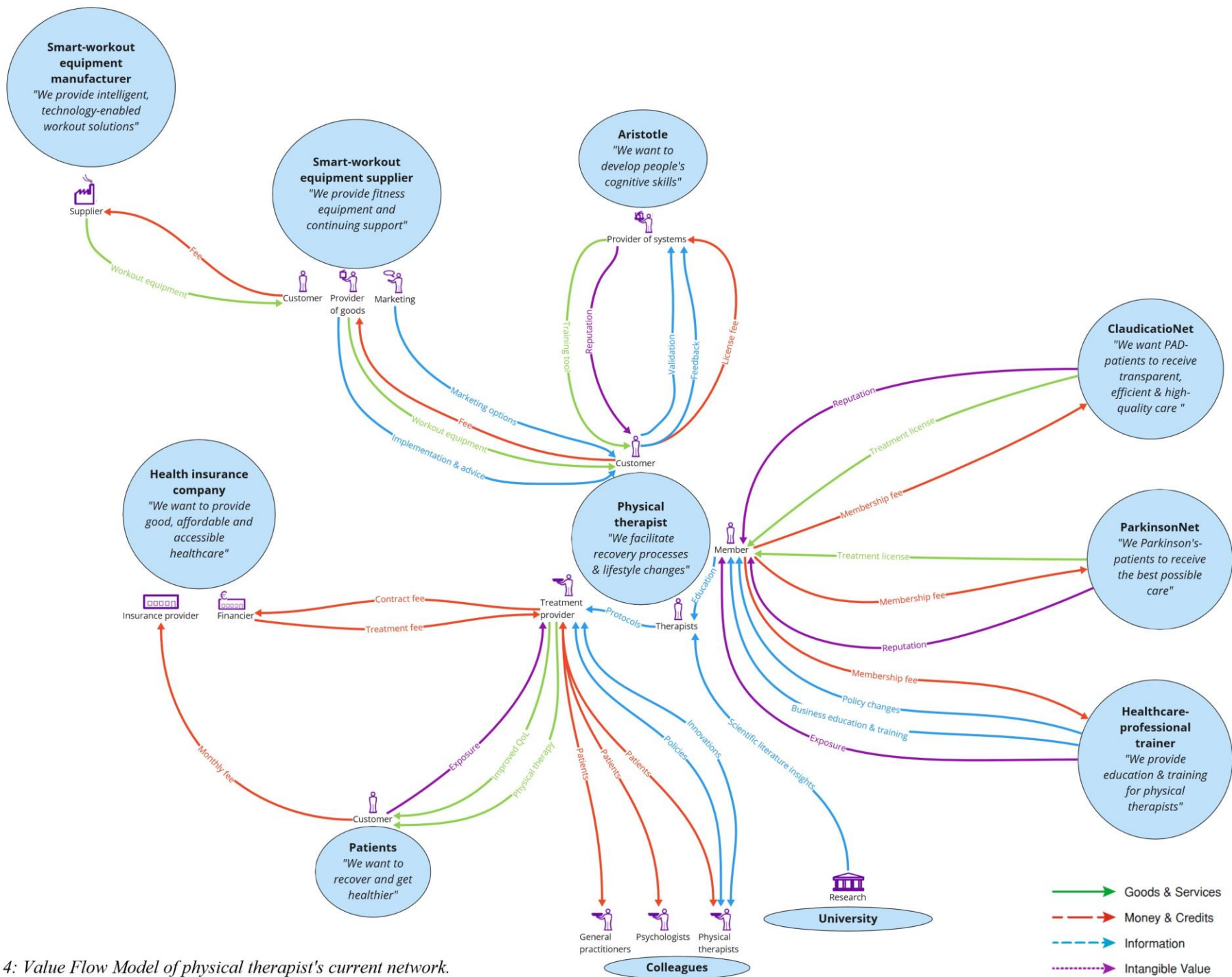


Figure 4: Value Flow Model of physical therapist's current network.

Neurological institute

The neurological institute has multiple areas of expertise; epilepsy, sleep disorders, and neurological- and developmental disorders. In these areas they conduct research as well as provide specialized healthcare. They predicate an open modus operandi, and combine perspectives from specialized healthcare, education, innovation and science to provide the best solutions. Through being open and involved in different fields, continuous development is possible, which is key for the institute. They view themselves as being connectors, through their (inter)national network they are able to connect people, disciplines, expertise and organizations.

By continuously developing new insights through collaboration with, among others a university medical centre they are able to provide state-of-the-art treatment. Besides being implemented in the medical world, these insights are also being deployed in the sports world. For example, they provide the aforementioned professional football club with treatment protocols for concussed players. New research avenues are partially based on current patient needs, which are provided by a peer association. This association represents the various patient groups and makes sure their voices are heard (Aristotle CEO, partner interview, May 12, 2023). Other avenues of research are provided by new innovations, such as the training tool provided by Aristotle.

The provided tool is implemented in an associated special-needs school. This school aims to educate the children such a way that they can participate in everyday-society, without any hurdles. The implementation of the tool is in support hereof. Currently, the tool is being tested in the school to find out whether the respective trainings comply with the needs and of the children, and their world of experience. This research thus also provides valuable feedback and validation for both Aristotle and the school (Aristotle CEO, partner interview, May 12, 2023). The school also lends itself to the needs of other specialized healthcare organizations, as they provide teachers and educational programs.

Going forward the neurological institute wants to keep being innovative within the fields of epilepsy, sleep disorders en neuro-cognition. In doing so they strive to keep offering effective and integral solutions, by including professionals from different disciplines.

Below, in Figure 5, the Value Flow Model, including actors, motivations and transactions, is displayed.

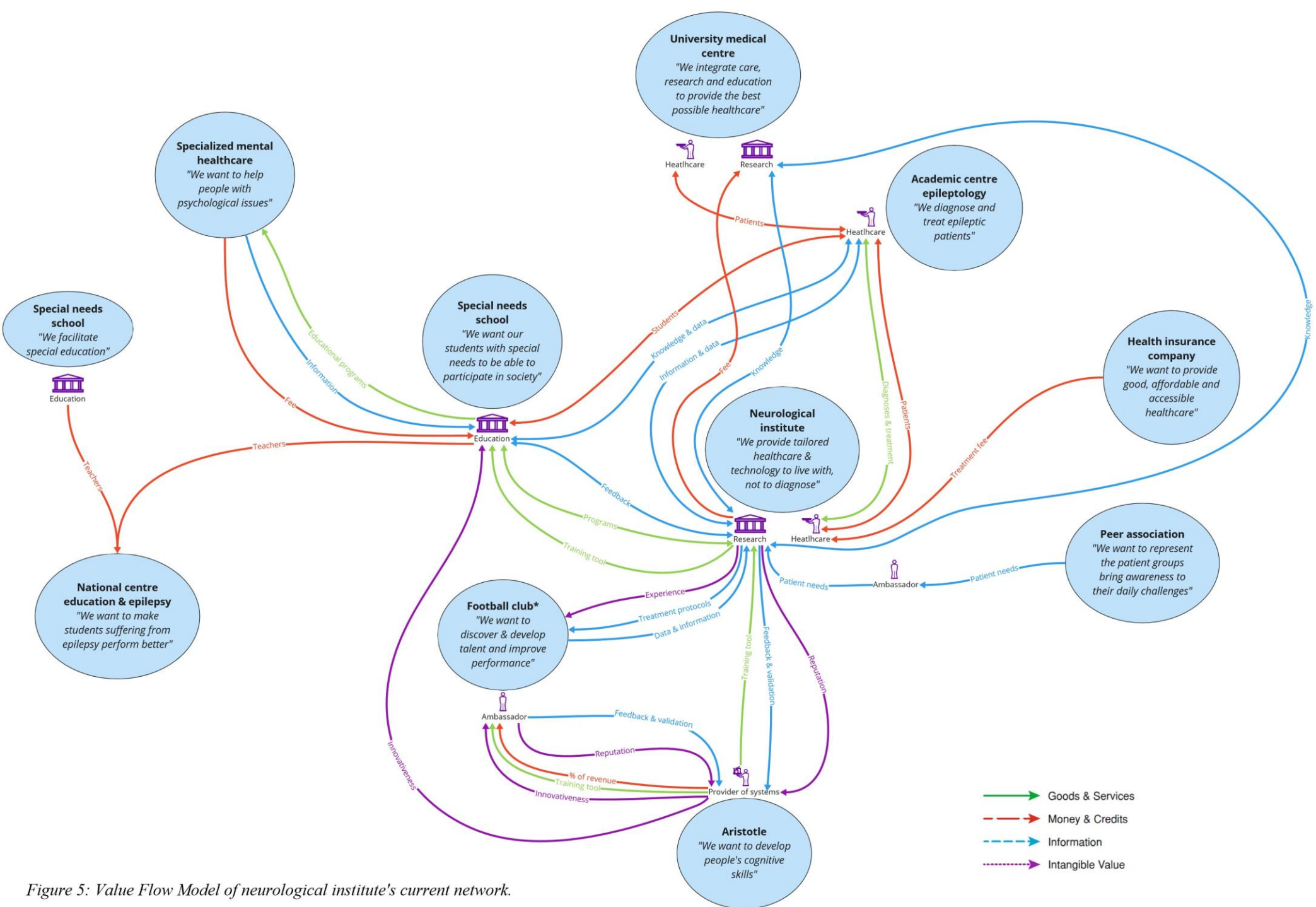


Figure 5: Value Flow Model of neurological institute's current network.

Aristotle Cognitive Technologies

Aristotle offers “*software as a tool for organizations, enabling people to train their cognitive abilities.*”. Their motivation comes from personal experiences and having seen that alternative solutions are either too complex in data-reporting, or offer too little measurability. As such they developed a solution that is both measurable and comprehensible.

The company was founded through the request of a professional football club that recognized the need for players to improve their cognitive abilities. This was especially the case for young, talented players: “*(...) they want to develop their talents and let them reach the first team.*”. This need arose from experiencing “*the increasing intensity on the pitch and available time to make choices decreasing.*”. The club had already tried alternatives, but those were faulty: “*(...) non-matching training programs, lack of flexibility, and low adaptability.*”. The need for performance also comes with a financial gain as “*the Dutch league is also based on selling highly-talented players.*”. Aristotle was therefore founded and, after partnering up with the club, now provides the tool to improve the football players’ performance. In return for a percentage of Aristotle’s total revenue the club has implemented the tool and “*(...) when we have new iterations we can test it with them. Kind of like a living-lab. So they are in front of everything and give feedback based on their needs.*”. Besides this, Aristotle also gains reputation and exposure through the club using their tool, as well as increased marketing value. Regarding intangible value, Aristotle supports the innovative image of the club, since “*the club can show that they are innovative by showing our product as use-case.*”.

Through the football club’s project group on football cognition, Aristotle came into contact with the neurological institute, resulting from “*concussion protocols being tested.*”. Their goal of collaborating with Aristotle was to “*help children with special educational needs in their cognitive development*” and “*aim to provide a better quality of life, and daily functioning.*”. For this reason, the institute provides the tool to an associated special needs school. “*In principle this is the same tool. (...) The overlap is that we provide cognitive tasks that should be performable within a small period of time, and gives feedback.*”. However, since the end-user differs from the end-user at the football club, “*the tool must fit within the experience of the kids. For example, they want nice figures. There has to be a theme that makes it engaging.*”. These settings of execution are drastically different, as some of the children are not always able to perform the task physically. When comparing the two tools in terms of the provided tasks, the CEO stated the following: “*For the athletes, it is focused on cognitive overstimulation in the setting they are to perform in physically. (...) Regarding the children, it is more focused on regaining trust in their own abilities. Firstly, it should be fun, and engaging. Then, it should build their self-confidence.*”. Additionally, the tool is used for scientific research purposes which may provide Aristotle with validation of their product. “*We offer the licenses, and they use them for their research (...) There is no commercial incentive from their side.*”. . Being connected to the institute helps in Aristotle’s reputation, as well as exposure being generated. The institute also gains, as Aristotle “*helps to innovate in their field.*”.

Aristotle furthermore partnered up with several physical therapists clinics, who use the tool for their “*patients’ cognitive-motoric issues.*”. This need arose from the clinics recognizing that “*(...) you cannot separate the brain from the body. A problem in the one can be translated to a problem in the other, and vice versa.*”. In this market, as well, a different tool

is applied: *“The competitive aspect from sports is not applicable here. (...) But the fact that you need space to move, and train in a specific setting is the same. For that you need certain types of hardware. But from a product-specific perspective it is different.”*. These clinics pay a license fee, enabling them to make use of the tool. By using the tool, they will be able to *“increase their efficiency, and start more projects.”*. Data and user-feedback is thereby gathered, allowing for further development of the tool. By using the tool, the clinics are supported in their goals of being innovative. Aristotle, besides financially, also gains through this usage by means of more exposure. Also, by collaborating with these clinics it was possible to apply for subsidies.

All associated partners receive the developed software, and are able to implement this as they please: *“Those three parties kept their IP regarding the training methods, so the implementation side of things. From the intellectual property they own, they also have the possibility to expand. That is how the notion of open innovation came to be in this case.”*.

There are several universities connected to the company as well. These provide Aristotle with interns, feedback and knowledge. Besides manpower and informational value there is also the exchange of intangible value, namely exposure, reputation and experience. One university also provides the company with a workspace. By providing internship opportunities, Aristotle indirectly generates marketing value for the university: *“Essentially it is a marketing exchange, because we are in the media a lot and as such offer marketing value form them in return.”*.

The future vision of the company entails setting up informational channels between partners: *“We want find a certain exchange, where feedback comes from multiple angles.”*. From the perspective of open innovation they want to include all generated insights to offer a more complete package. Individually, the partners *“are all positively affected by improving cognitive information processing. Hopefully they can learn certain aspects from each other, or spot opportunities for one another.”*. Thus, the vision is to make them work together, to enable cross-sector learning and to develop new business- and revenue models. Here, it is important for Aristotle that there is *“value is distributed amongst those involved.”*.

Below, in Figure 6, the Value Flow Model of Aristotle’s network is displayed.

6.2 Co-Creation Workshop

The co-creation workshop will be discussed in this section. The purpose of this workshop was to create a concept ecosystem by means of a visualization of the prospected joint value proposition. This was done by means of a Value Flow Model, since this not only clarifies the intended alignment structure, but also gives insight in the gained value per actor. Therefore, it is a good starting point in the effort to align the partners. Hence, it is key input in answering sub-question two. Part of the preparation was done through the partner interviews and the development of their respective Value Flow Models, as these were discussed and considered during the workshop. The other part of the preparation entailed developing an agenda that ensured the necessary information was gathered to draw the ecosystem with. The following paragraphs contain elaborations on the preparation, execution, and result of this workshop.

As stated above, the previously developed partner networks served as part of the preparation for the workshop at hand. These would be used to lay the foundation of what the respective partners represented as a business, both with and without respect to Aristotle. Then, it was considered what information was necessary to create the Value Flow Model, thereby reaching the goal of the workshop. As such a workshop agenda was created, which was used as guideline to ensure all necessary elements would be discussed. As last preparatory step it was discussed with the first assessor of the thesis which way of conducting the workshop would work most effective. It was decided that the author would lead the workshop, hence asking the questions and draw the proposed ecosystem. The software used to draw was Miro (version 0.7.37.0)

In total the workshop lasted three hours, and was conducted together with Aristotle's CEO and the first assessor of the thesis. The first assessor was present in an assisting role, due to their experience in conducting such workshops.

The workshop agenda, hence envisioned procedure, started with an introduction, in which the goal was stated. This was to visualize the value proposition, explicate the value streams between the actors. Here it was of key importance to clearly state the added value for each actor. Then, the developed partner networks were discussed. This included elaborating on their motivation for conducting business and engaging in a relation with Aristotle. To conclude this part of the workshop the respective future visions of each partner was discussed. The underlying purpose of this was to make clear the possible varying incentives the partners have, which could affect subsequent alignment efforts. Upon having discussed the partners, their networks, and motivations, the next step was to start drawing the value proposition. Firstly, the intended goal was discussed, and why it was deemed that an ecosystem structure was the best way to reach it. Then, the focal points of the value proposition were drawn up, after which it was possible to include the prospected ecosystem and the various value streams. Due to time constraints, only about a third of the whole proposition was able to be completed in the workshop. Therefore, the author of the thesis and Aristotle's CEO sat down at a later moment to finalize the proposition.

6.2.1 Results

In the section below the results of the co-creation workshop are discussed. This includes an explanation of the value proposition and the added value for the included partners. The section concludes with the developed Value Flow Model, visualizing the intended proposition.

The value proposition in general entails the following: through usage of the tool in various markets, and the sharing of information and expertise with the involved parties (e.g. commercial organizations and research institutes), it will be possible to on the one hand develop a new knowledge base, and on the other hand create novel business models. The main purpose is to “*research whether the tool works in the different contexts of application*”, standardize the gained knowledge and further develop the tool. Aristotle’s CEO mentioned: “*In general it is about the sharing of information.*”. The core of the proposition is to be structured around cross-sector information sharing and collaboration, which allows for gathering of multilateral feedback and validation. Additionally, this allows the involved partners to learn from each other as well. From this, iterations of the tool can be developed and deployed more efficiently. These objectives of information sharing, development, and collaboration will be reached as follows. Essentially, the proposition is made up of three parts, or project groups; *protocols*, *tailoring*, and *implementation*. These will be elaborated on below. It must be noted that, while the three project groups are treated individually, they are part of one value proposition. The separations are solely purposed to clarify both the different goals of the proposition, and roles of involved actors.

Protocols

Through using the tool, developing new training methods and gathering user feedback it is possible to create new protocols and treatment methods. The goal here ultimately is to standardize these new training- and treatment methods. The protocols will be developed through:

- Sharing of training-development knowledge with associated physical therapists.
- Sharing and validation of user (patients) needs, regarding the tool, e.g.:
 - Tool UI/UX
 - Data-visualization
 - User-friendliness
- Sharing and validation of general user needs, such as training intensity, duration etc.
- Data-driven validation of treatment methods

This way the R&D is continuously in motion, allowing for the tool to be adjusted based on the treatment methods at hand. The physical therapists will play a key role in this, and are responsible for this R&D. Ultimately, the newly developed protocols will be offered to health insurers, to standardize. The other associated actors share their gathered data, but nonetheless pay a subscription fee for the R&D, upon which the newly developed protocols may also be implemented in their respective organizations. Aristotle is the sole owner of the software, but any IP of the novel protocols is owned by the respective developers. As such, they can create new business models around these. For example, the physical therapists sells online training programs to other clinics, the football club trains external trainers by means of their new training protocols, and the neurological institute may train their teachers differently. Those new clients will pay a license fee and onboarding costs to Aristotle, after which they are granted the tool, and implementation advice. The (online) training education and the actual training program they will receive as well, but those costs are paid to the party that owns the respective IP. Aristotle will take commission over those costs. Below in Figure 7, a Value Flow Model providing an overview of this particular part of the value proposition is provided.⁵⁴

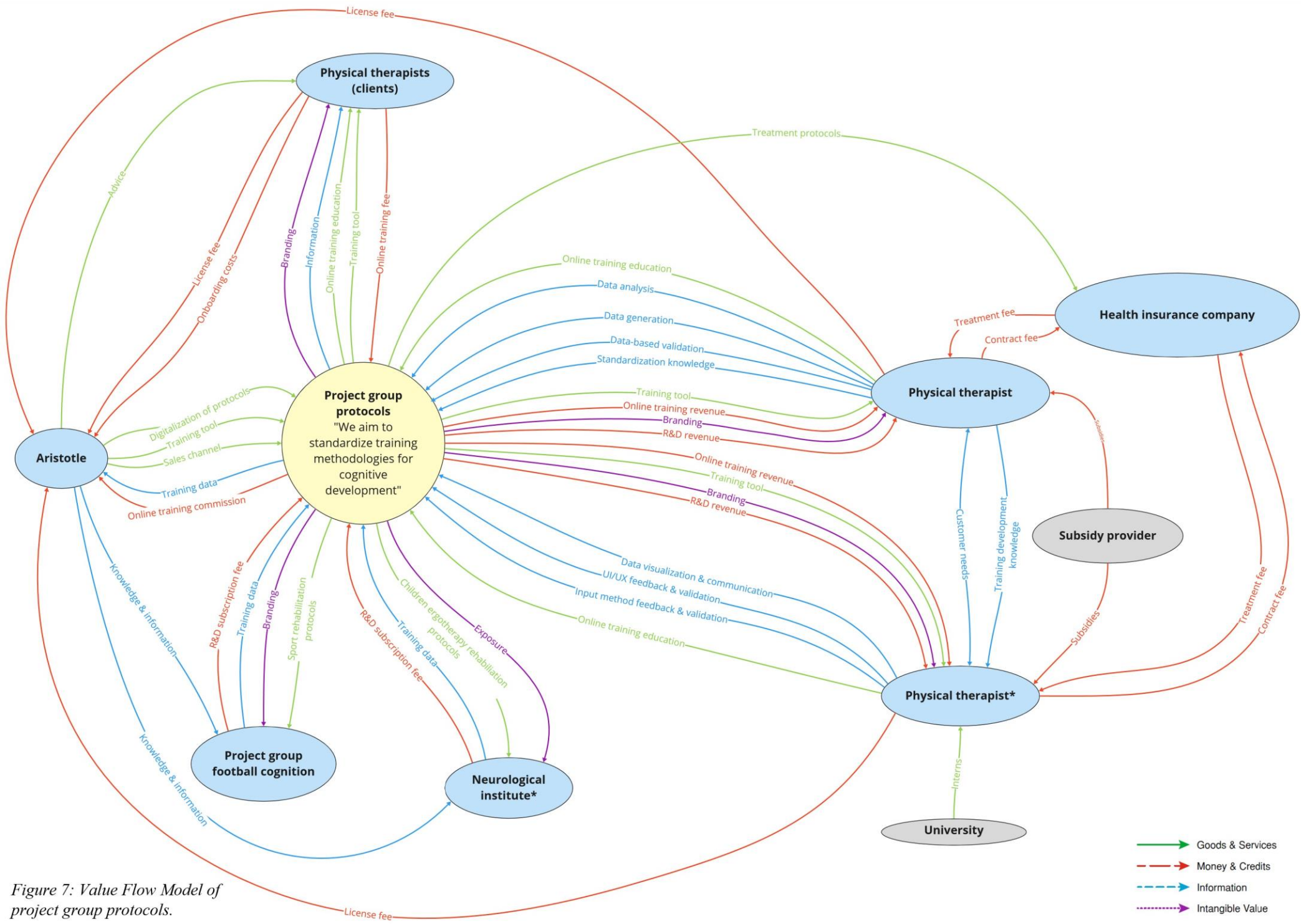


Figure 7: Value Flow Model of project group protocols.

Tailoring

The second aspect of the proposition is tailoring. This entails the continuous development of the tool its self-learning features. Due to the gathered user-data and written feedback (by the teachers, therapists and trainers) the natural language processing (NLP) algorithm implemented in the tool can be trained. Following this training of the tool is the possibility for the tools to make personalized recommendations, based on the specific user needs of the individual. That is the essence of the project group *tailoring*; embracing individual use-case and training the model accordingly. Resulting from continuous training of the tool, it is ultimately possible for physical trainers to offer their clients to use the tool in the comfort of their homes, as training is now possible without the therapists being present. Thus, this opens the opportunity for them to implement a B2B2C business model. Additionally, regarding the football club, workload efficiency will be improved due to the players now being able to train and utilize the tool on their own. In Figure 8 below, the Value Flow Model pertaining to this aspect of the proposition is added.

Implementation

The last aspect, or project group, of the joint value proposition is *implementation*. Here, collaborative learning is the focal point. Due to the various educational- and research institutes being part of the ecosystem, in addition to the commercial organizations, cross-sector learning is enabled. This allows for all involved parties to increase their network, and set up new collaborations. While cognitive training is the connecting factor among the involved parties, all actors implement the tool in their specific area of expertise. Therefore, it is intriguing to see how the actors can learn from each other, and possibly implement certain aspects relevant to them. The aim of this aspect of the proposition is leveraging all the individual use-cases in order to offer a more complete package. Figure 9, which is added below, displays the Value Flow Model concerning this part of the proposition

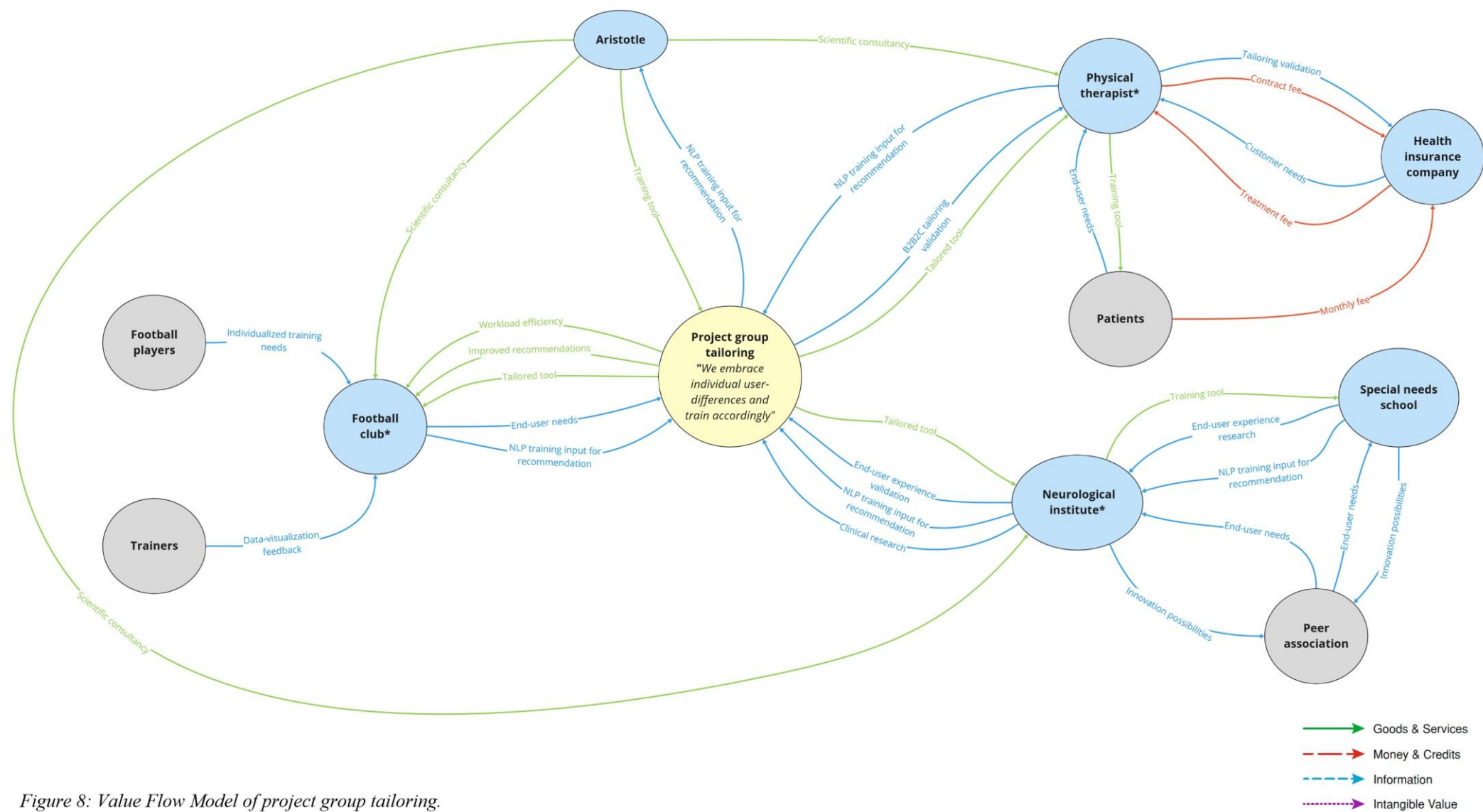


Figure 8: Value Flow Model of project group tailoring.

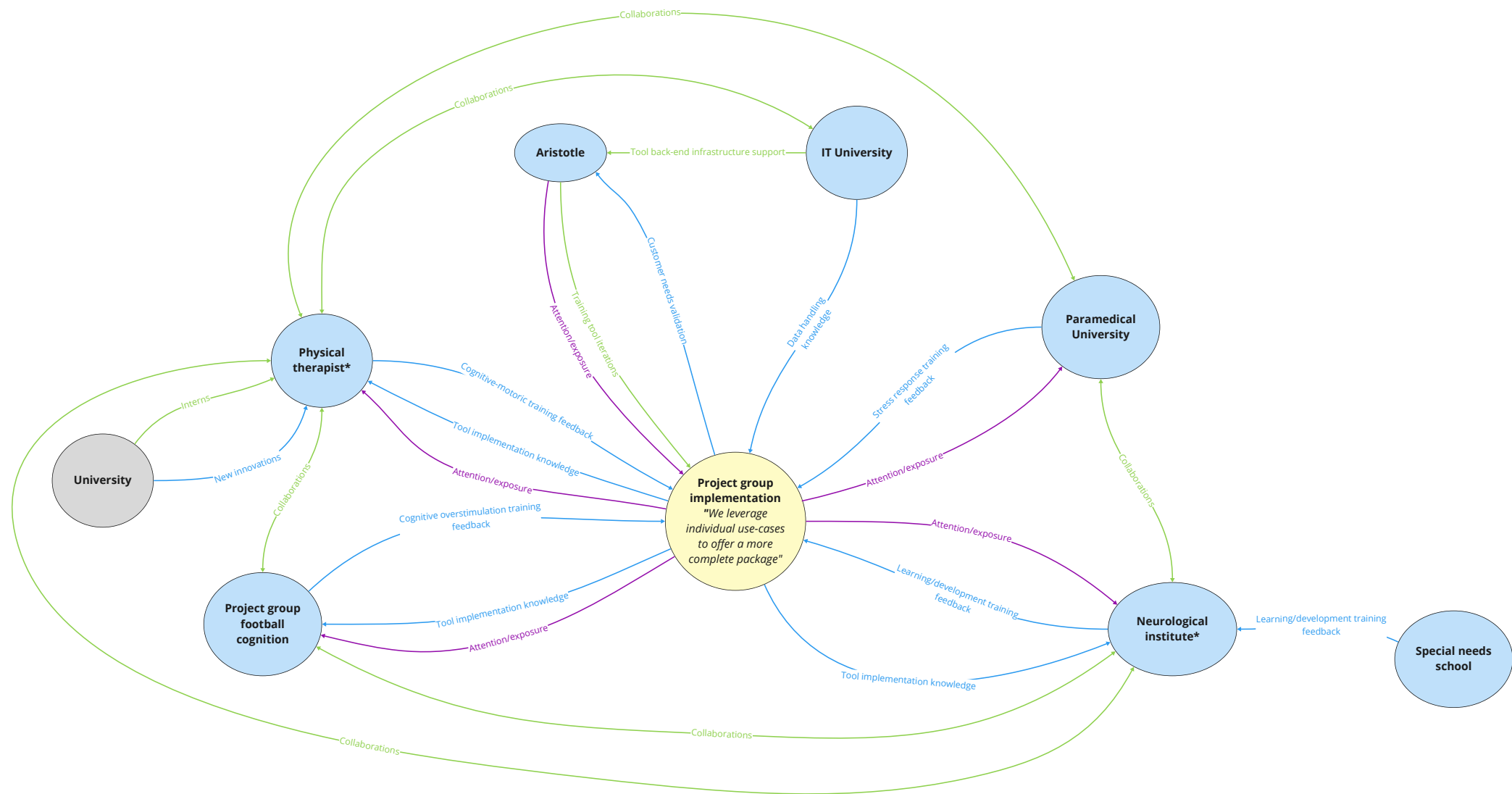


Figure 9: Value Flow Model of project group implementation.

Through the aforementioned proposed project groups the involved ecosystem actors are able connect, share insights, collaborate and create additional value together. The paragraphs below detail the added value per actor; the physical therapists, the football club, the neurological institute, and Aristotle, respectively.

Physical therapist

In the current situation the tool allows for more treatment projects to be started, as an effect of increased efficiency per project respectively. Through this new means of collaboration innovative projects can be provided, due to new protocols being developed. This means additional financial gains, as the aim is to standardize through health insurers. Seeing how the clinics play a crucial role in the R&D of these protocols, they will profit from the subscription fees the other ecosystem actors must pay to implement their developed protocols. Also, these new methodologies allow for alternative business models, since the trainings can be sold to external physical therapy clinics. Then, by means of tailoring, in the future it is possible to offer at-home training for clients. This means that the clinic will become less dependent on insurers for their income, as they now sell to their clients directly.

Besides monetary gains there is value in the knowledge sharing with the other actors, which may lead to new insights and possibly new collaborations. Then, there are the intangible values that must be noted, such as innovativeness, progressiveness and exposure that are generated through participating in this envisioned ecosystem. The added value is depicted visually in Figure 10 below, which shows the in- and outgoing value streams of the physical therapy clinic in the joint value model.

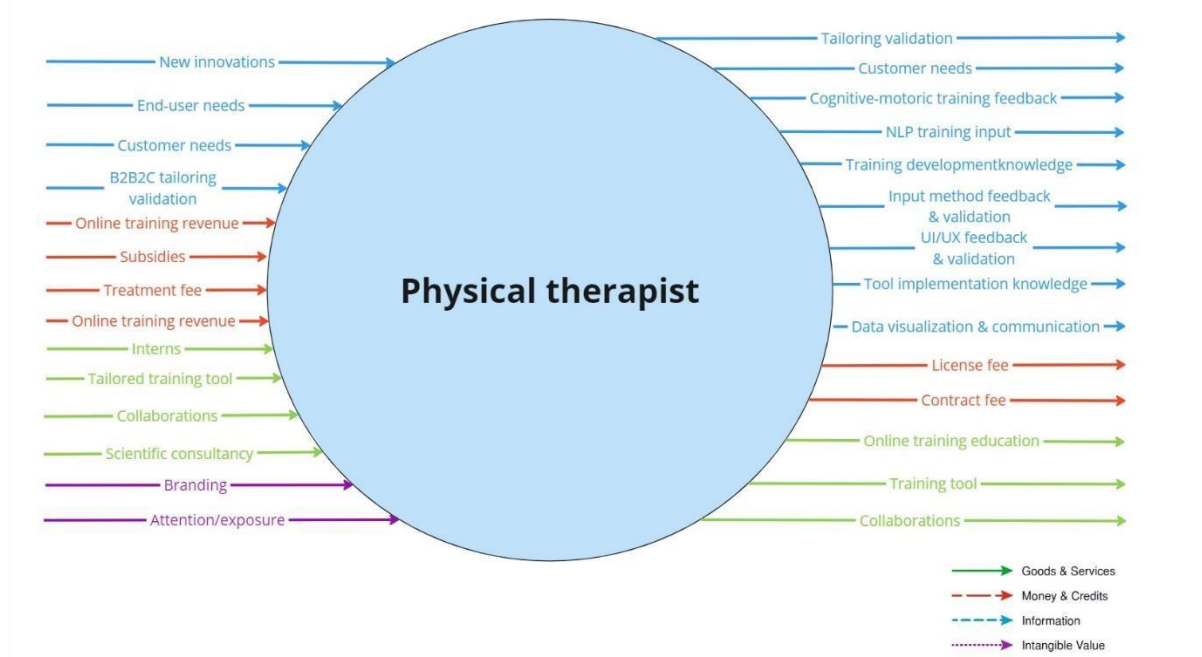


Figure 10: In- and outgoing value streams for the physical therapy clinic in joint value proposition.

Football club

Firstly, as a result of contractual agreements that the club shares in the total revenues generated by Aristotle, it is in their interest to make this company grow. By developing and launching new treatment- and training methodologies, the appeal of the product only grows, thereby indirectly benefitting the club as well.

The current situation enables the tool to improve players' cognitive abilities, by means of cognitive overstimulation, thereby improving overall performance on the pitch. The envisioned collaborative structure allows new treatment methods to be developed. For a subscription fee, these methods can also be applied in the club. This will lead to decreased downtime for injured players. This falls in line with their goal of keep on improving.

Additionally, resulting from the tailoring of the tool, improved recommendations will be made, thereby enabling players to utilize the tool on their own. This improves workload efficiency, as trainers are now able to focus on other tasks. Furthermore, by developing new training methodologies on their own, the club can now introduce additional business models. For example, they may decide to train external football trainers, in exchange for a fee.

Then, again there is significant value to be gained from knowledge sharing with the actors. Valuable lessons may be learned from seeing how the tool is implemented in different sectors, and learning about the trials and tribulations in other markets. The in- and outgoing value streams for the football club and associated football cognition project group is displayed in Figure 11 below. This provides a clear and concise overview of the added value.

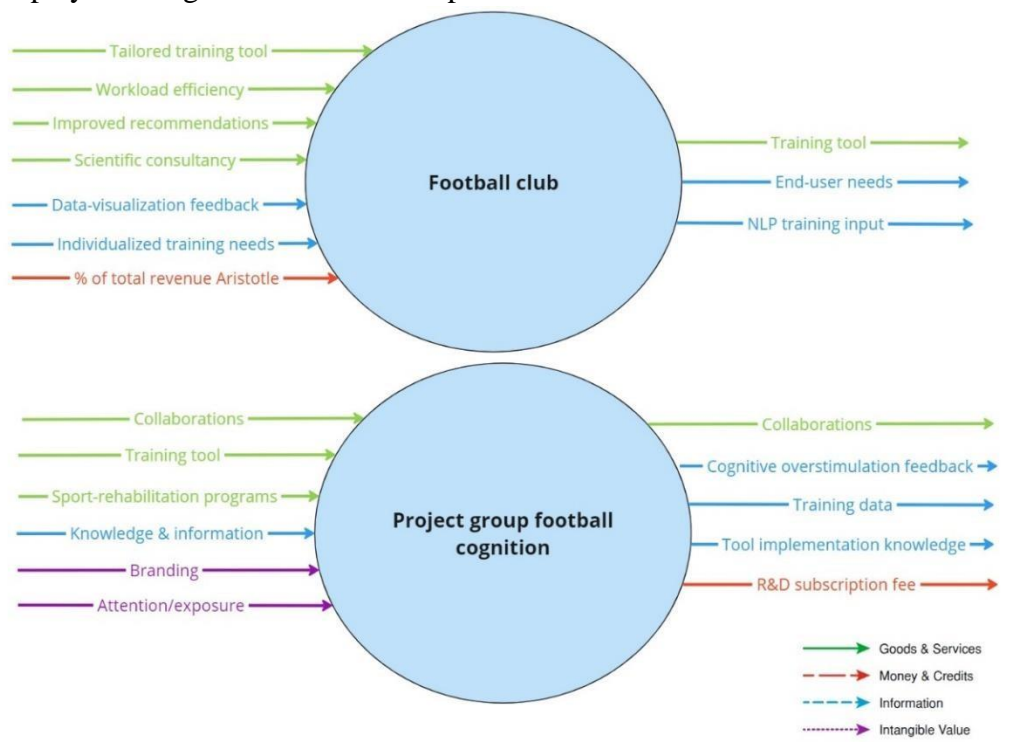


Figure 11: In- and outgoing value streams for the football club and project group football cognition in joint value proposition.

Neurological institute

The neurological institute, and particularly the special needs school, stands to gain from participating in this ecosystem. This is the case since new treatment and educational programs can now be developed by collaborating with the ecosystem actors. As their primary focus is providing the best care and education for their students, this is of high value. Additionally, as the continuous development and iteration of the tool also leads to validation of new methods, the tool may be distributed further through the special needs school.

Besides the educational value, the institute is now also able to explore new research avenues surrounding cognitive training. As they mention the connecting of different disciplines, people, expertise and organizations to be of high importance for them, this proposition falls perfectly in line with that vision. By continuously generating feedback and validating new features and insights, it is possible to subsequently iterate on the tool and keep tailoring to uncovered user needs. Figure 12 below displays the total in- and outgoing value streams for the neurological institute, as proposed in the joint value proposition.

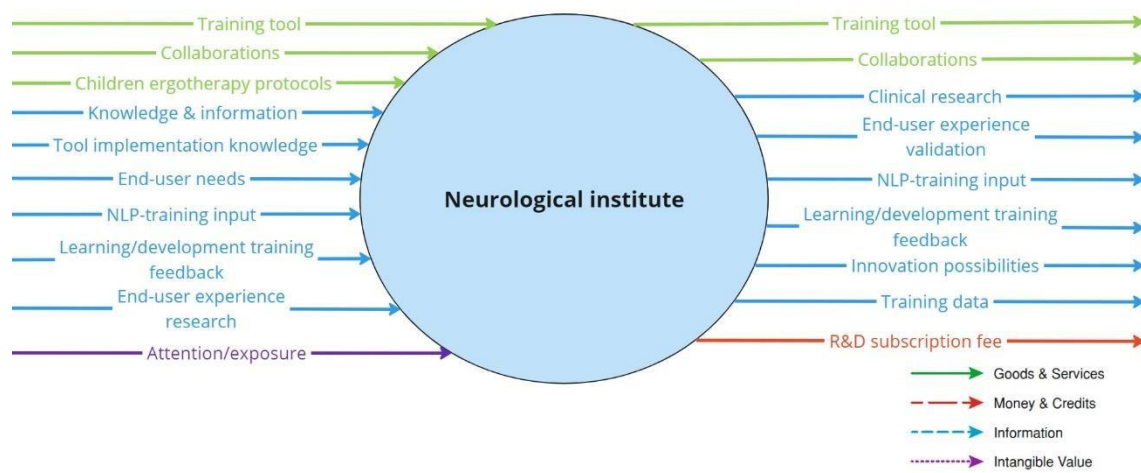


Figure 12: In- and outgoing value streams for the neurological institute in joint value proposition.

Aristotle Cognitive Technologies

Aristotle’s main goal is to help people in the best way they can, through their cognitive training tool. But, they are also a commercial organization. By developing new training and treatment methods, they stand to gain financially. This will primarily be through network effects, as their product will become more valuable as more clients decide to join, due to repeated onboarding costs, online training commissions and license fees. By allowing multisided feedback, they make sure the wheel only has to be invented once. Through this cross-sector learning they will be able to iterate and develop their product according to the user-needs that arise. In Figure 13 below, the in- and outgoing for Aristotle value streams as proposed by the joint value proposition.

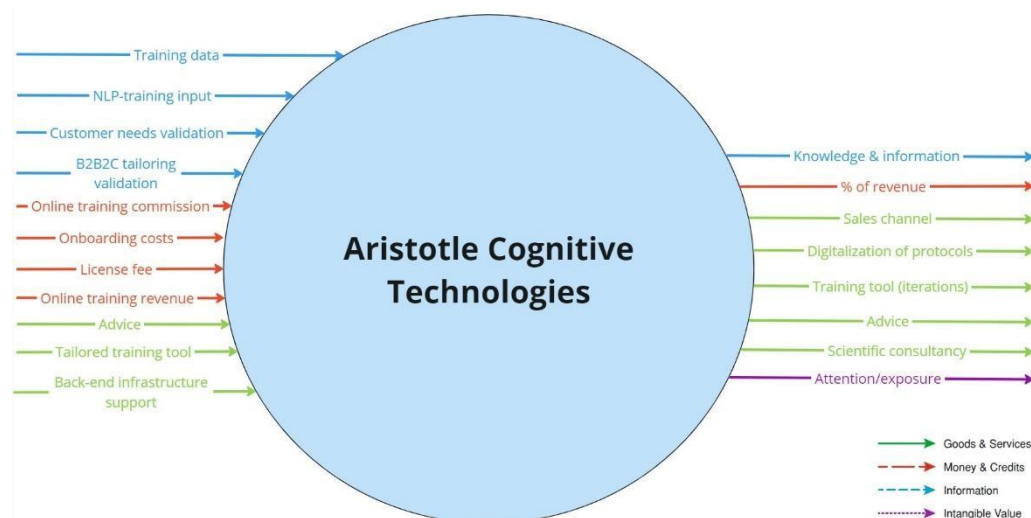


Figure 13: In- and outgoing value streams for Aristotle Cognitive Technologies in joint value proposition.

To combine the aforementioned aspects of the proposition, the included actors and the various value streams, the Value Flow Model displaying the complete structure is added in Figure 14 below.

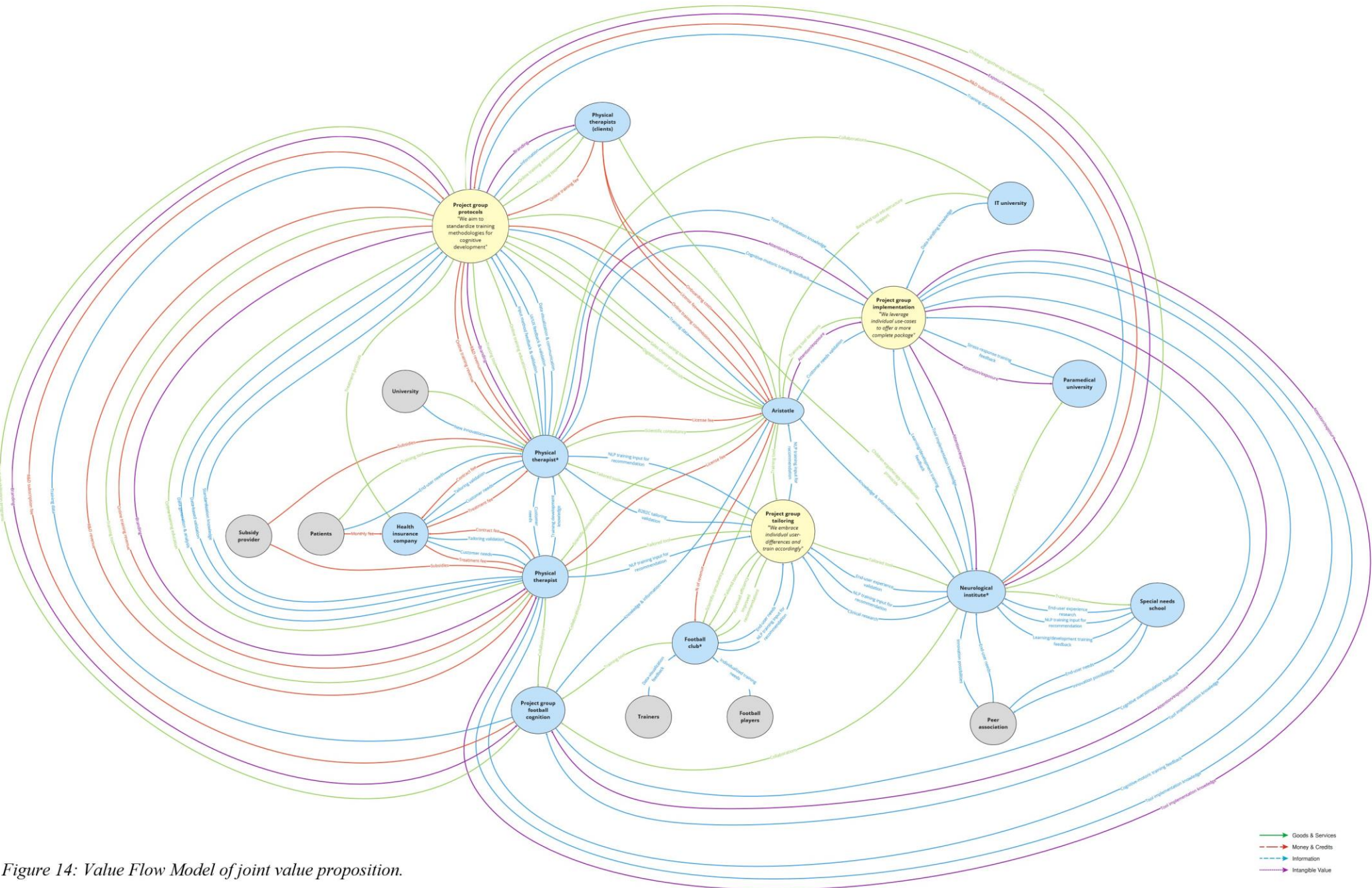


Figure 14: Value Flow Model of joint value proposition.

7. Evaluation Interviews

This chapter includes the evaluation of the results of the design cycles— the conceptual model and joint value proposition, as described in chapter 4.4. Here, the applied research methods, procedure and results shall be discussed. The goal of this evaluation step is assess to which extent the created artefacts serve their intended purposes. The sections below outline the evaluation processes for the two design cycles, respectively.

7.1 Conceptual model

This section serves the purpose of outlining the evaluation of the conceptual model, resulting from design cycle one. The goal of the evaluation is to validate whether the discovered factors in design cycle one actually hold pragmatic value. As the purpose of this thesis partially is to provide actionable knowledge for managers to employ in joint value creation efforts, the goal here is to assess the practical value of the discovered factors. In doing so, this evaluation also serves to answer the third sub-question:

“How can the influencing factors for joint value creation support the facilitation of strategic collaboration of partners from various markets?”

Answering this question was done by means of an interview. The process of conducting this empirical research will be discussed in the following paragraphs. Firstly, the interview guide development will be discussed. Following the interview guide, the analysis of the gathered data is detailed. Lastly, the results will be elaborated on.

In order to reach the abovementioned goal, a semi-structured interview guide was developed. The included topics were, logically, based on the found factors in design cycle one. While developing the interview guide it became apparent that not all factors were relevant at this particular point in time. This is related to the fact that in this stage, where the ecosystem is still in conceptualization phase, some factors cannot yet be applied, as they pertain to an operationalization stage. Therefore, it was carefully analyzed which factors were relevant to the current stage. This resulted in an interview guide including the general topics of *governance, alignment, shared vision, risk-analysis, and leadership*. The actual questions were aimed at discovering whether the factors were actually considered, and how these would possibly affect the facilitation of strategic collaboration between the partners. See Appendix F for an overview of the applied interview scheme.

The interview was conducted with Aristotle’s CEO. Ideally, also the other involved managers would have been interviewed. However, due to time constraints and summer holidays this was not possible.

In total the interview lasted 35 minutes. It was audio-recorded and transcribed manually. Thematic analysis was performed upon reading the transcription, to get more acquainted with the data. This analysis was done deductively, in the sense that pre-defined themes were already thought of through the discussed topics. These themes were *governance, alignment, risk-analysis, leadership and shared vision*. To derive codes from the data, firstly relevant and interesting phrases were highlighted. Then, stemming from this first round of analysis, 22 distinct codes were extracted. The second round of analysis included the merging of codes that found common ground, and grouping codes based on relevance to the themes. As some

codes did not fit in the scope of the pre-defined themes, it was decided to add the theme of *trust* as well. Appendix G displays the table of themes, codes, and their descriptions.

Results

The findings of the validation interview will be elaborated on in the following paragraphs. This section will be structured according to the developed themes of *leadership*, *governance*, *shared vision*, *alignment*, *trust*, and *risk-analysis*.

Leadership

Aristotle is the leading party in attempting to align their partners to develop their ecosystem. How this leadership role is aimed to be carried out by Aristotle, is to firstly convey a strong message of what the added value of collaboration— and more specifically, co-creation, would be for their partners. In spreading this message they want to inspire members to collaborate, and also encourage active participation. The CEO stated: “... *this is what can happen if you let other parties in. If not, that’s fine as well. But if you do, this is what the added value could be. By doing so we enable the partners to talk with each other, where we moderate what is shared, and what is not.*”. This indicates that it is not only about inspiring and encouraging, but also setting up the channels for information exchange to actually take place. In terms of management style, while the ecosystem is still in its early stages they would like to actively manage the facilitation and execution of meetings, and steer the topics to be discussed. This was indicated by stating the following: “*I would like to actively control it at first. To see what everyone can offer, and then collaboratively see what we can do.*”. From there on out it will be possible to establish agreements, to then concretize the actions to be taken. At this point it will be clearer for the involved partners what needs to be done to reach a certain goal. “*In that respect we will be in the lead. On the one hand you have the agreements, and on the other hand you need specific information and feedback. (...) Together you can then look at what you have validated. Does this match everyone’s needs? Then you move on.*”. This indicates that the need for concrete actions has been considered, as these arise from certain questions at hand or the need for information to be gathered.

However, at this point no concrete actions have been made to try inspire and encourage the partners, or facilitate the networks for information exchange to occur. This is the case because the current research is aimed at investigating if there is interest in setting up such collaborative structures at all: “*That is what we want to discover with your research. We do not want to offer anything premature. That would also hinder your process.*”. From this is can be derived that the actions to be taken are to some extent dependent on the development stage the ecosystem is currently in. This makes sense, as it may be futile the spend time and/or resources on, for example, facilitating information exchange, when there is no need in the first place.

Governance

As prospective ecosystem leader there must also be some type of governance model in place. In that respect, Aristotle already has certain agreements with the respective partners: “*We already have arrangements regarding development options, and what we do, and do not share with other parties. So mostly concerning IP. Everything that’s theirs, stays theirs, but from a software-perspective we can share what we want, because that is ours.*”. In that respect the partners may be less hesitant, or more willing to share information and collaborate because agreements are already contractually set in stone. “*The contracts state that the developed software is ours. The implementation is owned by the other party. (...) Essentially*

we offer 'empty' software, with options.". Thus, individual agreements and contracts have already been drafted. No plans have been set in motion as of yet to make agreements regarding this prospected new collaborative structure.

When told that defining roles for each partner may also aid in setting up a governance model, it was stated that it was difficult in this case, and stage, to clearly assess those roles. Between the involved partners, all are users of the tool and have influence in the ongoing R&D in the new value proposition. *"We all have something to say about everything. Okay, protocols involves more of the physical therapists, where the rest is supportive. User experience is mainly the football club, and the rest is supportive. Everyone has input in that regard."* So, it can be said that clearly defining roles for every actor is no easy task, due to the different activities that they are involved with. In this case, the roles depend more so on the question at hand, and as such are more loosely defined. Based on what information is needed, or which task needs to be carried out, Aristotle's team knows who to contact: *"We have someone for the operational side of things. If it regards commercial matters, then I am in charge. We have someone for UX/UI, as well as for more scientific matters."* As roles are clearly defined internally, it is easier for Aristotle to know which actors may play the role that is needed for a particular situation: *"Then from our side you know who is in charge of which division. For instance, for a particular subsidy project where you need certain information, you can assess who is best suited for it, internally. We may then need information from the neurological institute, and know who to contact."* Thus, in this stage, it is not so much about emphasizing set-in-stone, firm-based, roles, but more so about knowing what you need, and subsequently reaching out to the right party. However, roles are clear for new parties who decide to join: *"Other parties are simply customers. (...) They are customers of our partners, who obviously are allowed to provide feedback, but they will do so to their respective provider."*

Shared vision

For an ecosystem to thrive it is important to work towards a shared purpose, be part of a community, and have a common vision the actors can align themselves with. Seeing how the partners hail from different markets, it may be difficult to envision this shared purpose and communal identity. Therefore, it must be asked what the shared goal is that drives the proposed ecosystem actors, and what connects market-players in football, physical therapy and neurological research. *"We all have the goal of improving people's daily functioning, which is hindered by information overload. (...) The organizations we work with, including ourselves, are all out to let the end-users perform better. So improve performance and wellbeing."* While, in essence, this is certainly common ground between the actors, it may still prove difficult to set specific goals and objectives for the ecosystem as a whole, because the end-users in each market are so different. *"It is a spectrum; some want to improve from -10 to 0, while others are in it to maintain their current levels. Then you also have people who want to improve from 0 to 10."* That is why, at this point, ecosystem-level goals have not yet been defined. The focus is to firstly optimize for each market, individually, to then move on to a collective. *"Together as a group, they [goals] are not in place. In this phase we mostly look at finding the best way to train people in their specific setting. (...) It is still looking for what works best."*

Another challenge in defining these common goals is that the pressure to perform is different in each involved market. For a football club, performance improvement is necessary practically every week, while in education the timeline may be much more lenient. Even though the underlying goal of helping people is shared among the actors, the need for

immediacy of results varies significantly. This was indicated through stating: *“One may be in it for fifty years, the other wants to see results this moment. In the end it is about the person in front of you that you want to support, train the best, and make them perform the best. I think that is the basis of why everyone here does what they do.”* It is then of key importance to convey that message, from a moral perspective of wanting to help people, and share that vision across the ecosystem actors.

Risk-analysis

The challenge of all partners differently prioritizing the need for results also comes with a risk for Aristotle. This risk arises through planning issues, stemming from differences in priorities. For Aristotle, their main priority is the tool itself, thereby allowing them to help others. For the football club, performing is at the top of their priorities, where the tool comes in as supportive- and innovative extra. *“In football you have to perform on a weekly basis, so they have different priorities. This product is added to innovate their training, but the training itself is most important.”* This can be said for all involved actors, where their first priority is the task of providing care, treatment, or education. *“For us it is a primary task, but for them it is secondary.”* As such, Aristotle has experienced planning issues. The risk here is specifically related to the company being a start-up: *“We do not have months to wait on each other. As start-up you have to keep going. But, developing without feedback is no option either. Without validation you are just operating blindly, and we do not have the funds to do that.”* It seems, thus, that the efforts to develop an ecosystem are in a way also targeted at reducing the planning— which ultimately translate to financial, risks. By aligning the partners to work towards a common goal, Aristotle may be indirectly place themselves higher on their partners’ priority lists. This was also indicated by the following statement: *“If we can do it efficient, by means of this ecosystem, then we can get them all around the table instead of waiting for them individually. Let’s just pick it up together and move forward.”*

Alignment

The aforementioned scheduling issues have also been the biggest bottleneck thus far. On the one hand this has to do with individual priorities, but also with the partners working with different schedules in general. *“One [the football club] works with seasons, the other [the physical therapist] with heydays, while the other [neurological institute] has the care they provide. Those are all things that do not fit together, there is little overlap.”* This denotes the importance of discussing and aligning the incentives the different actors have, and the envisioned timeline for value to be created. Not only between firms must incentives and motivations be aligned, intra-firm this is the case as well: *“That is why you spoke to the innovation manager, who has a commercial perspective in the organization. The commercial, and football division within the club may clash at times. So there have to be different contacts for different purposes.”* Internal misalignment of motivations may thus also lead to avoidable slack, or hindrances.

Trust

By discussing goals, motives, and incentives in an effort to align partners, it is not only the actual intended goal that must be considered, but also about the perception of the motive behind it. This ties in with the crucial factor of trust, one of the building blocks of any healthy business relation. Aristotle’s CEO mentioned that one of the ways to build trust is the following: *“... show from a scientific point of view which steps are necessary. I can understand that it may be perceived a bit equivocal, when I ask something. It might be confused with my commercial position within the company.”* This leaves room for somewhat

of a paradox, as commercial organizations should strive to generate revenue, but at the same time it seems like this should not always be the main goal. The crux here is to be open in communication, and have no double-agenda. So, in doing that, the right person should be assigned to convey the message from the right point of view: *“To build trust, we can do that from a scientific perspective, or from a UX/UI perspective. Just to show that those are the crucial aspects at that time, and that it is not just about earning money.”*

It can thus be said that sincerity is a big part of building trust. Because people must not be held back by the position they occupy within a firm, but it is just that matters can be dealt with from different perspectives. So, on the one hand it is crucial to communicate open and honest. On the other hand, it is also about the actions itself, and proving oneself: *“Time and time again proving that the intentions are right. (...) Showing that there is no ulterior motive.”* This ultimately comes down to the coherence of the intention and the execution of certain actions, or plans.

7.2 Joint Value Proposition

The conducted interview to evaluate the developed joint value proposition will be discussed in this section. This evaluation serves the purpose of assessing the extent to which the prospected proposition is in line with the partners' future vision and overall motivations, and their business goals. In other words, the intended alignment structure is validated. The input and feedback of Aristotle's partners is therefore crucial. This gathered knowledge is subsequently of critical importance in answering research sub-question two:

“How can we align the partners from various markets to facilitate strategic collaboration?”

In the following paragraphs, the process of conducting this interview will be discussed. This includes the interview guide development, data analysis, and the results.

The interview guide was semi-structured, and based on the value proposition. To gather input relevant to answering the abovementioned research question it was necessary to consider the factors crucial for attaining alignment. Therefore, it was decided to firstly include a general elaboration of the value proposition and its intended goals, including the three main project groups: *protocols, tailoring, and implementation*. Thereafter, questions regarding the fit with organizational goals, -motivations, and future vision were asked. This ensured detailed insight on the firm's view of the proposition. Also, questions regarding the openness to collaboration were added, since this is the crux of value creation in ecosystems. Furthermore, questions regarding current usage and possible future options of the tool were added. These were not directly related to the proposed joint value model, but indirectly add value to the evaluation as they allow for additional insight on the firm's motives and vision. Appendix H includes the overview of the employed interview guide.

As mentioned in chapter 4.4, only one evaluation interview was conducted due to time constraints and the summer holidays. This was with one of the owners of the physical therapy clinic.

The interview lasted 44 minutes in total, and was audio-recorded. Upon completion of the interview, the recording was manually transcribed. Afterwards, the transcription was thoroughly read to get more acquainted with the data. Then, thematic analysis was performed to yield valuable insights from this data. This included the highlighting of interesting phrases

and quotes, and deriving codes from these highlights. The first round of analysis yielded 24 distinct codes. Then, codes were merged where possible, renamed, and grouped, after which themes could be developed. This second round of analysis resulted in 4 themes (*organizational goals, training tool, collaboration, and concretization*), with 8 distinct codes in total. The tabulation of these themes, codes, and their descriptions have been added in Appendix I.

7.2.1 Results

The paragraphs below include the results of the evaluation interview of the joint value proposition. These will be discussed according to the four themes; *organizational goals, training tool, collaboration, and concretization*. Hereby the clinic's general intrigue towards the proposition will be elaborated on.

Organizational goals

To assess the alignment of the joint value proposition with the organization, it is necessary to first reiterate the clinic's general future vision. They want to switch from providing solely curative care, to also providing preventive care. The clinic has noticed the ever-rising healthcare costs, and therefore want to prevent ill-health, to indirectly drive down individual expenses: *"Healthcare is very costly as is, and everything you can prevent at the front-end, helps at least a little."* The underlying vision here is to *"(...) make sure we all get a little healthier."* This human- and societal-oriented perspective is what firstly drives their organization, while they also realize that there has to be financial gain in their activities. This was indicated by the following: *"(...) we are not a company with billions of euros profit, and that is not necessary. But we do have to provide for our 30 employees. That always plays a role."* Hence, they see added value in creating new revenue models through the joint value proposition, to become less dependent on the insurers: *"Yes, so we can at least determine our own prices. (...) That is not possible in those insurance models. There you get X amount per treatment, done. Also, there is a cap on the amount of treatments per year"*.

The appeal of the proposition lies not only in developing revenue models, but in development itself as well: *"For us, the intention to join is that we want to develop within our practice. Here we strongly see the added value of this cognitive tool."* This notion of development ties in with the image the clinic wants to portray; being innovative: *"It is also a little bit of image. That we want to be innovative as a practice. (...) Of course you can develop new methods yourself, but it is nice if you can offer them innovatively. That is where we see the value, in being able to develop a solution for this."* By portraying this innovative and progressive image, the clinic also sees growth-potential as a business: *"For instance, if people want to come work for you, or people approach you because of your vision on treatments, then patients may be more inclined to come."* Where development and being innovative is the goal, the clinic's owner also realized that collaborating with the other parties may help in reaching this goal: *"Yes, because bringing together those groups is of course just a means to an end."*

What can be derived from this is that proposition generally is in congruence with the clinic's goals and motivations to add societal value, but also monetary value to themselves. Additionally, it seems they are open to collaborate with the other prospected ecosystem parties.

Collaboration

The idea of cross-sector collaboration, initially facilitated by Aristotle, was intriguing to the clinic as well: *“Yes, to in any case bring them together. They have contacts that we do not. So it would be nice if they take the lead in that respect, and to then go on.”*. Also, the added value of said collaborations was, when referring to the project group implementation: *“That is where those project groups are nice, because you can improve the tool. Maybe we encounter the same problems as others, but they may already have a solution for them in place.”*. This was indicated as being an important piece to the puzzle, regarding value creation with the tool: *“Of course, we could think of new things ourselves, but two know more than one. That is just how it is, and you can learn from each other.”*.

However, the owner also realized that when collaborating cross-sector, the motives for collaboration may vary per actor, and the end-goals may not always align: *“It is of course different when you develop software for the neurological institute, or the football club. The tool should be different for them, because you have different levels, and different goals.”*. Prior to actually collaborating, these motives thus have to be discussed, and goals must be negotiated: *“Maybe the other physical therapists has a different plan, or maybe Aristotle. So we should come together and draft a concrete plan.”*.

The value of collaboration has thus been realized, but since there are no plans set-in-stone as of yet, it is hard to envision the materialization of the proposition.

Concretization

With regards to drafting a concrete plan, in the eyes of the owner it is firstly the case to actually come together with the ecosystem actors. The proposition, as is, holds promise, but *“practice should prove how it will actually work. (...) So bring the parties together, see what we encounter and then move on to development.”*. Before anything can actually be developed, the individual goals and plan of action should be discussed and agreed upon: *“(…) the first step is to find agreeance on that matter.”*. Besides the sole drafting of plans, it must also be discussed under what conditions those plans will be actualized. This will further concretize the roles and information-exchange channels within the ecosystem: *“So, where are we going? Under which conditions will we do so with those three parties? (...) And then see how we can learn from each other to optimize the tool.”*.

Upon agreeing on said conditions, the clinic firstly wants to scope out the tool-development options within their own market, with the other associated physical therapist clinic: *“How can we handle physical therapist-related matters? So which exercises will we include, what will the test protocol look like, which levels etc.”*. This is to ensure they actually have valuable input in cross-sector discussions: *“Then we must sit down with all parties and discuss.”*. It was also pointed out that these discussions are not a one and done process, but must be reoccurring: *“Maybe on a two-month basis. Where we come together and learn from each other. That we share what we have developed, and discuss where that might be applicable for the other parties.”*.

Broadly speaking, the clinic’s owner sees merit in the proposed collaborative structure, and the intended outcomes, but also realizes that concretization of these plans is necessary for further collaborative development of the tool.

Training tool

Where the tool was firstly only used in dribs and drabs, the clinic nowadays schedules weekly recurring moments to employ the tool in their methods. This increase in usage resulted partially from the increase in technical user-friendliness: *“Before it was a bit hard, from a technical perspective. (...) Now the controller connects automatically. This increases the ease of use and makes it more interesting for the therapists to employ.”* This is the effect of gathering feedback, and subsequent development by Aristotle. By increasing usage, the clinic slowly integrates cognitive training in their organizational identity and image, which they want to continue: *“We are going to renovate, after which we want to make cognition an actual part of the practice.”* This further implies that cognitive training is an integral part of their future vision, and that they want to further invest in developments. This was also indicated by stating: *“Costs come before the benefits, and these types of products are really nice to develop with.”*

Through increased usage of the tool, the clinic not only positions themselves as being innovative and progressive, but also gathers user-feedback: *“(...) athletes are already using it. They enjoy trying it out. As such we are already gathering feedback, without having a real protocol connected to it. So we have already started doing that, and people like it.”* These protocols are important to the clinic, because they can then really build a structure around using the tool. This is currently lacking, and hence the reason why the proposed project group protocols was received positively: *“Yes, it should be a real part of the treatment, and that is the difficult part.”* It was indicated that the clinic themselves already thought of ways those protocols could be shaped: *“(...) how exactly will we develop the testing protocol? Is that within the tool itself? And how will we ensure easy usage with patients? (...) That is also where the collaboration with the football club is interesting, because they already do so much motorial-related stuff. Maybe we can apply things from them, which we have not even thought about.”* The development of new protocols allows, on the one hand, for better internal integration of the tool, but also for additional revenue models, as previously stated. The owner also mentioned the importance hereof: *“Now we have the software, but the subsequent therapy is separate. It should really be an integrated thing. (...) In our eyes this also makes it easier to further market it. Then we really have something to offer, otherwise it is just the tool.”*

Additionally, the owner mentioned the appeal of a B2B2C business model, where the training tool would be offered to patients directly, for them to use at home: *“I think, with a little instruction, it can already be used in home-situations. But you have to really check which exercises to include (...)”* This further implies the positive attitude towards the project group protocols, as this would generate a solution to which exercises to include. The owner continued: *“(...) but it would be great if the tool generated them itself.”* Hereby the appeal of the project group tailoring was confirmed, as this self-generating component of the tool is exactly the purpose of this part of the proposition.

Overall, the owner’s position towards the proposition is thus positive. Their future vision in terms of organizational image, revenue models and treatment options are in congruence with the proposition’s intended goals. Additionally, the cross-sector collaborative structure was received as being potentially fruitful. However, it must be emphasized that it the proposition has potential, as concretization has yet to occur.

8. Discussion

In the current research, theory- and practice- based findings have been combined to develop a conceptual model, comprising of actionable factors for managers to employ in support of ecosystem value creation. Additionally, a joint value proposition has been created, aiming to align Aristotle's partners. The following chapter serves the purpose of interpreting and reflecting on the findings in this research. This will be done by means of several sections. Firstly, the most notable and important results will be reflected upon, and contrasted against extant literature to exhibit the theoretical contributions of this research. Then, the managerial implications will be elaborated. Lastly, the limitations of the thesis are discussed, upon which possible future research directions are suggested.

8.1 Theoretical contributions

This research has various implications for extant literature. Firstly, we will consider ecosystem literature. This study adds to this literature stream as it provides valuable insights into how a start-up navigates the birth stage of an ecosystem. Zahra & Nambisan (2012) mentioned the coupling of entrepreneurial insight and strategic thinking to be key for firms to— among others, create an ecosystem. The importance of an ecosystem strategy in partner alignment, and ultimately value creation, was substantiated in other articles as well (Adner, 2006; 2017; Jacobides et al. 2018; Walrave et al., 2018). This notion was confirmed through the evaluation of the joint value proposition, where the need for a strategy to translate the entrepreneurial plans into concrete action was mentioned. The intrigue of the proposition was apparent, but a clear strategy to materialize the vision was lacking. The developed joint value model visualized the proposed alignment structure between partners. As mentioned by Adner (2010), attaining alignment is critical on the road to value creation in ecosystems, and in doing so, firm-specific challenges of all involved actors must be considered. These challenges can be technological in nature, but can also stem from opportunity discovery, product development, or scaling up (Overholm, 2015). Effectual principles have been proven useful to manage those challenges, in support of partner alignment, uncertainty reduction, and value creation in recent studies (Duygu & Markus, 2022; Radziwon et al., 2022). However, those studies emphasize established companies. As that is not the case in the current research, another implication for ecosystem literature is found. One of the main challenges in this study, besides attaining partner alignment, is related to the 'age' of the focal firm itself. Since Aristotle is a start-up, they must consider the general uncertainty of their product quality, lack of reputation and scarce in-house resources, consequent to their relative new- and smallness (Comi & Eppler, 2009). This gives rise to additional challenges, besides those related to the ecosystem birth stage. This was also mentioned by Aristotle's CEO, who indicated the scarcity of resources to be among their main challenges in the current phase. As such, with regards to ecosystem developmental efforts, challenges related to firm-maturity must also be considered.

Another implication for ecosystem literature concerns the concept of alignment. The discovered factors in the literature review regarding this concept emphasize inter-actor alignment of roles, activities, incentives, motivations, complementarities, and bottlenecks (Adner, 2017; Oskam, Bossink & de Man, 2021; Jacobides et al., 2018; Kapoor, 2018; Keskin & Markus, 2022; Pera, Occhiocupo & Clarke, 2016). The interviewed experts confirmed these, and one participant added to this by mentioning the importance of intra-firm

incentive alignment. During the process of scheduling the partner interview with the football club, this significance of intra-firm alignment became apparent. Resulting from conflicting motivations within the organization, difficulties concerning participation in the study arose. This had to do with the fact that the notion of open innovation is not widespread accepted throughout the club, and different departments have different incentives. Hereby, the indication of Oskam, Bossink & De Man (2021), that tensions can arise due to opposing or diverging goals can not only be applied between-, but also within firms. Thus, while the club predicates one of its goals to be collaborating to innovate, the internal incentives should align with this motivation. As such, this study adds to the literature by emphasizing intra-firm departmental alignment, in addition to the development of between-firm alignment structures.

With respect to the abovementioned ecosystem birth stage, this study also contributes to the strategy-as-practice literature. As indicated in chapter 3, current literature emphasizes higher-level constructs to map, manage and design ecosystems (e.g., Adner, 2012; Den Ouden 2012; Talmar et al., 2020), but lacks in the provision of practical knowledge. Hence, the first design cycle was conducted, to uncover the actionable factors that aid companies in this stage and can be employed to support their efforts in value creation. However, when evaluating the developed conceptual model, it was realized that it was not possible to implement all uncovered factors in this research. This provides valuable insights, as it indicates that different factors are deployable in different stages of the ecosystem development. According to Moore (1993), in the birth phase of an ecosystem, firms should emphasize what customers want, develop a proposition accordingly, and decide on the best form to deliver it. By conducting this study it became apparent that the birth phase, as described by Moore, can be further partitioned, as not all factors were applicable. This corresponds with the findings of Dedehayir & Seppänen (2015), whose case study indicated the birth phase can be divided in two distinct sub-phases; invention and start-up. The invention phase entails the discovery of a new technology, and the assessment of its technical feasibility. In this sub-phase, the presence of the ecosystem leader is critical in bringing together and connecting prospected actors, and configuring the ecosystem, to enable subsequent development. The start-up phase, as Dedehayir & Seppänen (2015) propose, consists of the first operationalization of the technology, improving technological performance, and the resolution of bottlenecks.

During the research, it became clear that Aristotle finds themselves in the invention phase of the developmental journey. The reason for this is the overarching purpose of this study, which is to discover how their individual partner relationships could be transformed to a multilateral structure, hence interconnecting the actors and enabling joint value creation. For this reason, the clusters of factors that pertain more to actor connection (*leadership, shared vision, and collective identity*) and ecosystem configuration (*alignment, governance model, and risk analysis*) were better applicable in this study. These clusters encompass the general activities necessary to define actor roles, create information-exchange channels, develop a common vision, thereby creating an alignment structure. The employed ecosystem strategy involves the deliberate approach of activities to subsequently entice actor collaboration, propagate knowledge exchange, maintain relationships, and facilitate value creation (Visscher, Hahn & Konrad, 2021). This strategy is therefore key to enter the start-up phase and operationalize the developed vision. In this case, the strategy has yet to be developed and implemented, which is why concretization of actions was not possible. The respective factors in the clusters of *collaboration, knowledge sharing, learning capability, and trust* seem to correspond more to the start-up phase, since these factors entail predominantly operationalization-based action points. Noteworthy is that, while trust is certainly necessary

in the invention phase as well, it is deemed by the author that this concept is more critical in the start-up phase. The foundation for trust-building lies in interactions and negotiations, which consequently create the drive for co-creation and learning (Keskin & Markus, 2022). However, the deliverance on agreements and promises can only come forth from the skills, competences, and characteristics possessed by a firm— or, organizational ability (Steinbruch, Nascimento & de Man, 2017), and is ultimately expressed in its actions.

The developed conceptual model thus provides actionable knowledge to employ in the sub-phases of the birth stage of ecosystems. Specifically, the model also gives insight in the order of processes in this birth stage, by manner of the aforementioned sub-divisions. Here, it not only provides insights to ecosystem theory, but also contributes to the strategy-as-practice literature stream. This stream emphasizes the specification of activities performed by managers in strategy development. The uncovered factors are able to support managers in their strategic decision-making processes, in trying to create shared value by means of an innovation ecosystem. This model may therefore add to the strategy-as-practice literature, as it provides pragmatic knowledge to apply in value creative efforts in the ecosystem birth phase.

8.2 Managerial implications

Additional to contributing to extant literature theoretically, the goal of this research was to provide managers with actionable points of attention that can aid them in joint value creative efforts in ecosystem development processes. Hence, through the first design cycle, a conceptual model has been developed that presents managers the handhelds they can employ in creating shared value. The model provides a clear overview of key concepts in joint value creation in ecosystems, by means of the developed clusters. These clusters represent the higher-level constructs critical to effective value creation in ecosystems. Subsequently, the appurtenant factors concretize these higher-level constructs, and makes it possible for managers to operationalize. This not only holds for focal firms in ecosystems, but for any ecosystem actor.

Following the interpretation of the results, and thereby subdividing the birth phase of the ecosystem development, important lessons can be learned by managers. In the early stages of this phase it is important to attract and connect possible ecosystem actors and align them with the conveyed message and vision. An important skill here for managers is to be able to place yourself in the shoes of your prospective ecosystem partners. The question of what the added value for those partners is can thereby be answered more clearly. This is important as the crux of ecosystems is the multilateral interdependency, so the scope of relevant goals and motives has outgrown the dyadic structure. However, during these processes it is also key to develop a strategy for the subsequent phases, to concretize the developed plans. This is important not only to strengthen your proposition, but also to identify bottlenecks, uncover possible hidden motivations and to set up future resource- and knowledge flows. In turn, this will ultimately increase the alignment between actors, which literature has proven to be key in joint value creation. Therefore, the notion of continuous open, honest and clear communication is critical. The discussion of incentives and goals, and negotiation of roles and objectives will, besides potential contracts, increase trust between actors. Thus, managers should always be upfront about their goals to reduce the risk of conflict.

By implementing the Value Flow Model as means to visualize the joint value proposition, another important takeaway for managers is that value is not only expressed in monetary exchanges. This was firstly realized in initial communication with the football club. The intended purpose of this research was interpreted by the club to solely be commercial success for Aristotle. Hence, they decided not to participate in the study. Thereby, they neglected the potential of the added value for themselves through information- and knowledge exchange with other prospected ecosystem partners. Herein lies an important message, since this also corresponds with the earlier mentioned notion of intra-firm departmental alignment. The goals of departments as subdivisions of an organization should correspond to the overall vision and mission-statements of the firm. Since the club expresses their intentions in participating in open innovation projects, the internal departments must be aligned according to this goal. Managers should thus be wary of possible internal misaligning regarding motivations, incentives and goals, and implement measures to resolve these. This can be achieved, again, through open discussions and negotiations. The added value of such discussions has also been proven by conducting this research. This holds because after the conduction of the partner interview with the club, internal discussions were sparked to see how open innovation can be ingrained more into their organizational culture.

By means of the evaluation with the physical therapy clinic, the interpretation of value other than monetary was confirmed. They realized that working together not only with organizations in their market, but also cross-sector, could yield benefits. The prospected value exchange channels in the joint value proposition have the potential to also add to their business in terms of information and knowledge, reputation and exposure. Therefore, in general, it is wise for managers to broaden their horizon in terms of the search for opportunities, and investigate which use-cases may valuable for their organization. In the end, any commercial organization stands to gain from generating additional revenues, but this should not be managers' sole goal.

8.3 Limitations & future research

Various limitations and implications for future research are to be considered with regards to this study. To conclude this paper, these will be discussed in the following paragraphs.

8.3.1 Limitations

First, we must consider the systematic literature review and its results. While this method is employed to provide a mapping of evidence in a certain research field as unbiased as possible (Mallett et al., 2012), there is still room for interpreter bias. This is especially the case in this research, as the literature review results are based solely on the interpretations of the author. Specifically, the literature was analyzed in search of the mention of concepts and notions in joint value creation, after which they were interpreted and actionable factors were derived from them. Finally, they were clustered based on the general concepts they relate to. In the interpretation and derivation of factors you invite the notion of subjectivity, thereby allowing room for bias. Additionally, the review was performed by a single researcher. While the results were partially validated in the expert interviews, the argument for bias still holds. Also, with regards to the expert interviews, the sample size was relatively small as there were only four participants. Therefore, cross-validation was only possible in limited capacity. The fact that no field experts were part of the research may also have limiting effects on the results, as insights from actual business-experience could have been of significant value.

The second limit pertains to the input of the developed Value Flow Models of the partner networks. In the case of the neurological institute, the input was solely based on desk-research and collaboration with Aristotle's CEO. Also, no validation was possible due to repeated scheduling issues and holidays. Therefore, no triangulation was achieved. This resulted in limited depth in their network in terms of value streams, and required the interpretation of the author to draw certain value streams. Therefore, the Value Flow Model of this particular network might not be completely representative of the real-life situation, thus possibly hurting research validity. Additionally, it was decided to omit value propositions from the respective networks, and base the Value Flow Models solely on actors, motivations and transactions. Although, by doing this, no fair comparison could be made between the in- and outgoing value streams of their current situations, and the streams in the joint value proposition. Thus, it was decided to not draw this comparison, and solely display the in- and outgoing value streams of the envisioned situation, as depicted in chapter 6.2.1. However, the added value of the joint value proposition could therefore only be explained in words, opposed to also substantiating these claims by comparison of the value streams. Due to the input for the partner networks being less than desired, the joint value model may consequently hold less weight because of lack of comparability with the current situation.

Third, it was intended to include two physical therapist clinics in the research. However, in the midst of scheduling interviews with the second clinic, they decided to withdraw from the collaboration with Aristotle. This was ultimately favorable for Aristotle, as they found another partner that was more open for close collaboration. Though, for this research it was too late to pivot and include the new partner in the research. This clinic also plays a vital role in the ecosystem and their input would be of great value, in terms of evaluation and feedback on the proposition. However, this could unfortunately not be realized. The effects of the withdrawal of the initial clinic were noticed in the rest of the process, as the time spent in preparation for their participation could have been used otherwise. Would this not have happened, more input, data and feedback could have been gathered, thereby further evaluating the created artefacts.

Finally, the evaluation of the created artefacts was performed with only one interview per artefact, respectively. On the one hand this resulted from repeated scheduling issues, while on the other hand the time constraints of this thesis and summer holidays of prospected participants also played a big role. The contact person of the neurological institute was not available, hence no meeting could be scheduled. With regards to the football club, it was the case that the persons responsible for the collaboration with Aristotle were not interested in the research, hence no evaluation was scheduled. The proposition was sent per mail to two innovation managers of the club, but these lacked the insight to provide substantive feedback, which had adverse effects on the evaluation of the value proposition. Consequently, the joint value proposition is now only evaluated by means of the interview with the physical therapy clinic. Also, the conceptual model was evaluated through only one interview, with Aristotle's CEO. It would have been valuable to also gather the input and feedback of the partners. It might be the case that they prioritize the order of actions differently, or have a different perspective on which actions should be taken at all. Therefore, potential valuable information was missed which could have substantiated the model, and possibly external managers.

8.3.2 Future research

Besides limitations, it is also important to consider possibly interesting avenues for future research. By directly building on this thesis, it is important to evaluate the conceptual model with the partners, to potentially uncover differences in their approach and actions, stemming from their varying goals and motivations. This could prove useful in future research where cross-sector collaboration is trying to be attained through an innovation ecosystem. Also, it may be interesting to delve deeper into strategy-as-practice research for start-ups taking the lead in developing an ecosystem. As mentioned in chapter 1, start-ups face inherently different challenges than incumbent firms due to their liability of new- and smallness, hence they may also maneuver differently in such developmental efforts. This can be done through literature reviews, case studies or design science research.

Then, an interesting research direction is the further development of the conceptual model. Specifically, further investigation of which factors apply in which sub-phases of the ecosystem birth-stage. As the model currently stands, it is rich in breadth, but it can be said that it lacks depth. Of course, this is the result of the first sub-question, which was quite all-encompassing. Future research could therefore add to the model by placing more emphasis on those factors deemed relevant in the invention-, and start-up subdivisions of the birth stage, respectively. Thereby, the factors may even be even more subdivided and detailed, allowing for increased concretization of the steps to take in joint value creation processes in ecosystems.

Another intriguing avenue is testing the interrelationships of the included clusters of the model against value-creative performance measures (e.g., different leadership styles and trust against amount of launched innovations). Making this model quantifiable may substantiate earlier claims, and could help in distinguishing relative importance of the clusters and factors. Subsequently, this may aid managers in prioritizing their actions, to increase efficiency of the process, and effectiveness of the collaborations.

9. Conclusion

In this chapter, the current master thesis will be concluded. The goal of this study was to discover the actionable knowledge managers can employ to support joint value creation processes in innovation ecosystems. Thereby, the aim was to get a better understanding of strategy-as-practice with regards to ecosystem development initiatives. Specifically, the gap between theoretically-provided tools and practically-applicable steps was to be bridged. This was done in support of a SaaS start-up, Aristotle Cognitive Technologies, whose goal it is to develop an innovation ecosystem by aligning their partners, who are active in different markets. We set out to research by means of which steps a joint value proposition could be created, that would in turn align these partners, which would be the first step in developing Aristotle's envisioned ecosystem.

As such, in the first part of this study, a systematic literature review was conducted to scout the ecosystem literature in search of actionable points of attention— or factors, for managers to apply in their value-creation efforts and strengthen their value proposition. Then, the study draws on empirical research in the form of interviews, conducted with various research experts in the field of innovation ecosystems. These were used for further exploration of abovementioned factors, and validation of the literature review results. The findings were synthesized and combined to create a conceptual model, listing the key clusters of factors employable by managers; *leadership, shared vision, governance model, alignment, collective identity, trust, knowledge sharing, learning capability, risk analysis, and collaboration.*

Then, in the second part, partner interviews were conducted, and desk research was done, to gain a deeper understanding of the partners' organizational goals, motivations, future visions and business networks. This data would prove valuable in creating the alignment structure by, as it was now clearer where every organization strived to move towards, both with- and without regards to Aristotle. The gathered data was then applied in a co-creation workshop with Aristotle's CEO, where the joint value proposition was drafted. This proposition was visualized by means of the Value Flow Model (Den Ouden, 2012), displaying the prospected actors around the focal value proposition, and the value streams— or transactions, between them.

Lastly, the developed artefacts, the conceptual model and the joint value model, were evaluated. Here, it became clear that, while it is critical to consider your prospective partners' goals, motivations, and future visions in aligning them through a joint value model, there also must be a strategy in place to concretize your vision and plan. Also, it seemed that it is possible to further subdivide the ecosystem birth phase. This realization is valuable for managers, as they can now break down their near-future goals in even smaller steps, and implement the factors more accurately.

Through theory-, empirical-, and design-based research methods, this study set out to answer the following research question:

“How can a start-up develop an innovation ecosystem through the development of a joint value proposition with their partners in multiple markets?”

By having conducted this research, this paper provides both literature and managers with actionable factors to employ in the birth phase of ecosystem development. These factors will

empower their strategic decision-making, by translating higher-level constructs to graspable action points, and will allow them to spend their time and resources more effectively.

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Appendices

Below the various appendices mentioned throughout the report will be listed in alphabetical order.

Appendix A: Reference list of factors and clusters from systematic literature review

A.1: Factors

Reference		
(Abdulkader et al., 2020)	Firms acting in partnership	Interconnect activities in ecosystem
(Den Ouden, 2012)	Understanding of needs	Alignment of motivations
(Ritala et al., 2013)	Forums, associations, concrete get-togethers	Communication of common vision
(Jacobides et al., 2018)	Set rules of engagements, standards and codified interface	Structure and align relationships to utilize complementarities
(Keskin & Markus, 2021)	Perceptions of types of uncertainties and challenges	Internal knowledge sharing
(Ketonen-Oksi & Valkokari, 2019)	Mutually-shared interests	Awareness of needs & expectations
(Oskam et al., 2021)	Discuss goals and interests	Align perceptions of value
(Pera, Occhiocupo & Clarke, 2016)	Linkages between stakeholder motives and resources	Encounter moments
(Adner & Kapoor, 2010)	Master new routines to conquer challenges	Availability of complements
(Adner, 2017)	Assess compatibility of motives and incentives	Assess perception of activity configuration
(Steinbruch, Nascimento & de Menezes, 2021)	Organizational ability	Look for others' interests
(Thomas & Ritala, 2022)	Cospecialize compatible offerings	Role-definitions, supermodular complementarity and coalignment
(Thomas, Autio & Gann, 2022)	Negotiate ecosystem purpose	Negotiate 'rules of the game'
(Tsou, Chen & Yu, 2019)	Information sharing among participants	Absorptive capacity
(Visscher, Hahn & Konrad, 2021)	Agreement on purpose, knowledge flows, rules and complementarities	Set up dedicated platforms or innovation labs
(Wajid et al., 2019)	Actor engagement	Customer knowledge sharing

(Kapoor, 2018)	Identify bottlenecks	Formal/relational governance mechanisms
(Ben Letaifa, 2014)	Create ecosystem mindset	Develop community to nurture collaboration

Reference		
(Abdulkader et al., 2020)	Interfirm relationships between dynamic capabilities	
(Den Ouden, 2012)	Include customers in creation process	Implement personas
(Ritala et al., 2013)	Build trust	Open communication
(Keskin & Markus, 2021)	Create shared meanings	Build trust-based relationships
Ketonen-Oksi & Valkokari, 2019)	Active communication	Express/discuss goals and objectives
(Oskam et al., 2021)	Learning and experimentation	
(Pera, Occhiocupo & Clarke, 2016)	Facilitate co-creative process	Recurrent and formalized touchpoints
(Adner, 2017)	Have joint value creation as general goal	Develop ecosystem strategy
(Steinbruch, Nascimento & de Menezes, 2021)	Trust	
(Thomas & Ritala, 2022)	Mobilize processes	Technical and relational governance mechanisms
(Thomas, Autio & Gann, 2022)	Negotiate 'rules of the game'	
(Tsou, Chen & Yu, 2019)	Coordination capability	Relational capability
(Visscher, Hahn & Konrad, 2021)	Specify knowledge flows	Create clear vision
(Wajid et al., 2019)	Actor embeddedness	
(Kapoor, 2018)	Take into account complementarities	
(Ben Letaifa, 2014)	Align firms' objectives with ecosystem's	Governance model for vision, objectives and projects

Reference		
(Den Ouden, 2012)	Combine offerings with components and complements	Inspire members to collaborate
(Keskin & Markus, 2021)	Focus on available means & explore complementarities	Stakeholder interaction --> align goals & interests
Ketonen-Oksi & Valkokari, 2019)	Geographical proximity	(In)formal discussions
(Pera, Occhiocupo & Clarke, 2016)	Work towards a shared purpose	
(Thomas & Ritala, 2022)	Reassure general consensus on co-creation	Ecosystem sensemaking
(Visscher, Hahn & Konrad, 2021)	Propagate networks for information exchange	
(Ben Letaifa, 2014)	Coordinator to lead the community	

Reference		
Ketonen-Oksi & Valkokari, 2019)	Encourage active participation	Seek shared values and create clear vision
(Oskam et al., 2021)	Change business model to align with ecosystem's visions/goals	
(Thomas & Ritala, 2022)	Categorize ecosystem components to form shared views	Interactions and negotiations among members

Reference	
Ketonen-Oksi & Valkokari, 2019)	Support vision to match people and ideas

Table 6: Reference list of factors.

A.2: Clusters

Reference	Alignment	Governance model
(Abdulkader et al., 2020)	Firms acting in partnership	
	Interconnect activities in ecosystem	
(Den Ouden, 2012)	Alignment of motivations	
	Combine offerings with components and complements	
(Ritala et al., 2013)		Forums, associations, concrete get-togethers
(Jacobides et al., 2018)	Structure and align relationships to utilize complementarities	Set rules of engagements, standards and codified interface
(Keskin & Markus, 2018)	Perceptions of types of uncertainties and challenges	
	Internal knowledge sharing	
	Stakeholder interaction	
Ketonen-Oksi & Valkokari, 2019)	Awareness of needs & expectations	(In)formal discussions
(Oskam et al., 2021)	Align perceptions of value	
	Change business model to align with ecosystem's visions/goals	
(Pera, Occhiocupo & Clarke, 2016)	Linkages between stakeholder motives and resources	Recurrent and formalized touchpoints
(Adner & Kapoor, 2010)	Availability of complements	
(Adner, 2017)	Assess compatibility of motives and incentives	
	Assess perception of activity configuration	
(Thomas & Ritala, 2022)	Supermodular complementarity	Role-definitions
	Mobilize processes	Technical and relational mechanisms

(Thomas, Autio & Gann, 2022)		Negotiate 'rules of the game'
(Visscher, Hahn & Konrad, 2021)	Joint standards or strategic collaborations with scientific institutes	
	Orchestrating coherence/leverage of innovative processes	
(Kapoor, 2018)	Take into account complementarities	Formal/relational mechanisms
	Identify bottlenecks	

Table 7: Reference list of alignment and governance model clusters.

Reference	Knowledge sharing	Leadership
(Abdulkader et al., 2020)	Interfirm relationships between dynamic capabilities	
(Den Ouden, 2012)		Inspire members to collaborate
(Ritala et al., 2013)	Open communication	
	Build trust	
	Communication of common vision	
Ketonen-Oksi & Valkokari, 2019)	Active communication	Encourage active participation
		Support vision to match people and ideas
(Pera, Occhiocupo & Clarke, 2016)	Encounter moments	Facilitate co-creative process
(Adner, 2017)		Develop ecosystem strategy
(Steinbruch, Nascimento & de Menezes, 2021)	Trust	
(Thomas & Ritala, 2022)	Ecosystem sensemaking	Reassure general consensus on co-creation
(Thomas, Autio & Gann, 2022)	Negotiate ecosystem purpose	
(Tsou, Chen & Yu, 2019)	Coordination capability	
	Relational capability	
(Visscher, Hahn & Konrad, 2021)		Implement strategies
		Facilitate innovation processes

Propagate networks to facilitate information exchange

Table 8: Reference list of knowledge sharing and leadership clusters.

Reference	Collaboration	Trust
(Den Ouden, 2012)	Understanding of customer needs/desires	
	Include customers in creation process	
	Implement personas	
(Ritala et al., 2013)	Build trust	
(Keskin & Markus, 2018)	Trust-based relationships	Negotiations
Ketonen-Oksi & Valkokari, 2019)	Geographical proximity	
(Pera, Occhiocupo & Clarke, 2016)	Resource integration	
(Steinbruch, Nascimento & de Menezes, 2021)	Look for others' interests	Organizational ability
		Sense of membership/community
(Thomas & Ritala, 2022)	Cospecialize compatible offerings	
(Tsou, Chen & Yu, 2019)	Information sharing among members	
(Wajid et al., 2019)	Actor engagement	
	Customer knowledge sharing	
	Actor embeddedness	
	Resource integration	
(Ben Letaifa, 2014)	Social proximity	
	Trust	
	Communityship	

Table 9: Reference list of collaboration and trust clusters.

Reference	Shared vision	Collective identity
(Ritala et al., 2013)	Coaching' ecosystem participants	
(Keskin & Markus, 2018)	Create shared meanings	
Ketonen-Oksi & Valkokari, 2019)	Mutually-shared interests	
	Seek shared values	
(Oskam et al., 2021)		Collaborative value creation
(Pera, Occhiocupo & Clarke, 2016)	Work towards a shared purpose	Communication encounters
(Thomas & Ritala, 2022)	Categorize ecosystem components	Interactions and negotiations among members
		Ecosystem orchestrator
(Ben Letaifa, 2014)	Governance model	

Table 10: Reference list of shared vision and collective identity clusters.

Reference	Learning capability
(Oskam et al., 2021)	Learning and experimentation
(Adner & Kapoor, 2010)	Master new routines to conquer challenges
(Tsou, Chen & Yu, 2019)	Absorptive capacity

Table 11: Reference list of learning capability cluster.

Appendix B: Expert interview guide + invitation

B.1: Interview guide

The interviews started with an introduction by the author, explaining the purpose of the research and the interview. Then, the exploratory part of the interview ensued.

1. In your experience in analyzing and designing innovation ecosystems, what would you say are the most important factors for creating value jointly with your ecosystem partners?
 - a. Which practical steps must be taken to utilize these?
2. Are there pitfalls you have encountered that undermine value creation initiatives in ecosystems?

Upon completion of the exploratory part, the conceptual model was introduced and discussed.

1. What are your initial thoughts when looking at this conceptual model?
2. Are there certain factors missing in your eyes?
3. What can be improved?

B.2: Invitation e-mail

Dear Sir/Madame,

My name is Jimmy van Zichem. I am an Innovation Management master student at the Eindhoven University of Technology. Currently I am doing my thesis research at Aristotle Cognitive Technologies, a start-up developing cognitive training tools to improve peoples' working memory, spatial awareness and reaction speed. Their tools are applicable in various markets and as such they have varying customers (a professional football club, a special education organization and physical therapists). Aristotle aims to develop an ecosystem with these customers to facilitate co-creation and innovation.

My role here is to figure out how they can approach this best and help them in the process of developing this ecosystem. As their customers are from different markets a focal value proposition is not immediately apparent. To tackle this problem I am currently doing my literature study to map the most important factors of joint value creation within innovation ecosystems. In order to subsequently validate these factors and possibly discover other factors I would like to speak to experienced researches who know a thing or two about ecosystems.

My supervisors Rianne Valkenburg and Arjan Markus made me aware of your experience within this field. As such I send you this mail to invite you for a conversation where I would like to discuss my findings. This conversation will be held in the form of an interview; I will ask you some questions about my results and am curious if you think there are some aspects that I may have missed. I estimate this interview to last between 30 and 60 minutes. The audio of the interview will be recorded if you agree to this. No personal information will be part of the end result, nor will any information be shared with third parties.

If possible I would like to conduct this interview in the second or third week of April. In case you would like to participate and it fits your schedule then please let me know! For any additional questions you can reach me either via mail or telephone.

Thank you in advance!

Sincerely,

Jimmy van Zichem

Mobile: +31 (0)653988093

Appendix C: Themes and codes expert interviews

Theme	Code	Description
Alignment	Components	The assessment and alignment of the ecosystem components.
	Activities	The assessment and alignment of the actors' ecosystem-relevant actions.
	Incentives	The assessment and alignment of the actors' (internal) incentives to collaborate.
	Complements	The assessment and alignment of the ecosystem complements.
	Bottlenecks	The identification of bottlenecks in activities and complements.
	Relationship symmetry	The assessment of relationships, identifying who holds the position of power.
	Technical architecture	The manner in which the interactions between the components and complements are structured.
Risk-analysis	Willingness	The willingness of a firm or individual to perform a task or collaborate.
	Ability	The ability of a firm or individual to perform a task.
	Complement generation	The risks related to a firm generating a certain complement.
	Cost-benefit-risk	The assessment of the relative costs, benefits and risks for a firm to perform a certain task.
	Organizational economics	Understanding which factors influence decision-making within firms (e.g. transaction costs, comparative advantage, cost-efficiency etc.).
	Path of least resistance	Seeking the path of least resistance in trying to create added value.
Leadership	Integrity	Being honest and having moral principles.
	Motivation & encouragement	The leader's ability to motivate and encourage the ecosystem actors
	Ecosystem management	Managing actor involvement, their roles, assets and capabilities.
	Strategic action	Translating strategy into action.
	Resilience	The ability to recover from setbacks.
	Perseverance	The continued effort despite difficulties and/or failure.
Vision	Compelling shared vision	Conveying an appealing vision ecosystem actors can align with.
	Collaborative mindset	Fostering a collaborative mindset through a strong vision.
Planned action	Experimenting	The conducting of experiments.
	Act concretely	Having a clear and concise path of action

	Minimum viable ecosystem	The smallest possible configuration of actors and activities that can create value.
	Implementation	Focus on the implementation of the vision and plans.
Trust	Trust	The notion of believing in the honesty and truth of the ecosystem actors.
	Commitment	The notion of being committed to the ecosystem actors and the value proposition.

Table 12: Coding scheme of expert interviews.

Appendix D: Partner interview guide + invitation

D.1: Interview guide physical therapist

1. In your own words, what does [company name] stand for? Which values do you pursue?
 - a. How do you operationalize this?
2. Here in [clinic name] you apply the newest technologies, I have seen. Why are you this progressive?
 - a. Is this also a means to differentiate yourself from competition?
3. How does the implementation of your practice in [external healthcare clinic] look like? Do you collaborate with other parties associated with that clinic?
4. Are you associated with other parties (besides Aristotle)? Why (not)?
 - a. What was the reason to engage in this relationship? And for the other party?
 - b. How do these relationship look like in practice?
 - c. In the past, have you worked with other parties?
5. What is the added value of working together with Aristotle?
 - a. What role do they play in your network?
 - b. Where do you see this relationship moving to?
6. What is your definition of innovation? How important is this for [company name]?
 - a. What do you do to innovate?
 - b. Is this an active point of discussion?
 - c. How did you decide to implement the smart-workout equipment?
7. What is your future vision? What do you want to work on the coming years?
 - a. Are there developments in the market you have to consider?

D.2: Interview guide neurological institute

1. [Institute name] commits itself to multiple disciplines (epilepsy, sleep disorders, learning- and developmental disorders), but in your own words, where does [institute name] stand for?
 - a. What do you do to operationalize this?
 - b. Openness is an important aspect, can you tell me more about this?
2. Discuss collaborations with hospitals and universities:
 - a. How exactly do you collaborate? What exactly is shared?
 - b. How are the results of those collaborations implemented in the institute?
3. What is the added value of Aristotle to your organization?
 - a. Is this especially related to the special needs school?
 - b. What role does Aristotle play in your network?
 - c. Where do you see this relationship moving to?
4. What are the activities carried out at the special needs school?
 - a. Regarding the students; what does their journey look like, so from application to treatment/education?
5. What was the reason to start collaborating with the football club?

- a. How does this relationship look like in practice?
- 6. What other parties are you involved with (in relation to cognition)?
 - a. What has been the reason to start this/these collaboration(s)?
 - b. How does this/these relationship(s) look like in practice?
 - c. Are there other, past, relationships?
- 7. What does innovation mean for [institute name]? How important is this?
- 8. What is your future vision? What do you plan on working on coming years?
 - a. Are there developments in the market to consider?

D.3: Interview guide football club

- 1. Various parties are associated with the project group football cognition:
 - a. What are the activities that are carried out?
 - b. How do the relationships look like in practice?
 - c. Are there monetary components involved?
- 2. On the website I read about the possible win-win situation regarding the collaboration with the neurological institute, because they have a specific knowledge-base. I can imagine this also being the case with other parties.
 - a. Are there examples of how this knowledge is shared, and the implementation thereof?
- 3. What is the added value of Aristotle to this network?
 - a. Where do you see this relationship moving to?
- 4. What is the relation between the top performance center and the project group football cognition?
 - a. What values do you pursue here?
 - b. How do you operationalize this?
 - c. There are different parties associated. How do these relationships look like?
- 5. What is your definition of innovation here? How important is innovation within the club?
 - a. What do you do to innovate?
 - b. Is this an active point of discussion? Is there a difference in the football and commercial side of things, regarding innovation?
- 6. What is your future vision? What do you want to work on the coming years?
 - a. Are there developments in the market to consider?

D.4: Interview guide Aristotle Cognitive Technologies

- 1. In your own words, what does Aristotle stand for? Which values do you pursue?
 - a. How do you operationalize this?
- 2. I know your company was founded through a request of a football club, but what was their reason for this request?
 - a. What does the collaboration between you look like?
 - b. What is the added value to provide to your company?

3. Through the football club, you came into contact with the neurological institute, what did this process look like?
 - a. How does this relationship look like in practice?
 - b. Where do you see this relationship moving towards?
 - c. What is the added value they provide to your company?
4. What was the reason to collaborate with physical therapists?
 - a. How does the collaboration look like in practice?
5. What is the role the technical university plays? Is this solely the provision of workspace?
6. Are there governmental bodies you are associated with?
7. What is the definition of innovation for you? How important is this within the company?
 - a. How do you operationalize this?
 - b. Is this an active point of discussion?
8. What is your future vision? What do you want to work on the coming years?
 - a. Are there market-developments you should consider?

D.5: Invitation e-mail

Dear Sir/Madame,

My name is Jimmy van Zichem. I am an Innovation Management master graduate student. Currently, I am conducting my graduate research at Aristotle Cognitive Technologies. Here, I am researching how they can develop a new value-network, by collaborating with their partners. This research shall add to the scientific literature regarding innovation ecosystems, and the development of multidimensional value networks. Various theories will be applied in a real-life case to test their practical value. From Aristotle's perspective, the result is to develop new customer-facing value propositions by means of this network. This will be done by evolving the classic 1-to-1 relationships between provider and customer, and allowing to share knowledge, information, and resources within the network. So, this research will provide value to both the literature and the involved partners.

As part of this research, I am to map the current network of [company name]. In this mapping the cognition-related parties are emphasized. I would like to converse to delve deeper into topics like why certain relationships were established, what these entail and how these are experienced. I am especially interested in the decision-making process behind these choices. I will conduct these conversations with Aristotle's partners, to describe their networks, activities and motivations. Subsequently, these results will be combined to make a visual display of the prospected value network. This is not only of value to my graduation, but can also be employed to visualize unfulfilled needs, underutilized value streams and novel value propositions.

Upon completion of this visualization I would like to invite the involved parties to come together for a co-creation workshop, where we will evaluate the new network. If you would like to participate, then I am keen to hear from you. The initial conversation will take place in the form of an interview, of which the audio (if you agree to this) will be recorded. This will take between 30 and 60 minutes.

I would like to re-emphasize that this is part of my graduation project. Besides the fact that there might be commercial steps from Aristotle's side, upon completion, to realize this network, the goal is solely scientific. Additionally, no personal information will be included in the result, and nothing will be shared with third parties.

Thank you in advance, and I look forward to hearing from you!

Sincerely,

Jimmy van Zichem

Mobile: +31 (0)653988093

Appendix E: Coding schemes partner interviews

Theme	Code	Description
Motivations	Increase health	The increase of patients' health.
	Lifestyle change	The treatment of patients to change their lifestyles, opposed to solely treating injuries.
	Revenue generation	The generation of revenue for the clinic
Transactions	Innovations	The sharing and notifying colleagues of innovations.
	Patients	The reference of patients to colleagues.
	(Scientific) Knowledge	The sharing of (scientific) knowledge.
	Policies	The sharing of (changes in/new) policies.
	Education	Healthcare-professional training education.
	Marketing options	The options in which workout equipment can be used and marketed.
	Training tool	The cognitive training tool as provided by Aristotle.
	Workout equipment	Smart-workout equipment.
	Contract fee	Contract fee for health insurance contracts.
	Treatment fee	Treatment fee of patients to the health insurers.
	Feedback & validation	Feedback & validation of training tool usage.
	Treatment license	License to treat patients with specific ailments.
	License fee	Fee for usage of cognitive training tool.
Actors	General practitioner	The facilitation of a collaborative structure.
	Physical therapists	The motives for collaborating.
	Aristotle	Aristotle Cognitive Technologies.
	Psychologists	Psychologists to which patients are referred.
	Equipment provider	The smart-workout equipment provider.
	Equipment manufacturer	The smart-workout equipment manufacturer.
	Patients	Patients in need of physical therapy treatment.
	PAD-patient network	Network providing PAD-patients treatment license.
	Parkinson's network	Network providing Parkinson's patient treatment license.
	Healthcare-professional training network	Networking providing healthcare-professional training education.
	University	University providing scientific literature insights.
	Healthcare insurance company	
Future vision	Independence	Extending amount of revenue models, to become less dependent on the health insurer.
	Preventative care	Providing preventative care, opposed to solely curative care.
	Lifestyle coaching	Providing lifestyle coaching to patients.
	Collaborative	Extensive collaboration with Aristotle.
	Extend treatment range	Extend range of offered treatments, to enable better care for patients.

Figure 13: Coding scheme physical therapist partner interview.

Theme	Code	Description
Motivations	Talent scouting	The identification of talented football players.
	Talent development	The development of talented football players.
	Improve performance	Improvement of football players' performance.
	Revenue generation	The generation of revenue for the football club.
Transactions	Innovations	The sharing and notifying partners of innovations.
	Data	The sharing of generated data.
	Treatment protocols	The sharing and development of treatment protocols.
	Training tool	The cognitive training tool developed by Aristotle.
	Improved players	The football players' increased performance, following usage of the training tool.
	Network	The business network of an organization.
	Knowledge	Knowledge innovations, treatment methods or training.
	Marketing channel	Smart-workout equipment.
	Feedback & validation	Feedback & validation of training tool usage.
	Treatment license	License to treat patients with specific ailments.
	License fee	Fee for usage of cognitive training tool.
	Actors	Football club
Project group football cognition		The motives for collaborating.
Aristotle		Aristotle Cognitive Technologies.
Neurological institute		Psychologists to which patients are referred.
Cycling team		The smart-workout equipment provider.
Talent identification specialist		The smart-workout equipment manufacturer.
Healthcare device manufacturer		Patients in need of physical therapy treatment.
University		Network providing PAD-patients treatment license.
Smart-training tool supplier		Network providing Parkinson's patient treatment license.
Technical university		University providing scientific literature insights.
Future vision		(Open) Innovation
	Increased performance	Providing preventative care, opposed to solely curative care.
	Revenue generation	Providing lifestyle coaching to patients.

Table 14: Coding scheme football club partner interview.

Theme	Code	Description
Motivations	Cognitive training	The identification of talented football players.
	Improve people's everyday functioning	The development of talented football players.
	Football players	Improvement of football players' performance.
	Special needs students	
	Revenue generation	The generation of revenue for the football club.
	Physical therapy patients	
Transactions	Training tool	The sharing and notifying partners of innovations.
	Iterations	The sharing of generated data.
	Feedback & validation	The sharing and development of treatment protocols.
	% of revenue	The cognitive training tool developed by Aristotle.
	License	The football players' increased performance, following usage of the training tool.
	Innovation	The business network of an organization.
	Efficiency	Knowledge innovations, treatment methods or training.
	Marketing value	Smart-workout equipment.
	Subsidies	Feedback & validation of training tool usage.
Actors	Football club	The facilitation of a collaborative structure.
	Project group football cognition	The motives for collaborating.
	Aristotle	Aristotle Cognitive Technologies.
	Neurological institute	Psychologists to which patients are referred.
	Physical therapists	The smart-workout equipment provider.
	Technical University	Network providing PAD-patients treatment license.
Future vision	Ecosystem	Extending amount of revenue models, to become less dependent on the health insurer.
	B2B2C revenue model	Providing preventative care, opposed to solely curative care.
	Revenue generation	Providing lifestyle coaching to patients.

Figure 15: Coding scheme Aristotle Cognitive Technologies partner interview.

Appendix F: Interview guide evaluation conceptual model

[INTRO]

Leadership:

1. Have you considered a strategy already to let this proposition come to fruition
2. In the envisioned situation you mentioned Aristotle to be the leading company; what is the best way to manage this ecosystem?
3. Are you planning to employ co-creative sessions/processes in this ecosystem?
 - a. How?
4. What do you think is the best way to encourage the partners to participate?
5. Are there any concrete steps already taken to get those the prospected actors on board?
 - a. If not, what should happen?

Governance model:

Ecosystems are governed differently than classic 1-to-1 relations, but are to be governed anyhow:

1. Have you already thought about how this should happen?
 - a. More so through contracts, of 'soft' arrangements?
2. Contracts may not always work as good, but if everyone knows their role in the system, this might allow for some sort of control
 - a. What role will the involved actors play? How can those be defined most concrete?

Shared vision:

1. Literature indicates being part of a whole also helps in value creation initiatives, how do you think this 'whole' is to be created?
2. Having a shared vision is also important, and the shared perception of value: we are dealing with parties with different goals, how do you think this coherent perception of value is to be developed?
3. To create a common vision it is good to set goals and discuss them. Are there concrete goals made already?
 - a. If so, are these discussed?

analysis

1. Where, in this proposition, are the biggest risks? Where are the crucial factors to the success of the proposition?
2. Is there a specific party that harbors this risk?
3. Which dependencies are there in the proposition? How do you think they impact the rest of the model?
 - a. What do you think of the current symmetry of the relationships? So, how equal is everyone to each other?

Alignment

1. Which products of services are there, in the model, which could increase the proposition's value?
2. Where, if any, are the bottlenecks?
3. Are existing communication channels that can be utilized for information exchange? Should new channels be set up?

Appendix G: Coding scheme evaluation interview conceptual model

Theme	Code	Description
Governance	Contracts	The contractual agreements between ecosystem actors.
	Role-definitions	The definition of respective ecosystem actors' roles.
Riskanalysis	Planning	The scheduling of encounter moments.
Leadership	Ecosystem management	Managing actor involvement, their roles, assets and capabilities.
	Concrete actions	Having a clear and concise path of action.
Shared vision	Goals	The discussion and agreement of attainable future objectives.
Alignment	Bottlenecks	The identification of bottlenecks in actors, activities, and complements.
	Incentives	The assessment and alignment of the actors' (internal) incentives to collaborate.
Trust	Motives	The reason for performing a certain action.

Figure 16: Coding scheme evaluation interview conceptual model.

Appendix H: Interview guide evaluation joint value proposition

[INTRO]

1. Discussion & elaboration of project group protocols
2. Discussion & elaboration of project group tailoring
3. Discussion & elaboration of project group implementation
4. Reiteration of organizational goals & motivation
 - a. Offer additional products/services to patients
 - b. Develop additional revenue models
 - c. From preventative to curative care
5. General thoughts and feedback
6. Discuss fit of proposition with organizational goals
7. Current use of tool
8. Envisioned future use of the tool

Appendix I: Coding scheme evaluation interview joint value proposition

Theme	Code	Description
Organizational goals	Image	The image the physical therapy clinic wants to portray.
	Revenue models	The mechanisms for revenue generation.
	Cognitive training development	
Training tool	Current usage	The clinic's current usage of the cognitive training tool.
	Future options	The clinics envisioned future options of using the cognitive training tool.
Collaboration	Facilitation	The facilitation of a collaborative structure.
	Motives	The motives for collaborating.
Concretization	Concrete actions	The discussion and agreement of attainable future objectives.

Figure 17: Coding scheme evaluation interview joint value proposition.