

## Innovation intermediaries and their role(s) in orchestrating networked innovation

**Moritz Marius Stahl**

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## DOCTORAL THESIS

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## Abstract

In today's entrepreneurial landscape, technology startups are the engines of innovation and economic growth. Central to their journey are innovation intermediaries, who navigate the complex web of external resources and relationships. These intermediaries play a key role in enhancing startups' innovation capabilities and, consequently, their overall success.

This dissertation, grounded in solid academic research, sets out to explore the intricate relationship between innovation intermediaries and technology startups. It delves into the dynamic and evolving roles these intermediaries play, highlighting how they adapt throughout different phases of startups' development, with a primary focus on investigating the role of innovation intermediaries in orchestrating networked innovation.

The research journey involves several stages, starting with the development of strong theoretical frameworks and foundational concepts. It then moves on to a comprehensive series of case studies, conducted in diverse regions, to uncover the various roles performed by innovation intermediaries. Alongside reaffirming established orchestrator roles, this study introduces a new archetype - the "Shaper" - which drives transformative changes within entrepreneurial ecosystems.

At the heart of this dissertation, a fuzzy set analysis is used to dissect the combinations of orchestration functions that positively affect startups' Product Innovativeness, a crucial performance measure, which reflects startups' ability to introduce groundbreaking products and services to the market.

The research makes both theoretical and practical contributions. Theoretical insights clarify the changing roles of orchestrators and their adaptive practices, shaped by collaboration dynamics. On a practical level, the findings have implications for policymakers, practitioners, and stakeholders, advocating for tailored support mechanisms that match the evolving needs of startups across different lifecycle phases. It underscores the importance of varied engagement with intermediaries and strategic use of orchestration functions to optimize startup performance.

This dissertation advances our understanding of network orchestration, innovation intermediation, and their impact on the entrepreneurial ecosystem. It stands as a testament to scholarly exploration and encourages further investigation into these dynamic aspects of entrepreneurship and innovation.

**Keywords:** Network Orchestration, Orchestration Roles, Technology Startups, Startup Lifecycle, Innovation Intermediary, Entrepreneurial Ecosystem

## Resumen

En el panorama empresarial actual, las startups tecnológicas son los motores de la innovación y el crecimiento económico. En su trayectoria, son fundamentales los intermediarios de innovación, quienes navegan la compleja red de recursos y relaciones externas. Estos intermediarios juegan un papel clave en el aumento de las capacidades de innovación de las startups y, en consecuencia, en su éxito general.

Esta tesis doctoral, basada en una sólida investigación académica, se propone explorar la intrincada relación entre los intermediarios de innovación y las startups tecnológicas. Profundiza en los roles dinámicos y evolutivos de estos intermediarios, destacando cómo se adaptan a lo largo de las diferentes fases de desarrollo de las startups, con un enfoque principal en investigar el papel de los intermediarios de innovación en la orquestación de la innovación en red.

El viaje de investigación incluye varias etapas, comenzando con el desarrollo de marcos teóricos sólidos y de conceptos fundamentales. Luego, se realizan una serie de estudios exhaustivos de caso, llevados a cabo en diversas regiones, para descubrir los variados roles desempeñados por los intermediarios de innovación. Además de reafirmar los roles establecidos de orquestador, este estudio introduce un nuevo arquetipo, el "Conformador", que impulsa cambios transformadores dentro de los ecosistemas empresariales.

En el corazón de esta disertación, se utiliza un análisis de conjuntos difusos para diseccionar las combinaciones de funciones de orquestación que afectan positivamente a la Capacidad de Innovación en Producto de las startups, una medida de rendimiento crucial, que refleja la capacidad de las startups de introducir productos y servicios innovadores en el mercado.

La investigación aporta contribuciones tanto teóricas como prácticas. Las perspectivas teóricas clarifican los roles cambiantes de los orquestadores y sus prácticas adaptativas, moldeadas por la dinámica de colaboración. A nivel práctico, los hallazgos tienen implicaciones para los responsables de políticas, los profesionales y los grupos de interés, abogando por mecanismos de apoyo personalizados que coincidan con las necesidades cambiantes de las startups en las diferentes fases de su ciclo de vida. Subraya la importancia de una implicación variada con los intermediarios y el uso estratégico de las funciones de orquestación para optimizar el rendimiento de las startups.

Esta disertación avanza en nuestra comprensión de la orquestación de redes, la intermediación en la innovación y su impacto en el ecosistema emprendedor. Se erige como un testimonio de la exploración académica y fomenta una mayor investigación sobre estos aspectos dinámicos del emprendimiento y la innovación.

**Palabras clave:** Orquestación de Redes, Roles de Orquestación, Startups Tecnológicas, Ciclo de Vida de Startups, Intermediario de Innovación, Ecosistema Emprendedor.

## Resum

En l'escenari empresarial actual, les startups tecnològiques són els motors de la innovació i el creixement econòmic. En la seva trajectòria, són fonamentals els intermediaris d'innovació, que naveguen per la complexa xarxa de recursos i relacions externes. Aquests intermediaris juguen un paper clau en l'augment de les capacitats d'innovació de les startups i, per tant, en el seu èxit global.

Aquesta tesi, basada en una sòlida recerca acadèmica, es proposa explorar la intrincada relació entre els intermediaris d'innovació i les startups tecnològiques. Aprofundeix en els rols dinàmics i en evolució d'aquests intermediaris, destacant com s'adapten en les diferents fases de desenvolupament de les startups, amb un enfocament principal en investigar el paper dels intermediaris d'innovació en l'orquestració de la innovació en xarxa.

El viatge de recerca implica diverses etapes, començant amb el desenvolupament de marcs teòrics sòlids i de conceptes fonamentals. A continuació, es realitza una sèrie d'estudis exhaustius de cas, conduïts en diverses regions, per descobrir els diferents rols realitzats pels intermediaris d'innovació. A més de reafirmar els rols establerts d'orquestrador, aquest estudi introdueix un nou arquetip, el "Fonformador", que impulsa canvis transformadors dins dels ecosistemes emprenedors.

En el cor d'aquesta tesi, s'utilitza una anàlisi de conjunts difusos per dissecionar les combinacions de funcions d'orquestració que afecten positivament la Capacitat d'Innovació en Producte de les startups, una mesura de rendiment crucial, que reflecteix la capacitat de les startups per introduir productes i serveis innovadors al mercat.

La recerca aporta contribucions tant teòriques com pràctiques. Les perspectives teòriques clarifiquen els rols canviants dels orquestradors i les seves pràctiques adaptatives, moldejades per la dinàmica de col·laboració. A nivell pràctic, els resultats tenen implicacions per als responsables de polítiques, els professionals i els grups d'interès, proposant mecanismes de suport adaptats que coincideixin amb les necessitats canviants de les startups en les diferents fases del seu cicle de vida. Subratlla la importància d'una participació variada amb els intermediaris i l'ús estratègic de les funcions d'orquestració per optimitzar el rendiment de les startups.

Aquesta tesi avança en la nostra comprensió de l'orquestració de xarxes, la intermediació d'innovació i el seu impacte en l'ecosistema emprenedor. Es presenta com un testimoni de l'exploració acadèmica i fomenta una investigació addicional sobre aquests aspectes dinàmics de l'emprenedoria i la innovació.

**Paraules clau:** Orquestració de Xarxes, Rols d'Orquestració, Startups Tecnològiques, Cicle de Vida de les Startups, Intermediari d'Innovació, Ecosistema Emprenedor

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## Preface

The inspiration for this dissertation emerged from a deep fascination with the intricacies and potential impact of innovation intermediation as orchestrators in entrepreneurial ecosystems. My objective was to explore the uncharted realms of this field, unveiling fresh perspectives, and adding to the existing pool of knowledge. Central to my drive was the aspiration to bridge the divide between theory and application, to examine practical experiences through a theoretical framework, and ultimately generate tangible contributions by amalgamating theory with practical significance.

The primary aim of this dissertation was to examine the dynamic nature of networking processes and the evolving roles of intermediaries as orchestrators in the context of technology startups. I intended to conduct a comprehensive analysis of this topic, delving into the interplay between theory and practice, unearthing real-world applications and implications, and ultimately generating practical value.

By examining and synthesizing practical experiences with a theoretical foundation, I aspired to contribute to both academia and practitioners, offering insights that are relevant and beneficial to both realms.

In closing, this dissertation represents the culmination of a rigorous and rewarding intellectual endeavor. It is my hope that this research will contribute to the advancement of knowledge in the field of innovation intermediation and network orchestration in entrepreneurial ecosystems. The findings and insights presented in this research aim to contribute to the existing body of knowledge and provide practical implications for both scholars and practitioners. By exploring the practical experiences of innovation intermediaries and startups and integrating theory and practice, this research strives to bridge the gap between academia and the real-world application. It is my sincere hope that this work will generate valuable insights with both theoretical and practical relevance, offering guidance and informing strategies for stakeholders in entrepreneurial ecosystems.

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## List of Abbreviations

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Abbreviation	Definition
EE	Entrepreneurial Ecosystem
EVO	Evaluation and validation of outcomes
FNP	Fostering networking and partnerships for resource mobilization
fsQCA	fuzzy set Qualitative Comparative Analysis
IMD	Identification and mediation of different interests
ITC	Intermediation for technology transfer, collaborative research, and commercialization
NCP	Network composition and process management
OI	Orchestrating Intermediary
PI	Product Innovativeness
PRI	Proportional Reduction in Inconsistency
QCA	Qualitative Comparative Analysis
RBV	Resource Based View
SME	Small and Medium-sized Enterprises
SYM	Symmetrical Analysis

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# 1. Introduction - Leveraging Networked Innovation through Innovation

## Intermediaries

In the dynamic landscape of global economies, entrepreneurship, particularly technology startups, has emerged as a pivotal driver of economic growth and innovation. These startups have garnered substantial attention from policymakers and academia for their role in introducing disruptive innovations, significantly contributing to economic development (Fukugawa, 2017, Nair et al., 2022). However, their journey is fraught with challenges, with their success and survival intricately linked to the ecosystems they operate within.

While the importance of entrepreneurial ecosystems (EEs) in startup success is widely recognized, a notable research gap exists in understanding the nuanced roles and dynamics within these ecosystems (Tabas et al., 2022). These EEs, comprising complex networks of actors, play a critical role in nurturing environments conducive to innovation (Pikkarainen et al., 2017, Fukugawa, 2017). Addressing this gap, this dissertation focuses on the orchestration roles and functions of neutral, third-party innovation intermediaries within these networks, an area that has not been fully explored in existing literature.

The interplay of relationships and networks among organizations is a cornerstone in the pursuit of innovation (Valkokari et al., 2017). Extant research has consistently underscored the critical role these networks play in fostering innovation (Powell et al., 1996, Romero and Molina, 2011, Ferraro and Iovanella, 2015). However, managing these networks effectively is a complex endeavor, especially in environments characterized by high transactional uncertainty and a diverse array of actors (Pikkarainen et al., 2017). While the existing body of research acknowledges the significance of these networks in catalyzing innovation, a notable gap persists in comprehensively understanding the dynamic roles played by innovation intermediaries as orchestrators within these ecosystems (Bergman and McMullen, 2021, Tabas et al., 2022, Reypens et al., 2019). This dissertation positions itself at the intersection of these challenges, aiming to shed light on the strategic orchestration roles, and operational orchestration functions of innovation intermediaries as well as their impact on startups performance.

Innovation intermediaries are pivotal in orchestrating interactions and facilitating the flow of resources within EEs (Ng et al., 2022, Fernandes and Ferreira, 2022). They navigate the complexities of these networks, yet their strategic and operational roles in innovation management remain insufficiently explored (Hurmelinna-Laukkanen and Nätti, 2018, Lin et al., 2020). By focusing on the nuanced roles of innovation intermediaries, this research contributes a vital perspective to innovation management literature, illuminating how these intermediaries influence and shape the trajectory of innovation in diverse entrepreneurial settings.

The significance of innovation intermediaries is particularly pronounced in the context of technology-based startups, which often face challenges such as limited resources and rapid growth pressures (Giones et al., 2013, Fukugawa, 2017, Marcon and Ribeiro, 2021). This research specifically addresses the gap in understanding how these innovation intermediaries dynamically adapt their orchestration roles and capabilities in response to the evolving needs of startups at different lifecycle stages. By delving into these adaptations, the study aims to shed light on the flexible and responsive nature of intermediary roles in orchestrating ecosystems, highlighting the circumstances that prompt role transitions for orchestrators. This insight underscores their critical function in fostering startup development and innovation within these complex ecosystems.

A central element of this research is the investigation into how the specific functions and activities performed by innovation intermediaries influence the Product Innovativeness (PI) of startups. PI, a key metric assessing a startup's capacity for introducing innovative and unique products or services, serves as an essential barometer of their competitive advantage and market success (Ganbaatar and Douglas, 2019, Ding and Ding, 2022). This dissertation delves into the direct effects of various intermediary activities and their collective configurations on elevating the PI of startups. By emphasizing the diverse functions and activities of intermediaries in the EE, this study unveils the intricate mechanisms through which these critical agents facilitate and amplify innovation within startups. This nuanced exploration offers valuable insights into how intermediaries, through their strategic and operational activities, play a crucial role in fostering startup innovation and success.

The dissertation unfolds in three investigative phases, each addressing specific aspects of this research gap:

1. **First Investigation (Strategic-Level Orchestration Roles):** This phase explores the strategic-level orchestration roles of intermediaries. Key findings of this phase reveal the adaptability and fluidity of intermediary roles in innovation networks, highlighting a range of roles that intermediaries assume, each tailored to the specific needs and stages of startups. The research questions guiding this phase are: “*How do orchestrator roles adapt to the evolving needs of startups' lifecycles in innovation networks?*” and “*How do orchestrator capabilities lead to role transitions in these relationships?*” The findings underscore the dynamic nature of orchestrator roles in response to changing startup environments, providing valuable insights into how intermediaries maneuver to support startups effectively at different phases of their growth.



2. **Second Investigation (Operational Dynamics and Regional Perspectives):** Broadening the scope to include practitioner perspectives through multiple-case study designs, this phase investigates the operational dynamics of intermediaries and their roles across various regions. A key finding of this phase is the discovery of the "Shaper" role, a novel orchestration role characterized by its proactive and transformational influence in shaping entrepreneurial environments and fostering early-stage entrepreneurship awareness. The guiding research questions are: "*How do innovation intermediaries orchestrate entrepreneurial ecosystems in various regions?*" and "*What distinct orchestration roles do these intermediaries play across regional contexts?*" This phase addresses the research gap in regional variations and the multifaceted roles of different intermediaries in orchestrating EEs.
3. **Investigation (Impact on Product Innovativeness):** Utilizing a set-theoretic lens, this phase assesses the impact of intermediaries' operational functions on startups' PI. Key findings from this investigation reveal that specific configurations of intermediary functions significantly enhance PI in startups. The research questions guiding this phase are: "*How do orchestration functions of intermediaries enable higher product innovativeness in startups?*" and "*To what extent can configurations of these functions lead to higher product innovativeness?*" This phase provides valuable insights into the direct impact of intermediary functions on startup innovation, contributing to an area that has received limited focus in previous research.

The main theoretical contribution of this dissertation lies in its in-depth analysis of the dynamic roles and functions of third-party innovation intermediaries as orchestrators within EEs. This includes the identification of six distinct intermediary roles: *shapers*, *architects*, *conductors*, *facilitators*, *mediators*, and *leaders*, their corresponding functions, and their varied impact on PI in startups (Lin et al., 2020, Go, 2022). The research significantly contributes to the field by demonstrating how intermediaries adapt their roles and capabilities in response to the changing needs of startups throughout their lifecycle (Reypens et al., 2019, Bergman and McMullen, 2021, Tabas et al., 2022). Furthermore, the study empirically validates the crucial role of intermediaries in enhancing startup innovation and performance, providing new insights into the orchestration of EEs and the strategic alignment of intermediation functions with startup innovation outcomes (Ding and Ding, 2022, Ganbaatar and Douglas, 2019, Ozdemir et al., 2019).

Practically, the findings have profound implications for practitioners, policymakers, and stakeholders within EEs, echoing the observations of scholars like, Lin et al. (2020), Go (2022), Sahut et al. (2021), and Hernández-Chea et al. (2021).

Expanding on the existing knowledge of network orchestration and innovation intermediation within the startup context, this dissertation undertakes an in-depth exploration of these concepts to illuminate their interdependencies and influence on achieving startup success. Through a meticulous examination of each section's unique contributions, this research endeavors to enrich our understanding of the multifaceted roles played by innovation intermediaries as both network orchestrators and their consequent impact on the prosperity of startups. Figure 1 serves as a visual representation, outlining the dissertation's structural framework, delineating the specific emphasis of each section, and underscoring their collective significance in advancing our scholarly insights within this domain.

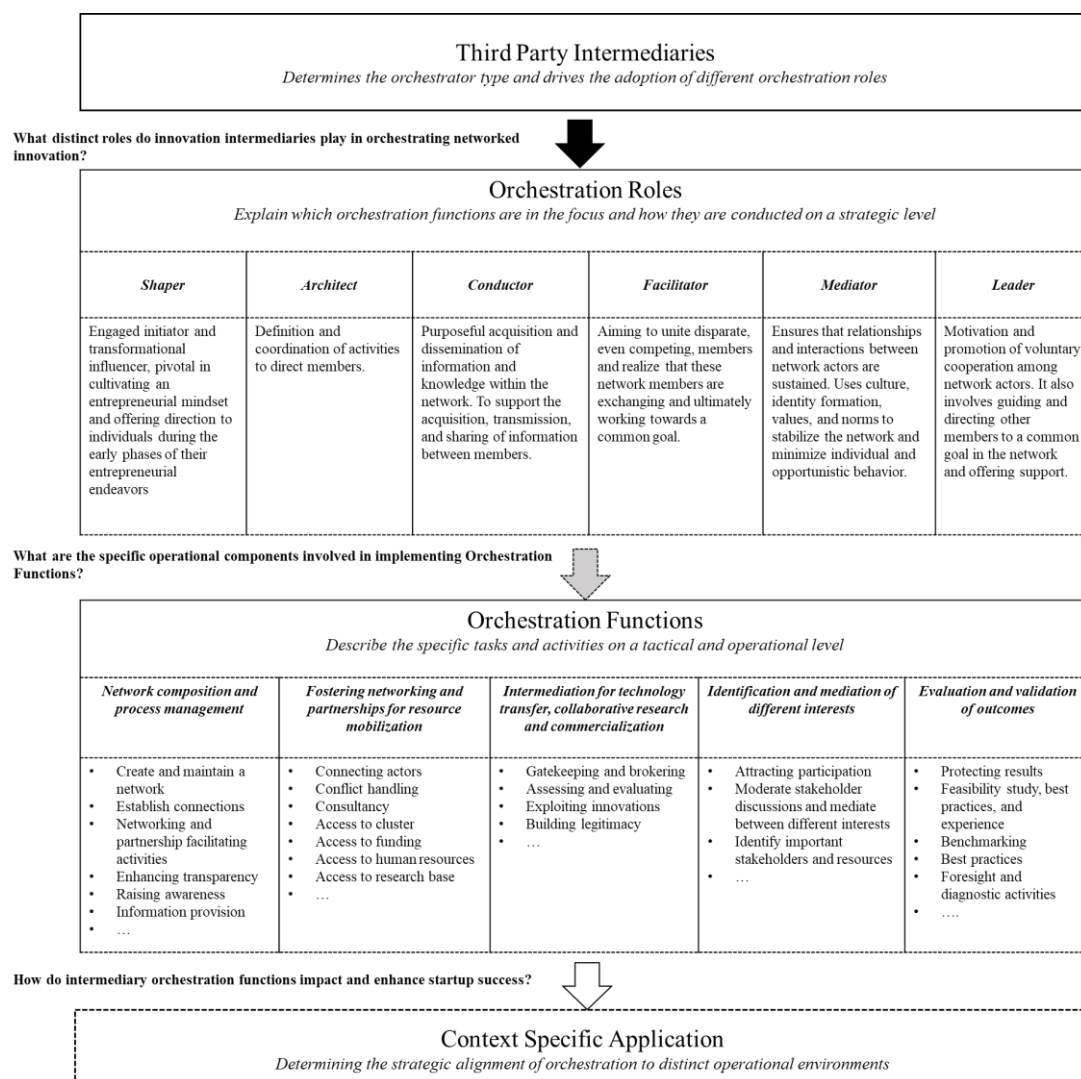


Figure 1: Structure of the dissertation.

This dissertation is structured as follows: Section 2 begins with a deep dive into the existing literature where I explore the theoretical framework surrounding innovation intermediaries and innovation network orchestration. Here, I examine key concepts such as the startup lifecycle, resource utilization, actor interaction, and the roles and functions of third-party intermediaries in networked innovation. Additionally, I discuss the importance of PI as a performance indicator for startups, highlighting its relevance in the context of EEs.

In Section 3, I outline the methodology adopted for this research. This section details my approach to collecting and analyzing empirical data, including the multiple case study analysis and the capability-dependent framework. I also describe how I incorporated multi-regional perspectives from practitioners and utilized Qualitative Comparative Analysis (QCA) as essential tools in my research.

The findings of my research are presented in Section 4. Here, I discuss the adaptive roles of intermediaries in orchestration across different startup lifecycle phases and provide insights into the operational dynamics of innovation intermediaries from various regional perspectives. This section also includes a set-theoretic analysis of the influence of intermediaries, focusing on strategic alignments and innovation outcomes in startups.

Section 5 is dedicated to discussing these findings. In this section, I critically examine the results in relation to existing literature, delving into the implications of my research, and discussing how the findings contribute to a deeper understanding of network orchestration and innovation intermediation within EEs.

Finally, in Section 6, I conclude my dissertation. This section encapsulates the theoretical contributions and practical implications of my research. I address the limitations of my study, suggest avenues for future research, and discuss the ethical aspects of my research process.

## 2. Theoretical Background

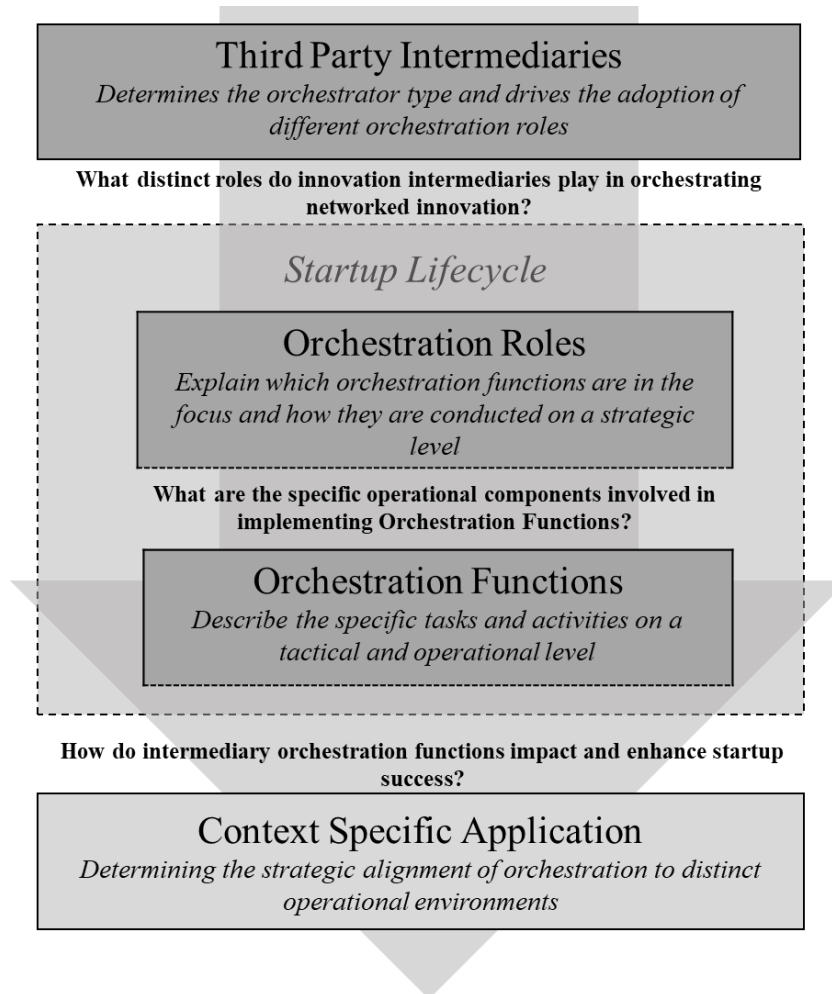


Figure 2: Theoretical Framework of the Dissertation. Source: Self-elaborated.

### 2.1 Startup Lifecycle: Resource Utilization and Actor Interaction

In the journey of a startup, the path to success is not a one-size-fits-all process. At each stage of its lifecycle, from inception to growth and maturity, a startup encounters unique challenges and opportunities. Understanding the intricacies of the startup lifecycle is pivotal to assessing their performance and success.

My dissertation is dedicated to bridging a research gap in understanding the dynamic facets of network orchestration and the associated roles and functions, with a specific focus on their implications for startups. To achieve this, the research employs the startup lifecycle as a solid foundation. This choice is substantiated by its practical significance, as the startup lifecycle provides a realistic context for a more profound examination of the

shifts and advancements within the network orchestration domain. This approach not only matches the changing nature of network orchestration but also covers the critical stages in a startup's journey where orchestration decisions can significantly shape their path. By taking a long-term perspective, this study captures the ever-changing dynamics of orchestration roles and functions as startups evolve. This enhances the practical importance of the research findings and contributes to a more nuanced understanding of the dynamic and evolving relationship between network orchestration and startups.

This section delves into the various phases of the startup lifecycle and the specific resource needs and stakeholder engagement requirements that define each phase. Different business ventures' lifecycle phases have been proposed in the literature (König et al., 2019). Each phase of the lifecycle impacts an organization's need for external resources and its ability to acquire them (Passaro et al., 2020, Nair et al., 2022). Following previous studies (Antunes et al., 2021b, Marcon and Ribeiro, 2021, Passaro et al., 2020), my definition of a startup's lifecycle is outlined by four significant phases from conception to establishment, namely: *ideating*, *structuring*, *startup*, and *scalability*<sup>1</sup>. While the phases outline a path for growth, the boundaries between them may be ambiguous or indefinite (Marcon and Ribeiro, 2021). As presented in Table 1, the startup has different needs in each phase, which change in development (Hite and Hesterly, 2001, Lewis, 1987).

During the *ideation* phase, the entrepreneur develops a potential idea based on the perception of market opportunities (Marcon and Ribeiro, 2021). In addition, market research is conducted to determine consumer behaviors and validate business concepts (Picken, 2017). In this phase, the startup structure may still be informal and loose and consist of a "*one-person show*" (König et al., 2019). At this level, preliminary information and assistance providers are non-market actors, such as higher education systems, startup competitions, and local government organizations (Reynolds and Uygun, 2018, Merguei and Costa, 2022). This initial phase is marked by a high degree of uncertainty (Passaro et al., 2020, Paschen, 2017).

In the *structuring* phase, the entrepreneur focuses on the opportunity to turn the idea into a business (Antunes et al., 2021b). As part of this process, it is indispensable to clarify the financial requirements and seek out seed capital and investors (e.g., family, friends, business angels, and competitors) (Marcon and Ribeiro, 2021).

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<sup>1</sup> It is crucial to acknowledge that, in practice, the progression through these life cycle phases is not always linear or clearly delineated. Characteristics of multiple phases may coexist, transitions between phases can be blurred and gradual, and the duration of each phase can significantly vary among startups due to external factors. Despite these overlaps and variabilities, the study assumes that the single lifecycle stages are independent in each phase.

During this phase, startups engage with non-market and market-oriented actors in the ecosystem (e.g., incubators, technology transfer agencies, business centers, and universities).

The *startup phase* marks the beginning of the commercial activity of the startup. During this phase, the startup launches its new product or service and generates its first recurring revenue (Antunes et al., 2021b). During this phase, entrepreneurs can assess the likelihood of business success and identify the tangible and intangible resources required (Paschen, 2017). Startups in this phase mainly interact with market-oriented actors and may be assigned participation in incubators, accelerators, and co-working spaces that offer additional business, technical, and physical resources (Marcon and Ribeiro, 2021, Bergman and McMullen, 2020). Startups should be able to enter contracts with reliable customers and suppliers and develop ties with other external partners.

During the *scalability* phase, the entrepreneur seeks to consolidate and control the company's financial returns; the startup has to become self-sustainable (Passaro et al., 2020). In addition to diversifying the product portfolio, the company must acquire new skills such as managing higher turnover, motivating and managing a growing workforce, and interacting with new customers and suppliers (Antunes et al., 2021b). Developing a network of market actors is a primary objective of startups. Moreover, entrepreneurs are expected to lead, coordinate, and identify funding sources. At this point, startups acquire customers on a larger scale, improve the back-end scalability, hire new employees and executives, and finish the selection of suppliers (Picken, 2017).

Phases	Ideation	Structuring	Startup	Scalability
<b>Description</b>	Idea development	Definition and validation of the business concept	Product and market validation	Consolidation, commercialization, and growth
<b>Required organizational resources and capabilities</b>	Technical resources and entrepreneurial culture	Financial, technological, and managerial resources	Financial, technological, physical, and managerial resources	Financial, technological, physical, and managerial resources
<b>Key Activities</b>	Product design and market understanding	Prototype development, technical and commercial feasibility, product marketing, and initial financing seeking	Business planning, marketing test, production, sales indicators, first competitive action, new design and pricing, additional funding	Leverage processes and partnerships to grow the business
<b>External Actors</b>	Higher education systems, startup competitions, and local government organizations	Startup initiatives, family, friends, business angels, fab labs, business centers, Technology Transfer Offices (TTOs), incubators	Incubators, accelerators, co-working spaces, crowdfunding platforms, venture capitalists, industry experts	Venture capitalists, consultants, industry experts

Table 1: Startup development model. Source: Adapted from (Passaro et al., 2020).

As the specificities and challenges of the startup development highlighted above, it underscores the delicate balancing act that startups must master to thrive in today's competitive business landscape.

However, the challenge for startups lies in establishing and nurturing relationships with these external stakeholders. Startups often grapple with what is referred to as the "*liabilities of newness and smallness*," (Stinchcombe, 1965, p. 148). These liabilities encompass several issues, such as limited brand recognition, credibility, and a lack of established networks. As a result, startups may encounter scepticism from potential partners, investors, and other key actors in the surrounding ecosystem, hindering their progress. However, these challenges also present opportunities for agile startups to pivot, innovate rapidly, and compete with larger, established organizations.

The success of startups hinges not only on their internal capabilities but also on their ability to navigate external networks and ecosystems. It is well-established that startups need to go beyond their boundaries to interact with other companies or institutions, accessing complementary technological resources, entering connected

networks, and cooperating with partners (Marcon and Ribeiro, 2021, Giones et al., 2013). Access to various external resources, including capital, expertise, and networks, at each stage of the lifecycle plays a crucial role in driving the growth of new ventures. Existing studies emphasize how the infusion of external knowledge and resources can offer startups the much-needed boost to expand, innovate, and maintain competitiveness, opening doors to new markets, facilitating the adoption of cutting-edge technologies, and enhancing a startup's overall capabilities (Leitão et al., 2022).

Having recognized the critical role of external networks and ecosystems in driving startup success, the discussion now advances to an intensive analysis of network orchestration. Subsequently, the next chapter delves into comprehending the role of third-party innovation intermediaries as neutral orchestrators within these networks. I will examine how these intermediaries play distinct orchestration roles, exercise various capabilities, and perform specific functions to cater to the unique needs of startups in their individual lifecycle phases. This exploration will shed light on the critical role these intermediaries play in helping startups access, coordinate, and leverage external resources, ultimately enabling them to grow, innovate, and remain competitive in the ever-evolving entrepreneurial landscape.

## 2.2 Orchestration in Networked Innovation

The survival and success of startups are profoundly influenced by the surrounding ecosystem in which they operate (Fukugawa, 2017, Kraus et al., 2021). This dynamic landscape of entrepreneurship involves various activities among a network of actors to facilitate innovation and create an enabling environment for startups (Pikkarainen et al., 2017). This complex web of relationships, activities, and processes plays a central role in their success and growth. To comprehend this framework effectively, it is imperative to distinguish between innovation networks and EEs, each characterized by unique attributes and dynamics.

Contemporary literature underscores the significance of inter-organizational relationships and networks' crucial role in driving innovation (Valkokari et al., 2017). As innovation expands beyond the boundaries of individual firms, the focus has shifted toward firms' ability to engage in external networks and ecosystems to access complementary resources (Powell et al., 1996, Romero and Molina, 2011, Ferraro and Iovanella, 2015). In the realm of innovation networks, legally independent yet economically interdependent firms form robust and intricate social interactions aimed at driving innovation in alignment with the network's objectives (Toigo et al., 2021, Duschek, 2002). By understanding the dynamics of these inter-organizational relationships, researchers and



practitioners can gain insights into how startups can harness network connections and resources to enhance their innovation capabilities and overall success.

Within the broader context of innovation ecosystems, EEs have emerged as a distinct subtype, offering a unique perspective on innovation and entrepreneurship (Gomes et al., 2018, Daymond et al., 2023). EEs encompass various elements, including human capital, structural capital, and relational capital, within the framework of innovation networks (Rosiello and Vidmar, 2022). The growing fascination with EEs signifies a greater understanding of their distinct qualities and pivotal role in driving innovation and entrepreneurship (Valls-Pasola and Reyes Álvarez, 2020, Daymond et al., 2023). EEs create opportunities for innovation by emerging new ventures as outputs at the ecosystem level (Stam and Spigel, 2016). What sets EEs apart from other innovation ecosystems is their focus on the entrepreneur as the central figure rather than the enterprise itself (Stam, 2015, Thomas and Autio, 2019). Key actors within these environments include new ventures, startups, scaleups, investors, mentors/advisors, and entrepreneurial peers (Thomas and Autio, 2019). The dynamics of EEs involve cyclical flows of tangible resources, such as human and financial capital, and intangible resources, like knowledge and information, which support the development and growth of innovative startups (Bittencourt et al., 2021, Spigel, 2017).

EEs and innovation networks are intertwined concepts, sharing common elements and objectives, yet distinguished by unique characteristics (Valls-Pasola and Reyes Álvarez, 2020). Innovation networks often serve as an integral part of EEs, as they facilitate the flow of knowledge, resources, and support among various actors (Fernandes and Ferreira, 2022). Simultaneously, EEs create the necessary conditions for innovation networks to thrive, offering a supportive culture, access to finance, and a pool of skilled talent (Rosiello and Vidmar, 2022). While innovation networks encompass a broader framework facilitating connections among various actors across different regions, industries, and sectors (Malecki, 2018), EEs focus on nurturing and supporting entrepreneurs within specific geographic regions (Spigel and Harrison, 2018).

Unlike strategic innovation networks with explicit collective activities geared towards a common goal, EEs often operate with a more loosely coupled structure, where actors pursue their individual business objectives (Möller and Rajala, 2007). The governance and coordination of the EE involve diverse stakeholders, including entrepreneurs, support organizations, policymakers, and others, who interact and collaborate to shape the ecosystem dynamics (Stam, 2015). While innovation networks focus on collaboration, knowledge exchange, and resource sharing to drive innovation (Adner, 2016, van Rijnsouwer, 2020), EEs foster entrepreneurship and create an enabling environment for startups within a localized context (Stam, 2015).

### 2.2.1 Third Party Intermediaries

In the realm of startups, the role of innovation intermediaries is paramount. The significance of these intermediaries lies in their ability to bridge the gaps between startups and external networks they aim to engage with. By proactively addressing the challenges inherent in the startup landscape, these intermediaries act as bridges, connecting startups with vital external resources and stakeholders (Howells, 2006). This proactive engagement enables startups to effectively navigate the complexities of the business environment and access essential expertise and networks, ultimately enhancing their capacity for growth and success (Russo et al., 2019, van Lente et al., 2020).

Recent research underscores the pivotal role of neutral, third-party intermediaries, as demonstrated by Giudici et al. (2018), Hernández-Chea et al. (2021), Ziakis et al. (2022) in mitigating collaboration and innovation barriers among startups and network actors within innovation networks and ecosystems (Nilsen and Gausdal, 2017, Batterink et al., 2010, Pikkarainen et al., 2017). Innovation intermediaries play a crucial role in orchestrating interactions across various levels of innovation networks, empowering organizations, including startups, to foster innovation rather than solely participating in its development and implementation (Howells, 2006, Winch and Courtney, 2007, Pikkarainen et al., 2017).

Intermediation is a deeply rooted business phenomenon debated in different settings and contexts. For instance, inter-organizational intermediation considers the facilitation of data exchange via interfaces within the R&D activities of companies (Colomo-Palacios et al., 2010). The purpose associated with an innovation intermediary's emergence is multifaceted, but generally, they emerge in response to a perceived suboptimal degree of connectivity between relevant actors due to market or innovation system failure (Klerkx and Leeuwis, 2009, Johnson, 2008). Especially startups rely on external innovation partners to access complementary assets (Passaro et al., 2020).

Innovation intermediaries support companies in their innovation process by facilitating access to resources and competencies outside a company (Germundsson et al., 2021, Nair et al., 2022). Research has consistently found that neutral and third-party innovation intermediaries can enhance innovation by orchestrating interactions between stakeholders at different levels within innovation networks (Giudici et al., 2018, Hurmelinna-Laukkanen and Nätti, 2018, Kivimaa, 2014, Batterink et al., 2010). Innovation intermediation research examines how organizations or groups work to enable innovation to facilitate the innovativeness of one or more firms by enhancing their innovative capacity (Howells, 2006, Dalziel, 2010). An intermediary is "*an organization or body*

*that acts as an agent or broker in any aspect of the innovation process between two or more parties*" (Howells, 2006, p. 720). Thus, intermediation commonly concerns how firms become interconnected via specific functions carried out by intermediaries (Howells, 2006). Third-party "*intermediaries whose goal is to bring heterogeneous parties together and co-develop innovations, not just to exploit the knowledge*" is an emerging concept in network literature (Kirkels and Duysters, 2010, p. 375). Different types of organizations, actors, and individuals can act as intermediaries. Therefore, the classification of an entity as an intermediary is not static but dynamic and can fluctuate over time.

Extant research sheds some light on the organization of innovation intermediaries. It provides an overview of the functions these organizations can perform regarding financing, organizational model, mandate, type, and scope (Batterink et al., 2010, van Lente et al., 2011), and how they are embedded in networks and innovation systems (Laschewski et al., 2002, Looy et al., 2003). Earlier studies on intermediaries focused primarily on firms as central hubs that shape and manage their own (R&D) network of partners as a side activity to their core business (Doz et al., 2000, Dhanaraj and Parkhe, 2006, Gassmann et al., 2011). Other authors shed light on the organization of innovation intermediaries and provide an overview of the functions these organizations can perform regarding financing, organizational model, mandate, type, and scope (Batterink et al., 2010, van Lente et al., 2011, Soares et al., 2020, Vidmar, 2021), and the way they are embedded in networks and innovation systems (Laschewski et al., 2002, Looy et al., 2003, Soares et al., 2020). In more recent contributions, the term innovation intermediary is often attributed to gatekeeper entities that exclusively focus on enabling other organizations to innovate rather than being involved in developing and implementing innovations themselves (Batterink et al., 2010, De Silva et al., 2018, Kilelu et al., 2011, Winch and Courtney, 2007).

Innovation intermediaries perform functions beyond merely retrieving and distributing information and engaging in long-term client relationships (Tran et al., 2011, Dalziel and Parjanen, 2012). Furthermore, a positive correlation exists between collaboration with innovation intermediaries and innovation outcomes (Jenson et al., 2020). A vital distinction emerges from the review between those organizations that mediate relations between suppliers, customers, and regulators in the same industry and firms that intermediate between firms in different industries (Winch and Courtney, 2007). Intermediaries are potentially available to all firms and are accessible to startups (Yao et al., 2022). Further, as intermediaries are the interface of companies, organizations, and industries, they can orchestrate the exchange of information concerning innovation (Kivimaa et al., 2019). Henceforth, the focal intermediary in the first investigation in my dissertation will be referred to as the network orchestrator and will be abbreviated as OI (orchestrating intermediary). See Section 3.1 for a description. In this context, network

orchestration is defined as the process of “*assembling and managing an inter-organizational network to achieve common goals*” (Paquin and Howard-Grenville, 2013, p. 3).

### 2.2.2 Orchestration Roles

Managing an innovation network is a multifaceted and complex task in environments with high transactional uncertainty where the actors are diverse and numerous (Pikkarainen et al., 2017). Given the intricate nature of these relationships, this study emphasizes the significance of comprehending the fundamental mechanisms within the governance framework to be embraced for innovation networks (Santos et al., 2021). Therefore, orchestration is arguably the most appropriate approach to describe network development, management, and coordination (Dhanaraj and Parkhe, 2006). As a weak organization with loose couplings, networks call for an instance that enables purposeful collaboration by orchestrating the network (Orton and Weick, 1990). A dedicated entity must identify the structures and capabilities of the network's participating organizations and coordinate, manage, and govern the network's resources. In this vein, network orchestrators can enable the mobilization and coordination of the innovation network through discreet direction and influence (Dhanaraj and Parkhe, 2006).

In the literature on network orchestration, focal enterprises are metaphorically associated with managerial roles (Hinterhuber, 2002). These roles may be interwoven, implying that a variety of roles are owned by one actor (Thorelli, 1986, Kelley and Littman, 2005). Orchestrator roles are reflected in their orchestration activities. In the context of orchestration, roles can be defined as “*behaviors expected of parties in particular positions*” (Nyström et al., 2014, p. 484).

In my dissertation, I place significant emphasis on orchestration roles due to their critical role in the context of networked innovation. Orchestration roles are instrumental in determining and guiding strategic capabilities. These capabilities are essential for identifying which orchestration functions, i.e., specific activities and tasks, are given precedence and how they are executed effectively. One of the distinctive aspects that I explore within the realm of orchestration roles is the dynamic nature of these roles throughout the startup lifecycle. Understanding these role transitions and their alignment with the startup lifecycle is crucial for comprehending the broader context of how startups leverage external networks and ecosystems to drive innovation and achieve success.

Through a comprehensive literature review (see Table 2), I identified the various orchestration roles studied in the literature and clustered them according to their contextual meanings: *Architect*, *Conductor*,

*Facilitator, Mediator, and Leader.* These orchestration roles, however, are derived from studies relating to hierarchical, hub-centric (enterprise) networks (Hinterhuber, 2002, Dhanaraj and Parkhe, 2006, Nambisan and Sawhney, 2011); networks of Small and Medium-sized Enterprises (SMEs) (Batterink et al., 2010, Kirkels and Duysters, 2010, Nilsen and Gausdal, 2017, Tabas et al., 2022); around distinct technologies (Hurmelinna-Laukkanen et al., 2011, Roijakkars et al., 2013); and in regional clusters or at city-level (Paquin and Howard-Grenville, 2013, Bittencourt et al., 2018, Hurmelinna-Laukkanen and Nätti, 2018, Mignoni et al., 2021). However, the literature rarely discusses orchestration roles within a non-hierarchical, neutral setting in the context of startups. To establish a solid foundation for assessing the strategic fit of orchestration roles and their associated capabilities and activities within various stages of the startup lifecycle, I employ the resource-based view (RBV). In this sense, using their activities and processes as the primary conceptual reference, I aim to develop a framework entailing the roles the OI is expected to perform within the dyadic relationship with startups.

The RBV offers a structured approach to assess the strategic fit of orchestration roles, associated capabilities, and activities in different startup lifecycle phases, thereby facilitating a comprehensive analysis of their effectiveness. The capabilities perspective has evolved within the RBV. This perspective originates from Penrose's (1959) interpretation of the firm as a bundle of resources that shape its competitive position. Business literature has given considerable support to the RBV of the firm proposed by Birger Wernerfelt (1984) and developed and refined by Jay B. Barney (1991). A central premise of the RBV is that competitive advantage is a function of the resources and capabilities of the firm (Wernerfelt, 1984, Conner, 1991, Peteraf, 1993). Therefore, RBV emphasizes the idea of firm heterogeneity in terms of the resources possessed by the firm and its ability to manage and utilize those resources innovatively so that environmental opportunities are captured (Pereira and Bamel, 2021). An organization's resources and capabilities are valuable if they enable it to exploit opportunities and counter threats. These resources can be considered bundles of intangible and tangible assets, such as management skills, organizational processes, and knowledge (Barney, 2001). Resources and capabilities create a niche in the firm's market, mainly if structured differently (Wernerfelt, 1984).

Adapting to significant changes will require changes in organizational structures, resources, and capabilities. Consequently, these resources should enable the organization to meet the requirements of its business environment. RBV focuses on the firm's internal resources and capabilities to improve its competitiveness (Barney, 1991, Penrose, 2009, Peteraf, 1993). These capabilities incorporate a series of routines that allow the execution and coordination of the tasks necessary to carry out an activity. A routine can be defined here as a "*repetitive pattern of activity*" in a sense used by Nelson and Winter (1982, p. 97). The RBV, however, is considered more

than an explanation of the sources of superior value generation but, moreover, “*one of the most prominent and powerful theories for describing, explaining, and predicting organizational relationships*” (Barney et al., 2011, p. 1300). In addition, the RBV provides an invaluable basis for analyzing inter-organizational relationships, such as innovation networks. Through the RBV approach, I can better understand how the OI develops roles and associated activities by supporting startups throughout their lifecycle by orchestrating the innovation network.

Orchestration is a dynamic activity (Mitrega and Pfajfar, 2015). In orchestration, not all activities are equally emphasized in all situations and will be conducted differently depending on the situation (Saka-Helmhout and Ibbott, 2014). Hurmelinna-Laukkanen and Nätti (2018) suggest that “*orchestrator capabilities are relevant in determining whether orchestrators succeed in taking different roles and conducting the activities within them*” (Hurmelinna-Laukkanen and Nätti, 2018, p. 67). Different types might develop specialized capabilities depending on the orchestrator's inherent characteristics. As a result, different orchestrators have different positions and orchestrate networks differently (Hurmelinna-Laukkanen et al., 2022). In several studies, network orchestration practices change along the innovation trajectory, indicating the need for different capabilities at different stages of startup development (Reypens et al., 2019, Paquin and Howard-Grenville, 2013). Contingent to the situation, the OI may focus on exploiting and refining the resources and capabilities most relevant to the particular role.

In the context of network orchestration roles, three types of capabilities allow orchestrators to effectively adopt roles allowing them to conduct focal activities, namely role-implementation capabilities, role-switching capabilities, and role-augmentation capabilities (Hurmelinna-Laukkanen and Nätti, 2018).

*Role-implementation* capabilities refer to the ability of the orchestrator to carry out orchestration activities on a daily basis, using the same techniques and resources to build and manage innovation networks (Tabas et al., 2022). Role-implementation capabilities refer to the orchestrator's abilities required to perform the specific role. They appear whenever the orchestrator remains proficient in a particular role (Schreyögg and Kliesch-Eberl, 2007). Within a low-dynamic environment, orchestrators remain within the specific roles they have adopted (Hurmelinna-Laukkanen and Nätti, 2018).

*Role-switching* capabilities, however, refer to the ability to detect changes to the network, its environment, and configuration, which requires switching between or adopting additional roles. Role-switching is similar to anticipating and shaping opportunities and threats, seizing opportunities, and partially reconfiguring assets to maintain a competitive advantage (Hurmelinna-Laukkanen and Nätti, 2018, Teece, 2007). In other words, role-switching involves shifting the focus from one activity to another (e.g., by expanding/adapting the resource base) rather than changing the approach and how an orchestrator performs or changes its intrinsic characteristics.

While role-switching capabilities are about reacting to ordinary, natural changes with existing capabilities, *role-augmentation* capabilities evolve due to adapting, developing, or acquiring new capabilities and extending the role base in response to new challenges and with ad hoc problem-solving (Hurmelinna-Laukkanen and Nätti, 2018, Aarikka-Stenroos and Ritala, 2017). For the orchestrator to effectively address new situations, it may need to change itself, develop or acquire new resources and capabilities, and extend its natural role base (Winter, 2003, Barney, 1999).

Network orchestration must react to the evolving nature of the network members' demands, the disrupting character of the startups and the technologies they promote, and, finally, to the ever-changing competitive environment. In this vein, my research examines the orchestrator roles, the associated resources, and capabilities across the startup lifecycle and the extent to which these resources and capabilities are adapted to meet startup requirements as they grow. In addition, I will examine whether these adaptations lead to transitions in the orchestrator role by what circumstances and at what point. Thus, I argue that having practices and routines that enable the orchestrator to meet such new and changing requirements is necessary for a successful, long-term orchestration process.

<b>Network Orchestrator Role</b>	<b>Description</b>	<b>Actor Type</b>	<b>Example</b>	<b>Example literature referencing this category</b>
<b>Architect</b>	Designs and structures the innovation network, setting up frameworks for interaction and collaboration. Involves definition and coordination of activities to direct members.	Educational institutions, incubators.	A university incubator program that designs a framework for startups to connect with mentors, investors, and industry experts.	Hinterhuber (2002); Dhanaraj and Parkhe (2006); Nambisan and Sawhney (2011); Hurmelinna-Laukkanen et al. (2011); Roijakkers et al. (2013); Nilsen and Gausdal (2017); Mignoni et al. (2021)
<b>Conductor</b>	Coordinates and directs the flow of information and resources among various actors within the ecosystem. This role encompasses the purposeful acquisition and dissemination of information and knowledge within the network, supporting the acquisition, transmission, and sharing of information between members.	Development agencies, industry associations.	A regional development agency that organizes networking events and workshops, connecting startups with potential partners and investors.	Nambisan and Sawhney (2011); Nyström et al. (2014); Bittencourt et al. (2018); Hurmelinna-Laukkanen and Nätti (2018); Mignoni et al. (2021)
<b>Facilitator</b>	Assists in the smooth interaction between ecosystem actors, often by providing support services or resources. This role is aimed at uniting disparate, and even competing, members to ensure that these network participants are engaging in exchange and collaboratively working towards a common goal.	Consultancy firms, service providers.	A business consultancy firm that provides mentorship and advisory services to startups, facilitating their growth and development.	Dhanaraj and Parkhe (2006); Kirkels and Duysters (2010); Batterink et al. (2010); Roijakkers et al. (2013); Nyström et al. (2014); Nilsen and Gausdal (2017); Hurmelinna-Laukkanen and Nätti (2018); Mignoni et al. (2021); Nair et al. (2022)
<b>Mediator</b>	Ensures that relationships and interactions between network actors are sustained. Uses culture, identity formation, values, and norms to	Ombudsmen, legal advisors.	An industry ombudsman that mediates disputes between startups and investors, ensuring fair and equitable solutions.	Howells (2006); Hurmelinna-Laukkanen et al. (2011); Nyström et al. (2014); Mignoni et al. (2021); Tabas et al. (2022)



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	stabilize the network and minimize individual and opportunistic behavior.			
<b>Leader</b>	Takes a proactive role in guiding and influencing the direction and priorities of the ecosystem, focusing on the motivation and promotion of voluntary cooperation among network actors. This role includes actively guiding and directing other members towards a common goal within the network, while also providing support. It emphasizes the encouragement of collaboration and concerted effort among various actors to achieve shared objectives.	Venture capitalists, influential investors.	A venture capital firm that not only funds startups but also plays a key role in setting industry trends and investment priorities.	Dhanaraj and Parkhe (2006); Metcalfe (2010); Hurmelinna-Laukkanen et al. (2011); Nambisan and Sawhney (2011); Nilsen and Gausdal (2017)

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*Table 2: Main orchestration roles.*

Previous studies have highlighted the importance of both innovation network orchestration (Antunes et al., 2021a, Eveleens et al., 2017) and innovation intermediation (Schepis, 2021, Vidmar, 2021) in facilitating the success of startups. Innovation network orchestration refers to the process of coordinating the activities of multiple actors in a network to achieve a common goal (Giudici et al., 2018, Dhanaraj and Parkhe, 2006). In contrast, innovation intermediation refers to the role of intermediaries in facilitating innovation processes between, e.g., startups and other actors in the ecosystem (Hernández-Chea et al., 2021, Goswami et al., 2018).

While these two concepts are distinct, they are closely related in the startup context (Schepis et al., 2021). Orchestration can be seen as a form of intermediation, as it involves coordinating the activities of multiple actors in the ecosystem to facilitate innovation (Giudici et al., 2018). Similarly, intermediation can be seen as a form of orchestration, as intermediaries often play a coordinating role in the innovation process (Clayton et al., 2018).

### 2.2.3 Orchestration Functions

In the preceding sections, I delved into the significance of neutral third-party intermediaries and their critical role in connecting startups with vital resources and stakeholders across various stages of their lifecycle. I further outlined the strategic-level roles and underlying capabilities of network orchestration. In the following section, my attention turns to operationalizing these concepts, where I aim to identify the underlying activities that, at a tactical level, provide a detailed exploration of individual orchestration tasks, also referred to as orchestration functions of intermediation.

Given the complex and occasionally paradoxical nature of collaboration in networks, it becomes evident that innovation intermediaries assume an indispensable role in linking diverse organizations. Acknowledging this role, I draw upon previous research on innovation intermediaries to conceptualize their primary orchestration functions and activities. Based on a comprehensive literature review, I categorized the roles played by innovation intermediaries in past research into five main orchestration functions of intermediation in Table 3.

I follow the considerations of Thomas et al. (2013) that intermediary functions resemble a sequential but overlapping scheme of different phases of the innovation process. In this sense, firm-intermediary relationships based on a combination of functions can affect startups success (Dalziel and Parjanen, 2012). Nevertheless, the differences in their functions imply differential impacts on the innovation process and outcomes.

<b>Intermediation Function</b>	<b>Key characteristics</b>	<b>Example literature referencing this category</b>
Network composition and process management (NPC)	Create and maintain a network Establish connections Networking and partnership facilitating activities Enhancing transparency Raising awareness Information provision Foresight and diagnostics Accreditation Articulate and combine knowledge	(Howells, 2006), (Winch and Courtney, 2007), (Batterink et al., 2010), (Dalziel, 2010), (Stadtler and Probst, 2012), (Ngongoni et al., 2017), (Agogué et al., 2017), (Randhawa et al., 2017), (Kanda et al., 2018), (Hernández-Chea et al., 2021), (Vidmar, 2021), (Schepis et al., 2021), (van Rijnsoever, 2022), (Yao et al., 2022)
Fostering networking and partnerships for resource mobilization (FNP)	Connecting actors Conflict handling Consultancy Access to cluster Access to funding Access to human resources Access to a research base	(Winch and Courtney, 2007), (Batterink et al., 2010), (Dalziel, 2010), (Tran et al., 2011), (Stadtler and Probst, 2012), (Ngongoni et al., 2017), (Agogué et al., 2017), (Kanda et al., 2018), (Warbroek et al., 2018), (Hernández-Chea et al., 2021), (Vidmar, 2021), (Schepis et al., 2021), (Rossi et al., 2022), (van Rijnsoever, 2022), (Yao et al., 2022)
Intermediation for technology transfer, collaborative research, and commercialization (ITC)	Gatekeeping and brokering Assessing and evaluating Exploiting innovations Building legitimacy	(Howells, 2006), (Dalziel, 2010), (Tran et al., 2011), (Ngongoni et al., 2017), (Agogué et al., 2017), (Randhawa et al., 2017), (Kanda et al., 2018), (Warbroek et al., 2018), (Hernández-Chea et al., 2021), (Vidmar, 2021), (Schepis et al., 2021), (Rossi et al., 2022)
Identification and mediation of different interests (IMD)	Attracting participation Moderate stakeholder discussions and mediate between different interests Identify important stakeholders and resources Provide a neutral arena for exchange	(Winch and Courtney, 2007), (Batterink et al., 2010), (Dalziel, 2010), (Tran et al., 2011), (Stadtler and Probst, 2012), (Ngongoni et al., 2017), (Agogué et al., 2017), (Kanda et al., 2018), (Warbroek et al., 2018), (Hernández-Chea et al., 2021), (Vidmar, 2021), (Schepis et al., 2021), (Rossi et al., 2022), (Yao et al., 2022)
Evaluation and validation of outcomes (EVO)	Protecting results Feasibility study, best practices, and experience Benchmarking Foresight and diagnostic activities	(Howells, 2006), (Winch and Courtney, 2007), (Tran et al., 2011), (Stadtler and Probst, 2012), (Agogué et al., 2017), (Randhawa et al., 2017), (Kanda et al., 2018), (Warbroek et al., 2018), (Vidmar, 2021)

*Table 3: Core orchestration functions of intermediation.*

In the preceding sections, I have explored the strategic roles and capabilities of neutral third-party intermediaries in orchestration networked innovation. Now, I turn my attention to a critical aspect closely tied to the success of startups: PI as an indicator of startup performance. This shift from the broader orchestration roles to the specific attribute of PI marks a more focused direction in my investigation. In the following section, I will delve into identifying which specific orchestration functions of intermediaries lead to high PI. My goal is to bridge the gap between the intermediary functions I have outlined earlier and their direct impact on PI. By integrating these concepts, I aim to develop a nuanced understanding of how the roles and actions of intermediaries influence the innovative capabilities and success of startups, particularly in dynamic and technologically advanced markets. This part of my research not only examines PI as a crucial outcome but also as a vital tool for assessing the effectiveness of intermediation in fostering innovation within complex networked innovation.

## 2.3 Product Innovativeness as an Indicator of Startup Performance

In the context of startups, the critical importance of innovation and the ability to offer distinctive products for long-term viability and competitiveness is undeniable<sup>2</sup> (José Santisteban and David Mauricio, 2021, Gómez-Prado et al., 2022). This chapter delves into the profound significance of PI as a pivotal determinant of startup performance and success. Furthermore, I explore the role of PI as a conceptual framework within my study and its distinct characteristics that justify its incorporation. The choice to center my study on PI is rooted in its unique role as a conceptual framework. It is critical to underscore that PI is not intended to function as a standalone theoretical framework. Rather, it operates as a pivotal conceptual framework, providing a substantial rationale for its inclusion in my research.

PI plays a dual role: classification and rationale. This multifaceted function allows me to establish a robust foundation for comprehending its indispensability within my research. Categorizing PI as such enhances my ability to substantiate its significance as an output variable, thereby elucidating its integral role in my research objectives.

This conceptual framework of PI not only serves as a classification and rationale but also holds practical implications that significantly influence my research approach (Ganbaatar and Douglas, 2019). It plays a crucial

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<sup>2</sup> When I use the term "products," I am specifically describing the ultimate outcomes of the production process within a startup. These "products" can encompass tangible goods, intangible services, or a combination of both goods and services.

role in structuring and adding rigor to the assessment of PI in startup ventures, particularly relevant when evaluating startup performance in dynamic high-tech markets (Amezcuca et al., 2013, Gómez-Prado et al., 2022).

Furthermore, this conceptual framework of PI acts as an intermediary framework within the core theoretical framework of my study, offering a distinct perspective to assess the implications and effects of the primary theoretical framework (Freeman and Engel, 2007). Its inclusion is vital for grasping how theoretical concepts manifest in practical outcomes. By serving as this intermediary lens, PI enables me to assess and justify my overarching research questions, bridging the gap between theory and application, and enhancing the ability to analyze my research objectives and their real-world implications (Mátyás et al., 2019).

PI also serves as a valuable metric for comparing products and tracking a firm's innovations over time, benefiting researchers and practitioners alike. Its role in resource integration, the ability to combine resources, competencies, partnerships, tools, and management methods to create value through innovation, is critical for startup success and growth (Barney, 1991). Its link to entrepreneurial profitability is reinforced by extant research, emphasizing its relevance, especially in unique startup scenarios marked by particular financial and intellectual property considerations (Ding and Ding, 2022, Oo et al., 2019).

In recent years, PI has attracted significant interest (Ding and Ding, 2022, Ganbaatar and Douglas, 2019). According to Ali et al. (1995), PI can be defined as the uniqueness or novelty of a new product to the customer and pertains to radicalness, uniqueness, and meaningfulness (Ven, 1986). Most commonly, PI refers to the degree of innovativeness embodied in new products (Balachandra and Friar, 1997, Salavou and Avlonitis, 2008). PI can be divided into two dimensions: technological innovativeness and market innovativeness (Danneels et al., 1998, Chandy and Tellis, 2000, Ding and Ding, 2022).

Technological innovativeness pertains to the new and state-of-the-art technologies embedded in the new product (Sethi et al., 2012). Innovative products incorporating substantial technological differences from existing products offer higher quality and value to customers (Zhou et al., 2005, Castaño-Martínez, 2020). A product incorporating state-of-the-art technologies appears relatively novel to the industry and significantly improves existing products (Singhal et al., 2020). Consequently, the new ventures will be able to compete against other ventures with an innovative edge, making them stand apart from their competitors. In addition, technological innovativeness involves adopting advanced technologies to provide more significant benefits to existing or mainstream customers of new ventures, resulting in better performance of new products (Salavou and Avlonitis, 2008).

Market innovativeness reflects the potential for new products to target new markets and features new functionalities. Market innovativeness provides new customer value for emerging market customers, despite no significant changes in core technology (Sorescu and Spanjol, 2008, Zhou et al., 2005). As a result, it creates value and allows more significant differentiation from competitors' products by meeting previously unmet needs or bringing entirely new benefits (Calantone et al., 2006, Konga and Ramaiah, 2021). It may also involve establishing new categories or segments of the market (Skala, 2019). Moreover, market innovativeness can create first-mover barriers that prevent competitors from entering the market with new products (Joshi, 2017). New ventures can take advantage of temporary monopoly rents by offering novel products that promote better product performance (Anwar et al., 2021).

Correspondingly, technological and market innovativeness results in enhanced customer benefit relative to currently offered products (Troilo et al., 2014, Zhou et al., 2005). According to Song et al. (2010), highly innovative products are more likely to generate higher product performance and new venture performance than low-innovative products. Innovative products perform better because of their higher value proposition and potential differentiation (Biazzo and Filippini, 2021, Danneels et al., 1998). In this vein, startups must develop products with substantial advantages over existing products to better compete (Ding and Ding, 2022, Garcia and Calantone, 2002, Hosseini et al., 2018).

Both theoretical and empirical studies in the new product literature emphasize distinguishing between different degrees of innovativeness associated with new products (Salavou and Avlonitis, 2008). Over the years, several approaches to characterizing PI as a measure of the degree of newness have been described in the literature (Cavusgil and Calantone, 2010, Chen et al., 2021). Booz et al. (1982) use two dimensions to measure innovativeness: 'Newness to the Market' and 'Newness to the Company.' The authors classify new products into four degrees of innovativeness: new-to-the-world products, new product lines to the firm, additions to an existing line, and product improvement. Based on their analysis of the relationship between PI and its performance, Kleinschmidt and Cooper (1991) reduce PI into three categories: low, moderate, and high. Further, Veryzer (1998) uses three dimensions: technological capability, product capability, and change in consumption patterns to measure PI. With two levels, macro (where the PI is new to the world, the market, or an industry) versus micro (where the PI is new to the firm or the customer) paired with marketing versus technology, Garcia and Calantone (2002) identify three degrees of PI: radical, really new, and incremental. Thus, Garcia and Calantone (2002) claim that all new products can be classified using macro and micro levels, followed by two sublevels – market and technology. *"It is therefore essential that research investigations specify innovativeness at the macro- or microlevel"*

(Calantone et al., 2006, p. 410). Thus, I conclude that PI is a complex, multilayered construct influenced by various micro and macro factors (Zastempowski, 2022).

In this sense, technological and market innovativeness allow new ventures to yield significant returns. However, different levels of risk and uncertainty (Oo et al., 2019, Troilo et al., 2014) are associated with each dimension, resulting in difficulties for startups in creating innovative new products (Ding and Ding, 2022). The corresponding risk of high market innovativeness lies in meeting unfulfilled and sometimes unarticulated customer demands by adopting new attributes and features within the product, which customers might perceive differently (Mandal, 2019, Kock et al., 2011). While an in-depth market research study can effectively mitigate the risk of market innovativeness, technological innovativeness will change the technological trajectory of a new venture or cause a paradigm shift (Zhou et al., 2005, Kock et al., 2011). Considering that technological innovativeness is a resource- and time-intensive process involving high levels of risk and uncertainty, startups may encounter an uncertain developmental process facilitated by external knowledge (Marcon and Ribeiro, 2021, Shu et al., 2005, Nair et al., 2022). Moreover, startups may lack the resources and capabilities to manage the risks and resources required to independently develop highly innovative technological products (Ding and Ding, 2022).

PI serves as a valuable metric for comparative product analysis and the tracking of a firm's innovations over time, facilitating research and practical applications alike (Ganbaatar and Douglas, 2019). In light of its profound role in the integration of resources, competences, partnerships, tools, and management methods, PI assumes a critical role in determining startup success and growth (Freeman and Engel, 2007). The role of PI in efficient marketing strategies is paramount, capturing customer attention and facilitating market penetration in a crowded marketplace (Bielialov, 2022). Furthermore, it cultivates positive sentiment, underpinning the development of successful and sustainable business models (Asgari et al., 2022).

PI stands out among startup performance indicators due to its unique focus on market acceptance, providing a long-term perspective that transcends the limitations of traditional financial metrics (Ding and Ding, 2022). This emphasis on differentiation is particularly relevant for technology-based startups, reflecting their core competency in innovation (Ganbaatar and Douglas, 2019).

However, existing measures of PI face challenges when applied to entrepreneurial firms, as conventional metrics like R&D budgets, patents, and organizational capabilities often lack sufficient data or relevance (Whittaker et al., 2016, Alegre et al., 2005). To address these challenges, this dissertation employs a measurement model tailored for entrepreneurship research, directly assessing the innovativeness of new products in an objective and data-independent manner. This proposed model builds upon previous conceptual frameworks (Ganbaatar and

Douglas, 2019, Ding and Ding, 2022) and offers a reliable and externally validated evaluation of PI (Alegre et al., 2006). It analyzes two critical dimensions: levels of technical novelty and levels of market novelty in both micro and macro contexts (Table 4).

		<b>Product Innovativeness</b>	
		<b>Market</b>	<b>Technology</b>
<b>Micro</b>	Customers perceive product features as novel/unique	Improvement in existing product features	
	Offering new benefits to customers	Involve significant technological changes in an existing product	
<b>Macro</b>	Completely new features to the market	Technology is new to the industry	
	Being first in new product introductions to the market	Incorporation state-of-the-art technology	

*Table 4: Measurement model of product innovativeness. Adapted from Danneels et al. (1998) and Garcia and Calantone (2002) and Ganbaatar and Douglas (2019).*

Having explored the significance of Process Innovation (PI) as a crucial metric in comparative product analysis and its pivotal role in startup success, growth, and marketing strategies, the theoretical background section of this dissertation concludes with an understanding of PI's importance in the startup landscape. This section has highlighted PI's relevance in capturing market acceptance and its unique position among performance indicators, especially for technology-based startups. Yet, the challenges of applying conventional PI measures to entrepreneurial firms have been acknowledged, pointing to the need for a more tailored approach.

Moving forward, the dissertation transitions into the methodology section. This next phase will detail the approaches and techniques employed to investigate how these theoretical concepts are applied and manifested in the real-world scenarios of startup development and innovation. The methodology section serves as a bridge



between the theoretical insights and their practical application, setting the stage for a deeper, empirical understanding of these concepts within the dynamic context of startups.

### 3. Methodology

As a researcher, my philosophical orientation aligns with pragmatism, emphasizing practical outcomes and the evolving nature of knowledge (Morgan, 2019). This perspective informs a research approach characterized by flexibility and contextual sensitivity. The philosophical elements of ontology, epistemology, and axiology, as outlined by Kaushik and Walsh (2019), intricately guide my methodological decisions.

In terms of ontology, I adopt a realist position, asserting the independent existence of an external reality. This influences my choice of the multiple case study analysis method, allowing for an in-depth exploration of EEs, intermediaries, and startups as distinct entities across diverse regional contexts.

Epistemologically, my constructivist stance acknowledges knowledge as socially constructed. This informs the selection of a mixed-method approach for studying innovation intermediaries and ecosystem orchestration. Document analysis, secondary data analysis, and semi-guided interviews are chosen for their aptness in interpreting socially constructed meanings and perspectives within distinct regional contexts.

Axiologically, my commitment to value neutrality and objectivity shapes the choice of the fuzzy set Qualitative Comparative Analysis (fsQCA) methodology. This structured approach, relying on predefined criteria and thresholds, ensures an objective assessment when investigating orchestration functions and PI in startups.

My philosophical position plays a pivotal role in shaping my chosen methodologies. The constructivist epistemological viewpoint directs me toward methods involving interpretation, while the realist ontological perspective guides the selection of in-depth case study analysis. These decisions collectively ensure the alignment of my research with my philosophical foundations, facilitating a precise, thorough, and formal investigation.

Investigation	1	2	3
Research Issue	Assessing dynamic adaptations and transitions of orchestrator roles to evolving startup needs over time.	Examining how various innovation intermediaries orchestrate EEs across regions.	Analyzing the relationships among intermediaries, startups, and new product innovativeness.
Data	Data on nine high-tech startups and one orchestrating intermediary.	20 innovation intermediaries, each assigned to one of four startup life cycle phases, span five regions.	Data on 14 high-tech startups.
Methodology	In-depth longitudinal multiple case study analysis.	In-depth multiple-case study analysis.	Fuzzy-set Qualitative Comparative Analysis.

Figure 3: Methodological Structure of the Dissertation. Source: Self-elaborated.

The foundation of my exploration lies in the shared objective across all investigations: to scrutinize the orchestration roles and functions of intermediaries within the startup landscape, recognizing their pivotal influence on product innovativeness. This common thread runs through the intricate tapestry of my research, acknowledging the critical role intermediaries play in shaping the innovation trajectories of startups.

The integration of these investigations results in a comprehensive framework, strategically designed for an in-depth exploration of the orchestration roles and functions of intermediaries in moulding PI within the dynamic startup milieu.

In the first investigation, to explore the orchestration roles an orchestrating intermediary might adapt to on a strategical level I employ an abductive approach, laying the theoretical groundwork and offering a conceptual foundation for subsequent analyses. Meanwhile, the dual lenses of the second investigation, utilizing multiple-case study designs, contribute diverse insights determining the specific orchestration functions as tasks and activities on a tactical and operational level from various perspectives, enriching my understanding of the complex interrelationships.

In the third investigation, I introduce a set-theoretic lens to determine the strategic alignment of orchestration to district operational environments. This context specific application creating a unique analytical dimension that allows me to intricately examine the interplay between intermediaries' orchestration functions and the resultant PI of startups. This set-theoretic approach brings a level of granularity to my investigation, enabling the identification of nuanced configurations that influence the outcomes under scrutiny.

The synthesis of these investigations ensures a holistic and meticulous investigation, leveraging the strengths of each approach. The combination of longitudinal perspectives, multi-case analyses, theoretical frameworks, and set-theoretic insights collectively enhances the robustness of my research. This integrated approach not only deepens my understanding of the intricate relationships at play but also provides a solid foundation for actionable insights in the dynamic landscape of EEs.

### 3.1 Multiple Case Study Analysis

In my dissertation, the first and second investigations employ a comprehensive multiple-case study approach, utilizing an exploratory and descriptive research methodology. The primary objective is to assess the evolving orchestration roles of intermediaries throughout the startup lifecycle. The study also delves into the orchestration strategies of innovation intermediaries across five distinct regions, each representing a unique EE (Miles and Huberman, 2014). Multiple-case studies are beneficial for exploring complex and multifaceted phenomena, as they allow for analyzing multiple cases selected based on their relevance to the research questions (Gerring, 2006). The exploratory methodology allows to gain a deeper understanding of the phenomenon, while the descriptive methodology facilitates the provision of a detailed account of the cases under study. As Ragin (1989) notes, in-depth multiple-case studies allow for exploring similarities and differences across cases and developing generalizable insights to inform future research and practice. This approach is widely used to observe and investigate emerging phenomena in ecosystems, including entrepreneurship (Jiang et al., 2019, Abbassi et al., 2022). According to Yin (2003), the in-depth multiple-case study design typically involves collecting and analyzing qualitative data such as interviews, observations, and documents to understand the cases comprehensively. This methodology enables to understand the subjects' attributes, actions, and perceptions and construct a comprehensive and elaborate portrayal of the phenomenon under investigation.

This study employs a unified methodology that combines two distinct approaches to thoroughly examine the dynamic adaptations of orchestrator roles in EEs. The emphasized integration in the methodology is tailored to capture the intricate dynamics inherent in orchestrator-startup relationships.

### *Empirical Setting*

In my dissertation, Germany serves as the empirical setting, a choice rooted in its unique entrepreneurial ecosystem (Sanders et al., 2020). This setting offers an insightful context for exploring the orchestration of EEs, which is central to my research.

Germany's entrepreneurial landscape is characterized by a dynamic interplay of private and public sector actors (Ebner and Taübe, 2010). This ecosystem is not only vibrant but also distinct due to its political agenda that actively fosters entrepreneurship. Publicly funded programs and institutions in Germany provide substantial support to the early stages of startups, creating an environment conducive to innovation and business growth (Kollmann et al., 2022).

My research leverages this rich context to delve into the mechanisms and dynamics of ecosystem orchestration. Germany, with its diverse mix of startup cultures and innovative policies, provides a fertile ground for examining how various elements within an entrepreneurial ecosystem interact and contribute to its overall success (Fuerlinger et al., 2015).

The rationale behind selecting Germany goes beyond mere convenience; it is a deliberate choice to investigate a context that offers both unique and universally relevant insights. The German model of startup support, with its blend of innovation and policy-driven initiatives, offers lessons that are applicable to both developed and emerging economies.

Furthermore, this setting allows my research to transcend the specifics of the German context. While the study is grounded in the unique features of Germany's entrepreneurial environment, it aims to extrapolate findings to a broader theoretical framework. This approach enhances the relevance of my research, making the insights gained applicable to a variety of economic and geographical contexts.

Building on the premise that my research transcends the specifics of the German context, it's important to emphasize the role of the focal Orchestrating Intermediary in my study. The focal OI, which serves as a data provider and unit of analysis in my investigation, is the core of the most significant technology association in southern Germany, which connects more than 700 companies and research institutions with a total of more than 6000 stakeholders. The OI describes itself as *"a platform for transferring experience, knowledge, and ideas. In*

*this context, the added value resides in the opportunities created by new cooperation and networking.*" The OI houses three business units with different focuses, extending the activities along the entire value chain, from startup ideas to SMEs to the enterprise level. The first and oldest business unit is an independent network association with around 700 members from different technology domains (including private people, companies, research institutions, and cities and municipalities). Founded as an economic initiative in 1997, the association's mission is to promote strategic technologies for southern Germany's business and living environment. The association is politically independent and aims to create Europe's most substantial cross-technology business network. Another subsidiary was founded in 2014 to offer network members continuous assistance in innovation. This subsidiary acts as an economic, profit-oriented unit and carries out, e.g., supporting activities, consulting projects, and assignments from the industry. In addition, the association includes a non-profit research organization whose purpose is to implement applied research and funding projects with network partners. Across all units, the OI employs 40 people in seven locations across southwest Germany.

My analysis focuses on the single case of the OI as the data provider and analysis unit for my research because it exhibits three desirable characteristics. Firstly, its three business units, each with its expertise, enable the OI to provide startup companies with the support they need from the moment they have an idea through to scaling. As a result, I can analyze different roles and underlying activities within the context of a single orchestrator. In addition, a heterogeneous network structure surrounds the OI, enabling direct tracking of intermediary activities without involving any third parties. Further, the OI works independently and is not dependent on politics, industries, or universities, which might exert influence based on their targets.

In my research, I focus on the dyad relationship between the OI and nine affiliated case startups from the initial sample, as well as the extended sample consisting of 14 case startups in investigation three. This dyad relationship serves as the primary unit of analysis.

### 3.1.1 Capability-Dependent Framework

In the initial phase of my investigation, I employ an abductive approach to delve into the strategical orchestration roles that an orchestrating intermediary may adapt. This approach serves as a foundational step, establishing the theoretical underpinnings and providing a conceptual framework that lays the groundwork for subsequent analyses. The primary goal is to enhance the understanding of the crucial dimensions of network orchestrator roles by constructing a cohesive conceptual framework that accounts for the evolving needs of startups

across different phases of their maturity. This examination is conducted through a dynamic perspective, aligning with the lifecycle of startups under study.

Based on an extensive literature review, this study introduces a capability-dependant framework to explain how the OI (i.e., third-party network orchestrator) can adapt to the distinct orchestration roles to meet the situational circumstances of startups considering the different phases of their lifecycle. To derive the capability-dependant framework, I propose an abductive approach by comparing the existing conceptualization of the orchestrator roles obtained from the extant literature with the empirical data of a cross-case analysis of nine dyadic relationships between one orchestrator and the startups in all phases of the startup's lifecycle.

This work adopts Perren and Ram (2016) "*multiple stories milieu*" approach to explore how the OI develops different roles responding to environmental changes and how these roles evolve within the dyadic relationship with startups. Inter-organizational relationships tend to evolve in a lifecycle pattern that includes establishing a new relationship, collaborating more closely, expanding commitment, collaborating less closely, and terminating or sometimes cooperating closely after termination (Giuliani, 2013). I chose a cross-case study design with a comparative setting to elucidate the evolution of orchestration roles by studying the dyad relationships between nine technology-based entrepreneurial firms from several high-tech industries, as shown in Table 5, and one orchestrating innovation intermediary based in southwest Germany.

In light of the scant literature on the dynamic nature of the roles of network orchestrators, I chose a qualitative multiple-case study approach to investigate the mechanisms of orchestration (Yin, 2003, Eisenhardt, 1989, Perren and Ram, 2016). I track the OI's relationship with startups from the surrounding network longitudinally to understand the dynamic nature of orchestration roles (Tabas et al., 2022, Hurmelinna-Laukkanen et al., 2022, Bergman and McMullen, 2021, Hernández-Chea et al., 2021, Pikkarainen et al., 2017).

### *Sample*

According to Eisenhardt (1989), four to ten case studies are accepted as the basis for theory-building a sample for multiple case studies. My choice of the nine cases under investigation followed an information-oriented selection strategy, as explicated by Flyvbjerg (2006). This strategy aims to maximize the utility of information from case studies by selecting cases based on expectations about their information content (Flyvbjerg, 2006).

The non-random sample was purposefully chosen to extend the theory to a diverse range of organizations, reflecting a deliberate choice rather than a random selection.

In my research, I employed a strategic and methodical approach for selecting nine case studies, each carefully chosen based on specific criteria to ensure relevance, depth, and diversity in my dataset. Central to this process was the geographical context of southwest Germany, with a focus on startups within this ecosystem to maintain consistency and regional relevance. A critical aspect of my selection was the duration of relationships with intermediaries, selecting startups with interactions ranging from 22 to 85 months, averaging 49 months. This was vital for capturing the evolving dynamics over time.

Moreover, I ensured that the chosen cases offered extensive historical data for an in-depth analysis of the startups' growth and evolution. My focus was on technology sector startups catering to various industries, allowing exploration of a broad spectrum of technology applications. I prioritized B2B-focused startups to understand the customization of technology solutions for business needs.

An integral part of my research was the extensive information accessibility, specifically targeting startups with direct access to the intermediary's internal management platform, documents, and servers. This level of access, akin to a Customer Relationship Management (CRM) system, was pivotal. It facilitated efficient data collection from various sources, including presentation documents, event registrations, business plans, investor-related documents, discussion records, and confidential agreements. This access was crucial, enabling not only the retrieval of interaction dates but also the observation of the frequency and intervals between interactions. Consequently, this allowed for the projection of events onto the lifecycle of individual startups, supporting a longitudinal analysis.

In striving for a comprehensive view, I made deliberate efforts to include a diverse range of startups, thereby minimizing industry-specific biases. This approach was further enhanced by selecting startups that provided insights into aspects crucial to my research questions, like the nature of startup growth and the impact of intermediaries on these processes. I incorporated a diversity of perspectives by including startups of varying sizes and development stages across different sectors.

This strategic selection process, underpinned by my focus on geographic, relational, temporal, sectoral, customer-oriented, and diversity criteria, and enriched by unparalleled access to critical information, ensured the robustness and applicability of my findings. It provided a nuanced understanding of the relationship dynamics between startups and intermediaries in the EE of southwest Germany.



	<i>Case Company</i>	<i>Date of incorporation</i>	<i>Main products and services (lifecycle phase)</i>	<i>Start of relationship with the intermediary</i>	<i>Employees*</i>
3.1.1 Capability-Dependant Framework	<b>1. Alpha</b>	April 2018	Online car subscription platform (Scalability)	February 2019	55
	<b>2. Beta</b>	June 2016	Autonomous professional service robots (Scalability)	June 2018	15
	<b>3. Gamma</b>	March 2019	Electric Water zero-emission Jet propulsion system (Startup)	March 2018	17
	<b>4. Delta</b>	March 2015	Distributed operating system for autonomous driving (Scalability)	July 2019	20
	<b>5. Epsilon</b>	September 2016	Digital, smart bicycle parts (Startup)	June 2017	3
	<b>6. Zeta</b>	February 2018	Online procurement platform for shared manufacturing resources (Startup)	February 2018	3
	<b>7. Eta</b>	May 2019	Personalized skill and career development platform (Startup)	August 2020	4
	<b>8. Theta</b>	December 2017	Turnkey IoT platform for energy data-based smart services (Scalability)	February 2016	8
	<b>9. Yota</b>	May 2017	Logistics platform for rural areas (Scalability)	November 2017	12
3.2 QCA	<b>10. Kappa</b>	September 2019	Content Explorer for Legal Experts (Startup)	June 2020	6
	<b>11. Lambda</b>	January 1999	Corporate design cloud solution (Scalability)	July 2017	13
	<b>12. Mu</b>	March 2018	Deep learning video analyses (Scalability)	June 2018	10
	<b>13. Nu</b>	December 2014	Optical contactless diagnostics (Scalability)	November 2017	11
	<b>14. Xi</b>	March 2015	Robotic Skill software (Scalability)	May 2015	10

\* As of June 2022

Table 5: Overview Case Study Sample.

To precisely delineate the lifecycle stages of the nine startups in my sample, I conducted a thorough evaluation of various operational, financial, and strategic indicators. These indicators included the stage of product or service development, their market presence, the scale of revenue generation, and the maturity of their organizational structures. My approach to categorizing each startup into a distinct lifecycle phase was comprehensive and multi-faceted. It involved an in-depth assessment of several factors such as the age of the

company, its current funding stage, its revenue-generating efficiency, market penetration, customer engagement levels, and the scale of organizational growth as indicated by employee count (Passaro et al., 2020, Hiemann, 2022). Additionally, I rigorously examined the advancement stage of each startup's products or services, gaining insights into their levels of innovation and developmental progress. In cases where it was relevant, I also incorporated sector-specific metrics into my evaluation, thereby enhancing the accuracy and specificity of the lifecycle phase categorization (Trachenko and Kozhanova, 2019).

A critical aspect of my methodology was the recognition of the inherently dynamic nature of startups (see section 2.1). These entities frequently undergo transitions across different phases over time. My methodology was designed to be adaptable, accommodating the fluid nature of the startups and allowing their categorization to accurately reflect their evolving states throughout the duration of the study. This adaptive approach afforded a nuanced and dynamic perspective on the development stages of the startups, laying a vital foundation for the subsequent analyses conducted in my research.

### *Data Collection*

My longitudinal investigation is based on different data sources related to startups and the OI. Therefore, a range of data was collected from different sources following best practice case study research (see Table 1 in Appendix A) (Welch et al., 2010). Due to the multi-year relationships between the startups and the OI, which lasted between 22 and 85 months, with an average of 49 months in my sample, a large amount of internal data per case was available for analysis. Mostly confidential documentation has been used in my analysis. The documentation ranged from presentation and event registrations to detailed business plans, investor-related documents, discussion protocols, and confidential agreements and contracts. Additional information, such as annual reports, protocols, and reports from joint projects and underlying applications, was obtained from the employees of the OI to provide context and validate my findings. I further obtained information from emails, internal (strategy) reports, media announcements, websites, and news articles, thus, enabling empirical triangulation. (see Table 1 in Appendix A).

I could triangulate the data by applying multiple data-collection techniques in reviewing different documents (Jick, 1979). Following Miles and Huberman (1994), Eisenhardt (1989) a case study protocol was constructed along with a case study database to increase reliability and enhance transparency, as well as the possibility of replication (see Table 7)

The study's primary research questions in determining the orchestrator type and the adoption of different orchestration roles by the OI are: *How does the orchestrator role adapt to the evolving needs of startups' lifecycles in innovation networks, and how do orchestrator capabilities lead to role transitions within this relationship?*

Sub-research questions were formulated like:

*Subquestion A: What are the natures of interactions between the actors in different phases?*

*Subquestion B: What were the activities, and what resources and capabilities were requested?*

*Subquestion C: What is the nature of outcomes that are part of the orchestration process?*

*Subquestion D: What are the implications of changing demands and environments?*

<b>Focus (Research Questions and Sub questions)</b>	<b>What am I looking for?</b>
What are the natures of interactions between the actors in different phases?	<ul style="list-style-type: none"> <li>◦ Process of collaboration during startup lifecycle</li> <li>◦ Who is involved?</li> <li>◦ Characteristics of relationship dyads?</li> </ul>
What were the activities, and what resources and capabilities were requested?	<ul style="list-style-type: none"> <li>◦ Types of resources, capabilities, and activities, as well as their impact on the orchestration process</li> <li>◦ Relevance in the single lifecycle phases</li> </ul>
What is the nature of outcomes that are part of the orchestration process?	<ul style="list-style-type: none"> <li>◦ Collaboration outcomes</li> <li>◦ Impact of outcome</li> <li>◦ Network vs. Orchestrator's achievement</li> <li>◦ Magnitude of change</li> </ul>
What are the implications of changing demands and environments?	<ul style="list-style-type: none"> <li>◦ OI stays in a particular role, role-switching due to minor changes or role-augmentation due to significant changes.</li> <li>◦ Adaption of resources and/or capabilities?</li> <li>◦ "Make or Buy"</li> <li>◦ Startup vs. environmental trigger?</li> </ul>

*Table 6: Empirical Material Discussion Pointers. Source: Self-elaborated.*

To interpret empirical data, I used a four-step approach: preparation, exploration, specification, and integration (PESI) (Rashid et al., 2019). By utilizing the PESI approach, I could interpret empirical data in a systematized, systematic manner and report it more effectively.

Data processing is considered one of the most challenging in qualitative research (Jandaghi and Matin, 2010). Step one involves preparation. This involves familiarizing yourself with the empirical data. An interpretation frame was developed after organizing, sorting, and analyzing empirical data. This step is called "playing with the data" (Yin, 2003). It included getting familiar with the document platform, reviewing field notes, organizing, and reading documents, and referring to the literature review. Four interpretation frames were developed based on the sub-research questions accompanying these tasks.

### *1. Nature of interactions*

2. *Resources, capabilities, activities, and actors' classification*
3. *Nature of outcomes*
4. *Consequences of change*

The four frames offered a unified approach to the interpretation of the documents. This way, I focused on addressing my research questions rather than detracting from them while interpreting the data. Furthermore, the frames served as a screening technique to focus on only that part of the data that dealt with the research questions.

Exploration is the second step. I developed initial focus themes and finalized concepts during this step. Different concepts were developed based on the similarities and differences among the identified issues.

Step three is the specification step, where the purpose of the interpretation is to develop categories consisting of various concepts and look for connections between these concepts. Based on these patterns and an understanding of the literature, categories were developed.

Integration is the final step. This step involved comparing the empirical material analysis of one case to another case to uncover cross-case patterns. Setting a framework for a concept is the outcome of this step.

	<b>Preparation</b>	<b>Exploration</b>	<b>Specification</b>	<b>Integration</b>
<b>Purpose</b>	Identifying key concepts of the empirical context to create a unified approach to interpretation	Delineating and selecting orchestration intermediary and technology startups to be analyzed	Analyzing the dyads of orchestrating intermediary and each startup	Revealing orchestration patterns
<b>Steps</b>	1) Select network orchestration domain case, 2) Investigate in-depth one orchestrator and two cases 3) Create an interpretation frame based on (sub)research questions 4) Validate interpretation frame	1) Delineate and select representative cases 2) Collect data 3) Organize the data	1) Analyze in parallel the intermediary and four startups 2) Determine interrater reliability, resolve issues, adapt interpretation frame 3) Finalize the analysis of the five remaining startups	1) Perform structures analysis and comparison of the data 2) Elicit patterns and contributions to the orchestration process and evolution
<b>Data Sources</b>	Participative observations, Documents	Documents	Documents	Collected Data
<b>Output</b>	Understanding orchestrator and startup domain and the first four interpretation frames of cases (see section 4.1 and Appendix C)	Primary case selection (see section 4.1)	Primary case analysis: 9 cases (see section 5), Revised interpretation frame	Findings and critical lessons (see sections 5 and 6)
<b>Who</b>	Research team + employees, management of orchestrating intermediary	Research team	Research team	Research team
<b>When</b>	January 2020 – August 2020	September 2020 – January 2021	February 2021 – August 2021	September 2021 – March 2022

*Table 7: Case Study Framework. Source: Self-elaborated.*

I further develop an analytical framework for cross-case analysis (See Figure 1 in Appendix B) (Ebneyamini and Sadeghi Moghadam, 2018).

#### *Data Analysis*

The incorporation of process research into my study directs my focus towards comprehending the dynamic sequences of actions and events over time within the investigated relationships. This approach goes

beyond static snapshots, aiming to trace the evolving interactions between startups and intermediaries, observing the changes in strategies, roles, and resources throughout their relationship.

My choice of process research aligns with methodologies employed by Schepis et al. (2021) and Nilsen and Gausdal (2017), providing a nuanced lens to unravel the dynamic evolution of activities within the studied relationships. Rooted in Langeley (1999) framework, this approach allowed me to explore the temporal dimension, understanding not just static moments but unfolding processes over time. This nuanced understanding helps discern how activities and occurrences shape orchestration resources, capabilities, and roles within startup-intermediary relationships.

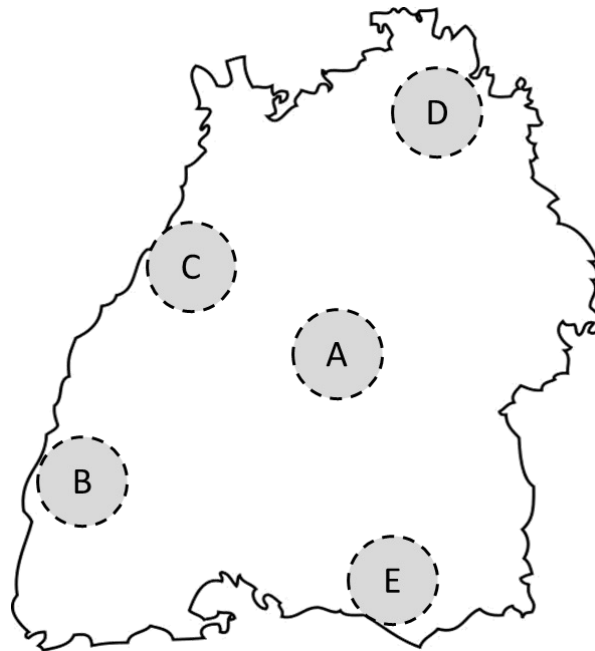
To navigate the intricacies of my study, I embrace a context-oriented perspective (Bamberger, 2008, Welch et al., 2010, Weick, 1989). Recognizing that relationships and orchestration processes operate within specific contextual milieus, my study considers the interplay of factors such as organizational culture, market conditions, and external influences on the evolution of orchestration dynamics. This context-oriented approach contributes to a more holistic understanding of the nuanced environmental factors shaping these relationships.

In parallel with the data-iteration process, I maintain a deliberate and systematic contrast between empirical findings and existing literature. This dual-purpose comparison validates my data-driven insights through established theories and frameworks, refining my interpretations considering relevant literature. The iterative nature of this process ensures a robust and well-informed analysis, synthesizing the empirical richness of the data with the theoretical foundations provided by existing knowledge in the field. This contrast between data-driven findings and literature sources systematically compares my empirical observations with existing theories and frameworks. This process helps validate the insights using established knowledge.

Expanding on this approach, in the next section, I adopt an integrated methodology that combines theoretical foundations and practitioners' complementary perspectives to address the multifaceted nature of innovation intermediaries. In addition to the inductive development of the conceptual framework based on existing literature, including practical knowledge and practitioner experiences, I refine and supplement the framework, enhancing its applicability and relevance. Recognizing the inherent limitation of a theoretical, conceptual framework based solely on the perspective of a single innovation intermediary operating within a restricted regional context, I expanded my sample size to encompass multiple innovation intermediaries in five distinct yet comparable regions. This expansion allows for a broader examination of the roles played by innovation intermediaries, contributing to a more robust and in-depth understanding of their functions within EEs.

### 3.1.2 Complementary Multi-Regional Perspective from Practitioners

Figure 4, is depicted through the empirical setting, which focuses on the EEs in five regions located in southwest Germany. The selected regions for this study include Stuttgart (Region A), Freiburg (Region B), Karlsruhe (Region C), Heilbronn (Region D), and the Bodensee region (Region E). These regions were selected based on their established reputation as crucial hubs for innovation and entrepreneurship in Germany due to their high concentration of industry, startups, universities, research institutions, and support structures such as incubators, accelerators, and venture-capital firms (Mercan and Goktas, 2011, Kollmann et al., 2022).



*Figure 4: Overview of sample regions.*

Prior research has underscored the significance of regional factors in understanding the performance of EEs. Scholars have posited that regional characteristics such as the availability of financial resources, the quality of human capital, and the cultural and social environment play a pivotal role in shaping the success of startups and innovation intermediaries (Kraus et al., 2021, Elia and Quarta, 2020).

The diversity of the selected ecosystems offers a unique and valuable opportunity to explore regional specificities and their impact on the orchestration of EEs by innovation intermediaries. This research investigates the extent to which the previous findings hold in these specific regional circumstances. Therefore, this study aims to advance the literature on EEs by providing a more comprehensive understanding of the impact of regional specificities on the orchestration process and associated orchestration roles. Through a comparative analysis of the

various regional factors that contribute to the orchestration of ecosystems by different innovation intermediaries across the selected regions, this study seeks to provide insights into the distinct challenges and opportunities that entrepreneurs and innovation intermediaries encounter in each ecosystem.

### *Sample*

In a qualitative study, a relatively small and purposively selected sample may be employed (Miles and Huberman, 2014) to increase the depth (as opposed to breadth) of understanding (Palinkas et al., 2015). In this vein, purposive sampling is a non-probability sampling method used in qualitative research to select a sample of individuals or groups based on specific criteria relevant to the research question (Bryman, 2016, Palys, 2008). This approach aims to select participants who can provide the most relevant and informative data for the research question (Patton, 2014). In my study, I adopted a purposive sampling method to select interviewees who were experts in innovation intermediation and possessed the necessary knowledge and experience to provide insightful responses to my research inquiry.

The selection of purposive sampling was a suitable method for my research study as it allowed me to tailor the sample to my research question, thereby ensuring the relevance and significance of my results. Using purposive sampling and selecting multiple interviewees from diverse regions allowed me to collect data from diverse experts, resulting in a more nuanced and robust analysis. To increase the breadth of the findings and account for potential regional differences, I selected comparable interviewees from five regions in southwest Germany. Expanding my sample size beyond a single innovation intermediary gave me a more comprehensive understanding of the relationship between startups and innovation intermediaries within EEs.

My sample selection methodology was informed by the insights gleaned in the previous investigation and was designed to consider the distinct lifecycle phases of startups. I purposively identified and selected 20 innovation intermediaries from the surveyed regions, with each intermediary assigned to one of the four phases of the startup life cycle: *ideation*, *structuring*, *startup*, and *scalability*, as shown in Table 8. An important consideration when designing my study was the initial limitation of my analysis, which focused solely on the perspective of one innovation intermediary operating within a restricted regional scope. By expanding the sample size to include multiple innovation intermediaries in five distinct but comparable regions, I was able to address this limitation and provide a more profound analysis of the relationship between startups and innovation intermediaries within EEs.



<b>Phase</b> <b>Region</b>	<b>Ideation</b>	<b>Structuring</b>	<b>Startup</b>	<b>Scalability</b>
<b>A</b>	1. University	2. University	3. Accelerator	4. Venture Capitalist
<b>B</b>	5. University	6. Accelerator	7. Open Innovation Intermediary	8. Corporate Venture Capitalist
<b>C</b>	9. Research institution	10. University	11. Consultancy	12. Venture Capitalist
<b>D</b>	13. Local innovation agency	14. Startup initiative	15. Consultancy	16. Venture Capitalist
<b>E</b>	17. Research institution	18. University	19. Innovation network	20. Business Angel

*Table 8: Overview of the sample intermediaries per region per lifecycle phase.*

### *Data Collection*

In this research study, a triangulation-based approach was employed through the collection of primary and secondary data (Eisenhardt, 1989). The primary data was obtained through 20 interviews with key stakeholders of the innovation intermediaries under study. The interviews were conducted using a semi-guided approach, with open-ended questions that were informed by previous theoretical and empirical contributions. The questions were primarily focused on the target groups, support services, type of collaboration, goals of the support, and essential local stakeholders and networks. The use of open-ended questions also allowed for the emergence of new themes and patterns that may not have been previously considered, thus increasing the richness and depth of the data collected. The questions used in the interviews underwent a rigorous development process to ensure clarity and ease of understanding for the participants. The questions were carefully crafted and tested before the interviews to achieve this.

All interviews were conducted in German during March and April 2023. They were conducted either face-to-face or via Zoom or MS-Teams. The interviews lasted 30 to 74 minutes, with an average duration of 39 minutes, and were recorded with permission and transcribed verbatim using MaxQDA software. To ensure confidentiality, anonymity was maintained for all interviewees, with their organizational role within the innovation intermediaries and the associated region being the only identifiable information. This approach allowed for a diverse range of perspectives on the research topic to be obtained, leading to increased validity and reliability of the findings. Additionally, the think-aloud method was employed during the pre-testing phase, allowing for

identifying unclear or confusing questions (Jääskeläinen, 2010). Table 9 provides a summary of the information related to the interviews.

Secondary data were acquired through an extensive analysis of external documents, including but not limited to national and local government data sources, industry reports, data from industry associations, newsletters, websites, project documentation, and social media. The integration of primary and secondary data enabled the triangulation of the gathered information, thereby enhancing the robustness and credibility of the research findings.

<b>Region</b>	<b>Interviewee</b>	<b>Type</b>	<b>Role/Responsibility</b>	<b>Length of the interview</b>
<b>A</b>	1	University	Project Lead	30 min
	2	University	Project Lead	40 min
	3	Accelerator	Project Lead	47 min
	4	Venture Capital	Investment Manager	70 min
<b>B</b>	5	University	Project Lead	33 min
	6	Accelerator	CEO	31 min
	7	Open Innovation Intermediary	Project Lead	30 min
	8	Corporate Venture Capital	CEO	32 min
<b>C</b>	9	Research Institution	Board of directors	31 min
	10	University	Head of Incubation	35 min
	11	Consultancy	CEO	31 min
	12	Venture Capital	Investment Manager	32 min
<b>D</b>	13	Local innovation agency	Project Lead	36 min
	14	Startup initiative	Project manager	30 min
	15	Consultancy	CEO	40 min
	16	Venture Capital	Investment Manager	45 min
<b>E</b>	17	University	Project Lead	74 min
	18	University	Project Lead	31 min
	19	Consultancy	Project Lead	41 min
	20	Business Angel	CEO	45 min

*Table 9: Summary of the interviewed innovation intermediaries per region.*

## *Data Analysis*

Following the suggestions of Kuckartz (2018) and Mayring and Fenzl (2019), I adopted a Qualitative Content Analysis approach to analyze the data collected from my interviews and secondary sources. Qualitative Content Analysis is a methodical and unbiased approach to analyzing qualitative data. It aims to identify patterns, themes, and relationships within textual data, leading to reliable and valid insights into the research question. The interpretation of the data is grounded in its meaning and context, ensuring the rigor of the analysis.

I conducted the data analysis for this study using a hybrid approach involving deductive and inductive coding (Fereday and Muir-Cochrane, 2006, Dubois and Gadde, 2002). Firstly, I familiarized myself with the data by reading and re-reading the transcripts to comprehensively understand the content. I then used a deductive coding process based on the pre-existing coding manual I had developed using previous literature and research findings to identify pre-determined themes and categories within the data.

I coded the data using MaxQDA software, which allowed for efficient coding and easy retrieval of coded data (Gizzi and Rädiker, 2021). I then shifted to an inductive approach using open coding, which allowed me to identify and label themes and categories not included in the initial coding manual (Gioia et al., 2012). This process enabled new patterns and themes to emerge from the data, resulting in additional codes that I added to the coding manual.

To ensure the reliability and consistency of the coding process, I assessed intracoder reliability by having the same coder re-code a subset of the data at different time intervals (Lacy et al., 2015). The coding process involved multiple stages, including initial coding, creating categories, and refining the coding scheme (Kuckartz, 2018). I reviewed and discussed the final coding scheme with the research team to ensure the validity and reliability of the findings.

After coding, I systematically compared and refined the data to identify overarching themes and patterns. I further analyzed the relationships between different themes to draw conclusions based on the data. I further analyzed the significance of the themes and patterns concerning the research question.

Expanding on these foundations laid in the first and second investigations, where I specifically focused on gaining deeper insights into strategic orchestration dynamics within the EE and systematically explored tactical and operational aspects using dual lenses in the second investigation. Transitioning to the third investigation, I introduce a set-theoretic lens to assess the strategic alignment of orchestration within distinct operational environments. This intentional methodological shift adds an analytical dimension, facilitating a detailed

examination of the interplay between intermediaries' orchestration functions and the resulting PI as performance indicator in technology startups.

### 3.2 Qualitative Comparative Analysis

To analyze the interrelatedness between the orchestration functions of intermediaries' and startups' high PI, the third investigation my dissertation applies fsQCA (Greckhamer et al., 2013). I selected fsQCA for the following reasons. First, fsQCA provides a practical way to shift the research focus from *whether* to *how* because it is a set-theoretic approach that offers an alternative to linear regression analysis (Ragin, 2008). Rather than disaggregating cases into analytically distinct variables estimating the net effect of single variables, fsQCA empirically examines the relationship between multiple conditions and an outcome (Rihoux and Ragin, 2009). Thus, it enables in-depth analysis of a given research question in configurational terms. The second advantage of fsQCA is its ability to identify complex complementary and substitutive linkages among antecedents. By redistributing resources, it can have a profound effect on practice (Lo et al., 2020). Third, fsQCA highlights the necessary conditions and core conditions. In this way, the importance of various factors can be clarified. Additionally, because fsQCA permits substantial comparisons across cases (startups), cases within the coverage of the results will correspond to an optimal approach.

FsQCA uses Boolean minimization to examine the relationship between a particular outcome (high PI in startups) and all possible combinations of predictor variables (five orchestration functions of intermediation). It delivers distinct variables (conditions) configurations that cause the same outcome (Fiss et al., 2013).

In the context of QCA, the condition refers to a set membership in a variable used to explain the outcome. The outcome refers to a set membership in a variable explained by one or more conditions. The outcome and the conditions are represented as set memberships (Rihoux and Ragin, 2009).

Further, I used the fsQCA to explain the equifinality of various intermediation configurations that led to higher firm PI. Equifinality means that different configurations of causal conditions (paths) can lead to the same outcome (Fiss et al., 2013). In seeking to understand how entrepreneurial firms achieve high PI through multiple configurations of complementary intermediation forms, equifinality allows to go beyond the prescriptions for complementarity between different types of intermediation functions. This is pertinent to the objective to move beyond the universal descriptive causal approaches explaining orchestration functions of intermediaries and PI.

To examine the multiple pathways by which intermediation functions facilitate higher PI in startups, Figure 5 represents a systematic framework to investigate the different cases of the sample. The framework's logic is based on the idea that the intermediary (represented by the five underlying functions and activities as boxes or ellipses) orchestrates the surrounding innovation network, thus representing the startups' link to external network actors. Different combinations of these orchestration functions of intermediation (configurations) provide startup access to different resources required from the surrounding network, eventually resulting in new PI.

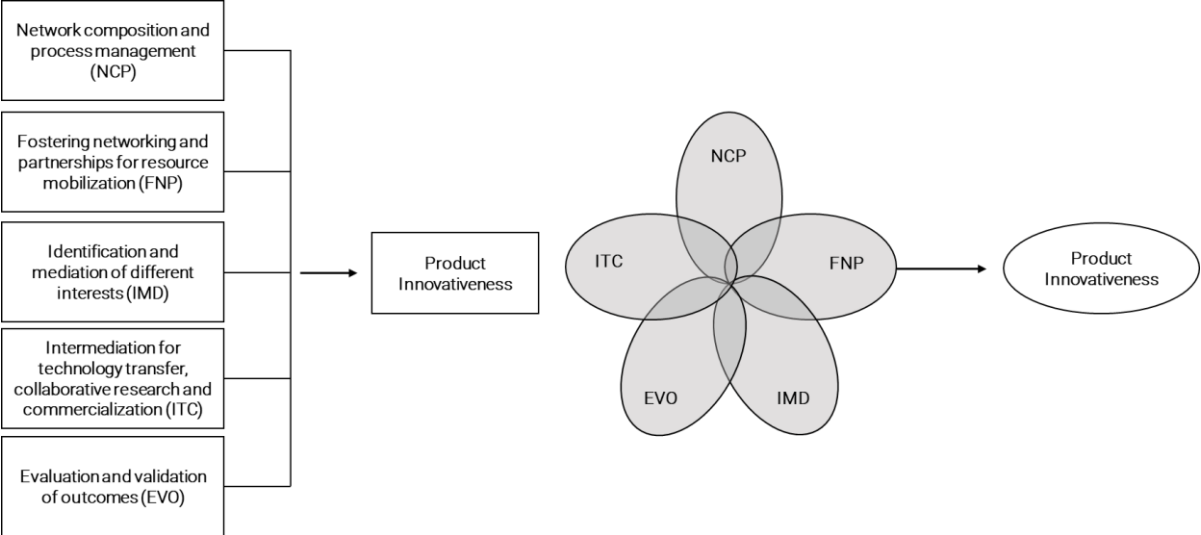


Figure 5: Configurational model. Source: self-elaborated.

Data

Based on a review of extant literature, I identified five orchestration functions of intermediation as activities that strongly influence the evolving shape of innovations in startups on an operational level (see Section 2.2.3). I used these functions as independent conditions in my analysis to determine to what extent these functions - or combinations thereof contribute to high PI in startups. I followed Eisenhardt (1989) and conducted a multiple case study analysis to elucidate the dyad relationship between 14 research-intensive entrepreneurial firms from several high-tech industries and their dyad relationship to the OI. In accordance with the QCA methodology requirements (Pagliarin et al., 2023), I augmented the sample size of the original nine startups by incorporating an additional five, resulting in a cohort of 14 technology startups. Analogous to the previously scrutinized nine startups, I maintained an equivalent extensive access level to the intermediary's internal management platform,

documents, and servers, as delineated in Section 3.1.1. These results establish the qualitative basis of the subsequent QCA analysis.

Transitioning from the intricate methodology to the results in this monograph, I refocus from the established theoretical frameworks and investigative methods to the tangible outcomes and insights they yield. This shift signifies the moment where the theoretical foundations and methodological precision I have carefully laid out start revealing the answers to my research questions. In the upcoming findings section, I will disclose the intricate dynamics of intermediaries in networked innovation as revealed by my comprehensive research. This segment is crucial, as it not only substantiates the theoretical models, I proposed but also provides practical insights, effectively bridging theoretical knowledge with real-world applications in the sphere of startup innovation.

## 4. Findings

In the first investigation in section 4.1, I delve into how intermediaries' orchestration roles dynamically adapt to startups throughout their various lifecycle phases. I will explore the nuances of these adaptations, delving into the reasons behind role changes and how they align with the evolving needs of startups. This examination aims to provide a detailed conceptual foundation for further analysis, illuminating the fluidity and responsiveness of intermediaries in the startup ecosystem.

In the second investigation in section 4.2, I employ a dual-lensed approach that synergistically combines theoretical frameworks with insights from practitioners. This method aims to offer a deeper, more textured understanding of the specific orchestration functions at tactical and operational levels. By integrating insights from practitioners, I address the multifaceted nature of innovation intermediaries, adding a vital, real-world dimension to my study. This approach allows me to gather a diverse range of insights into the tasks and activities of intermediaries, significantly enriching my comprehension of their complex roles and the varied interrelationships within the startup landscape.

Lastly, in the third investigation in section 4.3, I adopt a set-theoretic perspective to discern how the orchestration roles and their associated functions align strategically with various operational environments. This analytical approach provides a unique and detailed perspective, enabling a thorough examination of the intricate relationship between the orchestration functions of intermediaries and the resulting innovativeness in startup products. This set-theoretic analysis adds a layer of depth and precision to my research, offering nuanced insights into the complex dynamics at play in networked innovation.

### 4.1 Adaptive Orchestration: Intermediaries' Roles Across Startup Lifecycle Phases

This section delves into the nuanced roles played by the OI at different stages of a startup's life. The findings from my comparative analysis of nine relationship dyads are segmented into four distinct phases of the startup lifecycle: (a) ideation, (b) structuring, (c) startup, and (d) scalability. Each phase reveals unique insights into how the OI adapt and contribute to the evolving needs of startups.

#### *(a) Ideation phase*

My collected data shows that a central vehicle for the OI to attract and engage with (potential) founders is to host non-committal, free offers, such as "startup"-specific events for entrepreneurs and the community.

According to an employee of the OI: “regular events with different focus topics are crucial for raising awareness, sensitizing upcoming founders to the network, and bringing interested parties together.” Further, by hosting events associated with ecosystem partners, the OI aims to increase network density and foster a well-connected community with diverse stakeholders and regional familiarity. Additionally, to promote team building and to connect people with different skills to complete or initiate a startup team, the OI organizes informal open meetings, hackathons, and startup weekends, mainly with university partners. In my sample of startups, the core members of their teams were already complete when the startups began interacting with the OI. Within the ideation phase, the data shows that the OI’s core mission is to guide early-stage technology startups by providing a roadmap on appropriate steps in business development, e.g., through holding free monthly venture development workshops and periodical roadshows on company building and business planning. All nine companies in my sample participated at least once.

Additionally, an annual business plan award for technology ventures is a central element of the OI's support for entrepreneurs in this phase. The award is mainly sponsored by corporates who intend to gain access to innovative technologies, trends, and talents according to sponsoring agreements. Mentors, venture capitalists, and industry experts provide systematic feedback and guidance to applicants during the award. In my sample, all startups applied, of which *beta*, *theta*, and *yota* each made it to the finals, and *beta* was ultimately awarded in 2018. In an online statement, *beta's* CEO and Co-founder considered: “*The participation in the award and the feedback from the coaches and experts from the jury was a great experience and an important milestone for the company's development and a cornerstone for establishing first contacts to investors, partners, and customer to develop my personal network.*”

In most cases I studied, previously presented offers represent the startups' first point of contact with the OI. In my sample, *alpha*, *beta*, *gamma*, *delta*, and *yota* first attended an event, and *epsilon*, *zeta*, *eta*, and *theta* participated in the abovementioned workshop. My analysis revealed that the dyads between the OI and the startups in the ideation phase are predominantly informal and somewhat loose (see Figure 3 and Appendix C). The interactions are sporadic and ad hoc, with occasionally longer gaps between them. All decisions are made independently with little communication. In my sample, the average time between the first touchpoint or initiative of the startup and the OI and the consequent follow-up exceeded four months.

I identified relationship characteristics associated with weak ties, which are common when forming a new relationship (Giuliani, 2013). Based on the data, the OI could carry out orchestration activities within the dyads



using the same resources remaining within the specific role adopted, indicating role-implementation capabilities (Hurmelinna-Laukkanen and Nätti, 2018).

In light of these outcomes, enabling the OI to coordinate and set thematic focuses for events, select partners to increase (regional) awareness, and assist entrepreneurs in building their businesses, I conclude that the OI's role during the ideation phase is most consistent with an *architect*.

*(b) Structuring phase*

The structuring phase represents the beginning of a focused, direct collaboration between the case companies and the OI. At this phase, startups and the OI interact through standardized formal agreements such as association memberships (*beta, gamma, delta, epsilon, zeta, eta*) and brokerage agreements (*all cases*). The results suggest that entrepreneurs mostly rely on permanent contacts from the OI's staff to develop direct personal ties and exchange early thoughts and information on the initial idea representing an effectuation perspective (Sarasvathy, 2001). Hence, weekly, or biweekly meetings between startups and OI employees are evidenced by seven (*alpha, delta, epsilon, zeta, eta, theta, yota*) of the nine firms. According to a print article, the founders of *beta* and *gamma* are experienced entrepreneurs, so I assume that such assistance was not required.

Previous research has highlighted the potential influence of an entrepreneur's networks in conceptualizing opportunities (Wood and McKinley, 2010). The mismatch between the entrepreneur's personal knowledge and the opportunity-related needs in the sample triggered a targeted matching of the startups and network actors through the OI. In the case of *delta*, the OI initiated a roundtable with representatives from politics and industry to discuss individual needs and to assess the extent to which *delta's* legal and feasibility aspects need to be considered.

Likewise, *beta, delta, theta, and yota* leveraged the opportunity to participate in funded projects conveyed by the OI in collaboration with research institutions in the network and local public agencies.

Further, *theta* requested access to complementary hardware providers to assess technical feasibility, after which the OI established contacts with suitable network partners. In addition, the OI initiated several Special Interest Groups (SIGs) within the network to facilitate an intensive exchange of information on specific topics or technologies. This ability to adapt to network, environment, and composition changes indicates the role-switching capabilities of the OI.

Considering targeted collaboration and structured and moderated collaboration of network members, I may conclude that the orchestrator corresponds with several activities of the *facilitator's* role. Orchestration activities further include mobilizing network actors, identifying actors' needs, and facilitating the transmission of

information. The dyadic relationships in this phase are characterized by closer cooperation through repeated, more intense interactions. Further, the OI promotes exchange between network actors, enforces communication, and encourages mutual interaction. This corresponds primarily to the activities that the literature assigns to the role of the *conductor*.

By reacting to ordinary, natural changes with existing capabilities, I identify the role-switching capabilities of the OI within the structuring phase. I recognized frequent communication and shared decision-making. Based on my findings, startup requirements within this phase culminated in the adaptation of OI activities due to the closer relationship and startups' ability to express requirements. Thus, the OI must extend resources and partially reconfigure assets to adapt to these changing requirements of the startups.

*(c) Startup phase*

Startup activities in this phase focus on gaining access to capital, funding, customers, and strategic partners. Startups and the OI interact through standardized framework consultancy agreements (*all cases*) and brokerage agreements (*all cases*).

Accordingly, to enable the transmission and sharing of experience, the OI organized boot camps with experts to provide feedback on business strategy and plan of action, which were attended by *alpha, gamma, delta, epsilon, zeta, and theta*.

Additionally, the OI assisted in developing business-relevant documents (e.g., business plan, pitch deck, and financial planning) to prepare for contacting external capital providers. The OI operates on several levels in this context. In each of the nine companies studied, the OI provided support within their first round of funding.

During fundraising, the OI appears to play a crucial role by successfully linking the startups with investors and capital providers from the network. The OI supported all nine startups by compiling long and short lists of private and institutional investors with suitable profiles and personally known contacts from the ecosystem, and, in the case of *alpha, delta, epsilon, and eta*, the OI also took the lead in approaching them. In the case of *beta, delta, epsilon, zeta, and theta*, the OI was also involved in their second capital-raising process.

I consider that the OI's track record, reputation, personal contacts, and network knowledge significantly impact the chances of startup and capital provider collaboration, acknowledging the value of reputation in an early phase (Fischer and Reuber, 2007). In the words of an OI manager: "*We [the OI] have known these people [Investmentmanagers] personally for years and foster a close interaction on various levels; moreover, some of our former employees are now working in their ranks. Besides, we [the OI] have become very good at assessing*

*which startup could be a good match for a certain investor. This is why we [the OI] always manage to arrange a personal meeting between the startup and the investment manager.”*

In technology-based entrepreneurship, achieving a technology assessment and an acceptable fit between an initial idea and a dynamic market represents a significant challenge for startups. To advance, startups need to gain legitimacy. Public or private institutions' formal involvement mitigates stakeholders' perceptions of uncertainty within this phase (Giones et al., 2013). My results confirm this realization since the OI assisted *alpha*, *gamma*, and *yota* in developing collaborative research and grant projects to raise confidence in the technology by having an experienced third party evaluate it. The OI was instrumental in assembling the consortium and coordinated with the public sector and funding agencies to evaluate the proposal before applying. Furthermore, the OI was building legitimacy for *yota* by providing the company with the necessary financial credibility (patronship<sup>3</sup>) to implement a project that would not have been possible because of *yota's* status as a startup. The high significance of research and funding projects for technological startups resulted in the OI's decision to institutionalize knowledge and expand and condense capabilities by creating a dedicated non-profit research unit, where skilled employees engage with network members on funding and research projects.

During the startup phase, my findings revealed the impeded access to external sources of financing due to startups' liability of newness. Following the initiative of the OI and other stakeholders in the ecosystem, a semi-public early-stage funding program was developed together with the federal state government. The OI was designated as a partner to assist startups within this program. In addition, the OI provided administrative support for the application process by communicating with the ministry, the state bank, and co-investors. Further, in the case of *alpha*, *delta*, *epsilon*, *zeta*, *eta*, *theta*, and *yota*, the OI assisted in finding co-investors, which is mandatory to be eligible for the program.

My analysis revealed the multifaceted nature of the startup phase, which requires the OI to detect changes within the network, reconfigure assets, or acquire new capabilities and extend the role base indicating the role-augmentation capabilities of the OI.

In this vein, the OI has established an early-stage accelerator with industry, government, and research representatives to help participants to obtain future funding and acquire pilots and customers. According to the accelerator's former project manager, several capabilities are necessary for this program to succeed: *“The difficulty*

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<sup>3</sup> This is a type of guarantee which the intermediary issues for the startup, in which the intermediary guarantees towards the funding body that the required own part of the grant sum will be provided by the startup during the project period.

*with such a program with stakeholders from different backgrounds is to find the balance to meet the expectations of all the stakeholders, which can be very different. We must ensure that the program generates added value for everyone that justifies the effort involved in participating without compromising the startups, whose support is the program's overarching goal. For this to succeed, tact and excellent knowledge of the individual players are crucial.”*

I identified frequent and prioritized communication, shared decision-making, and shared resources. Driven by the incidents and developments within the startup phase, I have recorded activities related to the *facilitator role*. In contrast, on the other hand, I have compiled activities that can most likely be assigned to the *mediator role* of the orchestrator.

#### *(d) Scalability phase*

Based on my data, the dyads between the OI and startups in this phase are highly formalized by custom contracts with limited scope, defined activities, and targeted results. In addition, OI's activities in this phase are most individualized, as specific requirements of the startups must be met.

In this vein, *alpha* introduced a business model previously unknown in the market, requiring specialized market knowledge and support in rolling out data-driven business models. Besides, the OI conducted industry and market analyses to assist *delta* in identifying relevant market niches, including interviews with industry, science, and government stakeholders. With the support of a research group within the network, the OI supported *beta's* service-oriented, data-driven business model.

However, due to specific startup requests, the OI felt compelled to expand its portfolio with offerings tailored to startups during this later phase, indicating role-switching capabilities. By offering boot camps, workshops, and mentoring sessions with international partners, mature startups gain new insights into tailored strategies to build a global network. *Beta*, *delta*, and *zeta* joined to receive tailored advice. Subsequently, *beta* visited international partners and laid the foundation for the company's future on the international stage. Finally, the OI partnered with an international family office and global VCs to support startups in the later stage in subsequent funding and capital acquisition.

This phase signifies the start of a company's growth phase, so the startups' underlying requirements are predominantly market-oriented and focus on scaling and organizational readiness. According to the analysis, the OI in this phase has increasingly concentrated on empowering network members, managing strategic initiatives, and building visions. As a result, the role of the *leader* is most appropriate. Considering the complexity and

interdependencies among regional, national, and international actors, I have also emphasized the role of the *mediator*.

As I conclude the findings from my first investigation, which focused on the strategic roles of a single innovation intermediary in a specific regional context, I recognize the inherent limitations of this approach. While it provided valuable insights into the strategic orchestration roles, its narrow scope may not fully capture the diverse realities and nuanced challenges encountered across different regions and by various intermediaries. To overcome these constraints and enrich my understanding, I now transition to the findings of my second investigation.

In this next phase, I broaden my perspective to include the tactical and operational functions of innovation intermediaries, integrating the experiences and insights of practitioners from multiple regions. This expansion is crucial, as it not only addresses the limitations of concentrating on a single intermediary but also enhances my theoretical insights with practical, real-world experiences from diverse regional contexts. By engaging with a wider array of practitioners operating within EEs, my aim is to bridge the gap between theoretical frameworks and the everyday dynamics that influence startup growth and innovation, thus providing a more holistic and grounded understanding of these complex interactions.

## 4.2 Operational Dynamics of Innovation Intermediaries: Insights from Multiple Regional Perspectives

*"It takes a village to raise a child; this saying also applies to the entrepreneurial ecosystem. It's not just a phrase, but there's a lot behind it. It takes an ecosystem to raise a startup" (Interview 4).*

The following section embarks on an in-depth exploration into the diverse roles and impacts of innovation intermediaries in EEs. Utilizing a blend of theoretical and empirical approaches, this section aims to unveil the intricate dynamics of these intermediaries, drawing on insights from a variety of regional perspectives to enrich our understanding of their influence within the entrepreneurial landscape.

My hybrid research approach combined deductive confirmatory validation with an inductive, exploratory component, revealing an additional previously unrecorded orchestrator role of innovation intermediaries - *the shaper*. My data shows that the *shaper* is proactive and transformative in shaping the EE and its underlying culture. As one of the intermediaries described:

*"Our goal is to create a place where innovation and entrepreneurship are fostered" (Interview 18).*

Another intermediary interviewed described:

*"My focus is on building a healthy and sustainable network of partners such as consultants, coaches, and service providers in various areas and working with them to create value. Unfortunately, I have often heard from young companies that they have not received enough support from these sources, and we want to change that" (Interview 19).*

According to my investigation, the *shaper* sensitizes individuals to entrepreneurship at a very early stage, often serving as the first point of contact with the subject of entrepreneurialism. As one intermediary explained:

*"Sensitization, these open events where anyone can come, it's really just about showing the idea of alternative career paths, entrepreneurship, I would say" (Interview 17).*

This early exposure to entrepreneurship is further emphasized by universities, which aim to foster an entrepreneurial mindset among students as a viable career path:

*"So in the ideation phase, I think it's very important from a university perspective that this entrepreneurial mindset is strengthened. Additionally, we strongly focus on the topic of personal development and innovation spirit at the beginning to prepare students for entrepreneurship and help them achieve their goals. Entrepreneurship should not be a foreign concept, but a feasible path" (Interview 1).*

The *shaper* also plays a crucial role in improving the collaborative thinking of founders and encouraging them to be more open to partnerships:

*"Basically, it starts with sensitizing startups to a certain mindset, improving their cooperative thinking, and being more open to partnerships" (Interview 3).*

My findings reveal that the *shaper* plays an activating role in promoting the entrepreneurial mindset and guiding individuals, particularly in the early stages of their entrepreneurial journey. As one intermediary stated:

*"We presented the support services and funding programs, and we did not tell people that they had to start a business, but rather we were more of the final push to get them thinking about it. We have given a lot of people the final impetus through these activities" (Interview 5).*

Similarly, another shaping intermediary described their strategic approach to fostering an entrepreneurial mindset in a specific region:

*"At first, the focus is on promoting the enthusiasm for entrepreneurship here in the region [region D] and on the education campus. We are pursuing a strategic direction to support this region, starting with early talent development programs to foster entrepreneurial minds" (Interview 14).*

In addition to providing guidance, the *shaper* offers life counselling and realistic expectations to individuals in the early stages of the entrepreneurial process. As one intermediary noted:

*"In the very early phase of the founding process, our work often offers life counseling. There are cases where teams come to us who are partly very naive and have unrealistic expectations" (Interview 6).*

Overall, the *shaper* inspires individuals and provides the necessary tools and resources to activate the entrepreneurial mindset, as described by another intermediary:

*"Then, in a way, this inspiration comes into play, or a bit like 'How do I actually do it? How can I start a startup?' What are the tools I need?" (Interview 9).*

Furthermore, *the shaper* strives to encourage entrepreneurship as a feasible option for a profession, as stated by an additional intermediary:

*"We also want to show the way there are alternative career paths other than the traditional employment life" (Interview 16).*

Through my research, I have identified that *the shaper* operates at two levels. Firstly, *the shaper* directly supports the founder and operates proactively and engagingly. Secondly, *the shaper* invests in the surrounding ecosystem without expecting any direct (monetary) return. As one interviewee stated,

*"We take it one step further. We don't see startups as a means to an end to finance ourselves, it's actually the other way around. We invest in startups to make them fit for the region, to generate cool players in the region" (Interview 15).*

*The shaper's* support is not limited to monetary gain as another interviewee explained,

*"Our activity is thus an unpaid entrepreneurial ecosystem support component, in which we provide support at a very early stage" (Interview 4).*

Moreover, *the shaper's* efforts contribute to creating a vibrant and thriving ecosystem, which improves the quality and relevance of the EE, as explained by an interviewee,

*"Then again, you build bridges and act as a bit of a network partner, giving people a bit of a key to unlock doors for each other, to keep the entrepreneurial ecosystem alive or do our best to keep it alive or breathe a little more life into it" (Interview 4).*

However, it should be noted that this role was not exclusively confined to intermediaries that were assigned to the early phases. On the contrary, the shaper role was exercised by intermediaries from all lifecycle phases of startups throughout the entire sample.

For several reasons, the term *shaper* was chosen as the nomenclature for the additional orchestration role that emerged from the results.

Firstly, it aligns metaphorically with the purpose of the role. Secondly, the relevance of the term *shaper* to the broader discourse on innovation intermediation is further enhanced by its previous linkage to shaping elements by several authors, such as, e.g., Vidmar (2021), Randhawa et al. (2022), De Silva et al. (2018).

Thirdly, the *shaper* captures the proactive and transformative nature of the intermediary role, which goes beyond just enabling or equipping actors to innovate. Finally, the term *shaper* emphasizes the critical role intermediaries play in creating and shaping emergent innovation systems, highlighting the agency and leadership exhibited by intermediaries in driving innovation forward and making them vital actors in the broader ecosystem

(Corvello et al., 2023). They actively shape the surrounding ecosystem to foster a thriving environment for innovation.

### *Regional Variations in Study Findings*

In my research, I strive to further validate and enrich the findings from previous sections by conducting an in-depth analysis of various regions, each with its unique characteristics. My objective is not to draw direct comparisons among these regions based on specific target metrics. Instead, my focus is on confirming the insights previously gathered and identifying any common patterns or similarities across diverse geographic contexts. I aim to understand the overarching trends and tendencies that manifest across different environments, rather than making direct region-to-region comparisons.

This section of my research presents a detailed description of each region, accompanied by an extensive analysis of the significant findings from my investigation. To explore the relationship between intermediaries and startups at various stages of their lifecycle, I employed purposive sampling, choosing four innovation intermediaries from each of the five regions as interview subjects. The selection was based on specific characteristics and descriptions of the intermediaries, gleaned from sources such as their websites or published reports. The goal of this sampling method was to assemble a representative group of intermediaries, each offering valuable perspectives on the startup-intermediary dynamic at different stages of the startup lifecycle, namely ideation, structuring, startup phase, and scalability.

I consulted prior research to ensure the intermediaries' relevance to the various business lifecycle phases, including Passaro et al. (2020) and Marcon and Ribeiro (2021).

The purpose of this section is twofold. Firstly, I intend to provide an exhaustive discussion of each region included in the study. Secondly, I will delve into a detailed analysis of the key findings from my investigation, pinpointing any emerging patterns or trends and contemplating their potential implications for the broader objectives of my research.

For a clear and insightful presentation of the results from each region, I have utilized graphical representations. Specifically, Figure 6 in my study encapsulates the essential findings from Region A. This graph illustrates the trajectory of relationship dynamics throughout the startup lifecycle stages, depicted as a dotted curve with varying levels marked as low, medium, and high. I employed a numerical scale for this evaluation, ranging from 0.5 to 1.5, where 0.5 signifies low, 1 indicates medium, and 1.5 represents high intensity of interaction (Bouncken et al., 2021, Sinkovics et al., 2019).



Additionally, Figure 6 integrates a visual representation of the orchestrator roles identified in my study, depicted using integral symbols. The significance and impact of each role are conveyed through the size of the area and amplitude within the integral representation. This area curve is instrumental in revealing the shifting emphasis and dynamic nature of collaboration across the different stages of the startup lifecycle, providing crucial insights into how each orchestrator role's relevance evolves.

Moreover, the dotted line in Figure 6 traces the trajectory of relationship dynamics and underscores the interdependencies between the identified orchestrator roles and the evolving nature of the relationship between innovation orchestrators and startups. It graphically represents the fluctuating levels of relationship dynamics experienced throughout the startup lifecycle. This visual portrayal emphasizes the changing dynamics of collaboration and the consequent effects on the effectiveness of different orchestrator roles, highlighting the fluidity and complexity of these interactions.

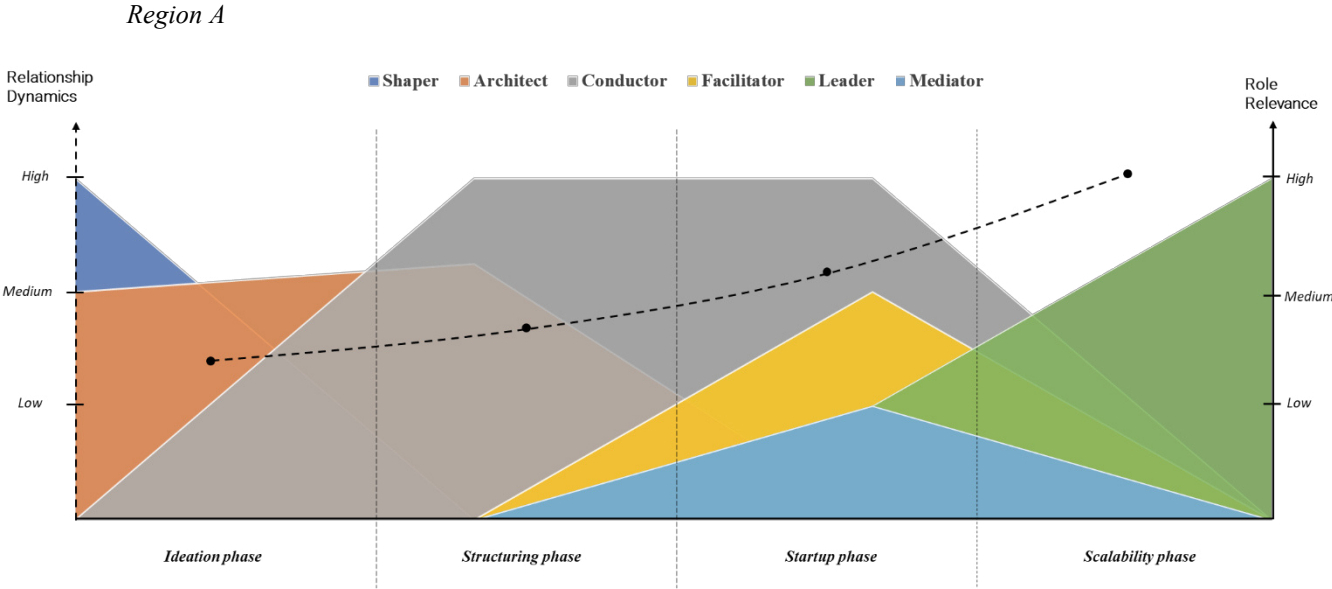


Figure 6: Region A: Result of relationship dynamics and orchestrator roles per lifecycle phase. Source: self-elaborated.

The present section focuses on Region A and draws insights from a comprehensive analysis of interviews and documents provided by intermediaries during Interviews 1-4. My findings reveal a consistent increase in relationship dynamics between intermediaries and startups across the various stages of the startup lifecycle. My analysis indicates that this upward trend begins from a relatively low initial value during the ideation phase and progresses to a high level of involvement during the scalability phase. Through my investigation, I have identified

all the orchestrator roles present in Region A, including the previously established five roles, as well as the new role of the *shaper*. However, I have found the *mediator* role to be relatively less prominent, appearing only once and in a secondary capacity. Notably, only Intermediary 4 plays an active role as a *leader* during the scalability phase, while the other intermediaries assume no significant role. Throughout all stages of the startup lifecycle, the *conductor* role emerges as the dominant orchestrator role.

According to the interviews with innovation intermediaries in Region A, it is essential to cultivate a culture of entrepreneurship within the ecosystem. This includes promoting the "*entrepreneurial me*," which can help to foster entrepreneurial spirit and focus on the individual behind the idea (Interview 1).

Additionally, networking startups with appropriate innovation intermediaries are crucial, and matching the content orientation is decisive in ensuring optimal interaction. As one intermediary noted,

*"If we notice that the startup has a content orientation that fits better with the profile or unique selling proposition of the startup activities, then they are sent back and forth in a friendly manner" (Interview 1).*

The willingness to exchange experiences and resources without competition underscores the close network between innovation intermediaries and startups. One intermediary explains,

*"We don't have to think twice about things if we already have them in our drawer, then we exchange ideas" (Interview 1).*

Moreover, successful collaboration is based on sharing knowledge and the willingness to work together to implement ideas. One intermediary stated,

*"We believe that success is easier to achieve when you share your ideas and open up to work on them together" (Interview 3).*

Finally, orchestrating ecosystems is essential to bring together a variety of actors contributing to innovation. Innovation intermediaries play a vital role as coordinators and *mediators* in improving the quality of ecosystems. One intermediary explained,

*"We want to support the ecosystem because one hand washes the other, and that is important for an entrepreneurial ecosystem" (Interview 4).*

These findings highlight the importance of creating a supportive and collaborative environment for startups in Region A, with innovation intermediaries as critical *facilitators*. Furthermore, intermediaries in Region A emphasized the importance of continuous learning and improvement in their role as ecosystem orchestrators. Interviewee 2, for instance, stated that,

*"Staying up to date with new trends and developments in the startup world is crucial for innovation intermediaries. We need to be flexible and adaptable to be effective in our role" (Interview 2).*

These insights demonstrate the multifaceted role of innovation intermediaries in promoting a supportive ecosystem for startups in Region A and the need for ongoing learning and improvement in their orchestration efforts.

*Region B*

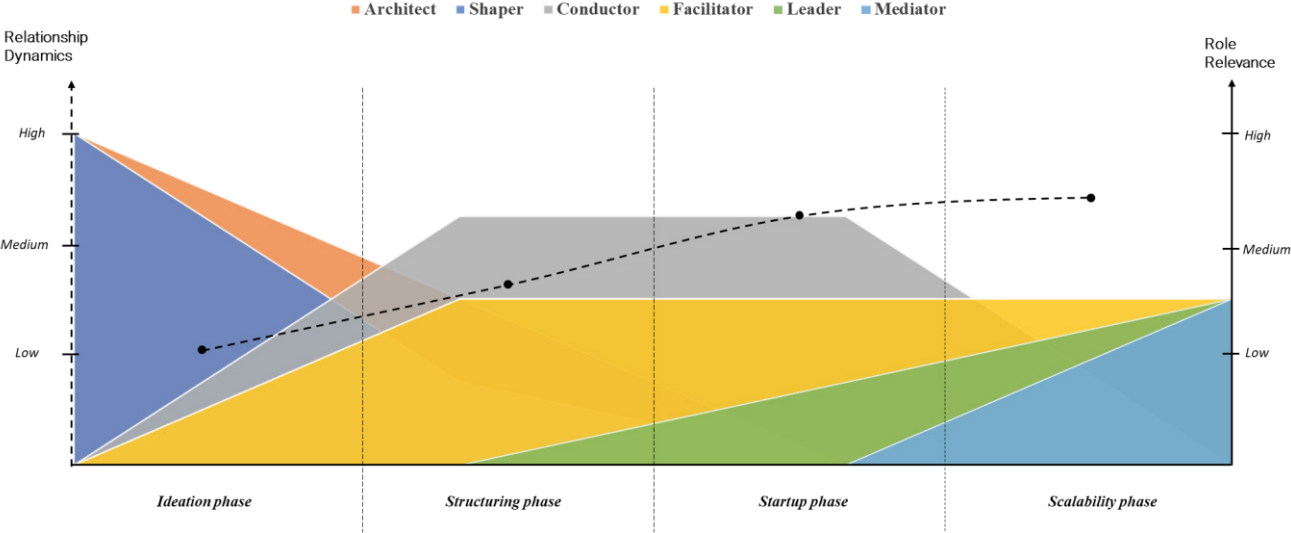


Figure 7: Region B: Result of relationship dynamics and orchestrator roles per lifecycle phase. Source: self-elaborated.

Region B is analyzed based on the inputs provided by Intermediaries 5-8. As observed in Region A, my analysis showed that relationship dynamics during different stages of the startup lifecycle in Region B exhibited similar trends. However, the scalability phase only reached a moderate level. My study identified all the orchestrator roles in Region B as observed in Region A, with the *mediator* role appearing only once in a subordinate capacity during the scalability phase. The *conductor's* role dominated all phases, with the *architect* becoming more prominent in earlier stages and the *facilitator* role becoming more relevant in later phases.

The interviews revealed different approaches and priorities among the intermediaries. Interviewee 5 highlighted that they act as a "final push" to help clients evaluate the feasibility of their ideas. In contrast, interviewee 6 emphasized that, over the last years, their focus has shifted away from the idea and towards the team's potential for success. Interviewee 6 emphasized that life coaching is often provided in the early stages of the founding process to support the founders in implementing their ideas. Interviewee 8 explained that they search for, evaluate, and bring together startups, providing long-term support over 5 to 10 years, and have high standards

for their work quality. Input or response from the teams was also highlighted as a crucial element in the operations of innovation intermediaries:

*"The issue of feedback from the teams is more important for us" (Interview 7).*

It was also emphasized that innovation intermediaries see themselves not as agencies or consultants but as companions to ensure that the company stays with its idea.

In addition to the importance of innovation intermediaries in creating a supportive environment for startups, my research also suggests a need for continuous evaluation and adaptation of ecosystem orchestration strategies. One interviewee emphasized the importance of regularly reassessing the needs of startups and adapting their services accordingly:

*"It's crucial to stay up to date with the latest trends and needs of startups and make changes to our programs and services accordingly. We have to stay flexible and adapt quickly to meet the changing demands of the ecosystem" (Interview 5).*

My analysis of Region B revealed that innovation intermediaries have different approaches to orchestrating ecosystems and supporting startups, prioritizing different aspects of the process. While some emphasize the idea, others focus more on the team and its potential. Supporting startups on their path to success is an important aspect where innovation intermediaries set different priorities. Feedback from the supported founder teams is vital for the work of innovation intermediaries, allowing them to improve their support and guidance continuously.

*Region C*

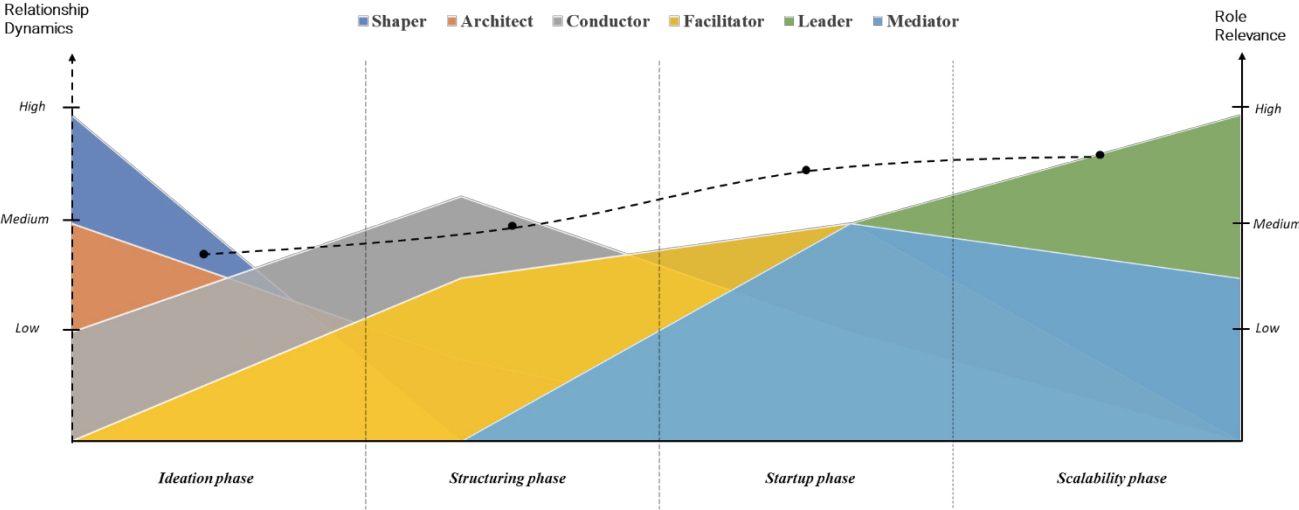


Figure 8: Region C: Result of relationship dynamics and orchestrator roles per lifecycle phase. Source: self-elaborated.

The current section presents the study's findings conducted in Region C, which were obtained through the analysis of interviews and relevant documents provided by Intermediaries 9 to 12. The results reveal that the relationship dynamics between intermediaries and startups in Region C are higher overall than in Regions A and B, with a constantly increasing trend throughout the startup lifecycle, albeit with a lower maximum value in the scalability phase than in Region A.

All orchestrator roles were found to be performed by the intermediaries in Region C, with only the scalability phase being supported by the two intermediaries, 11 and 12, similar to Region B. The *conductors*, *facilitators*, and *leaders*' roles were slightly more dominant than *shapers*, *architects*, and *mediators*.

The study suggests that innovation intermediaries in Region C primarily aim to inspire and enable students to start their ventures. A representative emphasized:

*"Our goal is actually only to inspire and enable students to start their own ventures" (Interview 9).*

The interviews also showed that innovation intermediaries are essential in helping teams find the right partner and assess the team's chances of success. Intermediary 10 stressed,

*"We assess the team in terms of its chances of success. If we cannot help the teams, we tell them directly before they have false hopes. However, we are happy to support them in finding the right partner" (Interview 10).*

Another critical aspect discussed during the interviews was the significance of personal relationships for the success of the collaboration. As intermediary 9 explained,

*"Personal relationships are already extremely essential" (Interview 9).*

Open and honest communication also appears to be significant. Innovation intermediaries help startups by recommending the right partner and evaluating their chances of success. Another intermediary also emphasized the importance of personal relationships, stating,

*"In general, being a sparring partner in all situations, so if the phone rings at midnight, I'll answer it" (Interview 12).*

However, the interaction between innovation intermediaries and startups can be challenging, especially when orchestrating ecosystems. As one interviewee emphasized, there is no exact pattern for collaboration, and it is essential for everyone to

*"Stay with their people on each side of the deal" (Interview 10).*

It is also crucial to balance supporting founders and respecting their needs. One significant challenge that intermediaries face is balancing the need to support startup founders while respecting their individual needs and goals. As Interviewee 12 notes,

*"We have to respect their [startup founders'] decisions. It's their company, and they're the ones who need to make the final call" (Interview 12).*

Additionally, intermediaries must be mindful of the startup founders' time and ensure their support does not interfere with their day-to-day operations. As Interviewee 11 explains,

*"We need to be mindful of their time and provide support that complements their work and doesn't interfere with it" (Interview 11).*

Besides, the intermediaries' relationship with startups must be built on mutual trust and respect. Intermediaries must understand the startup founders' needs and goals to provide relevant support. As Interviewee 9 highlights,

*"It's essential to build trust and understanding with the founders to provide the right support" (Interview 9).*

Moreover, the role of government policies and regulations in shaping the EE was also emphasized. Interviewee 12 pointed out that government policies can play a significant role in fostering innovation, stating,

*"Government policies can create a favorable environment for startups by providing incentives and support programs. This can significantly impact the growth and success of the ecosystem" (Interview 12).*

### Region D

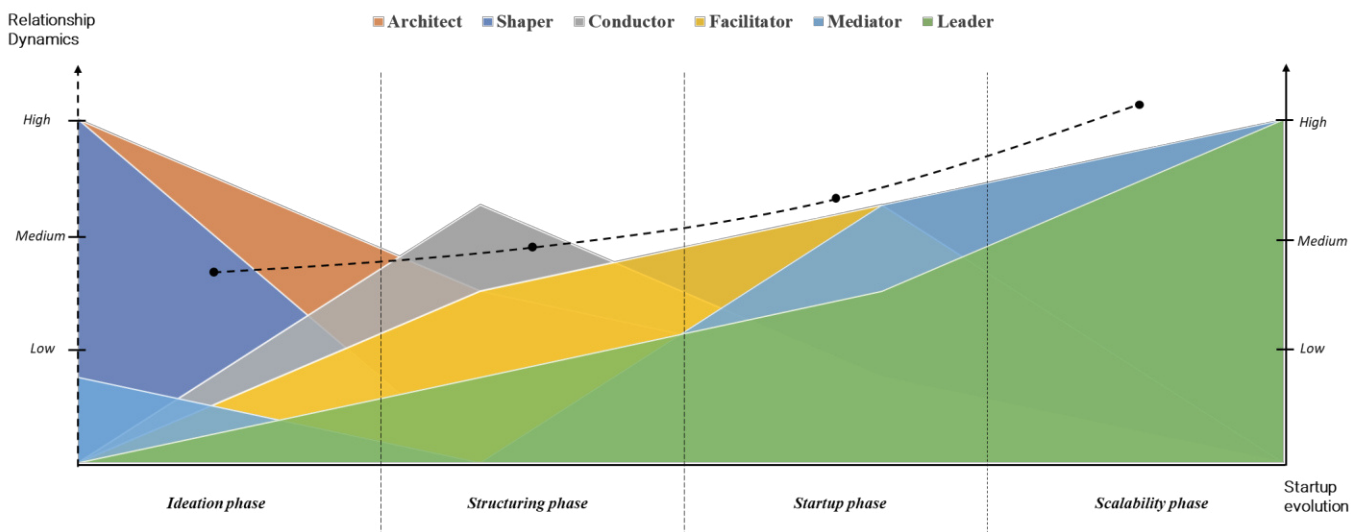


Figure 9: Region D: Result of relationship dynamics and orchestrator roles per lifecycle phase. Source: self-elaborated.

The present section focuses on Region D and draws insights from analyzing relevant documents provided by Intermediaries 13 to 16. The relationship dynamics observed in this region show a similar trend to Regions A and C, characterized by a consistently increasing trajectory throughout the startup lifecycle, with a significant peak

in the scalability phase. In Region D, the surveyed intermediaries effectively encompass all orchestration roles examined in this study, except for the scalability phase, where only Intermediaries 15 and 16 fulfill the roles of *mediator* and *leader*, aligning with trends observed in earlier regions. It is worth noting that the individual roles are relatively evenly distributed in Region D but with a noticeably higher prevalence compared to Region C. These roles remain relevant throughout multiple lifecycle phases, except for the *shaper* role, which becomes significant solely in the ideation phase. Furthermore, the *mediator* role in Region D is relatively pronounced and takes on the most prominent role alongside the *facilitator*.

A noteworthy outcome of my research is the supportive role that innovation intermediaries play in the development of startups, with startups being viewed as a means to generate excellent regional players rather than a source of revenue. This is exemplified in the statement made by Intermediary 15, who stated:

*"We do not handle startups as a source of revenue" (Interview 15).*

Another crucial aspect is that innovation intermediaries guide founders to understand what it takes to start a business. This is particularly important since startups typically lack the necessary resources and experience to successfully implement their ideas. Intermediary 13 reflects this when they state,

*"Our first successes are clear when you have your first MVP, and you see that what I have in mind, the idea I have in mind, really works, it can be done" (Interview 13).*

Furthermore, the interest and support of the region for startup products are critical success factors since startups often rely on the region's support to launch their products successfully. Intermediary 15 states,

*"When the region reflects and says, cool, we want that, let's do it, and this happens repeatedly, and that makes us very happy" (Interview 15).*

There are also challenges associated with working with innovation intermediaries, such as the need for startups to approach intermediaries proactively to remain in their care. Intermediary 15 acknowledges this challenge stating,

*"Because you also have to approach us to stay in our care proactively, so you also have to deliver yourself; we do not chase after you" (Interview 15).*

Moreover, competition between different innovation intermediaries is also present, but it is generally viewed as positive as it can benefit startups. Intermediary 14 states,

*"I think if it benefits the startups, then they should go there, so why should a startup suffer because there are multiple intermediaries in a relationship" (Interview 14).*

Furthermore, in addition to supporting startups, innovation intermediaries offer founders alternative career paths beyond traditional employment. This is an essential aspect of their role, as it can help to foster a

culture of entrepreneurship and innovation within the region. Intermediaries can provide founders with access to training, mentorship, and other resources to help them develop the skills and knowledge needed to succeed as entrepreneurs. This can be particularly valuable for individuals who may not have considered starting their business as a viable career option.

*Region E*

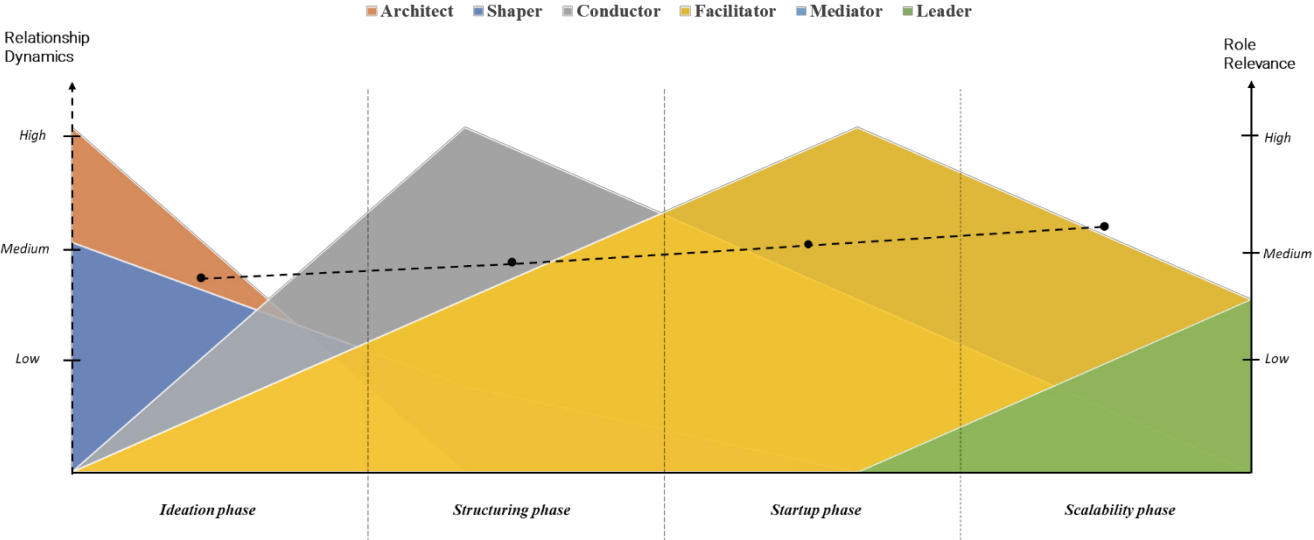


Figure 10: Region E: Result of relationship dynamics and orchestrator roles per lifecycle phase. Source: self-elaborated.

My analysis of Region E indicates a uniform pattern of relationship dynamics with a low amplitude throughout the startup lifecycle phases. The *conductor* and *facilitator* roles dominate in this region, followed by the *architect* and *shaper*, with the *leader* role being the least prominent. While the role of the *mediator* could not be identified in Region E, the remaining roles are represented by Intermediaries 17-20.

My interviews revealed two distinct approaches to startup promotion and ecosystem orchestration in Region E. One approach focuses on raising awareness among students and encouraging them to start a business, while the other takes a more holistic approach that addresses individual students' needs and offers a broad range of services. Interviewee 17 emphasizes the importance of raising students' awareness early on and offers a variety of events and workshops to guide them through the startup process. They state,

*"Our goal is to raise students' awareness early on and show them that starting a business is a realistic option. Therefore, we offer a variety of events and workshops to help them turn their ideas into reality" (Interview 17).*



In contrast, Interviewee 18 takes a more individualized approach, offering a broad range of services and emphasizing personal counseling and additional courses and workshops to help students develop their ideas further. They state,

*"We understand that every student has different needs when it comes to starting a business. That's why we offer a wide range of services to address them individually. We also place great emphasis on personal counseling and additional courses to help students develop their ideas further" (Interview 18).*

Both interviewees stress the importance of establishing a more comprehensive ecosystem for prospective entrepreneurs. One interviewee emphasizes the value of collaborating with other actors in the business context to build such ecosystems, stating,

*"Our goal is to create a broader ecosystem for aspiring entrepreneurs. To achieve this, we work closely with other actors in the business context and use metrics to improve our support offerings" (Interview 19).*

In addition to the different approaches taken by intermediaries in Region E, my analysis also revealed a strong focus on developing sustainable and socially responsible startups. This was emphasized by Interviewee 20, who stated:

*"We strongly believe that startups can have a positive impact on society. That's why we encourage and support startups that aim to address social and environmental challenges. We believe that entrepreneurship can drive positive change and help solve some of the world's most pressing problems" (Interview 20).*

Thus, the analysis of Region E highlights the importance of a comprehensive and holistic approach to startup promotion and ecosystem building, as well as a focus on sustainability and social responsibility.

Building on the insights gleaned from the first and second investigation about the diverse operational roles of innovation intermediaries in various regions, I now proceed to the third phase of my research. This segment introduces a more refined, set-theoretic approach to analyze the strategic alignment of these roles and functions within distinct operational environments. This shift in methodology allows for a precise and detailed examination of how different intermediary functions contribute to startups' PI.

By employing a set-theoretic lens, I aim to dissect the complex interplay between intermediaries' orchestration functions and the innovation outcomes in startups. This approach enables me to identify specific configurations of intermediary activities that are most conducive to fostering innovation. It marks a transition from a broad, qualitative understanding of intermediaries' roles to a quantifiable, nuanced analysis of their impact within the EE.

### 4.3 Set-Theoretic Analysis of Intermediary Influence: Strategic Alignments and Innovation Outcomes in Startups

In this part of my findings, I delve into the roles and functions of innovation intermediaries using a refined, set-theoretic methodology. This approach allows for a detailed and precise analysis of how different intermediary functions contribute to startups' PI. The aim is to pinpoint specific patterns and configurations in the activities of the OI and assess their direct impact on startup innovation outcome. Through this segment of my research, I endeavor to quantify and articulate the subtle yet significant ways in which intermediaries shape the innovation landscape within the EEs.

Progressing from the data analysis presented in section 3.2, this segment underscores the findings pertaining to the individual dyadic relationships between the OI and the 14 case study companies. To ensure the rigor and quality of this assessment, the results and their analytical interpretation underwent validation through multiple collaborative sessions with managers and relevant employees of the OI. (Beverland and Lindgreen, 2010). The evaluation of the 14 relationship dyads was based on a numerical scale with values ranging from 0 to 3 (representing low for 0-1; medium for 1-2; high for 2-3) in 0.25 steps (de Vaus, 2002, Bouncken et al., 2021). The value of 0 indicates that the analysis did not reveal significant activities carried out between the intermediary and the startup in the respective categories, whereas the value of 3 indicates the most prominent mutual activities in the respective category. A numerical scale simplifies statistical analyses and ensures that each score corresponds to a value within a category. Thus, I did not need to code the information before evaluating the numbers. Table 1 in Appendix D presents the results for each dyad relationship as the descriptive data for the conditions.

Consistent with recent work (Cavusgil and Calantone, 2010, Ding and Ding, 2022, Chen et al., 2021, Xie and Wang, 2020), this study uses two dimensions to measure PI from the firm's and the customer's perspectives. More specifically, each of the two dimensions (i.e., technology and market) is defined by four factors, and each of these is assigned a rating class within a 10-level range from 1 (highest rating) to 0 (lowest rating) in increments of 0.1 (Meyers et al., 2006). The level of PI per case is calculated based on the sum of the factors. Several sessions were conducted with managers and employees of the innovation intermediary to score the PI and validate the results and analytical interpretations of the data. Table 10 summarizes the PI scoring protocol and its respective values.

Product Innovativeness									
Technology					Market				Total
<i>Incorporation state-of-the-art technology</i>	<i>Involve major technological changes on an existing product</i>	<i>Technology is new to the industry</i>	<i>Improvement in existing product features</i>	<i>Customers perceive product features as novel/unique</i>	<i>Completely new features to the market</i>	<i>Offering new benefits to customers</i>	<i>Being first in new product introductions to the market</i>		
Case 1	0.3	0.3	0.2	0.2	0.8	0.7	0.8	0.7	4.0
Case 2	0.7	0.8	0.6	0.8	0.7	0.6	0.6	0.4	5.2
Case 3	0.8	0.9	0.7	0.5	0.7	0.6	0.4	0.4	5.0
Case 4	0.8	0.8	0.8	0.8	0.6	0.4	0.5	0.4	5.1
Case 5	0.5	0.4	0.4	0.5	0.8	0.7	0.8	0.7	4.8
Case 6	0.6	0.5	0.7	0.7	0.6	0.6	0.7	0.5	4.9
Case 7	0.3	0.3	0.4	0.8	0.8	0.7	0.6	0.7	4.6
Case 8	0.8	0.6	0.6	0.7	0.7	0.4	0.5	0.3	4.6
Case 9	0.3	0.2	0.2	0.3	0.5	0.6	0.5	0.4	3.0
Case 10	0.9	0.8	0.8	0.9	0.8	0.7	0.6	0.7	6.2
Case 11	0.6	0.6	0.6	0.5	0.7	0.7	0.8	0.6	5.1
Case 12	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	6.4
Case 13	0.8	0.7	0.9	0.8	0.8	0.7	0.7	0.7	6.1
Case 14	0.7	0.8	0.5	0.7	0.6	0.5	0.7	0.5	5.0

Table 10: A scoring framework for product innovativeness.

### Measurement

To perform fsQCA, qualitative data must be transformed into construct values. I measured construct values with established research instruments to decrease subjective deviations. Following previous studies (Del Sarto et al., 2019), I set the five conditions (*NCP*, *FNP*, *IMD*, *EVO*, *ITC*) with values between 0 of 3 (see Table 1

in Appendix D). FsQCA requires values ranging from 0 to 1. I obtain the values from 0 to 1 by dividing the value of the descriptive data for the five conditions equally by 3 (the highest value represents 100 %). Accordingly, I assigned a score of 0 to those of the five conditions where there was no activity by intermediaries and companies in the respective categories and a score of 1 to those with the most considerable activity level (Meyers et al., 2006).

Regarding the outcome of my analysis, namely the startup's high PI, it is necessary to transform the data collection results into values suitable for fsQCA. Since the values are calculated using comparison values from the multiple case study analysis, they can be divided by the number of underlying factors describing PI from the technology and market perspective (i.e., 8) to get values between 0 and 1 (de Vaus, 2002).

Table 1 in Appendix E presents the results obtained from the multiple case study analysis for the independent variables (*NCP*, *FNP*, *IMD*, *EVO*, *ITC*) and the outcome (*PINHigh*) and serves as a basis for the further steps of the fsQCA.

#### *Calibration and analytical approach*

As a configurational approach, fsQCA uses membership scores ranging from 0 to 1 to represent the degree to which cases belong to a set (Ragin, 2008). As such, measures must be translated into membership scores via calibration as the first step of the analysis procedure (Ragin, 2008, Kraus et al., 2017). Data calibration may be either direct or indirect. I chose the direct method, which is recommended and more common, to enable easier replication and validation of my research (Pappas and Woodside, 2021). As part of the direct calibration process, the researcher needs to choose three qualitative breakpoints that define the extent to which each case belongs to the fuzzy set (Rihoux and Ragin, 2009).

Calibration of the model requires the definition of three thresholds. Following Ragin (2008) recommendations, the 5th percentile was considered a non-membership point, the 50th percentile as a crossover point, and the 95th percentile as a full membership point, which will transform the data into the log-odds metric with all values being between 0 and 1. I used fsQCA software (v3.1b) to conduct the single steps of my study. Calibration is performed by using the *Compute Variable* function of the software, which takes as input the variable that will be calibrated and the three breakpoints (from the highest to the lowest values) using the function *calibrate(x,n1,n2,n3)* to create a new variable (see Table 1 in Appendix F). New variables after calibration are marked with a "c" in the following.

Deviation scores are established using these thresholds as anchors (Pappas and Woodside, 2021). I do not use precisely 1 and 0 as breakpoints because the two membership scores would correspond to positive and negative infinity, respectively, for the log of the odds (Ragin, 2008). In fsQCA, all conditions precisely on 0.5 are dropped from the analysis, making it challenging to analyze conditions set exactly on 0.5 (Ragin, 2008). To overcome this problem, I follow the recommendation of Fiss (2011), adding a constant of 0.001 to all causal conditions below full membership scores of 1 after calibration has been performed (see Table 1 in Appendix G).

#### *Necessary conditions and Truth table*

Identifying the necessary conditions to determine which path promotes high PI is vital. Concerning causality theory, fsQCA can identify the necessary and sufficient conditions that produce an outcome. In the absence of the necessary condition, the outcome will not occur. When analyzing necessity, I look for causal conditions with membership scores consistently greater than the outcome membership scores. When testing conditions for their necessity, the threshold for consistency should be high ( $> .90$ ), and its coverage should not be too low ( $> .60$ ) (Legewie, 2013, Mattke, 2021). According to my calculation, *Network composition and process management (NCPc)* meet the condition of necessity to a certain degree because its consistency is almost 0.90 with a value of 0.895, and its coverage of 0.74 is above the recommended threshold (see Table 11). As the plot in Figure 11 shows, most of the data points for the condition NCPc are below the diagonal line, which is essential for the necessity to hold. Thus, it could be argued that activities within the intermediation function NCPc are mainly necessary for a high degree of PI.

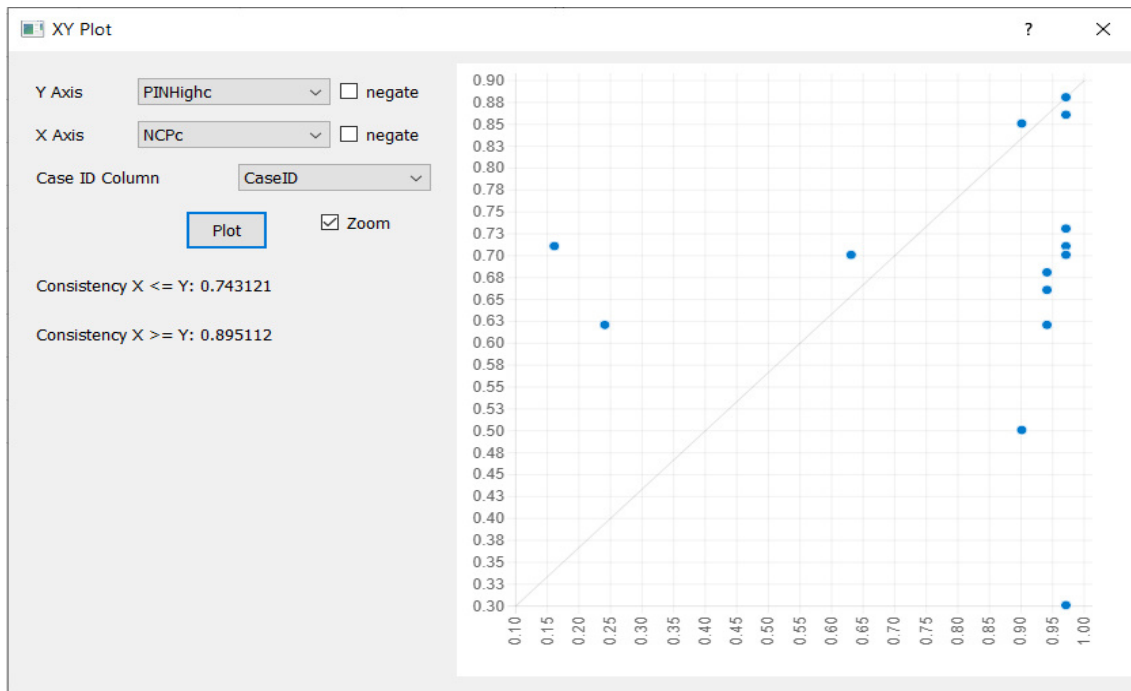


Figure 11: Plot of "NCPc" against "PINhighc".

According to my research, *NCP* tends to comprise the starting point of the relationship between startups and the intermediary, where startups enter the network for the first time. Since *NCP* is the solitary condition that constitutes a necessary condition for startups' high PI, Proposition 1 was proven.

Meanwhile, the consistency of other conditions remained below 0.90, indicating that startups may achieve high PI under different activities.

Conditions tested	Consistency	Coverage
NCPc	0.895112	0.743121
FNPc	0.859450	0.764216
IMDc	0.707363	0.860863
EVOc	0.641284	0.823545
ITCc	0.566813	0.891161
~NCPc	0.235997	0.894277
~FNPc	0.393329	0.960061
~IMDc	0.512482	0.792410
~EVOc	0.660793	0.958029
~ITCc	0.715335	0.859375

*Note: ~, logical negation.*

*Table 11: Analysis of necessary conditions.*

Once all variables have been calibrated, the dataset includes both versions of each variable, and I can proceed to the next step, which is running the fuzzy-set algorithm and generating the truth table.

#### *Sufficient solutions*

The sufficient condition signifies that causal conditions (or a combination of causal conditions) can sufficiently lead to the outcome. Based on the partitioned data, I created a truth table (Table 12) of all the possible combinations of causal conditions using the fsQCA software (v3.1b). I generated 32 possible configuration combinations based on five causal conditions. For  $k$  causal conditions, I generated  $2^k$  possible combinations. I applied frequency and consistency cutoffs to select consistent configurations. Following Greckhamer et al. (2013), I set a frequency cutoff of 1. As recommended by prior studies, I excluded all configurations with consistencies below the 0.8 thresholds to determine the consistency cutoff (Thomann and Maggetti, 2017). Subsequently, I determined a value where gaps in consistency scores occur naturally (Fiss, 2011).

The truth table can indicate which configurations can be regarded as outcomes. According to previous studies, the threshold for a proportional reduction in inconsistency (PRI) was set at 0.75 to prevent simultaneous

subset relations where the same configuration is a subset for both presence and absence of the outcome (Misangyi and Acharya, 2014). The raw consistency threshold was set at 0.95 according to the results of the truth table (Mattke, 2021).

Based on the sample size of 14 cases, I adopted a frequency threshold of 1, which allowed me to capture 9 out of 14 cases (64.3 %). In doing so, I ensured that at least one case is included in each configuration, and thus the recommended 5%-threshold of observations per configuration is fulfilled (Mattke, 2021).

<b>NCPc</b>	<b>FNPc</b>	<b>IMDc</b>	<b>EVOc</b>	<b>ITCc</b>	<b>PIN Highc</b>	<b>Numb.</b>	<b>Cases</b>	<b>raw consist.</b>	<b>PRI consist.</b>	<b>SYM consist.</b>
1	0	0	0	0	1	2	3, 5	1	1	1
1	1	1	0	1	1	2	8, 13	1	1	1
1	1	0	0	1	1	1	6	1	1	1
0	1	1	0	1	1	1	4	1	1	1
0	1	0	1	0	1	1	7	0.9932	0.9666	1
1	1	1	1	0	0	3	2, 10, 14	0.9372	0.8504	0.8793
1	1	1	1	1	0	3	9, 11, 12	0.9360	0.7742	0.7726

*Table 12: Truth table.*

Using the fsQCA software (Fiss, 2011), the Quine-McCluskey algorithm was used to minimize the selected configurations for each partitioned data identifying three solutions (see Figure 1 in Appendix H). Given a diligent use of simplifying assumptions, I apply the intermediate solution using reasonable logical remainders, recommended as the main point of reference for interpreting QCA results (Ragin, 2008, Rihoux and Ragin, 2009).



My findings show that the overall solution had a consistency level of 0.978, meaning that the degree to which the configurations guaranteed the proper results was high (Table 13) (Legewie, 2013, Mattke, 2021). Further, my findings confirmed that the overall solution had high coverage (i.e., coverage of 0.689), indicating that 68.9 % of the cases with high PI showed these three combinations of causal conditions (Kaya et al., 2020). Thus, my model is informative as it exceeds the recommended thresholds of 0.74 for consistency and 0.25 for coverage (Woodside, 2013).

I also provide the unique and raw coverage values for each configuration. Unique coverage reflects the percentage of the outcome (high PI) that a given configuration alone exclusively covers (Wagemann and Schneider, 2010). Comparatively, raw coverage figures include all the cases (startups) with both the outcome and the specific configuration (Ragin, 2008). I report the consistency value for each configuration. As outlined in the previous section, I only reported configurations with a consistency of 0.95 or higher.

<b>Configurations</b>	<b>Raw Coverage</b>	<b>Unique Coverage</b>	<b>Consistency</b>
NPCc*~EVOc	0.60515	0.23099	0.97644
~NPCc*FNPc*EVOc	0.17868	0.04824	0.9936
FNPc*IMDc*~EVOc*ITCc	0.39013	0.01366	1

Solution coverage: 0.689268

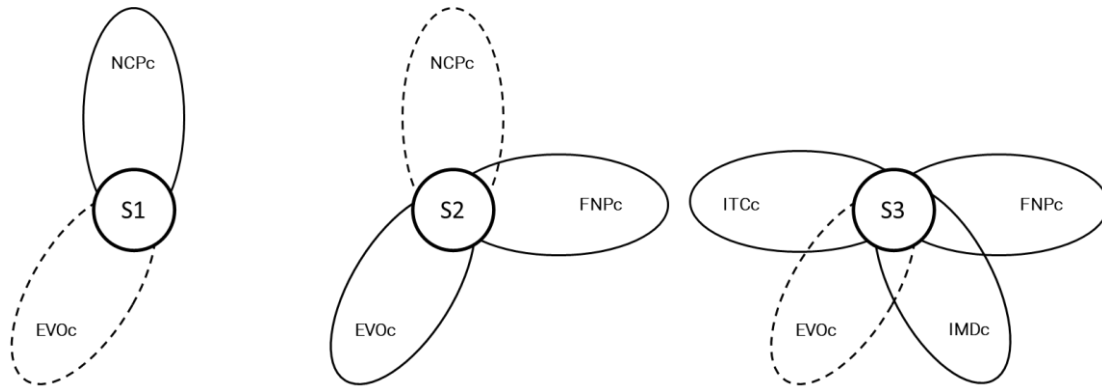
Solution consistency: 0.977652

Note: \*, logical AND; ~, logical negation.

Table 13: fsQCA output: Intermediate solution (reduced final set) leading to high product innovativeness.

### *Analysis of configurations*

For entrepreneurial firms, three configurations were associated with high PI. All three configurations demonstrated a high degree of consistency, and further, the coverage of each configuration provided evidence of its relative empirical importance (Ragin, 2008). Therefore, the interpretative solution was comprised of three different equifinal configurations that were sufficient to lead to a high level of PI (Xie and Wang, 2020).



Note: An ellipse with a solid line represents the presence (\*) of the condition, whereas an ellipse with a dotted line represents the absence (-) of the condition. No ellipse is displayed, if a condition is not relevant to the configuration.

Figure 12: Graphical representation of the solutions.

In my solution, high PI (*PINHighc*) is a product of three pathways (see Table 13). In the case of fuzzy sets, an equal representation of sufficiency can be graphically represented through an XY plot. In the necessity case, the points should be found *below* the main diagonal, while in the sufficiency case, the points should be located in the area *above* the diagonal (Rihoux and Ragin, 2009). Figure 13 show the membership XY plots for the three configurations; they establish the identity of the asymmetries of the complex causal paths of high firm product innovativeness. Expressly, the numbers in the upper-left and lower-right corners of the figures represent the consistency and coverage of the corresponding configurations. These scores also signify that the distribution of the fuzzy sets in the intermediate solution was consistent with the assertion that these configurations were a subset of the results.

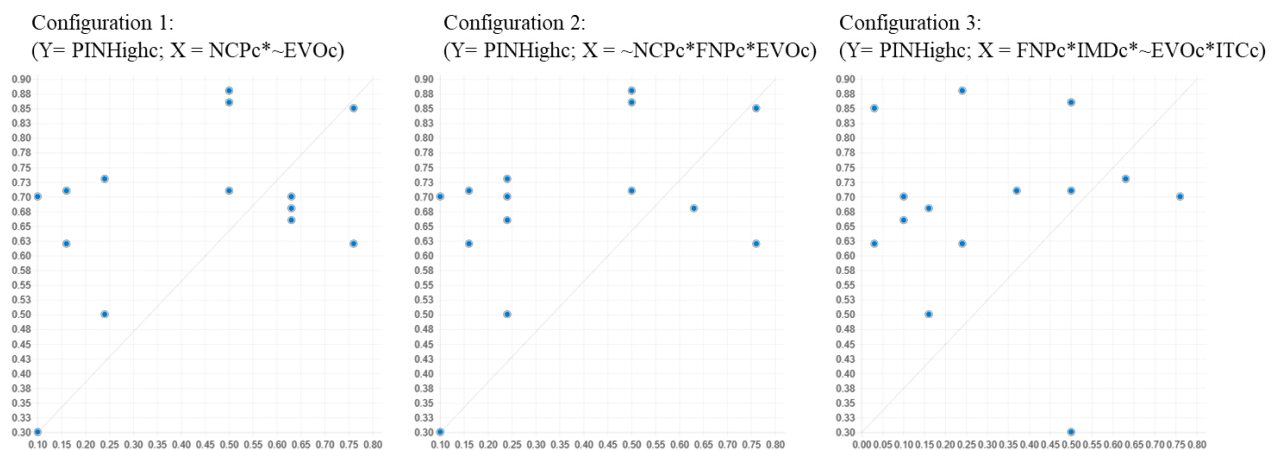


Figure 13: Plot of the three obtained configurations against *PINHighc*.

However, following Thomann and Maggetti (2017), the analysis evaluates the causal configurations with the greatest raw coverage, which, according to Ragin (2008), are the configurations with the most significant empirical relevance (Del Sarto et al., 2020).

In configuration 1, I obtain a combination of conditions with consistency greater than 0.976, specifically  $NCPc*\sim EVOc$ , with a coverage of 0.605. This means that the condition is necessary for the outcome, with a probability level greater than 97.6 %. The configuration shows that a sufficient condition for a company's high PI is the combination of interactions with the innovation intermediary from the field of  $NCPc$  with an absence of  $EVOc$ . It covered 60.5 % of the cases in the sample with this statement. The rationale provided in the necessary conditions section for the  $NCPc$  condition might also explain these results. From an empirical point of view, this can be explained by the constitution of the activities located in  $NCP$  often represent the first step towards establishing a relationship with the innovation intermediary. They enable startups to quickly reach a wide range of network actors by providing access to resources and external knowledge, which contributes to high PI (Marcon and Ribeiro, 2021, Brazauskaitė and Auruškevičienė, 2017, Ozdemir et al., 2019).

The second combination of conditions that were revealed as necessary is configuration 2:  $\sim NCPc*FNPC*EVOc$ , which has a slightly higher consistency than configuration 1 (0.994 of this one compared to 0.976 of configuration 1) and covers less (covers 17.9 % of cases instead of 60.5 % covered by the previous one). Configuration 2 shows another pathway to achieve high PI requiring the absence of activities in the sphere of  $NCPc$  and interaction from the intermediation function  $FNPC$  with the presence  $EVOc$ . Configuration 2 has a high level of consistency of 99.4 % combined with a low level of coverage of 17.9 %. In conclusion, it can be deduced that although configuration 2 has a high probability level for the outcome to occur (consistency 99.4 %), the overall lowest level of coverage (17.9 %) indicates that this observation has hardly taken place empirically. In the sample of cases present for this study, only Case 7 falls in this configuration. According to my research, the startup founder behind Case 7 is an experienced serial entrepreneur who sought interaction with the intermediary for specific purposes (access to venture capital and funding, regional market penetration assistance), which confirms the logic behind configuration 2.

Configuration 3 shows that a sufficient condition for achieving high PI is the combination of  $FNPC$ ,  $IMDC$ , and  $ITCc$  with an absence of  $EVOc$ . This configuration suggests that the potential for high PI here stems from the synergy of the three present intermediation functions. This third path is also sufficient and has the highest consistency score of 1. Configuration 3 has less coverage (0.390) than configuration 1 (it explains fewer empirical cases) but is slightly higher than configuration 2. Configuration 3 emphasizes the benefits of coupling activities

from configurations *FNPc*, *IMDc*, and *ITCc*. These configurations may lead to activities that complement each other and enhance the process of company development, ultimately resulting in higher PI.

In each solution, I find decisive causal ingredients that distinguish configurations and complementary ingredients that only make sense as contributing factors that reinforce the central features of the core conditions (Fiss et al., 2013, Kraus et al., 2017).

PATHS	NCPc	FNPc	IMDc	EVOc	ITCc	Raw Coverage	Consistency
NCPc*~EVOc	●			○		0.605147	0.97441
~NCPc*FNPc*EVOc	○	●		●		0.178676	0.993575
FNPc*IMDc*~EVOc*ITCc		●	●	○	●	0.390126	1

Solution coverage: 0.689286

Solution consistency: 0.977652

*Table 14: Configurations strongly related to high product innovativeness.*

Black circles indicate the presence of a condition, and white circles indicate its absence. Large circles are core conditions; Small circles are peripheral conditions; Blank space "don't care" conditions in which the condition may be either present or absent.

#### *Robustness test*

As QCA results are sensitive to methods, assessing the quality of thresholds and calibrations is essential to estimate how method decisions impact the results (Mattke, 2021). Several robustness analyses were conducted (Judge et al., 2020). In particular, following Epstein et al. (2008), I replicated the analysis with a reduced consistency threshold of 0.85. Five combinations of conditions remain in the intermediate solution, predicting high PI; however, the solution consistency is considerably lower (0.87). Configurations are similar to those in the

solution I presented above but are less precise, as might be expected when applying a lower consistency threshold (Wagemann and Schneider, 2010).

In addition, the variable measure was coded as a crisp set, i.e., all measures scoring less than or equal to 0.5 were coded 0 (otherwise 1). My main results were unchanged. The solution included an additional configuration:  $NCPc^* \sim ITCc$ . Since  $NCPc$  has the characteristics of a necessary condition and appears in combination with the absence of  $\sim ITCc$ , it rather confirms the overall result.

Transitioning from the detailed findings of my three investigations, I now move into the discussion section of my research. This segment will pivot from the presentation of empirical evidence to a critical analysis and interpretation of these findings. The discussion will contextualize the results within the existing body of knowledge, drawing parallels and noting divergences from established theories and prior research in the field of innovation intermediaries and startup ecosystems.

In this section, I will specifically address how my research contributes to the current understanding of the strategic, operational, and systemic roles of innovation intermediaries. I will dissect the implications of my findings, particularly the nuanced insights provided by the set-theoretic analysis, and how these might influence the practices and strategies of both intermediaries and startups. Additionally, I plan to critically examine the limitations of my methodologies and the scope of my research, acknowledging areas where further investigation is needed. The discussion will also delve into the practical ramifications of these findings for policymaking and the design of EEs. It will be a space where theoretical understanding is woven together with practical considerations, offering a comprehensive view of the implications of my research for practitioners, academics, and policymakers in the field of startup innovation and entrepreneurship.

## 5. Discussion

My research delves into the complex dynamics between startups and innovation intermediaries across different phases of the startup lifecycle. This study, underpinned by an abductive research approach, aims to elucidate the character and evolution of these relationships and the multifaceted roles played by OIs in various stages of startup development. The investigation spans multiple regions, incorporating diverse settings to gain a comprehensive understanding of these interactions.

### Investigation 1

Across all phases, my findings suggest that a key differentiator in distinguishing the dyadic relationships between startup and OI is the character of their relationship during each phase of the startup lifecycle. Therefore, Figure 14 shows the course of relationship dynamics (determined by the level of formalization, intensity, and frequency within the dyads (White, 2012, Pritzl and Bronder, 1992, Child et al., 2005)) for all cases between OI and startups within the individual startup lifecycle phases (for a more detailed analysis see Appendix C).

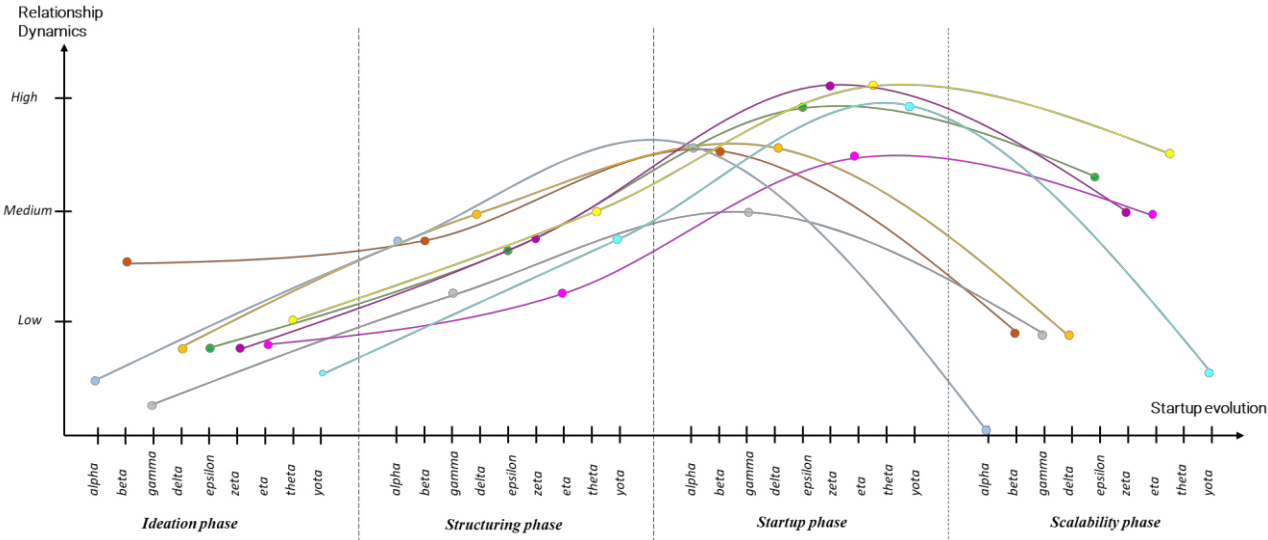


Figure 14: Resulting patterns associated with the OI-startup relationship dynamics and the startup evolution per case. Source: self-elaborated.

Initially, entrepreneurs seek support selectively, but their interaction increases when they get to the structuring and startup phases. The peak of these factors occurs during startup and declines as the scaling progresses.

According to the findings, this progression may be explained by the startup's ability to articulate needs and demand support as it progresses. Thus, my findings align with earlier orchestration studies (Dhanaraj and Parkhe, 2006, Pikkarainen et al., 2017), which found that constant exchange between OI and startups is crucial in scenarios with an elevated level of perceived uncertainty for the startups.

Nevertheless, my initial investigation of nine relationship dyads between startups and the OI revealed that certain dimensions of orchestrator roles can be attributed to specific stages of the startup lifecycle. Specifically, I found that the underlying activities performed by the *architect* are of particular significance during the ideation phase, highlighting their role in shaping the initial vision and conceptualization of the startup. Conversely, the *conductor's* role emerges as predominantly relevant in the structuring phase, where their ability to coordinate and align various elements of the startup's operations becomes crucial. On the other hand, the *facilitator* role extends from the structuring phase to the startup phase, emphasizing their importance in facilitating collaboration and resource mobilization throughout these stages. Furthermore, the *mediator* and *leader* roles are predominantly associated with the startup and scalability phases, underscoring their significance in resolving conflicts, fostering team cohesion, and driving the growth and expansion of the startup. These findings shed light on the nuanced nature of orchestrator roles and their varying contributions across different stages of the startup lifecycle. In line with previous research (Nilsen and Gausdal, 2017), I also conclude that the roles of orchestrators and their activities may change as the startup grows.

Furthermore, orchestration roles partially overlap, and transitions are blurry. Several roles may become relevant simultaneously, as the dyadic relationship always determines the orchestration role (Tabas et al., 2022, Davis and Eisenhardt, 2011). Figure 15 integrates the orchestrator roles identified in the study, represented as integrals, revealing their significance through area size and amplitude. It showcases the varying levels of relationship dynamics throughout the startup lifecycle, indicating the changing nature of collaboration and the impact on the effectiveness of different orchestrator roles. The area curve illustrates the relevance of each role across the startup lifecycle, offering insights into the changing emphasis and dynamic nature of collaboration. The dotted line in Figure 15 represents the trajectory of relationship dynamics and illustrates the interdependencies between orchestrator roles and the evolving nature of the relationship between the OI and startups.

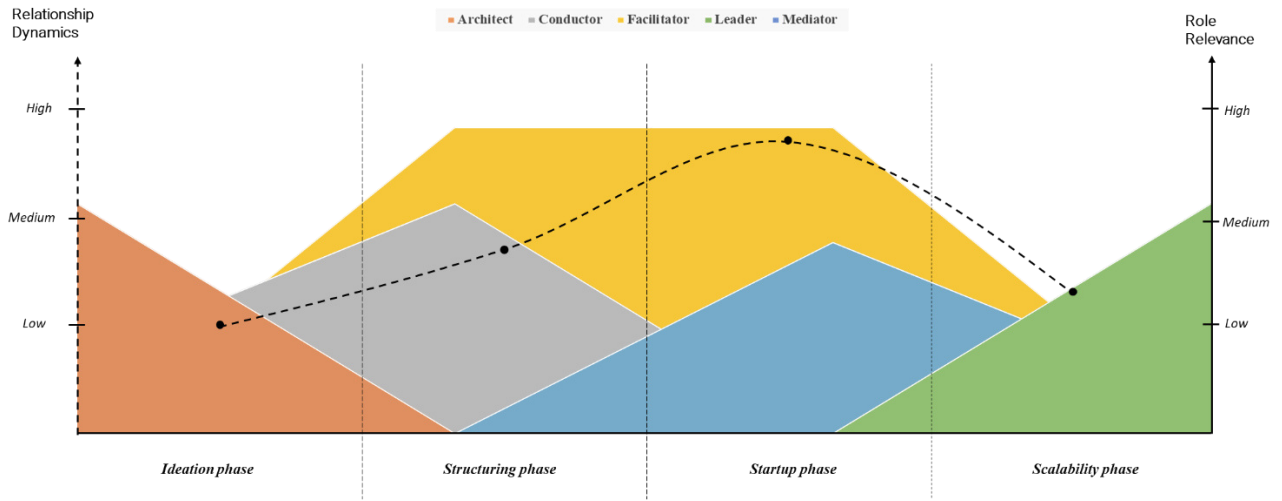


Figure 15: Orchestration roles and patterns in the dynamics of OI-startup relationships. Source: self-elaborated.

Overall, based on an abductive research approach, I propose a conceptual and temporal framework to highlight the relationship between orchestrator roles, their evolution, and the underlying characteristics of the relationship in different phases of technology-based startup evolution (see Figure 16). The proposed framework is grounded in the themes and dimensions identified in the empirical analysis. Figure 16 depicts the relationships among the emerging constructs in an innovation network context to create a lifecycle-based framework illustrating the interdependence of orchestration roles, relationship dynamics, and startup phases.

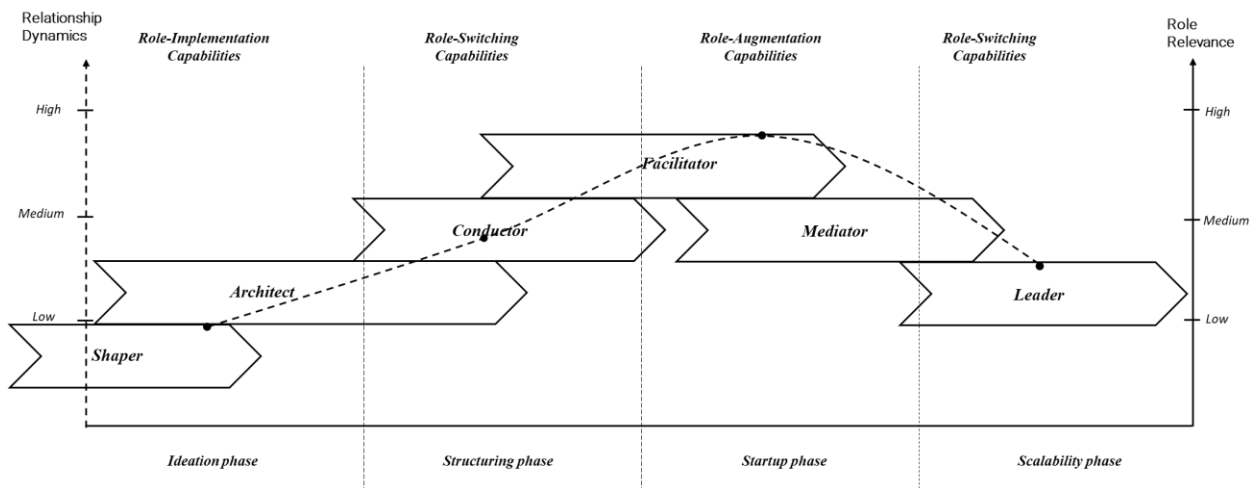


Figure 16: A lifecycle-based framework of orchestration roles. Source: self-elaborated.



In particular, I outline and explain a neutral, third-party network orchestrator's capabilities to enable orchestration mechanisms for technology-based startups within a specific orchestration role and at the transition between orchestration roles along the startups' growth cycle. As a result of my analysis, orchestrators need to provide phase-specific assistance to startups; all capabilities, activities, and routines must be present and functional, especially during intense collaboration and high uncertainty. In this sense, my findings indicate that the focal OI must be able to perform various roles simultaneously to deal with technology startups' demands throughout their lifecycle effectively.

To characterize orchestrator roles, I propose the dynamics of the relationship between orchestrator and startup as an additional differentiation criterion. Hence, my findings can be considered a complementary contribution to this stream of literature (Hurmelinna-Laukkanen and Nätti, 2018, Mitrega and Pfajfar, 2015, Mignoni et al., 2021, Hinterhuber, 2002, Roijackers et al., 2013).

In transitioning from my above discussion on the dynamics between startups and OIs across various phases of the startup lifecycle, I now turn my attention to further empirical insights. This shift in focus is crucial to explore the adaptability and manifestation of orchestrator roles across different regional settings, thereby enriching the understanding of their universality and flexibility in diverse EEs.

My initial analysis highlighted the complex interplay of roles such as *architect*, *conductor*, *facilitator*, *mediator*, and *leader*, and their pertinence to different stages of startup development. This discussion underscored the multifaceted nature of the OI, demonstrating the capacity to adopt various roles simultaneously to effectively cater to the evolving needs of technology startups throughout their growth trajectory. This part of the discussion was instrumental in laying a solid foundation for understanding the nuanced relationship dynamics between startups and the OI, setting the stage for the exploration of a previously unrecognized but pivotal role in the startup ecosystem: the *shaper*.

## *Investigation 2*

Table 1 in Appendix I encapsulates the research findings on the types of intermediaries, their corresponding orchestration roles, and the startup lifecycle phases they support across the five regions investigated. Building on these summarized insights, the next section will delve into a more detailed examination of these

elements, based on the empirical analysis. This part of the study will highlight the adaptability of the identified orchestration roles in various settings, emphasizing their relevance and utility in supporting startups and EEs.

Overall, expanding my investigation to encompass multiple heterogeneous intermediaries across diverse regions has primarily affirmed the results from the earlier section of this study. I successfully identified all five orchestration roles (i.e., *architect*, *conductor*, *facilitator*, *mediator*, *leader*) from the 20 interviews and were able to allocate them to the distinct lifecycle phases of startups, consistent with the initial inquiry. Hence, the present research proves that the orchestration roles derived from diverse contexts in my initial investigation are also applicable as relevant orchestration roles for innovation intermediaries in a non-hierarchical, neutral environment within the context of startups and their different lifecycle phases.

Figure 17 illustrates the relevance of individual orchestrator roles throughout the different lifecycle phases based on the results of my interviews across all regions. This relevance is derived from the ratio of the number of times a role was mentioned to the total number of identified roles in each phase. In my analysis, I focused on all identified roles of an intermediary, rather than only those that were dominantly exercised, to capture concurrent role-playing and potential role transitions.

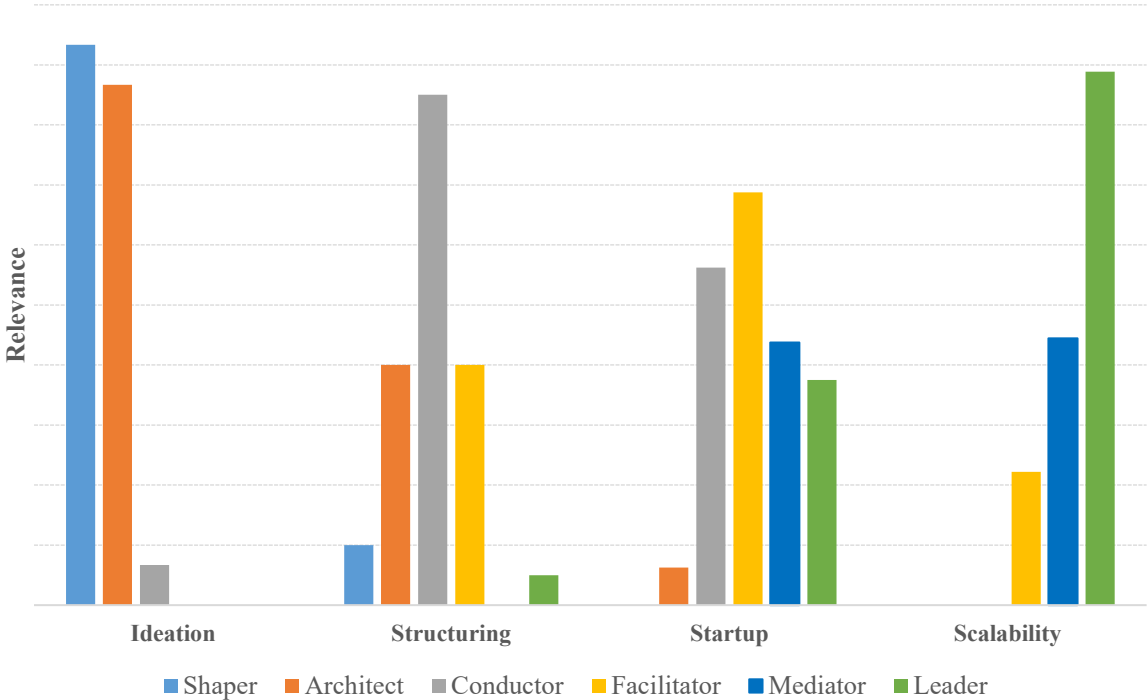


Figure 17: The relevance of orchestrator roles across the different phases of the startup lifecycle. Source: self-elaborated.

I found that before or during the ideation phase, the role of the *shaper* holds significant importance. Of the 15 intermediaries who operate during the ideation phase, 14 assume the role of the *shaper*. However, it is essential to note that this role is only dominant<sup>4</sup> in two instances (Intermediaries 4 and 11) and is not accompanied by any other concurrent roles. Among the remaining intermediaries surveyed in the ideation phase, the *shaper* always plays a secondary role to the dominant role of the *architect*. It must be noted that my primary investigation has also revealed the emerging relevance of the *conductors'* role in the ideation phase, which has been confirmed as an outcome of this analysis. Consequently, my findings confirm the significance of the *architect's* role in the ideation phase and further enrich my previous results with new insights into the relevance of the role of the *shaper* in the ideation phase.

In the structuring phase, the *conductor* role dominates and is exercised by 17 out of the 20 intermediaries interviewed who operate in this phase. Concurrently, my findings identified the roles of the *architect* and *facilitator* as equally relevant in the structuring phase. While my initial investigation primarily located the *architect's* role in the ideation phase rather than in the structuring phase, I can refine my allocation based on the expansion of my dataset and thus also manifest the relevance of the *architect* in the structuring phase based on my results.

Moreover, my findings confirm the relevance of the *facilitator* role in the structuring phase, which subsequently becomes the most relevant role in the startup phase, exercised by 11 of the 14 intermediaries operating in this phase. Meanwhile, the *conductor* remains relevant in the startup phase, with 9 out of 11 exercised roles, in contrast to my initial investigation. Additionally, in the startup phase, the roles of the *mediator* (7 out of 11) and *leader* (6 out of 11) become significant initially, which also aligns with my initial investigation.

In the scalability phase, my results show a clear dominance of the *leader* role, with 8 out of 9 intermediaries exercising this role. Aspects of the *architect's* role are also discernible in this phase, albeit with lower relevance (2 out of 9). Additionally, the *mediator* role remains relevant, with 4 out of 9 intermediaries fulfilling this role in the scalability phase.

Notably, the role of *mediator* was only unambiguously identified in seven interviews and was found to be subordinate rather than dominant and assigned to the later lifecycle phases of startup and scalability. Additionally, only those intermediaries I assigned to support the later phases of *startup* and *scalability* in my sampling process were found to perform the role of *mediator*. These observations align with my previous findings, which established a close correlation between the *mediator* role and the dominant roles of *facilitator* and *leader*.

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<sup>4</sup> In this context, "dominant" denotes the principal or most impactful role identified within a range of roles.

Therefore, I can infer that although the *mediator* role is vital in orchestrating startups, it is mainly carried out in combination with another dominant role, such as *facilitator* or *leader*. Furthermore, the *mediator* role is primarily undertaken by intermediaries specializing in supporting startups during the later stages of development.

#### *Relationship dynamics and role-switches*

In my initial investigation, I elaborated that the nature of the relationship between startups and intermediaries differs across different phases of the startup lifecycle. In line with previous studies (Fu and Cooper, 2021), my findings highlight the relationship dynamics between startups and intermediaries in terms of formalization, intensity, and frequency (White, 2012, Pritzl and Bronder, 1992, Child et al., 2005, Guo and Acar, 2005), play a pivotal role in determining and differentiating the relevance of different orchestration roles as well as influencing the transition of roles during the startup lifecycle.

Therefore, I incorporated inquiries about the frequency, duration, level of formality, degree of intensity, and financial implications associated with the collaboration into my interview guideline (see Appendix J).

To ensure a thorough analysis and clear interpretation of the results, I have carefully examined five key factors - length, frequency, formality, intensity, and costs - for each interview and at every stage of the startup lifecycle (ideation, structuring, startup, and scalability). A visual representation of how these factors relate to each interview and startup phase can be found in Appendix K. Additionally, using both the interview responses and supplementary information from secondary sources, I evaluated the relative significance of these factors. This assessment involved a detailed evaluation process, after which each factor was classified with a rating of low, medium, or high (de Vaus, 2002, Bouncken et al., 2021). A detailed overview of these findings is presented in Table 1 in Appendix I.

Figure 18 presents the aggregate results of the investigation from all the regions under study, providing a representation of the average values for both the orchestrator roles and the relationship dynamics.

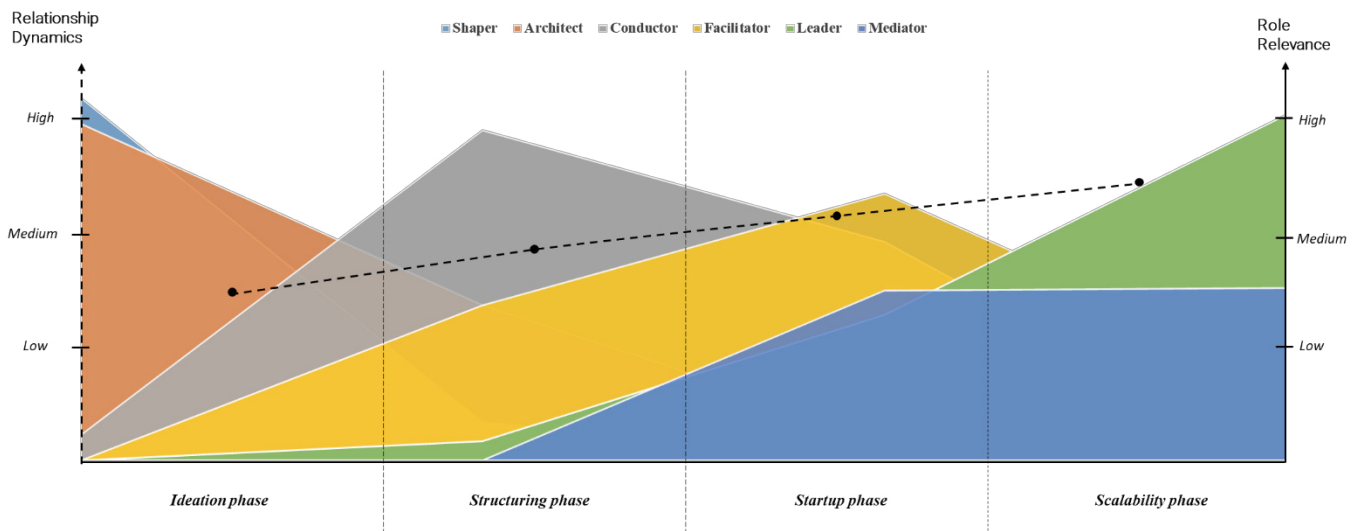


Figure 18: Overall Result of Relationship Dynamics and Orchestrator Roles per Lifecycle Phase. Source: self-elaborated.

Throughout the study, it was observed that low to medium relationship dynamics were predominantly present during the ideation phase. As the startup lifecycle progressed, there was a consistent increase in the intensity of these dynamics. During the structuring phase, medium relationship dynamics became prevalent in all the interviews conducted. In the startup phase, a shift towards medium to high relationship dynamics was noted. Finally, in the scalability phase, there was a distinct trend towards high relationship dynamics.

The findings of this investigation align with key elements from my initial inquiry. However, a notable difference is observed in the peak of the relationship dynamics. In the preliminary study, this peak was identified in the startup phase, but in the current research, it appears in the scalability phase. This discrepancy might be due to the study's design and potential ambiguities in defining the distinct phases of the startup lifecycle theoretically. Despite carefully operationalizing and defining each lifecycle phase for consistency in understanding during the interviews, it was challenging to precisely pinpoint the specific moments within each phase that the interviewees' responses referred to.

Additionally, it is important to highlight that in the initial investigation, the duration of the intermediaries' relationships with startups varied from 22 to 85 months, averaging 49 months. In contrast, the 20 intermediaries interviewed for the current study tend to have shorter, more intense relationships with the startups. This difference in the length and nature of relationships could lead to varying time perspectives and viewpoints among the intermediaries, especially in the scalability phase. This variation might explain why the peak in relationship dynamics is observed in the scalability phase in this study, as opposed to the startup phase as initially hypothesized.

The current research validates that the dynamics defining the relationship between intermediaries and startups across different lifecycle phases can be a crucial metric for identifying and differentiating the importance of various orchestration roles at distinct stages of the relationship.

In the following section, I aim to provide insights into the potential linkage between shifts in relationship dynamics within the intermediary-startup relationship and the corresponding transition of associated orchestration roles. While this particular topic is not the primary contribution of this section, it is noteworthy that previous studies have predominantly concentrated on a static perspective of orchestration roles, with limited attention being paid to the dynamic nature of roles and role transitions (Hurmelinna-Laukkanen and Nätti, 2018, Tabas et al., 2022). Hence, my results seek to provide an additional contribution to this body of literature.

In my research, I observed a transformation in the role of intermediaries from an *architect* to a *conductor*, particularly in cases where intermediaries transitioned from loosely defined, open, and frame-setting activities with various undefined founders to more active and individualized forms of collaboration between the intermediary and individual startups. This shift led to an increase in the relationship's frequency and intensity. In the *architect* role, the focus is on open, non-committal networking formats and informational events:

*"It's interesting that many people come to us who might not dare to seek individual advice because everything is still too vague. For the past six months, we have also been offering a crash course in starting a business. We also host a monthly startup get-together to promote networking and similar activities" (Interview 5).*

In the case of Interview 5, the role transition occurred from the ideation to the structuring phase. The support in the role of the *conductor* is more individualized and targeted and occurs during a period of joint action. This was described as follows:

*"Typically, clients come to us with a concrete idea from their everyday life or their research context or academic environment. Therefore, our focus at the beginning is more on structuring - not validating the business concept but jointly developing it. Ultimately, it is about playing through various options, which can take several meetings" (Interview 5).*

Similarly, I identified the *architect's* transition to the *conductor* role in situations where the intermediary-startup relationship undergoes significant changes. In the case of Interview 2, this occurred toward the end of their collaboration. While the intermediary initially held the role of the *conductor* during their joint efforts, as the startup outgrew the support services provided by the intermediary and no longer derived direct benefits, the intermediary assumed the role of *facilitator* and connected the startup with suitable external intermediaries. The intermediary described this action as follows:

*"I believe that both parties benefit when we collaborate with teams that do not entirely fit into our technological field or industry focus. That is, when it comes down to implementation, external partners become more relevant. This is more applicable as the startup matures from an economic perspective" (Interview 2).*

Based on my research, the relationship between *facilitator*, *leader*, and *mediator* can be described as follows. In the case of Interview 8 and Interview 16 (both in the Venture Capital industry), transitions between these roles are significantly indicated by the relationship dynamics between the intermediary and startup. Both intermediaries have a less formal relationship with the startup in the *facilitator* role, and their collaboration intensity is characterized as a medium in my study. Interviewee 8 describes their *facilitator* role as follows:

*"We are very strong in the network and opening up opportunities for business to take place. I think it's a strength, and we often work with companies that are technologically well positioned but searching for networks, primary networks that we can provide to them, along with the experience of going through the long journey" (Interview 8).*

Similarly, Interview 16 describes their *facilitator* role as providing support by:

*"... assisting and trying to introduce potential customers to startups and making our network available to them for feedback and access to expertise" (Interview 16).*

In both cases, the *facilitator* role transitions to that of a *leader* as the level of formalization of the relationship (in these cases, through investment options) increases the intensity and frequency of collaboration.

Interview 16 describes this as follows:

*"When it comes to our active portfolio investment, we are already relatively operational. We always make sure to have a seat on the advisory board so that we can really support the startup well" (Interview 16).*

Interestingly, in changing roles, the *mediator* role also comes into play, as the intermediary stabilizes the network, builds trust, and empowers the startup.

*"We must therefore be very active in our support by making many investor introductions. We usually cannot bear the burden alone when it comes to external financing rounds. We must, therefore, strongly support by creating pitch decks or assisting with a pitch to make the startup more attractive and enable many introductions to other investors" (Interview 16).*

In the case of Interview 8, the role shift also increases the formality of the relationship and leads to an active engagement of the intermediary, leading to increased relationship intensity and frequency. This was described as follows:

*"It is important to set goals, to retrieve them, to make milestones, to make target agreements, to look at where the company stands, where my long-term and medium-term goals are. But also for the investors, where do I stand? The next financing round, am I doing it, do I want it? In addition, to provide information, and it usually falls by the wayside in terms of the actual work that people do" (Interview 8).*

In this configuration, the role of the *leader* is also accompanied by a more robust expression of the *mediator* role:

*"In the end, you have to play all sides, and that is what we offer, what we deliver, what we retrieve, also what we retrieve on the side of the investor, in the obligation on the side of the startups, where we also take the lead to facilitate communication and negotiation among all parties" (Interview 8).*

In summary, this research approach effectively combined deductive and inductive components to identify a previously unknown orchestrator role, the *shaper*. The *shaper* is a proactive and transformative figure who plays a crucial role in promoting the entrepreneurial mindset and guiding individuals in the early stages of their entrepreneurial journey. The *shaper* invests in the surrounding ecosystem without expecting any direct (monetary) return, contributing to a vibrant and thriving EE. This role is exercised by intermediaries from all lifecycle phases of startups, demonstrating its importance throughout the entire sample. The *shaper's* orchestration role involves building an entrepreneurial mindset among potential founders and emphasizing the importance of entrepreneurship within society. *Shapers* provide guidance related to company building and founding a startup, identifying and cultivating promising entrepreneurial talent while promoting the idea of entrepreneurship to a broader audience. By investing time and resources into developing solid EEs, the *shaper* creates a fertile ground for startups to thrive, with the potential for significant economic and social impact. The *shaper's* role involves balancing their interests and goals with those of the broader ecosystem, ensuring that they can reap the benefits of their efforts while supporting the growth and development of others.

In this vein, my findings regarding the role of *shapers* align with recent research conducted by Merguei and Costa (2022), who investigated so-called pre-acceleration programs and their relevance in the very early stages of the startup lifecycle. Their results suggest that these programs' primary objective is not to foster entrepreneurship directly but rather to equip individuals with the skills to navigate the entrepreneurial process and connect them with others who share a common interest in entrepreneurship. Although these programs may eventually lead to the creation of startups, this is not the primary measure of success.

My investigation further substantiates this observation, which reveals that the *shaper* role is distinctive and predominant in contrast to the *mediator* role. Moreover, my analysis indicates that the *shaper* role is most closely linked with the initial ideation phase that immediately precedes the *architect* role.

In contradistinction to the *architect's* role, the *shaper* inspires and activates those who have recently or not yet delved into entrepreneurship, whereas the *architect* assumes a salient role in addressing tangible needs and issues.



Consistent with previous research that has emphasized the importance of context-specific analysis and the need for a nuanced understanding of the local EEs (Stam and Spigel, 2016, Isenberg, 2011), this study aims to validate the insights gained from previous research and identify patterns or trends that may exist in different geographic locations. I utilized purposive sampling to select four intermediaries from each of the five regions as interview partners, and the intermediaries' relevance to various business lifecycle phases was ensured through consultation with prior research (Passaro et al., 2020, Marcon and Ribeiro, 2021).

My analysis of 20 interviews provides empirical evidence that the five orchestration roles initially identified in my investigation remain relevant in different contexts and regions. This reinforces the adaptability and versatility of these roles in facilitating innovation and entrepreneurship (Howells and Thomas, 2022). My findings support my initial research and align with the insights of other scholars that have emphasized the importance of innovation intermediaries in promoting entrepreneurship and innovation (Ng et al., 2022, Feser, 2022).

I identified all five orchestration roles plus the role of the *shaper* in the intermediaries and EEs under investigation through the expanded sample size and regional context. Specifically, my results suggest that the identified orchestration roles are applicable and relevant as orchestration roles for innovation intermediaries in a non-hierarchical, neutral environment within the context of startups and their different lifecycle phases (Schepis et al., 2021, Giudici et al., 2018). Moreover, I could allocate these roles to the distinct lifecycle phases of startups, consistent with my initial inquiry.

The results of my study confirm the significance of the *architect's* role in the ideation phase. The findings also suggest that the *shaper* role, which focuses on refining the initial ideas, becomes relevant during the ideation phase, although it is not dominant. In contrast, the *conductor* role dominates in the structuring phase, which involves organizing the startup's resources and activities to achieve its goals. Additionally, the *facilitator* role becomes the most relevant role in the startup phase, where the focus is on implementing the startup's operations and bringing the product to market.

My findings further highlight the importance of the *mediator* and *leader* roles in the later startup and scalability lifecycle phases. The mediator role, which involves resolving conflicts and facilitating communication between stakeholders, becomes subordinate rather than dominant in the later phases. This role is typically undertaken by intermediaries specializing in supporting startups during the later stages of development. Meanwhile, the *leader* role, which involves providing strategic direction and overseeing the startup's growth, becomes the most dominant role in the scalability phase.

Drawing from the role description provided in Table 2, where the *mediator* role is characterized as having a primary function of intensifying and stabilizing, it is reasonable to infer that this role is more crucial in the later phases of the startup-intermediary relationships' life cycle. This inference is based on the fact that the later stages of these relationships are characterized by a relatively higher degree of relationship dynamics (see Table 1 in Appendix I).

The apparent contrast in the present results, whereby specific roles are found to be relevant in two consecutive lifecycle stages, while in the initial study, these roles were distinctly associated with individual phases, may be attributed to the blurry transition and unclear demarcation of the various startup lifecycle phases (Venkataraman, 1997, Sarasvathy et al., 2005).

Furthermore, in the present study, the allocation of roles to the respective lifecycle phases was derived from statements provided by 20 intermediaries with diverse backgrounds and experiences. This may account for the observed differences in role allocation, as compared to the initial investigation, where the research team assigned roles based on predefined criteria and the available data.

In summary, the results of my study indicate that the orchestration roles of innovation intermediaries, as identified in my initial investigation design, remain consistent even after expanding the scope of analysis to include a more significant number of intermediaries and a broader range of regions.

Furthermore, my research affirms that innovation intermediaries are required to perform a diverse range of roles in parallel or sequentially, depending on the specific needs and contextual factors of startups across various life cycle stages (Nilsen and Gausdal, 2017). This may be primarily due to the nature of collaboration in EEs, characterized as "*dynamic and more loosely coupled ecosystems with fairly unclear roles*" (Tabas et al., 2022, p. 5), distinguishing them from hub-and-spoke types of innovation ecosystems (Thomas and Autio, 2019).

Finally, my findings highlight a significant change in the intermediary's role, particularly evident when intermediaries transition from open and loosely defined activities with multiple founders to more involved and personalized collaboration with individual startups. This shift leads to a notable increase in the frequency, formality, and intensity of the relationship between intermediaries and startups. This discovery is consistent with prior scholars (van Weele et al., 2016, Cánovas-Saiz et al., 2020) who have observed that innovation intermediaries offer various services that evolve, from general business support to customized advice and that the intermediary-startup relationship between changes as the startup matures and becomes more independent, shifting towards a more peer-to-peer partnership (Yuan et al., 2021, Leitão et al., 2022, Giuliani, 2013). The literature on EEs and

innovation intermediaries also emphasizes the importance of tailored and personalized support for startups as they navigate the different stages of their entrepreneurial journey (Passaro et al., 2020, Marcon and Ribeiro, 2021).

My expanded investigation has empirically confirmed my initial findings and revealed the importance of intermediary-startup relationship dynamics in understanding the various orchestration roles at different relationship stages. My results demonstrate that transitions in these roles are closely linked to the dynamics of the relationship between intermediaries and startups, which are critical for understanding the relationship's evolution.

My study adds to the body of literature on network orchestration (Paquin and Howard-Grenville, 2013, Reypens et al., 2016, Schepis et al., 2021, Hurmelinna-Laukkanen and Nätti, 2018) by providing a more dynamic perspective on orchestration roles of innovation intermediaries and role transitions. Previous research has primarily focused on a static view of orchestration roles, while my study highlights the importance of considering the changing dynamics of the intermediary-startup relationship and the corresponding shifts in the intermediary's role. By taking a more dynamic view, my research sheds light on the evolving nature of intermediary roles and their importance in facilitating the growth and development of startups.

My research highlights the importance of intermediary flexibility and adaptability in transitioning between roles depending on the startup's phase and level of development. By examining intermediary-startup relationships across different lifecycle phases, my research contributes to a deeper understanding of how different types of intermediaries can orchestrate relationships with startups in various roles. These findings have practical implications for intermediaries, policymakers, and stakeholders in the EE, as they can use this knowledge to identify appropriate interventions and support for startups at different stages of their entrepreneurial journey.

Shifting from the detailed exploration of the complex dynamics between startups and innovation intermediaries, this study now turns its attention to the intricate relationship between intermediary-level activities and their specific impact on startup innovation performance within the network orchestration process.

### *Investigation 3*

Based on the analyses conducted, it is feasible to formulate some insights regarding the connection between activities at the intermediary level (specifically, configurations of orchestration functions) and a particular outcome (namely, high PI in startups) within the framework of network orchestration. Thus, I strive to move debates about intermediaries' ties with startups beyond a silo-based discussion and develop a more prosperous, relational, and dynamic understanding of their relationship, as e.g., Bergman and McMullen (2021) and

Pikkarainen et al. (2017) demand. It is understood that such a discussion and association is still incipient in the literature (Bergman and McMullen, 2021). Thus, this research seeks to bring theoretical and managerial contributions to the beginning of this debate.

Previous research in this area has mainly focused on descriptive point-in-time static analyses without considering the net effects of interactions between firms and innovation intermediaries (Batterink et al., 2010, Gassmann et al., 2011, Kanda et al., 2018). Batterink et al. (2010) and Kanda et al. (2018) made significant contributions to innovation intermediation by studying the support roles of intermediaries in the agri-food sector and eco-innovation. They found roles that align with the five orchestration functions of the current study but with different levels of detail and arrangement. However, they did not address the specific impact of each role on the sectors or the mechanisms by which the impact is achieved. Furthermore, they failed to discuss the expected results of each role on innovation outcomes. The current study expands upon their work by examining the nuances of individual orchestration functions and highlighting their impact on technology startups, thus complementing previous research in innovation intermediation. Besides, Gassmann et al. (2011) studied the role of intermediaries in cross-industry innovation within companies, primarily through the function of scouting. However, their study did not include the technology transfer process. The current study provides a comprehensive analysis of the activities and capabilities of a neutral and independent intermediary in supporting technology startups in a long-term relationship and sheds light on the impact of these activities on the startups' defined outcomes. The findings of Gassmann et al. (2011) are a valuable reference in the current study, further advancing the understanding of the role of intermediaries in innovation. However, my results provide evidence of the explanatory power of collaborations between startups and network orchestrators and initial empirical evidence for the coefficient effects of innovation network orchestration and PI within startups (Marcon and Ribeiro, 2021, Antunes et al., 2021b).

I established that operating in innovation networks orchestrated by innovation intermediaries is sufficient to improve startups' PI. Additionally, I found that three combinations of the five orchestration functions were sufficient to predict high PI in startups, precisely (1) the combination of interactions with the innovation intermediary from the field of Network composition and process management with an absence of Evaluation and validation of outcomes; (2) the absence of activities in the sphere of Network composition and process management and the presence of interaction from the Fostering networking and partnerships for resource mobilization together with the presence Evaluation and validation of outcomes; (3) the combination of Fostering networking and partnerships for resource mobilization, Identification and mediation of different interests, and Intermediation for technology transfer, collaborative research, and commercialization with an absence Evaluation

and validation of outcomes. Thus, this study identified multiple orchestration functions capable of driving PI in startups, suggesting that a non-competing path could generate the same outcome (Fiss, 2011). My findings further contribute to understanding how orchestration functions should be configured to foster startup PI (Tran et al., 2011).

Contrary to my expectations and somewhat contradictory to similar studies (Xie and Wang, 2020, Marcon and Ribeiro, 2021), I found that a single mode (i.e., Network composition and process management) might be sufficient to improve startups' PI. This phenomenon may be explained in light of the orchestration function's characterization. In most cases, the underlying activities pertain to the startup's participation in the network at its initial stage and mark the beginning of the intermediary-startup collaboration (see Table 3 in Section 2.2.3). Thus, this orchestration function provides immediate access to external partners, resources, and knowledge within the innovation network, which is essential for technology startups to achieve high PI (De Marchi, 2012, Lechner and Dowling, 2003, Shu et al., 2005).

It should be noted, however, that my study only covers that assistance provided through the intermediary directly or orchestrated through the intermediary in the network and broader ecosystem, which means that collaboration with other companies and intermediaries may also be crucial for startups' high PI.

Within the broader context of the dissertation, these insights align with the overarching goal of moving beyond descriptive analyses and providing a more comprehensive understanding of the relationship between network orchestration, innovation intermediation, and startups' performance regarding PI.

This research provides a theoretical foundation and analytical framework by distinguishing between orchestration roles and functions, enabling a deeper understanding of the intricate dynamics of network orchestration and innovation intermediation within the EE. By differentiating between these roles and functions, this framework contributes to theoretical advancements and offers practical implications for enhancing innovation and collaboration within the EE. It allows for a comprehensive analysis of the complex interactions among actors in the ecosystem, shedding light on how these interactions shape the orchestration process and impact startups' performance. This understanding can inform the development of effective strategies and interventions to foster innovation, facilitate collaboration, and improve outcomes for startups. By bridging theory and practice, this research offers valuable insights that can guide policymakers, practitioners, and stakeholders in promoting a thriving and vibrant EE.

Orchestration roles encompass the diverse activities and tasks necessary to effectively orchestrate the ecosystem, involving high-level and strategic coordination of actors and resources toward a common goal. These

roles include network design, resource allocation, partnership formation, and overall governance of the innovation network.

Conversely, orchestration functions focus on the specific tasks and actions carried out by intermediaries to facilitate interactions among different parties in the ecosystem. These tactical and operational functions emphasize the practical measures intermediaries take to enable collaboration, knowledge exchange, resource mobilization, and technology transfer between startups and other actors.

The framework presented initially in Figure 1 significantly contributes to theoretical advancements and practical implications in innovation and collaboration within the EE. The differentiation between orchestration roles and functions within the research framework enables a nuanced analysis of intermediaries' operations in the EE. It allows for identifying specific activities and tasks undertaken by intermediaries that directly impact startups' PI. Furthermore, it facilitates a deeper understanding of how strategic orchestration roles interact with the tactical execution of orchestration functions, shedding light on how the configuration of these functions can influence innovation outcomes for startups. By employing this theoretical foundation and analytical framework, this dissertation aims to provide comprehensive insights into the complex interactions among actors in the ecosystem, bridging the gap between descriptive analyses and a deeper understanding of network orchestration, innovation intermediation, and startups' performance regarding PI.

Concluding my in-depth discussion on the dynamic relationships between startups and innovation intermediaries, along with the nuanced impact of intermediary-level activities on startup innovation performance, I now transition into the concluding section of this study. This shift signifies a move from an extensive analysis of empirical findings and theoretical implications to a synthesis of the key insights and their practical applications. In the conclusion, I aim to encapsulate the core findings of my research, outline its theoretical and practical implications, and reflect on its broader impact. Additionally, I will suggest potential avenues for future research in the realm of network orchestration and innovation intermediation, offering guidance for both academic inquiry and practical implementation in this field.

## 6. Conclusion

This dissertation contributes significantly to the body of knowledge in the field of orchestration within EEs. By examining the roles and functions of third-party innovation intermediaries, this research enriches the understanding of how these entities influence startup innovation performance and growth. The integration of a

comprehensive theoretical framework, along with empirical analysis and practitioner perspectives, provides a multifaceted view of orchestration roles, associated orchestration functions and their impact on the efficiency and effectiveness of complex processes in EEs.

The first segment of this dissertation represents a comprehensive exploration into the dynamic nature of networking processes and the evolving roles of intermediaries as network orchestrators within EEs. This investigation specifically addresses the existing limitations in research by developing a capability-dependent framework. This framework provides critical insights into how network orchestrator roles adapt and evolve in response to the changing circumstances of a startup's lifecycle. Two research questions anchor this exploration: Firstly, "*How do orchestrator roles adapt to the evolving needs of startups' lifecycles in innovation networks?*" and secondly, "*How do orchestrator capabilities lead to role transitions along this relationship?*" These questions are pivotal in understanding the fluidity and adaptability required in network orchestration roles as they respond to various developmental stages of startups in innovation networks.

Recognizing the limitations inherent in the initial focus on a specific region and a single innovation intermediary, the dissertation progresses into its second phase. This phase expands the scope of the research, incorporating a diverse array of perspectives, particularly from practitioners active in the field. This methodological expansion is a strategic response to the earlier limitations, enabling a more holistic and comprehensive understanding that transcends regional and contextual constraints.

To drive this enhanced investigation, two research questions are formulated, aimed at deepening the understanding of the role of innovation intermediaries in diverse ecosystems. The first question, "*How do innovation intermediaries orchestrate entrepreneurial ecosystems within various regions?*" seeks to explore the strategies and approaches employed by intermediaries in different geographical contexts. The second question, "*What distinct orchestration roles do innovation intermediaries play across different regional contexts?*" focuses on identifying and characterizing the varied roles that innovation intermediaries assume in distinct regional ecosystems. These questions are instrumental in uncovering the nuanced and multifaceted roles that innovation intermediaries play, highlighting their significance in orchestrating EEs across diverse regional landscapes.

The third segment of this dissertation dedicated substantial effort to detail five essential orchestration functions, achieved through an extensive synthesis of insights from existing literature on network orchestration and innovation intermediation. This thorough approach was motivated by the goal to comprehensively address two

key research questions that are crucial for understanding the dynamics and impact of these orchestration functions, particularly in enhancing startup performance, specifically in terms of achieving high PI.

The first question, *“How do orchestration functions of intermediaries enable higher product innovativeness in startups?”* delves into the mechanisms through which intermediaries, leveraging their unique orchestration functions, actively contribute to enhancing the innovativeness of products developed by startups. This exploration seeks to unravel the specific roles and actions taken by intermediaries that directly influence the creative and innovative capabilities of startups, leading to the development of more novel and market-disruptive products.

The second question, *“To what extent can configurations of orchestration functions lead to higher product innovativeness in startups?”* takes a broader perspective. It investigates the interplay and combined impact of various orchestration functions when applied in unison or in strategic configurations. This aspect of the research recognizes that the contribution of intermediaries to startup innovation is not just the sum of individual functions but also the result of how these functions are configured and integrated. By examining various combinations and alignments of orchestration functions, the study aims to identify optimal patterns and synergies that maximize PI in startups.

## 6.1 Theoretical Contribution

My results contribute to the existing literature on network orchestration by critically examining the time-related role of orchestrators and their evolving practices throughout startup growth. Employing a qualitative longitudinal study design, I capture the dynamic nature of networking processes and the changing roles of orchestrators, aligning with previous research: Reypens et al. (2019), Bergman and McMullen (2021), Tabas et al. (2022), Hurmelinna-Laukkanen et al. (2022), Jack et al. (2008), Klerkx and Leeuwis (2009), Ratinho et al. (2020), Barney et al. (2011). My findings reveal that orchestrators adapt their roles to meet evolving environments and startup requirements, providing insights into when specific orchestration roles are appropriate. I also detail how orchestration operates across different innovation phases and its alignment with them. Moreover, I offer insights into the circumstances that prompt role transitions for orchestrators, highlighting the importance of role-switching and role-augmentation capabilities when orchestrators facing significant changes.

In part, the changing roles of orchestrators can be attributed to the characteristics of their relationships with startups. Orchestrators must comprehend and adapt to changing environmental conditions, which necessitates



early identification and evaluation of startups' needs and potential threats (Teece, 2007). The research reveals that the relationship dynamics between orchestrators and startups exhibit a curvilinear trajectory, marked by an initial increase and a subsequent gradual decrease over the course of the startup lifecycle. Based on these findings, I suggest incorporating relationship dynamics as an additional criterion for characterizing the roles of orchestrators.

Furthermore, my research emphasizes the fundamental orchestration mechanisms employed by intermediaries at multiple levels and phases, aligning with previous studies (Paquin and Howard-Grenville, 2013, Reypens et al., 2016, Schepis et al., 2021, Hurmelinna-Laukkanen and Nätti, 2018). By examining five distinct regions using a multiple-case study approach, I comprehensively analyze different types of innovation intermediaries as third-party orchestrators and their roles in supporting startups at various lifecycle stages.

I employed an in-depth multiple-case study approach to address my research questions, incorporating both deductive and inductive approaches. Purposive sampling was used to select diverse interviewees from five regions in southwest Germany, ensuring a robust analysis. Secondary data sources were also utilized to supplement my findings. Through this comprehensive methodology, I shed light on the various orchestration roles played by innovation intermediaries and their dynamics within and across regions.

My analysis identifies six distinct orchestration roles for innovation intermediaries: *shapers*, *architects*, *conductors*, *facilitators*, *mediators*, and *leaders*. The roles of innovation intermediaries prove to be relevant across various contexts and regions, highlighting their adaptability and versatility in promoting innovation and entrepreneurship. My research establishes that these intermediaries need to undertake a variety of roles, either simultaneously or in sequence, tailored to the unique requirements and situational factors of startups at different stages of their lifecycle (Lin et al., 2020, Go, 2022). My research successfully mapped these intermediary roles to different stages of the startup lifecycle. The architect's role emerges as significant during the ideation phase, while the shaper role, although relevant in this phase, is not the most dominant. In the structuring phase, the conductor role takes on a more dominant position. The facilitator role becomes particularly relevant in the startup phase. As the startup progresses, especially in the scalability phase, the roles of mediator and leader become increasingly prominent. These findings provide complementary insights into the dynamic nature of orchestrator roles and the importance of collaboration dynamics in EEs (Sahut et al., 2021, Hernández-Chea et al., 2021).

The existing body of research on network orchestration primarily views a commercial hub company as the central entity in acquiring knowledge and managing these networks (Giudici et al., 2018, Dhanaraj and Parkhe, 2006). This study expands the scope of research by extensively examining the role of a wide range of innovation intermediaries, beyond just commercial hubs, as third-party orchestrators in entrepreneurial networks. The focus

is on understanding how these intermediaries support startups throughout different stages of their lifecycle. Through the analysis of data from various regions and the application of a robust methodology, the study explores the changing roles of these orchestrators and the dynamics of their relationships. This comprehensive approach offers fresh perspectives on the role of innovation intermediaries and deepens our understanding of orchestration processes with EEs (Bittencourt et al., 2021).

A vital element of my study was to explore and offer new insights into the orchestration functions of intermediaries and how these functions, either individually or in combination, can effectively elevate PI in startups. This inquiry was framed within the context of PI's pivotal role as a determinant of startup performance and success (Ganbaatar and Douglas, 2019). By examining the distinct characteristics of PI and its dual role as both a classification and a rationale within the EE, the study aimed to understand the specific ways in which intermediaries contribute to fostering high PI in startups, particularly in dynamic high-tech markets. The importance of understanding this relationship can be demonstrated by the fact that PI is vital to the survival and performance of startups (Tornikoski et al., 2017, Ding and Ding, 2022). Due to their liability of newness and smallness, startups frequently face resource constraints and have difficulty establishing relationships with different network actors (Zheng et al., 2021, Marcon and Ribeiro, 2021, Shu et al., 2005). However, startups require external resources and knowledge to develop innovative products and gain a competitive advantage (Salavou and Avlonitis, 2008). In this respect, innovation intermediaries (Ziakos et al., 2022, Russo et al., 2019, van Lente et al., 2020, Schepis et al., 2021), which orchestrate interactions on the intersection between startups and other innovation network actors, are said to support companies, like startups, in their innovation process by facilitating access to resources and competencies outside of a company's boundaries (Germundsson et al., 2021).

Therefore, this study integrates network orchestration and PI literature to establish a contingent research design. With longitudinal data on a sample of 14 technology startups and their one-to-one relationship with the OI, I chose fsQCA (Ragin, 2008) as a methodology to better understand the relationship between orchestration functions of intermediation and high PI in startups.

I examined the literature on network orchestration and innovation intermediation and selected five orchestration functions of intermediaries. Consistent with recent work (Cavusgil and Calantone, 2010, Ding and Ding, 2022, Chen et al., 2021, Xie and Wang, 2020, Ganbaatar and Douglas, 2019), I further developed a framework to measure startups' PI from the firm's and customer's perspectives in conjunction with two dimensions (i.e., technology and market) based on the data revealed from the multiple-case study analysis. Using fsQCA, I

examined the interaction between the five orchestration functions and their impact on startup new PI. Compared to conventional statistical methods, fsQCA overcomes limitations related to sample size (Ragin, 2008).

The results of the fuzzy set analysis suggest that three different combinations of orchestration functions promoted the PI of the startups in my sample. I further discovered that a particular function (i.e., Network composition and process management) seemed sufficient to achieve this result in isolation.

The present study fills a research gap by empirically validating the relationship between interactions with innovation intermediaries and high PI in technology startups. Accordingly, there are significant theoretical contributions to this work. First, my findings contribute to network orchestration by providing new insights into how innovation intermediaries might orchestrate innovation networks to facilitate collaborating startups achieving high levels of PI. Previous research (De Silva et al., 2018, Tran et al., 2011, Lichtenthaler, 2013) in this area has mainly focused on the *what* (i.e., activities and services) within the interactions between startups and innovation intermediaries via descriptive or statistical methods without considering innovative outcomes. My research contributes to a deeper understanding of the value of orchestration activities and associated outcomes pertaining to PI in entrepreneurial firms, as proposed by Ding and Ding (2022). Thus, this study contributes to recent calls (Hyytinen et al., 2015, Tsai and Yang, 2013) by examining how different orchestration functions may jointly influence the innovative outcomes of startups, an area largely ignored in prior research. For this purpose, I provide a first indication of how relationships with external actors orchestrated by innovation intermediaries may influence the effects of innovativeness in startups.

## 6.2 Practical implications

This dissertation's findings carry significant implications for practitioners, policymakers, and stakeholders within EEs. They not only enhance the understanding of the contributions of intermediaries but also stress the necessity of adaptability in their roles and proactive engagement. Such insights are crucial for bolstering collaboration, facilitating knowledge transfer, and driving innovation, which are key elements in supporting startup growth and success.

A primary insight from this study is the need for support and resources that are specifically tailored to the changing requirements of startups. Policymakers, by leveraging this knowledge, can craft targeted programs and initiatives that resonate with the unique needs of startups at various developmental stages. This customized

approach is instrumental in nurturing entrepreneurship and stimulating innovation across diverse regional landscapes.

For practitioners, the research underscores the varied roles of intermediaries in network orchestration. A thorough understanding of these roles enables more efficient collaboration and resource distribution. Practitioners can thus identify and engage with the most relevant intermediaries for startups at different phases of their journey, enhancing the startups' ability to navigate challenges and seize growth opportunities.

An important finding of this research is the identification of six distinct roles of intermediaries, including the newly recognized 'shaper' role. This insight deepens the understanding of intermediaries' multifaceted contributions to EEs. It offers a valuable perspective for policymakers, practitioners, and stakeholders to build ecosystems that foster entrepreneurship, innovation, and sustainable startup growth.

Additionally, this study underscores the creation of an ecosystem that nurtures startup success and expansion. Stakeholders, by aligning support structures with the evolving needs of startups, can guarantee continuous resource availability and assistance throughout each developmental phase.

I have uncovered information that is highly beneficial for intermediary organizations, policymakers, and startup founders. My research indicates that a diversified mix of services and activities in the five key areas of intermediation I identified significantly enhances startup performance. Each orchestration function plays a vital role in creating pathways to successful startup outcomes, as demonstrated in Table 11. I place particular emphasis on the role of 'Network composition and process management', recommending it as a focal point for intermediary organizations due to its substantial influence on startup performance from the onset of their relationship.

I suggest that startups engage with innovation intermediaries to expand their business networks. Even limited interactions in certain orchestration areas can lead to positive outcomes. The causal 'recipes' I have identified provide a pragmatic framework for startup founders, demonstrating how various orchestration functions can be blended effectively for optimal performance. Additionally, startups can refine their engagement with external entities by pinpointing the orchestration function combinations that best suit their performance goals.

Furthermore, this study contributes to the broader understanding of network orchestration and innovation intermediation. It illuminates the specific roles and offers practical applications for various stakeholders. By utilizing these insights, an environment conducive to entrepreneurship and innovation can be fostered, supporting the growth of startups.

In conclusion, this dissertation lays a foundation for future research in network orchestration and innovation intermediation in various contexts. Further exploration in these domains will enrich our comprehension

of the intricate dynamics involved, potentially leading to more effective strategies and interventions for startup ecosystems.

### 6.3 Limitations and Future Lines

Although my study provided valuable insights into the distinct types of innovation intermediaries as third-party orchestrators and their roles in supporting startups at different stages of their lifecycles, some limitations must be acknowledged.

A key limitation of my dissertation lies in the assumption that the orchestration roles of intermediaries and startup lifecycle phases are strictly separated. This assumption, while necessary for analytical clarity and structured investigation, does not fully capture the fluidity and overlapping nature of these roles and phases in real-life scenarios. In practice, the transitions between different startup phases and the shifting of orchestration roles often occur without clear borders and can be highly interdependent. This inherent complexity and the blurred boundaries in the real-world startup ecosystem are not entirely reflected in the study's more segmented and distinct categorization. As a result, the research may not fully encapsulate the dynamic and often non-linear progression of startups and the multifaceted roles that intermediaries play in this process.

Furthermore, the research is confined to a specific innovation region and focuses on a single orchestrating intermediary in southwest Germany. Consequently, the generalizability of the findings may be limited. Besides, the varying lengths of dyadic relationships among startups, resulting from differences in their engagement with the orchestrating intermediary, pose a limitation. Further investigation is needed to analyze the effects of relationship duration on the outcomes. The study does not differentiate between hardware and software-based ventures, which may overlook potential distinctions and their implications. Furthermore, all startups examined are currently in the scalability phase, indicating a need for future research to explore startups beyond this phase and investigate their progression into SMEs.

Despite, the exploratory and descriptive nature of the multiple-case study approach may limit the generalizability of the findings beyond the selected cases in southwest Germany. Caution should be exercised when applying the findings to other regions or contexts. Moreover, the relatively small sample size may restrict the representativeness of the findings and calls for larger-scale studies. Furthermore, while valuable in providing in-depth insights, the qualitative approach employed may lack the rigor of quantitative research designs. Secondly, the reliance on self-reported data from interviewees introduces the potential for bias and inaccuracies. The absence

of longitudinal analysis of startup development restricts the understanding of intermediaries' long-term effects on startup success. Besides, the study primarily focuses on the roles of intermediaries in orchestrating EEs and does not comprehensively consider other contextual factors that may influence startup development. Lastly, the study's focus on specific types of innovation intermediaries may overlook other potential roles not captured in the analysis.

In addition, the sample is limited to high-tech companies located in Germany, which may restrict the generalizability of the findings to other industrialized nations. Future research should explore different factors and consider both presence and absence models to provide a comprehensive analysis. Future research is required to verify the conceptual hypotheses in different contexts and developing economies. Moreover, the set-theoretic approach relies on data from a single innovation intermediary, and utilizing alternative data sources in future studies would ensure the robustness and generalizability of the findings. It is important to note that the employed fsQCA methodology, while effective, has inherent limitations. Furthermore, the findings should be cautiously generalized, as they are based on specific cases. To enhance their broader relevance, it is necessary to investigate the similarity of other cases and contexts to those studied. Lastly, the study's assessment of PI did not differentiate between technology and market innovativeness, calling for future studies to investigate their influences and the impact of orchestration functions on each dimension.

Also, in my investigation, I aim to examine the events and relationships between intermediary and ecosystem actors that shed light on their collaborative efforts, specifically focusing on their value creation and progress. By comprehensively understanding these interactions, I seek to gain insights into the factors that contribute to successful and beneficial collaborations, particularly benefiting startups.

Nevertheless, relationships between actors often fail to align with their respective expectations and do not consistently yield positive outcomes for all parties involved. Rather, it is crucial to acknowledge that one-sided or mutual expectations may lead to unmet potential outcomes. Additionally, external circumstances and factors can precipitate the dissolution of these relationships. Within this context, I observe an intriguing research gap that merits further investigation. Existing studies primarily assess and evaluate relationships based on quantifiable value additions and outcomes. However, a holistic approach is imperative to comprehend the intricate nuances of relationship failures, examining where and why such breakdowns occur. Adopting this comprehensive perspective allows for a more comprehensive understanding of the interactions among diverse actors within an ecosystem.

One promising theoretical lens that can contribute to bridging this research gap is the Paradox Theory (e.g. Smith and Lewis (2011); Schad et al. (2016)). This theoretical framework emphasizes the existence of paradoxes and apparent contradictions within relationships among ecosystem actors. Instead of dismissing or

circumventing these paradoxes, the Paradox Theory encourages their recognition and exploration to understand their influence on actors' behaviors and dynamics. By applying the Paradox Theory, we can gain deeper insights into the reasons for relationship failures and the underlying contributing factors.

Integrating the holistic approach with the application of the Paradox Theory holds the potential to illuminate new perspectives on the interactions between intermediary and ecosystem actors. Such insights would enhance the understanding of the complexity inherent in these relationships and enable the development of viable solutions to foster successful and sustainable collaborations.

#### *Future Lines*

While my study provides valuable insights into the roles of innovation intermediaries in supporting startups at different stages of their lifecycles, limitations must be considered when interpreting the results. However, there are several avenues for further research in this area that could build upon my findings.

An imperative lies in investigating the transformative potential of new technologies startups adopt on innovation intermediaries' activities and structural dynamics. Understanding how intermediaries can utilize technology to improve their operational processes, develop innovative services, and adapt to the constantly evolving entrepreneurial landscape holds significant importance for both academic research and practical implementation. Hence, future research endeavors must delve into this transitional phenomenon and elucidate its ramifications on the multifaceted roles, functionalities, and impact intermediaries exert on startup performance.

Given the dynamic nature characterizing EEs, intermediaries are compelled to adapt and extend support to startups as they traverse various phases of development. Thus, an in-depth examination of intermediaries' specific mechanisms and strategies to navigate these intricate dynamics would significantly contribute to the understanding of their pivotal role in fostering the success of startups. Furthermore, future investigations can delve into the proficient equilibrium that innovation intermediaries establish in their orchestration roles and responsibilities across different stages of the startup lifecycle.

The significant influence of government policies and regulations in shaping the activities of innovation intermediaries and the overall maturation of EEs should not be understated. Unveiling the impact of policy environments on the activities and effectiveness of intermediaries would furnish invaluable insights into the interplay between government support and intermediary-driven initiatives. Consequently, such research endeavors possess the capacity to enlighten policymakers and practitioners alike on the formulation of conducive conditions conducive for intermediary growth and their contributions to ecosystem development.

Moreover, exploring the interplay and collaborative endeavors between diverse orchestrators within EEs holds tremendous potential for generating profound insights into the optimal configuration of orchestrator roles. Analyzing the collaborative synergies and complementary roles assumed by various orchestrators would foster a more nuanced understanding of the effective distribution of orchestration functions in supporting startups at different stages of their development.

Besides, it is imperative for future research to undertake an examination of the role intermediaries play in promoting social and environmental innovation. While my study primarily focused on technological innovation, intermediaries greatly influence supporting startups to address social and environmental challenges. Thus, comprehending the underlying mechanisms and activities through which intermediaries facilitate social and environmental innovation would offer valuable insights into pursuing sustainable and inclusive economic growth.

Lastly, building upon the insights from Lingens et al. (2021), which highlight the capability of startups to successfully orchestrate their ecosystems, a deeper exploration into this phenomenon could be a fruitful area of further research. The authors identified how startups can define their role in ecosystems through strategies like standardization/customization and value creation, benefiting a diverse range of entities including SMEs, corporates, investors, and accelerators. By delving into the proactive strategies and approaches startups use to navigate and shape their environments, future research could uncover the intricacies of how startups act as active orchestrators within their ecosystems. This investigation would not only shed light on the startups' role beyond being mere recipients of ecosystem benefits but also reveal the novel dynamics and mechanisms through which they engage with and influence their ecosystems. Such an understanding would significantly enhance the knowledge of entrepreneurial strategy and the developmental processes of ecosystems, highlighting the entrepreneurial agency in ecosystem dynamics.

By embarking on these avenues for future research, we can push the boundaries of knowledge regarding innovation intermediaries and their profound impact on startup performance, ecosystem development, and broader societal outcomes.

## 6.4 Ethical Aspects

Any research project must take ethical considerations seriously, and this dissertation is no exception. This study has taken into account a number of significant ethical issues. First and foremost, the researchers have made preserving participant anonymity and privacy a top priority, making sure that all private and delicate material is



treated with the utmost care. The right to withdraw from the study at any moment without suffering any harmful effects has been guaranteed, and participants' informed consent has been obtained. Second, the research has conformed strictly to accepted ethical standards and norms. The accuracy and dependability of the data obtained have been guaranteed while precautions have been taken to reduce any potential injury or discomfort to participants. Additionally, due acknowledgment and reference of prior works and sources have been meticulously followed, protecting academic integrity, and preventing plagiarism.

This thesis also closely adheres to an ethical framework that forbids research on human embryos, fetuses, children, patients, genetics, animals, military applications, or the potential for terrorist abuse. The research methods and design have been carefully planned to guarantee adherence to ethical standards. Additionally, the research's ethical concerns support and show adherence to the values set forth in the European Union's Charter of Fundamental Rights. The researcher's uncompromising commitment to keeping the highest standards of honesty and responsibility in their work is highlighted by this unflinching dedication to ethics, which adds to the validity and reliability of the study's conclusions and recommendations.

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## Appendix A.

### *Documentation:*

The documentation ranged from presentation and event registrations to detailed business plans, investor-related documents, discussion protocols, and confidential agreements and contracts. Additional information, such as annual reports, protocols, and reports from joint projects and underlying applications, was obtained from the employees of the OI to provide context and validate my findings. I further obtained information from emails, internal (strategy) reports, media announcements, websites, and news articles, thus, enabling empirical triangulation.

<b>Case Company</b> <b>Documentation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
<b>Business Plan(s)</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Pitch deck(s)</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Marketing material</b>	X	X	-	X	X	X	X	X	X	X	X	X	X	X
<b>Event Registration</b>	-	-	X	X	X	X	X	X	X	X	X	-	X	-
<b>Keynote Slides</b>	-	X	-	X	X	X	-	-	X	X	-	X	X	-
<b>Financial plan(s)</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	-
<b>Strategy report</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Protocols of collaboration</b>	-	X	X	X	X	X	-	X	X	X	-	X	X	X
<b>Relevant email traffic</b>	X	-	X	X	X	-	X	X	-	X	X	X	X	X
<b>Economic Evaluation</b>	X	X	X	X	X	X	X	X	-	X	X	X	X	X
<b>Application support formats</b>	X	-	X	X	X	X	-	X	X	X	X	X	X	-
<b>Awards</b>	-	X	X	X	X	-	-	X	X	X	X	X	X	X
<b>Evaluation of the OI</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Application for research/funding projects</b>	-	X	X	X	-	X	X	X	X	X	X	X	-	X
<b>Project reports</b>	-	X	X	X	-	-	X	X	X	X	X	X	X	X
<b>Co-investors contract</b>	X	X	X	X	X	X	X	X	X	X	-	X	X	X
<b>Term sheets</b>	X	X	X	X	-	X	X	X	X	X	X	X	X	X
<b>Capitalization table</b>	X	X	X	X	X	X	X	X	X	X	X	-	X	X
<b>Proof of use report</b>	X	X	X	X	X	X	X	X	X	X	X	-	X	X
<b>Annual reports</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X

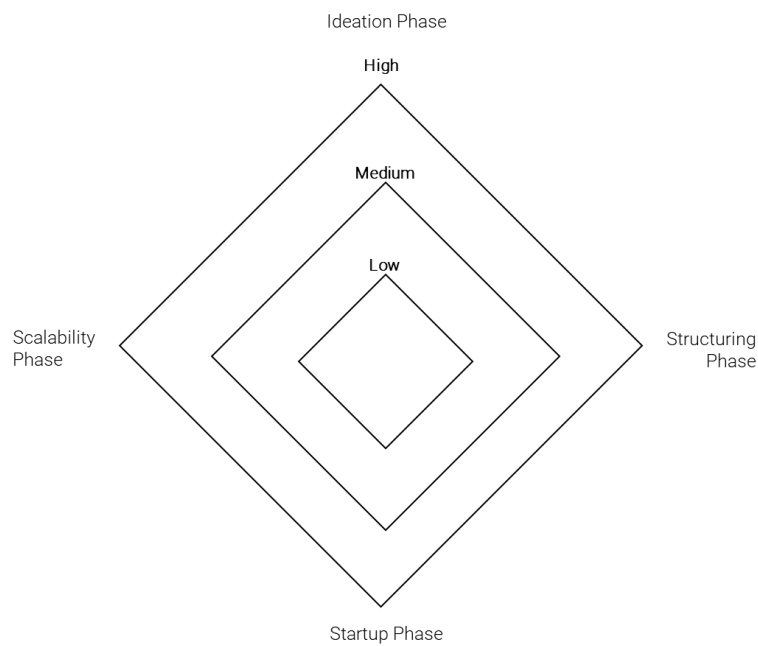
<b>Shareholders agreement</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Balance sheet</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Operating statement</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Brokerage Agreement</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Consultancy contract</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Membership Agreement</b>	X	X	-	X	X	X	X	-	X	X	X	X	X	X
<b>Newspaper article</b>	X	X	X	-	-	-	X	X	X	X	X	X	X	X
<b>Website</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X

*Table 1. Overview of documents available for data analysis.*

## Appendix B.

### *Analytical framework for cross-case analysis.*

I operationalize relationship dynamics by the formalization, intensity, and frequency level within the dyads of interactions (White, 2012, Pritzl and Bronder, 1992, Child et al., 2005). The evaluation of the relationship dynamics is based on a numerical scale with values ranging from 0 to 3 (representing low for 0-1; medium for 1-2; high for 2-3) in 0.25 steps (de Vaus, 2002). The value of 0 indicates an informal relationship with no discernible pattern of a continuation between the OI and startup in the respective lifecycle phases. In contrast, the value of 3 indicates the most prominent degree of formalization with a stable enduring relationship in the respective lifecycle phases.



*Figure 1. An analytical framework for cross-case analysis.*

Appendix C.

Resulting patterns of the relationship dynamics within the dyad between OI and case study startups.



Figure 1. Results of the analysis of the relationship dynamics per startup using the analytical framework.



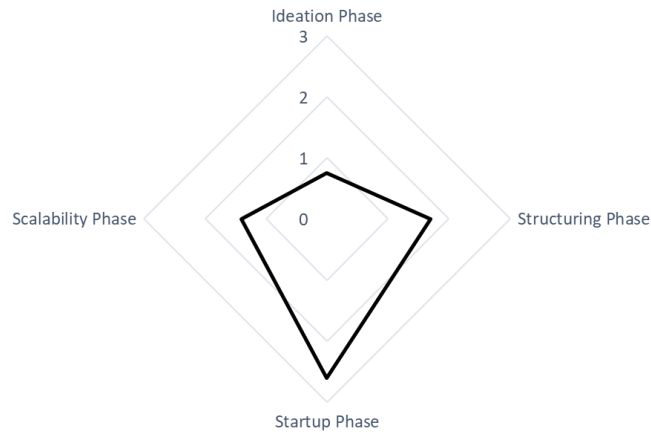


Figure 2. Results of the relationship dynamics analysis across all startups using average values.

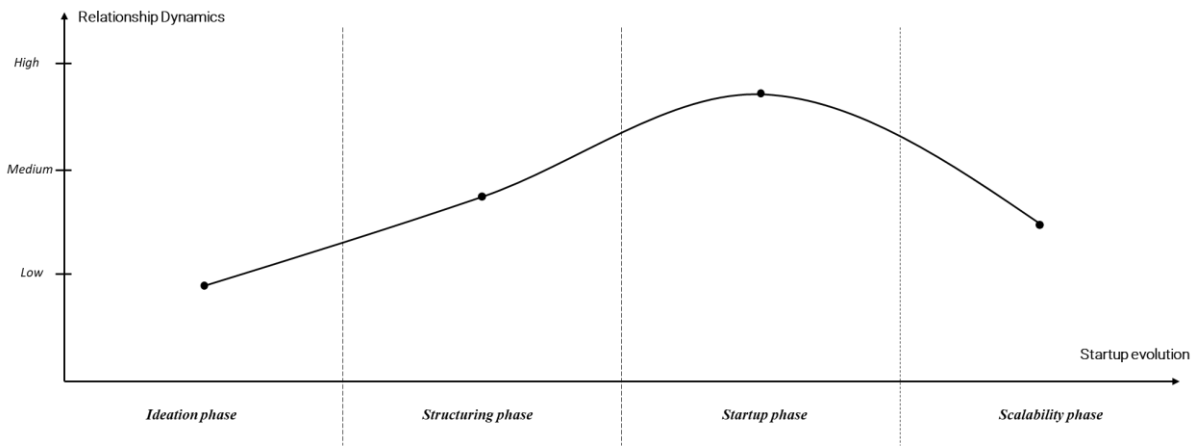


Figure 3: Resulting patterns associated with the OI-startup relationship dynamics and the startup evolution across all startups using average values.

## Appendix D.

*Table 1: Descriptive data for the conditions from multiple case study analyses.*

CaseID	NCP	FNP	IMD	EVO	ITC
Case 1	2.5	1.75	0.75	2	2
Case 2	3	1.75	2	2	0.5
Case 3	1.75	1	0.5	0.75	0.5
Case 4	0.75	2.25	1.75	1.25	1.5
Case 5	2.75	1	0.5	1.25	0.75
Case 6	2.75	2	0.75	1.25	2
Case 7	1	1.75	0	2.25	0.5
Case 8	2.75	2.5	2	1	1.5
Case 9	3	2.5	2	2.5	1.5
Case 10	3	1.5	2	1.5	0.5
Case 11	3	3	2.5	1.5	1.5
Case 12	3	3	2.5	1.5	2
Case 13	2.5	3	2.5	1	3
Case 14	3	2.5	2.5	2.5	1

## Appendix E.

*Table 1: Construct values for outcome and conditions for fsQCA.*

CaseID	PINHigh	NCP	FNP	IMD	EVO	ITC
Case 1	0.5	0.83	0.58	0.25	0.67	0.67
Case 2	0.65	1	0.58	0.67	0.67	0.17
Case 3	0.625	0.58	0.33	0.17	0.25	0.17
Case 4	0.6375	0.25	0.75	0.58	0.42	0.5
Case 5	0.6	0.92	0.33	0.17	0.42	0.25
Case 6	0.6125	0.92	0.67	0.25	0.42	0.67
Case 7	0.575	0.33	0.58	0	0.75	0.17
Case 8	0.575	0.92	0.83	0.67	0.33	0.5
Case 9	0.375	1	0.83	0.67	0.83	0.5
Case 10	0.775	1	0.5	0.67	0.5	0.17
Case 11	0.6375	1	1	0.83	0.5	0.5
Case 12	0.8	1	1	0.83	0.5	0.67
Case 13	0.7625	0.83	1	0.83	0.33	1
Case 14	0.625	1	0.83	0.83	0.83	0.33

## Appendix F.

*Table 1: Calibration of outcome and conditions.*

CaseID	PINHighc	NCPc	FNPc	IMDc	EVOc	ITCc
Case1	0.50	0.90	0.63	0.16	0.76	0.76
Case2	0.73	0.97	0.63	0.76	0.76	0.10
Case3	0.70	0.63	0.24	0.10	0.16	0.10
Case4	0.71	0.16	0.84	0.63	0.37	0.50
Case5	0.66	0.94	0.24	0.10	0.37	0.16
Case6	0.68	0.94	0.76	0.16	0.37	0.76
Case7	0.62	0.24	0.63	0.03	0.84	0.10
Case8	0.62	0.94	0.90	0.76	0.24	0.50
Case9	0.30	0.97	0.90	0.76	0.90	0.50
Case10	0.86	0.97	0.50	0.76	0.50	0.10
Case11	0.71	0.97	0.97	0.90	0.50	0.50
Case12	0.88	0.97	0.97	0.90	0.50	0.76
Case13	0.85	0.90	0.97	0.90	0.24	0.97
Case14	0.70	0.97	0.90	0.90	0.90	0.24

## Appendix G.

*Table 1: Calibration of outcome and conditions added 0.001.*

CaseID	PINHighc	NCPc	FNPc	IMDc	EVOc	ITCc
Case1	0,501	0.901	0.631	0.161	0.761	0.761
Case2	0,731	0.971	0.631	0.761	0.761	0.101
Case3	0,701	0.631	0.241	0.101	0.161	0.101
Case4	0,711	0.161	0.841	0.631	0.371	0.501
Case5	0,661	0.941	0.241	0.101	0.371	0.161
Case6	0,681	0.941	0.761	0.161	0.371	0.761
Case7	0,621	0.241	0.631	0.031	0.841	0.101
Case8	0,621	0.941	0.901	0.761	0.241	0.501
Case9	0,301	0.971	0.901	0.761	0.901	0.501
Case10	0,861	0.971	0.501	0.761	0.501	0.101
Case11	0,711	0.971	0.971	0.901	0.501	0.501
Case12	0,881	0.971	0.971	0.901	0.501	0.761
Case13	0,851	0.901	0.971	0.901	0.241	0.971
Case14	0,701	0.971	0.901	0.901	0.901	0.241

## Appendix H.

Figure 1: Output fsQCA software.

```
Model: PINHighc = f(NCPc, FNPc, IMDc, EVOc, ITCc)
Algorithm: Quine-McCluskey

--- PARSIMONIOUS SOLUTION ---
frequency cutoff: 1
consistency cutoff: 0.993293
      raw      unique
      coverage coverage consistency
-----
~EVOc  0.661555  0.482353  0.957725
~NCPc  0.236134  0.0569327 0.893482
solution coverage: 0.718487
solution consistency: 0.926076

Cases with greater than 0.5 membership in term ~EVOc: Case3 (0.839,0.7),
Case8 (0.759,0.62), Case13 (0.759,0.85), Case4 (0.629,0.71),
Case5 (0.629,0.66), Case6 (0.629,0.68)
Cases with greater than 0.5 membership in term ~NCPc: Case4 (0.839,0.71),
Case7 (0.759,0.62)
*****
*TRUTH TABLE ANALYSIS*
*****

Model: PINHighc = f(NCPc, FNPc, IMDc, EVOc, ITCc)
Algorithm: Quine-McCluskey

--- INTERMEDIATE SOLUTION ---
frequency cutoff: 1
consistency cutoff: 0.993293
Assumptions:
NCPc (present)
FNPc (present)
IMDc (present)
EVOc (present)
ITCc (present)

      raw      unique
      coverage coverage consistency
-----
NCPc*~EVOc  0.605147  0.230987  0.976441
~NCPc*FNPc*EVOc  0.178676  0.0484244 0.993575
FNPc*IMDc*~EVOc*ITCc  0.390126  0.0136554 1
solution coverage: 0.689286
solution consistency: 0.977652

Cases with greater than 0.5 membership in term NCPc*~EVOc: Case8 (0.759,0.62),
Case13 (0.759,0.85), Case3 (0.631,0.7), Case5 (0.629,0.66),
Case6 (0.629,0.68)
Cases with greater than 0.5 membership in term ~NCPc*FNPc*EVOc: Case7 (0.631,0.62)
Cases with greater than 0.5 membership in term FNPc*IMDc*~EVOc*ITCc: Case13 (0.759,0.85),
Case4 (0.501,0.71), Case8 (0.501,0.62)
```

## Appendix I.

*Table 1: Overview of Interviewed Intermediaries: Region, Type, Lifecycle Phase, Orchestrator Roles, and Relationship Dynamics.*

Region	Interviewee	Type	Supported Lifecycle Phase	Orchestration Role				Relationship Dynamics			
				Ideation	Structuring	Startup	Scalability	Ideation	Structuring	Startup	Scalability
A	1	University	Ideation Structuring	Shaper <b>Architect</b>	Architect <b>Conductor</b>	-	-	Low	Low	-	-
	2	University	Ideation Structuring Startup	Shaper <b>Architect</b>	Architect <b>Conductor</b>	<b>Conductor</b> Facilitator	-	Medium	Medium	Low	-
	3	Accelerator	Structuring Startup	-	Architect <b>Conductor</b>	Conductor <b>Facilitator</b> Mediator	-	-	Medium	Medium	-
	4	Venture Capital	Ideation Structuring Startup Scalability	<b>Shaper</b>	<b>Conductor</b>	Conductor <b>Leader</b>	<b>Leader</b>	Low	Medium	High	High
B	5	University	Structuring Startup	-	Shaper Architect <b>Conductor</b>	<b>Conductor</b>	-	-	Low	Medium	-
	6	Accelerator	Ideation Structuring Startup	Shaper <b>Architect</b>	Conductor <b>Facilitator</b>	Mediator <b>Leader</b>	-	Low	Low	Medium	-
	7	Open Innovation Intermediary	Ideation Structuring Startup Scalability	Shaper <b>Architect</b>	<b>Conductor</b> Facilitator	Conductor <b>Facilitator</b>	Facilitator <b>Leader</b>	Low	Medium	Medium	Medium
	8	Corporate Venture Capital	Structuring Startup Scalability	-	<b>Architect</b>	Conductor <b>Facilitator</b>	Mediator <b>Leader</b>	-	Medium	High	High
C	9	Research	Ideation	Shaper	<b>Architect</b>	-	-	Medium	Medium	-	-

		Institution	Structuring	<b>Architect</b>	Conductor						
	10	University	Ideation Structuring Startup	Shaper <b>Architect</b> Conductor	<b>Conductor</b>	<b>Conductor</b> Facilitator	-	Low	Medium	Medium	-
	11	Consultancy	Ideation Structuring Startup Scalability	<b>Shaper</b>	Conductor <b>Facilitator</b>	Mediator <b>Leader</b>	Mediator <b>Leader</b>	Low	Medium	Medium	High
	12	Venture Capital	Structuring Startup Scalability	-	<b>Facilitator</b>	Facilitator Mediator <b>Leader</b>	<b>Leader</b>	-	Low	High	Medium
<b>D</b>	13	Local innovation agency	Ideation Structuring Startup	Shaper <b>Architect</b>	Conductor <b>Facilitator</b>	<b>Facilitator</b> Mediator	-	Low	Low	Low	-
	14	Startup initiative	Ideation Structuring Startup	Shaper <b>Architect</b>	<b>Architect</b> Conductor	Architect <b>Conductor</b>	-	Medium	Medium	High	-
	15	Consultancy	Ideation Structuring Startup Scalability	Shaper <b>Architect</b> Mediator	Architect <b>Conductor</b>	<b>Facilitator</b> Mediator Leader	Mediator <b>Leader</b>	Medium	Medium	High	High
	16	Venture Capital	Ideation Structuring Startup Scalability	Shaper <b>Architect</b>	<b>Facilitator</b> Leader	Facilitator Mediator <b>Leader</b>	Mediator <b>Leader</b>	Low	Medium	Medium	High
<b>E</b>	17	University	Ideation Structuring	Shaper <b>Architect</b>	Conductor <b>Facilitator</b>	-	-	Low	Medium	-	-
	18	University	Ideation, Structuring,	Shaper <b>Architect</b>	Conductor <b>Facilitator</b>	-	-	Medium	Medium	-	-
	19	Consultancy	Structuring Startup Scalability	-	Shaper <b>Conductor</b>	Conductor <b>Facilitator</b>	<b>Facilitator</b>	-	Low	Medium	Medium
	20	Business Angel	Ideation Structuring Startup	<b>Architect</b>	<b>Conductor</b>	<b>Facilitator</b>	<b>Leader</b>	Medium	Medium	High	High



			Scalability								
<b>Note: Bold indicates the dominant role</b>											

## Appendix J.

### *Interview Guideline.*

#### **Person and Role:**

- Could you tell us briefly about yourself and what tasks you undertake in your organization?
- How long have you been working in your organization, and in what positions have you worked?

#### **Target Group:**

- Does your organization support specific target groups with respect to technology, industry, or application field of startups?
- Is there a geographic focus on supporting startups?
- Which phases of the startup lifecycle are supported by your organization?
- How does your organization identify promising startup companies to work with?

#### **Support Offerings:**

- What specific services does your organization offer in the various phases?
- How does the support offered by your organization differ within each phase of the startup lifecycle?

#### **Type of Collaboration:**

- How often and in what form do you interact with startups in the different phases of the lifecycle?
- Is there a formal relationship between your organization and the startups?
- To what extent does this formal relationship differ by support offering and startup lifecycle phase?
- What are the costs of collaboration, and who bears the costs?

#### **Goal of Support:**

- What is the goal of your organization's offering in each phase of the startup lifecycle?
- How is the achievement of the goal measured?

#### **External Third Parties:**

- Which external actors are relevant in the various phases of the startup lifecycle?
- To what extent do you collaborate with these external actors?

# Appendix K.

Illustrations of the relationship dynamics per interview and startup lifecycle phase.

