ORCHESTRATING INNOVATION ECOSYSTEMS ACROSS LIFECYCLE STAGES

Evolving orchestration practices for ecosystem continuity

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Abstract

Innovation ecosystems are key drivers of complex innovations, relying on effective orchestration to manage collaboration, align objectives, and foster value co-creation across different lifecycle stages. However, despite growing research, the evolution of orchestration across the lifecycle stages—initiation, growth, maturity, and renewal—remains underexplored.

This study addresses this gap by examining eleven Dutch innovation ecosystems across various lifecycle stages, offering a comprehensive analysis of how orchestrators adapt their approaches, roles, and strategies to manage stage-specific challenges and dynamics.

The findings reveal three key insights: First, the study highlights that orchestration evolves dynamically in response to the changing complexities of each stage, transitioning from directive roles in early stages to facilitative roles in later stages, ensuring alignment with ecosystem goals while fostering participant autonomy. Second, it underscores the critical interplay between top-down and bottom-up orchestration approaches, demonstrating that balancing these approaches is essential to sustaining collaboration, innovation, and ecosystem continuity. Third, it identifies that challenges such as aligning diverse interests, managing scaling complexities, and sustaining engagement manifest differently across lifecycle stages, necessitating stage-specific orchestration strategies.

This study refines existing orchestration models, highlighting orchestrators' dynamic roles and offering strategies to foster growth, resilience, and effective coordination in innovation ecosystems across lifecycle stages.

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Keywords

Innovation ecosystems, orchestration, ecosystem lifecycle, adaptive governance, leadership

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Introduction

Innovation ecosystems face significant coordination and cooperation challenges (Foss, Schmidt, & Teece, 2023). These challenges arise from the multilateral interdependencies among diverse actors that these ecosystems bring together—such as firms, governments, and academic institutions—to co-create value (Adner, 2006; Adner, 2016; Jucevicius et al., 2016). Coordination and cooperation complexities are particularly significant because innovation ecosystems play a vital role in tackling complex societal and economic problems in today's fast-paced world (Su, Zheng, & Chen, 2017; Talmar et al., 2020). To address these challenges and co-create value for society, ecosystem orchestration has emerged as a vital practice (Autio, 2022; Brink, 2023; Cobben, Ooms, & Roijakkers, 2023; Dedehayir, Mäkinen, & Ortt, 2018; Foss, Schmidt, & Teece, 2023; Pellikka et al., 2021). Ecosystem orchestration involves coordinating activities and participants to foster collaboration around shared goals and shaping the ecosystem's evolution (Autio, 2022; Cobben, Ooms, & Roijakker, 2023; Hurmelinna-Laukkanen, Möller, & Nätti, 2022; Reiter, Stonig, & Frankenberger, 2024; Still et al., 2014; Stonig & Müller-Stewens, 2019; Thomas, Faccin, & Asheim, 2021). Typically, a focal entity or entities – often key organisations such as established firms, research institutions, or governmental bodies – take on the role of orchestrator and establish rules, define roles, coordinate interactions, and guide value co-creation toward a shared vision, thereby catalysing the ecosystem's formation (Benitez, Ayala, & Frank, 2020; Dedehayir, Mäkinen, & Ortt, 2018; Foss, Schmidt, & Teece, 2023).

Regarding ecosystem orchestration, recent studies have highlighted the importance of relational governance in managing interactions and the role of orchestrators in fostering ecosystem resilience by ensuring adaptability and driving ongoing value co-creation (Chen et al., 2019; Cobben, Ooms, & Roijakkers, 2023; Dedehayir, Mäkinen, & Ortt, 2018; Garin, Béjean, & Meisiek, 2022; Linde et al., 2021; Pikkarainen et al., 2017; Thomas, Faccin, &

Asheim, 2021). Additionally, recent literature has discussed the use of top-down and bottom-up orchestration approaches, with top-down involving planned designs and centralised decision-making and bottom-up leveraging collaborative management and self-regulation by participants (Autio, 2022; Hurmelinna-Laukkanen, Möller, & Nätti, 2022; Reiter, Stonig, & Frankenberger, 2024; Stonig & Müller-Stewens, 2019; Thomas, Faccin, & Asheim, 2021). However, despite these theoretical advancements, significant gaps remain. First of all, there is limited understanding of how orchestration evolves across the ecosystem lifecycle. While studies such as Autio (2022), Dedehayir, Mäkinen, & Ortt (2018), and Reiter, Stonig, & Frankenberger (2024) have addressed orchestration in general or in a particular stage, such as initiation, there is limited analysis of orchestration practices across the entire lifecycle. Given the dynamic nature of innovation ecosystems, addressing this gap is critical for understanding how orchestrators adapt to shifting dynamics and ensure ecosystem continuity and resilience over time. Secondly, specific approaches and strategies orchestrators use to enable ongoing value co-creation and ensure ecosystem continuity in the face of ecosystem complexities remain underexplored (Gu et al., 2021; Yaghmaie & Vanhaverbeke, 2020). Addressing this gap is relevant for identifying specific practices to overcome challenges at different lifecycle stages, ensuring sustained value co-creation. Thirdly, while existing studies (e.g. Autio, 2006; Foss, Schmidt, & Teece, 2023) identify ecosystem challenges, there is a significant gap in understanding the specific challenges at each stage and how certain challenges may manifest differently across stages, subsequently impacting orchestration roles and strategies. Addressing this gap is crucial for gaining a more comprehensive understanding of how orchestrators adapt their roles and strategies to effectively navigate evolving complexities. Following the identified research gaps, this study aims to provide a comprehensive understanding of the evolution of innovation ecosystem orchestration across different lifecycle stages. The research focuses on the approaches, roles, and strategies required to

address stage-specific challenges and ensure the resilience and continuity of innovation ecosystems over time. To achieve this goal, the research addresses the following question:

"How can orchestrators manage innovation ecosystems across different lifecycle stages to ensure their continuity?"

To address the research question, empirical data was collected through interviews with ecosystem orchestrators from eleven different innovation ecosystems in the Netherlands, capturing valuable insights into ecosystem dynamics and orchestration practices employed across lifecycle stages. By uncovering how ecosystem dynamics vary across lifecycle stages and how orchestrators adapt to effectively manage innovation ecosystems, this research provides valuable insights for addressing the unique complexities of each lifecycle stage and ensuring ecosystem continuity over time.

This study contributes to academic research on innovation ecosystem orchestration by addressing gaps in ecosystem lifecycle models (Moore, 1993; Mikhailov et al., 2021), ecosystem challenges (Adner, 2006; Foss, Schmidt, & Teece, 2023), and orchestration approaches, roles, and strategies (Autio, 2022; Dedehayir, Mäkinen, & Ortt, 2018; Reiter, Stonig, & Frankenberger, 2024). By combining existing theoretical perspectives with empirical insights into a new framework, this research illustrates how orchestration evolves in response to changing ecosystem dynamics across lifecycle stages, providing a dynamic and context-specific framework for orchestrating innovation ecosystems.

Theoretical Framework

Innovation Ecosystems

This study is embedded in the context of innovation ecosystems, a vital concept for understanding collaborative innovation and value co-creation. Building on Moore's (1993) notion of business ecosystems, innovation ecosystems emphasise interconnected relationships among diverse actors —including companies, governments, and knowledge institutions — collaborating to drive innovation through value co-creation (Adner, 2016; Jackson, 2011; Jucevicius et al., 2016; Marcon et al., 2024; Thomas & Autio, 2020; Walrave et al., 2018). Unlike business ecosystems, which focus on competitive value capture, innovation ecosystems emphasise value co-creation among diverse actors (Galvagno & Dalli, 2014; Gomes et al., 2018; Pushpananthan & Elmquist, 2022; Ritala et al., 2013; Smorodinskaya et al., 2017). Similarly, they differ from entrepreneurial ecosystems, focused on regional development through stimulating new venture creation (Burda, Volkova, & Gavrikova, 2020; Hakala et al., 2020; Stam & van de Ven, 2021; Thomas & Autio, 2020), and knowledge ecosystems, focused on new knowledge generation (Scaringella & Radziwon, 2018; Valkokari, 2015). In contrast, innovation ecosystems integrate both knowledge exploration and exploitation, and encompass a wider variety of participants (Scaringella & Radziwon, 2018; Thomas & Autio, 2020; Valkokari, 2015; Visscher, Hahn, & Konrad, 2021). Innovation ecosystems are typically guided by a shared vision that aligns diverse actors with long-term strategies for value creation and shapes value propositions to direct collaborative efforts (Adner, 2017; Pellikka et al., 2021; Pushpananthan & Elmquist, 2022; Talmar et al., 2020; Visscher, Hahn, & Konrad, 2021; Walrave et al., 2018). To create value around shared objectives, close collaboration among diverse actors who leverage their unique resources and capabilities is essential, highlighting the multilateral interdependencies within innovation ecosystems (Adner & Kapoor, 2010; Arena, Azzone, & Piantoni, 2022; Dondofema &

Grobbelaar, 2019; Galvagno & Dalli, 2014; Ketonen-Oksi & Valkokari, 2019; Piantoni, Arena, & Azzone, 2023; Pushpananthan & Elmquist, 2022; Smorodinskaya et al., 2017). A key feature of innovation ecosystems is their reliance on trust, effective communication, and resource exchange to foster collaboration, while also balancing competitive dynamics that drive innovation (Arena, Azzone, & Piantoni, 2022; Granstrand & Holgersson, 2020; Marcon et al., 2024; Su, Zheng, & Chen, 2017; Visscher, Hahn, & Konrad, 2021). Maintaining this balance is critical for ensuring both functionality and competitiveness, fostering sustainable innovation (Arena, Azzone, & Piantoni, 2022; Scaringella & Radziwon, 2018; Su, Zheng, & Chen, 2017; Zhao, 2021). These dynamics highlight the need for coordination within innovation ecosystems, which brings us to the concept of orchestration.

Orchestration in Innovation Ecosystems

To address the complexities of innovation ecosystems and ensure their functionality and continuity, orchestration is an essential practice (Autio, 2022; Brink, 2023; Cobben, Ooms, & Roijakkers, 2023; Dedehayir, Mäkinen, & Ortt, 2018; Foss, Schmidt, & Teece, 2023, Pellikka et al., 2021; Thomas, Faccin, & Asheim, 2021). At the core of innovation ecosystems, a focal entity, such as an organisation, platform, or hub, typically takes on the orchestrator role, crucial for coordinating activities, managing interactions, and setting up the infrastructure to enable co-creation aligned with the ecosystem's vision (Adner & Kapoor, 2010; Autio, 2022; Cobben, Ooms, & Roijakker, 2023; Dedehayir, Mäkinen, & Ortt, 2018; Gu et al., 2021; Hurmelinna-Laukkanen et al., 2022; Reiter, Stonig, & Frankenberger, 2024; Still et al., 2014; Stonig & Müller-Stewens, 2019; Walrave et al., 2018). Although there are some instances where ecosystems are successful without a focal entity, instead relying on loosely connected participants independently collaborating (Brink 2022, 2023), most ecosystems depend on a focal entity to orchestrate value co-creation (Walrave et al., 2019). Effective orchestration is essential for establishing a shared vision, fostering shared understanding among diverse

participants, defining roles, building trust, stimulating collaboration, and realising the ecosystem's potential (Autio, 2022; Benitez, Ayala, & Frank, 2020; Bittencourt, Santos, & Mignoni, 2021; Cobben, Ooms, & Roijakkers, 2023; Foss, Schmidt, & Teece, 2023; Linde et al., 2021; Neto et al., 2024; Paasi et al., 2023; Pellikka et al., 2021; Reiter, Stonig, & Frankenberger, 2024). Through strong connections and unique capabilities, the orchestrator attracts participants, develops value propositions aligned with the ecosystem's vision, and addresses internal and external uncertainties to maintain and enhance ecosystem viability (Chen et al., 2019; Dondofema & Grobbelaar, 2019; Foss, Schmidt, & Teece, 2023; Gomes, Dos Santos, & Facin, 2022; Gomes, Facin, & Salerno, 2021; Pikkarainen et al., 2017; Walrave et al., 2018). As orchestrators must continuously balance fostering innovation with maintaining coherence, adaptive governance strategies are needed that evolve with ecosystem dynamics (Reiter, Stonig, & Frankenberger, 2024). To address this, orchestrators balance formal mechanisms – such as contracts and standardised processes – that provide stability in low-uncertainty contexts, with informal, trust-based mechanisms, that foster agility and innovation in high-uncertainty settings (Reiter, Stonig, & Frankenberger, 2024). Furthermore, to effectively manage innovation ecosystems, orchestrators need to identify emerging opportunities, seize these through competitive value propositions, and reconfigure resources to adapt to changes, ensuring the ecosystem remains relevant (Chen et al., 2019; Linde et al., 2021). However, since these different activities require distinct mindsets and approaches, it is common that multiple actors share various orchestration responsibilities (Garin, Béjean, & Meisiek, 2022). To orchestrate innovation ecosystems, orchestrators' approaches can primarily focus on top-down methods, where the ecosystem's structure is thoroughly designed with more centralised decision-making, or bottom-up methods, where the ecosystem's structure is co-created through iterative interactions among participants, involving more decentralised decision-making (Autio, 2022; Thomas, Faccin, & Asheim, 2020). Given the

uncertainties in innovation ecosystems, the viability of a planned top-down approach is often constrained, making the inclusion of bottom-up approaches preferable as they enable the ecosystem to better respond to emerging challenges and opportunities (Autio, 2022). In summary, orchestration is a critical practice for coordinating innovation ecosystems, involving strategic oversight, adaptation to emerging challenges and opportunities, and ensuring ecosystem resilience and continuity.

Lifecycle

Given the need for orchestrators to continuously adapt their strategies, understanding the lifecycle of innovation ecosystems is crucial. Innovation ecosystems typically progress through four stages—initiation, growth, maturity, and renewal (Moore, 1993). Each stage is characterised by distinct dynamics as ecosystems adapt to changing internal and external conditions such as participant dynamics, technological advancements, and market pressures (Moore, 1993). As ecosystems evolve, their priorities shift – from establishing foundational relationships and structures to scaling activities, maintaining stability, and ultimately redefining value propositions in response to new opportunities or threats (Benitez, Ayala, & Frank, 2020; Dedehayir, Mäkinen, & Ortt, 2018; Mikhailov et al., 2021; Paasi et al., 2023; Ritala et al., 2013). Moore's lifecycle perspective provides a structured framework for understanding how innovation ecosystems evolve, emphasising the need for continuous adaptation and transformation to remain relevant and ensure ecosystem continuity. By framing ecosystem development as a lifecycle, this study recognises the dynamic nature of innovation ecosystems and the need for tailored orchestration approaches that address the unique challenges of each stage.

Innovation Ecosystem Challenges

Across the lifecycle stages, innovation ecosystems face several coordination and cooperation challenges (Foss, Schmidt, & Teece, 2023). Adner (2006) identifies three fundamental risks in

innovation ecosystem: initiative, interdependence, and integration risks. Initiative risks involve typical project uncertainties like planning, resource allocation, and execution, affecting collaborative success and the ecosystem's timeline. Interdependence risks arise from the need to align diverse objectives and activities among participants with the ecosystem's vision (Foss, Schmidt, & Teece, 2023; Reiter, Stonig, & Frankenberger, 2024; Yaghmaie & Vanhaverbeke, 2019), with a fundamental challenge being the lack of a direct link between individual efforts and collective benefits, which can lead to opportunism and free riding, undermining overall collaboration and success (Autio & Thomas, 2014). Lastly, integration risks involve challenges in integrating new technologies or innovations, often causing compatibility issues and resistance to change (Adner, 2006). These risks are further compounded by external challenges, such as adapting to shifting user preferences, policies, and cultural factors, impacting the ecosystem's acceptance within the broader socio-technical environment (Walrave et al., 2018). Together, these challenges underscore the complexity of orchestrating innovation ecosystems. They serve as a foundation for understanding the orchestration roles and strategies required to effectively manage these challenges across lifecycle stages.

Building upon Theory

The concepts of orchestration, the lifecycle model, and ecosystem challenges, embedded within the context of innovation ecosystems, provide a comprehensive framework for examining the dynamic nature of innovation ecosystem orchestration. Existing studies recognise orchestration as a critical practice for fostering collaboration, managing interdependencies, and aligning diverse actors toward shared value creation (Autio & Thomas, 2014; Dedehayir, Mäkinen, & Ortt, 2018). The lifecycle model highlights the adaptive processes ecosystems undergo as they progress through initiation, growth, maturity, and renewal stages, each presenting distinct dynamics and challenges (Moore, 1993).

Additionally, literature on ecosystem challenges emphasise the complexities orchestrators must address to ensure alignment, functionality, and continuity within ecosystems (Adner, 2006; Foss, Schmidt, & Teece, 2023). Building on this foundation, this study investigates how orchestrators manage innovation ecosystems across their lifecycle. It focuses on the evolving challenges of innovation ecosystems and how orchestration approaches, roles, and strategies adapt to navigate the challenges of each stage. By addressing these dynamics, the study seeks to advance understanding of how orchestration practices evolve to ensure ecosystem continuity across the lifecycle. In the following section, the methodological approach used for this investigation will be presented.

Methodology

Research Design and Method

The aim of this study was to provide a comprehensive understanding of the dynamic and complex-specific processes of innovation ecosystem orchestration across different lifecycle stages, necessitating a thorough exploration of challenged faced, and the roles and strategies employed by orchestrators across the ecosystem lifecycle. Therefore, a qualitative research design was adopted, which allowed for an in-depth investigation of complex context-dependent phenomena where understanding emerges directly from the phenomenon under investigation rather than being imposed by existing theories (Babbie, 2019). As orchestration within innovation ecosystems is an underexplored phenomenon, this approach enabled the discovery of new insights grounded in empirical evidence.

Given the intricate and evolving dynamics of innovation ecosystems, a multiple-case study method was chosen to capture the nuances of orchestration processes across lifecycle stages. This approach enables in-depth investigation of real-world phenomena embedded in their contexts and allows for the inclusion of multiple perspectives and data sources (Babbie, 2019). Applying the multiple-case study method not only facilitated a comprehensive understanding of individual cases but also enabled comparisons and the identification of patterns across cases. By examining multiple innovation ecosystems at varying lifecycle stages, this study captured the diversity and commonalities of orchestration practices, enhancing the robustness and transferability of the findings. Within this framework, the Eisenhardt method (1989; 2021) was applied as it provides a systematic, theory-building approach to case study research. By emphasising cross-case analysis, the Eisenhardt method facilitated the systematic analysis of orchestration dynamics across lifecycle stages, enabling the identification of patterns and the development of a novel, empirically grounded framework that advances the theoretical understanding of innovation ecosystem orchestration.

This approach is particularly well-suited for addressing the underexplored phenomenon of orchestration in innovation ecosystems, where existing theoretical frameworks are limited.

Research Context

This study focused on innovation ecosystems in the Netherlands, an advanced economy renowned for its technological advancement, public-private collaboration, and sustainability initiatives, supported by strong institutional frameworks and triple-helix models of collaboration among government, academia, and industry (TNO, 2015). Initiatives such as The National Growth Fund (Rijksoverheid, 2021), which supports collaborative advancements in critical areas such as quantum technology and artificial intelligence, underscore the country's commitment to addressing societal challenges through collaborative innovation and technological progress. These characteristics made Dutch innovation ecosystems a relevant context for examining the dynamic roles and strategies of orchestrators in coordinating innovation ecosystems to co-create value for tackling complex challenges in advanced settings. The insights gained can inform other economies aiming to enhance their innovation capacity through similar practices. While rooted in the Dutch context, the findings are expected to have broader applicability to other developed economies aiming to advance ecosystem orchestration and address complex challenges through collaborative innovation.

Selecting Cases

The case selection followed a theoretical sampling approach (Eisenhardt, 2021), prioritising cases that could replicate or expand emerging theories on orchestration in innovation ecosystems. This method enhanced relevance by focusing on cases aligned with the study's research problem, rather than relying on random sampling. Theoretical sampling is particularly well-suited for exploring underdeveloped phenomena, as it enables the collection of data that maximises variation in key dimensions and ensures depth in the analysis (Strauss & Corbin, 1998, p. 202). This approach involved data gathering driven by concepts derived

from the theory, focusing on making comparisons and discovering variations among key concepts, following the principles outlined by Strauss and Corbin (1998, pp. 201-203). Specifically, this involved selecting cases that provided the best opportunities to capture variations in ecosystem challenges and orchestration approaches, roles, and strategies across lifecycle stages, while enriching the categories by expanding their dimensions as the analysis evolved. Eleven innovation ecosystems in the Netherlands were selected, covering the four lifecycle stages, with at least two ecosystems per stage to enable a comprehensive understanding of how orchestration varies across stages. All cases were public-private partnerships, highlighting the interplay between governmental and private actors. This context provided an opportunity to capture the diverse collaborations within innovation ecosystems and explore the orchestration dynamics required to manage them effectively. Of the selected ecosystems, nine operated on a regional scale, while two operated on a national scale, enriching the analysis with diverse perspectives. Moreover, the ecosystems in more advanced stages provided further insights into the evolution of orchestration over time, as they had already progressed through earlier stages. Together, these cases contributed to a deep understanding of orchestration dynamics across the lifecycle. Table 1 outlines the cases, detailing participant roles, current lifecycle stage, and both initial and current orchestration approaches. To ensure robust insights, the sampling process aimed to reach theoretical saturation, defined as the point at which no new insights emerged and all constructs had their main properties clearly identified (Strauss & Corbin, 1998, pp. 212, 292). The comprehensive analysis of eleven cases enabled to successfully achieve theoretical saturation, providing a thorough and nuanced understanding of innovation ecosystem orchestration across lifecycle stages.

Table 1. Case characteristics

Case	Interview participant	Role interview participant	Lifecycle stage	Geographical Focus	Initial orchestration approach	Current orchestration approach
A	IP1	Program manager	Growth	Regional	Hybrid with bottom-up focus	Hybrid with bottom-up focus
B	IP2	Director	Initiation	Regional	Top-down	Hybrid
C	IP3	Director	Renewal	Regional	Hybrid with top-down focus	Hybrid
D	IP4	Theme-tracker	Growth	National	Hybrid	Hybrid with bottom-up focus
E	IP5	Program director	Growth	Regional	Hybrid with top-down focus	Hybrid
F	IP6	Project leader	Growth	Regional	Hybrid	Hybrid
G	IP7	Director	Maturity	Regional	Top-down	Hybrid with bottom-up focus
H	IP8, IP11, & IP12	CEO and Community developers	Maturity	Regional	Hybrid with top-down focus	Hybrid with bottom-up focus
I	IP9	Senior business developer	Growth	Regional	Top-down	Hybrid with bottom-up focus
J	IP10	Managing director	Maturity	National	Hybrid with bottom-up focus	Hybrid with bottom-up focus
K	IP13	Program director	Renewal	Regional	Hybrid with bottom-up focus	Hybrid with bottom-up focus

Data Collection

Data was primarily gathered through qualitative interviews with key informants involved in orchestrating innovation ecosystems. To ensure the interview participants were orchestrators in their ecosystems, they were selected based on their direct responsibilities for coordination, alignment, and facilitation within their respective ecosystems. Background checks, including organisational roles and professional profiles, were conducted to confirm their orchestration

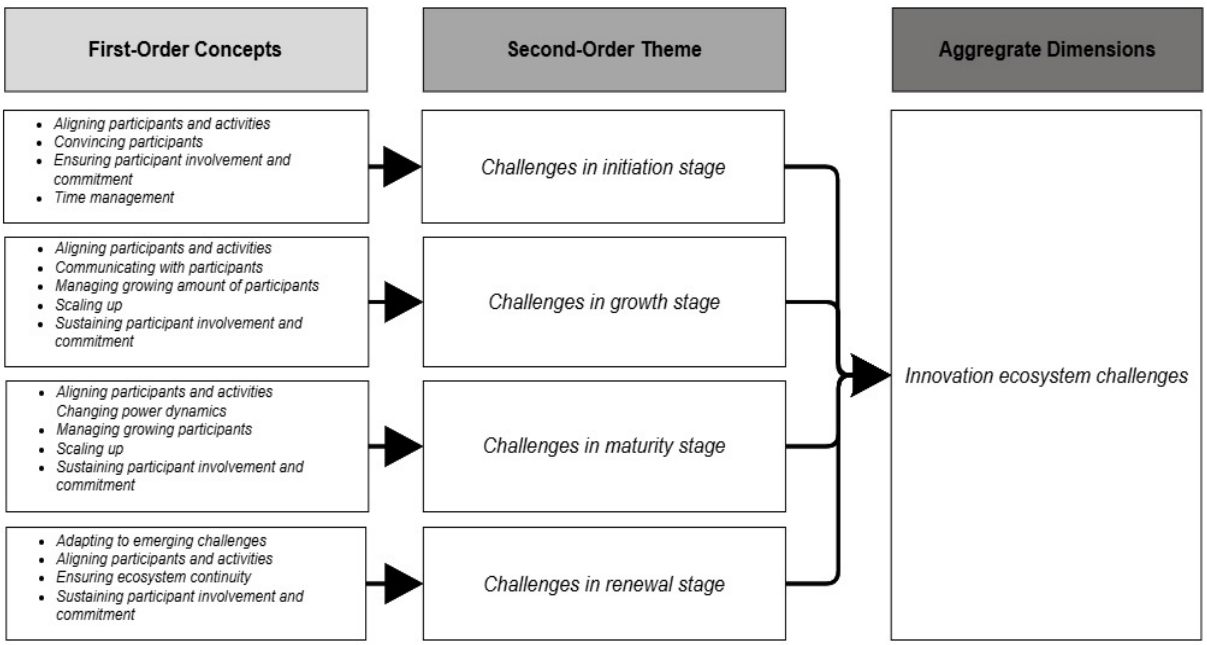
roles. For ten of the eleven case studies, a single interview was conducted, while due to a unique opportunity one case included interviews with three orchestrators, providing a richer dataset and deeper insight into how different orchestration roles complement one another. The key informants, selected for their in-depth knowledge and first-hand experiences, offered direct insights into ecosystem challenges and orchestration approaches, roles, and strategies, adding depth and reliability to the data (Marshall, 1996). Although interviewing only one person per ecosystem may have introduced bias by capturing only the orchestrator's perspective – potentially overlooking the views of other ecosystem participants – the focus on key orchestrators was purposeful. This approach aligned with the study's aim to understand orchestration from the perspective of those responsible for its execution. The interviews followed a semi-structured approach, which offered both structure and flexibility, enabling deeper exploration through follow-up questions (Babbie, 2019). An interview guide (see Appendix A), based on the theoretical framework, ensured all interviews addressed essential topics, providing content validity through alignment with existing literature (Babbie, 2019). To enhance reliability, the first interview was used to refine the interview guide for subsequent interviews. Additionally, secondary data such as the innovation ecosystems' websites, reports, and accessible documents were assessed to provide contextual background, validate interview findings, and refine the emergent framework. These sources complemented the primary data by providing additional insights on the challenges and orchestration approaches, roles, and strategies within the cases.

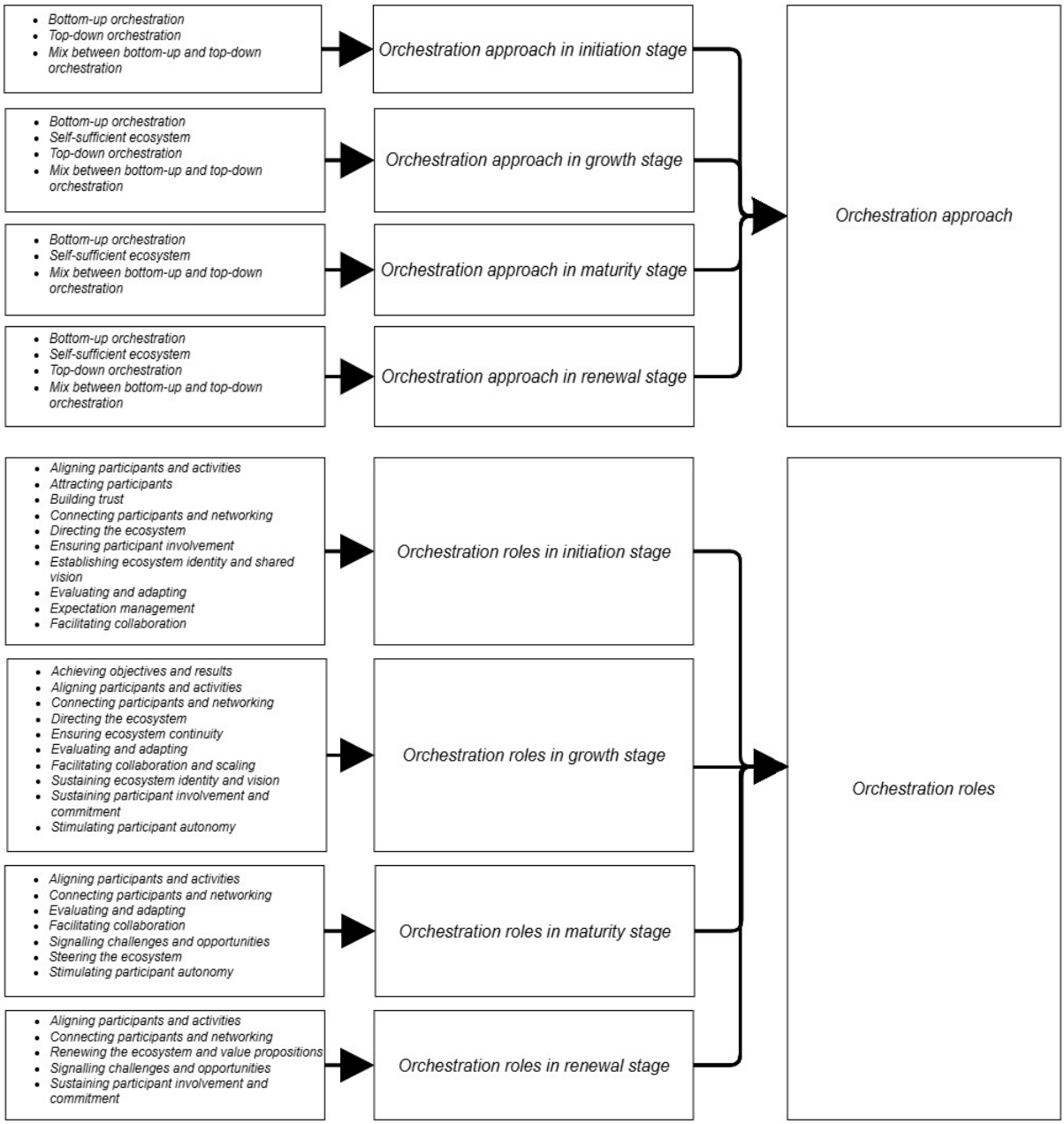
Data Analysis

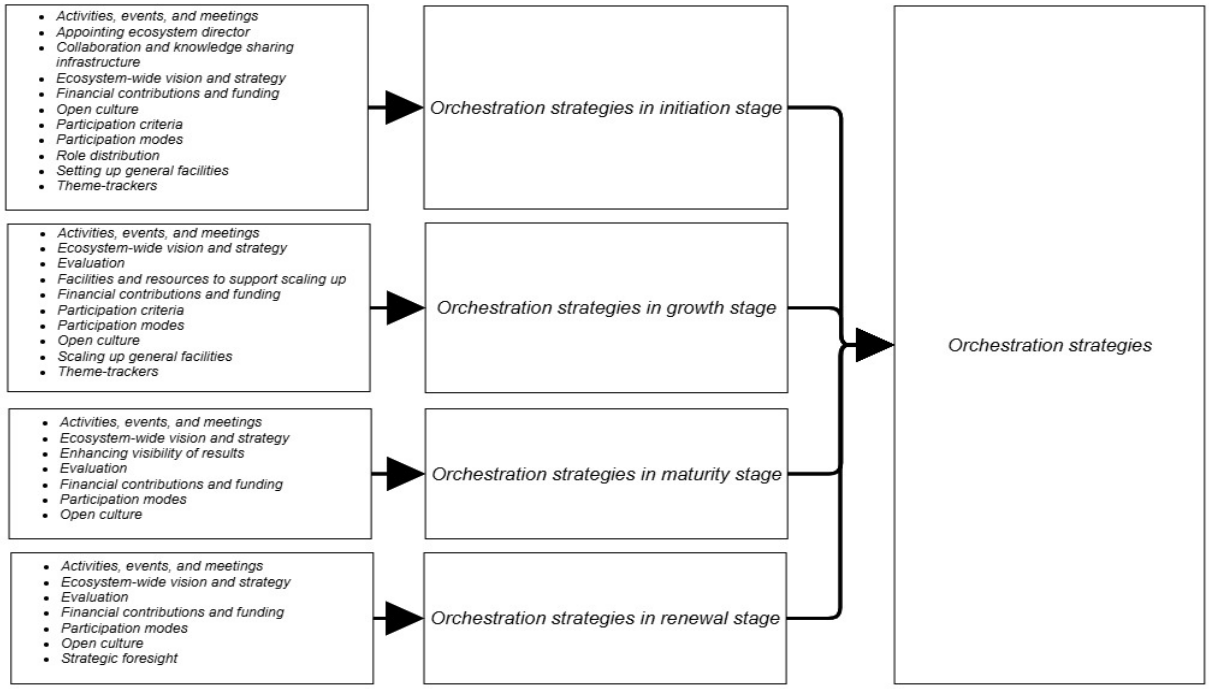
To ensure accuracy and guide data analysis, all interviews were recorded and transcribed, followed by a mixed-coding approach using both inductive and deductive methods. A structured approach, inspired by Gioia et al. (2013), was employed to ensure transparency and rigor in the coding process. First-order concepts were derived inductively from interview

transcripts, capturing participants' nuanced perspectives and emergent insights. This approach was particularly valuable for capturing the underexplored, detailed, and context-specific dynamics of orchestration in innovation ecosystems (Chandra & Shang, 2019). However, unlike the traditional Gioia method, second-order themes and overarching categories were informed deductively by key dimensions of innovation ecosystem orchestration, such as challenges, approaches, roles, and strategies. This adaptation allowed for alignment between emergent findings and the study's focus on understanding the evolving orchestration practices to manage the complexities of innovation ecosystems across various lifecycle stages. The deductively themes were further organised into four categories representing the lifecycle stages (initiation, growth, maturity, renewal), based on Moore's (1993) ecosystem lifecycle model. The coding process was iterative, involving constant comparison within and across cases to refine codes, ensure coherence, and identify recurring patterns. This approach systematically captured both the detailed dynamics of orchestration and broader patterns across lifecycle stages. Figure 1 provides an example of the coding approach.

Figure 1. Coding structure




Bottom-up orchestration
Top-down orchestration
Mix between bottom-up and top-down orchestration
Orchestration approach in initiation stage
Bottom-up orchestration
Self-sufficient ecosystem
Top-down orchestration
Mix between bottom-up and top-down orchestration
Orchestration approach in growth stage
Bottom-up orchestration
Self-sufficient ecosystem
Mix between bottom-up and top-down orchestration
Orchestration approach in maturity stage
Bottom-up orchestration
Self-sufficient ecosystem
Top-down orchestration
Mix between bottom-up and top-down orchestration
Orchestration approach in renewal stage
Orchestration approach
Aligning participants and activities
Attracting participants
Building trust
Connecting participants and networking
Directing the ecosystem
Ensuring participant involvement
Establishing ecosystem identity and shared vision
Evaluating and adapting
Expectation management
Facilitating collaboration
Orchestration roles in initiation stage
Achieving objectives and results
Aligning participants and activities
Connecting participants and networking
Directing the ecosystem
Ensuring ecosystem continuity
Evaluating and adapting
Facilitating collaboration and scaling
Sustaining ecosystem identity and vision
Sustaining participant involvement and commitment
Stimulating participant autonomy
Orchestration roles in growth stage
Aligning participants and activities
Connecting participants and networking
Evaluating and adapting
Facilitating collaboration
Signalling challenges and opportunities
Steering the ecosystem
Stimulating participant autonomy
Orchestration roles in maturity stage
Aligning participants and activities
Connecting participants and networking
Renewing the ecosystem and value propositions
Signalling challenges and opportunities
Sustaining participant involvement and commitment
Orchestration roles in renewal stage
Orchestration roles



In the result section, direct quotes from participants were used to support first-order concepts and highlight key insights, while interpretations were explicitly distinguished to maintain clarity. Although specific codes were not formally quantified, priority was given to themes that were consistently observed across multiple cases or emphasised strongly by participants. Following Eisenhardt's (2021) methodology, the analysis began with within-case analysis to identify unique patterns in each case, allowing a deep understanding of each ecosystem prior to identifying broader patterns across cases. Cross-case analysis was then conducted to identify similarities and differences across ecosystems, facilitating the development of a generalisable framework for orchestration. Finally, in line with the Eisenhardt method (2021), findings from the interviews were contextualised through comparison with existing literature on innovation ecosystem orchestration. This iterative process enabled the validation of the emergent framework by building on insights from established theories, thereby enhancing its internal validity and theoretical robustness, while also providing nuanced insights into orchestration processes across lifecycle stages. In the following section, the findings from the case analyses, which led to the development of an emerging framework, will be presented.

Findings

Following the analysis of the elven ecosystems, this section outlines the key findings, starting with the individual case analyses that highlight how the interviewed orchestrators managed their innovation ecosystems across different lifecycle stages. These are followed by a cross-case analysis, providing comparative insights into common patterns and differences across the cases. Building on the cross-case analysis, a new framework is introduced to synthesise the findings and provide a structured overview and comprehensive understanding on innovation ecosystem orchestration across lifecycle stages.

Individual Case Analyses

Case A

Case A involved a regional innovation ecosystem in the growth phase, initially developed as a bottom-up collaboration among education, businesses, and government. An organisation was established to manage the ecosystem and set its strategic direction. Initially, top-down structures were employed but proved less effective, leading the orchestrator to shift towards a bottom-up approach that integrated participant interests. The ecosystem faced several challenges, including fostering collaboration and aligning diverse participant interests initially, and maintaining participant engagement and ensuring continuous knowledge flow as the ecosystem grew. Another challenge was translating knowledge generated within the ecosystem into tangible outputs while balancing diverse contributions from participants. Additionally, in the growth stage the ecosystem needed to attract new participants and identify new projects that aligned with participant interests to ensure long-term sustainability.

The orchestrator played a pivotal role in addressing initial challenges through networking efforts. During the growth phase, the orchestrator focused on expanding the ecosystem, turning knowledge into tangible outputs, and balancing diverse participant contributions. Efforts included ongoing communication, stimulating in-kind contributions, and organising

events to maintain engagement. Furthermore, as the ecosystem evolved, the orchestrator directed efforts towards ensuring the ecosystem's self-sufficiency by gradually transitioning to a participant-driven model. To further improve orchestration, the orchestrator suggested to appoint neutral theme trackers to oversee coordination and enhance collaborative effectiveness.

Case B

Case B represented a regional innovation ecosystem in the initiation stage, emerging from a top-down initiative. Orchestration was managed by two entities: one responsible for branding and coordination and the other for infrastructure. Their collaboration aimed to align ecosystem development with urban planning, with plans to centralise orchestration under one body in the future. The ecosystem faced several challenges, including forming a cohesive ecosystem identity early on to attract participants, integrating diverse components, and aligning stakeholder objectives. Encouraging participant engagement and fostering partnerships were critical to establishing a solid foundation for the ecosystem's development. The orchestrator's primary role during this stage was to direct the ecosystem's formation. This included integrating and aligning diverse stakeholders, establishing an ecosystem identity to position it in its broader environment, and encouraging participant involvement and proactive contributions. To address the various challenges, the orchestrator initially implemented a predominantly top-down approach, blended with bottom-up elements to encourage shared ownership and lay foundations for sustainable growth. The orchestrator also played a facilitative role by organising networking events and activities to promote engagement and foster partnerships, while encouraging participants to appoint business developers to enhance their networks. To further support long-term sustainability, expanding regional involvement and increasing the orchestrator's strategic roles were suggested.

Case C

Case C involved a regional innovation ecosystem in the renewal stage, orchestrated by an organisation employing both top-down and bottom-up approaches to sustain its relevance through continuous renewal. The ecosystem faced challenges in translating evolving societal needs into actionable projects, adopting an integrated approach to align diverse participants, and managing the multilateral interdependencies that slowed some processes while accelerating others. Furthermore, individual competition occasionally hindered collaboration, adding complexity to fostering a cohesive and collaborative culture.

The orchestrator balanced a directive role in providing strategic guidance with a facilitative role in encouraging participant input. This included signalling renewal opportunities, aligning activities with the ecosystem's vision and external demands to remain relevant, and active relationship-building to maintain engagement and foster a sense of shared ownership. The orchestrator encouraged a culture of collaboration and ensured participants were recognised for their contributions, strengthening commitment and collaboration. Furthermore, the orchestrator promoted cross-sectoral collaboration by organising networking events to spark new initiatives and foster knowledge sharing. Additionally, strategic collaboration with other ecosystems to expand the ecosystem's visibility was key to sustain renewal.

Case D

Case D featured a national innovation ecosystem that recently transitioned from the initiation to the growth stage. Originating as a bottom-up initiative, its coordination is managed by a dedicated team overseeing facility management, participant alignment, and theme tracking. The orchestrator employed a balanced approach, integrating top-down oversight with support for participant-driven initiatives. Key challenges during the initiation stage included establishing collaboration and aligning diverse participant activities. Ensuring effective use of shared facilities and encouraging participants' commitment required mechanisms to address issues like resource management and stakeholder alignment. In the growth stage, managing

increasing participant autonomy while maintaining oversight for strategic activities and scaling initiatives became essential.

The orchestrator initially focused on building relationships, integrating participants, initiating collaboration, and aligning activities. Establishing shared facilities and introducing membership requirements, including financial and in-kind contributions, strengthened participant commitment. Theme trackers were appointed to oversee specific areas and encourage knowledge sharing. As the ecosystem grew, the orchestrator shifted towards enabling greater participant autonomy by providing data access and tools for scaling successful projects, while maintaining strategic oversight to ensure alignment. Learning from other ecosystems and continuous reflection on the orchestrator's roles and strategies were also emphasised to sustain long-term ecosystem growth and resilience.

Case E

Case E involved a regional innovation ecosystem in the growth phase. Initially initiated as a top-down municipal initiative, it evolved through bottom-up input from diverse sectors. In the growth stage, the orchestrator focused on facilitating the scaling of innovations and demonstrating their broader impact while addressing diverse participant needs and maintaining a unified identity. Initial challenges included laying a strong foundation to foster future growth, while growth stage challenges included managing increasing complexity of participant interactions and ensuring new participants aligned with the ecosystem's identity.

During the initiation phase, the orchestrator set clear objectives and used strategic participant selection to provide a strong foundation for growth. In the growth phase, the orchestrator transitioned from primarily coordinating to realising value co-creation among participants. The orchestrator balanced formal structures for guidance with informal interactions for trust and collaboration. Supporting participants from ideation to implementation was also crucial, ensuring innovations could be scaled effectively and achieve a broader impact. Furthermore,

to reinforce ecosystem values and maintain coherence, participant selection became even more rigid in the growth stage. Additionally, learning from other ecosystems helped refine the ecosystem's strategy and enhance its competitiveness, sustaining innovation and success while maintaining a unified identity.

Case F

Case F featured a regional innovation ecosystem in the growth phase, developed from a bottom-up initiative. Governance was structured with a director and steering group providing strategic direction, an independent orchestrator ensuring balanced interests, and a management team, including participant representatives, overseeing strategy execution. This governance model blended top-down and bottom-up approaches to support participant alignment and commitment. The ecosystem faced several challenges during its growth phase. Key issues included maintaining alignment with shared objectives among diverse participants, balancing flexibility with structure to accommodate evolving needs, and fostering accountability through clear commitments. Additionally, scaling projects from regional to national contexts while attracting a broader range of participants posed complexities, as did establishing a unified national identity in a broader landscape.

The orchestrator played a crucial role in balancing diverse interests, preventing conflicts, and ensuring strategic alignment and commitment during the ecosystem's growth phase. Key strategies included fostering value co-creation by promoting knowledge sharing, supporting the scaling of successful projects, and establishing clearer commitments for in-kind contributions to enhance participant accountability. Governance adjustments streamlined processes to promote participant self-sufficiency while maintaining oversight, fostering transparency and alignment through regular reflections with participants on progress. Adapting governance structures not only strengthened collaboration mechanisms and

responsiveness, but also positioned the ecosystem for sustained growth and a stronger national presence in the broader innovation landscape.

Case G

Case G represented a regional ecosystem in the maturity stage, initially established through a top-down initiative. Orchestration is managed by an organisation focused on strategic planning, maintaining alignment, and supporting business development. Key challenges included establishing foundations and collaboration in the initiation phase and promoting participant autonomy while ensuring alignment as the ecosystem matured. Furthermore, managing shifting power dynamics as larger organisations gained influence was a significant challenge during maturity, impacting the engagement of smaller participants. Sustaining collaboration among diverse participants and ensuring equal participation in decision-making remained an ongoing challenge.

The orchestrator's role transitioned from establishing foundations and building collaborations in the initiation stage to promoting participant autonomy while ensuring alignment as the ecosystem matured. The orchestrator played a strategic role in expanding networking efforts to attract new participants, fostering growth and sustaining alignment among participants. Furthermore, facilities were developed to support collaboration and later expanded to accommodate scaling and commercialisation efforts. To address power dynamics, an inclusive framework was implemented to ensure equal participation and collective problem-solving. Further suggested strategies to improve orchestration included introducing a membership model with financial contributions to enhance participant commitment and accountability. Furthermore, expanding government involvement and learning from other ecosystems were recommended to support continued development and sustain the ecosystem's long-term success.

Case H

Case H involved a regional innovation ecosystem initiated through a top-down collaboration between government and a knowledge institution, building on bottom-up efforts from regional organisations. The ecosystem is orchestrated by an entity including a director focused on strategic guidance and community developers connecting participants and promoting co-creation. In the initiation stage, key challenges involved establishing trust, fostering collaboration, managing participant expectations, and defining participant roles. As the ecosystem grew, scaling projects required proper knowledge infrastructure while sustaining alignment with the shared vision. In maturity, balancing decreasing proactive orchestration with the need for strategic oversight was challenging.

During initiation, the orchestrator directed trust-building efforts by creating a shared vision and facilitating connections. Open culture-building initiatives and organised events were key to fostering a community where participants could connect independently, creating a foundation for a self-sustaining ecosystem. The orchestrator initiated projects to enhance the ecosystem's visibility and attract diverse participants. In the growth stage, the orchestrator focused on scaling projects by providing knowledge infrastructure and general facilities. Furthermore, start-up programs and matchmaking were implemented to engage organisations of all sizes. As the ecosystem matured, proactive orchestration decreased, with participants gaining autonomy, while top-down oversight remained essential for alignment and ecosystem guidance. Continuous evaluation of strategic objectives with participants balanced top-down guidance with bottom-up engagement. To further enhance orchestration, suggestions included implementing a funding model for financial stability and integrating innovation management to strengthen the ecosystem's long-term resilience. Case H illustrates the importance of dividing orchestration tasks effectively, with a director providing high-level strategic oversight and community developers engaging participants to foster trust and collaboration.

Case I

Case I represented a regional innovation ecosystem transitioning from the initiation to the growth stage. Initiated by local governments and knowledge institutions, the ecosystem followed a predominantly top-down approach. Orchestration was managed by a project-based organisation, including theme trackers overseeing specific focus areas. Initially, key challenges included motivating participants to be proactively involved in the ecosystem. In the growth stage, significant challenges included transitioning towards participant self-sufficiency while maintaining strategic alignment and accountability.

In the initiation stage, the orchestrator focused on building strong institutional foundations, securing funding, facilitating projects, fostering trust, and promoting co-creation among participants. Efforts were geared towards creating a stable environment for collaboration and stakeholder alignment. As the ecosystem transitioned into growth, the orchestrator adopted a more facilitative role while retaining top-down direction for strategic decisions. A partner model was developed which enhanced scaling efforts, relying on the foundations established during initiation. Furthermore, regular partner meetings provided a platform for monitoring progress and agenda-setting, fostering shared responsibility and enhancing collaboration. Although informal practices were common, maintaining formal structures improved accountability and ensured alignment. To support scaling and reduce dependence, the orchestrator encouraged bottom-up practices, enabling participants to take on greater responsibilities. To improve long-term orchestration, a well-defined mandate established early on was suggested to provide clarity and structure for future growth and decision-making.

Case J

Case J featured a national innovation ecosystem in the maturity stage, originating from a bottom-up initiative and managed by an organisation with a participant-representative board. The orchestrator played a dual role as a strategic guide and facilitator, balancing participant-driven initiatives with overarching coordination to sustain alignment and impact. Initially, the

ecosystem faced challenges in managing participant expectations and building trust. As the ecosystem matured, ensuring alignment during strategic shifts and supporting the transition from knowledge development to tangible economic outcomes posed additional challenges. To address challenges, the orchestrator acted as an ambassador, crafting a shared vision and developing strategic roadmaps to enhance ecosystem visibility and attract new participants. This further involved identifying trends, facilitating initiatives, and guiding participants in scaling projects and realising outcomes. To manage expectations early on, the orchestrator provided clarity and transparency about goals and timelines. Furthermore, through networking events, independent collaboration among participants was fostered, reducing the need for direct orchestration. As the ecosystem matured, the orchestrator's role shifted from initiator to facilitator, while still guiding strategic shifts. Bottom-up approaches, such as collaborative evaluations, ensured responsiveness to participant needs, while top-down strategic oversight remained important to ensure alignment with long-term objectives. Looking forward, collaboration with other ecosystems was recommended as a strategy to share resources, accelerate innovation, and enhance the ecosystem's ability to respond to emerging challenges and opportunities.

Case K

Case K involved a regional innovation ecosystem in the renewal stage, initiated by individuals and entrepreneurs to address urban challenges. Orchestration was led by a dedicated team operating within a bottom-up governance model, where participants were involved in evaluating progress and setting new directions, supported by a steering group providing top-down guidance for coherence. Key challenges included fostering trust and resilience, managing expectations, addressing competition among stakeholders, and sustaining alignment in a diverse ecosystem. Balancing participant autonomy with strategic oversight and ensuring access to resources for scaling activities were also persistent issues.

The orchestrator adopted a neutral role to promote independence while leveraging network support, focusing on transparency and mutual learning to build trust and foster a collaborative culture. Acting as a 'playmaker,' the orchestrator facilitated coalition-building by connecting participants facing challenges with those offering solutions, empowering participants to lead projects while providing strategic guidance and managing expectations. To address alignment challenges, the orchestrator emphasised open dialogue to integrate diverse perspectives and turn conflicts into opportunities for growth. As the ecosystem matured, priorities shifted towards scaling innovations, supporting participants with access to funding, and leveraging network connections to expand impact. To enhance orchestration, a network approach with sub-networks led by key partners was suggested to maintain alignment, cohesion, and adaptability for future challenges.

Cross-Case Analysis

Building on the individual case analyses, the following analysis compares insights across cases, exploring how orchestrators manage innovation ecosystems across various lifecycle stages. It highlights patterns, including commonalities and differences, across several themes identified in the empirical investigation.

Initiation stage: Building foundations and establishing collaboration

In the first stage of the lifecycle, initiation, orchestrators focused on establishing ecosystem foundations by creating a shared vision, facilitating collaboration, and aligning participants.

Top-down vs. Bottom-up orchestration

In the initiation stage, cases varied in their orchestration approaches, employing either top-down or bottom-up models. Cases B, C, E, G, H, and I used top-down orchestration to guide initial activities and set strategic direction. For instance, Case I emphasised the importance of a top-down mandate to prevent disorganisation, as IP9 noted: "The mandate must be made even more explicit for those orchestrating. If orchestration is not well-organised, it distracts

from the core focus." In contrast, Cases A, D, F, J, and K adopted bottom-up approaches, fostering shared responsibility from the start. For example, in Case K, participants were actively involved in selecting new partners, demonstrating shared decision-making. IP13 explained: "If we have an prospective partner, we present them to the network and ask if they agree or have any objections to that organisation joining the ecosystem, based on values of trust and respect." Despite the predominant approach in each case, some ecosystems adopted hybrid approaches. Case B, primarily top-down, also incorporated participant interests to foster shared ownership, while Case J combined their primary focus on bottom-up orchestration with top-down guidance for setting strategic goals. These findings suggest that orchestration approaches are context-dependent, with top-down methods providing structure and bottom-up strategies enabling a sense of shared ownership from the start.

Shaping the ecosystem's vision and building trust

Orchestrators across cases were key in developing the ecosystem's vision and ensuring participant alignment. Cases B, D, E, and H emphasised creating a strong identity early on to align participants and foster long-term sustainability. Top-down strategies were effective in establishing a unified vision, but Cases D and J showed that involving participants in vision-setting could be equally effective when participants were motivated by a common cause. To ensure participants' commitment to the shared vision, several strategies were used, with Cases D and G implementing financial contributions and Cases A, B, D, and I using theme trackers to advance projects and sustain engagement. Furthermore, Case F highlighted the need to balance flexibility with clear commitments for accountability. IP6 emphasised: "We want to have more explicit commitments from partners, as vague agreements make accountability difficult. However, overly rigid structures can hinder early collaboration, so the balance lies in fostering trust while setting clear expectations." Trust-building was also essential, with Case I demonstrating the need for strong institutional foundations an Cases A and J using networking

events to build trust. Managing expectations was also vital for building trust; Cases E, F, H, J, and K showed that setting clear roles and realistic goals early prevented overpromising and ensured trust and participants' commitment to the shared vision.

Facilitating collaboration and co-creation

In the initiation stage, further main priorities included facilitating collaboration and co-creation, and aligning participant interests with shared ecosystem goals. Case J, for instance, signalled trends and organised initiatives that enabled valuable and relevant co-creation, while Case H integrated start-ups into joint projects to foster collaboration across different scales, as explained by IP8: "We set up a new start-up program to actively attract start-ups here. Through a start-up challenge, we match external company challenges with start-ups, creating opportunities for collaboration. This not only provides the start-up with clients but also integrates them into our ecosystem, fostering connections and collective work with other participants." Furthermore, organising both formal and informal events was emphasised in Cases H and K as a key strategy for building trust, creating new collaboration opportunities, and strengthening long-term relationships. Additionally, Cases D, F, G, and J underscored the value of providing knowledge-sharing platforms and meeting spaces to support collaboration.

Growth stage: Scaling up and increasing participant autonomy

In the growth stage, orchestrators focused on scaling the ecosystem, fostering self-sufficiency, and managing increasing complexity, with participants acting more autonomously.

Top-down vs. Bottom-up orchestration

During the growth stage, a transition towards more bottom-up orchestration was common, with participants assuming greater responsibility. For example, in Case A, the orchestrator moved from top-down orchestration to enabling more participants autonomy and input. Furthermore, Case G, which built strong foundations in its initiation stage, also transitioned smoothly to a bottom-up model, granting participants more autonomy. However, Cases D and

F showcased a need for maintaining top-down leadership for strategic decisions to ensure critical activities progressed, as IP4 explained: “In the initiation stage, we took on a leading role to drive progress. As we transition to the growth stage, we aim to let go of some control, but certain tasks will always require our direction to avoid them being neglected.” Cases E and J also highlighted a balance between top-down direction and bottom-up engagement to align scaling efforts with participant needs. This evolution highlights the need for orchestrators to balance control and autonomy as ecosystems grow and demonstrates that some ecosystems continue to require a more controlled approach, depending on initial approaches.

Maintaining identity and managing increasing complexity

As ecosystems grew, maintaining a cohesive identity was crucial amidst growing complexity of interactions and participant dynamics. Orchestrators ensured that new participants aligned with ecosystem values, as demonstrated in Cases E and H, where participant selection became more rigorous. IP5 explained: “We’ve become more selective about who we work with. The growing number of participants has made orchestration more challenging, as it’s not possible to give every phase the attention we would ideally like, which adds to the complexity.” Furthermore, Case F highlighted the orchestrator's more pronounced role in reinforcing participant alignment with the shared vision by acting as an ambassador. Similarly, Cases E and I sustained formal governance to manage growing complexity and maintain a unified identity. However, orchestrators also needed to remain responsive to diverse participant needs to sustain participant commitment. For instance, Case E balanced formal and informal mechanisms to ensure meaningful participation while maintaining alignment. Furthermore, Cases A, D, and F demonstrated that reducing direct coordination encouraged participants to take ownership and greater responsibility, thereby sustaining participant commitment. These

examples illustrate the need for different orchestration approaches and roles based on the ecosystem's context and complexities.

Facilitating collaboration and co-creation

In the growth stage, orchestrators enhanced collaboration and co-creation mechanisms as the number of participants grew. Case E demonstrated a shift from direct coordination to fostering participant-led co-creation, as IP5 explained: "Orchestration cannot remain solely focused on orchestrating, because then you end up co-creating nothing. Orchestration must transition into enabling co-creation." Furthermore, networking and connection-building remained essential, as shown in Cases H and J, where orchestrators continued to host both formal and informal events to facilitate meetings and ensure ongoing collaboration and co-creation.

Supporting scaling

As ecosystems grew, scaling up activities was critical to increase impact. In Cases D, E, J, and K conditions were developed that allowed successful initiatives to expand regionally and nationally and to ensure visibility of project results across participants. In Case G, the orchestrator identified scaling opportunities for participants and supported scaling initiatives by expanding general facilities. Additionally, Cases A, and D promoted participant autonomy and self-sufficiency while providing oversight and essential resources. Moreover, Case H tailored support to reduce reliance on the orchestrator, encouraging independent efforts.

Maturity stage: Maintaining stability and ensuring continuity

In the maturity stage, when ecosystems were well-established, orchestrators focused on maintaining stability while promoting participant self-sufficiency. Orchestrators balanced oversight with participant autonomy to sustain engagement and alignment with objectives.

Top-down vs. Bottom-up orchestration

During maturity, ecosystems generally shifted towards more participant-driven models, but top-down orchestration was often still needed to provide strategic guidance. For example,

Cases H and J balanced bottom-up mechanisms to foster innovation and participant engagement with top-down orchestration for strategic alignment. IP10 explained: “My role is to listen to what the members value, but also to act as a scout – signalling market trends and bringing them back to the members for validation. It’s a mix of bottom-up and top-down, though with a stronger emphasis on bottom-up, grounded in trust built over years of collaboration.” Cases A and G emphasised a similar evolution, promoting self-sufficiency while maintaining strategic oversight to ensure alignment with their shared vision and goals.

Maintaining strategic vision and participant engagement

As ecosystem matured, maintaining strategic vision and alignment was vital as participants gained more autonomy. While participants took on more responsibilities, orchestrators had to ensure the ecosystem’s long-term goals were upheld. For example, Case G focused on overseeing key projects to sustain alignment, while Cases H and J employed regular evaluations and collaborative strategic planning to keep the ecosystem relevant and aligned with evolving needs. Engaging participants across various scales was a significant challenge; larger organisations often gained influence while smaller participants became less proactive, as seen in Case G. IP7 noted: “Smaller companies tend to wait and see what the larger ones will do, as they are less equipped to take the lead themselves. This sometimes causes them to take a step back, which makes it challenging for us to keep them actively involved.” Solutions like Case G’s membership model and Case H’s start-up program aimed to address this challenge and boost long-term commitment, particularly for smaller participants. Furthermore, Case H highlighted the need to carefully manage participants’ varying speeds and provide tailored support to maintain coordinated and meaningful contributions.

Facilitating collaboration and co-creation

Facilitating collaboration and value co-creation remained vital in the maturity stage, with orchestrators maintaining frameworks for ongoing collaboration, even as participants assumed

more responsibility for driving initiatives. For instance, Case G expanded networking to regional and national levels, creating broader opportunities for collaboration. Furthermore, Case J stressed the importance of regular networking events to facilitate new partnerships and the application of new insights in ongoing projects.

Managing increasing complexity

A significant role of orchestrators in the maturity stage was managing the growing complexity arising from increased participant autonomy, ensuring ecosystem stability and continuity. As participants took on more responsibility, orchestrators needed to maintain strategic oversight to address gaps in coordination and ensure ecosystem stability. For instance, Case J's orchestrator acted as an ambassador, signalling trends, supporting new initiatives, and fostering ongoing collaboration to keep the ecosystem relevant and aligned. Furthermore, Case K demonstrated the importance of making project results visible to all participants, to maintain alignment, drive continuous innovation and ensure ecosystem continuity.

Renewal stage: Adapting to change and maintaining relevance

In the renewal stage, ecosystems faced emerging threats, which required orchestrators to prioritise adaptability to address emerging challenges and capitalise on opportunities, such as market, technological, or societal developments, ensuring the ecosystem's relevance and continuity. Orchestrators in this stage focused on sustaining the ecosystem's capacity for renewal through innovation and strategic alignment, combining top-down guidance and bottom-up input.

Top-down vs. Bottom-up orchestration

Renewal-stage orchestrators, as seen in Cases C and K, blended top-down and bottom-up approaches to maintain strategic alignment while promoting participant-driven innovation. While the ecosystems predominantly operated bottom-up, orchestrators intervened selectively with top-down guidance for high-level decisions and scaling advanced ideas. As IP13

stressed: “We are very bottom-up ourselves, looking at what arises and how we can strengthen it. But you also need top-down support – if there is not a councillor or CEO leading the way, things will stall at some point due to lack of direction.” This balance kept participants engaged and maintained focus on long-term objectives, while being responsive to changing circumstances.

Redefining strategic vision and value propositions

In the renewal stage, orchestrators focused on identifying new opportunities and redefining the strategic vision and value propositions to remain relevant in the face of emerging developments that threatened the ecosystem. Case C employed an integrated approach to address complex societal challenges, aligning diverse ecosystem components and ensuring adaptation without deviating from core objectives. IP3 explained: “The challenge is translating complex societal issues into practical projects that can be acted upon today. This requires an integrated approach, as the issues are increasingly interconnected. The puzzle has become much more complex, raising questions about priorities.” Case K primarily focused on sustaining an open culture based on transparency and mutual learning, empowering participants to lead initiatives while providing necessary strategic oversight. Both cases engaged in regional collaborations with other ecosystems to enhance renewal capacity by bringing in fresh perspectives for long-term sustainability. IP3 emphasised: “Collaboration is the only way forward. By sharing insights with other ecosystems on the innovations they create today, we can use them tomorrow. If we do not know about them, we cannot benefit from them.” Furthermore, maintaining participant engagement and alignment with evolving goals was essential for successful renewal. For example, Case K involved participants in evaluating progress and setting new directions, supported by top-down oversight to ensure broader strategic alignment while facilitating bottom-up input. In both Cases C and K, the orchestrators adopted personal approaches to relationship-building, ensuring participants felt

recognised for their contributions and helping sustain motivation as the ecosystem navigated the complexities of renewal.

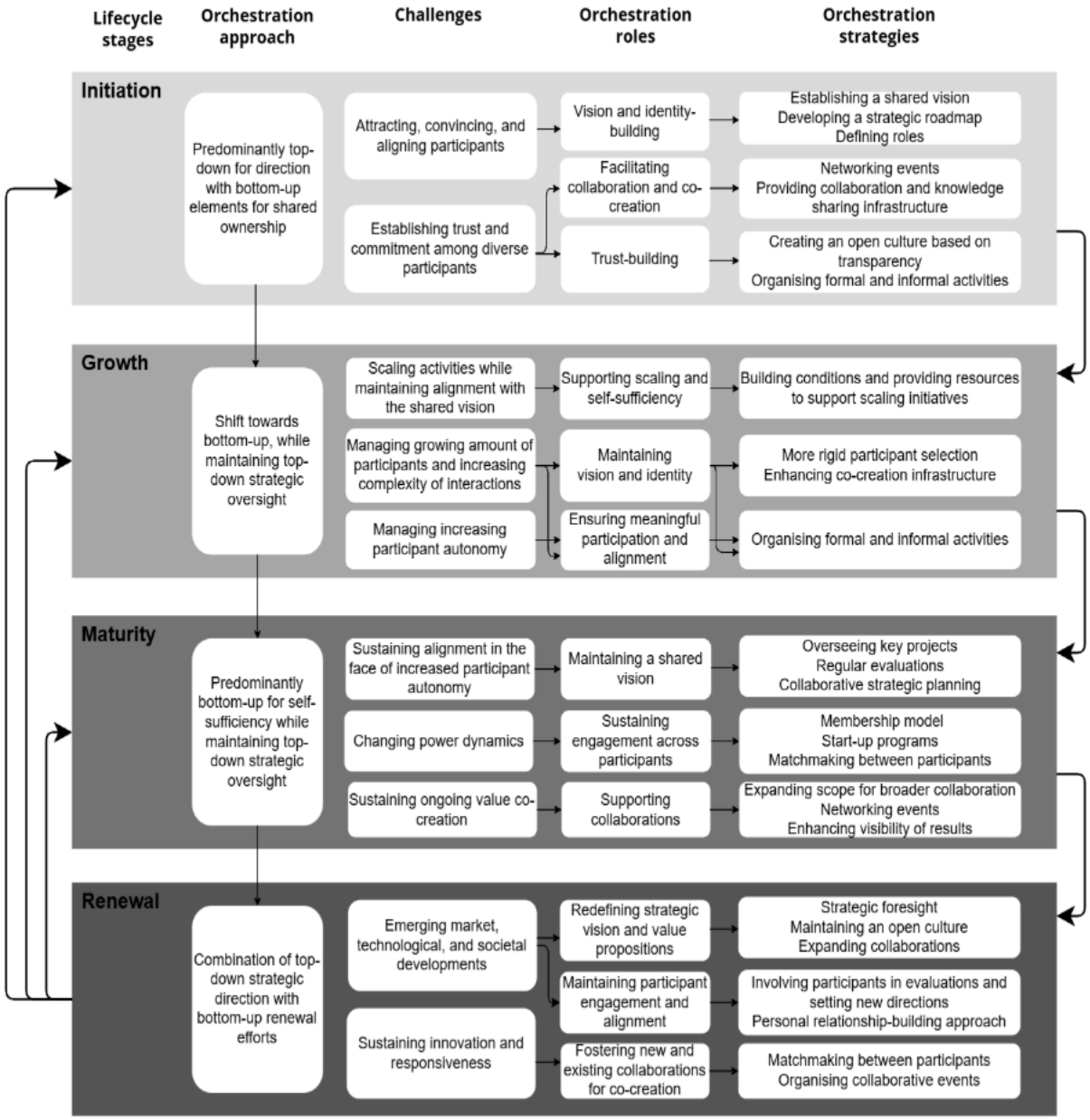
Facilitating collaboration and co-creation

In the renewal stage, facilitating collaboration and co-creation was sustained through orchestrator-led networking and matchmaking efforts to encourage new collaborations and strengthen existing collaborations, ensuring ongoing co-creation and responsiveness to emerging opportunities and challenges. Case C focused on fostering knowledge-sharing and addressing competitive dynamics, while Case K emphasised trust-based relationships, enabling participants to take ownership and co-develop the ecosystem's direction. Both cases hosted collaborative events to encourage a creative, collaborative, and open culture, driving meaningful co-creation and continuous renewal. After successful renewal, the ecosystems entered a phase of revitalised growth, maturity, or even initiation, depending on the nature of the change, and maintained relevance and impact through the development of new value propositions.

The Emergent Framework

Building on the cross-case analysis, this study developed an emergent framework (Figure 2) that illustrates how orchestrators manage innovation ecosystems across lifecycle stages. By synthesising insights from the cases, the framework provides a nuanced understanding of the dynamic and context-specific nature of innovation ecosystem orchestration. It highlights how orchestrators shape ecosystem structure, address stage-specific challenges, and ensure resilience and continuity over time.

Figure 2. Innovation ecosystem orchestration across lifecycle stages



The framework outlines orchestrators' critical roles, including fostering trust and alignment during initiation, managing scaling complexities in growth, sustaining engagement and stability in maturity, and driving adaptation during renewal. Central to the framework is the balance between top-down and bottom-up approaches, enabling orchestrators to provide strategic oversight while empowering participants to co-create and adapt to evolving ecosystem goals. By integrating stage-specific challenges with adaptive roles and strategies, the framework offers a comprehensive perspective on the complexities of innovation

ecosystem orchestration. It emphasises how orchestrators anticipate changes, navigate challenges, and foster co-creation to ensure resilience and continuity over time. The following section summarises the key findings and contextualises them within existing literature, elaborating on their theoretical and practical implications.

Discussion

This study aimed to explore how orchestrators manage innovation ecosystems across lifecycle stages and compare practical insights with theoretical frameworks. The cross-case analysis identified key patterns in orchestration roles and the balance between top-down and bottom-up approaches as ecosystems progress through initiation, growth, maturity, and renewal stages. This discussion summarises the key findings and situates them within existing literature, highlighting contributions and implications for theory and practice. Furthermore, the discussion outlines the limitations of the study and provides several suggestions for future research.

Key Findings

This study reveals that orchestrators' approaches, roles, and strategies evolve significantly across the lifecycle stages of innovation ecosystems, highlighting the dynamic and context-specific nature of orchestration. A key finding is that ecosystem challenges, along with orchestration practices, differ significantly across lifecycle stages, requiring orchestrators to balance top-down and bottom-up approaches to align with the ecosystem's evolving objectives and dynamics.

In the initiation stage, orchestrators adopt directive roles, focusing on establishing a shared vision, building trust, and aligning diverse participants through top-down strategies. Key priorities include defining roles, building trust, and creating collaboration frameworks to address initiative and interdependence challenges, such as aligning diverse participants with a shared vision. As ecosystems transition to the growth stage, orchestrators shift towards empowering participants, fostering autonomy while maintaining strategic oversight to ensure alignment with the ecosystem's vision. They address scaling complexities, such as managing expanding interdependencies and collaboration, by further developing infrastructure, facilitating new partnerships, and enabling participants to take greater ownership of

ecosystem activities. In the maturity stage, orchestrators balance top-down and bottom-up approaches to ensure stability and alignment with long-term goals amidst increased participant self-sufficiency. They manage shifting power dynamics, selectively integrate new participants, and sustain engagement to maintain ecosystem cohesion. Interdependence challenges become more complex as participant numbers grow, requiring orchestrators to navigate evolving relationships and maintain alignment across the ecosystem. During the renewal stage, orchestrators take on the role of change leaders, guiding the ecosystem through adaptation to address external threats and emerging opportunities. They address integration challenges, such as incorporating new technologies and participants, while redefining the ecosystem's strategic direction by co-developing new value propositions to maintain the ecosystem's relevance. Orchestrators ensure co-creation, mobilise resources, and maintain a collaborative culture to navigate transitions and sustain impact.

Across all stages, orchestrators adapt their approaches, roles, and strategies to address unique challenges, balancing top-down and bottom-up approaches to provide oversight, align participants, and foster co-creation. These findings collectively highlight the pivotal role of orchestrators in navigating the complexities of innovation ecosystems, ensuring their adaptability, continuity, and sustainable value co-creation across all lifecycle stages. In the following section, the findings are discussed in relation to existing literature, providing deeper insights into these dynamics and highlighting the theoretical implications of this study.

Theoretical Implications

This research makes significant contributions to the theoretical understanding of innovation ecosystem orchestration by providing insights into how orchestrators' roles evolve across different ecosystem lifecycle stages in response to changing challenges and dynamics. By examining the balance between top-down and bottom-up orchestration approaches, this study deepens the understanding of how orchestrators adapt their strategies to foster value co-

creation and ensure ecosystem continuity. The findings offer new perspectives on the dynamic nature of orchestration and highlight the importance of context-specific approaches in guiding ecosystem initiation, growth, maturity, and renewal. In doing so, this research extends existing theories of innovation ecosystem orchestration while also identifying areas for further theoretical exploration.

First of all, building on theoretical perspectives on lifecycle and evolutionary models (Moore, 1993; Mikhailov et al., 2021), this study enhances understanding of how ecosystems progress through initiation, growth, maturity, and renewal stages, and how orchestration evolves to address the complexities of each stage. While Moore's lifecycle model offers a broad framework for ecosystem evolution, it provides limited guidance on the orchestrator's evolving role in navigating these transitions. This study addresses that gap by providing a more nuanced understanding and illustrating how orchestrators adapt their roles to address stage-specific challenges and complexities. For instance, orchestrators shift from directive roles that align participants and build foundational structures in early stages to facilitative roles that empower participants and support independent value co-creation in later stages. Furthermore, unlike literature focusing on orchestration in a specific stage, often initiation (e.g., Autio, 2022; Dedehayir, Mäkinen, & Ortt, 2018), this study extends insights into orchestrators' evolving role across stages. This research shows that orchestration is dynamic and context-specific, requiring continual adaptation to changing needs as ecosystems progress. This dynamic and adaptive orchestration perspective adds a new layer of depth to lifecycle theories, emphasising the importance of tailored roles and strategies for addressing shifting needs and complexities.

Secondly, this study contributes to existing theories on orchestration approaches by emphasising the necessity of a hybrid orchestration model – balancing top-down and bottom-up approaches – for navigating the evolving challenges of innovation ecosystems across their

lifecycle. This model challenges traditional perspectives in the literature, where orchestration is often viewed as either centralised or decentralised (e.g. Autio, 2022; Dedehayir, Mäkinen, & Ortt, 2018; Walrave et al., 2018), offering instead a dynamic and context-specific framework that evolves with ecosystem needs. In early stages, top-down orchestration is critical for establishing foundational elements, such as strategic alignment, identity-building, and collaboration frameworks. As ecosystems mature, bottom-up approaches become increasingly important, fostering participant autonomy and independent co-creation while maintaining coherence and alignment with overarching goals through strategic oversight. This dynamic adaptation contrasts with prior models that focus predominantly on top-down models and provides a nuanced understanding of how orchestration evolves over time (Dedehayir, Mäkinen, & Ortt, 2018; Walrave et al., 2018). However, while some literature such as Autio (2022) do suggest a move towards bottom-up governance as ecosystems mature, this study finds that some top-down oversight remains necessary even in mature ecosystems to ensure strategic alignment and manage complexity. This insight also nuances Brink's (2022, 2023) perspective that ecosystems can function without a focal entity, demonstrating the ongoing need for orchestrators to maintain coherence and strategic oversight. Furthermore, contrary to Reiter, Stonig, & Frankenberger's (2024) suggestion that bottom-up mechanisms suit high-uncertainty phases, this study finds that early-stage ecosystems, where uncertainty is high, often require top-down guidance to build trust and clarity. These findings advance theoretical understanding by illustrating that the effectiveness of orchestration approaches depends not only on uncertainty levels but also on the complexity of interactions and specific participant needs at each stage. The study shows that ecosystems rarely thrive solely under a singular orchestration style, advocating instead for a dynamic and adaptive orchestration framework, wherein top-down approaches provide essential structure, and bottom-up approaches empower participants and drive independent co-creation. This nuanced understanding of the

interplay between top-down and bottom-up orchestration approaches represents a novel contribution to the field, emphasising the need for orchestrators to continuously balance strategic oversight with participant autonomy. By capturing the complexities of managing this balance, the study enriches existing theories and provides a more holistic framework for understanding orchestration dynamics across the ecosystem lifecycle. This contribution moves beyond existing theories to articulate the dynamic and context-specific nature of orchestration, offering valuable insights into how orchestrators can maintain ecosystem coherence, adaptability, and continuity across their lifecycle stages. Finally, the broader implications of this hybrid orchestration model extend beyond innovation ecosystems. Future research can build on this hybrid model to explore orchestration dynamics in other contexts, such as entrepreneurial ecosystems or other cross-sector collaborations, thereby expanding its applicability and further enriching understanding of ecosystem orchestration.

Thirdly, the research contributes deeper insights into the stage-specific challenges faced by innovation ecosystems, emphasising the need for orchestrators to adopt dynamic and tailored approaches to address these evolving complexities. This study extends the insights of Adner (2006) and Foss, Schmidt, & Teece (2023), who identified fundamental coordination and cooperation challenges related to interdependency and integration. While these frameworks provide a valuable foundation, they provide limited analysis of how these challenges evolve across ecosystems. This research demonstrates that these challenges manifest differently depending on the lifecycle stage, adding a new layer of understanding to their application. For example, in the initiation stage, initiative challenges often revolve around mobilising resources and establishing a shared vision to align diverse participants. As ecosystems mature, initiative challenges shift towards sustaining engagement and ensuring that established structures remain adaptable to emerging needs. Similarly, interdependence challenges, which in early stages involve aligning diverse actors with a shared vision, grow in complexity as

participant numbers and interconnections expand, requiring orchestrators to manage increasingly intricate networks. Lastly, integration challenges become increasingly tied to managing scaling efforts, onboarding new participants, and integrating diverse contributions without disrupting the ecosystem's coherence or strategic direction. This study advances theoretical perspectives on innovation ecosystem challenges (e.g. Adner, 2006; Foss, Schmidt, & Teece, 2023) by detailing how these challenges evolve across lifecycle stages. It highlights the need to go beyond one-size-fits-all approaches by understanding the context-specific manifestations and stage-specific adaptations of challenges, as these are crucial for effective orchestration across different lifecycle stages. Moreover, this study extends insights from Foss, Schmidt, & Teece (2023) and Reiter, Stonig, & Frankenberger (2024) on the need for adaptive strategies by providing a refined framework that links stage-specific challenges to specific orchestration approaches, roles, and strategies. This framework not only highlights the adaptive capabilities required of orchestrators but also provides a structured basis for future empirical testing, offering valuable guidance for deeper exploration of how stage-specific dynamics influence ecosystem growth, continuity, and renewal.

By emphasising the dynamic and adaptive nature of innovation ecosystem orchestration, this research refines theoretical perspectives on lifecycle models, orchestration practices, and innovation ecosystem challenges across stages. The findings highlight the importance of hybrid approaches, tailored strategies, and context-specific orchestration practices in fostering sustainable ecosystem development. This study provides a foundation for understanding how orchestrators drive value co-creation and ensure continuity across lifecycle stages, offering a comprehensive framework for future exploration and application.

Practical Implications

This research also provides actionable insights to orchestrators managing innovation ecosystems across their lifecycle stages. Orchestrators can apply the findings by embracing

flexibility in their approach, adjusting their approaches, roles, and strategies according to the ecosystem's evolving challenges and needs at different lifecycle stages. In the early stages, orchestrators should focus on providing direction and coordination, while in more mature stages, they should shift from directive roles towards more facilitative roles, sustaining stability and empowering participants to maintain engagement while ensuring alignment with core objectives. This proactive adaptability ensures sustainable ecosystem growth and long-term success. The research also offers concrete strategies tailored to each lifecycle stage, helping orchestrators navigate common challenges across stages and build ecosystems that thrive over time. A key takeaway is the necessity of balancing top-down oversight with bottom-up engagement. Orchestrators should avoid over-controlling the ecosystem, which can stifle innovation, or giving participants too much freedom, which may lead to misalignment. By maintaining this balance, orchestrators can ensure effective orchestration and keep the ecosystem aligned with its objectives. Finally, insights into the evolution of orchestration roles provide orchestrators a foundation for designing adaptive models that anticipate transitions and support ongoing value co-creation. By adopting this forward-thinking, adaptable approach, orchestrators can sustain innovation and ensure long-term ecosystem success.

Limitations and Future Research

While this research provides valuable contributions, there are some limitations that should be acknowledged. First, with one interview per case (except Case H with three interviews), the research provided valuable first-hand insights but lacked multiple perspectives that could offer a fuller picture of orchestration processes. Future research could include perspectives of multiple stakeholders, such as other orchestrators and participants, for a more comprehensive understanding of orchestrating innovation ecosystems.

Second, the study's focus on Dutch innovation ecosystems limits its generalisability. The findings may not apply to ecosystems in other countries with different cultural, economic, or regulatory environments. Moreover, the study involved mostly regional ecosystems, with limited representation of (inter)national ecosystems, who may face distinct challenges due to their larger scope. Future research could conduct comparative studies across regions to explore the impact of local factors on orchestration, and expand to (inter)national ecosystems to examine how scale and complexity affect orchestration. This would contribute to the development of more adaptive orchestration models.

Third, the study provided more extensive data on initiation and growth stages, with fewer insights on maturity and renewal phases. This may have limited the depth of understanding regarding the unique challenges and orchestration practices needed in these later stages. Therefore, future research could specifically focus on ecosystems in maturity and renewal stages to gain deeper insights into the dynamics of these phases. Longitudinal studies are also recommended to effectively capture the evolution of orchestration as ecosystems progress through different stages, offering a closer view of the transitions.

Fourth, the study did not examine in detail how external factors such as technological advancements, policy changes, or global market shifts impact orchestration over time. Future research could explore how orchestrators adapt to these specific external pressures and develop resilience, focusing on proactive strategies that support long-term sustainability.

Fifth, while this study explores orchestration across different lifecycle stages, it does not examine how the composition of the orchestrating entity impacts effectiveness of orchestration practices. Future research could investigate different orchestrator configurations across cases and lifecycle stages, shedding light on how variations in the structure of the orchestrating entity influences orchestration practices and ecosystem continuity. This would

provide valuable insights into best practices for structuring the orchestrating entity and its practices across lifecycle stages to enhance ecosystem performance.

Conclusion

The aim of this research was to shed light on the complex dynamics and evolution of innovation ecosystem orchestration, revealing the evolving approaches, roles, and strategies required for navigating distinct challenges across various stages of the ecosystem lifecycle. By emphasising the importance of an adaptive and hybrid orchestration approach that balances top-down guidance with bottom-up input, this study contributes valuable insights to both theory and practice. As innovation ecosystems continue to evolve in response to emerging challenges and opportunities, the findings of this research underscore the necessity for orchestrators to remain proactive and responsive. Ultimately, this thesis not only advances the understanding of innovation ecosystem orchestration but also provides a foundation for future research aimed at enhancing ecosystem sustainability and fostering meaningful collaboration among diverse stakeholders to address complex innovation challenges.

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Appendices

Appendix A

Interview guide

Section 1: General questions on innovation ecosystems and orchestrator's role

1.1. Can you tell us something about yourself and your role within [NAME ECOSYSTEM]?

1.2. Can you tell something about the origins of the innovation ecosystem?

1.2.1. Why did it emerge, which organisations were involved?

1.2.2. What were the main goals of the ecosystem, and have they changed over time?

1.3. What stage is the innovation ecosystem currently in (initiation, growth, maturity, innovation)?

1.4. What added value does participation in the ecosystem bring to the various partners and potential participants?

1.5. What are the criteria or requirements for parties to participate in the innovation ecosystem and how are they determined?

Section 2: Ecosystem challenges

2.1. What are the biggest challenges for the innovation ecosystem?

2.1.1. What are the underlying causes of these challenges?

(If ecosystem is already in further stage than initiation)

2.1.1.1. What were the biggest challenges for the innovation ecosystem in the previous phases?

2.1.1.2. To what extent do the challenges differ in the different phases the ecosystem went through?

2.2. How do these challenges affect the dynamics and effectiveness of the innovation ecosystem?

Section 3: Governance and coordination

3.1. How is the innovation ecosystem currently orchestrated and coordinated? *Is there a central coordinating actor? Who sets the standards and coordinates collaboration, and how are decisions made? How are these orchestrating roles established?*

3.1.1. What is the importance of effective orchestration within an innovation ecosystem?

3.1.2. What role do orchestrators play in addressing ecosystem challenges?

3.1. How is governance organised? And how is informal coordination organised? What does this relationship between formal and informal look like? How important is it to strike a balance between formal and informal orchestration? How to find a balance?

3.2. Do you apply a top-down or a bottom-up strategy, or a mix of both, with regard to orchestrating the innovation ecosystem?

3.2.1. Does this approach change when the ecosystem advances?

3.2.2. When do you use top-down, and when bottom-up approaches?

3.3. If already advanced through multiple phases: Has the orchestration of the ecosystem changed as the ecosystem entered a new phase? Do you expect orchestration to change as the ecosystem enters the next phase? How does the role of the orchestrator change as the ecosystem grows and evolves?

3.4. To what extent does the importance of orchestrating roles differ at different stages of development?

3.5. In what ways is the ecosystem orchestrated? What means, mechanisms and strategies are currently being used to orchestrate the ecosystem and address the challenges?

3.5.1. And what strategies have been used in the past, at other stages of development, to address the specific challenges?

3.5.1.1. Can you give examples of successful tools, mechanisms or strategies?

3.5.1.2. How are these mechanisms evaluated and adjusted?

3.6. How is the role of the orchestrating actor evaluated and adjusted?

3.7. What are the biggest challenges specifically for orchestrating the innovation ecosystem? And how are these challenges being dealt with?

3.7.1. Did these challenges also change as the ecosystem evolved?

3.7.1.1. To what extent do the challenges differ specifically with respect to orchestrating the ecosystem at different stages of development?

3.7.2. To what extent do different challenges at different stages require different approaches to orchestration or application of different mechanisms and strategies?

3.7.2.1. When the ecosystem grows in participants, does it also require a different approach to orchestration? How does growing the number of participants affect ecosystem orchestration?

3.8. What lessons have you learned so far about orchestrating the innovation ecosystem? If you had to do it all over again now, what would you do differently? And what lesson would you pass on to other (starting) ecosystems? What are the do's and don'ts of orchestrating an innovation ecosystem?

Section 4: Strengthening orchestration in innovation ecosystems

4.1. In what ways could orchestrating roles in the innovation ecosystem be supported and strengthened to better address existing and future challenges and improve ecosystem effectiveness and continuity?

4.1.1. What specific means, mechanisms and strategies could be used to address the challenges more effectively and strengthen ecosystem orchestration?

4.1.2. To what extent is another interpretation of orchestrating roles needed to even better address challenges?

4.2. Are there examples of orchestration strategies and resources from other innovation ecosystems that can be applied to enhance ecosystem orchestration?

4.3. Are there specific skills or capabilities that are crucial for the orchestrating roles? How are these developed and strengthened within the ecosystem?

Section 5: Questions to end with

5.1. What challenges are anticipated in the future, and how do you envisage the orchestration of the ecosystem in the future? Will it change, or will it remain the same?

5.2. Did I forget to ask anything else, or would you like to add?

Appendix B

Informed consent form

Research Purpose
This research is conducted by Wouter Vonk.
The purpose of this study is to investigate how orchestration and coordination roles within innovation ecosystems can be enhanced.

How will we proceed?
You will participate in a study where we will gather information by:

- Interviewing you and recording your responses via audio. A transcript of the interview will also be prepared.

Potential Risks and Discomforts

- There are no physical, legal, or economic risks associated with your participation in this study. You are not required to answer any questions you do not wish to. Your participation is voluntary, and you may withdraw at any time.

Compensation
You will not receive any compensation for your participation in this study.

Data Confidentiality
We will take all possible measures to protect your privacy. No confidential information or personal data will be disclosed in a manner that could identify you.
Before the research data is published, your data will be anonymised as much as possible.

In publications, anonymous data or pseudonyms will be used. Audio recordings, forms, and other documents created or collected during this study will be stored securely at the University of Twente and on the encrypted storage devices of the researchers.
The research data will be retained for a period of [10 years]. At the end of this period, the data will be deleted or anonymised so that it can no longer be traced back to any individual.
Research data will only be shared, if necessary (e.g., for scientific integrity checks), in anonymous form with individuals outside the research group.

This study has been reviewed and approved by the ethics committee of the Faculty of Behavioural, Management and Social Sciences (BMS).

Voluntary Participation
Participation in this study is entirely voluntary. You can withdraw your participation or refuse the use of your data at any time without providing a reason. Withdrawing participation will have no negative consequences for you or any compensation already received.
If you decide to withdraw during the study, the data you provided up to that point will still be used in the research.
If you wish to withdraw from the study or have any questions or complaints, please contact the principal researcher.
For concerns regarding the design or conduct of the study, you may also contact the Secretary

of the Ethics Committee for the Humanities & Social Sciences domain at the Faculty of Behavioural, Management and Social Sciences at the University of Twente. This research is conducted by the University of Twente, Faculty of Behavioural, Management and Social Sciences. If you have specific questions regarding the handling of personal data, you may contact the Data Protection Officer of the UT.

Finally, you have the right to request access, modification, deletion, or amendment of your data with the principal researcher.

By signing this consent form, I acknowledge the following:

1. I have been sufficiently informed about the research through a separate information sheet. I have read the information sheet and have had the opportunity to ask questions, which have been answered satisfactorily.
2. I voluntarily agree to participate in this research. There is no explicit or implicit pressure for me to participate in this research. I understand that I can withdraw from the research at any time without giving a reason. I am not obligated to answer any question I do not wish to.

In addition to the above, you can provide specific consent for different parts of the research below. You can choose to give or refuse consent for each part. If you wish to give consent for everything listed, you may do so by checking the box at the bottom of the statements.

	YES	NO
1. I consent to the processing of data collected from me during the research as stated in the attached information sheet.		
2. I consent to audio recordings being made during the interview and my (anonymised) responses being transcribed.		
3. I consent to the storage and use of the research data collected from me for future research and educational purposes.		
I consent to everything described above (not applicable if any "no" option is selected).		

Name Participant:

Name Researcher:

Wouter Vonk

Signature:

Signature:



Date:

Date: 30-4-2024