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Developing Orchestration Capability for Industrial Innovation Ecosystems: A Dynamic Capabilities and Microfoundations Perspective

August 26th 2026

School of Management
Master's thesis in Strategic
Business Development

Vaasa 2026

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ABSTRACT:

Teollisuusyritykset toimivat yhä useammin osana innovaatioekosysteemejä, joissa arvontuonti perustuu useiden toimijoiden väliseen yhteistyöhön sekä organisaation ulkopuolisten resurssien ja osaamisen hyödyntämiseen. Ekosysteemi-innovaatioiden kautta yritykset voivat saavuttaa uusia tulovirtoja, erilaistumista kilpailijoista sekä pääsyn uusiin asiakassegmentteihin ja markkinoille. Tämän kehityksen myötä ekosysteemiorkestointikyvykkyydestä on tullut keskeinen tekijä organisaatioiden innovaatiosuorituskyvyn kehittämisessä ja kestävä kilpailuedun muodostamisessa.

Tämän tutkimuksen tavoitteena on selvittää, miten teolliset ydinyritykset kehittävät ekosysteemiorkestointikyvykkyyttään innovaatioekosysteemeissä sekä miten kyvykkyyden mikrorakenteet mahdollistavat ja muovaavat kyseistä kyvykkyyttä. Tutkimus toteutettiin laadullisena monitasoisena monitapaustutkimuksena kolmessa Suomessa pääkonttoriaan pitävässä johtavassa teollisuusyrityksessä. Tutkimuksessa haastateltiin sekä innovaatiotoimintoihin liittyviä johtajia että sisäisten ekosysteemitointien johtoa ja asiantuntijoita.

Tulosten perusteella ekosysteemiorkestointikyvykkyys näyttäytyy dynaamisena kyvykkyytenä, joka toteutuu jatkuvan aistimisen, tarraamisen ja uudelleenkonfiguroinnin kautta. Tulokset osoittavat, että kyvykkyys rakentuu ekosysteemivision muodostamisen, innovaatiokumppaneiden tunnistamisen ja arvioinnin, innovaatioiden validoinnin ja kaupallistamisen sekä organisatorisen oppimisen ja jatkuvan uudistumisen ympärille. Lisäksi tulokset osoittavat, että ekosysteemiorkestointikyvykkyyttä mahdollistavat ja muovaavat mikrorakenteet muodostuvat resursseista, prosesseista ja rutiineista, organisaatorakenteista sekä yksilötason tekijöistä.

Tutkimus syventää ymmärrystä ekosysteemiorkestointikyvykkyyden kehittämisestä ja tarjoaa empiiristä näyttöä siitä, kuinka mikrorakenteet mahdollistavat ja muovaavat ekosysteemiorkestointikyvykkyyttä innovaatioekosysteemeissä. Tutkimus laajentaa ekosysteemiorkestoinnin, dynaamisten kyvykkyyksien ja mikrorakenteiden tutkimusta tarjoamalla monitasoisen näkökulman kyvykkyyden kehittämiseen ja toteutumiseen käytännössä.

KEYWORDS: Innovaatiojärjestelmät, verkostojohtaminen, mikroperusteet, dynaamiset kyvykkyydet. Innovation ecosystems, innovation networks, orchestration capability, dynamic capabilities, microfoundations.

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1 Introduction

1.1 Research Background

Industrial companies are increasingly operating in rapidly changing environments shaped by technological disruption, digitalization, sustainability transitions, evolving regulation, and changing customer expectations (e.g., Kohtamäki et al., 2019; Sjödin et al., 2020; Sjödin et al., 2024; Kolagar et al., 2022; Jovanovic et al., 2022). These developments create opportunities for new customer value propositions, digital offerings, and revenue streams, while simultaneously increasing firms' need for access to advanced technologies, specialized knowledge, and complementary resources beyond organizational boundaries (Gebauer et al., 2020; Paschou et al., 2020; Chesbrough, 2003; Chesbrough, 2006; Töytäri et al., 2018; Linde et al., 2021).

The growing importance of ecosystem-based innovation can be observed in the transformation of industrial firms such as Wärtsilä. In addition to developing core products and technologies, Wärtsilä increasingly collaborates with technology providers, startups, research organizations, customers, and other ecosystem actors to develop digital services, smart technologies, and sustainable energy and marine solutions (Wärtsilä, 2026). In such settings, the focal firm often provides only part of the overall solution, while complementary technologies, software, services, and specialized expertise are contributed by ecosystem partners. As a result, value creation depends not only on the focal firm's capabilities, but also on the effective coordination and integration of distributed resources and activities across multiple ecosystem participants (Adner, 2017; Jacobides et al., 2018). This creates managerial challenges related to partner selection, alignment of interests, governance, resource integration, and ecosystem-level value creation, highlighting the growing importance of ecosystem orchestration capability as a means of coordinating interdependent actors and complementary resources within innovation ecosystems (Dhanaraj and Parkhe, 2006; Adner, 2017; Jacobides et al., 2018).

In response, firms increasingly rely on innovation ecosystems to accelerate innovation, access complementary resources and capabilities, and create value beyond their traditional products and technologies (McKinsey, 2026a; McKinsey 2026b). Innovation ecosystems bring together multiple independent actors whose contributions are required for ecosystem-level value creation and innovation outcomes (Adner, 2017; Jacobides et al., 2018). By combining resources and capabilities across organizational boundaries, innovation ecosystems enable focal firms to access complementary resources, develop new customer value propositions, create new business opportunities, and scale innovations more effectively (Adner and Kapoor, 2010; Paiola and Gebauer, 2020; Sjödin et al., 2020). Many industrial firms, including Fortum, Valmet, and Wärtsilä, increasingly collaborate with ecosystem partners to develop broader customer solutions and new sources of value creation (Fortum, 2026; Valmet, 2024; Wärtsilä, 2026).

At the same time, innovation ecosystems create significant managerial challenges related to coordination, interdependence, and uncertainty (Dhanaraj and Parkhe, 2006; Jacobides et al., 2018). Within innovation ecosystems, focal firms often assume a central role in shaping ecosystem direction, attracting and coordinating ecosystem participants, and facilitating ecosystem-level value creation (Adner, 2017; Jacobides et al., 2018). Focal firms must therefore continuously make strategic decisions regarding ecosystem positioning, partner engagement, and governance arrangements as ecosystems evolve and new opportunities emerge (Aarikka-Stenroos et al., 2017; Huikkola et al., 2020). To address these challenges and fulfil their coordinating role within innovation ecosystems, focal firms require ecosystem orchestration capability.

Recent research has increasingly conceptualized ecosystem orchestration capability as a dynamic capability that enables focal firms to purposefully integrate and coordinate ecosystem resources and relationships while adapting to changing ecosystem conditions (Shi and Shen, 2021; Reypens et al., 2021). Ecosystem orchestration capability supports the coordination of ecosystem actors, the alignment of complementary resources, the

management of ecosystem relationships, and the facilitation of collaboration and joint value creation (Dhanaraj and Parkhe, 2006; Linde et al., 2021).

Dynamic capabilities theory provides a complementary theoretical lens for understanding how organizations adapt to changing environments and create future-oriented value (Teece et al., 1997; Eisenhardt and Martin, 2000; Teece, 2007). Drawing on dynamic capabilities' theory, ecosystem orchestration capability can be understood as being enacted through sensing, seizing, and reconfiguring activities that enable organizations to identify opportunities, mobilize resources, and adapt to changing environments (Teece, 2007). Furthermore, a microfoundations perspective suggests that sensing, seizing, and reconfiguring activities are enabled and shaped by underlying resources, processes and routines, organizational structures, and individual-level factors (Felin et al., 2012; Felin et al., 2015). A microfoundations perspective provides a basis for understanding how organizational-level capabilities emerge and develop over time and how interactions among multiple microfoundations contribute to capability development (Rabetino et al., 2025). This study applies a microfoundations perspective to examine how ecosystem orchestration capability is enacted through sensing, seizing, and reconfiguring activities and how underlying microfoundations enable and shape these activities within industrial innovation ecosystems.

Despite growing interest in ecosystem strategies and ecosystem orchestration capability among both practitioners and scholars (McKinsey, 2026a; McKinsey, 2026b; Shi and Shen, 2021; Linde et al., 2021), important gaps remain in the existing literature.

First, recent research highlights the growing importance of ecosystem management and orchestration capabilities for focal firms operating in innovation ecosystems (Linde et al., 2021; Sjödin et al., 2024). However, limited empirical research has examined how ecosystem orchestration capability is enacted and developed in practice, particularly within industrial innovation ecosystems. While ecosystem orchestration capability has increasingly been conceptualized as a dynamic capability (Shi and Shen, 2021; Reypens et al.,

2021), understanding remains limited regarding how sensing, seizing, and reconfiguring activities are translated into concrete organizational practices and capabilities through which focal firms identify opportunities, mobilize ecosystem actors, integrate complementary resources, and adapt to changing ecosystem conditions.

Second, recent research has emphasized the importance of adopting a microfoundations perspective to better understand ecosystem-related capabilities and the mechanisms through which dynamic capabilities emerge and develop (Rabetino et al., 2025). However, limited empirical research has examined how microfoundations enable and shape ecosystem orchestration capability in practice. Empirical understanding remains limited regarding how resources, processes and routines, organizational structures, and individual-level factors interact to support sensing, seizing, and reconfiguring activities within industrial innovation ecosystems. Consequently, the underlying mechanisms through which ecosystem orchestration capability develops and is enacted remain insufficiently understood.

1.2 Research Purpose and Research Questions

To address these gaps, this thesis examines how focal firms develop ecosystem orchestration capability within industrial innovation ecosystems and how underlying microfoundations enable and shape this capability. By integrating innovation ecosystem, ecosystem orchestration capability, dynamic capabilities, and microfoundations perspectives, the study seeks to advance understanding of ecosystem orchestration capability as an organizational capability through which focal firms coordinate ecosystem actors, mobilize complementary resources, manage ecosystem relationships, and adapt to changing innovation environments.

In addition to understanding how ecosystem orchestration capability is developed, there is a need to better understand the underlying mechanisms through which this capability is enabled and enacted. Recent microfoundations research has emphasized the im-

portance of examining how organizational capabilities emerge through interactions among resources, processes and routines, organizational structures, and individual-level factors (Felin et al., 2012; Felin et al., 2015; Rabetino et al., 2025). Therefore, this study adopts a microfoundations perspective to examine how underlying microfoundations enable and shape ecosystem orchestration capability and its enactment through sensing, seizing, and reconfiguring activities within innovation ecosystems.

The purpose of this study is to address these research gaps by answering the following question:

How does an industrial focal firm develop ecosystem orchestration capability within innovation ecosystems? (Research question 1)

Furthermore, this research contributes to answering the following supporting research question:

How do microfoundations enable and shape ecosystem orchestration capability within innovation ecosystems? (Research question 2)

1.3 Research Contributions

This research contributes to academic literature by advancing understanding of how focal firms in industrial innovation ecosystems develop ecosystem orchestration capability as a dynamic capability that supports long-term adaptation and value creation in changing environments. First, the study contributes to ecosystem orchestration and dynamic capabilities literature by providing an empirical account of how ecosystem orchestration capability is enacted through sensing, seizing, and reconfiguring activities within industrial innovation ecosystems.

Second, the study contributes to microfoundations literature by examining the underlying mechanisms through which ecosystem orchestration capability is developed and enacted. In particular, the study adopts a microfoundations perspective to explain how organizational and individual-level mechanisms enable and shape ecosystem orchestration capability.

Third, the study contributes to recent multi-level perspectives on capability development (Rabetino et al., 2025) by examining how ecosystem orchestration capability emerges through interactions among multiple microfoundations operating across organizational and individual levels.

In addition to its academic contributions, the study provides practical guidance for managers seeking to strengthen their organizations' ecosystem orchestration capability. By examining how ecosystem orchestration capability is developed and enacted in practice, the study identifies managerial considerations related to opportunity identification, partner evaluation, ecosystem positioning, validation of external innovations, organizational alignment, governance, and organizational learning. The findings further highlight the importance of developing organizational and individual-level capabilities that support collaboration, resource integration, and coordination across ecosystem boundaries. As such, the study provides actionable insights for managers seeking to navigate ecosystem complexity, leverage complementary resources, and support long-term value creation within innovation ecosystems.

1.4 Structure of the Thesis

This thesis consists of five chapters. Chapter 1 introduces the research background, research gaps, research purpose, research questions, and expected contributions of the study.

Chapter 2 presents the theoretical background of the study. The chapter first discusses innovation ecosystems and the role of focal firms within them. It then examines ecosystem orchestration capability, including the orchestration of resources and networks, before introducing dynamic capabilities theory and the concept of microfoundations. The chapter concludes with a synthesis that integrates the theoretical perspectives into the conceptual framework guiding the study.

Chapter 3 describes the research methodology. The chapter outlines the research design, case selection, data collection process, and data analysis methods. In addition, it discusses considerations related to research quality and trustworthiness.

Chapter 4 presents the empirical findings. The chapter reports the findings related to the development of ecosystem orchestration capability and examines how underlying microfoundations consisting of resources, processes and routines, organizational structures, and individual-level factors enable and shape this capability within industrial innovation ecosystems.

Finally, Chapter 5 discusses the findings in relation to the existing literature and presents the theoretical and managerial implications of the study. The chapter concludes by outlining the limitations of the research and providing suggestions for future research.

2 Theoretical Background

2.1 Innovation Ecosystems and Focal Companies

Innovation ecosystems provide the organizational context within which ecosystem orchestration capability is developed and enacted. They consist of interdependent actors whose resources, technologies, and activities must be coordinated to achieve ecosystem-level value creation and innovation outcomes. Within these ecosystems, focal firms frequently assume a central coordinating role, creating a need for ecosystem orchestration capability. The following sections discuss the characteristics of industrial innovation ecosystems and the role of focal firms within them.

2.1.1 Industrial Innovation Ecosystem Context

Changing market environments create both new opportunities for revenue generation and innovation, as well as new requirements that industrial focal companies must address. Innovation ecosystems provide industrial focal companies with access to complementary resources, knowledge, and networks that extend beyond firm boundaries. The market environments of industrial firms are increasingly shaped by technological disruption, including the emergence of advanced technologies, digital solutions, new business models, shifting customer expectations, and evolving competitive dynamics (Kohtamäki et al., 2022; Kolagar et al., 2022; Jovanovic et al., 2022).

Ecosystem structures enable industrial focal companies to realize several strategic advantages. These include increased speed in launching new products and services, access to established capabilities in advanced technologies and digital solutions, and opportunities to optimize supply chains and internal business processes (Ellström et al., 2021). Advanced technologies and digital solutions include, but are not limited to, the Internet of Things, cloud-based solutions, fifth generation networks, and artificial intelligence (Aagard et al., 2026). Such technologies support enhanced data processing capabilities,

improved decision making, and more efficient coordination of complex business operations (Ellström et al., 2021).

At the same time, industrial focal companies face increasing pressure to respond to heightened market requirements and accelerated technological change. To remain competitive, organizations often need to strengthen their innovation capabilities by acquiring resources, knowledge, and skills that are not available internally (Kohtamäki et al., 2019). Innovation ecosystems have been shown to facilitate this process by accelerating capability development and enabling access to complementary expertise through collaboration with external partners (Jovanovic et al., 2022; Kohtamäki et al., 2022).

2.1.2 From Value-Chains into Innovation Ecosystems

The managerial challenges faced by industrial focal companies have evolved substantially over recent decades, particularly with respect to how organizations manage their external environments alongside internal operations. A major driver of this change has been a shift in the locus of innovation. Innovation has increasingly moved from closed, internally focused processes toward open innovation strategies that integrate both internal and external resources within ecosystem-based innovation models led by industrial focal companies (Chesbrough, 2003; Chesbrough, 2006; Teece et al, 1997; Teece, 2007; Hurmelinna Laukkanen et al., 2022). This transition reflects a broader change in managerial perspective, away from managing innovation solely within individual firms and toward managing innovation ecosystems and networks of external partners beyond firm boundaries (Adner, 2017; Dhanaraj and Parkhe, 2006; Gomes et al., 2022; Hurmelinna Laukkanen et al., 2022; Jacobides et al., 2018). The specific role of the focal company within such ecosystems is discussed in greater detail in a later section.

James Moore (1993) introduced the concept of business ecosystems, describing networks of interdependent firms that collectively develop customer value propositions and serve as a platform for joint innovation. Building on Moore's original ideas, subsequent

management research has emphasized that the locus of value creation has shifted from the internal resources and processes of a focal firm toward the coordination and governance of external resources and processes distributed across a broader ecosystem (Chesbrough, 2003; Chesbrough, 2006; Adner, 2017). In parallel, analytical perspectives in management studies have expanded beyond the individual firm to consider the external environments in which firms are embedded (Gomes et al., 2022; Teece, 2017).

Moore's (1993) business ecosystem perspective conceptualizes value creation as taking place within a broader value system surrounding the focal firm. Porter (1985, p. 34) defines the value system as a "set of interconnected value chains that extend beyond the boundaries of a single firm." While Porter's (1985) value-chain framework focuses on firm-level activities, the business ecosystem perspective extends the analysis beyond organizational boundaries and emphasizes the interdependencies among multiple actors involved in value creation (Kapoor, 2018).

Prior to the development of the business ecosystem concept, the dominant framework for understanding interorganizational coordination was supply chain management. Supply-chain management focuses on networks of suppliers, customers, and distributors and has been defined as the planning, implementation, and control of supply chain operations with the objective of satisfying customer requirements efficiently (Oliver, 1982; Chen and Paulraj, 2004; Ritala et al., 2013). Traditionally, supply-chain management emphasized the flow of raw materials, components, and finished products from production to markets (Oliver, 1982; Gomes et al., 2021). This perspective is closely aligned with industrial value-chain thinking, which often centers on bilateral relationships and power dynamics limited to between buyers and suppliers instead of larger communities (Gomes et al., 2021).

The distinction between Moore's business ecosystem concept and traditional supply chain management lies in the scope and structure of value-creation. While supply-chain management focuses on linear and relatively hierarchical relationships within industrial

value-chains, business ecosystems emphasize value-creation within a broader, more complex value system involving multiple interdependent actors (Moore, 1993). The emergence of the business ecosystem concept can be understood as a response to growing market demands for closer, nonlinear collaboration among industrial organizations in areas such as new product development, technological advancement, service innovation, and expanded distribution channels (Möller and Rajala, 2007).

More recently, industrial focal companies have faced increasing pressure to engage in collaborative value creation involving ecosystem partners and customers (Adner, 2006; Möller and Rajala, 2007; Kohtamäki et al., 2019). Innovation ecosystem research addresses these evolving expectations by highlighting the need for focal firms to facilitate customer value-creation beyond their organizational boundaries (Chesbrough, 2003; Chesbrough, 2006; Jacobides et al., 2018). Innovation ecosystems have been defined as “the alignment structure of a multilateral set of partners that must interact for a focal value proposition to materialize” (Adner, 2017, p. 40). Central to this literature is the role of the focal or hub firm, which is responsible for managing and coordinating ecosystem complementors situated both upstream and downstream in the value-system (Adner, 2006; Jacobides et al., 2018).

2.1.3 Innovation Ecosystem Value-Creation Mechanism and Dynamics

This section examines the value-creation mechanism of innovation ecosystems and the primary roles of ecosystem participants within this process. It is followed by a discussion of the main dynamics that shape ecosystem functioning and performance. Innovation ecosystem literature commonly describes ecosystems as consisting of three core roles: the focal company, component providers, and complementors (Adner and Kapoor, 2010).

The focal company holds a central position in the ecosystem and is responsible for leading and facilitating ecosystem level value creation. Although the objectives and selection criteria of focal companies may vary across ecosystems, foundational contributions in

the literature consistently emphasize the focal firm's role in articulating the ecosystem vision and coordinating value creation activities (Adner, 2017; Jacobides et al., 2018). The focal company defines the core value proposition of the ecosystem and sets the direction for collaboration among participants.

In contrast, the roles of components and complementors differ depending on their position within the ecosystem value structure. *Components* refer to upstream contributors that supply critical technologies, knowledge, or resources to the focal company, often related to research and development, manufacturing, or the creation of core technologies (Adner and Kapoor, 2010). These resources typically enable the development and performance of the ecosystem's core product or technology, which is often owned or governed by the focal firm.

Complementors, by comparison, operate predominantly downstream in the ecosystem value structure. Their role is to enhance and extend the value of the focal company's core product or technology by enabling its effective use by end customers (Adner and Kapoor, 2010). Complementors often contribute services, applications, infrastructure, or complementary solutions that unlock customer value in specific usage contexts. The interaction among focal firms, components, and complementors constitutes the core value creation mechanism of innovation ecosystems.

While ecosystem-based innovation offers the potential for increased innovation performance and accelerated value-creation (Chesbrough, 2003; Chesbrough, 2006; Teece et al., 1997; Teece, 2010), it also introduces significant complexity for industrial focal companies (Hannah and Eisenhardt, 2018). This complexity arises from interdependencies among heterogeneous actors, uncertainty regarding partner performance, and coordination challenges across organizational boundaries. Importantly, these *challenges* manifest differently depending on the ecosystem role involved.

At the upstream level, components may generate challenges related to the design, integration, or scaling of external technologies or solutions into the focal firm's core product or platform. Such challenges are particularly salient in the case of advanced digital or technological components, where compatibility, reliability, or technological maturity may constrain ecosystem performance (Adner and Kapoor, 2010; Kolagar et al., 2022). Increasingly, novel types of components for industrial focal companies include advanced technologies provided by external technology firms, such as artificial intelligence, cloud computing, and Internet of Things solutions (Jovanovic et al., 2022). These components enable industrial firms to develop differentiated customer value propositions, often through digitally enabled products and services that leverage data generated by physical assets (Aagard et al., 2026; Paschou et al., 2020).

Downstream challenges associated with complementors often relate to delays in customer adoption or limitations in value realization. Complementors are frequently required to make the focal company's core technology usable in customers' operational environments, and failure to do so may slow ecosystem level value creation (Adner and Kapoor, 2010). For example, the widespread adoption of hydrogen energy technologies depends not only on core production technologies, but also on complementary infrastructure such as transportation, storage, and logistics solutions. In this context, complementors play a crucial role in enabling market adoption by supporting the practical use of the core technology.

Industrial focal companies must therefore ensure that complementors can serve demanding industrial customers, particularly with respect to requirements such as data governance, security, system reliability, and interoperability with other ecosystem components (Aagard et al., 2026; Kolagar et al., 2022). Failure in either component or complementor performance can create *bottlenecks* that constrain ecosystem value-creation and value-capture (Adner and Kapoor, 2010; Hannah and Eisenhardt, 2018). Bottlenecks at the component level may reflect dependencies on critical technologies, knowledge,

or resources, while complementor related bottlenecks often appear as delays in customer adoption or insufficient value realization.

Managing such bottlenecks is therefore a central task in ecosystem orchestration. Effective orchestration seeks to mitigate interdependencies that hinder performance and to align ecosystem participants in ways that sustain value creation across the ecosystem (Adner and Kapoor, 2010; Hannah and Eisenhardt, 2018). Figure 1, adapted from Adner and Kapoor (2010), illustrates the innovation ecosystem value creation mechanism by depicting the roles of the focal company, components, and complementors and the interdependencies among them.

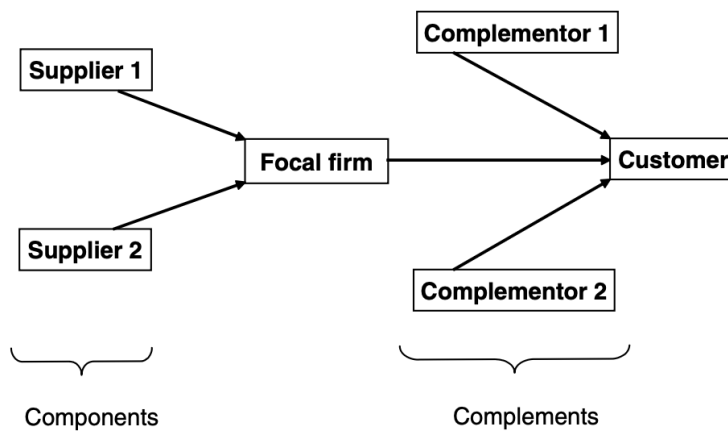


Figure 1. Ecosystem value-creation mechanic (Adner & Kapoor, 2010, edited).

Three domains, namely cooperation, competition, and bottlenecks, play a critical role in shaping ecosystem dynamics (Hannah and Eisenhardt, 2018). The first domain, cooperation, refers to the mechanisms through which ecosystem participants jointly create a value proposition for customers (Chesbrough, 2003; Adner, 2017; Hannah and Eisenhardt, 2018; Jacobides et al., 2018). This joint value creation process generates interdependencies among ecosystem participants by linking them to a shared value system (Kapoor, 2018).

The second domain, competition, operates both externally and internally within ecosystems (Hannah and Eisenhardt, 2018; Visscher et al., 2021). Externally, ecosystems compete against alternative ecosystems that may offer rival solutions or value propositions to customers (Adner, 2017; Hannah and Eisenhardt, 2018). Internally, competition arises among firms occupying similar roles, as component suppliers and complementors often face rivalry within their respective categories (Adner, 2017; Adner and Kapoor, 2010).

The third domain comprises bottlenecks, which directly influence ecosystem innovation and overall performance. Bottlenecks emerge when dependencies on specific components, complementors, or capabilities constrain the realization of the ecosystem value proposition (Hannah and Eisenhardt, 2018). Importantly, although all components and complementors are necessary for producing the ecosystem level customer-value proposition, their roles and power positions within the ecosystem are not equal (Adner and Kapoor, 2010; Hannah and Eisenhardt, 2018). In sum, ecosystem orchestration requires the focal company to actively manage cooperation, internal and external competition, and bottlenecks arising from interdependencies among ecosystem participants. Addressing these dynamics is essential for sustaining ecosystem value creation and innovation performance in complex and evolving environments (Hannah and Eisenhardt, 2018).

2.1.4 The Role of the Focal Company in Innovation Ecosystems

The focal company, also referred to as the hub company, occupies a central role in innovation ecosystems. It is responsible for both designing and facilitating the delivery of the ecosystem level customer value proposition (Adner, 2017; Jacobides et al., 2018). The focal company has been defined as “an organization that attains prominence and power through its individual attributes and its central position within the network structure, and that exercises leadership by coordinating the dispersed resources and capabilities of ecosystem participants” (Dhanaraj and Parkhe, 2006, p. 659). In a similar formulation, the focal company is described as an actor that leverages its central network position to

mobilize and coordinate external resources and capabilities in pursuit of collective value creation (Dhanaraj and Parkhe, 2006).

Through its prominent position, the focal company seeks to enhance overall ecosystem performance by aligning ecosystem resources, skills, and contributions toward shared objectives (Dhanaraj and Parkhe, 2006; Toigo et al., 2021). At the same time, both innovation ecosystem research and innovation network literature emphasize that ecosystems lack formal hierarchical authority (Dhanaraj and Parkhe, 2006; Jacobides et al., 2018). Ecosystem participants retain legal and strategic independence, even as they become interdependent through shared value creation. In the absence of formal authority, the focal company must establish and sustain its leadership position through informal mechanisms, such as strategic partner selection, ecosystem structuring, and governance arrangements that align incentives and expectations (Dhanaraj and Parkhe, 2006).

A key distinction between business networks and innovation ecosystems lies in the way these structures are formed and in how the focal company is positioned within them (Adner, 2017; Jacobides et al., 2018). In many business networks, the structure emerges around a powerful focal firm that occupies a dominant position within an industry or value chain. In such contexts, the focal firm is often selected based on its market power, resource base, and ability to open future business opportunities for network partners (Adner, 2017; Jacobides et al., 2018). These focal firms typically possess substantial financial resources, technological knowledge, or privileged access to markets, which enable them to coordinate network activities effectively. In contrast, innovation ecosystems are more commonly structured around a customer value proposition rather than around an already dominant firm (Adner, 2017; Jacobides et al., 2018). In this context, the focal company's role is defined less by preexisting power and more by its ability to envision, articulate, and facilitate the realization of a compelling ecosystem level value proposition. The focal company acts as an orchestrator that aligns external ecosystem participants and their complementary contributions to deliver customer value (Adner, 2017). As such, leadership in innovation ecosystems is grounded in the capacity to coordinate interde-

dependencies, manage complexity, and enable collective innovation rather than in hierarchical control.

2.2 Orchestration Capability In Innovation Ecosystems

2.2.1 Concept and Main Aspects of Ecosystem Orchestration

Ecosystem orchestration has evolved over time, with more recent literature increasingly conceptualizing orchestration as a dynamic capability. Early work defines ecosystem orchestration as “a set of deliberate and intentional actions performed by a central organization with the aim of creating and capturing value from a network of actors” (Dhanaraj and Parkhe, 2006, p. 659). This perspective emphasizes orchestration as a purposeful activity managed by a focal organization that coordinates interactions among ecosystem participants. Subsequent research has further refined this view. Adner (2017) describe ecosystem orchestration as involving the articulation of a shared vision and the facilitation of value creation for customers. From this standpoint, orchestration is positioned as a strategic level activity that often affects organizational boundaries and structural arrangements. Ecosystems are thus understood as “configurations that align diverse partners whose interactions are necessary for ecosystem level value creation to materialize” (Adner et al., 2017, p. 40). The concept was further developed by Jacobides et al. (2018), who emphasize the role of resource configuration within ecosystems. Their work highlights that unique combinations of resources across ecosystem participants enable differentiated customer value propositions. At the same time, ecosystem innovation is characterized by increased complexity, partly due to the absence of clear hierarchical authority between the orchestrator and its ecosystem partners. This distributed structure requires coordination mechanisms that differ from those used within traditional firm boundaries. In parallel, Hurmelinna Laukkanen et al. (2018) argue that effective ecosystem orchestration requires a combination of capabilities. These include operational capabilities that support current business activities, as well as future oriented orchestra-

tion development capabilities that enhance innovation performance over time. This view reinforces the notion that orchestration involves both present coordination and long-term capability development. More recently, Shi and Shen (2021) explicitly conceptualize ecosystem orchestration as a dynamic capability. They define it as the “(a dynamic) capability of hub firms to purposefully design, assemble, develop, and manage interorganizational networks in order to meet evolving strategic objectives” (Shi and Shen, 2021, p. 3038). From this perspective, ecosystem orchestration is understood as a higher-level capability that enables organizations to manage different phases of orchestration across changing environmental conditions.

Ecosystem orchestration has been examined from multiple complementary perspectives in the literature. The foundational innovation network orchestration theory proposed by Dhanaraj and Parkhe (2006) was extended by Batterink et al. (2010), who conceptualize orchestration as a process consisting of three phases, each associated with distinct managerial requirements. In their framework, the initial phase of orchestrating innovation networks, namely innovation initiation, is identified as particularly critical for achieving successful innovation outcomes, as it shapes partner selection, interaction patterns, and early coordination mechanisms. In parallel, Ritala et al. (2009) further developed the orchestration perspective by distinguishing between two levels of orchestration, namely the organization level and the individual level. Their work emphasizes that orchestration activities at these two levels are interdependent and mutually reinforcing, as individual actions influence organizational outcomes and vice versa. This multilevel perspective adds nuance to earlier orchestration theories by highlighting the role of micro-level interactions alongside organization level coordination.

Further refinement is offered by Hurmelinna Laukkanen et al. (2018), who argue that orchestrators may pursue different objectives and assume varying roles depending on their capabilities and strategic context. According to their findings, attributes of the focal organization, such as its resource base, organizational culture, and power position within the industry, influence both the objectives of orchestration and the modes through

which orchestration is carried out. More recently, Shi and Shen (2021) integrate these views by proposing that ecosystem orchestration encompasses both the management of resources and the management of networks. They note that, within management research, these perspectives have often evolved in relative isolation, with network orchestration focusing primarily on relationship management and ecosystem research emphasizing resource configuration.

The role of the focal company has remained central to orchestration theory since its early formulation by Dhanaraj and Parkhe (2006). In their framework, ecosystem orchestration is understood as the active management of network activities with the dual objective of creating and capturing value. The authors identify three interrelated orchestration processes that facilitate learning and knowledge sharing among ecosystem participants, enable the appropriation of innovation value at the ecosystem level, and support the dynamic management of the ecosystem as it evolves. This latter process includes activities such as strategic selection of ecosystem partners, governance of interactions, and protection of the focal firm's position as an ecosystem hub.

Subsequent ecosystem research further elaborates the role of the focal organization. Adner (2017) conceptualizes the focal firm as responsible for both designing the ecosystem level customer value proposition and managing the components and complementors required to deliver that proposition. Their work highlights the importance of managing interdependencies among ecosystem participants, particularly in relation to resources and structural alignment. This perspective is extended by Jacobides et al. (2018), who emphasize the combinations of ecosystem components and complementors as key enablers of differentiated customer value propositions. Rather than focusing solely on coordination, their work underscores the strategic role of orchestration in shaping distinctive value creation outcomes for ecosystem customers.

In summary, innovation ecosystem research consistently positions the focal organization as responsible for articulating the vision of the ecosystem level customer value proposi-

tion and facilitating its delivery to end customers (Adner, 2017; Jacobides et al., 2018). External complementors are typically essential for realizing this value proposition, as they provide complementary knowledge, technologies, resources, or access to markets. The selection of complementors by the focal firm is therefore closely guided by the requirements of the intended customer value proposition. These requirements may include advanced technological expertise, resources for service innovation, or access to new geographical markets and customer segments (Kolagar et al., 2022).

The following sections examine the key dimensions of ecosystem orchestration in greater detail, focusing on the management of resources, the management of networks, orchestration at both the organization level and the individual level, and ecosystem orchestration as a dynamic capability.

2.2.2 Orchestration of Resources

As discussed in Chapter 2.1, Adner (2006) introduced a seminal contribution that conceptualized innovation ecosystems as configurations consisting of multiple actors whose interdependent contributions collectively deliver a value proposition to customers. These actors were assigned to distinct roles, including suppliers, complementors, distribution channels, regulators, and customers (Adner, 2006). More broadly, the paper argued that innovation was shifting from linear, value-chain based value creation toward ecosystem-based value creation, characterized by accelerated innovation through the integration of complementary resources accessed via ecosystem partners. Linear value creation can, for example, be illustrated by bilateral relationships between a supplier and a buyer (Ritala et al., 2012).

Adner further developed the ecosystem concept in his 2017 work by framing ecosystems as strategic units characterized by their architecture, governance mechanisms, and differentiated participant positions. The ecosystem value creation logic proposed by Adner (2017) was discussed in detail in Chapter 2.1. According to this perspective, ecosystem

orchestration focuses on managing the interdependencies among complementary resources, as well as the roles and structures through which these resources are coordinated. The ecosystem as a structure approach emphasizes the organizational and relational arrangements required for the customer value proposition of the ecosystem to materialize. In parallel, Adner (2017) also acknowledges an ecosystem as affiliation perspective, which conceptualizes ecosystems as loosely structured collectives centered around a focal firm with strong industry power, without necessarily emphasizing the realization of a specific customer value proposition. The emphasis on structures is central to Adner's (2017, p. 40) definition of an ecosystem as "the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize." From this viewpoint, ecosystem management involves specifying the activities required to realize the value proposition, identifying the actors responsible for these activities, defining the positions actors occupy in the value flow, and clarifying the dependencies among actors that enable ecosystem level value creation. More recently, Jacobides et al. (2018) extended the work of Adner by placing a stronger emphasis on the management of ecosystem resources. Their theory focuses particularly on complementors as a central source of value creation for end customers. Innovation ecosystems are defined as a "set of actors engaged in varying degrees of multilateral and nongeneric complementarities that are not fully controlled through hierarchical governance" (Jacobides et al., 2018, p. 2264). This conceptualization highlights that ecosystem coordination differs fundamentally from traditional organizational or supply chain control.

Jacobides et al. (2018) identify two defining characteristics of innovation ecosystem orchestration. The first concerns the role of complementors in enabling differentiated customer value propositions. According to the authors, orchestration involves forming differentiated, and potentially unique, combinations of resources across ecosystem participants. This perspective differs from resource-based view theory, which primarily analyzes the quality and type of individual firm level resources and emphasizes that resources which are valuable, rare, non-substitutable, and difficult to imitate can serve as the basis of competitive advantage (Barney, 1991). From this viewpoint, ecosystem or-

chestration is approached as the strategic management of complementors rather than the optimization of isolated resources. The focus lies on structuring and coordinating complementary contributions to achieve a unique and defensible ecosystem level value proposition. As such, the theory places strong emphasis on the structural management of ecosystem resources and relationships, rather than on resource ownership alone (Jacobides et al., 2018).

The second defining characteristic identified by Jacobides et al. (2018) relates to the absence of formal hierarchical authority within innovation ecosystems. In contrast to traditional industrial value chains, which typically feature clear hierarchical relationships between buyers and suppliers, innovation ecosystems operate without a centralized mandate for control (Gomes et al., 2021). While the term ecosystem management may also be applied to settings with clearer hierarchical arrangements, such as business ecosystems oriented toward opportunity exploitation or internally governed organizational ecosystems, innovation ecosystem orchestration lacks such authority structures. Even though the orchestrator defines the boundaries and direction of the customer value proposition, individual ecosystem participants retain control over their own resources and investment decisions (Adner, 2017; Jacobides et al., 2018).

Recent ecosystem literature further highlights the importance of managing combinations of components and complementors in enabling differentiation and disruptive customer value propositions (Kolagar et al., 2022; Sjödin et al., 2024). In addition, scholars emphasize the skills, routines, processes, and organizational structures required for orchestrating ecosystem innovation (Linde et al., 2021). This development underlines the growing need for focal firms to acquire, integrate, and govern novel types of partners, including technology startup firms and advanced technology providers (Sjödin et al., 2020; Sjödin et al., 2024). As a result, organizations are increasingly required to develop orchestration capabilities and related dynamic capabilities to effectively manage ecosystem-based innovation (Linde et al., 2021; Sjödin et al., 2024). Ecosystem orchestration may also involve strategic repositioning, whereby focal firms adjust their roles, capabili-

ties, and relationships to strengthen their position within the ecosystem and support value creation (Huikkola et al., 2020).

In summary, ecosystem theory conceptualizes the focal firm as responsible for defining and managing the boundaries of the ecosystem customer value proposition, specifying the roles and processes required to deliver this proposition, and recruiting appropriate ecosystem participants (Adner, 2017; Jacobides et al., 2018). Ecosystem orchestration is thus approached through the management of structures and resources rather than hierarchical control. The managing of both components and complementors are recognized as critical sources of value creation, enabling differentiated customer value propositions and access to new markets and customer segments. In dynamic and disruptive environments, these complementary resources are increasingly sourced from technology startups and advanced technology providers, reinforcing the strategic importance of orchestration capabilities for sustained innovation performance (Kolagar et al., 2022; Sjödin et al., 2024).

2.2.3 Orchestration of Networks

Like innovation ecosystem research, the innovation networks literature has its roots in ecological analogies, which view individual actors as developing within a shared environment of resources that enables their collective growth (Iansiti and Levien, 2004). Building on earlier work on business ecosystems (Moore, 1993), innovation network research evolved alongside ecosystem research, reflecting a growing need to move beyond firm centric and supply chain focused perspectives toward a broader view of the external environment surrounding industrial organizations (Ritala et al., 2013). This shift marked a transition from managing primarily internal processes to coordinating interactions with a wider set of external partners engaged in joint innovation activities. A major turning point in innovation network research, like developments in ecosystem theory, was driven by the rise of open innovation practices (Chesbrough, 2003). Open innovation highlighted the importance of external knowledge sources and collaborative arrangements,

thereby shifting analytical attention toward the management of an organization's external environment, including partners that contribute complementary resources and capabilities for innovation (Ritala et al., 2013).

A foundational contribution to innovation network orchestration is provided by Dhanaraj and Parkhe (2006), who introduce the concept of orchestration capability in their conceptual framework. They define network orchestration as "the set of deliberate and intentional actions performed by a central organization with the aim of creating and capturing value from a network of actors" (Dhanaraj and Parkhe, 2006, p. 659). This definition emphasizes the active role of a focal organization in shaping interactions, aligning interests, and governing collaboration within innovation networks. Dhanaraj and Parkhe (2006) conceptualize network orchestration as comprising three interrelated processes: knowledge mobility, innovation appropriability, and network stability. Knowledge mobility refers to the mechanisms through which knowledge is shared, distributed, and integrated across the network, highlighting both learning and knowledge exchange among members. Innovation appropriability concerns the ability of innovators to capture value from their innovations, emphasizing the role of intellectual property, patents, and licensing arrangements in collaborative settings (Dhanaraj and Parkhe, 2006; Teece, 1986). This process also involves governance mechanisms designed to allocate value fairly among participants and to prevent opportunistic behavior such as free riding. The third process, network stability, addresses the dynamic nature of innovation networks, including the entry and exit of participants. It involves strategic partner selection, management of network composition in terms of number and type of participants, and decisions regarding the degree of formality in network governance. Strategic recruitment of partners is identified as a key mechanism for strengthening the power position of the focal organization. This framework has served as a foundational reference for subsequent research in both innovation network and ecosystem literature (for example, Shi and Shen, 2021).

Subsequent studies emphasize that ecosystem and network orchestration operate across multiple levels of capability. Orchestration has been conceptualized as involving

both organization level and individual level capabilities, which interact and mutually reinforce each other. Individual level capabilities are often found to contribute to the development and strengthening of organization level capabilities, a logic that aligns closely with the micro-foundations perspective of dynamic capabilities discussed earlier. Ritala et al. (2009) explicitly address this multilevel nature of orchestration by highlighting the interaction between organization level capabilities and individual level skills in innovation networks. They conceptualize orchestration as a multidimensional capability, in which individual level expertise and routines influence the evolution of organization level processes. In practice, when individuals with specialized knowledge and skills are recruited into a focal organization, their expertise may become embedded in organization level routines and processes. Although individuals may later leave the organization, the knowledge and routines developed often persist as part of the organizational structure. At the same time, organization level routines provide guidance and support for individual action. While Ritala et al. (2009) do not explicitly label orchestration as a dynamic capability, they frame it as a future oriented capability that supports both incremental and radical innovation. Organization level capabilities are characterized as recurring routines shaped by organizational history and culture, whereas individual level capabilities are rooted in the skills and routines of individual actors.

More recently, Hurmelinna Laukkanen et al. (2018) further develop this perspective by distinguishing between two types of ecosystem orchestration capabilities: operational or ordinary capabilities and dynamic capabilities. Operational capabilities relate to the coordination and exploitation of existing activities to support current income generation. Dynamic capabilities, in contrast, enable future oriented value creation by supporting the development and evolution of orchestration capabilities over time. This distinction reinforces the view that ecosystem orchestration involves both the management of present operations and the continuous renewal of collaborative arrangements in response to changing conditions.

Aarikka-Stenroos et al. (2017) further show that ecosystem orchestration approaches may vary depending on an organization's objectives and innovation context. Their findings suggest that organizations focused on research and exploration tend to rely more on informal collaboration, relationship-building, and flexible coordination. In contrast, organizations with stronger commercialization objectives are more likely to use formal processes, governance mechanisms, and structured coordination practices. This highlights that ecosystem orchestration is not carried out in the same way by all organizations. Instead, orchestration practices may vary according to the objectives and requirements of the innovation process. Differences in orchestration approaches may also reflect the capabilities, resources, and positions of focal organizations within their ecosystems (Hurmelinna-Laukkanen et al., 2018). As a result, orchestration approaches may evolve as organizations move from exploring new opportunities toward commercializing and scaling innovations (Aarikka-Stenroos et al., 2017).

In summary, innovation network literature conceptualizes orchestration as a multilevel capability that integrates individual level skills and routines with organization level processes and structures. Individual level capabilities contribute to the development of organization level capabilities, while operational and dynamic capabilities jointly support current performance and future oriented value creation. Together, these perspectives position network orchestration as a critical foundation for ecosystem orchestration and innovation in complex and evolving environments.

2.2.4 Orchestration as a Dynamic Capability

Ecosystem orchestration in changing environments requires the focal company to possess dynamic capabilities. Ecosystem orchestrators face the challenge of adapting different orchestration modes to a heterogeneous set of complementors operating in dynamic and uncertain contexts (Reypens et al., 2021; Shi and Shen, 2021, p. 3084). This need for continuous adaptation implies that orchestration capability itself must be dynamic in nature, enabling organizations to respond effectively to environmental change (Shi and

Shen, 2021). Consistent with this view, Shi and Shen (2021, p. 3087) define orchestration capability as “the dynamic capability of a central actor to efficiently and effectively integrate and coordinate resources and relationships within an ecosystem in order to adapt to continuously changing environments”. From this perspective, ecosystem orchestration encompasses the coordination of both resources and interorganizational relationships.

Ecosystem orchestration is frequently described in the literature as a set of processes. This conceptualization originates from the foundational definition of orchestration as “the set of deliberate and intentional actions performed by a central organization with the objective of creating and capturing value from a network” (Dhanaraj and Parkhe, 2006, p. 659). Dhanaraj and Parkhe (2006) further identify three core orchestration processes, namely knowledge mobility, innovation appropriability, and network stability. Importantly, their framework already acknowledges that orchestration requires responsive and adaptive management activities to address changing external conditions.

The objectives of orchestration theory and dynamic capabilities theory are closely aligned. Shi and Shen (2021) emphasize that dynamic capabilities are essential for fostering long term competitive advantage in changing environments, particularly through innovation-oriented adaptation. Similarly, ecosystem orchestration theories highlight the need for continuous adjustment of coordination mechanisms, partner configurations, and governance structures (e.g. Reypens et al, 2021). In this sense, the two theoretical perspectives converge in their emphasis on future oriented adaptation and responsiveness.

The convergence between ecosystem orchestration theory and dynamic capabilities theory is also reflected in their understanding of capability development. According to Shi and Shen (2021), effective orchestration requires the focal company to develop both organization level capabilities and individual level skills. This view is consistent with innovation network orchestration research by Ritala et al. (2009), which demonstrates that

individual level skills contribute to the development of organization level capabilities. Likewise, dynamic capabilities theory emphasizes the role of underlying micro-foundations, such as skills, routines, and organizational structures, in shaping higher level dynamic capabilities (Teece et al., 1997; Teece, 2010).

The overlap between ecosystem orchestration and dynamic capabilities theory has been explicitly recognized in recent management research. Linde et al. (2021) acknowledge strong connections between ecosystem innovation and dynamic capabilities theory. Their work highlights, first, the role of focal firms' sensing, seizing, and reconfiguring capabilities in orchestrating innovation ecosystems. Second, it emphasizes the importance of micro-foundations in enabling the development of these capabilities. Third, the theory underlines how routines, processes, and organizational structures support ecosystem level innovation orchestration. Within this framework, dynamic capabilities complement resource-based view perspectives by extending beyond operational or ordinary capabilities oriented toward current income generation and addressing future-oriented ecosystem development (Hurmelinna Laukkanen et al., 2018; Linde et al., 2021). Recent studies further extend this line of inquiry. Foss et al. (2023) emphasize differing leadership requirements across the phases of ecosystem orchestration, highlighting that orchestration demands evolve over time. Similarly, Sjödin et al. (2024), drawing on a detailed case study, identify ecosystem management dynamic capabilities as critical for industrial focal firms, particularly in relation to collaborating with novel types of partners such as deep technology startup firms and advanced technology providers.

In summary, the need for focal firms to adapt to disruptive environments while managing a heterogeneous set of complementors with varying requirements creates a strong rationale for viewing ecosystem orchestration as a dynamic capability rather than a stable or static set of processes. Developing orchestration capability therefore entails building orchestration related dynamic capabilities and their underlying micro-foundations. Dynamic capabilities theory contributes to ecosystem orchestration research by providing a future oriented perspective on ecosystem development, by structuring managerial ac-

tion around sensing, seizing, and reconfiguring, and by explaining how orchestration capabilities are developed through underlying skills, routines, procedures, managerial rules, and organizational structures.

2.3 Dynamic Capabilities and Microfoundations

Dynamic capabilities theory provides an important theoretical foundation for understanding how firms adapt to changing environments and sustain competitive advantage over time. While traditional resource-based perspectives emphasize the strategic value of firm-specific resources, dynamic capabilities research extends this view by examining how organizations renew, reconfigure, and deploy resources in response to environmental change. In the context of innovation ecosystems, this perspective is particularly relevant because firms must continuously adapt their resources, relationships, and activities to address evolving technological and market conditions. The following section discusses the theoretical development from the resource-based view to dynamic capabilities theory.

2.3.1 From Resource-Based View to Dynamic Capabilities

Resource based view scholars (Barney, 1991; Penrose, 1959, Penrose, 2009; Peteraf, 1993; Schumpeter, 1934; Wernerfelt, 1984) have long recognized an organization's resource base as a primary source of competitive advantage, with a strong emphasis on the firm's internal environment (Eisenhardt and Martin, 2000). Resource based view theory explains differences in organizational performance through heterogeneity in firms' resource endowments (Eisenhardt and Martin, 2000; Penrose, 1959). In his seminal contribution, Barney (1991) argues that combinations of resources that are valuable, rare, difficult to imitate, and non-substitutable form the foundation of sustainable competitive advantage. Subsequent research within the resource-based view tradition (for ex-

ample, Grant, 1996) has further emphasized intangible resources, particularly knowledge, as potential sources of sustained competitive advantage.

Some years later, scholars within the resource-based view increasingly addressed the challenges posed by dynamic and high velocity markets (Eisenhardt and Martin, 2000). In response, scholars such as Teece et al. (2007) emphasized the need to adapt management theories to environments characterized by rapid change driven innovation, technological development, evolving market dynamics, and changing customer needs. This shift redirected resource-based view scholarship from a predominantly internal focus toward greater consideration of the organization's external environment (Teece et al., 2007).

In parallel, innovation ecosystems increasingly highlighted the importance of resources that extend beyond firm boundaries. While the resource-based view emphasizes resources controlled by the focal firm as sources of competitive advantage (Barney, 1991), ecosystem environments require firms to rely on complementary resources, knowledge, and capabilities accessed through external relationships and collaboration (Chesbrough, 2003; 2006; Dhanaraj and Parkhe, 2006; Adner, 2017; Jacobides et al., 2018). This broader perspective aligns with extended resource-based view (eRBV) thinking, which suggests that firms can create value not only through their own resources but also through resources accessed through external partners and collaborative relationships (Yang et al., 2019). However, both RBV and eRBV provide limited insight into how firms continuously adapt, combine, and reconfigure resources in changing environments. This limitation contributed to the development of dynamic capabilities theory, which focuses on how organizations intentionally renew and transform their resource base over time (Teece et al., 2007).

2.3.2 Dynamic Capabilities (Sensing, Seizing, Reconfiguring)

The objective of dynamic capabilities theory is to build an understanding of how organizations manage strategic change, with the aim of adapting to or even shaping external market environments. Dynamic capabilities are conceptually distinct from operational or ordinary capabilities, as they focus on the creation of future oriented value through the development, extension, and modification of an organization's existing resource base. The theory identifies a set of organizational capabilities that support opportunity identification, opportunity realization, and resource reconfiguration within established organizations that are often operating in global markets affected by technological disruption. Dynamic capabilities theory further advances understanding of the microfoundations underlying these capabilities by conceptualizing them within a tripartite structure consisting of sensing, seizing, and reconfiguring.

John Teece, Gary Pisano, and Amy Shuen introduced dynamic capabilities theory in a conceptual paper published in 1997. The theory builds an understanding of organizational strategic change with the objective of explaining how organizations can develop a superior and sustainable competitive advantage in environments characterized by rapid change. The theory addresses how organizations adapt to changing environments or actively shape them. It identifies a specific set of organizational capabilities required to manage strategic change. According to Teece et al. (1997), the role of dynamic capabilities is defined as "the ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (p. 516). The author further emphasizes the role of dynamic capabilities in enabling organizations to develop novel combinations of resources with the objective of adapting to changing market conditions or influencing the external environment itself (Teece et al., 1997).

Dynamic capabilities may be considered a subgroup of organizational capabilities. Winter (2003) categorizes organizational capabilities into two main groups, namely operational or ordinary capabilities and dynamic capabilities. Operational or ordinary capabilities are understood to support the management of an organization's current activities

and income generation through existing resource configurations. Dynamic capabilities, in contrast, complement operational capabilities by enabling organizations to manage change (Winter, 2003), as operational capabilities alone are considered as insufficient in dynamic environments (Eisenhardt and Martin, 2000). These groups of organizational capabilities are commonly understood to follow a hierarchical relationship. This hierarchical view is grounded in the work of Collis (1994), who proposes that operational or ordinary capabilities can be regarded as zero order capabilities, while dynamic capabilities are positioned above them as first order, second order, or even higher order capabilities. In this framework, dynamic capabilities function to modify, renew, or reconfigure operational or ordinary capabilities. In other words, dynamic capabilities support the cognitive and strategic capacity of organizations by enabling them to sense market changes, seize informed strategic decisions, and reconfigure their resource base in response to evolving environments (Teece et al., 1997; Teece, 2007; Schilke et al., 2018).

Teece further developed dynamic capabilities theory in 2007 by emphasizing its underlying microfoundations. For this purpose, the theory organizes dynamic capabilities into three distinct sets, each with a specific objective. The first set, sensing, concerns the identification of opportunities. The second set, seizing, relates to the realization of identified opportunities through resource commitment, deployment, and investment. The third set, reconfiguring, refers to the organizational capabilities required to modify and realign company resources and structures to sustain success and identify new viable strategic trajectories. Building on the foundational definition of dynamic capabilities provided by Teece et al. (1997), Teece (2007) advanced the theory by explaining the microfoundations through the sensing, seizing, and reconfiguring framework. Helfat et al. (2009) further developed the theory by emphasizing the lifecycle dimension of dynamic capabilities and explaining how they are developed, changed, and updated over time. More recently, Helfat and Raubitschek (2018) highlighted the role of dynamic capabilities in supporting managerial decision-making in challenging circumstances, emphasizing their cognitive nature.

Following Teece (2007), *sensing* refers to organizational capabilities related to opportunity identification, creation, and learning. Organizations differ in their capacity to access and interpret market information, which in turn affects their innovation performance. Dynamic capabilities theory (Teece, 2007) emphasizes the importance of scouting new information and developing both commercial and technological opportunities. The theory of Helfat & Raubichek (2018) highlighted sensing capabilities role in identifying both opportunities and threats in the market. Linde et al. (2021) further conceptualize sensing capability as the generation of knowledge concerning markets, customers, competitors, market segments, and technologies. Teece (2007) highlights that sensing capabilities require organizations to identify, sense, and shape market opportunities. The identification of new commercial opportunities necessitates know-how and learning related to market requirements, user needs, and customer decision-making processes. Sensing capabilities are therefore essential for building and testing market hypotheses regarding customer needs, emerging technologies, and market responses to novel value propositions. The primary objectives of sensing capabilities include identifying and validating customer needs, technological developments, and relevant scientific breakthroughs. At the core of sensing lies the organization's ability to enable and manage information flows among appropriate internal and external stakeholders. (Teece, 2007)

The second element, *seizing* capabilities, following Teece (2007), refers to an organization's ability to realize previously sensed opportunities by committing resources to development and commercialization. In dynamic capabilities theory, seizing captures the capacity to make strategic investment decisions that transform identified opportunities into concrete economic value. These capabilities are particularly reflected in an organization's ability to evaluate alternative investment options within a networked innovation environment and to align such decisions with an overarching investment strategy. The theory of Helfat & Raubichek (2018) acknowledges integration capabilities essential, with the deployment of complementarians as part of innovation processes supporting the transaction-cost efficiency of the focal innovator. At the core of Teece (2007) seizing capabilities lies the assessment of investment decisions from both technological and

market perspectives. The author emphasizes that effective investment strategies aim to reduce uncertainty surrounding potential investment targets for as long as possible and to commit resources once a dominant design or strategic direction becomes apparent (see also Cooper, 2008; Nunes et al., 2023). Organizations occupying different strategic positions may therefore follow distinct investment trajectories. Well-positioned organizations typically possess greater strategic flexibility and may delay investment commitments longer than challenger organizations (Teece, 2007; see also Pihlajamaa et al., 2023).

The third element, *reconfiguring*, in Teece's (2007) framework refers to the organizational capabilities required to sustain the performance achieved through the first two capability sets, sensing and seizing. Reconfiguring capabilities relate to an organization's ability to modify and realign its resource base and organizational structures in response to changing conditions. Teece (2007) distinguishes two broad forms of change associated with reconfiguring capabilities, namely incremental innovation and radical innovation. The author acknowledges that for well performing organizations, incremental innovation may be sufficient to maintain a successful strategic trajectory. In such cases, relatively small and gradual adjustments to existing resources, routines, and structures are adequate. In contrast, organizations facing declining performance or unprofitable positions often require radical innovation to regain a sustainable competitive position. The author finds radical innovation involving fundamental strategic change and requiring the development of substantially new resource configurations and organizational structures to ensure organizational survival. Reconfiguring capabilities are particularly important for established organizations, which may develop blind spots that limit their ability to leverage market opportunities that do not align with existing path dependencies such as organizational culture, values, history, or the current resource base. (Teece, 2007)

Incumbent organizations may also experience strategic misalignment when top management decision making is based on incomplete or inconsistent information that is insufficiently connected to markets or customers. In such contexts, strong reconfiguring capabilities are essential for restoring alignment and enabling organizational adaptation

(Teece, 2007). Organizational structures may create unintended and conflicting incentives across individual business units, which can give rise to internal competition. In such situations, the reconfiguration of resources and routines is often required to identify and realize synergies between new complementors and existing organizational structures. In the absence of sufficient reconfiguring capabilities, internal conflicts may emerge and persist within the organization. Reconfiguration may involve the sharing of capabilities between existing and new complementors or the redeployment of capabilities from one market context to another, thereby enabling renewed alignment between organizational resources and strategic objectives (Teece, 2007).

Dynamic Capabilities Link to Competitive Advantage

Returning to the resource-based view, RBV theory explains differences in competitive positions among organizations through the quality of their resources. Resources that are valuable, rare, difficult to imitate, and non-substitutable, commonly referred to as VRIN, are argued to form the basis of competitive advantage in markets (for example, Eisenhardt and Martin, 2000). In addition, RBV theory considers organizational operational or ordinary capabilities as those related to the efficient management of current activities and income generation through an existing set of resources (Winter, 2003).

Over time, RBV has been criticized for its limitations, particularly its relatively static nature and its inability to adequately explain sustained competitive advantage in environments characterized by rapid change (for example, Eisenhardt and Martin, 2000). In response, the original dynamic capabilities theory introduced by Teece et al., (1997) developed an understanding of how organizations create and capture value in changing environments. The objective of the theory is to support organizational strategic change, including the ability to adapt to or actively shape external market environments. Instead of considering the quality and amount of organizations resources as such like resource-based view theories (Barney, 1991), dynamic capabilities focus on the creation of future

oriented value by enabling the modification of existing resources and the development of new resource combinations (Teece et al., 1997; Teece, 2007).

However, aligning with the VRIN logic, dynamic capabilities are often considered difficult to copy or imitate (Schilke et al., 2018; Winter, 2003). Two main aspects support this argument. First, dynamic capabilities can be clearly distinguished from individual ad hoc actions (Schilke et al., 2018). While all organizations face occasional problem-solving situations, dynamic capabilities refer to recurring organizational abilities rather than isolated responses. According to the literature, they consist of stable patterns or routines through which organizations develop and apply learning and cognitive capabilities in a reliable and repeatable manner (Eisenhardt and Martin, 2000; Winter, 2003). Through these recurring abilities, dynamic capabilities enable organizations to perform learning and cognitive activities with consistency and effectiveness. This reliability represents a core organizational capability for managing strategic change. Second, dynamic capabilities are widely regarded as context specific, which makes their imitation or replication particularly challenging (Schilke et al., 2018). They typically develop gradually over time and are deeply embedded within the organization. As such, dynamic capabilities cannot be traded independently and can only be transferred in their entirety if the organization itself is sold (Winter, 2003). Due to their non imitable nature, dynamic capabilities are therefore acknowledged as a potential source of competitive advantage, especially in environments characterized by change (Teece et al., 1997).

It is important to note, however, that the mere possession of dynamic capabilities does not in itself guarantee competitive advantage. Rather, their role lies in enabling organizations to achieve sustainable competitive advantage by supporting opportunity sensing in markets and technologies, opportunity seizing through resource commitment, and the reconfiguration of existing resources and organizational structures (Teece, 2007). In this sense, dynamic capabilities support organizational strategic renewal and the ability to adapt to changing environments.

While dynamic capabilities research has traditionally focused on organizational-level capabilities related to sensing, seizing, and reconfiguring (Teece, 2007), more recent studies have increasingly examined the underlying mechanisms through which such capabilities emerge and develop (Rabetino et al., 2025). This shift has directed attention toward the microfoundations of dynamic capabilities, including the resources, processes, structures, and actors that enable capability development and adaptation over time.

2.3.3 Microfoundations (Resources, Processes, Structures, Individuals)

While dynamic capabilities theory explains how firms adapt to changing environments through sensing, seizing, and reconfiguring activities, it provides less detail regarding the underlying mechanisms through which these capabilities are developed and enacted. Microfoundations research addresses this limitation by examining the individual, organizational, and structural elements that give rise to higher-order organizational capabilities (Felin et al., 2012; Felin et al., 2015; Helfat and Peteraf, 2015). In the context of ecosystem orchestration, a microfoundational perspective helps explain how resources, processes and routines, organizational structures, and individual-level factors enable and shape the development and enactment of ecosystem orchestration capability.

Introduction to Dynamic Capabilities Microfoundations

Dynamic capabilities theory, as developed by Teece et al (1997), and Teece (2007), advances understanding of organizational change in rapidly evolving environments through the capabilities of sensing, seizing, and reconfiguring. However, these capabilities do not operate in isolation. Their effectiveness is grounded in underlying microfoundations, which determine the components of dynamic capabilities and explain how such capabilities emerge and evolve over time. These microfoundations enable organizations to identify opportunities and threats, realize opportunities, and modify their resource base.

Early microfoundations literature, exemplified by Teece (2007) sensing, seizing, and re-configuring, conceptualized capabilities primarily at the corporate or organizational level (Felin et al., 2015; Foss and Pedersen, 2019; Kindström et al., 2013; Koivisto, 2026). This perspective emphasizes how organizations adapt and transform but largely treats capabilities as higher level phenomena. Consequently, earlier research paid limited attention to the role of individual level dynamics in shaping these outcomes (Bingham et al., 2019; Koivisto, 2026). The origins of microfoundations are often traced to multiple disciplines, including sociology, social psychology, cognitive psychology, and behavioral psychology (Jepperson and Meyer, 2011; Finkelstein and Hambrick, 1996; Gavetti, 2005; Huff, 1990).

Felin et al. (2012) conceptualize organizational capabilities as emerging from individual-level elements and their interactions, emphasizing that capabilities are rooted in human action and behavior rather than existing solely as organizational attributes. Consequently, attention shifts from capabilities themselves toward the mechanisms through which they emerge.

Building on this perspective, microfoundations research increasingly adopts a multi-level perspective to explain how capabilities develop across different levels of analysis. Felin et al. (2015) emphasize that microfoundations provide a link between individual-level actions and organizational-level outcomes, thereby helping to explain how higher-level capabilities emerge and evolve (Coleman, 1990; Barney and Felin, 2013). Similarly, the managerial dynamic capabilities literature highlights the role of managerial cognition, human capital, and social capital in shaping organizational adaptation and capability development (Adner and Helfat, 2003; Helfat and Peteraf, 2015; Helfat and Martin, 2015). Together, these perspectives suggest that dynamic capabilities are best understood as multi-level phenomena that connect individual actions with organizational capabilities and outcomes.

Critical perspectives within microfoundations theory, however, either downplay the significance of individual level factors or treat individuals as adaptive, replaceable, and relatively homogeneous resources. These views emphasize contextual factors, coordination

mechanisms, and leadership as the primary drivers of organizational level outcomes (Foss and Pedersen, 2019). At the same time, Foss and Pedersen (2019) note that microfoundations research itself has often remained biased toward macro level explanations, highlighting a persistent tension between viewing capabilities as collective organizational structures and understanding them as products of individual level processes.

Recent research has increasingly moved beyond individual and organizational levels toward more integrative multi-level frameworks that simultaneously consider relationships between individuals, organizations, and broader ecosystem contexts (Helfat and Peteraf, 2015; Junge et al., 2023). Empirical studies have applied this perspective in industrial settings, identifying how dynamic capabilities emerge through interactions across multiple levels of analysis (Kindström et al., 2013; Rabetino et al., 2025).

Microfoundations research can be applied across different levels of analysis while maintaining its focus on explaining higher-level outcomes through underlying mechanisms (Foss and Pedersen, 2016). Much of the literature highlights individual and managerial factors, such as cognition, decision-making, and human capital, as important drivers of capability development (Palmie et al., 2023). However, microfoundations are not limited to the individual level. They may also include organizational resources, processes, structures, and other factors that contribute to the development of higher-level capabilities and outcomes (Foss and Pedersen, 2016). In ecosystem settings, for example, firm-level factors may contribute to the development of ecosystem-level capabilities and outcomes.

Conceptualizing Microfoundations

From a conceptual perspective, Teece (2007) defines microfoundations as the “skills, processes, procedures, organizational structures, decision rules, and disciplines that underpin enterprise level sensing, seizing, and reconfiguring capacities and are difficult to develop and deploy” (p. 1319). This perspective highlights that dynamic capabilities are

supported by underlying organizational elements that enable firms to sense opportunities, seize them, and reconfigure their resource base. Because these elements are often difficult to develop, transfer, and imitate, they contribute to differences in organizational performance and competitive advantage. Consequently, understanding the microfoundations of dynamic capabilities helps explain how sensing, seizing, and reconfiguring capabilities are developed and enacted in practice.

The microfoundations perspective was further developed by Felin et al. (2012), who shifted attention from defining capabilities toward understanding how their underlying elements interact. The authors define microfoundations as “individuals, processes, structures, and their interactions, which serve as key drivers of the emergence, functioning, and evolution of routines and capabilities” (p. 4). In doing so, they contribute to the genealogy of dynamic capabilities by advancing understanding of the foundational elements and interactions that give rise to capabilities and shape their development over time. From this perspective, differences in organizational performance are explained not only by the existence of capabilities but also by the nature of the underlying elements and interactions that support them.

Like the hierarchical view of organizational capabilities proposed by Winter (2003), Felin et al. (2012) suggest that microfoundations also exhibit hierarchical relationships. Some microfoundations interact closely and exert mutual influence, while others operate more independently. As a result, the contribution of individual microfoundations to capability development may vary across organizations and contexts. This perspective helps explain why dynamic capabilities differ across firms despite similar resources or environmental conditions.

Building on these perspectives, this study adopts a structured view of microfoundations consisting of four categories: resources, organizational processes and routines, organizational structures, and individual-level factors. Together, these categories provide a

framework for examining how ecosystem orchestration capability is developed and enacted in practice.

Resources

Resources form a central concept within resource-based view theory and represent the foundational inputs through which firms pursue competitive advantage. They may be tangible or intangible in nature, with later theoretical developments explicitly recognizing knowledge as a critical resource (Grant, 1996). Within this perspective, resources are commonly categorized as physical, human, and organizational assets (Barney, 1991).

Dynamic capabilities theory builds on this view by shifting attention from resource possession to how resources are mobilized, combined, and reconfigured over time. Eisenhardt and Martin (2000, p. 1107) describe dynamic capabilities as “the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, or die.” Similarly, Teece (2007) identifies resources as important microfoundations that support sensing, seizing, and reconfiguring activities. From this perspective, resources provide the inputs upon which higher-level organizational capabilities are developed and enacted.

Barney (1991, p. 101) defines firm resources broadly as “all assets, capabilities, organizational processes, firm attributes, information, and knowledge controlled by a firm that enable it to conceive and implement strategies that improve efficiency and effectiveness.” Building on this definition, resources can be grouped into three categories: physical capital resources, human capital resources, and organizational capital resources.

Physical capital resources include technologies, production facilities, geographic location, and access to raw materials (Barney, 1991). Further, human capital resources consist of employees' and managers' knowledge, skills, experience, training, judgment, and net-

works. Organizational capital resources, in turn, include formal and informal management systems such as planning, control, coordination, reporting structures, and embedded organizational routines. (Barney, 1991)

However, not all resources contribute equally to competitive advantage. Barney (1991) argues that only those resources that support the implementation of effective strategies constitute strategic resources. Later research has extended this perspective by recognizing that social capital, organizational culture, and cognitive capabilities may also function as important organizational resources (Barney and Felin, 2013; Foss and Lindenberg, 2013).

In ecosystem contexts, resources increasingly extend beyond organizational boundaries. Ecosystem orchestration literature emphasizes the importance of accessing, combining, and integrating distributed resources through collaboration with partners and complementors (Adner, 2017; Jacobides et al., 2018). Accordingly, resources relevant to ecosystem orchestration may include technological assets, knowledge, relationships, access to partners, and other complementary assets located outside the focal firm.

Consequently, resources constitute an important category of microfoundations by providing the inputs upon which dynamic capabilities are developed and enacted. Their value depends not only on their availability but also on the organizational processes, structures, and individual actions through which they are mobilized and integrated.

Processes and Routines as Microfoundations

Organizational routines have long been recognized as important mechanisms through which organizations coordinate activities and achieve their objectives (Nelson and Winter, 1982; Feldman and Pentland, 2003). Routines are commonly defined as “repetitive, recognizable patterns of interdependent actions carried out by multiple actors” (Feld-

man and Pentland, 2003, p. 95). They provide stability and continuity while also supporting learning, adaptation, and organizational change. Feldman and Pentland (2003) further distinguish between the structural aspects of routines and the actions through which they are enacted, emphasizing that the interaction between these elements enables both consistency and change.

A key distinction in the literature concerns the difference between operational and dynamic routines. Nelson and Winter (1982) distinguish routines that support day-to-day operations from those that facilitate organizational change. Building on this perspective, Winter (2003) differentiates between operational capabilities and dynamic capabilities. While operational capabilities support the efficient execution of existing activities, dynamic capabilities enable organizations to adapt, renew, and transform those activities in response to changing conditions.

The dynamic capabilities literature further emphasizes the role of organizational processes and routines in enabling adaptation. Teece et al. (1997) conceptualizes dynamic capabilities as being embedded in organizational and managerial processes, while Eisenhardt and Martin (2000, p. 1107) define them as “the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die.” Similarly, Zollo and Winter (2002, p. 5) describe a dynamic capability as “a learned and stable pattern of collective activity through which an organization systematically generates and modifies its operating routines in pursuit of improved effectiveness.” Together, these perspectives position processes and routines as key mechanisms through which organizations sense opportunities, seize them, and reconfigure their resource base.

From a microfoundations perspective, the focus shifts from routines themselves to the actions and interactions that create and sustain them (Felin et al., 2012). While resources provide potential sources of value, organizational outcomes depend on the processes and routines that mobilize, combine, and reconfigure those resources. Consequently,

processes and routines serve as important microfoundations because they coordinate individual and collective action, enabling capabilities to develop and evolve over time.

Empirical research has further highlighted the role of processes and routines in dynamic capability development. Kindström et al. (2013) identify capability assessment, learning, and strategic renewal processes as important mechanisms through which organizations adapt to changing market conditions and develop future growth opportunities. These processes help organizations evaluate existing capabilities, identify capability gaps, and direct investments toward areas that support long-term competitiveness. More recently, Rabetino et al. (2025) demonstrate that dynamic capabilities emerge through interactions among multiple microfoundations operating across individual, organizational, and ecosystem levels. Their findings emphasize the importance of organizational learning, coordinated processes, and interaction mechanisms in enabling capability development and adaptation over time.

Consequently, organizational processes and routines represent a central microfoundation of dynamic capabilities. They provide the mechanisms through which organizations coordinate activities, integrate resources, support learning, and adapt to changing environments. Through these mechanisms, sensing, seizing, and reconfiguring capabilities are developed, enacted, and renewed over time.

Organizational Structures

Organizational structures are widely recognized as an important microfoundation of organizational routines and capabilities. They shape how organizational activities are coordinated by influencing which activities are performed, how they are performed, and by whom they are carried out (Felin et al., 2012). Organizational structures further support the processing of information, facilitate the flow and integration of knowledge, and contribute to the development of organizational competencies and performance (Felin et

al., 2012). Furthermore, organizational structures are closely related to internal decision-making processes (Knudsen & Levinthal, 2007) and an organization's ability to adapt to changing environmental conditions (Siggelkow & Rivkin, 2005). Consequently, organizational structures may be understood as mechanisms that shape organizational behavior at both the organizational and individual levels, thereby influencing the development and enactment of organizational routines and capabilities. Organizational structures may influence organizational action through both formal and informal mechanisms.

Felin et al. (2012) emphasize that interactions within organizations are shaped by both formal and informal structural arrangements. Formal interaction is primarily supported through managerial rules, disciplines, roles, and structured processes that coordinate organizational activities. Such arrangements facilitate the consolidation and coordination of dispersed resources, including individuals, teams, business units, and cross-functional knowledge. Through these mechanisms, formal structures guide organizational behavior, support decision-making, and align activities with shared organizational objectives.

In contrast, informal interaction is enabled through coordination mechanisms grounded in shared values, norms, relationships, and accumulated experience (Felin et al., 2012). Informal structures play an important role in facilitating knowledge exchange, organizational learning, and the development of organizational culture. Because informal interactions often emerge beyond formally defined processes, they can either reinforce or challenge existing organizational routines and practices.

From a microfoundations' perspective, formal and informal structures shape how organizational actors interact, exchange knowledge, and coordinate activities (Felin et al, 2012). Through these mechanisms, they support the development and renewal of organizational capabilities. Recent microfoundations research extends this perspective by viewing organizational structures not as fixed organizational arrangements but as enabling mechanisms that shape relationships and coordination among organizational ac-

tors (Rabetino et al., 2025). Through these mechanisms, structures influence how knowledge is shared, how decisions are made, and how capabilities develop and adapt over time (Felin et al, 2012; Rabetino et al, 2025).

The dynamic capabilities literature further emphasizes the importance of organizational structures in enabling organizational adaptation and renewal. Teece (2007) identifies organizational structures as a key microfoundation of dynamic capabilities, defining microfoundations as “the distinct skills, processes, procedures, organizational structures, decision rules, and disciplines that underpin enterprise-level sensing, seizing, and reconfiguring capacities” (p. 1319). This perspective highlights that dynamic capabilities are not developed in isolation but are supported by organizational arrangements that facilitate coordination, decision-making, and resource deployment (Teece, 2007).

Accordingly, organizational structures encompass elements such as governance mechanisms, managerial processes, decision-making systems, organizational roles, and communication channels that support capability development. Through these mechanisms, structures enable organizations to identify opportunities, mobilize and coordinate resources, and reconfigure assets and activities in response to changing environmental conditions. Organizational structures therefore provide an important foundation through which sensing, seizing, and reconfiguring capabilities are enacted in practice (Teece, 2007).

Consequently, organizational structures constitute a central microfoundation of dynamic capabilities. By shaping interactions, enabling coordination, supporting knowledge exchange, and guiding decision-making, they provide an important foundation through which sensing, seizing, and reconfiguring capabilities are developed and enacted (Felin et al, 2012; Teece, 2007; Rabetino et al, 2025).

Individual-level Factors as Microfoundations

Microfoundations research adopts a multi-level perspective, emphasizing that organizational capabilities and outcomes are best understood by examining the lower-level mechanisms from which they emerge (Barney and Felin, 2013; Koivisto et al, 2026). While dynamic capabilities are commonly conceptualized at the organizational level, they ultimately originate from the actions, interactions, and decisions of individuals operating within organizations (Felin et al., 2015).

Organizational routines, processes, and structures are continuously enacted and shaped through the actions and interactions of organizational actors. In dynamic environments, managerial cognition and decision-making become particularly important, as managers interpret environmental changes, identify emerging opportunities, and guide organizational adaptation (Helfat and Peteraf, 2015). According to Helfat and Peteraf (2015), the ability to sense opportunities before they fully materialize constitutes a critical element of both dynamic capabilities and entrepreneurial activity.

Individual-level factors such as knowledge, experience, skills, and cognitive capabilities support pattern recognition and opportunity identification (Helfat and Peteraf, 2015). In addition, managerial social capital and networks facilitate sensing by enabling access to relevant information and connections with key external actors, such as customers and partners (Felin et al., 2015; Kemper et al., 2013). Together, these capabilities enable managers to identify emerging opportunities, mitigate potential risks, identify and connect with appropriate partners and key decision-makers, and formulate adaptive organizational responses.

Recent microfoundations research further extends this view by emphasizing that dynamic capabilities emerge through interactions across individuals, organizations, and ecosystems rather than from isolated elements (Rabetino et al., 2025). Capability development is enabled through mechanisms that connect these levels and help translate in-

dividual actions into broader organizational outcomes. While dynamic capabilities are typically observed at the organizational level, their development depends on the knowledge, cognition, actions, and interactions of individuals operating within organizational structures and processes. Consequently, understanding the relationship between individual-level actions and organizational-level outcomes is important for explaining how dynamic capabilities develop and evolve over time.

In summary, dynamic capabilities are enabled by a set of interconnected microfoundations consisting of resources, processes and routines, organizational structures, and individual-level factors. Together, these microfoundations provide the underlying mechanisms through which sensing, seizing, and reconfiguring capabilities are developed and enacted within organizations. Furthermore, capability development emerges through interactions among these microfoundations operating across individual and organizational levels rather than through any single microfoundation in isolation (Felin et al., 2015; Rabetino et al., 2025).

From this perspective, dynamic capabilities can be understood as organizational-level phenomena that emerge from the interaction of multiple underlying organizational and individual-level elements.

2.3.4 Dynamic Capabilities in Ecosystem Context

Dynamic capabilities theory, as developed by Teece et al. (1997) and further elaborated by Teece (2007), was originally formulated at the organizational level of analysis and focuses on firms' capabilities to extend, develop, and reconfigure resources. Through these capabilities, organizations can adapt to changing environments and, in some cases, actively shape them.

However, to adapt to rapidly changing and disruptive market environments, established organizations increasingly face the need to accelerate their innovation capabilities (Linde

et al., 2021; Sjödin et al., 2024). Innovation capabilities can be strengthened by integrating both internal and external resources into organizational innovation processes, particularly in industrial contexts (Chesbrough, 2003; 2006). This development highlights the growing importance of leveraging knowledge, technologies, and complementary assets that reside beyond the boundaries of the focal firm.

As a result, organizations have become increasingly dependent on the orchestration of resources and external partners to create value within broader ecosystem environments (Dhanaraj and Parkhe, 2006; Adner, 2017; Jacobides et al., 2018). To effectively identify, deploy, and reconfigure their resource bases (Teece, 2007), established organizations are required to develop externally oriented capabilities at the ecosystem level rather than relying solely on internally focused capabilities.

To achieve strategic objectives and respond to novel environmental requirements, organizations must be able to design, assemble, develop, and manage inter-organizational ecosystems (Shi and Shen, 2021, p. 3038). This ability is commonly referred to as orchestration capability and reflects the capacity to coordinate diverse actors, align incentives, and integrate resources across organizational boundaries in pursuit of collective value creation (Dhanaraj & Parkhe, 2006; Adner, 2017; Jacobides et al, 2018).

The perspective presented in Chapters 2.1, 2.2, and 2.3 suggests that ecosystem orchestration may be understood as a dynamic capability that enables organizations to integrate and coordinate resources and relationships across ecosystem boundaries. Furthermore, the microfoundations perspective highlights that such capabilities are not developed in isolation but emerge through the interaction of resources, processes and routines, organizational structures, and individual-level factors. These microfoundations not only enable ecosystem orchestration capability but also shape how sensing, seizing, and reconfiguring activities are enacted in practice (Teece, 2007, Felin et al, 2012; Rabetino et al, 2025). From this viewpoint, ecosystem orchestration capability can be understood as an organizational-level capability that is enabled by multiple interconnected micro-

foundations operating across different levels of analysis. Building on this view, the following section synthesizes ecosystem orchestration and dynamic capabilities into an integrated conceptual framework.

In ecosystem contexts, these microfoundations may be manifested through mechanisms such as managerial cognition, ecosystem experience, personal networks and relationships, governance routines, organizational learning practices, and cross-functional coordination structures. While dynamic capabilities are observable at the organizational level, these underlying mechanisms contribute to how sensing, seizing, and reconfiguring activities are enacted in practice. Consequently, examining these microfoundations provides a more fine-grained understanding of how ecosystem orchestration capability develops and evolves over time.

2.4 Synthesis

The preceding sections have examined innovation ecosystems, ecosystem orchestration, dynamic capabilities, and their underlying microfoundations. Although these research streams are well established individually, they provide limited understanding of how focal companies develop ecosystem orchestration capability to manage innovation ecosystems characterized by complexity and interdependencies. While research on general-level ecosystem management capabilities and routines is more established (Sjödin et al., 2024), the research gap is particularly evident at the microfoundations level, where limited attention has been given to how capabilities originate and develop over time (Koi-visto, 2026; Rabetino et al., 2025).

Through the integration of these perspectives, this study conceptualizes ecosystem orchestration capability as a dynamic capability through which a focal company integrates and coordinates resources and relationships to adapt to continuously changing environments (Shi and Shen, 2021, p. 3087). From this perspective, ecosystem orchestration en-

ables focal firms to purposefully manage complex interdependencies among ecosystem participants and respond to environmental uncertainty through coordinated action.

This orchestration capability is enacted through three interrelated activities aligned with the dynamic capabilities' framework: sensing ecosystem-level opportunities, seizing these opportunities through the mobilization and alignment of partners and resources, and reconfiguring ecosystem structures to sustain value creation over time (Dhanaraj and Parkhe, 2006; Teece, 2007). These activities reflect the focal firm's ability to identify emerging opportunities, coordinate complementary contributions, and continuously renew ecosystem arrangements.

These activities are enabled by underlying microfoundations consisting of resources, organizational processes and routines, organizational structures, and individual-level factors (Teece, 2007; Felin et al., 2012; Felin et al., 2015). In ecosystem contexts, these microfoundations may be manifested through managerial cognition, ecosystem experience, social relationships and networks, governance routines, organizational learning mechanisms, and coordination structures that support collaboration across organizational boundaries. Resources provide essential inputs for orchestration activities, while processes and routines guide coordination, learning, and adaptation. Organizational structures enable interaction and alignment across organizational boundaries, and individual-level actions and interactions by managers and employees enact and shape organizational-level capabilities. Together, these microfoundations enable and shape how orchestration capability is developed and enacted in practice.

Taken together, these elements form an initial conceptual framework for understanding how focal companies in industrial innovation ecosystems develop orchestration capability as a dynamic capability that supports long-term adaptation and value creation in changing environments. The framework serves as the basis for the empirical analysis, guiding the examination of how sensing, seizing, and reconfiguring activities are enacted and developed through underlying microfoundations in practice.

Based on the preceding discussion, ecosystem orchestration capability can be conceptualized as a capability-level construct that is enacted through sensing, seizing, and reconfiguring activities and enabled by underlying microfoundations consisting of resources, processes and routines, organizational structures, and individual-level factors. Figure 2 illustrates the conceptual framework guiding the study and the relationships between these elements.

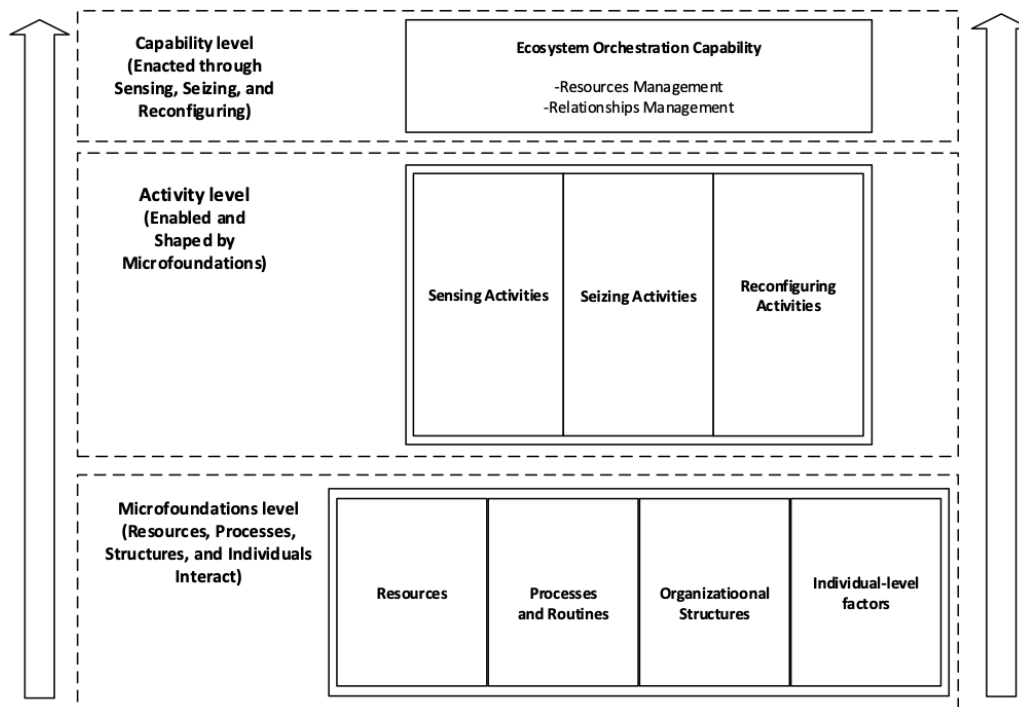


Figure 2. Conceptual framework of ecosystem orchestration capability.

3 Research Methodologies

This chapter presents the methodological choices adopted in this study, following the research onion framework proposed by Saunders et al. (2009). Attention is given to the abductive research approach, qualitative multi-case study design, and multi-level analytical perspective adopted to examine the development and enactment of orchestration capability. The chapter further describes the research philosophy and approach, research design and strategy, case and interviewee selection, data collection procedures, data analysis process, and the measures undertaken to ensure the quality and trustworthiness of the research.

3.1 Research Philosophy and Approach

This section outlines the research philosophy and methodological approach adopted in this study, following the research onion framework (Saunders et al., 2009). The study adopts a critical realist epistemology combined with a subjectivist ontology, supported by an interpretive research orientation and an abductive research approach. This combination is appropriate for examining orchestration capability as a complex and multi-level phenomenon.

From an epistemological perspective, this study is grounded in critical realism, which assumes that organizational phenomena are shaped by underlying structures and mechanisms that exist independently of human perception but are understood through socially constructed interpretations (Saunders et al., 2009). This perspective is particularly suitable for this research, as orchestration capability and dynamic capabilities involve underlying processes, relationships, and structures that are not directly observable but can be identified through empirical analysis.

From an ontological perspective, the study adopts a subjectivist stance, viewing organizational reality as socially constructed through the actions and interactions of individuals

(Saunders et al., 2009). This aligns with the research objective, as orchestration capability emerges through managerial actions, organizational processes, resource mobilization, and interactions across organizational boundaries (Teece, 2007; Felin et al., 2012; Felin et al., 2015; Rabetino et al., 2025). Understanding these dynamics therefore requires interpreting how individuals perceive and enact organizational activities within their specific context.

Building on these foundations, the study is guided by an interpretive research orientation, focusing on developing in-depth understanding of how orchestration capability is enacted in practice rather than testing predefined hypotheses (Saunders et al., 2009). This orientation is appropriate given the exploratory nature of the research and its emphasis on understanding processes, interactions, and capability development within real-world organizational settings.

In terms of research approach, this study adopts an abductive methodology, combining elements of inductive and deductive reasoning (Saunders et al., 2009; Timmermans and Tavory, 2012). The research draws on established theoretical frameworks, particularly ecosystem orchestration, network orchestration, dynamic capabilities, and microfoundations, and iteratively refines these perspectives through empirical observations. This approach enables movement between theory and data, allowing new insights to emerge while maintaining theoretical grounding (Dubois and Gadde, 2002).

The abductive approach aligns with the logic of systematic combining, whereby empirical observations and theoretical frameworks are continuously matched and re-oriented during the research process (Dubois and Gadde, 2002). Rather than strictly testing predefined hypotheses or purely generating theory from data, the study develops insights through iterative interaction between theory and empirical material.

In addition, the study follows principles of theory elaboration and extension from case-based research, as outlined by Eisenhardt and Graebner (2007). By building on existing

theoretical concepts and refining them through empirical analysis, the study contributes to developing a more contextually grounded and fine-grained understanding of orchestration capability.

The abductive approach is particularly suitable for this study, as it integrates established theories of ecosystem management (Adner, 2017; Jacobides et al., 2018), network management (Dhanaraj and Parkhe, 2006; Hurmelinna-Laukkanen et al., 2018; Shi and Shen, 2021), and dynamic capabilities (Teece, 2007) with recent developments in microfoundations (Felin et al., 2012; 2015; Helfat and Peteraf, 2015; Rabetino et al., 2025). By combining theoretical perspectives with empirical insights, the study develops a more nuanced understanding of how orchestration capability is structured and enacted across multiple levels of analysis.

The study further adopts a multi-level analytical perspective, acknowledging that orchestration capability emerges through interactions across individual, organizational, and ecosystem levels. This perspective aligns with microfoundations research, which emphasizes that organizational-level capabilities are shaped by underlying individual actions, interactions, and organizational structures (Felin et al., 2012; 2015; Rabetino et al., 2025). Accordingly, the analysis focuses on how interactions across these levels contribute to the development and enactment of orchestration capability in practice.

3.2 Research Design and Strategy

Qualitative Research

First, the qualitative case study approach aligns with the abductive research approach by enabling the development of a rich understanding of the phenomenon within its real-world context and facilitating iterative interaction between empirical observations and theoretical perspectives (Dubois and Gadde, 2002). Second, as the study relies exclu-

sively on the collection and analysis of non-numerical data, it adopts a mono-method qualitative research design (Saunders et al., 2009; Yin, 2009). A qualitative approach is particularly appropriate for developing an in-depth understanding of complex organizational phenomena, such as orchestration capability, and the multi-level processes through which such capabilities are developed and enacted in practice.

Case Study Approach

Dubois and Gadde (2002) consider an abductive approach particularly relevant when the objective is to identify new relationships, mechanisms, or dimensions of a research phenomenon. In this respect, a case study strategy is particularly suitable for investigating contemporary phenomena in depth and within their real-life context (Yin, 2003).

This aligns well with the objective of the present study, which seeks to understand how orchestration capability is developed and enacted within industrial innovation ecosystems. Since orchestration capability is embedded in organizational processes, structures, and interactions across organizational boundaries, it cannot easily be separated from its organizational and ecosystem context. Consequently, a case study strategy enables an in-depth examination of the phenomenon within its natural setting.

Case study research may be conducted using either a single-case or multiple-case design (Yin, 2003). According to Saunders et al. (2009), multiple cases are particularly appropriate when the objective is to compare findings across organizations and assess whether similar patterns emerge in different contexts. Similarly, Yin (2003) argues that a multiple-case design supports analytical generalization through replication logic, enabling the researcher to examine whether identified patterns are consistent across cases. As such, a multi-case design enables the identification of common mechanisms while simultaneously capturing context-specific variation across organizations.

Given the objective of developing a broader and more empirically grounded explanation of orchestration capability and its underlying microfoundations across industrial focal companies, a multi-case study design was considered the most appropriate research strategy. Furthermore, a multi-case design supports the identification of patterns and mechanisms that may remain hidden within a single organizational context (Dubois and Gadde, 2002).

In the present study, the comparison of multiple cases contributed to a more nuanced understanding of orchestration capability and its underlying microfoundations, particularly regarding how individual-level factors such as managerial cognition, experience, and attitudes enable and shape organizational-level outcomes. By examining similarities and differences across cases, the study developed a more comprehensive understanding of how orchestration capability emerges, is enacted, and is enabled by underlying microfoundations across individual, organizational, and ecosystem levels in industrial innovation ecosystem contexts.

3.3 Case Selection and Research Context

Research Context

The empirical context of this study consists of industrial innovation ecosystems in which focal firms collaborate with external actors, such as startups, technology providers, customers, and research institutions, to develop and commercialize innovations. Such environments are increasingly shaped by technological disruption, digitalization, changing customer expectations, and evolving competitive dynamics, creating both new opportunities and new challenges for industrial firms (Kohtamäki et al., 2022; Kolagar et al., 2022; Jovanovic et al., 2022).

Innovation ecosystems provide access to complementary resources, knowledge, and capabilities that extend beyond firm boundaries and support organizational innovation and adaptation (Kohtamäki et al., 2020; Jovanovic et al., 2022). At the same time, these ecosystems are characterized by interdependencies among participants and require the coordination of resources, knowledge, and relationships across organizational boundaries (Adner, 2017; Jacobides et al., 2018).

These characteristics make industrial innovation ecosystems a particularly suitable empirical context for examining orchestration capability, as focal firms are required to continuously identify opportunities, mobilize ecosystem participants, and adapt organizational structures, resources, and relationships in response to changing environmental conditions.

In addition, the selected context provides an opportunity to examine orchestration capability across multiple levels of analysis, including individual-level actions and decision-making, organizational-level processes and structures, and ecosystem-level interactions among participating actors. Consequently, the context is particularly well suited for exploring how orchestration capability emerges and is enacted through interactions between individuals, organizations, and ecosystem participants.

Case Company Selection

The cases were selected using theoretical sampling, which is commonly applied in case-based research when the objective is to develop and elaborate theoretical constructs and relationships through the selection of information-rich cases (Eisenhardt and Graebner, 2007). Consistent with the abductive logic of systematic combining, the selected cases provided opportunities to refine existing theoretical perspectives and identify new patterns and mechanisms related to orchestration capability (Dubois and Gadde, 2002).

The selected companies are leading Finnish-headquartered industrial firms with established innovation capabilities and a demonstrated track record of ecosystem-based innovation. The cases were selected because they provided particularly suitable settings for examining both research questions of the study. First, all organizations actively participate in innovation ecosystems and collaborate with startups, technology providers, customers, and research institutions, creating opportunities to examine how ecosystem orchestration capability is developed and enacted in practice (Fortum, 2026; Valmet, 2024; Wärtsilä, 2026). Second, the selected organizations maintain dedicated innovation, ecosystem, and business development activities, providing visibility into the organizational and individual-level mechanisms through which ecosystem orchestration capability is enabled and shaped. Third, the researcher was able to gain access to senior managers and decision-makers directly involved in innovation, ecosystem collaboration, and business development activities, enabling the collection of rich empirical insights into ecosystem orchestration capability and its underlying microfoundations. As a result, the cases provide information-rich settings for examining both the enactment of sensing, seizing, and reconfiguring activities and the microfoundations that support these activities across individual, organizational, and ecosystem levels of analysis. To preserve confidentiality, the participating organizations are presented anonymously as Case A, Case B, and Case C.

Case	Organizational Context	Ecosystem Characteristics
Case A	Finnish-headquartered industrial firm	Established ecosystem collaboration and innovation activities
Case B	Finnish-headquartered industrial firm	Active ecosystem development and partnership management
Case C	Finnish-headquartered industrial firm	Ecosystem-based innovation and external collaboration activities

Table 1. Overview of case organizations.

While the objective was not statistical representativeness, the selected cases provided information-rich settings for examining how ecosystem orchestration capability is developed and enacted across different industrial innovation ecosystem contexts. The cases were expected to exhibit both common patterns and context-specific variation in ecosystem orchestration activities and their underlying microfoundations, thereby supporting comparison across cases and facilitating theory elaboration (Eisenhardt and Graebner, 2007). Consistent with Yin's (2003) replication logic, the use of multiple cases enabled examination of whether similar sensing, seizing, and reconfiguring activities, as well as similar microfoundational mechanisms, could be identified across different organizational contexts, thereby strengthening the analytical generalization of the findings.

Interviewee Selection

Interviewees were selected using purposive sampling based on their involvement in ecosystem-related activities and their knowledge of innovation and ecosystem management practices (Patton, 2002; Saunders et al., 2009). The interviewees occupied senior executive and managerial roles associated with innovation management, ecosystem collaboration, business development, and technology development. This sampling approach enabled the collection of in-depth insights from individuals with direct experience of developing and enacting orchestration capability.

Interviewee	Case	Position Level	Interview Format
A1	Case A	SVP	Telephone
A2	Case A	VP	Online
A3	Case A	VP	Online
B1	Case B	SVP	Online
B2	Case B	Manager	Online
C1	Case C	SVP	Online

Table 2. Table of the interviewees.

The empirical data consisted of six semi-structured interviews conducted across the three case organizations. While the number of interviews varied across cases, all interviewees possessed direct experience of ecosystem-related activities and were able to provide insights into individual-level actions, organizational processes, and ecosystem-level interactions relevant to orchestration capability.

Furthermore, the interviewees represented multiple organizational functions and hierarchical levels, providing perspectives spanning strategic decision-making, organizational processes and structures, and ecosystem-level interactions. This diversity of perspectives supported the study's multi-level analytical perspective and enabled examination of orchestration capability across individual, organizational, and ecosystem levels.

3.4 Data Collection

The empirical data were collected through semi-structured interviews. Semi-structured interviews are particularly suitable for exploring complex organizational phenomena, as they enable the researcher to investigate predefined themes while allowing respondents to elaborate on topics that emerge during the discussion (Saunders et al., 2009; Yin, 2009). This flexibility was considered important given the exploratory nature of the study and the objective of developing an in-depth understanding of orchestration capability and its underlying microfoundations.

Semi-structured interviews were selected because they provide access to participants' experiences, interpretations, and reflections regarding organizational practices and ecosystem-related activities. This approach was particularly suitable for examining how orchestration capability is developed and enacted in practice, as well as for identifying the underlying organizational and individual-level factors that contribute to capability development.

The empirical data consisted of six individual interviews conducted across three case organizations (see Table 2). Five interviews were conducted online, and one interview was conducted via telephone. The interviews lasted approximately 60 minutes on average and were conducted with respondents occupying senior executive and managerial roles associated with innovation management, ecosystem collaboration, business development, and technology development.

The interviews began with an introduction of the research objectives and the purpose of the study. The interview guide was developed based on the research questions and theoretical framework. To ensure comparability across cases, a set of core questions was asked of all respondents. At the same time, the semi-structured format allowed flexibility to explore issues raised during the interviews in greater depth.

Consistent with the abductive research approach adopted in this study, the interview process evolved iteratively throughout the data collection phase. Insights generated from earlier interviews informed the refinement of subsequent interview questions, enabling further exploration of emerging themes and relationships (Dubois and Gadde, 2002; Eisenhardt and Graebner, 2007). This iterative process supported the development of a richer understanding of orchestration capability and its underlying mechanisms.

Four interviews were recorded and subsequently transcribed using the Microsoft Teams transcription functionality. Two interviews were not recorded. One interview was conducted by telephone, and one interview was conducted online without recording. Detailed notes were taken during and immediately after both interviews to support subsequent analysis. To preserve confidentiality, all interviewees and organizations were anonymized and are referred to using case and interviewee identifiers throughout the study.

The interviewees provided perspectives spanning strategic decision-making, organizational processes and structures, and ecosystem-level interactions. Consequently, the collected data supported the study's multi-level analytical perspective and enabled examination of orchestration capability across interacting individual, organizational, and ecosystem levels.

3.5 Data analysis

This section describes the analytical process used to examine the empirical data and develop the study's findings. Following the principles of the Gioia methodology (Gioia et al., 2013), the analysis progressed iteratively between the empirical data and existing theory. The process involved identifying first-order concepts, developing second-order themes, and aggregating these themes into higher-level theoretical dimensions. Through this approach, the study sought to develop an empirically grounded understanding of ecosystem orchestration capability and its underlying microfoundations.

Analytical Process

The empirical data were analyzed using an abductive coding approach following the principles of the Gioia methodology (Gioia et al., 2013). Consistent with the study's abductive research design, the analysis involved continuous interaction between empirical observations and existing theoretical perspectives (Dubois and Gadde, 2002; Timmermans and Tavory, 2012). The objective of the analysis was to identify patterns, relationships, and mechanisms associated with the development and enactment of orchestration capability.

The analysis proceeded through multiple stages. First, interview transcripts and interview notes were reviewed repeatedly to establish familiarity with the empirical material. Second, first-order concepts were identified directly from interview statements while

preserving the language and perspectives of the respondents (Gioia et al., 2013). Third, related first-order concepts were grouped into second-order themes that reflected emerging theoretical patterns and relationships. Finally, the second-order themes were synthesized into the aggregate dimensions of sensing, seizing, and reconfiguring, enabling higher-level conceptualization and theory development. The coding process enabled a systematic transition from empirical observations toward theoretical interpretation while maintaining traceability between interview data and the resulting analytical framework.

The coding process progressed from first-order concepts derived from interview data to second-order themes and aggregate dimensions, following the Gioia methodology (Gioia et al., 2013). The resulting aggregate dimensions of sensing, seizing, and reconfiguring formed the primary analytical structure of the empirical findings and guided the subsequent examination of orchestration capability. Figure 3 presents the resulting data structure and illustrates how first-order concepts were grouped into second-order themes and subsequently synthesized into aggregate dimensions.

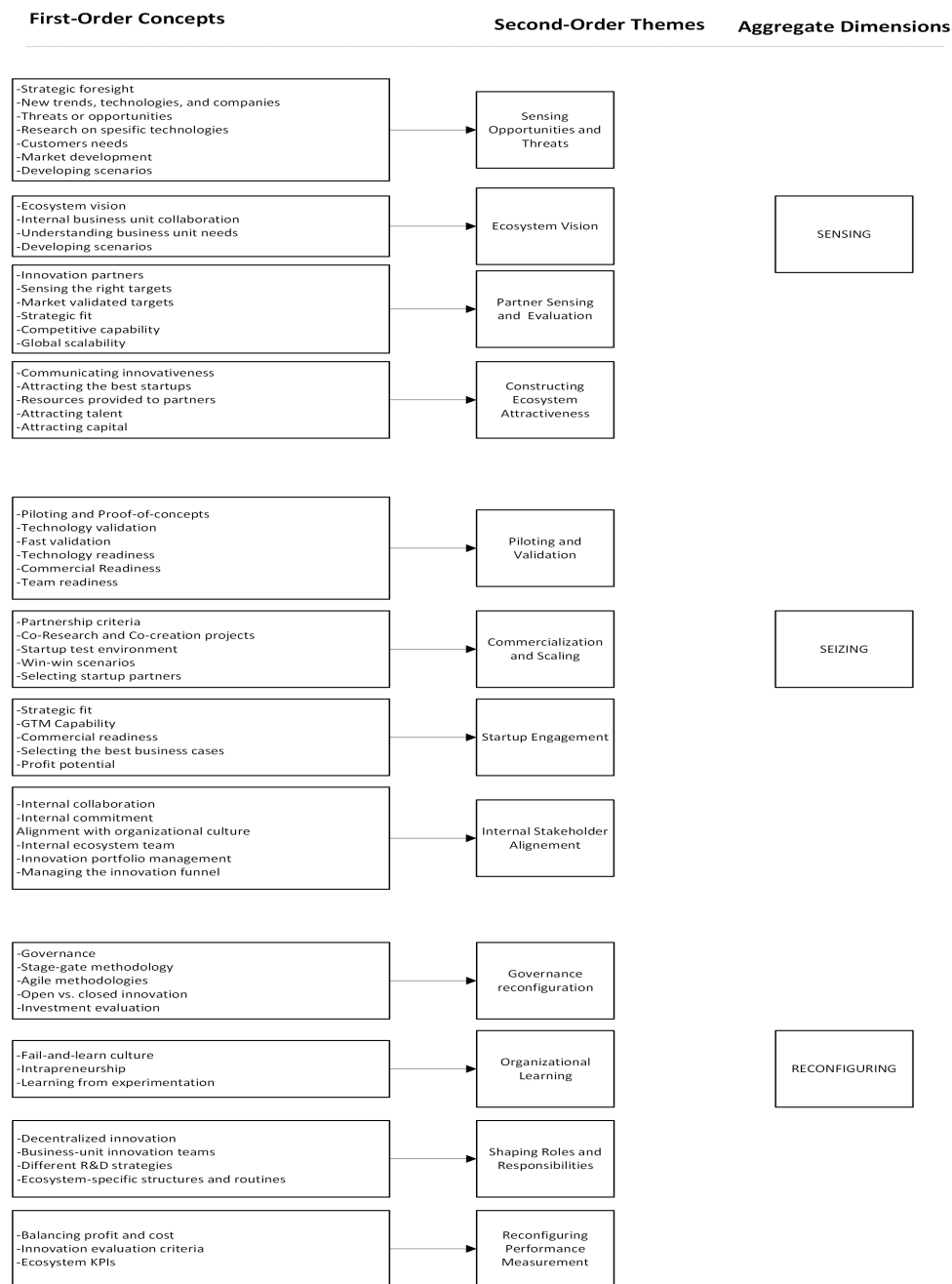


Figure 3. Gioia Data Structure.

As illustrated in Figure 3, first-order concepts identified from the interview data were organized into second-order themes representing key orchestration activities. These themes were subsequently consolidated into the aggregate dimensions of sensing, seizing, and reconfiguring, which formed the basis for the empirical analysis presented in Chapter 4.

Abductive Analysis

Consistent with the logic of systematic combining, the analysis involved iterative movement between theory and empirical observations throughout the research process (Dubois and Gadde, 2002). Existing theoretical perspectives, including ecosystem orchestration, network orchestration, dynamic capabilities, and microfoundations, informed the initial analytical focus. At the same time, empirical observations were allowed to challenge, refine, and extend these perspectives.

Rather than testing predefined hypotheses, the analysis focused on identifying patterns, relationships, and mechanisms that contributed to understanding how orchestration capability is developed and enacted in industrial innovation ecosystems. The iterative interaction between theory and data enabled refinement of the initial theoretical framework and supported theory elaboration through empirical investigation (Eisenhardt and Graebner, 2007).

The abductive approach was particularly valuable in identifying relationships that were not explicitly anticipated in the original framework. For example, the empirical findings highlighted the role of individual-level factors such as managerial cognition, experience, and attitudes in enabling and shaping organizational-level orchestration capability. These insights emerged through continuous interaction between existing theoretical perspectives and empirical observations.

Multi-level Analysis

The analysis adopted a multi-level perspective consistent with microfoundations research (Felin et al., 2012; 2015; Helfat and Peteraf, 2015; Rabetino et al., 2025). While orchestration capability was examined primarily as an organizational-level phenomenon,

the analysis explicitly considered interactions across individual, organizational, and ecosystem levels.

At the individual level, attention was directed toward managerial cognition, experience, decision-making, and interactions with ecosystem actors. At the organizational level, the analysis focused on resources, organizational structures, processes, and routines supporting orchestration capability. At the ecosystem level, the analysis examined relationships, coordination activities, and interactions between focal firms and external ecosystem participants.

Attention was directed toward identifying relationships between these levels. This enabled examination of how individual-level actions and organizational-level mechanisms contributed to the development and enactment of orchestration capability, as well as how these activities influenced ecosystem-level outcomes. The multi-level analytical perspective therefore supported a more comprehensive understanding of orchestration capability and its underlying microfoundations.

Framework Development

The final analytical structure was developed through iterative interaction between the empirical data and the theoretical framework. Initially, the empirical material was examined through the sensing, seizing, and reconfiguring dimensions of dynamic capabilities (Teece, 2007). These dimensions provided the primary analytical structure for organizing and interpreting the empirical observations.

Subsequently, the aggregate dimensions and their underlying second-order themes were examined through a microfoundations lens, focusing on individual-level factors, organizational resources, organizational structures, and organizational processes and rou-

tines. This enabled identification of relationships between orchestration capability activities and the underlying factors that enable and shape their development and enactment.

The resulting framework represents a synthesis of theoretical perspectives and empirical findings. It provides a structured representation of how orchestration capability is developed and enacted through sensing, seizing, and reconfiguring activities, as well as how underlying microfoundations enable and shape these activities across individual, organizational, and ecosystem levels. The framework therefore serves as the basis for the interpretation of the empirical findings and the theoretical contributions presented in the subsequent chapters.

3.6 Research Quality and Trustworthiness

The quality of this study was supported through methodological choices designed to enhance the credibility, transparency, and consistency of the research process. Given the qualitative and abductive nature of the study, research quality was evaluated based on the rigor of the research design, data collection, and analytical procedures rather than solely through traditional quantitative criteria.

First, the study employed theoretical sampling to select information-rich cases that could contribute to the development and refinement of theoretical constructs and relationships (Eisenhardt and Graebner, 2007). The selected organizations possessed substantial experience in ecosystem-based innovation activities and external collaboration, ensuring that the empirical material was directly relevant to the phenomenon under investigation. In addition, the use of multiple case organizations enabled comparison across different organizational contexts and supported the identification of both common patterns and context-specific variation.

Second, the credibility of the empirical material was supported using semi-structured interviews with senior executive and managerial respondents directly involved in eco-

system-related activities. The use of a common interview guide ensured that comparable topics were discussed across interviews while maintaining sufficient flexibility to explore emerging themes and insights (Saunders et al., 2009). Furthermore, the interview process evolved iteratively, allowing insights from earlier interviews to inform the development of subsequent questions. This iterative approach supported a richer understanding of orchestration capability and its underlying mechanisms.

In addition, some interviewees were identified through referrals from previously contacted respondents, reflecting elements of snowball sampling (Saunders et al., 2009). Furthermore, the respondents represented multiple organizational functions and hierarchical levels closely associated with ecosystem-related activities. This enabled the collection of perspectives from different organizational actors and decision-making levels, supporting a richer understanding of orchestration capability across individual, organizational, and ecosystem levels.

The analytical rigor of the study was enhanced through the application of the Gioia methodology (Gioia et al., 2013). The coding process progressed from first-order concepts derived from interview data to second-order themes and aggregate dimensions, providing a transparent link between empirical observations and theoretical interpretation. This structured analytical procedure strengthened the traceability of findings and reduced the risk of conclusions being driven solely by researcher interpretation.

In addition, the study followed the abductive logic of systematic combining, whereby empirical observations and theoretical concepts were continuously compared and refined throughout the research process (Dubois and Gadde, 2002). Rather than testing predefined hypotheses, the analysis involved iterative movement between theory and data, enabling the refinement of existing theoretical perspectives and the identification of new mechanisms related to orchestration capability. This process enhanced the robustness of the findings by grounding interpretations in both empirical evidence and established theoretical frameworks.

The objective of the study was not statistical generalization but analytical generalization (Yin, 2003). Through the examination of multiple industrial focal companies, the research sought to identify patterns and mechanisms that contribute to understanding orchestration capability and its underlying microfoundations. Consequently, the findings may provide insights that are relevant beyond the specific case organizations while remaining sensitive to contextual differences. At the same time, all case organizations differ in terms of their capabilities, resources, strategic objectives, and ecosystem positions, which may influence their ecosystem strategies and orchestration practices (Hurmellinna-Laukkanen et al., 2018). Consequently, the findings should be interpreted with consideration of the specific organizational contexts in which they emerged.

Several limitations should be acknowledged. The empirical material consisted of six interviews conducted across three case organizations, limiting the breadth of empirical coverage. Furthermore, the findings primarily reflect the perspectives of senior executive and managerial respondents and may therefore underrepresent viewpoints from other organizational levels. Finally, the study was conducted within the context of Finnish industrial innovation ecosystems, which may influence the applicability of the findings to other geographical or industrial contexts. Despite these limitations, the use of multiple cases, information-rich respondents, systematic coding procedures, and iterative theory–data interaction contributed to the overall quality, credibility, and trustworthiness of the study.

4 Findings

In the following chapter, the empirical findings are organized around the sensing, seizing, and reconfiguring activities through which ecosystem orchestration capability is enacted, drawing on the dynamic capabilities' framework of Teece et al. (2007). While these activities are presented separately for analytical clarity, the findings indicate that they are highly interconnected in practice and continuously influence one another.

To address the research objectives, the findings examine how ecosystem orchestration capability is enacted through sensing, seizing, and reconfiguring activities, and how underlying microfoundations enable and shape these activities. Attention is given to resources, processes and routines, organizational structures, and individual-level factors as microfoundations of ecosystem orchestration capability.

4.1 Orchestration Sensing

Sensing activities within the dynamic capabilities' framework relate to identifying and interpreting changes in technologies, markets, and the external environment, as well as recognizing emerging opportunities and threats (Teece et al., 2007). The empirical findings related to sensing activities were grouped into four categories: sensing opportunities and threats, ecosystem vision, partner identification, and impression management. Together, these categories demonstrate how focal firms not only identify ecosystem opportunities but also actively shape their ecosystem position, attractiveness, and partner networks. The following sections discuss each category in turn.

4.1.1 Sensing Opportunities and Threats

The first category of sensing activities, sensing ecosystem opportunities and threats, relates to acquiring and interpreting external market information concerning emerging

trends, technologies, companies, competitors, and broader market developments. These activities support the identification of ecosystem opportunities, emerging threats, and potential areas for future ecosystem development. The market environment surrounding industrial manufacturers has evolved significantly, with increasing expectations from customers and intensified competitive pressures. The empirical research results highlight a strong market driven need for industrial companies to improve their innovation performance, often through the adoption of open innovation strategies. *“I would say like 13 years ago, we started to talk about innovation as a terminology and basically it started with us introducing an idea handling tool and starting kind of incubation of incubation process, moving away from sort of like purely R&D focused mindset towards” (Case B, Senior Vice President)*. The empirical data clearly indicates a shift from internally focused, closed innovation models toward externally oriented, open innovation approaches. This shift is driven by increased market velocity and shortened company lifecycles, which require more agile and adaptive innovation practices. *“Considering the lifetime of the S&P 500 (Standard & Poor’s) companies, in 1970s it was often considered as 45 years, whereas currently the lifeline of companies is 15–20 years” (Case C, Senior Vice President)*. Industrial companies are therefore facing new requirements related to emerging technologies, changing customer expectations, and evolving market dynamics. These developments are pushing firms to strengthen their innovation capabilities to remain competitive. *“So, you need to be innovative to be competitive. You need to be innovative to attract talent. You need to be innovative to attract capital. Those are the dynamics pushing you forward into increasing innovation performance. Nowadays, if you look at Finland, leading 10 innovators have some level of innovation arm” (Case C, Senior Vice President)*.

The research data further highlights that ecosystems play a key role in enabling this shift by providing access to external technologies, knowledge, and collaboration opportunities. *“The starting point of the transformation was moving towards (internal) centres of excellence, where all innovation basically happened. The second phase was starting to reach outside the company. I think we have been a forerunner when it comes to testing*

different new things and innovation methodologies and exploring. So, we have done this kind of venturing in different forms. We have done a lot of pilots testing sort of like doing giving seed investments. We have worked in different ecosystems, sort of like in different ways. Sometimes it's more about though leadership, than creating an offering. Sometimes it's about developing new technologies more on research level. So, I think we have been active in many, many ways" (Case B, Senior Vice President).

The findings indicate that innovation ecosystems serve as an important mechanism through which industrial firms strengthen their innovation capabilities by accessing complementary resources beyond organizational boundaries. Companies actively seek leading technologies, talent, financial capital, and organizational practices from ecosystem partners to support innovation and create differentiated outcomes. This highlights the importance of ecosystem orchestration capability in identifying, accessing, and mobilizing ecosystem resources for innovation and value creation. As one interviewee explained, *"Our job is to ensure, we are having the best companies, best technology, and latest business models in the ballpark, to position us in win park. We need to have the best tools in how to engage with our customers"* (Case C, Senior Vice President).

The findings indicate significant variation among the case companies in their sensing strategies. Prior literature provides useful perspectives for understanding this variation. For example, March (1991) conceptualizes organizational learning objectives as a balance between business efficiency and future oriented innovation. In line with this perspective, the case companies approach innovation through differing allocations across multiple time horizons, a framework often discussed in management theory as horizon-based innovation management. In addition, Hurmelinna-Laukkanen et al. (2018) suggest that ecosystem strategies are inherently firm specific, shaped by factors such as market position, organizational attributes, and strategic objectives. The empirical findings are consistent with this view. Some companies emphasize systematic acquisitions as a primary sensing mechanism, others rely on minority investments in target firms, while some focus more on co research or co innovation projects with external partners. These

differences reflect the individualized nature of ecosystem sensing strategies across industrial focal companies and highlight how firms adapt their approaches based on their strategic priorities and capabilities.

The findings also indicate substantial variation in the resources available for sensing activities, both in financial resources and human resources. The first financial resources are used in acquisitions, minority investments, research projects, and innovation initiatives, while different organizational practices exist for allocating and managing these resources. Some companies operate dedicated innovation investment funds, others collaborate closely with internal M&A functions, and some rely on defined annual budgets for pilot projects or joint innovation activities. The second human resources also differ across firms, particularly in terms of analytical capabilities, geographical presence, and the size of innovation or ecosystem teams. Some companies maintain global networks of internal innovation hubs that support collaboration with external partners through pilots and proof-of-concept projects.

Sensing activities are supported by a combination of internal and external processes. Internally, firms rely on strategic foresight activities to identify and interpret market signals. Externally, sensing is supported through collaboration with universities, research institutes, innovation hubs, and scouting networks. External research institutes, such as VTT, are often utilized for early-stage research activities, extending the firm's research capabilities, while development activities closer to business implementation are typically conducted within internal R&D functions. Together, these activities form a structured approach to sensing, combining external foresight processes with internal collaboration and scouting practices. In sum, the organizations need strategic foresight capabilities.

“Gaining strategic insights, spotting new disruptions, such as new technologies.”

(Case C, Senior Vice President; Case B, Senior Vice President)

“What is the likelihood to get best ideas internally? Not much, because it will be around us only in Northeast, (whereas) a lot of interesting startups with ideas that needs to get funding, and support with legal issues to be able to scale faster.”

(Case C, Senior Vice President)

As noted, the research data indicates significant variation in the resource bases of the case companies, particularly in terms of annual budgets allocated to talent development, piloting activities, and investments in minority stakes, acquisitions, and research initiatives. This variation suggests that firms possess differing capacities to engage in ecosystem sensing activities, which may influence both the scope and depth of their engagement with external environments. Despite these differences, all case companies demonstrate a consistent adoption of structured sensing routines. These include systematic trend radaring across multiple innovation time horizons, scenario-based analysis, and the maintenance of an innovation funnel that integrates resources and activities into a coherent innovation system. The use of multiple horizons, as highlighted in management theory popularized by McKinsey and Company (2021), reflects an orientation toward balancing short term operational needs with longer term strategic exploration (Mittal, 2024).

The findings further indicate that ecosystem sensing is not conducted as an ad hoc activity, but rather as a structured and institutionalized practice supported by formal routines and processes. In this context, sensing activities contribute to reducing uncertainty and enable forward looking decision making by systematically scanning and interpreting signals from external environments. Importantly, despite variation in resource endowments, the underlying logic and objectives of ecosystem sensing appear to remain consistent across organizations.

The primary purpose of ecosystem sensing, as identified in the research data, is the detection and acquisition of externally originating resources that are critical for innovation and competitive positioning. These include advanced technologies, specialized

knowledge, skilled talent, financial resources, and market insights related to competitors, industry dynamics, and evolving customer requirements. In addition, ecosystem sensing supports access to broader markets and new application domains.

Overall, the findings indicate that while resource availability influences the scale and intensity of sensing activities, the presence of structured routines such as trend radaring, scenario building, and innovation funnel management constitutes a common foundation that enables organizations to systematically identify and access external opportunities within innovation ecosystems.

4.1.2 Ecosystem Vision

As part of the organizational structures, internal ecosystem management units play a central role in driving strategic renewal and competitive advantage for industrial manufacturing companies. Based on the empirical research, the objectives of internal ecosystem functions can be grouped into three main areas. First, internal ecosystem functions are expected to generate insights into new technologies, business models, and market developments, including emerging customer segments and trends. Second, they are expected to support the core business by improving existing processes and contributing to the development of new products and services. In doing so, these functions facilitate learning across the organization in multiple forms. Third, internal ecosystem functions are expected to enable the creation of new business opportunities and revenue streams. In addition, they are responsible for shaping and managing the overall ecosystem vision and the customer value proposition. *“Our objectives are threefold. First, our job is to gain strategic insight. This builds awareness, understanding, expertise and vision of technologies, business models, growth segments and trends. Second, our job is to support business renewal. These builds support to current businesses improving core processes and developing new products and services. Third, we are building options for significant new businesses. Our job is to validate and build options for new business that can become significant source of new income for our current businesses or main group”* (Case C, Sen-

ior Vice President). The ecosystem vision may be structured around focal company's core products or services, or customer pain points to solve. *"Overall, our job is to drill down certain technologies, or pain points we have"* (Case C, Senior Vice President).

Literature by Kohtamäki et al. (2022) highlights the rapid transformation of industrial ecosystems, driven by the convergence of product, service, and software technologies, as well as evolving business models and activities shaped by digitalization and servitization trends, often enabled through ecosystem partnerships. Consistent with this perspective, the empirical findings indicate that industrial manufacturers are increasingly influenced by these developments, particularly through the growing importance of advanced technologies, digital solutions, and service-based offerings. Industrial manufacturers are therefore strongly shaped by digital servitization trends, which require the integration of advanced technologies, digital solutions, and service elements into their offerings. This transformation is reflected in the development of partner alliances and ecosystem-based collaboration models. *"We have been working for many years around developing partner alliances, and system around industrial plants and the digital elements and so forth"* (Case B, Senior Vice President).

As an increasing share of the resources required for innovation, particularly technologies, specialized know-how, and complementary capabilities, originates from outside organizational boundaries, the configuration of ecosystem business models becomes increasingly important. In this context, business models must support both value-creation and value-capture across multiple ecosystem participants. The findings indicate that sensing activities extend beyond the identification of technological opportunities and include the evaluation of emerging business models and ecosystem value-creation opportunities. Consequently, focal firms require capabilities related to market insight, ecosystem visioning, business model innovation, and organizational learning to navigate evolving ecosystem environments. As one interviewee noted, *"We are looking for disrupting technologies and the latest business models, the best startups"* (Case C, Senior Vice President).

The research data further indicates that innovation ecosystems are typically structured around the focal company's core products or technologies. *"We have the core product (removed). And then we buy from different entities. We are building industrial plants and putting it all together. We are delivering the project"* (Case B, Senior Vice President). At the same time, ecosystem revenues are often largely derived from these core products or technologies. As a result, focal companies typically aim to retain ownership of their core technologies and the associated intellectual property rights. The core product or technology also functions as a central platform for ecosystem innovation activities, which are typically aimed at enhancing the performance and value of the core offering within the customer environment.

"The main of our R&D happens in our core product (engines), and the engines are sort of bread and butter. So, it's clear we want to develop and understand that IPRs" (Case B, Senior Vice President).

"The R&D of our core product engines happens in (removed business line) and (removed product) are sort of like bread and sort of like the core. And when vertical (removed business line) is having requirements (from customers), we buy from (removed business line). Then we are working on with different players around the industrial plants with digital elements and so forth. We are of course working in an ecosystem, but when it comes to value-chain around our main products, we want to develop the technology and own the IPRs" (Case B, Senior Vice President).

Building and managing ecosystem vision as part of ecosystem sensing involves identifying both opportunities and threats related to the focal company's core products or technologies. Sensing processes and routines focus on monitoring and interpreting market trends and technological developments. Opportunities are typically associated with the creation of new revenue streams, access to new business opportunities, or the enhancement of core products through the integration of new technologies. At the same time, emerging technologies may represent threats if they compete with or potentially substi-

tute existing core technologies, or if they are difficult for the focal company to access or control.

“So of course we are exploring those technologies. And we are sort of looking how that field is evolving.”

(Case B, Senior Vice President)

“We are monitoring for both opportunities and threats’ related to our core technology, such as possible substitutes.”

(Case B, Senior Vice President)

“Thinking (new technology and related companies) from strategic perspective. Are they threats? Are they an opportunity?”

(Case B, Senior Vice President)

As part of the ecosystem sensing phase, processes and routines, ecosystem orchestrators monitor the ecosystem across two dimensions, namely upstream and downstream of the value chain. The theoretical framing and terminology are discussed in the ecosystem orchestration section of the theoretical background, exemplifying literature from Adner and Kapoor (2010). Supporting organizational structures are required to achieve these objectives. Ecosystem orchestrator focal companies assess their strategic position within the value chain, particularly in relation to where their value creation takes place. In the research data, the upstream position is referred to as the “vertical position”, while the downstream position is referred to as the “horizontal position”.

Ecosystem orchestrators typically aim to maintain control over the upstream position, focusing on value creation around and above their core product or technology. The upstream position encompasses activities such as research and development as well as the components required for manufacturing the core product or technology. By contrast, value creating activities related to the use of the core product or technology are associ-

ated with the downstream position. The downstream position is particularly connected to how customers utilize the core product or technology and generate additional value through enhanced usability, integration, or application specific solutions.

Industrial ecosystems function as an organizational structure that enables focal companies to maintain and strengthen their market position. The research data indicates that ecosystem orchestrators consistently aim to control the upstream position of the value system. This position is defended through activities such as acquisitions, partial investments, and strategic radar practices. These activities are supported by routines such as opportunity and threat-oriented scenario building around the core product or technology. Several case companies emphasize the strategic importance of owning intellectual property rights related to the core product or technology.

“Approaching from value-chain perspective that this is us, this is where we are strong, these are our capabilities. But how do we bridge the new and required capabilities (for our customers), and then we take the decision that is this something we want to grow ourselves, or is this something which makes sense to partner, or even acquire since we have a legacy of acquiring a lot of companies.”

(Case B, Senior Vice President)

At the same time, ecosystem orchestrators demonstrate a strategic willingness to engage in partnerships in downstream positions of the value chain. This reflects a deliberate differentiation between control and collaboration domains within the value system. While orchestrators aim to retain control over upstream activities, downstream collaboration is actively leveraged to enhance value creation, differentiation, usability, and cost efficiency of the core product or technology within customers’ business environments. In this context, downstream partnerships function as mechanisms for extending the value proposition rather than protecting proprietary advantage.

Importantly, the orchestrator's willingness to collaborate downstream is enabled by its strategic position in the upstream domain. Ownership of upstream core product or technology intellectual property rights provides a protected foundation that reduces the risks associated with openness in downstream activities. As a result, orchestrators can engage in downstream open innovation with external partners in horizontal domains surrounding their core product or technology without compromising their control over the core value generating assets. This structural asymmetry between upstream control and downstream openness reflects a dual logic of ecosystem orchestration, combining protection of core assets with collaborative value expansion.

At the activity level, this strategic orientation is reflected in a higher degree of openness in downstream interactions. Orchestrators demonstrate a greater willingness to share insights, best practices, market opportunities, and engage in collaborative initiatives related to their core product or technology. These practices indicate that downstream collaboration is not only operational but also strategic, supporting ecosystem adoption, strengthening complementarities, and accelerating market penetration.

"It's all related to performance of our core product, engines. That is our main business, so the related research, business, and IPRs need to stay inside. Controversially, we are interested of growing the ecosystem in horizontal (downstream) perspective."
(Case B, Senior Vice President)

"Considering vertical (upstream) position, what comes to our main technology, main products, it needs to stay inside. It is our core business. But in horizontal (downstream) perspective, it is easier to be sharing insights, knowledge, and best practices."
(Case A, Vice President)

Overall, successful orchestration of the ecosystem requires the focal company to formulate and guide a coherent ecosystem vision that integrates upstream control with downstream collaboration. *"Our objective is bottom-line generation. We produce (removed*

modity), but the technologies are changing. We look for (removed technologies. It has been the same for the last 40 years. But we put more emphasis on consumer-centric areas, how can we improve our (removed commodity) production or services to customer” (Case C, Senior Vice President).

However, exceptions to this pattern are also observed. In certain industries, such as textiles, national level capability gaps influence ecosystem development. In these contexts, the absence of a complete value chain requires ecosystem orchestrators to participate in rebuilding the industry structure to enable value creation. *“There are some industries, which makes an expectation for this. For an example in (removed) industry, Finland has lost its capability considering the (removed industry) value-chain. We need to rebuild the whole value-chain, to be able to provide our part, our technology or products in it” (Case A, Vice President).*

In summary, the findings reveal a consistent pattern in which ecosystem orchestrators combine upstream control with downstream collaboration as part of their ecosystem strategy. While focal companies seek to maintain control over core technologies and related intellectual property in upstream positions, they simultaneously leverage openness in downstream positions to expand value creation and strengthen ecosystem adoption. This combination suggests that ecosystem orchestration in practice is characterized by a dual orientation, balancing protection of core assets with collaborative value expansion. Such an approach enables focal companies to manage interdependencies across the value system while sustaining both competitive positioning and long-term ecosystem development.

4.1.3 Partner Sensing and Evaluation

The market environment of industrial manufacturers is undergoing significant change. The emergence of new technologies, companies, business models, competitors, market dynamics, and evolving customer expectations is increasing the need for industrial firms

to enhance their innovation performance through ecosystem collaboration. The empirical research data highlights a clear shift in external partnerships, moving from traditional industrial suppliers toward new types of partners that drive innovation and disruption through advanced technologies and digital solutions.

Identifying and accessing advanced technology providers through sensing and scouting activities emerges as a key driver of increased innovation performance for industrial manufacturers. To adapt to changing market environments, industrial firms increasingly rely on ecosystem partners that provide critical resources in terms of technology and specialized knowledge. This development creates a demand for new sensing and scouting capabilities within ecosystem orchestration.

“Spotting something we can actually build on, this can create new revenues and make us more efficient and reduce costs.”

(Case C, Senior Vice President).

A central aspect of partnership identification is the validation of target companies. The research data indicates that validation is a critical and often challenging component of ecosystem sensing. While identifying potential partners is generally not considered a primary limitation, selecting the most suitable partners from a large pool of candidates represents a significant challenge. Ecosystem orchestrators often manage extensive deal flows generated through longlist and shortlist processes, resulting in numerous potential partner companies.

The findings further emphasize that the first stage in the validation process involves evaluating which partnerships the focal company intends to pursue. The associated processes and routines are based on predefined validation criteria, which guide the formation of a longlist of potential partners and its subsequent refinement into a shortlist through a structured stage gate evaluation process. This phase is conducted internally by the focal company prior to engaging with selected candidates.

“There is usually this kind of checkpoints where you evaluate and sort of like take the decision that we go forward or not. It can be we even have a long list. We go through the short list, then we go forward or not. The ones going forward from the short list we start to build. We start to engage.” (Case B, Senior Vice President)

“We are keeping the first gate inside. We (as the focal company) are always selecting the projects which are taken forward.” (Case A, Vice President)

In this context, the main bottleneck is not the availability of opportunities, but the validation and prioritization of suitable partners. The challenge lies in distinguishing between multiple viable candidates and selecting those that best align with the focal company’s strategic objectives and operational requirements. Industrial focal companies typically operate in large scale, business critical environments, such as industrial plants, energy systems, and infrastructure intensive settings. As a result, reliability, safety, and compatibility are key criteria in the validation of ecosystem partners.

Consequently, the validation process is often lengthy and resource intensive, requiring substantial time investment and the involvement of experienced personnel. The findings suggest that ecosystem orchestrators require dedicated validation capabilities, consisting of appropriate human resources as well as structured processes and routines. These elements are closely interrelated, as resources enable the execution of processes, while routines structure the application of those resources. At the same time, not all resources and routines interact directly, indicating that effective capability development depends on identifying and leveraging combinations that reinforce each other.

“There are a lot of frogs out there to be kissed. We have a young, ambitious team. Often after having an NDA (legal non-disclosure agreement), we get the second numbers, which are like if we had those from the start, we would not have been interested in the first place. And it’s a long journey to that point.”

(Case B, Senior Vice President)

Overall, the findings indicate that partner identification in innovation ecosystems is characterized by a shift toward technologically advanced and innovation-driven partners, combined with increasing complexity in partner selection and validation. While the availability of potential partners has expanded, the ability to evaluate, prioritize, and validate suitable partners emerges as an important ecosystem orchestration capability. The findings suggest that ecosystem vision plays an important role in guiding partner selection, as focal firms actively pre-select partners that support their strategic objectives and desired ecosystem direction. Consequently, partner identification functions not only as a sensing activity but also as the first stage of the validation process, through which focal firms selectively engage the partners they consider most relevant for future collaboration.

4.1.4 Constructing Ecosystem Attractiveness

The final group of sensing activities concerns ecosystem attractiveness and the activities through which focal firms position themselves as attractive ecosystem partners. Ecosystem orchestrators operate in competitive environments where external partners, such as startups and advanced technology providers, often have multiple options for ecosystem participation. In practice, this means that ecosystem partners may evaluate several ecosystems simultaneously and, in some cases, participate in more than one.

As discussed in the theoretical background, ecosystem competition occurs at multiple levels. First, actors compete for advantageous positions within ecosystems, such as the role of orchestrator or differentiated roles as component providers in upstream activities or complementors in downstream activities. Second, entire ecosystems compete against each other in attracting valuable partners. This aligns with prior ecosystem literature, which highlights competition both within and between ecosystem structures (Adner, 2017; Jacobides et al., 2018). As a result, ecosystem orchestrators are positioned in a competitive landscape where they must continuously attract and retain high quality external partners.

The empirical research data highlights that this competitive setting leads to an active contest for the most attractive ecosystem partners. Leading partner companies, whether startups or established firms, often have flexibility in selecting both the ecosystem and their role within it. To succeed in this competition, ecosystem orchestrators must develop and deploy a set of resources and routines that enhance ecosystem attractiveness.

The findings identify a set of activities related to building an attractive brand image for the focal organization. This attractiveness capability is closely linked to impression management. In line with prior research, impression management can be understood as the set of actions through which organizations influence external stakeholders' perceptions of their capabilities and attractiveness (Pihlajamaa, 2023). The empirical data further supports the identification of two key capabilities contributing to ecosystem attractiveness: innovation communication capability and scalability capability. The first, innovation communication capability, reflects a dual role performed by internal ecosystem functions. On the one hand, these functions support innovation by facilitating sensing, seizing, and reconfiguring activities. On the other hand, they communicate the organization's innovation efforts and capabilities to external stakeholders. This aligns with Pihlajamaa (2023), who highlights that impression management in open innovation contexts often relies on communicating innovation activities to external audiences. In this sense, innovation communication becomes a key mechanism for shaping how potential partners perceive the focal organization.

“Communicating our innovativeness in especially vertical dimension, our core products and technologies, is important.”

(Case B, Senior Vice President)

“One of our main field of responsibilities as an internal ecosystem function is to support innovation. But innovation in different forms. Sometimes it is about creating an offering. Sometimes it is about communicating our innovation capabilities, and innovativeness.”

(Case C, Senior Vice President)

The second, scalability capability, relates to the value offered to ecosystem partners through access to markets and growth opportunities. Prior research has identified that focal firms' ecosystem positions and market access are important mechanisms through which they attract and engage ecosystem partners (Adner, 2017; Huikkola et al., 2020). Consistent with this, the empirical findings indicate that scalability is a central component of ecosystem attractiveness. Focal companies leverage their global presence, customer relationships, and established infrastructure to provide partners with opportunities to scale their solutions.

“We are providing to our partner scalability. Our company is having a global market access. We are known as demanding, but at the same time we are providing an opportunity for scaling to global markets to our partners.”

(Case B, Senior Vice President)

In addition to market access, ecosystem attractiveness is supported by complementary organizational resources, such as sales channels, intellectual property, and internal capabilities that lower barriers to partner growth and market entry. *“It is the resources we have promised to startups. We have e.g. sales channels, and IPs (technology patents).”*

(Case C, Senior Vice President)

“But if you can scale them faster than others, they are interested. We have legal expertise, we have marketing expertise. But most of all we have customers. The trickiest part for startup is acquiring customers, since it is costly.”

(Case C; Senior Vice President)

Overall, the findings indicate that ecosystem attractiveness is actively constructed through a combination of communication and resource-based value propositions. This aligns with ecosystem and open innovation literature, which emphasizes the importance of both value creation and value signaling in attracting partners (Adner, 2017; Pihlajamaa, 2023). By communicating innovativeness and offering scalable growth opportunities,

ecosystem orchestrators position themselves as attractive partners in a competitive ecosystem landscape.

Taken together, the findings indicate that sensing activities constitute a continuous and proactive process through which focal firms identify opportunities, develop ecosystem visions, evaluate potential partners, and strengthen their attractiveness to external actors. Through these activities, firms gain access to external resources and capabilities that support innovation and long-term value creation within industrial innovation ecosystems.

The findings further suggest that sensing activities are enabled by several underlying microfoundations. At the individual level, managerial cognition, ecosystem experience, and personal networks support opportunity identification, ecosystem vision development, and partner evaluation. At the organizational level, sensing is enabled through structured scouting routines, trend-radar activities, and ecosystem management structures that facilitate access to external knowledge and innovation opportunities. Together, these microfoundations support the systematic identification and interpretation of ecosystem opportunities and threats.

4.2 Orchestration Seizing

Seizing activities within ecosystem orchestration capability focus on mobilizing resources, making investment decisions, and structuring actions to capture value from identified opportunities (Teece, 2007). Within innovation ecosystems, seizing activities enable focal firms to transform external opportunities into concrete initiatives, partnerships, and value-creating activities.

In practice, ecosystem seizing involves the evaluation, selection, and activation of external partners and technologies, as well as the allocation of organizational resources to support their development. The empirical findings indicate that seizing activities are

characterized by structured validation, experimentation, and decision-making processes through which ecosystem orchestrators assess the feasibility, strategic fit, and commercial potential of identified opportunities. While presented separately from sensing activities for analytical clarity, the findings suggest that sensing and seizing are closely interconnected in practice.

4.2.1 Piloting and Validation

The first group of seizing activities concerns piloting and validation activities and the microfoundations through which these activities are enacted. These activities enable focal firms to evaluate external opportunities, reduce uncertainty, and assess their potential for future commercialization. Industrial ecosystem orchestrators are required to facilitate the integration of internal and external resources while simultaneously validating ecosystem partners, technologies, and business opportunities to develop differentiated customer value propositions. Validation requires a combination of resources, routines, and processes, and is supported by organizational structures, managerial rules, and formal decision-making mechanisms. The empirical findings indicate that validation activities are structured around three primary dimensions: technological readiness, commercial readiness, and strategic fit. Each of these layers is associated with specific evaluation criteria and managerial requirements that must be fulfilled before progressing to the next stage.

The first layer, technological readiness, focuses on assessing the functional performance of the technology or solution. The research data highlights that technologies are validated based on criteria such as performance, safety, and reliability. Piloting activities, often referred to as proof-of-concept (POC) projects, are commonly used to test and validate these aspects. In the context of rapidly evolving industrial environments, piloting activities increasingly focus on advanced, early stage, and digital technologies as part of ecosystem orchestration.

The resources validated through these routines may relate either to upstream components connected to the focal company's core product or technology, or to downstream solutions that enhance the performance or usability of the core offering within the customer environment. The findings indicate that piloting serves multiple purposes, ranging from testing specific attributes, such as safety, to generating learning and building data around emerging technologies, particularly in early stages of maturity. In this sense, piloting activities also contribute to organizational learning processes, which balance short term efficiency needs with long term innovation objectives (March 1991; Duncan, 1976). The validation process requires a range of resources, including testing centers, innovation hubs, technological infrastructure, human expertise, and financial capital. The associated processes are centered around hypothesis testing, data generation, and structured decision making. A commonly applied managerial approach in this context is the stage gate methodology, which enables systematic evaluation of progress and decision making at predefined checkpoints.

"If the matrix is sort of that we want to test and validate a new technology so then it can be sort of for instance we have tested this specific technology (removed) venture. We are not so advanced as the big (global) players, but if we wanted to validate for an instance safety aspect, we are validating is this new tested technology safer than the one we usually use as part of our solutions."

(Case B; Senior Vice President)

"The matrix can be also a learning matrix, producing us data on something, validating promises, figures, or whatever is given."

(Case B, Senior Vice President)

The second layer of validation routines within ecosystem orchestration is commercial readiness. In this phase, piloting or proof of concept projects are utilized to assess the commercial feasibility of a solution, often referred to as a business case. The empirical findings indicate that commercial validation focuses on evaluating key market related

variables, such as total addressable market, pricing levels, and customers' willingness to adopt and pay for the solution. As part of commercial validation, ecosystem orchestrators frequently integrate pilot companies with existing customers to generate experiential learning related to market acceptance and pricing structures. This interaction enables the focal company to test not only demand, but also the practical applicability of the solution in real customer environments. The primary resources required for commercial validation are market based, including access to existing customers and business opportunities through which pilot solutions can be tested and evaluated.

A central capability accessed by pilot companies during this phase is the scalability potential offered by the ecosystem focal company. Through collaboration, pilot companies gain access to markets, customers, and infrastructure that support growth and expansion. When ecosystem orchestration involves public sector funding partners, scalability aligned with the funding partner's mission is often emphasized. This reflects the broader influence of public objectives on ecosystem development and partner selection. For example, in Business Finland co funded programs, global scalability is typically a key requirement for supported initiatives.

"The numbers, a financial analysis we are investing for a business plan, a marketing plan. Invest ten years, and we will be having this revenue and this number of customers."
(Case C, Senior Vice President)

"The incubation phase is to validate test of the product, take the mud of its face, test number of customers, and find some kind of price level, what are customers actually willing to pay" (Case C, Senior Vice President)

"For us, it is not just the financial metrics, or numerical metrics. There are other criteria aswell, such as scalability, the significance to national competitive capability to Finland, and potential for global marker access. If Business Finland is in as a funder, it is not just about us, or local Finnish markets." (Case A, Vice President)

In addition to these dimensions, the findings indicate that individual-level considerations also play an important role in managerial decision making. The empirical data further indicates that individual-level factors influence validation-related decision making and therefore complement the organizational-level microfoundations identified in the study. In particular, the importance of qualitative or “soft” factors is emphasized, especially in relation to the founding team of the target company. After technological and commercial criteria have been assessed, attention typically shifts toward evaluating the individuals behind the solution. The empirical findings emphasize the importance of the founding team’s capabilities, commitment, and ability to execute. This is particularly important in cases involving advanced technologies, early-stage solutions, or digital innovations, where uncertainty is high and long development timelines are common. In such contexts, the competence and resilience of the founding team become critical factors in determining the long-term viability of the collaboration.

Moreover, proximity between the focal company and the target company is highlighted as an important factor. Ecosystem orchestrators often prefer close interaction with founders and teams, including regular face to face engagement. This requirement may also influence the geographical scope of ecosystem partnerships, as accessibility is considered important for effective collaboration and evaluation.

“And it is not just the product or technology; it is the team behind the startup.”

(Case C, Senior Vice President)

“I want to be close; I want to see face to face with the founder for at least every second for a month.” (Case C, Senior Vice President)

The final layer of the validation process concerns decision making related to strategic fit. In this phase, potential ecosystem initiatives must align with the overall strategy of the focal organization, including the priorities of internal units such as research and development and business units. The findings indicate that even cases that are validated in

both technological and commercial terms may be rejected if they do not meet internal alignment requirements. *“The reasons to sell a CVC portfolio company are varied. Might be too small or having too heavy investment trajectory for us.” (Case C, Senior Vice President)*. The empirical research data highlights that strategic fit represents a comparatively flexible layer of validation. Due to this flexibility, the evaluation of strategic fit is strongly influenced by internal stakeholders. Decision making in this phase involves multiple organizational actors, typically including senior management, research and development functions, and business units. This reflects the need to ensure that ecosystem activities are aligned with the broader strategic direction and operational priorities of the organization.

The complexity of strategic fit validation increases in cases involving deeper forms of collaboration, such as minority investments or acquisitions. In these cases, alignment must be ensured not only at the level of individual projects, but also in relation to long term strategic positioning and resource allocation. The findings show that alignment challenges may arise even after a case has been validated from technological and commercial perspectives.

“Strategic fit. Good case, and works, but does not align with strategy of business unit. So, we see it out.” (Case C, Senior Vice President)

“But this didn’t really fit because maybe we change strategy or we decided not to go into this market or withdraw from that market.” (Case C, Senior Vice President)

The data also indicates that strategic fit is dynamic in nature. Changes in organizational strategy or external market conditions may lead to re-evaluation of previously validated cases. As a result, companies that initially met all validation criteria may later be divested if their alignment with organizational strategy changes. *“But we still have a valuable asset that we can actually sell out.” (Case C, Senior Vice President)*

Overall, the findings suggest that validation is a multi-dimensional seizing activity consisting of technological readiness, commercial readiness, and strategic fit considerations, supported by managerial judgement and organizational decision-making processes. Among these dimensions, strategic fit functions as the final and decisive filter through which focal firms determine whether ecosystem initiatives are aligned with long-term organizational objectives and should progress toward broader implementation or commercialization.

4.2.2 Startup Engagement

The second group of seizing activities concerns startup engagement and the microfoundations that enable collaboration with startup partners. These activities enable focal firms to integrate external innovation resources and coordinate collaboration with startup companies. The empirical research data indicates that industrial manufacturing companies face increasing pressure to enhance their innovation performance in response to rapidly changing market conditions. These changes are often driven by advanced technologies, early-stage innovations, and digital solutions, which frequently fall outside the scope of existing internal capabilities.

To access required resources in technology, knowhow, and market insight, industrial manufacturers increasingly engage with startup companies as ecosystem partners. However, startup collaboration differs significantly from traditional industrial partnerships. Despite their early-stage nature, startup companies are expected to meet strict industrial standards regarding reliability, safety, and scalability. This creates new requirements for ecosystem orchestrators, particularly those originating from traditional industrial contexts.

As part of ecosystem orchestration seizing, startups must be integrated into existing organizational resources, routines, and processes. Collaboration with startups is primarily conducted through co research and co innovation activities, where focal companies and

startups jointly combine resources to develop customer value propositions or pursue joint innovation projects. In such collaborations, resource flows must be actively managed, with the focal company typically assuming a leading role.

The empirical findings highlight three key activities required for effective startup collaboration. First, ecosystem orchestrators must document and communicate collaboration opportunities and requirements. Second, collaboration projects must be actively facilitated and managed. Third, joint value creation outcomes must be validated before progressing toward deeper forms of collaboration. These activities require capabilities related to innovation management, piloting, and value creation validation.

Startup partnerships are most operationalized through pilot or proof of concept projects between the focal company and startup. The empirical research indicates that demonstrating value creation is a prerequisite for advancing toward deeper partnerships. This creates a need for integrated capabilities that combine experimentation, validation, and resource coordination. The resources involved typically include human expertise, piloting environments or hubs, financial capital, and enabling infrastructure such as open interfaces or structured project frameworks. Corresponding processes focus on managing innovation, coordinating external resources, and validating outcomes in a systematic manner.

“Of course, we have already a lot of partnerships, but usually with very mature companies, but we want to start follow them at the like smaller companies. And engage with the ones that make sense for us.” (Case B; Senior Vice President)

At the same time, the empirical data highlights the presence of misaligned expectations between industrial ecosystem orchestrators and startup companies. Industrial manufacturers typically serve business critical environments, which impose strict requirements related to reliability, safety, and global scalability. These requirements can limit the abil-

ity to collaborate with startup companies, particularly in core or upstream activities of the value chain.

As a result, startup collaboration is often constrained to co-research and co-innovation activities rather than mission critical implementations. The findings indicate that collaboration opportunities with startups are more extensive in downstream positions of the value chain, where value can be added through performance improvements, optimization, or enhanced usability of the focal company's core product or technology.

"It's collaboration in that space because we have high requirements. And of course, if you think about when we are developing new things, for instance for our core product engines and related technologies, we are doing it together with collaboration partners and then those are selected. We are not using startup for sort of like something business critical." (Case B, Senior Vice President)

"There we are using and innovating together with more established partners in that sense. But then we are like we can do POCs (Proof-of-concept) and kind of test and so forth with less matured companies. But as we are accountable (to our customers) sometimes it is not possible in access to use startup. Or neither the existing supply-chain partners. We are known as a tricky master; we have high expectations but on the other hand what they also say is that we help them to grow." (Case B, Senior Vice President)

"And of course, it is challenging for us since we are a company that needs to keep its promises." (Case B, Senior Vice President)

"And then we sort of like, engage and have a partnership. So, then it is usually win-win. But there are a lot of criteria's to be met to sort of like come into that inner circle." (Case B, Senior Vice President)

When appropriately scoped, the findings indicate that startup collaboration can create mutual benefits for both ecosystem orchestrators and startup companies. This interaction is often described as a “win-win” relationship. For industrial focal companies, collaboration with startups enables access to new technologies, particularly in emerging and disruptive domains, and supports the development of new customer value propositions through low-risk experimentation. Successful collaborations can also lead to further strategic actions, such as minority investments or acquisitions, supported by learning generated during joint projects.

For startup companies, collaboration with industrial focal firms provides access to scalability opportunities, including entry into global markets and customer acquisition. In addition, startups benefit from access to complementary capabilities, such as managerial expertise, marketing capabilities, and legal support. These resources are often critical for startups to achieve growth and market adoption.

The findings further emphasize that achieving successful collaboration requires strong learning capabilities from both parties. *“Not an only to invest, but also to learn. Specifically, learning more in specific industries” (Case C, Senior Vice President).*

Overall, startup engagement emerges as an important seizing activity within ecosystem orchestration capability, enabling industrial focal firms to access external technologies, knowledge, and innovation opportunities through collaboration with startup companies. The findings suggest that effective startup engagement depends on structured validation, resource integration, and active collaboration management. At the same time, startup collaboration is shaped by the focal firm's requirements for reliability, safety, and scalability, resulting in a selective approach in which startups are primarily engaged in experimentation, co-innovation, and downstream value creation activities.

4.2.3 Commercialization and Scaling

The third group of seizing activities concerns commercialization and scaling and the microfoundations that enable these activities. These activities enable focal firms and ecosystem partners to transform validated opportunities into market outcomes. The empirical research data emphasizes that commercialization is a critical aspect of collaboration between startup companies and corporate ecosystem orchestrators. Startup companies often face resource constraints and go to market activities related to the commercialization of products or technologies are generally resource intensive, particularly in terms of financial capital. *“Commercialization. GTM needs money. They will be financed.” (Case C, Senior Vice President)*. In contrast, corporate ecosystem orchestrators typically possess established market positions, trusted brands, and existing customer bases. These assets provide startups with access to markets and opportunities to acquire data that is essential for further product or technology development. From this perspective, corporate partners function not only as commercialization channels but also as platforms for learning and validation in real market environments. *“That’s always a tricky part for a startup company, acquire customers, since its costly. That’s a win-win scenario.” (Case C, Senior Vice President)*. The research data further highlights that leading startup companies often have multiple options when selecting ecosystem partners, including corporates, ecosystems, and investors. As a result, competition among ecosystem orchestrators extends to commercialization capability. A key capability for the focal company is therefore the ability to enable effective commercialization through a combination of resources, routines, and processes that support scaling new products and technologies. *“The best startups, they don’t need money. They have it everywhere. But if you can scale then faster than others, then they are intrested. We have lots of strengths the startups don’t have. The best cases are, where we will give our love to startup. We might be helping with the product, or channels, or so. Startups may use us as a testbed.” (Case C, Senior Vice President)*. The findings indicate that startups evaluate potential ecosystem partners based on their ability to accelerate scaling and commercialization. In this context, corporates are often viewed as valuable partners due to their access to customers, distribution channels, and established infrastructures. In addition, corporates can act as testbeds,

enabling startups to pilot, refine, and validate their solutions in real world environments, thereby supporting both product development and market entry.

Overall, the empirical findings suggest that commercialization capability is an important capability supporting seizing activities within ecosystem orchestration capability. For focal companies, this involves not only enabling market access for ecosystem partners but also leveraging established customer relationships, distribution channels, and market infrastructures to accelerate the scaling of ecosystem innovations. The findings further indicate that the ability to support commercialization and scaling represents an important source of ecosystem attractiveness for startup companies and contributes to long-term value creation within the ecosystem.

4.2.4 Internal Stakeholders Alignment

The final group of seizing activities concerns internal stakeholder alignment and the microfoundations that enable the integration of external ecosystem opportunities with internal organizational priorities, resources, and decision-making processes. The empirical research data highlights that internal managerial microfoundations play a critical role in the successful operation of internal ecosystem functions. Consistent with the findings related to sensing activities, internal ecosystem functions are subject to both expectations and requirements from the broader organization, including responsibility for shaping ecosystem vision, innovation priorities, and ecosystem direction.

*“Of course, we have our scouting and providing case for them. But what sort?”
(Case V, Senior Vice President).*

A central finding of the study is that effective internal collaboration between the ecosystem function and the broader organization is essential for successful orchestration. This applies across multiple layers of the organization. As discussed in the sensing activities, internal alignment is required for defining ecosystem vision, innovation scope, and

scouting priorities. Similar requirements are evident in seizing activities, where successful ecosystem initiatives depend on internal alignment and collaboration.

In the context of startup collaboration, this is reflected in the ability of the ecosystem orchestrator to mobilize internal resources for joint innovation projects. The findings indicate that linking external partners, such as startups, with internal business units remains one of the most challenging aspects of orchestration. *“The hardest thing is to link startup to internal resources, business units. If they have something else in their mind, I will not be supporting the resources that I promised to the startup” (Case C, Senior Vice President)*

More broadly, collaboration between the internal ecosystem function and other internal units, such as senior management, research and development, and business units, is critical for securing financial and operational support. The findings emphasize that the internal ecosystem function must continuously demonstrate its value to the main organization. However, this value is often difficult to quantify, particularly when it relates to strategic outcomes such as insight generation or business renewal.

“The main purpose for us is not the financial gains. It might be supporting main business units. That’s harder to calculate concrete.” (Case C, Senior Vice President)

“Our main purpose as an innovation ecosystem is to support our main business units. How can you measure that?” (Case C, Senior Vice President)

“Lowering costs, how do you measure that? We can measure the value of the company which will be sold out. We can measure how valuable is the product or solution after our investment.” (Case C, Senior Vice President)

The empirical data also highlights areas of tension in internal collaboration. These challenges may manifest as misalignment, frustration, or a lack of understanding between the ecosystem function and other parts of the organization. Common areas of disagreement include the definition of innovation scope, the boundary between core and non-core activities, and the evaluation of ecosystem function performance.

“If you ask the people in this company, there are many opinions related to this. Which is inside the scope, and which is outside the scope.” (Case B, Senior Vice President)

“They think we are out of the scope of business. They believe, we are just wasting the company money.” (Case C, Senior Vice President)

Despite these challenges, the findings also identify mechanisms for improving internal alignment. Active and continuous dialogue between the ecosystem function and internal stakeholders is emphasized as a key enabler of mutual understanding. In particular, the ability of the ecosystem function to communicate its broader value, beyond direct financial outcomes, is highlighted as critical.

“So, we align with business units to have support, to be able to build a successful strategy” (Case C, Senior Vice President)

The relationship with senior management is consistently identified as the most critical internal stakeholder relationship. Securing top management support for innovation is considered a prerequisite for effective ecosystem orchestration, as it enables alignment of strategic priorities across the organization.

“To build a successful strategy, it is needed also from management to say innovation is important. Then, we (ecosystem orchestrator) are having an internal strategic objective for building a new common target for all business units to do innovation.” (Case C, Senior Vice President)

The findings further highlight that alignment at the individual level, including shared attitudes, skills, and cultural orientation toward innovation, plays a significant role in enabling collaboration across internal units. As a practical objective, ecosystem function managers aim to establish organization wide innovation objectives that facilitate cooperation across business units.

Empirical evidence also emphasizes the importance of structured and continuous engagement between the ecosystem function and internal stakeholders. This includes regular interaction with business units to identify needs, align priorities, and ensure commitment to ecosystem initiatives.

“We have explored (removed chemical process) so then we have built a pipeline, we have gone from long list to short list, and that’s where we are good at. But when it is sort of like taking a big picture and a look from strategic perspective, it gets more difficult.”

(Case B, Senior Vice President)

“It takes effort to go from grassroots to the high-level. So how to like to create the path there between. That is part of our role to create clarity on that.”

(Case B, Senior Vice President)

“They are now, for instance, introducing on agile how they have developed concept development, and all of this. So of course, we have our scouting and providing cases for them. But what sort?” (Case B, Senior Vice President).

“We (internal ecosystem unit) are having a monthly meeting with every business unit. We are there to learn, so we are curious about themes such as What’s your pain point? How can we help you? What are you looking for? How can we be your eyes and ears out in the market?” (Case C, Senior Vice President)

Overall, the findings indicate that internal stakeholder alignment capability is an important capability supporting seizing activities within ecosystem orchestration capability. Successful implementation of ecosystem initiatives depends on internal alignment, active communication, and the ability to integrate external opportunities with internal organizational priorities, resources, and decision-making processes. The findings further suggest that leadership support, cross-functional collaboration, and continuous stakeholder engagement are critical enablers of effective ecosystem orchestration.

Taken together, the findings indicate that seizing activities within ecosystem orchestration capability involve the evaluation, activation, and implementation of opportunities identified through sensing activities. Validation capability, startup engagement capability, commercialization capability, and internal stakeholder alignment capability emerged as important capabilities supporting seizing activities and enabling focal firms to transform external opportunities into concrete ecosystem initiatives and value-creating outcomes. Successful seizing depends on the ability to combine external collaboration with internal organizational support, resource mobilization, and strategic alignment.

The findings further indicate that seizing activities are supported by interacting organizational and individual-level microfoundations. Validation routines, piloting processes, and internal decision-making structures enable the systematic evaluation of ecosystem opportunities, while managerial judgment, experience, and stakeholder relationships influence assessments of technological readiness, commercial viability, and strategic fit. These microfoundations enable focal firms to transform sensed opportunities into concrete ecosystem initiatives and commercialization efforts.

4.3 Orchestration Reconfiguring

Reconfiguring activities within ecosystem orchestration capability focus on the continuous renewal and adaptation of resources, processes, and organizational structures that support ecosystem value creation and the delivery of ecosystem value propositions. In line with dynamic capabilities theory, reconfiguring activities enable focal firms to adapt ecosystem arrangements, governance mechanisms, and organizational practices in response to changing market conditions and emerging opportunities (Teece, 2007).

As discussed in earlier sections, industrial manufacturing companies operate in increasingly dynamic environments characterized by technological change, evolving customer requirements, and shifting competitive conditions. These developments create a need to continuously adapt existing resources, business models, organizational practices, and ecosystem relationships. Consequently, ecosystem orchestrators play an important role in coordinating and enabling organizational adaptation across both internal and external ecosystem contexts.

The empirical findings indicate that reconfiguring activities are supported by several capabilities related to organizational adaptation and renewal. These findings are organized into three areas: shaping roles and responsibilities, governance adaptation, and organizational learning. Together, these capabilities enable focal firms to continuously renew ecosystem arrangements and support long-term ecosystem value creation.

4.3.1 Shaping Roles and Responsibilities

The first group of reconfiguring activities concerns the shaping of roles and responsibilities and the organizational arrangements through which these activities are enacted. The empirical findings indicate that industrial manufacturers acting as ecosystem orchestrators continuously adapt organizational structures, responsibilities, and ecosystem arrangements to support innovation and ecosystem value creation. These changes enable

focal firms to align innovation activities with evolving ecosystem requirements and strategic priorities. The first major transition identified relates to the shift from internally focused, closed innovation strategies toward externally oriented, open innovation approaches. This transformation reflects the growing importance of engaging with external partners and ecosystems to access new knowledge, technologies, and business opportunities. *“The starting point for a transformation has been moving from acting inside the company towards reaching outside of our company. I think our company has been a forerunner in testing different new things and innovation methodologies” (Case B, Senior Vice President).*

The second transition concerns the decentralization of internal innovation functions. The research data shows that innovation activities have increasingly been distributed across business lines to better align with their specific needs. Business lines are typically responsible for distinct products, technologies, and market contexts, which results in differing innovation requirements. Some business lines are strongly research oriented, focusing on core products or technologies and typically operating in upstream positions of the ecosystem value chain. In contrast, other business lines emphasize downstream innovation, focusing on how products or technologies are used in customer environments, including performance, usability, and integration aspects. This variation in innovation needs has led to the decentralization of innovation resources and teams, enabling closer alignment with business specific requirements. By embedding innovation capabilities within business lines, organizations aim to enhance responsiveness and relevance of innovation activities. *“In one of the business lines (removed), we are having a heavy focus on research. Considering it, we have acquired lot of companies in the history. Concerning it, the scope is big. But in the other one (removed), we have acquired only one company. In this business line we are focusing more on downstream around the core product (removed), such as data platform and integration capabilities to storage the (removed commodity) produced. The needs in innovation are very different in both” (Case B, Senior Vice President).*

The third identified transition relates to the structuring of ecosystems around program-based models. In several case companies, each business line operates its own program, supported by a dedicated ecosystem. These programs are characterized by distinct strategies that reflect the specific innovation needs of the associated business line. Some programs are strongly research oriented, while others focus on more traditional business ecosystem collaboration. *“Each of our main business lines are having their own program, supported by own ecosystem around it. The needs of the different business lines are highly different. Some of them are having a heavy focus in research, some are more traditional business ecosystems (Case B, Vice President)”*. Taken together, these transitions indicate that ecosystem orchestrators continuously redefine organizational roles, responsibilities, and coordination structures to align innovation activities with changing ecosystem requirements and strategic priorities.

Further insights into this program-based structure are provided through an illustrative case example. Programs are typically organized around target industries, such as a textile industry program. First, the technological scope of each program is defined in alignment with the focal company’s broader technology strategy. Second, each program, sometimes referred to as a “value stream”, is assigned a dedicated owner. In some cases, program ownership extends beyond the focal company, including external actors responsible for coordination and management. The research data indicates that focal companies may externalize certain governance functions within these programs. For example, administrative responsibilities and communication among ecosystem partners may be managed by external partners rather than the focal company itself. In publicly funded programs, such as those supported by Business Finland, funding applications and program coordination may also be handled by ecosystem partners. In addition, external innovation partners may be engaged to manage project level activities within the program. Third, programs are structured around predefined themes and subthemes, which often correspond to specific technologies, product areas, or industries. Examples include recycling technologies, resource efficient industries, or service lifecycle concepts. Fourth, each program defines its innovation horizon, process, and roadmap. The innovation hori-

zon is often structured according to the three horizons, a framework popularized by McKinsey (2009), reflecting different time scales of innovation. The innovation process itself is typically facilitated by the internal research and development function, integrating both internal and external resources and knowledge flows. *“The innovation roadmap is aligned with technology strategy 2030 by focal case company” (Case A, Vice President).*

4.3.2 Governance Reconfiguration

The second group of reconfiguring activities concerns governance reconfiguration and the organizational mechanisms through which ecosystem governance is adapted over time. The research data further highlights three main findings considering the managerial practises of ecosystem governance for orchestrator. The first of the findings is organizational structures for managing large ecosystem investments. The data highlights that industrial orchestrators have applied standardized managerial processes for evaluating large ecosystem investment cases, such as acquisitions, minority investments, and large R&D projects. *“When current Ceo joined the company (removed), he made changes to the company and how things are going. So, for an example he has created documents, product boards, and solution boards that are evaluating big investment cases. The big cases can be 10.000.000 EUR or 100.000.000 EUR in size for us (Case B, Senior Vice President)”*. In parallel, research data highlights that ecosystem investments are containing a field of variety in size. Ecosystem orchestration is considering also a portfolio of smaller investment, where flexibility and even ability to act in relatively short period of time, is often needed. Some of these smaller ecosystem investments are co-innovation, or co-research projects together with startup partners. *“For this kind of small things, and I talk like 20.000 – 30.000 EUR investments and experiments, it is possible to take decision-making to very low in hierarchy cases (Case B, Senior Vice President).”*

The second finding relates to the adaptation of governance processes using agile stage-gate practices. The empirical findings indicate that industrial focal firms rely on stage-gate processes as important mechanisms for evaluating ecosystem investments and in-

novation projects. These governance mechanisms support resource allocation and investment decisions while reducing uncertainty associated with ecosystem initiatives. At the same time, the findings suggest that stage-gate processes are increasingly combined with agile ways of working, enabling continuous learning, stakeholder feedback, and iterative evaluation of ecosystem opportunities. Together, these practices allow focal firms to balance control, flexibility, and learning within ecosystem orchestration activities.

The third governance-related finding concerns intrapreneurship and entrepreneurial ways of working within industrial focal firms. The findings indicate that ecosystem orchestration increasingly requires capabilities that support experimentation, opportunity development, and commercialization activities within established organizations. Interviewees emphasized the importance of entrepreneurial mindsets, commercialization know-how, willingness to experiment, and the ability to advance ecosystem initiatives from idea generation toward commercialization. These capabilities were supported by individual-level factors such as experience and entrepreneurial judgement, as well as organizational practices that encouraged experimentation, learning, and the integration of external innovation opportunities.

The respondents highlighted the need for entrepreneurial capabilities within established organizations to support ecosystem-related innovation activities. Interviewees emphasized the importance of advancing ecosystem initiatives from idea generation and incubation toward commercialization. Critical elements of this capability included commercialization know-how, commitment, experimentation, and the ability to identify market opportunities and scalable business potential. The findings further suggest that organizations face challenges in incentivizing employees to engage in entrepreneurial activities within corporate structures and processes. *“The challenge is to incentivize company people as intrapreneurs. It is an entrepreneurial ‘trial-and-error’ method, where external product is conducted as an internal startup. The challenge is to find the balance in between, spotting someone we can build on, this can create new revenues and make us more efficient and reduce costs.” (Case C, Senior Vice President).*

Overall, the findings indicate that governance reconfiguration is an important reconfiguring activity within ecosystem orchestration capability. The findings show that focal firms adapt governance arrangements through a combination of formal investment evaluation structures, agile decision-making processes, and entrepreneurial practices that support ecosystem collaboration and innovation. These governance mechanisms enable organizations to balance control and flexibility while aligning ecosystem activities with changing strategic priorities and ecosystem requirements.

4.3.3 Organizational Learning

The third group of reconfiguring activities concerns organizational learning and the mechanisms through which learning supports the adaptation and renewal of ecosystem orchestration capability. The empirical findings indicate that organizational learning is a key capability supporting the adaptation and renewal of ecosystem orchestration capability by enabling focal firms to acquire, integrate, and apply knowledge generated through ecosystem collaboration. The empirical research data emphasizes the importance of structured and metered learning, particularly in the context of startup collaboration. Respondents consistently highlight that the ability to learn effectively is a central requirement for generating value through ecosystem orchestration. *“We need a ‘fail and learn’ capability” (Case C, Senior Vice President).* At its core, organizational learning is grounded in the capability to manage both internal and external resources and knowledge flows within the innovation process. The findings highlight startup collaboration as a key source of new knowledge, including access to advanced technologies, emerging business models, and specialized expertise. However, realizing these benefits requires the focal company to actively engage in learning and to develop mechanisms for absorbing and utilizing this knowledge. *“We need to start learning faster.” (Case C, Senior Vice President).* To ensure that learning is actionable and measurable, the empirical data indicates that learning activities are increasingly formalized through defined metrics and documentation practices. Organizations establish explicit expectations for collaboration outcomes and track learning progress over defined timeframes. *“We need*

to be documenting our expectations towards startup companies. We need to document our learning. What should we do in the next three months? What have you learned?" (Case C, Senior Vice President). These practices are often operationalized through milestone-based targets for startup collaboration, including metrics related to product development, customer acquisition, and commercialization outcomes. Such milestones function as control mechanisms within the learning process, enabling structured evaluation and continuous adjustment. *"Milestones for startups, what will happen in next six months. Five new contracts, two new products. We need to setup a controlling function (for the startup)" (Case C, Senior Vice President).*

Organizational learning is further supported by structures and processes that span multiple ecosystem orchestration activities. In sensing activities, learning is facilitated through scouting activities and customer value validation. In seizing activities, learning is embedded in co-creation activities, such as proof-of-concept projects, where focal firms and startups jointly develop and test solutions. In reconfiguring activities, learning supports the integration, adaptation, and scaling of ecosystem outcomes over time. *"You can use this metadata on the long run as well, but especially maybe when it is incubation or acceleration phase (of the innovation process)" (Case C, Senior Vice President).*

Startup collaboration is also described as a mutually beneficial arrangement that enables learning for both parties. Ecosystem orchestrators provide startups with access to customers and market channels, creating an environment where startups can refine their value propositions, test pricing mechanisms, and validate customer demand. *"Piloting. Startups may use corporates as a test pad" (Case C, Senior Vice President).* From the perspective of the focal company, ecosystem orchestration facilitates learning by integrating external knowledge into internal processes. This involves managing both resources and knowledge flows in a coordinated manner. *"Our focus is 60% on the piloting, 40% on the listening" (Case C, Senior Vice President).*

Overall, the findings indicate that organizational learning capability is an important capability supporting reconfiguring activities within ecosystem orchestration capability. Rather than being confined to a single activity, learning operates as a continuous and structured mechanism that spans sensing, seizing, and reconfiguring activities. The findings further suggest that learning is increasingly formalized through documentation, milestones, performance monitoring, and feedback mechanisms, enabling focal firms to transform ecosystem experiences into long-term capability development and organizational adaptation.

4.3.4 Reconfiguring Performance Measurement

The fourth and final group of reconfiguring activities concerns performance measurement and the mechanisms through which ecosystem outcomes are evaluated and monitored over time. The empirical findings indicate that performance measurement plays an important role in evaluating ecosystem outcomes, supporting organizational adaptation, and guiding the continuous development of ecosystem orchestration capability. The empirical research data indicates that case companies can be divided into two distinct groups based on their approaches to performance measurement of internal ecosystem functions. The first group characterizes performance measurement as complex and insufficiently aligned with the long term and strategic nature of ecosystem activities. Respondents in this group emphasize that existing metrics often fail to capture the broader and long-term business value generated by internal ecosystem functions. *“And how do you measure it? And especially in our context, when return on investment is like five years in the future, maybe?” (Case B, Senior Vice President)*. In practice, internal ecosystem functions in this group are often evaluated using metrics derived from business units, such as sales related indicators. These measures reflect short term business performance but do not fully capture the strategic and developmental contributions of ecosystem activities. *“Yeah, it’s a really, really difficult on that usually how we sort of like it not next business lab but energy as a business is measured is like sales” (Case B, Senior Vice President)*. The most used metrics in this group include sales outcomes and the

number of partners acquired. A “qualified” partner is typically defined as a partner that participates in co research or co innovation activities with the ecosystem function. *“Then we have made promises we secured to them 30 partners this year. To be able to become ecosystem partner, you must do a co-research or co-innovation project with us” (Case B, Senior Vice President).* Despite their operational relevance, these metrics are perceived as limited in capturing the full value potential of ecosystem orchestration. Respondents highlight that such metrics are often externally assigned and required for maintaining funding, rather than fully reflecting the strategic impact of ecosystem activities. *“But my team is responsible for finding partners for those. Topics that are either co-researched or co-innovated. I don’t say it’s an optimal KPI, but it is an KPI and then there are workarounds on how to view it. I am myself not a fan of those KPIs. But these KPIs have been assigned to us. So, it is something we need to reach to secure maintaining the funding” (Case B, Senior Vice President).*

More broadly, respondents in this group compare the challenge of ecosystem performance measurement to that of innovation and entrepreneurial programs, where defining appropriate metrics is inherently difficult. *“I have been in many different kinds of innovation type of entrepreneur programs and these things, and it has always been a challenge with KPIs” (Case B, Senior Vice President).* A key challenge identified in this group is the misalignment of time horizons between ecosystem activities and traditional business performance metrics. Ecosystem value creation often unfolds over longer periods, while business units are typically evaluated on shorter term performance cycles, such as annual financial results. *“So, it is one of the metrics. But I believe also in this kind of development sort of like that you try to break it down into sort of like incremental and you sort of like work towards that return on investment as it is sold out for in the future. So, we can follow it. You know, we should have a business case and all of that, but it is not so motivating. And it is very sort of like you know it does not say much because you will see it in the future” (Case B, Senior Vice President).* To address this challenge, respondents suggest the use of incremental metrics that track progress toward long term

outcomes. However, such forward looking measures are associated with uncertainty and offer limited ability to influence or predict results.

The second group of case companies adopts a more structured and integrated approach to performance measurement. In this group, ecosystem functions are closely aligned with both research and development and business units, and their performance is evaluated using a combination of traditional research and development metrics and business metrics. These are typically oriented toward measurable outcomes, such as partner acquisition, funded projects, and overall portfolio performance. In this group, the internal ecosystem function operates with more clearly defined targets and less operational flexibility. At the same time, the associated performance metrics are perceived as more concrete, measurable, and aligned with organizational objectives. *“We have achieved the targets set by amount of partner to (removed national innovation program) by doubling the target amount in our budget” (Case B, Vice President).*

Overall, the findings indicate that performance measurement in ecosystem orchestration remains a complex and evolving area. While some organizations rely on traditional business metrics, others seek to integrate broader innovation and ecosystem related indicators. The results suggest that balancing short term measurable outcomes with long term strategic value creation remains a central challenge in managing ecosystem orchestration performance.

Taken together, the findings indicate that reconfiguring activities within ecosystem orchestration capability constitute a continuous process through which focal firms adapt organizational structures, governance mechanisms, learning practices, and performance management approaches to changing ecosystem conditions. The findings highlight the importance of role and responsibility shaping capability, governance adaptation capability, organizational learning capability, and performance measurement capability in supporting organizational renewal and ecosystem adaptation. Through these capabilities, focal firms integrate external resources, renew internal capabilities, and respond to

evolving technological, market, and ecosystem requirements. The findings further suggest that sustained ecosystem orchestration requires the continuous alignment of organizational arrangements with long-term innovation and value creation objectives.

Reconfiguring activities are enabled by microfoundations related to governance, learning, and organizational coordination. Formal governance mechanisms, agile decision-making practices, organizational learning processes, and cross-functional coordination structures support the continuous adaptation of ecosystem arrangements. Furthermore, entrepreneurial mindsets and individual-level experience contribute to the renewal of organizational practices and ecosystem relationships over time.

4.4 Summary of The Findings and Revised Theoretical Framework

The empirical findings refine the initial conceptual framework by demonstrating how ecosystem orchestration capability is enacted and developed through sensing, seizing, and reconfiguring activities in practice.

4.4.1 Sensing, Seizing, and Reconfiguring Activities

In *sensing activities*, the findings show that focal firms identify opportunities, technologies, and ecosystem partners while simultaneously positioning themselves as attractive ecosystem actors (Adner and Kapoor, 2010; Adner, 2017; Jacobides et al., 2018; Teece et al., 2007; Dhanaraj and Parkhe, 2006; Batterink et al., 2010). In contrast to purely analytical interpretations, sensing is revealed as an active and strategic process in which firms shape their ecosystem role and signal value to potential partners. For example, firms actively engaged in startup scouting, ecosystem networking, and collaboration with external innovation actors to identify emerging technologies and partnership opportunities. Orchestrators combine upstream control over core technologies and intellectual property with downstream openness and collaboration to expand ecosystem

value creation and adoption. Partner identification increasingly emphasizes technologically advanced actors, making partner evaluation a critical activity within ecosystem orchestration. Ecosystem attractiveness is actively constructed through communication, signaling of innovativeness, and scalable growth opportunities. The findings further suggest that these sensing activities are enacted through capabilities related to ecosystem visioning, partner evaluation, and ecosystem positioning, which together support the identification and selective engagement of ecosystem opportunities and partners.

In *seizing activities*, ecosystem orchestration centers on mobilizing ecosystem actors, validating opportunities, and integrating external innovation into organizational objectives and commercialization processes (Adner and Kapoor, 2010; Adner, 2017; Jacobides et al., 2018; Teece, 2007; Dhanaraj and Parkhe, 2006; Aarikka-Stenroos et al., 2017; Linde et al., 2021; Sjödin et al., 2024). The findings show that validation is not ad hoc but structured into three interrelated dimensions: technological readiness, commercial viability, and strategic fit. For example, firms used proof-of-concept projects and pilot implementations to evaluate the technical feasibility and practical applicability of external innovations. These activities were supported by internal validation and decision-making processes involving innovation, business, and technology stakeholders to assess strategic fit and determine whether opportunities should progress toward commercialization. Among these, strategic fit emerges as the key mechanism linking external opportunities to organizational priorities. At the same time, validation processes are shaped by informal managerial judgment, highlighting the role of experience and interaction. Startup collaboration and commercialization activities support the integration and scaling of ecosystem initiatives, while internal stakeholder alignment ensures coherence between external activities and internal strategic objectives. Collectively, these findings indicate that seizing activities are enacted through capabilities related to validation, startup engagement, commercialization, and internal stakeholder alignment, which support the transformation of external opportunities into concrete ecosystem initiatives and value-creating outcomes.

In *reconfiguring activities*, orchestration capability is characterized by the continuous adaptation of organizational roles, governance structures, learning mechanisms, and performance practices (Teece, 2007; Dhanaraj and Parkhe, 2006; Adner, 2017; Linde et al., 2021; Sjödin et al., 2024). The findings indicate a shift toward ecosystem-based innovation models, decentralized activities, and program-based orchestration structures. Governance combines formal investment processes with agile practices, enabling flexibility while maintaining control. For example, firms established dedicated ecosystem and innovation programs to coordinate collaboration activities and support the integration of external innovation. Governance combined formal investment and decision-making processes with agile ways of working to balance flexibility and control. Interviewees also described learning from both successful and unsuccessful collaborations and using these experiences to refine ecosystem practices and future partnership decisions. Organizational learning operates as an embedded and continuous mechanism, supporting ongoing capability development. Performance measurement is identified as a critical but complex area, requiring a balance between short-term outcomes and long-term ecosystem value creation. The findings further suggest that reconfiguring activities are supported by capabilities related to role and responsibility shaping, governance adaptation, organizational learning, and performance measurement, enabling the continuous renewal and adaptation of ecosystem arrangements over time.

4.4.2 Microfoundations of Ecosystem Orchestration Capability

Across sensing, seizing, and reconfiguring activities, the findings indicate that ecosystem orchestration capability is enabled and shaped by interacting microfoundations operating across individual and organizational levels. Consistent with recent microfoundations research, ecosystem orchestration capability emerges through interactions across multiple levels of analysis rather than through isolated organizational activities (Rabetino et al., 2025). This perspective extends earlier microfoundations literature (Felin et al., 2012; Felin et al., 2015) and aligns with recent multi-level conceptualizations of capability development (Rabetino et al., 2025) by emphasizing the importance of interactions among

resources, processes and routines, organizational structures, and individual-level factors in enabling higher-order organizational capabilities. The findings further suggest that the four categories of microfoundations identified in the theoretical framework jointly enable and shape ecosystem orchestration capability in practice.

Resources

The findings demonstrate that ecosystem orchestration capability is supported by both internal and external resources. Particularly important resources include ecosystem-related knowledge, prior experience, access to partner networks, technological capabilities, and customer access. These resources support sensing activities by enabling the identification of opportunities, technologies, and potential partners, while also facilitating seizing and reconfiguring activities through commercialization, resource integration, and organizational learning. The findings further suggest that ecosystem orchestration increasingly depends on the ability to access and combine complementary resources residing beyond organizational boundaries. This observation is consistent with resource-based and dynamic capability perspectives that emphasize the strategic value of resource integration and reconfiguration in supporting organizational adaptation and value creation (Barney, 1991; Teece, 2007).

Processes and Routines

The findings highlight the importance of formalized processes and routines in enabling ecosystem orchestration capability. Sensing activities were supported by scouting activities, trend-radar practices, scenario-building exercises, and innovation funnel management. Seizing activities relied on structured validation processes, piloting routines, proof-of-concept projects, and stage-gate decision-making mechanisms. Reconfiguring activities were enabled through governance practices, agile decision-making routines,

and organizational learning mechanisms. Together, these processes and routines reduce uncertainty, support decision-making, and facilitate the systematic development of ecosystem initiatives. These findings are consistent with prior research emphasizing organizational routines as critical microfoundations through which organizations coordinate activities and renew capabilities over time (Nelson and Winter, 1982; Feldman and Pentland, 2003; Zollo and Winter, 2002). More specifically, the findings support Rabetino et al.'s (2025) argument that dynamic capabilities emerge through coordinated interactions among multiple microfoundations operating across individual, organizational, and ecosystem levels.

Organizational Structures

Organizational structures emerged as another important category of microfoundations. The findings indicate that dedicated ecosystem functions, ecosystem programs, governance structures, decision-making mechanisms, and cross-functional collaboration arrangements support coordination across organizational and ecosystem boundaries. These structures facilitate knowledge sharing, resource integration, and alignment among internal and external stakeholders. Furthermore, they enable focal firms to coordinate ecosystem activities while maintaining alignment with organizational strategy and innovation objectives. This supports previous studies suggesting that organizational structures provide important mechanisms through which organizations coordinate activities, integrate knowledge, and develop organizational capabilities (Felin et al., 2012; Teece, 2007). In addition, the findings align closely with Rabetino et al. (2025), who emphasize the role of organizational structures in enabling interactions and knowledge flows across different levels of capability development.

Individual-Level Factors

At the individual level, managerial cognition, managerial judgment, experience, leadership support, and personal relationships emerged as important microfoundations of ecosystem orchestration capability. Managers play a central role in interpreting ecosystem developments, shaping ecosystem vision, evaluating opportunities, and identifying suitable partners. The findings further indicate that personal networks and direct interactions with startup founders, management teams, and internal stakeholders support partner evaluation, collaboration, and organizational alignment. In addition, managerial judgment appears particularly important during validation activities, where decisions concerning technological readiness, commercial viability, and strategic fit frequently extend beyond purely analytical considerations. These findings are consistent with managerial dynamic capabilities literature, which emphasizes managerial cognition, human capital, and social capital as important foundations of organizational adaptation and opportunity identification (Adner and Helfat, 2003; Helfat and Peteraf, 2015; Felin et al., 2015). The findings therefore support recent calls for greater attention to individual-level mechanisms within dynamic capabilities research and provide empirical evidence consistent with Rabetino et al.'s (2025) multi-level view of capability development.

Taken together, the findings demonstrate that ecosystem orchestration capability does not emerge from isolated activities or mechanisms. Rather, it develops through interactions among resources, processes and routines, organizational structures, and individual-level factors that collectively enable sensing, seizing, and reconfiguring activities. More specifically, ecosystem knowledge and experience, partner networks, governance and validation routines, organizational learning mechanisms, coordination structures, managerial cognition, managerial judgment, and social relationships interact to support opportunity identification, partner mobilization, organizational coordination, and ecosystem adaptation. In doing so, the findings support and extend the multi-level perspective advanced by Rabetino et al. (2025) by demonstrating how interactions among microfoundations operating across organizational and individual levels enable the develop-

ment and enactment of ecosystem orchestration capability in innovation ecosystems. The findings therefore suggest that ecosystem orchestration capability should be understood as a multi-level organizational capability that is enacted through sensing, seizing, and reconfiguring activities while simultaneously being enabled and shaped by interacting microfoundations.

4.4.3 Concluding Empirical Findings

Overall, the findings demonstrate that ecosystem orchestration capability is developed as a dynamic and continuously evolving organizational capability through which focal firms adapt to changing environments and create long-term value. Consistent with the dynamic capabilities' perspective, this capability is enacted through sensing, seizing, and reconfiguring activities (Teece, 2007; Schilke et al., 2018), which are highly interconnected in practice and collectively support opportunity identification, ecosystem mobilization, and organizational adaptation. Furthermore, the findings indicate that these activities are enabled and shaped by underlying microfoundations consisting of resources, processes and routines, organizational structures, and individual-level factors (Felin et al., 2012; Felin et al., 2015; Helfat and Peteraf, 2015). In line with recent microfoundations research, ecosystem orchestration capability emerges not from isolated organizational elements but through interactions across multiple levels of analysis involving individuals, organizations, and ecosystem relationships (Rabetino et al., 2025). The findings therefore suggest that ecosystem orchestration capability should be understood as a multi-level capability that emerges through the interaction of dynamic capability activities and their underlying microfoundations. By illustrating how ecosystem orchestration is enacted in practice, the findings provide an empirically grounded refinement of the conceptual framework and establish a basis for the theoretical implications discussed in the following chapter.

Figure 4. Revised theoretical framework. Ecosystem orchestration capability is conceptualized as a dynamic capability that is enacted through sensing, seizing, and reconfiguring activities (Teece, 2007; Schilke et al., 2018; Reypens et al., 2021; Shi and Shen, 2021; Sjödin et al., 2024). Sensing activities support the identification and evaluation of ecosystem opportunities, partners, and strategic positions; seizing activities support the validation, mobilization, and commercialization of ecosystem opportunities; and reconfiguring activities support the adaptation of organizational arrangements, governance structures, and ecosystem relationships over time. The findings further indicate that these activities do not operate independently but are enabled and shaped by underlying microfoundations consisting of resources, processes and routines, organizational structures, and individual-level factors (Felin et al., 2012; Felin et al., 2015; Helfat and Peteraf, 2015). Within the framework, microfoundations function as the underlying enabling mechanisms through which sensing, seizing, and reconfiguring activities are developed, enacted, and renewed over time. Building on and extending the multi-level microfoundations perspective proposed by Rabetino et al. (2025), the revised framework demonstrates how interactions among these microfoundations enable ecosystem orchestration capability and identifies their manifestations in ecosystem contexts through ecosystem knowledge and experience, partner networks, governance and validation routines, ecosystem coordination structures, and managerial cognition, judgment, and social relationships.

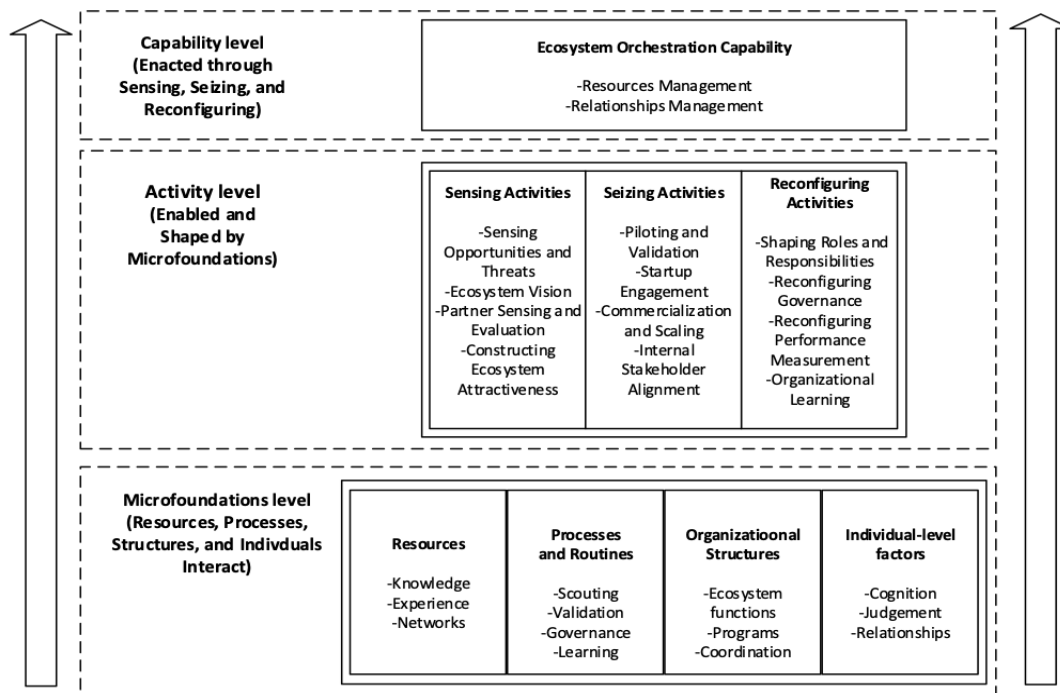


Figure 4. Revised theoretical framework.

5 Conclusions

This study examined how focal companies in industrial innovation ecosystems develop orchestration capability as a dynamic capability that supports long-term adaptation and value creation in changing environments. By integrating perspectives from ecosystem orchestration (Adner, 2017; Jacobides et al., 2018), network orchestration (Dhanaraj and Parkhe, 2006; Ritala et al., 2009; Hurmelinna-Laukkanen et al., 2018), dynamic capabilities (Teece, 2007; Schilke et al., 2018), and microfoundations (Felin et al., 2012; 2015; Helfat and Peteraf, 2015; Rabetino et al., 2025), the study addresses a key gap in understanding how orchestration capabilities are developed and enacted in practice.

The findings indicate that ecosystem orchestration capability is a dynamic and continuously evolving organizational capability that is enacted through sensing, seizing, and reconfiguring activities (Teece, 2007; Hurmelinna-Laukkanen et al., 2018; Reypens et al., 2021; Shi and Shen, 2021). Rather than occurring as discrete phases, these activities are enacted in an interconnected manner through ongoing coordination, learning, and resource reconfiguration. Furthermore, orchestration capability is underpinned by multi-level microfoundations, where organizational structures enable coordination across boundaries, and managerial cognition, managerial judgment, and social relationships drive opportunity sensing, partner engagement, and organizational transformation (Felin et al., 2015; Helfat and Peteraf, 2015; Rabetino et al., 2025).

Taken together, the study provides an empirically grounded understanding of how orchestration capability is structured and developed, offering insights into both its underlying mechanisms and its role in enabling firms to manage complexity and interdependencies in innovation ecosystems. The following sections elaborate on the theoretical and managerial implications of these findings.

5.1 Theoretical Implications

This study contributes to the literature on dynamic capabilities, ecosystem orchestration, and microfoundations by addressing the limited understanding of how orchestration capabilities are developed and enacted in practice. In doing so, it responds to two research questions: how focal firms develop ecosystem orchestration capability, and how microfoundations enable and shape this capability.

Contribution to Dynamic Capabilities and Ecosystem Orchestration

First, the study advances dynamic capabilities theory by demonstrating that ecosystem orchestration capability is enacted through continuous and interconnected sensing, seizing, and reconfiguring activities rather than a sequence of discrete phases (Hurmelinna-Laukkanen et al., 2018; Reypens et al., 2021; Shi and Shen, 2021). While prior research has often treated these dimensions as analytically separable (e.g., Teece, 2007), the findings show that they are enacted in a tightly interconnected manner through ongoing learning, coordination, and resource reconfiguration. This highlights cross-activity continuity as an important characteristic of ecosystem orchestration capability and challenges more linear interpretations of the dynamic capabilities' framework. Furthermore, the findings identify several capabilities through which sensing, seizing, and reconfiguring activities are enacted in practice, including ecosystem visioning, partner evaluation, validation, startup engagement, commercialization, internal stakeholder alignment, organizational learning, and governance adaptation capabilities. Together, these capabilities provide a more fine-grained understanding of how ecosystem orchestration capability is developed and enacted within industrial innovation ecosystems.

Second, the study contributes to understanding the sensing dimension of ecosystem orchestration capability by demonstrating that sensing involves not only opportunity identification but also deliberate strategic positioning within the ecosystem (Adner, 2017; Jacobides et al., 2018; Pihlajamaa, 2023). Rather than a purely analytical activity, sensing

is shown to include the active construction of an ecosystem role, the articulation of an ecosystem vision, and the deliberate development of ecosystem attractiveness. The findings indicate that focal firms actively signal innovativeness, communicate future growth opportunities, and position themselves as desirable collaboration partners to attract complementary actors and resources. At the same time, sensing involves the selective engagement of partners whose technologies, capabilities, and strategic objectives align with the focal firm's ecosystem vision. Consequently, sensing emerges not merely as an information-processing activity but as a strategic and relational process through which focal firms shape both their ecosystem position and the composition of the partner network that supports future ecosystem development.

Third, the study contributes to ecosystem governance literature by conceptualizing the balancing of control and openness as a dynamic managerial capability. While prior research has acknowledged this tension (Chesbrough, 2003; Adner, 2017; Jacobides et al., 2018), the findings demonstrate how firms actively manage it in practice by maintaining control over core technologies and intellectual property while fostering openness in downstream collaboration. More specifically, the findings reveal a recurring pattern in which focal firms protect upstream value-creating assets while selectively enabling downstream collaboration with ecosystem partners. This balance enables firms to simultaneously safeguard competitive advantage and expand ecosystem value creation, providing a more fine-grained explanation of how openness and control are coordinated within ecosystem orchestration.

Contributions to Microfoundations of Dynamic Capabilities

To address the second research question, the study contributes to the microfoundations literature by providing a detailed account of how ecosystem orchestration capability is developed and enacted through interacting microfoundations that jointly enable and shape ecosystem orchestration capability (Felin et al., 2015; Rabetino et al., 2025). The

findings indicate that orchestration capability emerges through the interaction of resources, processes and routines, organizational structures, and individual-level factors. More specifically, the findings identify ecosystem knowledge and experience, partner networks, governance and validation routines, organizational learning mechanisms, coordination structures, managerial cognition, managerial judgment, and social relationships as key microfoundations enabling sensing, seizing, and reconfiguring activities. In doing so, the study extends foundational microfoundations research (Felin et al., 2012) and provides empirical support for recent multi-level conceptualizations of dynamic capabilities (Rabetino et al., 2025) by demonstrating how these interacting mechanisms collectively give rise to a higher-order dynamic capability in an ecosystem context.

Importantly, the study advances recent microfoundations research by providing empirical support for the multi-level perspective proposed by Rabetino et al. (2025). While previous research has emphasized that dynamic capabilities emerge through interactions among multiple microfoundations operating across levels of analysis, empirical evidence remains limited, particularly in ecosystem contexts. The findings demonstrate how resources, processes and routines, organizational structures, and individual-level factors interact to support opportunity identification, partner mobilization, organizational coordination, and ecosystem adaptation. More specifically, the findings illustrate how ecosystem knowledge and experience, governance and validation routines, coordination structures, managerial cognition, and social relationships jointly contribute to the enactment of sensing, seizing, and reconfiguring activities. By identifying these concrete interactions and mechanisms, the study extends understanding of how ecosystem-related dynamic capabilities emerge and operate in practice.

Furthermore, the findings highlight the central role of individual-level microfoundations, particularly managerial cognition, managerial judgment, and social relationships, in enabling sensing, seizing, and reconfiguring activities within ecosystem orchestration capability. While prior microfoundations research has emphasized the importance of these individual-level mechanisms in shaping dynamic capabilities (Felin et al., 2015; Helfat

and Peteraf, 2015; Kemper et al., 2013), empirical evidence from ecosystem contexts remains limited. The findings indicate that managers play an active role in interpreting ecosystem opportunities, evaluating potential partners, and aligning ecosystem initiatives with organizational objectives. For example, managers relied on personal networks and direct interactions to identify and evaluate potential startup partners, exercised judgment when assessing technological readiness, commercial viability, and strategic fit during validation processes, and facilitated alignment between ecosystem initiatives and internal business units. The findings further demonstrate that these individual-level mechanisms interact with organizational structures, governance routines, and coordination processes, enabling focal firms to translate ecosystem opportunities into coordinated organizational action. By illustrating how managerial cognition, judgment, and relationships contribute to ecosystem orchestration in practice, the study provides a more granular explanation of how ecosystem-related dynamic capabilities are enacted and contributes to bridging the gap between macro-level capability conceptualizations and their underlying micro-level foundations.

Finally, the study contributes to ecosystem orchestration literature by linking ecosystem orchestration capability to the strategic objectives, ecosystem positioning, and ecosystem repositioning activities of focal firms (Aarikka-Stenroos et al., 2017; Hurmelinna-Laukkanen et al., 2018; Huikkola et al., 2020). While ecosystem orchestration capability is often discussed as an abstract organizational capability, the findings demonstrate how it is enacted through concrete practices related to ecosystem visioning, partner evaluation, validation, commercialization, governance adaptation, and organizational learning. Furthermore, the findings show that focal firms actively shape and reposition their ecosystem role through strategic positioning, selective partner engagement, and the balancing of openness and control. By connecting ecosystem orchestration capability to these observable managerial and organizational practices, the study provides a more practice-oriented and empirically grounded understanding of how ecosystem orchestration capability develops and operates within industrial innovation ecosystems.

Overall, the study advances understanding of ecosystem orchestration capability as a dynamic and continuously evolving organizational capability that is enacted through sensing, seizing, and reconfiguring activities. The findings demonstrate that these activities are highly interconnected in practice and collectively support opportunity identification, partner mobilization, organizational coordination, and ecosystem adaptation. In particular, the study extends existing understandings of sensing by demonstrating that focal firms actively shape and reposition their ecosystem role, attractiveness, and partner network while identifying opportunities and mobilizing complementary resources. Furthermore, the findings show that ecosystem orchestration capability is enabled and shaped by interacting microfoundations consisting of resources, processes and routines, organizational structures, and individual-level factors. More specifically, the study identifies ecosystem knowledge and experience, partner networks, governance and validation routines, organizational learning mechanisms, coordination structures, managerial cognition, managerial judgment, and social relationships as key microfoundations enabling sensing, seizing, and reconfiguring activities. By illustrating how these interacting mechanisms support capabilities related to ecosystem visioning, partner evaluation, validation, startup engagement, commercialization, internal stakeholder alignment, organizational learning, governance adaptation, and performance measurement, the study provides a more practice-oriented and empirically grounded understanding of ecosystem orchestration capability within industrial innovation ecosystems.

Taken together, the findings move beyond treating microfoundations as broad analytical categories by identifying the concrete mechanisms through which ecosystem orchestration capability is enacted. In doing so, the study provides a more granular microfoundational explanation of ecosystem orchestration capability and extends recent multi-level perspectives on dynamic capability development in ecosystem contexts.

5.2 Managerial Implications

The theoretical contributions presented above also have important practical implications. By identifying the sensing, seizing, and reconfiguring activities that underpin ecosystem orchestration capability, as well as the microfoundations that enable these activities, the study provides guidance for managers seeking to strengthen their organizations' ability to coordinate ecosystem actors, integrate external resources, and support long-term value creation. The following implications outline key managerial considerations for developing and implementing ecosystem orchestration capability in industrial innovation contexts.

First, managers should recognize that ecosystem orchestration capability is not a static organizational capability but requires continuous development through sensing, seizing, and reconfiguring activities (Hurmelinna-Laukkanen, 2018; Shi and Shen, 2021; Reypens et al., 2021). This implies that firms should establish systematic processes for identifying emerging technologies, monitoring ecosystem developments, and evaluating potential partners. Rather than approaching ecosystem engagement on an ad hoc basis, firms should institutionalize routines that support opportunity identification, partner selection, and capability development over time.

Second, the findings highlight the importance of strategic positioning and ecosystem attractiveness. Managers should actively shape their role within the ecosystem by articulating a clear and compelling vision, signaling innovativeness, and offering scalable value creation opportunities to potential partners (Adner et al., 2017; Jacobides et al., 2018; Pihlajamaa, 2023). At the same time, firms must strengthen and protect their focal position by maintaining ownership of critical core technologies and products while enabling collaboration with external actors to enhance customer value (Chesbrough, 2003; 2006). Balancing control and openness is therefore essential for achieving both value co-creation and value capture within the ecosystem.

Third, managers should develop validation capability to support the integration of external innovation. The findings emphasize the importance of evaluating opportunities through technological readiness, commercial viability, and strategic fit. Firms should establish structured validation and decision-making processes that combine formal evaluation criteria with managerial judgment and iterative feedback mechanisms to ensure alignment between external opportunities and internal strategic priorities.

Fourth, the study underlines the critical role of internal stakeholder alignment in supporting ecosystem orchestration. Managers should design organizational structures that enable cross-functional collaboration and facilitate knowledge flows across internal units and external partners. This may involve establishing dedicated ecosystem or innovation units and governance mechanisms that combine formal processes with agile practices. Ensuring alignment between business units, R&D, and senior management is essential for integrating ecosystem activities into broader organizational objectives and securing long-term organizational support for ecosystem initiatives.

Fifth, the findings emphasize the importance of individual-level microfoundations in enabling ecosystem orchestration capability. Managers play a central role through their cognition, judgment, experience, and social relationships (Felin et al., 2015; Helfat and Peteraf, 2015; Kemper et al., 2013). While prior research has highlighted the importance of managerial cognition and social networks in enabling dynamic capabilities, the findings demonstrate how these mechanisms support ecosystem orchestration in practice. For example, managers relied on personal networks and direct interactions to identify and evaluate startup partners, exercised judgment when assessing technological readiness, commercial viability, and strategic fit during validation processes, and facilitated alignment between ecosystem initiatives and internal business units. Firms should therefore invest in developing capabilities related to ecosystem visioning, partner evaluation, validation, stakeholder alignment, ecosystem coordination, and commercialization. Organizations should recognize that ecosystem orchestration depends not only on structures and routines but also on the ability of managers to interpret ecosystem opportu-

nities, build trusted relationships, and connect external opportunities with internal strategic priorities.

Finally, managers should focus on learning and adaptation mechanisms. Ecosystem orchestration requires continuous learning from both successes and failures, particularly in uncertain environments (Helfat and Peteraf, 2015; Rabetino et al., 2025). While prior research has emphasized the importance of organizational learning for capability development, the findings indicate that learning in ecosystem orchestration is increasingly formalized through documentation, milestone tracking, validation activities, and structured feedback mechanisms. For example, firms established explicit learning objectives for startup collaborations, monitored progress through predefined milestones, and used pilot projects and experimentation activities to generate knowledge for future decision-making. Organizations should establish feedback loops, experimentation practices, and knowledge-sharing mechanisms that support ongoing capability development. The findings further suggest that organizational learning should be treated as a strategic capability that links sensing, seizing, and reconfiguring activities by transforming ecosystem experiences into future capability development and decision-making.

At the same time, performance measurement should balance short-term outcomes with long-term ecosystem value creation, recognizing that ecosystem investments often require extended time horizons (March, 1991). The findings suggest that the ability to evaluate both immediate outputs and longer-term ecosystem outcomes is an important component of sustaining ecosystem orchestration capability over time.

Overall, effective ecosystem orchestration requires an integrated approach that combines strategic positioning, validation capability, internal stakeholder alignment, organizational learning, and managerial-level capabilities. By developing these capabilities alongside appropriate organizational structures, processes, routines, and individual-level capabilities, firms can enhance their ability to leverage external resources, manage eco-

system interdependencies, and sustain competitive advantage in complex innovation ecosystems.

5.3 Limitations

This study is subject to several limitations that should be considered when interpreting the findings.

First, the study adopted a qualitative multi-case research design focused on three Finnish-headquartered industrial companies. While this approach enabled an in-depth examination of ecosystem orchestration capability within real-world organizational settings, the findings should be interpreted in terms of analytical rather than statistical generalization (Yin, 2003; Eisenhardt & Graebner, 2007). Consequently, the findings may not be directly transferable to other industries, organizational settings, or geographical contexts.

Second, the study primarily relied on semi-structured interviews as the main source of empirical data. Although the interviewees represented experienced managers with direct responsibility for innovation and ecosystem activities, the findings reflect their perspectives and interpretations. As with all interview-based research, the data may be influenced by individual experiences, perceptions, and retrospective accounts of organizational activities.

Third, the participating organizations comprise multiple business units, functions, and managerial levels that may hold differing perspectives on ecosystem orchestration and innovation activities. Although the study included interviewees with extensive experience and responsibilities related to innovation and ecosystem management, it was not possible to capture all viewpoints within the participating organizations. Consequently, the findings reflect the perspectives of the selected interviewees rather than the full

range of perspectives that may exist across organizational functions and hierarchical levels.

Fourth, the study focused on the perspectives of focal firms acting as ecosystem orchestrators. While this perspective was appropriate given the research objectives, the views of other ecosystem participants, such as startups, customers, suppliers, research institutions, and public organizations, were not directly examined. Consequently, the findings primarily reflect ecosystem orchestration capability from the perspective of focal firms.

Fifth, although the study adopted a multi-level analytical perspective, the analysis focused on understanding how ecosystem orchestration capability is developed and enacted rather than establishing causal relationships between specific microfoundations, dynamic capability activities, and capability outcomes. As a result, the study identifies interactions among resources, processes and routines, organizational structures, and individual-level factors, as well as capabilities through which sensing, seizing, and reconfiguring activities are enacted in practice. However, the study does not assess the relative importance of different microfoundations or their causal effects on ecosystem orchestration capability and related organizational outcomes.

Despite these limitations, the study provides an empirically grounded and contextually rich understanding of ecosystem orchestration capability and its underlying microfoundations in industrial innovation ecosystems.

5.4 Suggestions for Future Research

This study provides an empirically grounded understanding of how focal firms develop and enact ecosystem orchestration capability within industrial innovation ecosystems. However, several avenues for future research emerge from the findings and limitations of the study.

First, future research could further develop understanding of *the microfoundations of ecosystem orchestration capability*. While dynamic capabilities research has increasingly emphasized the importance of microfoundations, understanding of the underlying mechanisms through which capabilities emerge and evolve remains limited (Rabetino et al., 2025; Koivisto, 2026). Although this study examined microfoundations through the categories of resources, processes and routines, organizational structures, and individual-level factors, the findings identified ecosystem knowledge and experience, partner networks, governance and validation routines, organizational learning mechanisms, coordination structures, managerial cognition, managerial judgment, and social relationships as important mechanisms enabling ecosystem orchestration capability. Future research could therefore investigate these microfoundations in greater depth and examine how they influence sensing, seizing, and reconfiguring activities across different ecosystem contexts. Further attention could be given to managerial cognition, networking activities, entrepreneurial judgment, boundary-spanning roles, and the interactions between individual-level and organizational-level microfoundations in enabling ecosystem orchestration capability in practice.

Second, future research could further advance *multi-level perspectives on ecosystem orchestration capability*. While this study identified interactions across ecosystem, organizational, and individual levels, it did not examine these relationships systematically. Existing ecosystem and network management literature increasingly recognizes the importance of multi-level interactions, yet understanding of how ecosystem-level structures, organizational capabilities, and individual actions influence one another remains limited (Rabetino et al., 2025). Future studies could therefore investigate how capabilities related to ecosystem visioning, partner evaluation, validation, startup engagement, commercialization, organizational learning, and internal stakeholder alignment emerge and evolve through interactions across ecosystem, organizational, and individual levels. Such research could contribute to a more integrated understanding of ecosystem orchestration.

Third, future research could further investigate *the role of ecosystem positioning and ecosystem attractiveness* within ecosystem orchestration capability. The findings suggest that focal firms do not merely identify ecosystem opportunities but actively shape their ecosystem position, attractiveness, and partner networks while sensing new opportunities. Future studies could examine how ecosystem positioning activities influence partner attraction, ecosystem participation, collaboration opportunities, and long-term orchestration effectiveness across different ecosystem contexts. Such research could contribute to a more nuanced understanding of the sensing dimension of ecosystem orchestration capability.

Finally, future research could *examine ecosystem orchestration capability through alternative theoretical perspectives* beyond the dynamic capabilities' lens. While dynamic capabilities theory provided a valuable framework for understanding how ecosystem orchestration capability is enacted through sensing, seizing, and reconfiguring activities, complementary perspectives may offer additional insights into the underlying mechanisms of capability development. For example, cognitive perspectives could provide a deeper understanding of managerial cognition, judgment, and decision-making processes (Helfat & Peteraf, 2015), while behavioral perspectives may contribute to understanding how organizational routines, learning processes, and bounded rationality shape ecosystem orchestration activities. Integrating alternative theoretical perspectives could enrich understanding of ecosystem orchestration capability and its underlying microfoundations.

Taken together, these research directions provide opportunities to further advance understanding of ecosystem orchestration capability, its underlying microfoundations, and the mechanisms through which focal firms coordinate ecosystem actors and adapt to changing innovation environments.

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