
Beyond the Hub: The Emergence of Orchestration in Healthcare Innovation Networks

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Abstract: Healthcare innovation networks comprise diverse stakeholders, are often loosely coupled, and operate in complex and uncertain environments posing significant challenges for orchestration. Extant research explores orchestration predominantly from the orchestrator's perspective, and there is limited understanding of how network members experience and collectively influence orchestration over time. We use qualitative, longitudinal data from a Nordic innovation network to investigate the collective dynamics of orchestration and answer the question of *how does orchestration unfold in loosely coupled healthcare innovation networks?* Our findings indicate that orchestration unfolds through interactions of orchestrator's and orchestratees' activities, hence revealing broader mechanisms of emergence: collective sensemaking, value integration and securing continuity. Each mechanism is driven and kept in motion by internal and external catalysts that shape the direction of the network over time. Contributing to prior knowledge, this study moves beyond hub-centric conceptualizations of orchestration and reveals relevant new dimensions and mechanisms of orchestration.

Keywords: emergence of orchestration; orchestratees; innovation networks; healthcare; orchestrator

1 Introduction

Healthcare innovation is increasingly pursued within interorganizational networks that bring together actors from the public and private sectors to tackle complex health challenges (Aarikka Stenroos et al., 2017). These networks are often loosely coupled

(Roth et al., 2024), with limited or no formal contractual obligations. At the same time, they attract diverse actors, involving organizations with differing goals, incentives, professional backgrounds, and institutional logics (Hurmelinna-Laukkanen et al., 2021). Although such diversity enables access to a broad range of knowledge, resources, and expertise, it also introduces orchestration challenges related to coordination, sustained engagement, and management of knowledge flows across organizational and institutional boundaries (Aarikka Stenroos et al., 2017; Reypens et al., 2021). These challenges are particularly pronounced when development processes are highly regulated, technologically complex and often slow, and when private sector innovation practices must be aligned with public sector requirements (Alalääkkölä et al., 2025).

The characteristic features of healthcare innovation networks challenge established views about their orchestration. Existing literature on network orchestration widely suggests that many networks are organized around hub organizations – most often private firms (Dhanaraj & Parkhe, 2006) – whose orchestration efforts are actively examined to increase understanding of how they create and extract value from network relationships (Hurmelinna-Laukkanen & Nätti, 2018; Nambisan & Sawhney, 2011). Consequently, orchestration remains predominantly theorized from the orchestrator’s perspective. While prior research does acknowledge that innovation networks comprise heterogeneous actors whose roles, engagement levels, and positions shape coordination and orchestration practices (Hurmelinna-Laukkanen & Nätti, 2018; Reypens et al., 2021; Henry & Möllering, 2023), there is limited understanding of how network members experience and collectively influence orchestration over time.

In this study, we argue that foregrounding the experiences and roles of not just the orchestrators, but also ‘orchestratees’, particularly in networks characterized by limited formal authority, is essential for understanding how orchestration occurs in practice. Hence, this study investigates the collective dynamics of orchestration in healthcare innovation networks to answer the question of *how does orchestration unfold in loosely coupled healthcare innovation networks?*

We build theoretically on innovation network orchestration literature and empirically on a longitudinal study of a Nordic healthcare innovation network. Our study contributes to earlier research by showing how orchestration entails not only orchestrator’s activities along varying dimensions (Hurmelinna-Laukkanen et al., 2022), but also orchestratees’ activities forming corresponding dimensions. Our findings demonstrate the importance of orchestratees in network formation and coordination, including shaping the orchestrator’s activities. Our study further shows that orchestration, especially in loosely coupled networks, undergoes a process of emergence: it unfolds in the interaction of orchestrator’s and orchestratees’ activities, driven by external and internal catalysts. With these insights, we advance both scholarly understanding and the practical management of healthcare innovation networks.

2 Theoretical background – Multifaceted innovation network orchestration

Network orchestration is commonly conceptualized as a hub-centric activity, in which a focal firm, or central orchestrator, coordinates and aligns network actors to facilitate value creation and appropriation (Dhanaraj & Parkhe, 2006; Möller & Halinen, 2017). Foundational studies have identified a range of orchestration processes performed by hub firms (Nambisan & Sawhney, 2011), showing how the orchestrators steer both the formation of the network and the activities within (Batterink et al., 2010). These studies

integrate the orchestrator's activities across the orchestration dimensions of mobilizing, agenda setting, network stability, knowledge mobility, innovation appropriability, and coordination (Hurmelinna-Laukkanen et al., 2022). Research has identified different types of orchestrators and their respective roles and capabilities to orchestrate varying networks (Hurmelinna-Laukkanen & Nätti, 2018; Reypens et al., 2021).

Recently, the hub has come to be understood not necessarily as a firm with commercial goals, but an organization with activities that are geared towards societal developments, such as in healthcare, possibly coming from public sector or academia (Mbitse et al., 2024; Pikkarainen et al., 2025). Likewise, it is acknowledged that orchestration can be carried out through participant-governed networks or network-administrative organizations (Raab et al., 2015; Roehrich et al., 2023). Addressing complex settings, research also covers situations where orchestrators may work in collaboration, or through rotation where hub-organizations take turns in steering the network (Davis & Eisenhardt, 2011; Hurmelinna-Laukkanen & Nätti, 2018).

The discovered fluidity of the orchestrator roles has directed scholarly interest towards the evolution of orchestration, and research emphasizes that orchestration is not static but transforms over time as innovation networks evolve (Hurmelinna-Laukkanen & Nätti, 2018). Different orchestration approaches coexist or alternate across phases of network development, with orchestration activities and orchestrator roles interacting over time (Aarikka-Stenroos et al., 2017; Paquin & Howard-Grenville, 2013). For example, Roehrich et al. (2023) show that the choice of orchestration arrangements is shaped by task complexity, and Reypens et al. (2021) find that early phases, characterized by uncertainty and high partner influx, favour more directive orchestration, whereas later phases with clearer objectives and stabilized participation enable more consensus-based coordination.

Although much of the literature remains hub-centric, it implicitly acknowledges a player-structure duality in which orchestratees can exercise agency in orchestration processes (Dhanaraj & Parkhe, 2006). Empirical studies increasingly demonstrate that actor heterogeneity shapes orchestration dynamics. Reypens et al. (2021) show that the number and diversity of network partners shape orchestration modes, and Aarikka-Stenroos et al. (2017) find that orchestration activities vary depending on actor types, positions, and phases of the innovation process. Henry and Möllering (2023) demonstrate that orchestration practices are shaped by member commitment, not just orchestrator intent. As members share knowledge, they identify new collaborative opportunities and affect orchestration practices by adjusting their engagement and expectations (Reypens et al., 2021).

Although prior studies offer some preliminary understanding of how orchestration ensues over time, gaps exist in the current knowledge and the viewpoints remain limited considering the complexities exhibited by many innovation networks, such as those in healthcare. Little attention has been paid to the initial unfolding of network orchestration, or to the experience-based perceptions of the orchestratees and their effects on the orchestration of the network (Lunnan & McGaughey, 2019; Tee et al., 2019). Considering these caveats, our study next turns to empirical evidence to extend prior theorizing.

3 Empirical evidence

3.1 Context and data collection

This study adopts a qualitative, longitudinal case study approach to investigate the unfolding of orchestration in a Nordic network, that developed from a collaborative project initiated in 2015 and was formally established in 2018. The network comprises ten partners consisting of leading hospitals, municipalities, testing hubs, and research institutions across five Nordic countries. The network aims to accelerate health-technology innovation by supporting the industry to develop their products. The partners provide companies with expertise and testing opportunities for solutions in all development phases. The scale and diversity of partner organizations led to a simple structure and a practical approach to what could be collectively offered. The network provides one contact point of entry for companies to reach partners. Once the company inquiries are received, reviewed and taken forward, testing and further contracts are conducted at the most suitable testing facility.

The network operates on invitation basis and is primarily externally funded through 3–4-year cycles, complemented by an annual partnership fee that supports coordination tasks and in-person meetings. Since establishment, partners have engaged in biweekly virtual meetings, two in-person meetings per year, and an increasing number of workshops, webinars, and one-to-one company engagement events. While externally formalized through branding and shared representation, internal organizing remains intentionally informal, relying on flexible communication, voluntary collaboration, and partner-driven efforts to improve the network. The network’s loosely coupled nature is reflected in its evolving composition, partner organizations having joined or exited over time, and in changes to their representatives (see Table 2). The loosely coupled structure, the diversity of participating organizations, and a regular schedule of activities make it a rich context for studying the unfolding of orchestration.

Table 1 Overview of data collection

<i>Data type</i>	<i>Description</i>	<i>Purpose</i>
Interviews	26 semi-structured interviews with network partners Round 1: N=11 Round 2: N=15 33-142 min each, average 85 min; total of 2211 min of recordings	To understand partner’s experiences, perspectives and interpretations of the collaboration
Participant observations	Participation in biweekly meetings (about 1 hour each; total of 158 pages), workshops, webinars, and network physical meetings over 24 months	To observe real-time interactions and how orchestration unfolds in practice
Archival materials	Meeting memos, case reports, webinar recordings, project reports; coverage: 2015-2025	To provide contextual background, trace the development of the network

Source: Authors’ own work

The data consists of in-depth interviews, observations and documents collected by the first author (see Table 1). Altogether, 26 interviews were conducted at two timepoints

over a two-and-a-half-year period (see Table 2). In addition, the data include notes from a physical partner meeting and five workshops, along with archival documentation by the project coordinators.

The first round of interviews focused on network formation and partners' initial motivations for joining. Topics included partners' goals, challenges, perspectives on the network's international dimension, collaboration and learning between partners, organizational particularities related to testing and innovation activities, and prior experiences with similar collaborations. Building on information from the first round, the second round captured perceived changes in the network, shifts in goals, network's strategic direction, participation, coordination, engagement in network activities, perceptions of the network's value, outcomes, and future aspirations.

2.2 Data analysis

The data were first viewed in a comprehensive way, constructing a chronological representation including the key events in the network development. Inspired by the theoretical gap, the data were then initially coded searching for the roles and activities of orchestratees. We used the interview transcripts and identified relevant data examples that captured their perspectives, actions and opinions in relation to the network's past, current and future activities. While predominantly focusing on the orchestratees, we also accounted for the role and influence of the orchestrator. These resulted in the identification of 8 orchestratee activities (e.g. interpreting roles) and 8 orchestrator activities (e.g. balancing viewpoints). These were further clustered into 3 orchestration dimensions for orchestratees (e.g. responsive organizing) and 3 for the orchestrator (e.g. agenda setting). While the identified dimensions for orchestrator activities were in line with prior literature (e.g. mobilizing), many of the ones for orchestratees appeared to be novel (e.g. reimagining). Representative data excerpts are presented in Table 3.

Realizing during the analyses that the identified orchestrator and orchestratee activities were linked, in the next phase, we coded the combinations of the connected orchestrator and orchestratee-specific dimensions, hence forming three mechanisms – collective sensemaking, value integration, and securing continuity – through which orchestration emerged in the network. Table 3 shows the coding structure. Finally, turning attention to the related dynamics, we further examined the constructed chronological representation focusing on events that could shift the network's operations, hence revealing internal and external catalysts contributing to the interaction of orchestrator and orchestratee activities along the identified dimensions.

Table 2 The empirical data

<i>Interviews</i>					
<i>Organization</i>	<i>Interviewee</i>	<i>Nr.</i>	<i>Duration</i>	<i>Round 1</i>	<i>Round 2</i>
Hospital testbed, FIN (2019-)	Testing and innovations manager (2019-)	2	50 min/ 125 min	04.04.2023	17.12.2025
	Innovation coordinator (2022-)	1	106 min		04.12.2025
Hospital testbed, NOR (2015-)	Testbed coordinator (2019-)	3	110 min/ 130 min/ 111 min	25.04.2023 03.05.2023	16.02.2026
	Head of innovation, technology, and e-health (2015-2024)	1	103 min	03.08.2023	
Innovation company, SWE (2022-)	Innovation Manager (2022-)	2	101 min/ 129 min	30.06.2023	25.08.2025
Consultancy, DNK (2022-2024)	CEO and partner (2022-2024)	1	52 min	03.07.2023	
Testbed, NOR (2019-)	Project coordinator (2023-)	3	142 min/ 117 min/ 34 min	04.07.2023	28.10.2025
	Testbed coordinator (2021-)			05.12.2025	
	Leader / Head (2019-)	1	101 min		19.12.2025
Accelerator, SWE (2022-2025)	Business advisor (2022-2025)	2	47 min/ 101 min	05.07.2023	02.12.2025
Network coordinator, NOR (2015-)	Project owner and coordinator (2015-)	2	47 min/ 102 min	11.08.2023	28.11.2025
Hospital, ISL (2022-)	CTO and head of innovation (2022-)	1	33 min	21.08.2023	
Hospital testbed, NOR (2015-)	Special advisor (2023-)	2	56 min/ 127 min	21.09.2023	15.12.2025
Hospital testbed, FIN (2015-)	Specialist (2021-)	1	56 min		30.09.2025
Municipality, DNK (2022-2025)	Special advisor (2022-2025)	1	114 min		15.12.2025
	Coordinator (2024-2025)	2	44 min/ 33 min		29.01.2026 03.02.2026
Testbed, NOR (2023-)	Senior advisor for innovation (2024-2025)	1	40 min		19.12.2025
<i>Participant observations</i>					
<i>Data type</i>	<i>Period</i>	<i>Nr.</i>	<i>Duration</i>		
Biweekly meeting observations	09.06.2023 – 04.04.2025	37	≈ 50 min (158 pages)		
Physical partner meetings	30.10.2023 – 31.10.2023	1	2 days		
Workshops	09.06.2023 – 04.04.2025	5	≈ 60 – 120 min		
<i>Archival materials</i>					
<i>Data type</i>	<i>Period</i>	<i>Nr.</i>	<i>Duration</i>		
(Biweekly) meeting minutes	2015-2023		≈ 400 pages		
Physical partner meeting files	2015-2024				
Webinars	2020-2025	20	≈ 60 – 120 min		
Case reports	2020-2021	4			
Project report	2022	1			

Source: Authors' own work

Table 3 Activities in orchestration emergence process

<i>Emergence of orchestration</i>	<i>Orchestration dimensions</i>	<i>Activities</i>	<i>Data examples</i>
Collective sensemaking	Orchestrates responsive organizing	Interpreting roles	I know what the companies are thinking and I know what the companies want. So hopefully I could contribute with that instead of the actual knowledge from the inside. (Innovation manager)
		Identifying commonalities	There were not that many environments [...] that I could discuss with and try to figure out how to do it the best way. So, it was very valuable for me just having colleagues that were working on the same issues and the same challenges and the same area. (Testbed coordinator)
		Becoming inspired	The value is when people meet, the value of Nordic collaboration you can't even measure, it's so high. So how to keep people active, how to learn and how to be inspired. (Testing and innovations manager)
	Orchestrator agenda setting & mobilizing	Balancing viewpoints	They're balancing their need or sort of their funders' need for progress on certain topics, and their wish for the partnership to evolve over time to more strategic topics. (Senior advisor for innovation)
		Encouraging engagement	I really try hard to listen all the time [...] what the core interests of the partners are. I really have that as a way of working instead of being a kind of manager that tries to push my own agenda [...]. So, we tried to develop it as a network, not a company. (Project owner and coordinator)
		Anticipating	A network that is just doing what they did last year is not sustainable, one needs to try to be curious about things that could be of interest to do in a group like this. At least that's my perspective, trying to push for new areas of collaboration. And of course, maybe some pending issues. I think we were pushed a bit from [the funding organization] as well. That was very good. The call, the money they offered for international work maybe started that discussion a bit quicker than what it would. (Project owner and coordinator)

Value integration	Orchestrates owning the strategy	Sharing to learn	How other hospitals are doing it in the Nordic, learn from them, use some of the processes that [the network] has built, and just leverage their experience. (CTO and head of innovation)
		Seeking transparency	We have to take time in the meetings to actually present and say: 'This is what the company needed, this is how we did the test, these are the obstacles and the problems that we met. And this is how we solved it.' (Testbed coordinator)
		Advocating for own interests	I think that my perspective was that we had to have more one-on-ones. I think that was mainly one of the things we were talking about in that workshop and we got more one-on-ones after that. [...] I asked for something and then we got something. So, for me I think that was very effective. (Coordinator)
	Orchestrator supporting network stability & knowledge mobility	Taking initiatives	We need to push all the time because the partners as such are interested and not in the driving position. They show interest and follow up when we do things, but it's very much dependent on our initiatives when it comes to development [...] We are very much trying to find new initiatives, push for things. Of course that's our role. (Project owner and coordinator)
		Framing interaction	We have dedicated schedules, so we are meeting every 2 or 3 weeks to go through these testing proposals. [...] and then we are meeting face to face two times a year. So that kind of activities, that are continuously taking place throughout the years, they really bring us close together (Testing and innovations manager)
		Leveraging partner diversity	We have sent out an interview guide to all the partners that we have had interview with to fill in information about their test site, location, services, everything we need to kind of map it up and had that talk that this is what we need to be able to talk about you and find companies that are relevant for your test facilities. So the more you give us, the better marketing we also can do. (Testbed coordinator / Project coordinator)

Securing continuity	Orchestrates reimagining	Recalibrating expectations	Maybe I don't need a lot of requests and companies, maybe it's enough that it's a network for case sharing experiences and good practices as well as information channel as well as PR channel. (Special advisor)
		Taking on new challenges	We can see how this is evolving, not only within the network, but within each partner. How they work with testing regarding the, it's a lot of things happening also in Europe on this regard to rules and regulations and how can we adapt to that in the test services that we provide. That is really interesting. And now also AI and everything that is coming, AI act, we have a lot of things that we need to build competence within. So why not do it jointly? It's much easier. (Leader/ Head)
	Orchestrator coordinating & ensuring appropriability	Adjusting	I think they would love if the partners are more active and [...] really own the strategy and the goals and that they are more active [...] we need some financing to do that because all the partners do not have time and not budget to do it. But if we apply for some money that we can kind of have each of us be paid or have some money, project money, to develop this project. (Leader/ Head)
		Upskilling	Ending the first period of external funding [...] we had to rethink a lower cost base for the collaboration, how we could streamline it better. Now we are utilizing the new funding to maybe grow and become a bit bigger to be more sustainable. (Project owner and coordinator)

Source: Authors' own work

4 Findings

The above-described steps led to developing a framework that elucidates the unfolding of orchestration in healthcare innovation networks. The framework with the orchestration dimensions from the viewpoints of orchestrators and orchestratees, internal and external catalyst events, and the mechanisms of orchestration emergence is illustrated in Figure 1. The discussion below explains these findings in detail.

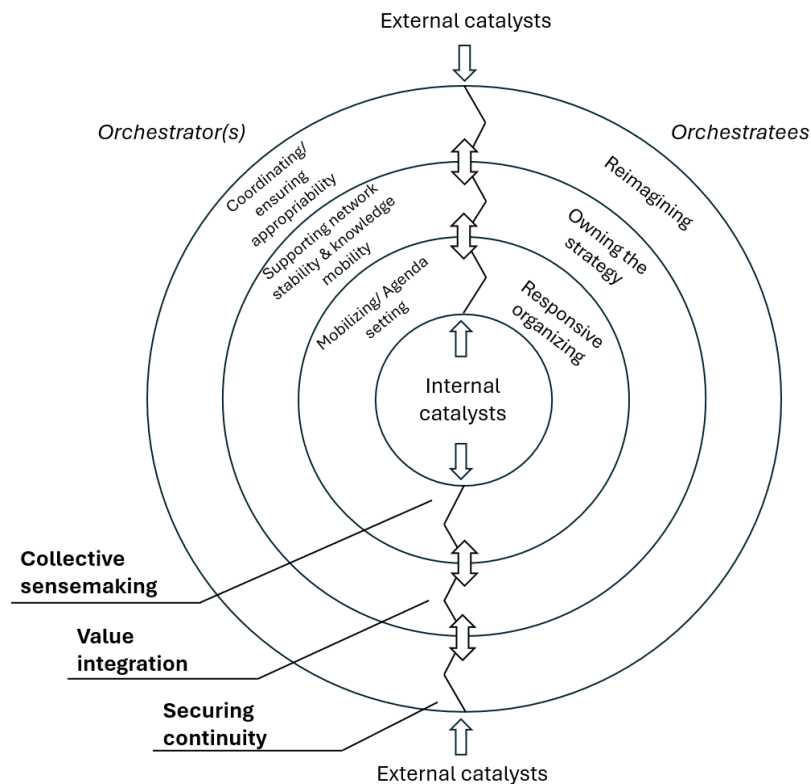


Figure 1 Emergence of orchestration

4.1. Dimensions and activities of orchestration

4.1.1. Orchestratees responsive organizing

Our findings show that the orchestratees have an influential role in how the network is built and how its purpose is defined. The network's heterogeneous composition, including testbeds, municipalities, research institutes, and other organizations, means that each partner plays a distinct role, based on a specific viewpoint and capabilities. As the orchestratees get involved in the activities of interpreting roles, identifying commonalities, and becoming inspired, they exercise responsive organizing as an orchestration dimension.

Through the activity of *interpreting roles*, both during the formation of the network and through subsequent structural changes (new organizations or representatives joining), partners enact their own roles and define the role of the network for their organization. These are interpreted differently by each partner based on the value brought by the network to their organization. Partners make sense of their role in relation to their level of involvement in the network's core activities (i.e. testing), their response to emerging needs (e.g. AI), and changing conditions (e.g. network direction change). The roles evolve over time, shaped by the evolution of the network itself, the maturation of the health-technology testing field, and the partners' growing expertise, which influences their contributions:

"I think I was one of the more active partners. I felt maybe more responsibility for many years because we have the role that we had from the start." (Testbed coordinator)

The testbed activities have been developing in parallel across the Nordic countries, and most partners encounter similar challenges, require similar tools, and draw on similar experiences. Through biweekly meetings, partner presentations during webinars and events, workshops and on-site physical meetings, network members engage in the activity of *identifying commonalities*. These commonalities do not simply create opportunities for collaboration; they shape the orchestration process by setting the strategic direction of the network:

"We do consist of a group of partners with whom there is potential to work more strategically together on selected areas. So, there's potential which I think we should explore more." (Senior advisor for innovation)

Becoming inspired manifests in forming perspectives and concrete responses to the network activities. There is a connection between inspiration and diversity, as exposure to different organizational practices, perspectives, and approaches have led to new ideas and motivated engagement. Partners with a company-oriented perspective have inspired the network to cultivate a stronger sense of urgency and to become more proactive. Others do the same by demonstrating their ability to conduct projects under stringent conditions, showcasing practices and standards to reach:

"That's such a backbone [...] building culture and trust between the partners and getting inspired by how other people solve different things." (Testbed coordinator/ Project coordinator)

4.1.2. Orchestrator's agenda setting and mobilizing

In line with the orchestratees' responsive organizing, the orchestrator engages in agenda setting and mobilizing. The purpose is to form common goals, create priorities, and engage the network to pursue them. Under this orchestration dimension we identify three core activities.

Balancing viewpoints involves managing the network's diversity to facilitate sharing different viewpoints about roles, contributions, capabilities, and interests. *Encouraging engagement* is necessary as the network has a partner-driven concept dependent on the partners' own volition to engage and develop the network with informal, open communication and voluntary participation in the network activities, meetings, and events. *Anticipating* builds on the view that a network operating in the same way year after year is not sustainable. They continuously scan for new areas of collaboration,

emerging opportunities, and ways to address unresolved issues, while stressing the importance of collectiveness:

“It's something we need to think actively [...]: to make sure that everybody is seen and heard and that we meet their interests.” (Testbed coordinator/ Project coordinator)

4.1.3. *Orchestrates' owning the strategy*

For orchestrates, owning the strategy involves activities of sharing to learn, seeking transparency, and advocating own interests. Partners actively contribute to the network's funding applications, and many details are raised and agreed upon during the biweekly meetings. Partners introduce potential new members, suggest themes and topics for discussion, and take ownership of the strategic direction of the network. These contributions spill over to board meetings where decisions are validated by simple majority.

Sharing to learn involves a mutual expanding of the partners' capabilities. During both interview rounds, partners expressed a desire for more opportunities to network amongst each other, to discuss different test cases across countries, and share experiences. Many partners emphasize their common tasks, such as regular test protocols, test reports, and contracts with companies. Issues that initially appeared as individual challenges faced by partners within their respective countries often evolve into collective problems, prompting sharing to learn and implement the same inquiry forms, pricing mechanisms, interview protocols and case handling tools:

“I think the network inquiry form was a little bit inspired by ours. We also have been working on it for the past 10 years or so. [...] I'm happy with both, with ours and with the network's.” (Testing and innovations manager)

Operating in the health-technology innovation landscape is challenging due to complex and evolving regulations, possible public-sector resistance to innovation, funding constraints, and lengthy assessment processes. This gives rise to the activity of *seeking transparency*. As testbed activities have historically developed in parallel across the Nordic countries, resulting in diverse operational models, service offerings, and accumulated experiences, partners emphasize visibility to the underlying complexities when working with rapidly developing health-technology solutions:

“We have the same EU regulation and a lot of similarities when it comes to ethics approvals, laws and regulations. It could be more of a discussion arena on how to solve, how to be a good partner for an industry in practice.” (Senior advisor for innovation)

As partners gain experience and maturity within the network, they become more vocal in *advocating for own interests*, and about desired improvements. Due to the network's loosely coupled nature, partners decide individually their level of engagement in network activities, which can change as roles evolve, needs shift, and adjustments are made within the network:

“I addressed quite early on that I just don't have the time to sit every other week to talk about just cases. I was missing sort of strategic discussions. [...] They made quite quickly some changes to the meetings, which I thought was good.” (Special advisor)

4.1.4. Orchestrator supporting network stability and knowledge mobility

The orchestrator exhibits responsiveness to the orchestratee activities by supporting network stability and knowledge mobility. While all practices do not lead to the desired outcomes, *taking initiatives* plays a key role in incentivizing engagement by keeping ideas alive and identifying new ways to operationalize those that partners consider valuable. In response to partners' ongoing interest in increasing knowledge sharing, *framing interaction* involves creating new avenues for exchange, including workshops and, more recently, thematic groups where partners can share experiences, insights, and concrete practices. The orchestrator also supports knowledge mobility through thorough documentation of all network interactions and by regularly following up on the strategic areas identified by partners. From the inception of the network to its most recent activities, the orchestrator has consistently *leveraged partner diversity*, initiating discussions on how to best showcase the partners and their services. Pursuing clear internal understanding among partners regarding what each organization can offer supports making the most of their diverse competences:

“It's very partner-driven concept. They have meetings twice a year and we put up for discussion what to do next and they actually are the ones deciding what to do together. [...] It's the partners and what brings value to them. It's very honest discussion.” (Project owner and coordinator)

4.1.5. Orchestratees reimagining

Reimagining involves orchestratees taking on new challenges and recalibrating expectations. By *taking on new challenges*, orchestratees engage with emerging developments, such as AI testing, international expansion, need-driven innovation, testing in municipalities, and the formation of new thematic groups. These developments are often triggered by changing external needs and conditions, prompting the network to adjust its structures, priorities, and roles. For instance, with the rapid advancement of AI and the rise in company inquiries for AI-related testing, partners held workshops and knowledge-sharing sessions to identify challenges and explore possible approaches. One partner organization participated in a separate international AI-testing project which enabled them to advance rapidly in this area. This progress added competence to the network:

“Not totally failed, but we did not reach the moon. [...] We only got like a broken bounce and then a nice landing. But we learned a lot. Looking back, we gained so much out of it. And now we are in the top three well-being services counties to execute AI. Maybe we'll get to the moon with the next rocket.” (Testing and innovations manager)

By *recalibrating expectations*, partners recognize their growing expertise but also understand that substantial changes to established practices require time. This maturity has made them more realistic about what can be achieved both within the network and as a network, and more appreciative to the lessons learned even if outcomes differ from expectations:

“I think the biggest difference is experience, that I understood what to expect. [...] understanding what to get from the network, to understand what I need from the network and what is possible.” (Special advisor)

4.1.6. *Orchestrator coordinating and ensuring appropriability*

In response to the orchestratee reimagining activities, the orchestrator coordinates through adjusting to the changing needs and ensures appropriability through upskilling partner capabilities. Coordination is *adjusted* in response to current developments, external changes, and feedback from partners and companies. For example, the orchestrators have individual check-in interviews to monitor progress, gather feedback, and understand each partner's status. In relation to the network's new international direction, the orchestrator hired an additional staff member primarily responsible for supporting the network's international activities. The orchestrators also undergo *upskilling* activities ensuring a comparable level of professionalism across network partners in testing health-technology solutions, ensuring that all partners can benefit from the knowledge shared and the collectively developed tools and practices:

“The more important part is to professionalize the way testbeds are run, support the development of this functionality, making it easier in general for companies to get the right contact. I think we have succeeded to a very high degree in that during these years.” (Project owner and coordinator)

The orchestrator is also open to stepping back from their role to allow new forms of orchestrating to develop under the responsibility of orchestratees. To reduce the need for a central coordinator, they have discussed a rotating model between orchestratees and are working on automating administrative work.

4.2 *Emergence of orchestration*

Our findings indicate that orchestration in loosely coupled healthcare innovation networks does not unfold as a clearly defined or centrally imposed structure but through complex interactions amongst orchestrators and orchestratees. These interactions involve activities carried out by both orchestratees and the orchestrator along relevant dimensions, forming broader mechanisms of emergence: collective sensemaking, value integration and securing continuity (see Figure 1). Each mechanism is driven and kept in motion by internal and external catalysts that shape the direction of the network over time.

4.2.1. *Mechanisms of orchestration emergence*

Collective sensemaking encompasses orchestration dimensions of orchestratee responsive organizing, and orchestrator agenda setting and mobilizing (see Figure 1). Collective sensemaking was prominent during the initiation of network operations and is recurring when there are new circumstances to be interpreted. When new partners join the network, they undergo a phase of sensemaking to understand the network and their own role in it.

Value integration is characterized by interaction between orchestratees owning the strategy and the orchestrator's efforts to support network stability and knowledge mobility. This interaction generates space and opportunities for knowledge sharing and value co-creation, such as in connection to exploring funding opportunities.

Securing continuity reflects the mutually reinforcing influences of orchestratees reimagining and orchestrators coordinating and ensuring appropriability. Beyond ensuring smooth and consistent core network operation, it concerns the network's efforts to be relevant in the future. With increasing orchestratee experience and with testing health-technology innovation, both capabilities and value appropriation expectations

evolve. These mechanisms may occur in parallel and influence each other, for example with securing continuity setting in motion changes in collective sensemaking and value integration. These dynamics are prompted and shaped by varying catalysts.

4.2.2. Catalysts of orchestration emergence

Increasing healthcare challenges, regulatory processes, rapidly evolving digital health-field, and diversity of healthcare stakeholders add dynamic layers of complexity to network operations. While orchestration has an identifiable beginning, its emergence is best understood as a cyclical, interlayered process rather than a linear one (Figure 1). Our findings suggest that there are changes occurring within and outside the network that serve as catalysts for the mechanisms of orchestration emergence.

Internal catalysts involve partners moving into new roles or entering and exiting the network. Exit of an active, particularly competent partner led to shifts in network interaction dynamics as the parties assumed additional responsibilities to compensate for the absence, (re)igniting the value integration mechanism. The effect of internal catalysts depends on an orchestratee's level of engagement, with low engagement indicating weak disruptive effect. For example, with several new partners joining in 2023, existing partners conducted operations as usual, without a new cycle of collective sensemaking; established partners could rely on well-established tools and practices within the network to guide new partner integration.

External catalysts can be more disruptive compared to internal ones, prompting new mechanisms of orchestration emergence due to higher levels of uncertainty. They introduce new knowledge, challenges or opportunities that are not incorporated in the existing practices within the network. The growing number of company inquiries seeking to test digital and AI-based solutions exemplifies an external catalyst. It reactivated collective sensemaking, as orchestratees identified common limitations while the orchestrator encouraged engagement to collectively address these issues. This was followed by value integration, when orchestratee and orchestrator efforts were united in creating a strategic direction for the network to be able to test such digital solutions and integrate their value at the network level. However, as most advancements were pursued individually, the relatively low collective engagement needed to be counteracted with enhanced knowledge sharing to allow value integration. As part of securing continuity, the orchestrator initiated a joint funding application focused on AI, cybersecurity, and patient data security, inviting partners to work on it collectively. This initiative provided an opportunity to engage more systematically in developing and testing AI-related solutions and products together, feeding back to value integration. Most partners jointly prepared the funding application, taking ownership of the changing network strategy.

Another example of an external catalyst is the pandemic, which sparked a new cycle beginning with collective sensemaking. Through exercising responsive organizing, orchestratees interpreted the changing conditions and identified shared challenges. In parallel, the orchestrator engaged in agenda setting and mobilizing, creating space and opportunities for more systematic discussions. The interactions between the orchestrator and the orchestratees evolved to a cycle of value integration where the orchestrator created the means and embedded the orchestratees' efforts into tangible outcomes. This led to introducing "home hospitalisation" as a potential focus area of the network. Many of the practices were subsequently adapted as the network's ongoing activities even after the crisis subsided, showcasing securing continuity.

Across the findings, it can be seen how orchestratees actively shaped orchestration by selectively engaging with coordination practices, proposing alternatives, or redefining expectations of collaboration. In the loosely coupled network, external catalysts in particular, prompted actors to reassess their fit with the network's activities, leading them to either realign priorities through increased involvement or, alternatively, to disengage or exit the network. As a result, the network's trajectory emerged through successive reorientations, indicating that orchestration operates by embedding orchestratee expectations into cyclical coordination and engagement, with the orchestrator engaging in the interactive process in a responsive way.

5 Discussion and conclusions

5.1 Theoretical contributions

This study contributes to existing discussion on innovation network orchestration in several ways. First, our study moves beyond hub-centric conceptualizations of orchestration by showing that orchestration emerges through member agency rather than being centrally imposed. Orchestratees actively legitimize, reshape, resist, and direct orchestrator's coordination efforts. This insight advances recent work on member commitment and responsiveness (Henry & Möllering, 2023) and extends portrayals of orchestration as adaptive and responsive (Reypens et al., 2021; Henry & Möllering, 2023). Rather than being adapted solely by orchestrators, orchestration is co-produced. Accordingly, the orchestrator's role shifts from directing action to interpreting progress, legitimizing priorities, and deciding when and how to intervene.

Second, our study describes in detail different types of orchestration dimensions and their activities. While our findings align with activities of the orchestrator-led orchestration dimensions observed in prior research (Hurmelinna-Laukkanen et al., 2021), we identify orchestratee-led orchestration dimensions (e.g. reimaginging) and activities (e.g. becoming inspired), which to our knowledge, have not been previously documented. These centre the focus on how network member organizations experience and collectively influence orchestration.

Third, connecting to research that highlights the conditioning role of partner diversity in orchestration (Hurmelinna-Laukkanen et al., 2021; Aarikka-Stenroos et al., 2017; Reypens et al., 2021), our study shows how diversity is generative in collective sensemaking, inspiring, and motivating contributions but demanding for the orchestrator in terms of value integration. The diverse orchestratees comply with orchestration not because the hub possesses formal authority, but because they perceive orchestration efforts as competent, neutral, and aligned with their interests. While prior studies propose the idea of orchestrators needing to convince members with different motivations to collaborate and see the network's value (Paquin & Howard-Grenville, 2013; Henry & Möllering, 2023), our empirical insights show that in a loosely coupled network, value is acknowledged by network members from the start and re-evaluated with growing expertise and maturity. Despite flexible commitment and engagement of orchestratees, they recognize the value of the network – even when exiting.

Fourth, our study reconceptualizes orchestration as an emergent outcome of multi-actor interaction. By doing so, it advances lifecycle perspectives on orchestration (Aarikka-Stenroos et al., 2017; Hurmelinna-Laukkanen & Nätti, 2018), showing that orchestration emerges through the orchestratee-orchestrator interactions triggered by

catalyst events and environmental complexity. In this regard, our study resonates with wider discussion on emergence that comprises new additions to existing features, presence of catalysts, and the influence of complexity and uncertainty in systems (Vargo et al., 2023). Our study suggests that orchestration gains new forms over time exhibiting recurring emergence of orchestration mechanisms, triggered by varying internal and external catalysts.

5.2 Practical implications

This study offers several practical insights for managing loosely coupled, multi-actor innovation networks in healthcare. First, we posit that partner-driven networks should emphasise the activities and influence of the network members instead of focusing solely on the role of the orchestrator. Orchestration strategies should be adapted to partner diversity and their engagement level. Selective engagement can be leveraged to co-produce effective coordination rather than viewed as obstacles, ultimately directing the network trajectory. The detailed account of how orchestration emerges in practice can be leveraged by new actors entering existing networks or forming new ones, helping them anticipate challenges, choose relevant activities, and understand contributions.

Second, the emergent and relational characteristic of orchestration, unfolding through interactions, engagement choices, and negotiated contributions of network members, should motivate orchestrators to support and leverage the roles and contributions of orchestratees. The identified orchestratee-led orchestration dimensions can guide orchestrator support to specific orchestratee activities, depending on the related challenges and opportunities, or to step back and allow orchestratees to work based on their internal motivation.

Third, the discovery of emergence of orchestration suggests that practitioners should be aware of the shifts between different orchestration mechanisms and their potential triggers. The identified orchestratee and orchestrator dimensions, and their subsequent activities provide a roadmap for how to react to different catalysts.

5.3 Limitations and future research directions

As this study is based on a single and context-specific case (healthcare innovation; Nordic), the findings should be interpreted with caution. Hence, the identified orchestration dimensions and the associated activities call for verification and validation using other methods across different sectors, contexts, and countries.

Content-wise, we chose to focus here on elaborating the orchestratees' activities, but our findings also point toward orchestrator-led dimensions possibly exhibiting some new features when they interact with orchestratees' activities. Future studies could investigate the anticipating and future-envisioning focus in orchestration, and how stepping back may become a relevant activity for orchestrators. Moreover, building on our view on orchestration as a process of emergence, future research could identify between the types of emergence (e.g. weak vs strong) in network orchestration. In a similar vein, future research could investigate in more detail the types of catalysts and their influence on orchestration. These research directions may enhance understanding of fast-changing networked innovation.

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