Designing Digital Service Innovation Hubs:
An Ecosystem Perspective on the Challenges and Requirements of SMEs and the Public Sector
Research Paper

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Abstract. Service ecosystems reshape service innovation by enabling value co-creation among diverse actors. However, small and medium-sized enterprises and public organizations face significant challenges navigating and leveraging these ecosystems due to resource constraints, knowledge gaps, and partnership difficulties. While digital innovation hubs have been introduced as potential intermediaries to foster innovation, existing models primarily focus on individual solutions and networking rather than orchestrating service innovation. This study investigates the design of a digital service innovation hub as an orchestrating entity that facilitates service innovation within ecosystems. Under the design science research paradigm, we analyze the challenges faced by small and medium-sized enterprises and public organizations and derive design requirements for these hubs. Based on 17 expert interviews and focus group validations, we define the problem space and provide a requirements catalog for designing digital service innovation hubs as a step towards providing holistic support for service innovation initiatives.

Keywords: service innovation, ecosystem, innovation hubs, SMEs, public sector

1   Introduction

Service innovation is increasingly integral to today's economy, constituting over two-thirds of total value added by German companies (Beverungen et al. 2020) and generating value that extends beyond purely economic dimensions (Coutelle-Brillet et al. 2014). Enabled by advancements in digital technologies (Burström et al. 2021), service innovation often unfolds within non-hierarchical, modular, and dynamically evolving networks (Jacobides et al. 2018) – commonly referred to as *service ecosystems* – where diverse actors coordinate under shared institutional structures and co-create value (Vargo & Lusch 2016). Such ecosystems offer substantial potential for innovation by pooling varied resources and capabilities (Kohtamäki et al. 2019).

A small manufacturing firm in rural Germany, for instance, might wish to develop a new predictive maintenance service to enhance its product offerings and drive competitiveness. While the firm can secure basic analytics tools and form ad hoc partnerships with local universities or technology vendors, its limited internal resources and fragmented collaborations complicate efforts to institutionalize newly acquired knowledge and sustain long-term service innovation. Such a scenario illustrates the systemic barriers that small and medium-sized enterprises (SMEs) and public organizations face, including constrained budgets, skill gaps, and fragile networks (Radziwon & Bogers 2019, Simonsson & Magnusson 2018, Chen 2024).

Digital Innovation Hubs (DIHs) have emerged as a policy-oriented approach to support organizations along their digital transformation journey (Maurer 2021, Crupi et al. 2020). Although these hubs typically provide training, infrastructure, and matchmaking services, they often focus on discrete technological solutions rather than on the broader orchestration of service innovation across an ecosystem (Asplund et al. 2021, Sassanelli & Terzi 2022*a*). As a result, DIHs often lack the frameworks and mechanisms needed to guide SMEs and public entities in continuously refining, introducing, and reconfiguring resources for new value propositions (Butter et al. 2020).

To address these limitations, this study introduces a *Digital Service Innovation Hub* (DSIH) concept that expands the traditional DIH model beyond technology adoption. Building on service innovation theory (Skålén et al. 2015), the DSIH takes on a structured orchestrator role, actively coordinating multi-actor activities in order to foster more robust and holistic innovation processes. Our research applies the echelon Design Science Research (eDSR) approach (Tuunanen et al. 2024) within a larger design science research (DSR) project (Peffers et al. 2007), iterating through problem analysis, objective and requirement definition, and initial solution ideation (Heinz et al. 2024). Through 17 expert interviews with SMEs and public organizations, we identified three meta-requirements (MRs): (1) orchestrating the right partners and collaborations, (2) facilitating effective knowledge exchange, and (3) providing sustained implementation support.

In doing so, this paper clarifies the challenges that SMEs and public entities encounter in ecosystem-oriented service innovation, provides a structured overview of design requirements for a DSIH, and demonstrates how this new framework extends the capabilities of existing DIHs. Thereby, we offer a practical blueprint for organizations aiming to leverage digital ecosystems as catalysts for ongoing service innovation.

2   Related Work

SMEs consistently report technological, organizational, and human resource obstacles in servitization and digital service innovation (Peillon & Dubruc 2019, Burton et al. 2024); mastering advanced technologies requires competencies and investments they often lack (Hoffmann & Schröder 2019, Kolagar et al. 2022, Rapaccini et al. 2024). Public organizations encounter similar barriers, compounded by budgetary limits and regulatory complexity (Figenschou et al. 2024, Brunswicker & Vanhaverbeke 2015). Yet research on how public actors (can) participate in service ecosystems remains limited.

Service ecosystems are dynamic configurations in which diverse actors coordinate, exchange, and integrate resources to co-create value through mutual service exchange

(Vargo & Lusch 2016). These configurations enable new value propositions by refining, introducing, or reconfiguring resources and practices with ecosystem partners (Skålén et al. 2015, Sklyar et al. 2019), amplifying innovation outputs by pooling varied knowledge bases and capabilities (Jacobides et al. 2018, Kolagar et al. 2022). Although design methods for such ecosystems have emerged – e.g, the SOS-Design framework and related toolkits that model actor roles, competencies, and value exchange (Robra-Bissantz et al. 2022, Robra-Bissantz 2024) – SMEs still struggle to engage because of low digital maturity, limited networks, and rigid organizational structures (Kolagar et al. 2022, Radziwon et al. 2016). They therefore need dedicated support mechanisms.

Recognizing this gap, research highlights the need for a mediating entity – an orchestrator – that aligns participants around shared value propositions (Lingens et al. 2021) across technological, economic, institutional, and behavioral layers (Autio 2022), balancing iterative and time-bound innovation logics (Poblete et al. 2022). This orchestrator's structural configuration must be aligned with the specific characteristics and governance needs of the (emerging) ecosystem (Reischauer et al. 2021). In this context, DIHs were introduced to provide training, matchmaking, and technical assistance to SMEs (Crupi et al. 2020, Sassanelli et al. 2021). However, many DIHs concentrate on either isolated solutions for discrete technological challenges or largely unspecified partner networks rather than offering tailored solutions for ecosystem-oriented service innovation (Butter et al. 2020, Sassanelli & Terzi 2022a). Although some DIHs facilitate partner searches or provide platforms for cooperative knowledge exchange, their usual lack of neutrality and superficial stakeholder connection limit long-term, cross-sector collaboration (Crupi et al. 2020, Sassanelli & Terzi 2022a). Real-world DIHs, such as JOSEPHS (2024) in Nuremberg and LESSIE (2024) in Leipzig, illustrate aspects of such orchestration, both aiming to facilitate innovation and cross-sectoral networking through publicly open events, structured formats, and collaborative initiatives (Roth & Jonas 2018). Yet, they lack formal mandates for orchestrating service ecosystems.

Building on these insights, we conceptualize a DSIH as an ecosystem orchestrator that not only guides cross-organizational collaboration but also supports iterative innovation cycles and sustains innovation for actors such as SMEs and public institutions. Although initiatives like JOSEPHS and LESSIE provide valuable inspiration, a systematic formalization of the underlying design knowledge of a DSIH is still lacking. Echoing Lingens et al. (2021), the critical task is to articulate and instantiate design principles that align heterogeneous actors and address persistent SMEs and public sector constraints. By systematically analyzing related challenges and requirements, this study seeks to formalize the mechanisms through which orchestrators can enable resource reconfiguration, knowledge exchange, and joint value creation in service ecosystems.

3   Methodology

We adopt the eDSR approach (Tuunanen et al. 2024) because its modular, iterative structure matches the complexity of the multi-actor environment in which DSIHs operate. In contrast to linear frameworks such as the design science research methodology (DSRm) (Peffers et al. 2007), eDSR embeds validation within every echelon, enabling continuous reflection on emerging design knowledge. Figure 1 shows the five echelons.
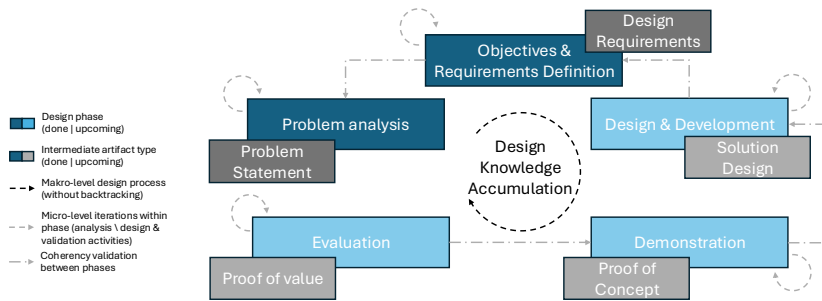
Figure 1. Methodological framework of this study based on Tuunanen et al. (2024)

Our study concentrates on the first two echelons – problem analysis and objectives/requirements definition – to decompose DSIH design into manageable units. A DSIH orchestrates actors, resources, and institutional aspects towards service innovation; its design must therefore evolve with the surrounding ecosystem. Accordingly, we (1) identify core challenges of service innovation in ecosystems and (2) derive design objectives that position the DSIH as an effective and adaptive orchestrator. We validate each echelon with the criteria of Tuunanen et al. (2024), assessing problem solvability and stakeholder relevance in echelon 1 and the coherence, completeness, and operationality of requirements in echelon 2.

To ground these echelons empirically, we conducted 17 semi-structured interviews with SMEs and public institutions between August 2024 and January 2025 (Table 1). Participants, recruited through practitioner networks at five universities, represented diverse experiences in digital service contexts without narrowing the scope to a specific sector or role type. Interviews were audio-recorded with consent and transcribed verbatim (Myers & Newman 2007). As our study unfolded, we iteratively adjusted our questioning to explore emerging concepts and continued data collection until theoretical saturation was reached (Corbin & Strauss 1990). Each interview followed a two-part structure aligned with the two focal echelons. The interview guide was structured to capture insights on organizational innovation processes, partner collaboration, and perceived challenges and requirements in digital service innovation. Rather than assessing existing hubs, questions sought to identify unprompted needs and expectations, thus avoiding premature fixation on specific designs, which is why we did not include DIH representatives at this stage.

For *echelon 1 (problem analysis),* interviewees described innovation processes, obstacles, and collaboration strategies. Following the Gioia method (Gioia et al. 2013), we generated first-order concepts (reflecting verbatim statements), distilled second-order themes (emerging patterns), and formed aggregate dimensions (core challenges), which were then validated and refined in a 60-minute focus group with six experienced service researchers. For *echelon 2 (objectives and requirements definition),* participants reacted to a deliberately open DSIH concept, articulating expectations, requirements, and concerns that addressed the previously identified challenges. Using the same coding procedure, we compiled a requirements catalogue and validated it in additional focus groups, drawing on kernel theories of service ecosystems and orchestration (e.g. Vargo & Lusch 2016) to inform interpretation of empirical patterns.

Table 1. Overview of interviews conducted with SMEs and public sector organizations

ID	Sector	Organization	Role	Length
I1	SME	IT Industry, AI Software Supplier for Machine and Plant Manufacturers	Project Coordinator	0:53h
I2	SME	IT Industry, Digitalization of Power Grid	Client Relationship Manager	0:49h
I3	SME	IT Industry, Product Mining Software	CTO, Chief Data Officer	0:56h
I4	SME	IT Consulting	Senior Consultant IT-Management	0:41h
I5	SME	IT Consulting	Functional Lead and Manager	0:49h
I6	SME	Start-Up in Consulting Services	Managing Director	0:36h
I7	SME	Digital Services (VR Solutions)	Managing Director	0:33h
I8	SME	Machine Manufacturer	Management & Head of Organizational Development and Strategy	1:09h
I9	SME	Logger Manufacturer	Head of Product Management	0:53h
I10	SME	Machine Manufacturer	Managing Director	0:43h
I11	Public	Public Institution	Digital Change Manager	0:35h
I12	Public	Public Institution	Head of Digital Transformation	1:02h
I13	Public	Public Institution	Head of the Economic Development Agency	1:02h
I14	Public	Youth Welfare Office	Head of Division	0:56h
I15	Public	Kindergarten	Director	0:38h
I16	Public	Regional Craft Association	Head of Innovation	1:10h
I17	Public	Data Space Initiative in Cultural Sector	Project Coordinator	0:47h

The resulting design knowledge for DSIH is thus anchored in empirically substantiated problem statements and rigorously derived design objectives, providing a solid foundation for subsequent echelons of the eDSR process.

4 Challenges and Design Requirements

4.1 Challenges Faced in Service Innovation

Our analysis, following Gioia et al. (2013), revealed four aggregate dimensions of challenges faced by SMEs and public organizations in service innovation in service ecosystems: (1) **exogenous** and (2) **intraorganizational factors**, (3) **knowledge and skills**, and (4) **partnerships**. Each dimension contains distinct yet interrelated second-order themes (in *italic*) derived from first-order concepts identified in interviews.

Exogenous factors are external conditions organizations must adapt to but cannot control, including technological advancements, market dynamics, and regulations. Interviews revealed three key themes: the *evolving role of IT*, the *speed of market developments*, and *legal challenges*. The *evolving role of IT* brings opportunities and uncertainties. Organizations must adapt rapidly to the *speed of digitalization and digital transformation. Uncertainty regarding the role of providers due to AI-driven solutions* highlights challenges in positioning as AI automates services. This shift is further complicated by the convergence of *business and IT functions*, especially in less digitized organizations, accelerating the *speed of market developments*. As I5 noted, innovations have "a much higher impact" but quickly become outdated. Technology hype cycles add volatility, increasing investment risks in trends that may not yield lasting value. *Legal challenges* hinder digital and AI-driven innovation as regulations lag behind technology, creating compliance uncertainties: "But how are some laws digitally represented if there has never been a precedent?" (I12). Strict data protection rules further limit potential: "We are in a very specific market [. . .] which is regulated and places high demands on data protection. [. . .] We, therefore, cannot use customer data to develop new offerings." (I2). The public sector faces rigid constraints, as I15 noted: "It is strictly regulated how many professionals must be assigned to specific tasks with children, making innovation difficult within these predefined structures."

Intraorganizational challenges, while specific to individual entities, significantly impact SMEs' and public organizations' participation in service ecosystems. The interviews highlight three key constraints on collaborative innovation and ecosystem opportunities: *organizational culture*, *organizational framework*, and *financing and monetization*. SMEs and public organizations often lack a service innovation-oriented *organizational culture*. Employee resistance, especially near retirement, is common: "I am two years away from retirement. Why should I change anything?" (I15). Customer skepticism toward radical innovations and general distrust in digital transformation further hinder digital service integration. The *organizational framework* constrains service innovation through poor change management and outdated digital infrastructures. Many SMEs and public organizations rely on legacy systems without structured adaptation processes. Resource shortages worsen the issue, as I14 noted: "We are really struggling with our IT, and internally, people already say: 'Who even applies for IT jobs at the district administration? Who wants to work here?' How can we attract the innovative people we need if we can't even find committed IT specialists?" Additionally, a lack of operational understanding hampers efficient technology integration. *Financing and monetization* pose major innovation barriers. I17 noted: "The greatest challenge for the sustainable long-term operation [of innovations] is securing funding." Bureaucratic hurdles restrict public funding access, while undefined financial incentives create uncertainty, discouraging long-term investments.

Knowledge and skills reveal critical gaps regarding two key areas: *Methodological service innovation competences* and *digital competences*, limiting the ability of SMEs and public organizations to engage effectively in ecosystem-driven innovation. SMEs and public organizations often lack *methodological service innovation competences*, with limited expertise and no structured decision-making processes: "decisions mostly come from the specialist department, and we have no systematic method to structure bottom-up innovation processes – we handle them ad hoc" (I15). Missing evaluation mechanisms hinder measuring innovation success and ecosystem impact. *Digital competences* are unevenly distributed, hindering seamless integration and knowledge exchange: "Digitalization topics are always associated with uncertainty because people do not know how to apply them due to lacking skills in this area." (I16). Gaps in emerging technologies, especially AI, prevent effective data-driven innovations.

Interorganizational **partnerships** are crucial for service innovation in ecosystems, yet SMEs and public organizations face significant challenges in establishing and maintaining them. The interviews highlight three key areas of difficulty: *collaboration*, *matchmaking*, and *networking*. Effective *collaboration* is hindered by diverse communication preferences, competitive reluctance to share data, and unclear role boundaries affecting quality standards. Non-uniform vision statements further complicate the alignment of shared innovation objectives. *Matchmaking* challenges hinder ecosystem collaboration. I17 noted: "It would actually be great to have a platform that systematically connects those who belong together so that we could find partners much faster." Organizations struggle to find stakeholders, align innovation paces, and assess team and cultural fit. Without structured matchmaking, much innovation potential remains untapped. *Networking* barriers limit access to relevant contacts and complicate stakeholder management, especially for resource-constrained SMEs and public organizations. I15 noted: "This is

really the big problem: we actually need much more exchange beyond district boundaries with other institutions, but there is no proper structure for this." The lack of networking infrastructures prevents synergy and experience sharing. I17 added: "We rely on cross-regional partnerships, but this is all very unsystematic and based on coincidences. This really needs to be systematized."

4.2 Requirements for a Digital Service Innovation Hub

While these challenges hinder ecosystem-driven innovation, DSIHs can help if they address these obstacles effectively. The analysis of the interview data and the focus group led to the identification and refinement of three MRs for DSIHs. These include (1) **orchestrating actors**, (2) **facilitating knowledge transfer**, and (3) **ensuring effective implementation and provision**. Each requirement is detailed and empirically substantiated by quotations in Table 2 and implicitly or explicitly addresses key challenges to service innovation.

Table 2. Design requirements for a digital service innovation hub

Design Objective	Design Requirement	Source
MR 1: Ecosystem Actor Orchestration: The DSIH should facilitate the identification of potential partners and orchestrates collaboration.		
DO1: Connecting potential partners for collaboration projects	DR1.1: The DSIH should include a variety of actors with different backgrounds	I2: "partnerships, especially with SMEs and mid-sized companies that have similar challenges" I3: "An exchange on funding programs or joint activities with universities could (...) be [of relevance]."
	DR1.2: The DSIH should possess an AI matching partners of interest	I17: "So that people do not just randomly come across each other but, if necessary, also in a AI-based manner."
	DR1.3: The DSIH should allow for actors to search/-filter for specific criteria	I2: "It would be useful to have a filter function that allows me to set the type of partner I am looking for. For example, a partner who has industry knowledge or more in the direction of consulting."
	DR1.4: The DSIH should have their actors' most important contacts listed to ensure direct communication	I15: "That everyone is integrated and that I would have direct contact details or contact options on the platform. [So, a kind of infrastructure that shortens communication paths and clearly presents them would be interesting for me. It could help me see who might support me further. Something like this does not yet exist [as far as I am aware] – at least not on a supraregional level.]"
DO2: Fostering collaboration	DR1.5: The DSIH should enable actors to connect for funding opportunities	I6: "Facilitating matchmaking for funding programs would also be a highly interesting area, in my opinion. That way, the budget comes along with it, which is particularly exciting for medium-sized businesses, especially if it has already proven effective."
DO3: Fostering actor engagement	DR1.7: The DSIH should clearly communicate the benefits an engagement in the community entails	I17: To convince a district administrator to participate in the DSIH, "the benefit for organizations must be clearly stated".
MR 2: Knowledge Transfer: The DSIH should provide knowledge and enables structured knowledge exchange formats.		
DO4: Enabling interorganizational learning for knowledge transfer	DR2.1: The DSIH should enable and facilitate the exchange of knowledge and experience between different organizations	I17: "Then perhaps also an exchange opportunity with similar projects [. . .], where it is recognized that they work in similar fields, have similarly designed or complex project structures, and similar stakeholder or partner structures, so that synergies can somehow be created and exchanges can take place on challenges and best practices."
	DR2.2: The DSIH should have formats which promote the exchange of knowledge and experience (e.g., a forum)	I15: "Where there might also be various forums – digital ones – that could be set up accordingly for different questions and main topics, facilitating better contact."
	DR2.3: The DSIH should include a representation of success stories accomplished by the ecosystem's actors	I6: "They described how they implemented this with telecommunications corporations, and the way they framed it sounded really exciting to me."
	DR2.4: The DSIH should enable organizations to share their successful implementations of specific technologies or methods to foster acceptance	I12: "Because often, of course, the internal leadership holds the responsibility—not only morally but also in terms of motivation—to carry out the project. However, when highly specialized external experts are involved, particularly those specifically trained in such topics, it enhances acceptance."
	DR2.5: The DSIH should enable organizations to recommend each other when they are of relevance	I6: "You often get approached with, 'Hey, I know someone doing something similar—you should talk to them.'"

Table 2 – continued from previous page

DO5: Selecting and providing relevant and fitting content	DR2.6: The DSIH should provide current, scientific content	I5: "If universities manage to position themselves practically and develop useful solutions for real-world application, I believe they can generate significant impact".
	DR2.7: The DSIH should include trending topics of interest	I5: "External perspective, new developments, new trends."
	DR2.8: The DSIH should include domain-specific content	I16: "What topics might currently be relevant for craft businesses, and then we quickly look for an expert."
	DR2.9: The DSIH should provide different methods required for Service Innovation	I15: "Through [systematic] methods, it might also be possible to create something uniform that each provider can access as needed within their own scope."

MR 3: Implementation and Provision: The DSIH should be implemented and provided in a way that is attractive to SMEs and public.

DO6: Implementing an engaging DSIH	DR3.1: The technical implementation of the DSIH should be intuitively understood by users	I15: "Make it as intuitive and simple as possible so that as many professionals as possible, even with minimal digital or other expertise, can access it."
	DR3.2: The DSIH should include IT-Support	I14: "What would also be great is if there were a functioning technical support."
	DR3.3: The DSIH should possess a documentation	I14: Requirements for documentation and tracking everything (documentation updates classified as 'very high').
	DR3.4: The DSIH should possess both – AI-Supported and Non-AI-Supported – functionalities. The use of AI should be possible, but not mandatory	I14: "Sometimes I don't need it; I just want quick information. But when I face a challenge, I might need a human counterpart to guide me through it, provide an exchange, and offer input."
	DR3.5: The DSIH could provide modular solutions to the customer	I11: "However, there is no dedicated modular system; the current approach is entirely different."
DO7: Providing a System with a clear Pricing Structure	DR3.7: The DSIH should have a formalized offering, including structure, pricing and type of engagement expected	I2: "It is essential that the hub reaches a critical minimum size to attract as many partners as possible." I5: "What is expected of us, and what are our responsibilities?"
	DR3.8: The DSIH should be flexible and respond to demand. (Also referencing the pricing structure.)	I3: "This is already quite useful and helpful, but in our current phase, we utilize it only when there's a real necessity, as we need to operate in an agile manner."
	DR3.9: The DSIH should include regional and specialized competence centers	I14: "These shared spaces would be extremely important, particularly as competence centers that enable networking. (...) Simply because in-person discussions and personal interactions are fundamentally different from a 'digital network' alone."
	DR3.10: The DSIH should promote the practical application of (methodological/technical) knowledge acquired through the community	I5: "Because, for example, you can also test things with students." I5: "An interface would be useful so that you can check whether the issue is even relevant."
	DR3.11: The DSIH should include further service options, depending on their relevance for the ecosystem actors	I11: "Corporate financing up to potential pilot projects."
	DR3.12: The DSIH should provide incentives for organizations to interact and share their knowledge	I17: "[It is important] to first get an overview of the added values, the technical requirements needed to connect, the necessary data, exchange opportunities, or synergies, and what added value emerges from this."

MR1: Ecosystem Actor Orchestration One of the most pressing challenges identified is the difficulty SMEs and public organizations face in establishing and managing partnerships within service ecosystems. To address this, a DSIH must provide mechanisms that facilitate *matchmaking and partner mediation*, *collaboration*, and *ecosystem engagement*. A key requirement is the *matchmaking and mediation of partnerships*. Interviewees emphasized the need for structured support in identifying suitable partners, both within and outside their industries. While some organizations seek collaboration with peers facing similar challenges, others highlighted the importance of connecting with research institutions or startups to gain complementary expertise. To enable this, participants proposed two approaches: an AI-driven automated matchmaking system and a search/filter function allowing users to define selection criteria such as service offerings, project experience, and company profiles. Direct access to contact information was seen as crucial for fostering direct communication. Beyond that, *collaboration* formats must be actively facilitated. Participants suggested that structured forums, such as expert mentoring programs, targeted discussion forums, and funding partnerships, would enhance the organizations' ability to co-develop service innovations. To avoid being perceived as just another networking platform, the DSIH must clearly define and communicate its benefits. Interviewees stressed that a well-articulated value proposition is essential for driving *engagement*, as organizations may be reluctant to participate.

MR2: Knowledge Transfer A second key requirement involves structured knowledge transfer to address gaps in methodological and digital expertise. The interviews identified two primary design objectives in this category: (1) *enabling interorganizational learning for knowledge transfer* and (2) *selecting and providing relevant, tailored content. Enabling interorganizational learning* focuses on facilitating structured knowledge exchange between organizations to bridge expertise gaps. Interviewees emphasized learning from peers, particularly startups and innovation-experienced organizations. Essential elements include feedback mechanisms, best practice dissemination, and structured exchange formats such as discussion forums and expert mentoring. Moreover, showcasing and discussing successful service innovation cases was seen as crucial in shifting organizational mindsets and fostering the adoption of new technologies and methodologies. Participants noted that such initiatives could also help overcome skepticism toward digital transformation, particularly among employees resistant to change. The second design objective, *selecting and providing relevant and fitting content*, addresses the challenge that existing research and methodological knowledge are often not tailored to the needs of SMEs and public organizations. To bridge this gap, the DSIH should curate and disseminate applied research, industry trends, and domain-specific insights, making them accessible and actionable. Additionally, interviewees expressed a need for structured guidance on service innovation methodologies, particularly in areas such as business model restructuring and strategic service development.

MR3: Implementation and Provision Ensuring that the DSIH is effectively implemented and sustainably maintained is essential for its adoption and long-term success. Participants emphasized the need for an elaborate *implementation* and a clear *provision and pricing structure*. The first design objective, *implementation*, emphasizes the need for a user-friendly and accessible format that accommodates diverse organizations, including those with limited digital expertise. Interviewees expressed concerns about implementation complexity and stressed that an intuitive design, comprehensive documentation, and dedicated IT support are critical for adoption. While AI-driven functionalities were recognized as potentially valuable, participants highlighted that their use should be optional rather than mandatory. Furthermore, modular software solutions were suggested as a means to provide adaptable tools that meet the specific needs of different organizations. The second design objective, *provision and pricing structure*, focuses on establishing a sustainable operational framework. The DSIH should provide a formalized structure with defined engagement formats, pricing models, and participation expectations. While no single approach was universally favored, there was broad agreement on the need for regional competence centers that collaborate while maintaining distinct areas of specialization. Interviewees emphasized the need for an interface to assess topic relevance and mechanisms to retain knowledge, such as collaborations with university students. Additional service ideas were seen as optional, while incentives were deemed crucial to encourage participation from established organizations.

5 Discussion and Conclusion

This research advances the conceptualization and design of DSIHs as orchestrating entities for service innovation in service ecosystems by applying the eDSR approach

(Tuunanen et al. 2024). Our study both confirms and enriches prior insights on service innovation barriers, emphasizing the need for more comprehensive support structures in increasingly complex ecosystem environments. Further, we extend DIHs, traditionally concentrating rather on technology deployment or digitalization initiatives, by defining DSIHs as central entities that facilitate ecosystem-based service innovation initiatives.

5.1 Barriers to Ecosystem-Based Service Innovation

Technological, market, and regulatory developments frequently drive uncertainty for organizations – particularly SMEs and public entities – seeking to innovate within service ecosystems. Although prior studies acknowledge the inhibitory effect of environmental volatility on innovation (Burton et al. 2024), our work highlights how these exogenous factors manifest within ecosystems, where diverse and interdependent actors must rapidly adjust to external shifts. For example, interviewees noted that heightened business-IT convergence (Kitsios & Kamariotou 2021) demands digital integration capabilities that many resource-constrained organizations lack. Rapid market shifts, shifting customer expectations, and regulatory barriers (e.g., data privacy) further elevate perceived investment risks. Thus, exogenous factors do not merely create hurdles but actively shape strategies and priorities in service ecosystem collaborations.

Our findings emphasize that cultural, structural, and financial limitations significantly impede service innovation within SMEs and public organizations. Although previous research has discussed these factors individually (e.g., Hoffmann & Schröder 2019, Lerch & Moll 2020), we show that organizational culture often amplifies other structural and financial difficulties. Where leadership does not prioritize innovation, staff remain under-resourced, digital initiatives fail to receive the necessary funding, and change management is weak. Public organizations face similar hindrances, compounded by bureaucratic complexities in obtaining resources and implementing change. Such internal constraints can be even more detrimental in an ecosystem context, where organizations must coordinate with multiple partners that also face their own constraints, thereby adding new layers of uncertainty and complexity.

We also confirm the enduring challenge of inadequate digital competencies for service innovation (Heinz et al. 2022). Notably, this shortfall is especially problematic when collaborations cross organizational boundaries. SMEs and public entities lack systematic methods to conceive, develop, and implement new service offerings within a multi-actor context (Anke, Pöppelbuß & Alt 2020, Pöppelbuß et al. 2022); for example, they may struggle to integrate disparate data sources or adopt best practices for user-centered service design. Echoing calls for structured support in digital transformation (Anke, Ebel, Pöppelbuß & Alt 2020, Butt 2020), our results underscore that service ecosystems require specialized technology and interorganizational coordination competencies.

Finally, our study highlights the multifaceted difficulties associated with collaboration in an ecosystem. Participants pointed to misalignments between actors and inadequate matchmaking mechanisms as key inhibitors of joint service innovation, confirming previous findings (e.g., Wei et al. 2020; Guertler & Sick 2021). While the importance of collaboration and competition for service innovation is widely known (Bacon et al. 2020, Kohtamäki et al. 2019), our empirical results reveal how these issues intensify in

a highly networked environment. Networking deficiencies compound these challenges, as SMEs and public organizations often rely on informal connections despite networks being fundamental to service ecosystems (Vargo & Lusch 2016). Effective ecosystem orchestration thus requires a balance between formalized and flexible structures to align goals and foster collaboration in an ecosystem.

5.2 Designing DSIHs for Ecosystem-Based Service Innovation

The derived MRs show how a DSIH should be designed to provide tailored offerings and connect diverse actors for ecosystem-based service innovation. The first MR underscores the DSIH as an active orchestrator, extending the existing knowledge on DIHs beyond ad hoc matchmaking or loose networking. In addition to offering partner directories, advanced filtering, and AI-based recommendation engines (DR1.2-1.4), DSIHs should integrate multiple collaboration mechanisms, manage shared funding avenues (DR1.5), and provide transparent communication channels that reduce transaction costs and build trust among potential partners. This emphasis details orchestrating capabilities discussed in the academic discourse on DIHs and shows that more mechanisms than matchmaking should be implemented to facilitate ecosystem-based service innovation. Referencing Section 2, described DIHs like JOSEPHS or LESSIE may complement a DSIH by anchoring ecosystem development in concrete, experience-oriented formats that support accessibility and adoption for ecosystem-based service innovation.

MR2 envisions the DSIH as a catalyst for learning. Rather than merely housing static information or toolkits as described in the DIH literature (Sassanelli & Terzi 2022*b*), it should foster knowledge co-creation through formal and informal opportunities like talks about real-world success stories that illustrate tangible pathways to innovation (DR2.3-2.4). By incorporating reflective practices and showcasing replicable examples, DSIHs can overcome the frequent inertia that arises from uncertainty or skepticism, thereby stimulating more confident, evidence-driven experimentation. This implies that DSIHs should curate and tailor their content selection to reveal the balance needed between domain-specific content addressing immediate needs and novel perspectives.

Finally, MR3 highlights the practical and long-term viability of a DSIH. Interviewees consistently emphasized the importance of user-centric design and the availability of support (DR3.2-3.4), both online and offline. Related requirements around pricing and physical competence centers (DR3.7–3.12) reflect the necessity of blending digital platforms with in-person interaction. This is not always seen as a prerequisite in the DIH literature (e.g., Sassanelli & Terzi 2022*a*). MR3 suggests that DSIHs should establish trust- and relationship-building mechanisms for ecosystem-based service innovation.

While the MRs reflect how DSIHs should be designed for ecosystem-based service-innovation, the different expectations of public organizations and SMEs have to be highlighted: First, while a matchmaking algorithm was generally desired, Public organizations brought to attention the fact that they still must launch a tendering process even if matchmaking exists beforehand. Further, they expressed uncertainty about the regulations potentially hindering cooperation started via a paid DSIH. While this is to be expected due to the limited funding of some public institutions, it should be considered additionally when designing a DSIH.

5.3 Limitations and Future Research

While this study provides empirically based insights, several limitations warrant further investigation. First, although our sample included both SMEs and public sector organizations, which showed a high degree of consistency in their challenges and requirements, public entities may face unique regulatory or structural constraints not fully captured in this analysis. Future research could refine DSIH design knowledge to address potentially divergent requirements, such as public procurement regulations or stricter privacy mandates. Second, we focused on the first two echelons of the eDSR approach, focusing on problem analysis and objectives definition (Tuunanen et al. 2024). While this approach offers rigorous empirical grounding, subsequent research should proceed to later echelons to translate our conceptual findings into validated artifacts. Piloting an actual DSIH in a real-world ecosystem would be highly informative, shedding light on adoption dynamics, performance outcomes, and long-term viability. Examining service innovation within the DSIH through the lens of continuous value shaping (Böhmann et al. 2025) could also be of interest. Third, while our study deliberately focused on potential beneficiaries of DSIHs, future research should include perspectives of those managing existing DIHs. Comparing their practices, mindsets, and structural logics with the identified requirements could clarify complementarities or tensions between DIHs and DSIHs, which could inform decisions about possible integration, co-existence, or differentiation of hub models. Moreover, large-scale survey studies could complement our interview-based, qualitative findings to test the generalizability of identified challenges and requirements across broader populations or different industry verticals. Comparing DSIHs to other potential solutions (e.g., open innovation labs or public-private accelerators) may also yield useful insights into which design configurations are most effective under varying conditions (e.g., resource availability, sectoral maturity). Such investigations would refine the blueprint we propose, helping researchers and practitioners create robust pathways for service innovation. In addition, future studies could further examine the scoping challenges involved in designing partner directories to support meaningful actor matchmaking – particularly regarding the appropriate granularity of partner profiles and the modular composition of service architectures, including pricing logics. We encourage further exploration and real-world implementation of the DSIH concept, anticipating that adaptive, orchestrating entities will become increasingly vital in fostering ongoing, cross-sectoral service innovation.

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