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Dynamics of value proposition in emerging B2B platform ecosystems

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ABSTRACT:

Digital platforms are reshaping industrial value creation; however, the mechanisms through which value propositions emerge in early-stage business-to-business (B2B) ecosystems remain inadequately theorized. This thesis investigates how diverse stakeholders co-create and progressively refine value propositions in an emerging Finnish biogas platform that spans three Ostrobothnian regions. The study employs an interpretivist abductive single-case design grounded in Service-Dominant Logic and platform-ecosystem theory. Twenty semi-structured interviews with farmers, municipal officials, technology providers, biogas producers, and industrial users were analyzed using the Gioia methodology, which traces first-order actor narratives to second-order theoretical themes.

The analysis identifies three interlocking processes: stakeholder-driven value co-creation, platform-enabled value proposition, and external forces that shape platform evolution. Each process is supported by distinct mechanisms such as boundary resource design, trust-building routines, and regulatory sense-making. Together, these processes constitute a dynamic capability termed governance-enabled resource integration, through which architectural decisions, actor engagement, and institutional negotiations co-evolve before strong network effects emerge. The resulting process model clarifies the meso-level "missing middle" between the abstract axioms of Service-Dominant Logic and the technical governance choices foregrounded in platform research.

The study advances theory by (i) integrating micro-level boundary resources with macro-level institutional dynamics, (ii) reframing value propositions as relational and co-evolutionary constructs, and (iii) demonstrating how power, trust, and reverse-value risks influence B2B platform trajectories. The findings provide platform orchestrators with a staged roadmap encompassing discovery, design, rollout, and upscaling while helping balance openness with control and sustain complementor engagement in sustainability-oriented industries.

KEYWORDS: B2B platform ecosystem, Digital platform, value proposition emergence, value co-creation, Service-Dominant Logic, stakeholder, actor engagement, emerging B2B platform

FOREWORD

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Disclaimer:

This thesis is based on original research and was completed under the guidance of my supervisor. Artificial Intelligence (AI) tools were used solely to enhance grammar and improve the clarity and logic of the text.

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Abbreviations

VCC- Value Co-Creation
VC- Value creation
VP- Value Proposition
AE- Actor Engagement
B2B- Business to Business
B2C- Business to Customer
P2P- Peer to Peer
D2C- Direct to Customer
API- Application Programming Interfaces
IoT- Internet of Things
SDKs- Software Development Kits
IIOT- industrial Internet of Things
VIE - Value Idea Emergence
VPC- Value Proposition Creation

1 Introduction

The beginning of the digital age has brought about a paradigm shift in the structure and operations of contemporary business models. More and more businesses are leading transformation into the platform-based model, which has risen as the dominant structure in the digital economy (Alstyne et al., 2016). The digital platform, characterized as an adaptable digital infrastructure that facilitates interactions between multiple consumer groups, e.g., producers and consumers, has changed how value is created and distributed across sectors. Consequently, the digital platform has created ecosystems where developers, users, complementors, and platform owners work together to generate and seize value (Constantinides et al., 2018; Tiwana, 2014).

Notable is that various digital platforms such as Google, Apple, Amazon, and Facebook, among many others, have been known to register a high level of creating value through the orchestration of the economy, affording technology, and leveraging their infrastructural resources. It has also been observed that digital platforms have made their profit by effectively utilizing network effects and the innovation of third-party partners, thereby enhancing their capacity to scale up the business (Cusumano, 2019). However, it is important to consider that the research around platforms, especially digital platforms, has shown that almost 85% of the new digital platforms are neither able to attain sustainable success nor have the potential to scale up their economy (Boston Consulting Group BCG, 2023). The vast difference in successful business models shows a need to understand the value model created by the business organizations in developing an economy.

1.1 Background Study

In recent years, platform ecosystems have emerged as a transformative force in digital business strategy, enabling firms to move beyond traditional linear models toward more distributed, collaborative, and scalable forms of value creation (Gawer & Cusumano, 2014; Jacobides et al., 2018). While extensive research has been conducted on platform

dynamics in business-to-consumer (B2C) contexts, the unique characteristics and developmental challenges of business-to-business (B2B) platform ecosystems remain underexplored (Latinovic & Chatterjee, 2024; Schreieck et al., 2021). These ecosystems are marked by intricate interdependencies among heterogeneous actors, such as producers, technology providers, municipalities, and regulatory bodies, who collaboratively co-create and adapt value propositions over time (Gomes et al., 2022; Vargo & Lusch, 2016).

In contrast to established ecosystems with solidified positions, governance, and technological standards, emerging B2B platforms are subject to institutional and technological uncertainties and dynamic stakeholder relationships (Adner, 2017; Tiwana, 2015). In these contexts, value propositions are not predefined offerings from a single company. Instead, they are collaboratively developed through mutual adaptation, resource integration, and ongoing feedback among stakeholders (Budde et al., 2024; Kapoor et al., 2021). This aligns with a broader shift from a firm-centered to an ecosystem-centered value logic, where value creation is a distributed process that digital platforms facilitate and orchestrate (Cennamo et al., 2020; Kenney et al., 2019).

This study investigates how value propositions are co-created and evolve in the context of emerging B2B platform ecosystems. By drawing on the theoretical lenses of service-dominant logic (Vargo & Lusch, 2016). The research aims to identify the mechanisms, challenges, and strategic decisions influencing platform-based value creation's early development and sustainability in industrial settings.

1.2 Motivation of the study

Although digital platforms are acknowledged as vital channels for innovation and value co-creation today, their implementation in industrial and B2B environments presents distinct challenges. Most studies have focused on well-established platform ecosystems. At the same time, much less emphasis has been placed on the early phases, where uncertainty is most significant and strategic choices have profound long-term

implications (Shi et al., 2021). New B2B platforms face hurdles such as institutional uncertainty, divided stakeholder interests, and underdeveloped technological infrastructures as they work to create viable value propositions (Hawlitschek & Hodapp, 2024).

Furthermore, the gap between theoretical frameworks and practical implementation of value co-creation strategies remains substantial, with practitioners encountering difficulties like building trust, achieving partner alignment, and concerns about platform control issues that current academic perspectives overlook (Madanaguli et al., 2023). This research addresses these gaps by exploring how value propositions are collaboratively developed in emerging B2B platform ecosystems. Through a detailed analysis of a real-world industrial case, the study aims to enhance both theoretical insights and practical knowledge for companies striving to establish sustainable and inclusive digital platform strategies in new ecosystems.

1.3 Research Question

This thesis's central issue is the lack of empirical understanding of how value propositions emerge and evolve in early-stage platform ecosystems where B2B interactions, public interests, and sustainability goals converge. In these cases, value is not predefined by a central platform owner but must be co-constructed through interaction, negotiation, and experimentation among diverse actors. This is especially critical in renewable energy and biogas, where coordination failures can stall innovation and systemic transitions. If left unaddressed, the assumptions of mature platform design may be misapplied to contexts that require bottom-up, collaborative approaches to value creation. In response, this study poses the following research question:

- How do stakeholders co-create and evolve value propositions in emerging B2B platform ecosystems?

This central question is further discovered through three sub-questions:

- How do stakeholder interactions shape the formation of a shared value logic in the early stages of platform development?
- What role does the digital platform infrastructure play in enabling or constraining value co-creation?
- How do external factors—such as regulation, infrastructure, and market dynamics—influence the evolution of value propositions?

1.4 Thesis Structure

This thesis is organized as follows:

- **Chapter 1** introduces the study, presents the background, motivation, and research questions, and outlines the structure of the thesis.
- **Chapter 2** reviews the literature on digital platforms, value co-creation, and platform ecosystems.
- **Chapter 3** describes the research methodology, data collection, and analytical framework used to explore the co-creation processes.
- **Chapter 4** presents empirical findings from case studies of emerging platform ecosystems.
- **Chapter 5** discusses the implications of the findings for theory, practice,
- **Chapter 6** presents the conclusion and limitations

2 Literature Review

This chapter comprehensively explores the scholarly work on the digital platform ecosystem, emphasizing how the value proposition is co-created and dynamically evolves through stakeholder engagement and what factors influence this joint evolution. The main objective of this literature review is to establish a theoretical foundation for understanding the evolutionary process of value proposition within the emerging business-to-business (B2B) platform ecosystem. While foundational platform literature has primarily focused on Business-to-Consumer (B2C) models, B2B platforms have distinct dynamics regarding value creation, actor engagement, and stakeholder governance. In contrast to B2C contexts, where users play a comparatively passive role in consuming value, B2B platforms involve enterprise users, developers, service providers, and institutional partners who are more deeply engaged in co-designing, negotiating, and continuously shaping value propositions.

Particularly, five topics are addressed in this chapter in light of existing scholarly contributions to strengthen the validity of the central and sub-research questions. First, to outline the foundational concept of platform ecosystems, elaborating on the multi-sided B2B configurations that act as complex value creation mechanisms compared to other business model classifications (e.g., B2C, D2C, P2P, etc.). Second, it examines the concept of value proposition, tracing its evolution from firm-centric approaches to dynamic ecosystem-based concepts emphasizing co-dependence and affiliation among actors. Third, the literature on value co-creation is reviewed, exploring how actors collaboratively influence the formulation, adaptation, and redefinition of value propositions through ongoing interactions that include mechanisms like open innovation, feedback integration, and modular design participation. Fourth, it also covers actor engagement, including cognitive, emotional, and behavioural dimensions, which drive the stakeholder participation decisions and platform development trajectories. Finally, it explains the identified research gap and research opportunities.

2.1 Understanding Platform Ecosystems

2.1.1 Definitions and Core Concepts

Platform ecosystems have emerged as dominant organizational structures in technology-intensive markets, illustrated by their instinctive design that enables interaction among distinct categories of users, setting them apart from business and innovation ecosystems[1] (Jacobides et al., 2018). The core of the platform ecosystems is a shared digital infrastructure or common base, which enables a diverse set of independent participants to develop modular and complementary innovations that collectively form a unified value offering (Adner, 2017; Kapoor et al., 2021). Unlike innovation ecosystems, which are typically organized around the development of a specific innovation, platform ecosystems are not bound to a singular innovation objective; they are instead structured around the technological core that supports continuous and distributed innovation.

These ecosystems usually have technology-enabled digital platforms facilitating interactions among and between various stakeholders, including producers, consumers, developers, and third parties (Parker, 2016; Tiwana, 2014). The effectiveness of platform ecosystems lies not only in their technological foundation but also in the dynamic network of complementary actors who often collaborate in a dynamic or decentralized way to generate and sustain value (Jacobides et al., 2018).

Platform ecosystems are dynamic and evolve, often shifting from firm-centric models to more distributed, network-oriented configurations through “platformisation"[2] (Poell et al., 2019). These ecosystems typically involve a diverse set of participants, including

[1] Business ecosystem revolves around the company and its business environment, while the innovation ecosystem is merely focus on new specific innovation and the complementors that assists in its development.

[2] Platformisation is defined as the penetration of infrastructures, economic processes and governmental frameworks of digital platforms in different economic sectors and spheres of life, as well as the reorganisation of cultural practices and imaginations around these platforms

platform owners (orchestrators), end-users or enterprise customers (such as manufacturers, consumers, and distributors), third-party complementors (developers or service providers), and sometimes regulatory or institutional actors. Each stakeholder plays a distinct role in co-creating and capturing value within the ecosystem (Schreieck et al., 2021).

2.1.2 Core characteristics

The contemporary platform-ecosystem literature converges on four interdependent design principles that collectively build ecosystem scalability and resilience. First, modularity constitutes the architectural criteria as the formulation of a stable technological core with a loosely coupled boundary, which permits the incremental recombination of components and ongoing system evolution (Peng et al., 2023). Second, Boundary resources, including openly documented applications like programming interfaces (APIs), software development kits, and formalised data-sharing protocols, further operationalise this modularity by lowering entry barriers for complementors while preserving the platform owner's ability to steer architectural integrity (Schreieck et al., 2021). Third, building on these foundations, network effects discuss positive feedback loops, in which each marginal participant enhances aggregate value even though such effects simultaneously produce early-stage coordination problems commonly referred to as the "chicken-and-egg"[3] dilemma (Nerbel & Kreutzer et al., 2023). Finally, the ecosystem's capacity to align autonomous actors, which is secured through distributed governance, is characterised by the diffusion of decision rights and the reliance on collectively sanctioned rules and standards(Jacobides et al., 2018). These four principles explain how platform ecosystems maintain coherence while accommodating continual technological and organisational adaptation.

[3] The chicken and egg problem in marketplaces refers to the challenge of attracting both buyers and sellers to the platform. The problem arises because buyers won't use the marketplace if there aren't enough products or services available, and sellers won't join if there aren't enough buyers

2.2 Types of Platform Ecosystems: Participant and Functional Perspectives

Platform ecosystems are complex networks of interdependent stakeholders, such as users, developers, and organizations, interacting on a shared platform to create and exchange value (Jacobides et al., 2018). Platform ecosystems may be categorized from two complementary perspectives: participant-based types, focusing on the intended actors and models of interaction (e.g., B2B, B2C, D2C, P2P), and functional types, focusing on the essential function of the platform and its governance (e.g., transaction, innovation, hybrid). Both positions are worthwhile for understanding how stakeholders co-create value propositions in emerging ecosystems because they highlight the interaction between interaction dynamics, functional roles, and structural design.

2.2.1 Participant-Based Platform Types

Longitudinal studies of platform emergence consistently describe a four-stage developmental trajectory. In the platform-formation phase, a focal firm or, in some instances, a consortium defines the initial architectural core. It uses targeted subsidies or exclusive contracts to enrol the first users (Nerbel & Kreutzer, 2023). The resulting boundary-resource-creation stage sees the publication of APIs, software development kits, and data-access protocols designed to attract third-party innovators and stimulate generativity around the core artefact. Once complementary applications begin to flourish, the ecosystem transitions into complementor integration, during which value-adding partners assist in scaling the joint offering, even as governance pressures regarding standards, data ownership, and revenue-sharing arrangements start to emerge. Finally, in the ecosystem-orchestration stage, the platform owner orchestrator focuses on quality control, role refinement, and cross-generation renewal to preserve coherence while enabling further growth (Nerbel & Kreutzer, 2023).

Participant-based typologies classify platform ecosystems based on the primary actors engaged and their interaction models, which determine stakeholder engagement and value co-creation processes.

B2B Platforms facilitate interactions among firms, often involving complex, multi-sided relationships among stakeholders such as suppliers, business customers, and third-party developers. Examples of B2B ecosystems are SAP's Business Network and Microsoft Azure, which enable firms to collaborate in supply chain management, data integration, and service provision (Hagiu & Wright, 2015). These platforms focus on trust, compatibility, and long-term relational contracts, with strict governance mechanisms ensuring the coordination of plural stakeholder interests (Gawer & Cusumano, 2014). From the stakeholders' perspective, B2B platforms allow complementors such as system integrators or software firms to jointly create value through developing specialized solutions; their products and services are usually constrained by the platform's architectural control and governance policies (Schreieck et al., 2021).

B2C platforms connect businesses directly with end consumers by focusing on scalability and user experience. Such examples include Amazon's Marketplace and Netflix, which utilize network effects to attract large consumer bases while enabling businesses to distribute products or services (Parker et al., 2016). B2C websites have more open architectures to facilitate consumer participation, but their control is more centralized to deliver quality and consistency to end customers (Eisenmann et al., 2008). Stakeholders in B2C platforms, such as creators on Netflix or sellers on Amazon, are part of co-creating value propositions through matching offerings to consumer preferences. However, their action is filtered through the strategic interests of the platform and its algorithmic choices (Alstyne et al., 2016)

D2C Platforms represent a transformational shift where firms bypass traditional intermediaries to engage directly with consumers, often through digital platforms for personalized engagement. Brands like Warby Parker or Dollar Shave Club operate D2C

models, using platforms like Shopify to manage sales, marketing, and customer relationships. D2C platforms value stakeholder autonomy, where companies can co-create value with customers directly through feedback loops and customized offerings. However, such direct engagement requires stakeholders such as consumers and brand managers to collaborate intimately in iteratively developing value propositions, often necessitating agile architectures that support rapid iteration and data-driven personalization (Bal et al., 2023).

P2P Platforms is another participatory-based platform that enables peer-to-peer engagement, connecting individuals to exchange goods, services, or resources without business intermediaries. Airbnb and Upwork are examples of P2P ecosystems where stakeholders and peers who are both providers and consumers co-create value through shared resources and trust mechanisms (Moon et al., 2019). P2P platforms will likely adopt decentralized governance models that build trust and encourage peer collaboration. They employ community-driven rules and reputation systems to manage interactions (Einav et al., 2016). From a stakeholder perspective, value co-creation in P2P ecosystems relies on peer interaction and bilateral trust, while the platforms facilitate iterative feedback cycles that shape value propositions, i.e., pricing models or level of service norms (Alstyne et al., 2016).

Every platform type influences the value co-creation dynamics differently, depending on the nature of stakeholder interaction and the platform's architectural design. These variations highlight how stakeholders influence value proposition emergence, providing a foundation for explaining their roles in emerging ecosystems. It is important to note here that the platform ecosystem is not specified by stakeholder interaction and participation conditions only, but it can also be typified according to its core functional purpose and governance logic.

2.2.2 Functional Platform Types

Functional typologies organize platform ecosystems based on their core mission and governance models, providing an additional framework for how stakeholder interactions drive value co-creation between participant-based types.

Transaction platforms allow users to exchange information directly with one another. Uber and Alibaba are good examples of how the facilitation of transactions and matchmaking is taking centre stage (Alstyne et al., 2016). They include categories of participants like Uber as P2P and Alibaba as B2B, emphasizing the roles of participants in the determination of offerings depending on supply and demand (Hagiu & Wright, 2015). While Innovation Platforms provide technological ground for third-party development, such as Microsoft Windows or Google Android (Tiwana et al., 2015). Standard in B2B (e.g., Windows within business settings) and B2C (e.g., Android for consumers), these platforms enable stakeholders like developers to create value alongside each other through modular innovations, propelling ecosystem growth (Yoo et al., 2012).

Another type is the hybrid platform, which combines transaction and innovation activity; for example, Amazon (Marketplace and AWS) and Apple (App Store and devices) (Gawer & Cusumano, 2014). Hybrid Platforms are usually B2C (Apple for end-consumers), allowing stakeholders to engage in transactions but under controlled conditions (Anderson & Bedre Defolie, 2024)

However, other platforms, such as data platforms like Palantir or Snowflake, provide data consolidation and analytics capabilities, which are technically based on data-driven decision-making (Brynjolfsson & McElheran, 2016). Common in B2B (e.g., Snowflake for companies) and D2C (e.g., taking advantage of consumer data), these platforms allow stakeholders to collaboratively generate value by leveraging data insights while ensuring strong governance for data security is required. Another example is investment Platforms, i.e., Alphabet or SoftBank, that are interested in building portfolios of

platform-based companies through financial investments (Cusumano et al., 2019). Largely B2B-facing, these platforms involve stakeholders like portfolio companies in co-creating value through strategic alignment, even though their contribution to the emergence of a direct value proposition will be less strong.

Social Platforms are also counted as a type of platform, e.g., Facebook and TikTok, which prioritize user-generated content and social interaction (Van Dijck, 2013). Typically, B2C or P2P platforms rely on stakeholders like users and content creators to co-create value through engagement, shaping value propositions like personalized feeds (Torres Pena & Breidbach, 2021). Moreover, IoT Platforms, i.e., Google Nest or Siemens MindSphere, facilitate ecosystems of interconnected devices (Wortmann & Flüchter, 2015). Spanning across B2B (Siemens for industrial application) and B2C (Nest for home), these platforms allow stakeholders to generate value through collaborative, interoperable solutions.

However, these types are not the only ones through which the platforms' ecosystems are classified. The Platform's governance mechanism (Open, Closed) also affects these dynamics. Open platforms (such as Android) allow high levels of stakeholder involvement, giving rise to generativity among participant categories, while closed platforms (such as Apple iOS) exert control that produces coherence at the expense of stakeholder autonomy (Tåg et al., 2008)

2.3 Emergence of Platform Ecosystem

The emergence phase of platform ecosystems represents a critical and formative stage usually characterized by considerable uncertainty, evolving stakeholder roles, and continuous refinement of value propositions. Unlike mature platform ecosystems, which benefit from established user bases and stabilised governance structures, emerging platforms must navigate ambiguity concerning market acceptance, actor engagement, and technological standards (Adner, 2017; Kapoor et al., 2021).

During the first stage, platform orchestrators are often actively involved in formulating the ecosystem structure, positively recruiting and supervising various actors, such as early adopters, developers, complementors, and institutional partners. Orchestrators' primary function is to develop an early value proposition powerful enough to ignite initial engagement, which creates the necessary network effects for developing platforms (Gawer & Cusumano, 2014; Tiwana et al., 2014). This phase is usually characterized by repeated experimentation with various governance styles, from comparatively open and decentralized models to optimised innovation, which further moves to more closed and controlled ones that guarantee coherence and quality control (Baldwin & Woodard, 2008; Schreieck et al., 2016). These governance decisions significantly impact the willingness and degree of actor participation that shape the trajectory of the evolution of the value propositions of the platform.

In addition, emergent platforms must be able to navigate technological uncertainty effectively. Platform architecture, interoperability standards, and modularity choices significantly affect the ability of stakeholders to innovate and co-create value together (Jacobides et al., 2018). Initial architectural decisions can constrain or enhance the future adaptability and scalability of the platform, which ultimately determines its competitive positioning and durability (Kapoor & Agarwal, 2017). Besides, the emergence phase is characterized by continuous sense-making and negotiation processes among actors. Actors tend to communicate intensively to align their interests, resources, and expectations about the course of the development trajectory of the platform (Blasco-Arcas et al., 2020). These processes affect initial co-creation dynamics, shaping which actors become significant, what innovations are practised, and how the general value proposition becomes linked and evolves (Nenonen & Storbacka, 2010). Hence, understanding the development of platform ecosystems involves observing how orchestrators and stakeholders bargain value propositions, alter governance mechanisms, and confront technological and market uncertainties. Capturing these dynamics provides an understanding of how strategic choices and actor interactions in

the early stages finally shape digital platform ecosystems' successive evolution and prosperity.

2.3.1 Emerging B2B Ecosystems and Challenges

Emerging B2B platform ecosystems are transforming industrial manufacturing, logistics, and digital services industries by enabling scalable, networked, collaborative business models. Prominent examples include Salesforce AppExchange, Honeywell Forge, and GE Predix. These initiatives aim to build strong B2B ecosystems where stakeholders create value collaboratively. However, the development and scaling of these platforms face significant hurdles.

Among the most significant obstacles in this emerging ecosystem is integration complexity, as companies are often required to integrate novel platforms with existing legacy systems, which adds cost, introduces risk, and necessitates specialized skills (Yoo et al., 2012). In addition, firms must also contend with the complexity of multi-actor involvement, making alignment across companies with diverse technical capabilities and strategic agendas more challenging (C. C. Mbanefo & Grobbelaar, 2025).

Interoperability and data ownership are yet another significant issue. These issues typically occur due to challenges in determining who owns, accesses, and aggregates the data created in the ecosystem (Spagnoletti et al., 2024). This is the case in B2B contexts, where confidential operational information and intellectual property data remain at the centre of competitive advantage. Also, platform power imbalances could generate "reverse-value" effects where dependency risks and data monopolies overshadow the promise of collaboration (Latinovic & Chatterjee, 2024).

Adoption resistance is also widespread among firms that fear strategic dependency on platform operators or the potential leakage of intellectual property. This is especially true in emerging platforms where governance structures are not fully institutionalized. While B2C platforms often have codified governance rules, B2B platforms typically lack

standardized governance models. Instead, they employ context-specific agreements concerning access rights, control mechanisms, and value sharing (Hendricks et al., 2025; Zhang et al., 2024).

Moreover, platform operators face several challenges early in the ecosystem lifecycle, so building trust among potential participants and demonstrating clear value is difficult. This creates a “chicken-and-egg” dilemma, where stakeholders are hesitant to engage without a proven ecosystem, while the ecosystem cannot mature without early adopters (McIntyre et al., 2021; Schreieck et al., 2021). So, the ecosystem orchestrators must manage not just the technological infrastructure but also foster alignment through mechanisms like neutral orchestration, targeted reconfiguration of goals, and ecosystem-level incentives to reduce participant uncertainty (Tsytsyna & Valminen, 2024).

These challenges highlight the delicate and strategic nature of cultivating B2B platform ecosystems and underscore the importance of stakeholder-oriented design, governance, and engagement strategies. Emerging research in this field increasingly points to the necessity of co-evolving capabilities across stakeholders, coordinated through flexible and robust ecosystem architectures (Gomes et al., 2022; Jacobides et al., 2018).

2.4 Evolution of the Value Proposition in Platform Ecosystems

2.4.1 From Firm-Centric to Ecosystem-Centric Value Propositions

The concept of value proposition has gone through a transformation from a firm-centric model to a digitally mediated platform ecosystem in terms of its coordination mechanism. Traditionally, firms have shaped their value propositions from a product- or service-centric perspective, in which a single firm's offering was positioned as fundamentally valuable to customers. The firm typically defined these propositions unilaterally, which were structured around stable supply chains and delivered through one-directional marketing and distribution channels. However, platform ecosystems

introduce an ecosystem-centric logic, where the value propositions emerge from the interplay of multiple stakeholders rather than from a single entity (Adner, 2017). This configuration indicates that no single actor, including the platform provider, can deliver value independently. Instead, ecosystem participants' combined efforts and complementarities are required to co-create and deliver the complete value proposition.

This evolution from unilateral to multilateral value creation explains the emphasis on shifting from being dependent on catering to end-customer needs to align a diverse network of contributors, each contributing uniquely toward the emergent value proposition. Such alignment is particularly evident in emerging B2B platform ecosystems, where roles and relationships remain flexible and value-creation processes are still being established. For example, platforms such as SAP Business Network illustrate how firms no longer act as sole providers but as facilitators of cross-organizational collaboration, enabling manufacturers and enterprises to engage with external developers offering value-adding services such as predictive analytics or integration tools (Kapoor et al., 2021). This results in a combined value proposition in which the platform’s core offering is enhanced by the stakeholders' innovations, such as software add-ons or specialized services that deliver enhanced value through collaboration (Gawer & Cusumano, 2014). However, Stonig (2022) states that this reconfiguration represents a strategic challenge for early adopters who want to shift their focus from standalone products to system-level coordination of integrated and co-produced offerings.

This transition from a single product to multiple offerings value proposition is deeply rooted in mutual adaptation processes. Schreieck (2021) highlights how adaptation must occur bidirectionally from platform to ecosystem and from ecosystem to platform to ensure strategic alignment and long-term viability. This mutual adjustment highlights that value propositions in platform ecosystems are not static outcomes but dynamic constructs continuously shaped through feedback loops, negotiation, and co-development. So, the platform’s role is to offer technical infrastructure and facilitate

productive interactions among contributors, aligning their capabilities and incentives toward achieving shared value outcomes.

Empirical studies provide further proof of this evolution. For example, Budde (2024) tracks the evolution of a traditional SME in the recycling business into a platform orchestrator, initially structured around linear supply relationships. However, the firm reframed its value proposition by connecting waste producers and recyclers through a digital platform, making a network-based resource exchange model and service provision possible. This reconfiguration of value from internal optimisation to external orchestration is aligned with the broader trend to digitally mediated, ecosystem-level coordination of value creation.

Cennamo (2020) argues that digital transformation is not about changing the value but the organization itself, which allows firms to reconfigure their boundaries, engage in real-time adaptation, and capture value from digital technologies. Supporting this argument, Gomes (2022) proposes that platform ecosystems demand new organizational capabilities, particularly by formalizing an ecosystem management (EM) function that coordinates system-wide learning, configuration, and governance activities to sustain clear and evolving value propositions.

Similarly, Kenney (2019) Stated that platform businesses leverage digital infrastructure, streams of data, and modular architecture to complementors in developing highly dynamic value propositions that scale and enhance the value for the other ecosystem users. These propositions involve user-generated content, developer innovations, as well as complementary services, thus decentralizing value creation and reducing reliance on internal R&D. Thus, platforms such as Amazon or Alibaba not only pool offerings but also organize the way value is experienced and perceived by enabling generative participation across sets of different actors.

The shift from traditional to platform-based value propositions fundamentally changes how firms conceptualize and deliver value. No longer confined to linear production and delivery models, value in platform ecosystems is co-created through distributed collaboration, mediated by digital infrastructures, and dependent upon the alignment of diverse stakeholders. This collaborative activity represents an innovation model and a transformation of firm strategy and industry architecture. The following section will explore how multisided value configurations challenge traditional customer segmentation, revenue logic, and strategic control, which are fundamental to understanding platform-based value delivery.

2.4.2 Conceptualizing the Value Proposition in the Platform Ecosystem

The value proposition in a platform ecosystem is inherently multi-dimensional and multi-actor oriented, especially within B2B contexts where diverse stakeholders bring different specific goals, constraints, and expectations from the platform. It must be designed to appeal simultaneously to different sides of the platform, such as enterprise clients, developers, integrators, and service providers (Evans & Schmalensee, 2016). This means that the value proposition extends beyond simple utility and should include considerations about cost savings, operational efficiency, interoperability, scalability, and alignment with strategic objectives. Lusch (2015) In digital ecosystems, value is increasingly understood as “value-in-use,” emphasising that value is not embedded in a fixed set of predefined features but is realised through stakeholders’ experience. It is context-dependent and influenced by stakeholders’ specific needs, goals, and interactions within the ecosystem.

In emerging B2B platform ecosystems, value is articulated along several dimensions, including functional efficiency, network expansion, innovation potential, strategic alignment, and configurability. Stakeholders perceive and prioritise these dimensions differently based on their roles, objectives, and degree of integration in the ecosystem (Thomas et al., 2022; Tiwana et al., 2014), making the platform's value proposition multi-faceted and context-dependent.

It is important to know that only platform-level changes would not affect the value proposition. Additionally, ecosystem-level dynamics such as trust, role alignment, and shared norms significantly influence how value is perceived and evolves. (Tsytsyna & Valminen, 2024). As the actor's interaction mechanism changes on the ecosystem level over time, the platform's value proposition is also continuously negotiated and adapted in response to collective learning feedback and the shifting needs of its changing users.

This relational and adaptive understanding of value emphasizes the importance of ongoing actor engagement and institutional arrangements that facilitate alignment and cooperation (Jacobides et al., 2018; Vargo & Lusch, 2016). In B2B platforms, these feedback loops are especially critical, as firms often evaluate value based on long-term strategic fit, ecosystem maturity, and the reliability of inter-firm collaboration rather than immediate transactional benefits.

Latinovic and Chatterjee's (2024) survey of 79 B2B platforms confirms that early propositions depend heavily on standalone value, such as functional benefits that the platform owner can deliver alone, whereas later growth centres on network effect value that materialises only if other sides join the system. Their longitudinal data show that only 23 % of young B2B platforms could initially demonstrate network effect benefits, which explains slower diffusion relative to consumer markets. Emergent stage research in industrial IoT platforms confirms that the “birth” phase is dominated by business model sensing and boundary definition before network externalities can be unlocked (Hawlitschek & Hodapp, 2024).

Value propositions do not follow a linear trajectory; they are repeatedly recalibrated as actors renegotiate roles, contribute new complements, and respond to external triggers. Schreieck's (2016) study identifies two categories of capabilities that strengthen this evolution: ”(1) technology-related (cloud-based platformisation, open IT landscape management) and (2) relationship-driven (ecosystem orchestration, platform

evangelism, co-selling)". These mutually reinforce each other, enabling the owner to "give up control to create value" and "reassert control to capture value". The same tension surfaces in Latinovic and Chatterjee's (2024) Dynamic capabilities framing, where sensing aligns with value understanding, seizing with proposition design, and transforming with value delivery and capture.

2.4.3 Mechanisms that drive value proposition evolution in the B2B platform

B2B ecosystems involve more deliberate, negotiated, and capability-intensive forms of value co-creation. This makes the evolution of value propositions a stakeholder-driven process, influenced by how enterprises, developers, SMEs, and platform orchestrators engage, adapt, and align over time.

B2B platforms typically begin with some basic offering, such as a digital infrastructure, an enterprise toolset, or a data service. However, this is unlikely to be enough to attract or retain strategic partners. The platform must continue improving its value proposition, responding to diverse stakeholder expectations and issues such as integration complexity, domain specificity, and ecosystem maturity. Driving this constant evolution is not merely technological improvement but a series of embedded mechanisms, such as structural, relational, and cognitive, that allow the ecosystem to learn, evolve, and expand.

Boundary resource use is one of these mechanisms, i.e., APIs, SDKs, and standardizing data formats. They act as mediators between the platform and participants as translation layers so that external parties can build, integrate, or extend services. SAP's open SDK is a case in point; it reduced entry barriers for complementors and third-party developers and increased offerings in its cloud ecosystem (Schreieck et al., 2021). Through this, technical stakeholders directly contribute to the functional diversification and modular evolution of the platform's value proposition.

A second mechanism is the strategic leveraging of network effects, i.e., how B2B platforms train and empower partners. Siemens Xcelerator, for example, actively trains and empowers ecosystem partners to create co-development solutions. This transforms individual offerings into collaborative services, which makes the platform more attractive and interdependent. (Latinovic & Chatterjee, 2024). Here, strategic and partnership-oriented stakeholders play a fundamental role in converting individual contributions into network-level benefits that reinforce the platform's relevance over time.

Third, SME resource orchestration outlines where the small players belong and generates ecosystem value. SMEs may lack a big player's scale and height but bring agility, domain innovation, and niche specialisation. For example, the case of "Recycle," a small firm embracing a circular supply chain platform, demonstrates how ecosystem-focused integration and incremental uses can scale localized, linear value into networked ecosystem value without the traditional "liability of smallness." These stakeholders, as entrepreneurs, reshape the platform boundary by infusing new roles, orientations, and competencies (Budde et al., 2024).

Finally, capability-building feedback loops which occur less often but are a necessary mechanism. As members of the platform interact more by co-selling, marketing technological solutions, providing integration feedback, or using relationship capabilities, they drive co-evolution with the technological affordances of the platform. Schreieck (2016) explains how these competencies align with value creation and capture and encourage long-term engagement and innovation. In these circumstances, relational stakeholders like ecosystem architects, customer success managers, and integration consultants are critical functional roles that align strategic intent with operational requirements.

2.5 Co-Creation of Value Among Stakeholders

2.5.1 Foundations and Mechanisms of Value Co-Creation

Value co-creation in platform ecosystems is firmly grounded in Service-Dominant Logic (SDL), in which all actors are framed as resource providers engaging in service exchange instead of linear product delivery (Ng & Vargo, 2018). From this perspective, value is not embedded in offerings but arises from actors' interactions, inflected by shared or contested institutional arrangements (Jaakkola et al. 2024). Platforms are not single-handed value creators but enablers or orchestrators that make collective resource combinations possible (Gomes et al., 2022).

Technology in the form of Application Programming Interfaces (APIs) and Software Development Kits (SDKs) is a key facilitator of this value co-creation. These technologies allow stakeholders, particularly developers, to develop complementary innovations and extend current platform functionality (Tiwana et al., 2014). In addition, governance mechanisms like feedback systems, user councils, and knowledge-sharing forums facilitate collaboration through ongoing conversation and incremental development. (Hein et al., 2020; Wareham et al., 2013). These forms of governance facilitate collaboration and develop engagement and trust among ecosystem players.

Building on this foundation, Latinovic and Chatterjee (2024) Suggested a staged value proposition development model in B2B platforms. It begins with a discovery phase, during which lead companies create initial benefits and engage key stakeholders and users. This is followed by a design phase, during which early actors co-design boundary resources like APIs, governance rules, and revenue models. Early users start integrating their resources in the roll-out phase, although network effects are still weak. Lastly, in the upscaling phase, more intense actor-to-actor interactions extend the service offer and institutional setup, progressively stabilizing and reinforcing the platform's value proposition (Hendricks et al., 2025).

Value generation in B2B platform ecosystems is exceptionally dynamic and emergent. It is driven by continuous feedback, adaptive contextuality, and changing inputs of core platform offerings and complementary actors. Instead of developing value on their own, platform providers act as facilitators. Value arises from interactions among the core platform competency and third-party inputs like application developers, integrators, and service providers (Gomes et al., 2022).

2.5.2 Challenges and Strategic Management in Co-Creation

Despite its advantages, co-creation in platform ecosystems has various strategic and operational challenges. The coordination complexity arises from overseeing diverse stakeholder interactions with different objectives and resources, which can lead to inefficiencies and conflict (Latinovic & Chatterjee, 2024). Asymmetric power relations intensify these challenges, with powerful actors such as large enterprise customers or platform providers able to disproportionately determine decisions, leaving smaller or less influential stakeholders on the edge (Kenney et al., 2019).

Additional complexity is added by intellectual property (IP) management and data governance in open collaborative settings. As required for successful co-creation, openness can increase strategic and legal risks, most notably associated with data privacy and IP rights (Adner, 2017). Strategic management of these challenges involves designing transparent, incentive-compatible governance frameworks that balance openness with necessary protections, fostering trust and equitable stakeholder participation.

Moreover, recent studies emphasize that successful integration of resources demands not merely strategic fit but also adaptive capabilities to dynamically direct and leverage internal and external resources and competencies (Pikkarainen et al., 2022). Strategic cultivation of these adaptive capacities allows platforms to work through challenging complexities successfully with sustainable and equitable co-creation processes.

2.6 Actor Engagement in Platform Ecosystems

2.6.1 Conceptualizing actor engagement (AE)

Actor engagement (AE) in platform ecosystems extends from the principles of Service-Dominant Logic (SDL), which emphasizes that not all actors are passive recipients of value; only some take an active role in resource integration and ecosystem evolution. (Hendricks et al., 2025). Blasco-Arcas (2020) characterises AE as a multidimensional inclination comprising cognitive, affective, and behavioural investments. Benz (2021) Argues that engagement levels vary significantly based on perceived individual value and motivation. In contrast, Jaakkola (2024) Focuses on institutional interdependencies, suggesting that engagement is shaped not solely by internal motivations but also by how value is organized and contested within institutional arrangements. These views illustrate that AE is a context-sensitive process dependent on actor-specific and structural factors.

2.6.2 Antecedents: Why actors engage

AE is driven by various antecedents across strategic, technical, relational, and institutional domains. Hein (2020), for instance, stresses the importance of economic and technological enablers such as revenue-sharing models and open APIs, which reduce barriers for platform complementors. In a complementary vein, Benz (2021) Highlights relational antecedents, arguing that procedural fairness and transparent communication are central to building trust and long-term actor commitment. Meanwhile, Mbanefo & Grobbelaar (2025) Introduce an institutional perspective by underlining how governance structures must align with prevailing industry norms to facilitate legitimate participation. Staub (2021) further contributes by presenting strategic resource complementarity as a mechanism through which actors collaboratively enhance platform competitiveness.

While antecedents explain why actors initially engage, their continued participation often adheres to structured or emergent principles of trajectories. Hendricks (2025) distinguishes viral and controlled engagement models; whereas the former relies on

decentralized, user-led growth, the latter involves platform-led onboarding of strategically significant actors. Expanding on this framework, Benz (2021) posits that actor engagement becomes increasingly durable with each cycle of value realization, forming a feedback loop that reinforces itself. Similarly, Jovanovic (2022) argues that AE and platform architecture co-evolve, suggesting that the structural evolution of a platform is both a driver and outcome of actor engagement. This evolving interplay underscores engagement's adaptive and recursive nature within digital ecosystems.

2.6.3 Orchestrating, Monitoring, and Safeguarding Actor Engagement

Platform orchestrators employ a range of mechanisms to support, regulate, and nurture AE. Hein (2020) emphasizes key technical resources, such as open APIs, SDKs, and data ecosystems, which lower integration barriers and indicate platform openness. These are complemented by formal governance mechanisms such as certification programs, pricing structures, and dispute-resolution procedures that stabilize expectations and impose constraints on opportunism. At the social level, orchestrators prefer interaction through community-building activities such as hackathons, developer communities, and peer mentoring programs to foster a shared identity and trust. (Mbanefo & Grobbelaar, 2025). Springer (2024) states that effective orchestration relies on aligning technical design with relational and institutional coordination and balancing system-wide scalability with actor-level considerations of autonomy.

Platform orchestrators employ a range of mechanisms to support, regulate, and nurture AE. Hendricks (2025) recommends a three-legged measurement approach comprising behavioural metrics (e.g., logins, API calls), relational measures (e.g., satisfaction scores, trust ratings), and systemic outcomes (e.g., complementor diversity or active participation rate). Peng (2023), however, extends this model by arguing for engagement monitoring at micro, meso, and macro levels to capture emergent, non-linear patterns. Meanwhile, Benz (2021) emphasizes the requirement for temporal and contextual sensitivity in measurement, warning that engagement is constructed over time and

should be measured accordingly. These studies indicate that evaluative and strategic engagement measures guide adaptation and policy.

Still, even with strong orchestration and governance mechanisms, AE remains exposed to system risks. Latinovic and Chatterjee (2024) Warn about the dangers of power imbalances, where dominant platform members extract disproportionate value or enforce governance terms that disadvantage smaller participants. They refer to such issues as "reverse-value effects," whereby participation costs begin to eclipse benefits, resulting in disengagement and deteriorating network effects. To alleviate those risks, Jovanovic (2022) highlights fairness mechanisms such as open value-sharing mechanisms and multi-sided governance boards that deter opportunism and ensure equitable representation of participation across the ecosystem.

2.7 Stakeholder Interactions and Influence

2.7.1 Modes of interaction

An analysis of longitudinal sequences in five emerging ecosystems reveals four intertwined interaction sequences: “value discovery, collective governance, platform resourcing, and contextual embedding”. These sequences co-evolve as participants decipher the ecosystem’s purpose and their respective benefits (Thomas et al., 2022). In Stage I (launch), the sequences appear similar across cases; however, by Stage III (established), they diverge, suggesting that micro-level interaction patterns become increasingly unique. Consequently, early-stage ecosystems emerge through collaborative sense-making and negotiation rather than a top-down imposition of a value framework.

2.7.2 Interaction mechanisms and orchestration tools

Empirical studies indicate that platform orchestrators utilize a multifaceted interaction toolkit to align stakeholders and maintain productive collaboration. First, they establish boundary resources and governance rules such as APIs, pricing tiers, and revenue-

sharing formulas that define who can interact with whom, under what technical conditions, and on what economic terms (Poniatowski et al., 2022). Second, managers strategically manage information flows, revealing new payment rules or data feeds to selected partners in pilot phases to estimate behavioural responses while minimizing systemic uncertainty (Gomes et al., 2022). Third, they implement decoupling and cross-generation strategies by layering new architectural components on top of legacy systems; this approach enables complementors to adopt innovations at their own pace, thus preventing ecosystem disruption as technologies evolve. Finally, orchestrators engage selectively, onboarding high-potential or strategically essential actors first and only later expanding participation. This order harmonizes the necessity for initial stability with the advantages of more exhaustive viewpoint experimentation. Collectively, these mechanisms constitute what Gomes and colleagues term ecosystem regulation. This dynamic capability navigates between coherence and flexibility to keep stakeholder interactions productive amid technological change and competitive pressure (Gomes et al., 2022).

Interactions on platforms can frequently be dissonant. Technical design choices, such as the degree of openness and the friction from multi-homing, contend with strategic approaches like envelopment, breaching, and tipping, which redistribute power among various actors (Poniatowski et al., 2022). An analysis of supplier participation in Indian food delivery platforms reveals that restaurants consider fees, visibility, and competitor presence before opting to join, highlighting how economic power influences the intensity of interactions (Kathuria et al., 2020). In the absence of perceived fairness, weaker participants may withdraw, undermining the logic of shared value.

2.7.3 From interaction to shared value logic

The cumulative effect of these mechanisms is a gradual alignment of individual incentives into a collective value proposition. As actors iterate through value discovery and collective governance, they arrive at role definitions and participation rules that stabilise expectations (Thomas et al., 2014). However, alignment is fragile; continuous

orchestration depends on balancing centrifugal (competitive) and centripetal (collaborative) forces. Ecosystems that achieve this balance develop capabilities of an "architecture of participation," a blend of technical modularity and social negotiation, creating a coherent yet flexible shared value logic (Poniatowski et al., 2022).

2.8 Identified Gaps and Research Opportunities

2.8.1 Current debate: a short overview:

As B2B platform applications continue to gain traction, their usefulness has been explored across various industries. Recent research has begun to explore the evolving mechanisms of value co-creation and value proposition in the emerging platform ecosystem. These dynamics for studying the evolution of these processes are particularly relevant in emerging sectors such as the energy market, including biogas. There is a need for empirical research grounded in real-world industrial settings to address this theoretical gap, which is only partially acknowledged in current frameworks.

As seen previously in this chapter, an increasing body of literature now touches on the issues, core practices, decisive factors, and future direction of platformed B2B (Chibuike et al., 2024; Mbanefo & Grobbelaar, 2025; Mbanefo & Saartijie Grobbelaar, 2022). On the other hand, previous literature consists of research on platform core practices, organizational forms, governance modes, and value co-creation processes. For instance, Hein (2019)Identified three core value co-creation practices in B2B platforms: integrating complementary assets, platform readiness, and servitization through application enablement. However, the above-mentioned studies outline established ecosystems where strategic decisions are less uncertain, and the roles of stakeholders are better defined.

Although these areas are now being studied at a broader scale, the literature lacks sufficient empirical evidence to clearly define the generic essential characteristics of B2B

platform ecosystems' value emergence through empirical and statistical justification. One reason for this is the presence of interpretive ambiguities among scholars, as noted by(Madanaguli et al., 2023). While B2B ecosystems generally involve digital inclusivity and multiple stakeholders, much empirical work has focused on limited collaborations involving multiple actors, particularly platform industrial perspective emergence to ecosystem developments (Filosa et al., 2025).

This narrow empirical focus fails to capture the wider ecosystem-level interactions that occur during the early stages of platform development. Platforms may not be fully established in these formative phases, yet important multi-actor interactions are already emerging with informal fragment interactions. The external forces influencing customer Interest, decision-making processes, and engagement are still poorly understood. Latinovic and Chatterjee (2024) contribute to this discussion by distinguishing between several value types in B2B platforms, including standalone value, network-effect value, data-network-effect value, and marketplace control. Nonetheless, there is a lack of empirical studies investigating how these value dimensions work within emergent, multi-actor ecosystems, indicating a significant area for future research.

B2B contexts investigated also encompassed space domination, like Pauli et al. (2021) developed a conceptual framework emphasizing Value Idea Emergence (VIE) and Value Proposition Creation (VPC) as a transition from traditional buyer-seller relations toward a more ecosystemic thinking has become possible through digitalization. The framework has yet to be tested empirically, especially on emerging platforms. Pauli et al. (2021) investigated actor participation in IIoT ecosystems and showed their participation in numerous instances below expectations based on complex decision-making unique in B2B contexts. Despite both helpful contributions, they fail to fully explain the collaborative dynamics and everyday challenges in emerging B2B ecosystems.

2.8.2 Theoretical Frameworks and Their limitations

Various theoretical foundations can be used to study value co-creation at the platform ecosystem level. However, none of them have applicability to explain it collaboratively at the micro, meso, and macro levels, particularly in early-stage B2B contexts. Some of the theories relevant to our scope are discussed below.

- Service-Dominant Logic (Lusch, 2015):

This theory suggests that value is co-created through the collaboration of resources among actors within a service ecosystem. Although S-D Logic is a valuable paradigm for value co-creation, it offers little insight into real-world issues such as building trust, balancing the many interests of stakeholders, and overseeing platform governance in business-to-business settings. These aspects become particularly important in nascent ecosystems where stakeholder relationships are formed.

- Boundary Resources Theory (Ghazawneh & Henfridsson, 2010):

This theory explains how platforms facilitate interactions using boundary resources like development tools and APIs to promote shared perspectives and structural flexibility. However, it does not fully account for the dynamic and iterative processes of developing value propositions within institutions characterized by emerging technological infrastructures and uncertainties.

- Actor Engagement Theory (Brodie, 2019; Nenonen & Storbacka, 2010):

This theory offers an actor-centric perspective on value co-creation, concentrating on the cognition of actors during engagement. Although it emphasizes actor involvement, it insufficiently explains why actors approach B2B platforms cautiously and how their interactions affect mutual value logic in the early stages.

2.8.3 Identified gaps

Table 1, shown below, exhibits the theoretical gaps relevant to our study.

Table 1 Identified Gap

Study	Focus Area	Context	Key Findings	Identified Gaps
Hein et al. (2019)	Value co-creation practices	B2B (IoT)	Defined key practices like asset integration, readiness, and servitization	Limited to IoT, it lacks relevance for early-stage or emerging ecosystems.
Rustholllkarhu et al. (2021)	Value co-creation model	B2B (Sales)	Introduced VIE and VPC as a conceptual model for ecosystem-based value creation	The model remains untested in empirical, emerging B2B platform contexts.
Pauli et al. (2021)	Actor engagement behavior	B2B (IIoT)	Found hesitant engagement and weak participation due to B2B decision-making complexity	Fails to link engagement directly to value proposition formation in early platforms
Shi et al. (2021)	Governance in early platforms	B2B	Emphasized uncertainty and fluid dynamics in early-stage ecosystems	Underexplored multi-actor interactions and collaboration in ecosystem emergence
Chibuike et al., (2024); C. C. Mbanefo and Grobbelaar , (2025); C. Mbanefo and Saartijie Grobbelaar (2022)	Strategic evolution of platforms	B2B	Outlined strategic direction, platformed growth, and core practices over multiple years	Insufficient empirical studies on early-stage platform ecosystems
Latinovic and Chatterjee (2024)	Value components in platforms	B2B	Defined standalone, network-effect, data-network-effect, and marketplace-control values	Needs empirical validation in multi-actor, early-phase ecosystems
Hawlitschek and Hodapp (2024)	Collaborative co-creation	B2B	Advocated bottom-up, iterative, experimental co-creation over predefined practices	Misaligned with top-down assumptions in existing frameworks, it lacks empirical case support.
Filosa et al. (2025)	Ecosystem development pathway	B2B (Energy sector)	Tracked strategic platform pivot from experimentation to integration and ecosystem envelopment	Based on one firm, it lacks generalizability and focuses on early-stage, fragmented value co-creation

2.8.4 Research opportunities.

This thesis will address theoretical space by providing a holistic empirical assessment of value proposition development and co-creation in an emerging B2B platform ecosystem, specifically focusing on the renewable energy sector. The theoretical contributions of this research include an empirical case study of an industrial firm, shedding light on the concurrent value proposition development processes of new B2B platforms, a topic where existing research is limited and where there is significant uncertainty and variety among stakeholders. This research will bridge the gap between conceptualization and practical issues, integrating S-D logic, boundary resources theory, and actor engagement theory to create a holistic framework for value co-creation in B2B contexts. This research will explore value proposition development in sectors such as renewable energy. It will emphasize the role of these factors in value co-creation, an area not well established in the current literature. This research offers practitioners essential insights on tackling challenges such as trust-building, stakeholder coordination, and platform governance by conducting a detailed analysis of a real case, thus helping to connect theory with practice.

3 Methodology

This chapter presents a structured overview of the research process, which incorporates the research philosophy, research design, and the methods used for data collection and analysis. This section defines the research approach adopted for the study and justifies the selected approach. The study was conducted on empirical data gathered through semi-structured interviews with diverse stakeholders from different professional domains (farmers, municipalities, producers, etc.) engaged in developing a regional digital biogas platform connecting three regions of Ostrobothnia, Finland. The methodology design is set to align with the interpretive paradigm, an abductive reasoning strategy, and the Gioia qualitative research approach to attain grounded theoretical knowledge from the experienced realities of the platform actors. A qualitative approach was selected, envisioning its in-depth richness, which further helps to understand the phenomenon and interviewers' specific perspectives about the selected topic.

3.1 Research Philosophy

The research philosophy adopted for this study is an interpretive approach (Saunders et al., 2023), which is usually based on the belief that reality is socially constructed and that understanding is co-created through interactions among individuals and organizations. Interpretivism differs from positivist paradigms because of its approach, as positivism attempts to search for things that can be quantified and expressed into universal laws. In contrast, interpretivism aims to understand the process of meaning-making. This approach is specifically relevant for investigating how actors co-create value propositions in emerging platform ecosystems.

Given that this study investigates the evolving nature of value propositions through actor interactions on an emergent biogas platform ecosystem, researcher reflexivity was maintained to mitigate interpretive bias. An interpretive lens was the best way to understand key insights and represent diverse actors' situated and structured realities,

including farmers, municipalities, developers, and technology providers. This also helped us develop new ideas and concepts to understand the perspective of actors' roles in the emerging platform ecosystem.

3.2 Research Approach

This research employs an abductive approach (Dubois & Gadde, 2002; Peirce & Ketner, 2024). Instead of adopting a linear process to derive theory from theory to data (deduction) or move from data to theory (induction), abduction allows an exchange between interview insights and existing conceptual models. During the research process, empirical data is always directly and indirectly compared with the views of Service-Dominant Logic (Vargo & Lusch, 2004). To build upon theoretical understanding while remaining connected to participants' lived experiences. Thus, the research is not intended to test hypotheses but to develop a theoretical understanding of how value propositions dynamically arise and develop through co-creation practices within new platform ecosystems.

3.3 Research Design

The research uses an exploratory qualitative case study design to explore the evolution of a value proposition in the emerging platform ecosystem. A single case study approach (Hollweck, 2015) was selected so that the design and development of a digital platform ecosystem, which connects different stakeholders interested in creating and using biogas across the three Ostrobothnia regions in Finland, could be studied in detail. The case is defined as the emerging biogas platform initiative and is treated as a bounded, evolving system involving multiple organizational stakeholders collaborating through a shared digital infrastructure.

The case study method is appropriate for various reasons:

- The platform ecosystem under investigation is complex and emerging, involving various actors such as farmers, municipalities, biogas producers, technology suppliers, and biogas users, which can offer rich and key insights into value co-creation.
- The research questions seek to uncover why and how value propositions co-evolve in the emerging stages of the platform lifecycle among stakeholders rather than trying to generalize it statistically.
- Case studies can be the best option when researching live outcomes within a real social system context (Hollweck, 2015).

The research will focus on B2B (business-to-business) interactions in this case study. All the participants and their respective organizations collaborate to create value rather than for the end consumer market. Therefore, the investigation focuses on organizational-level value co-creation, not B2C (business-to-consumer) interactions. The study is part of the broader Biogas project, which intends to build a regional digital platform to accelerate biogas production and distribution. The study occurred in three connected areas in Ostrobothnia, South Ostrobothnia, and Central Ostrobothnia, working among industries with distinct characteristics but creating connections through biogas ecosystem development. The research context is broader, looking at different regional solutions offered to similar local platform developers, especially analysing stakeholder interactions, platform-mediated collaboration, and the co-creation and adaptation of value propositions as the ecosystem emerges.

The Gioia methodology was used to systematically capture the evolution of value propositions from the perspectives of diverse stakeholders (Gioia et al., 2013). The Gioia method supports moving systematically from rich participant accounts toward higher-level theoretical insights by:

- Identifying the first terms grounded closely in participant language through open coding.
- Developing second-order themes that abstract across concepts to reveal broader patterns.

- Creating aggregate dimensions by synthesizing the second-order themes into fundamental theoretical insights.

The Gioia methodology also supports an abductive reasoning process, enabling an iterative interplay between empirical observations and existing theory, which, in this case, we used Service-Dominant Logic (Vargo & Lusch, 2004). This abductive movement allowed theoretical constructs to emerge organically from the data while remaining grounded in participants' lived experiences. Using an exploratory qualitative case study and the Gioia methodology gave this study a detailed insight into how value propositions have been co-created, adapted, and transformed over time.

3.4 Data Collection

3.4.1 Participants and Sampling Strategy

The research sample was developed using a purposeful sampling strategy (Patton, 2010) to capture participants directly involved in developing or affected by a biogas-focused platform ecosystem.

The participants represent a diverse group of stakeholders, including:

- Raw Material Providers (Farmers)and agricultural producers operating biogas plants,
- Representatives from large food Processing companies,
- Biogas Producers (large industries and SMEs),
- Municipal and city council representatives are responsible for rural development and city strategy.
- Service providers (Logistics, Technology) and project developers,
- Biogas experts, specialists and
- Biogas User (Industries).

This diversity in selecting the participants ensured that multiple perspectives on platform co-creation, value proposition evolution, and external influencing factors (e.g., policy and technology) could be captured. Twenty interviews were conducted with this diverse group from different organizations. Table 2 exhibits the participants' descriptions.

Table 2 Participants' Descriptions

Characteristic	Sample
Participant roles	6 Biogas Users (U1–U6), 3 Biogas Producers (P1–P3), 3 Raw Material Providers (RM1–RM3), 1 Biogas Distributors (D1), 5 Local and Regional Authorities (A1–A5), 2 Technology/Service Providers (T1–T2)
Job titles	Head of Business Intelligence, Executive Director, General Manager, Business Area Director, Plant Manager, Technical Concept Director, Managing Director, Product Development Manager, Sustainability Manager, Farmer, Supply Planner, Board Member, Business Developer (×2), Development Director, Climate Expert, Rural Manager, Project Manager, Director Projects
Organizational types	SMEs, Farms, Municipal/Regional Authorities, Large Enterprises, Technology Developers, Distributors, Service Providers
Regions represented	6 Ostrobothnia, 4 South Ostrobothnia, 10 Central Ostrobothnia
Interview languages	7 Finnish, 13 English

3.4.2 Data Collection Process

The primary data collection method was semi-structured interviews. An interview questionnaire, shown below in Table 3, was developed based on the research questions that focused on topics such as:

- Experiences and expectations related to biogas platform development,
- Needs and challenges of each stakeholder in the biogas industry,

- Mechanisms of stakeholder collaboration and co-creation,
- Factors influencing the evolution of value propositions over time and
- The role of external forces, such as policy, regulation, and technological shifts.

Table 3 Questionnaire Framework

Biogas Producers	Biogas User	Biogas Distributor	Service Providers	Raw Material Supplier
Scalability -Stakeholder Engagement	Scalability -Stakeholder Engagement	Scalability -Stakeholder Engagement	Scalability -Stakeholder Engagement	Scalability
Value proposition-Business Opportunities-Core Interaction	Value proposition-Business Opportunities-Core Interaction	Value proposition-Services	Value proposition-Services	Value proposition- Core Interaction
Ownership Choices	Ownership Choices	-	Ownership Choices	-
Revenue Model - Monetization- Model Preferences	Revenue Model - Monetization- Model Preferences	Revenue Model-Monetization-Operational Complexity	Revenue Model-Monetization-Operational Complexity	Monetization
Compliance Strategies - Regulatory Challenges	Compliance Strategies - Regulatory Challenges	Compliance Strategies - Regulatory Challenges	Technical Aspect-Platform Challenges	-

These interviews aim to get insightful, rich data combining limited quantified elements (e.g., scales, project size, market estimates) and qualitative information. All interviews were conducted online and scheduled according to participant availability during data collection (Jun 2024 - Sept 2024). Each interview lasted approximately 45–60 minutes. Each participant was asked 8 to 10 core open-ended questions. The participants were encouraged to talk openly about their experiences and opinions. After the 8-10 questions, additional follow-up questions were asked to make the conversation more constructive and interesting, which allowed the participants to express themselves more fully. They were allowed to choose whether the interviews would be conducted in Finnish or English, allowing the interview process to proceed smoothly and without language barriers for the participants. A sample of the interview framework is shown below in Table 4.

Table 4 Interview Question Sample

Theme	**Sample Question**
Challenges	What are the main challenges you face in the biogas industry? How could the DBH platform help your company deal with those challenges?
Value Expectations	What services/offerings should the DBH platform offer to scale up your engagement in the industrial ecosystem within your region? What level of support and engagement do you expect from the DBH platform?
Co-Creation and Collaboration	How do you collaborate with others in the biogas ecosystem? What are the core business opportunities you are looking for when interacting with other actors in the biogas value chain?
Governance Preferences	"Who do you think should own or manage the platform, and why?"
Stakeholder Role	Can you describe your role and how you interact within the biogas industry?

The data collection followed the ethical standards of qualitative research (Tracy, 2010). All interviews were documented in audio and video format, with the participants' permission, following the EU GDPR Regulation regarding data protection and privacy. Informed consent was obtained from all participants before the interviews began. Participants were given all the necessary information from the Privacy Notice, including the full explanation of how the data is collected, starting with how it is obtained and where it is stored, who can use it, and who can see it. The participants were also informed about their right to check and verify what they had entered and how their data would be interpreted and used in different research studies.

The participation was entirely voluntary, and the participants were assured that their identity would remain confidential until they provided their explicit consent to be

disclosed. They were informed that the interview recordings would be used solely for academic research purposes and securely stored in compliance with GDPR standards.

3.5 Data Analysis

The information collected during the interview was carefully scrutinized according to a structured plan proposed by the Gioia approach (Gioia et al., 2013). Expanding more on the previous explanation, the analysis is concerned with organizing participants' conceptions to understand how values emerge, develop, and are co-produced in the emergence of a platform ecosystem.

The analysis begins with open coding from the interview transcript data, keeping participants' terms intact as closely as possible. Each transcript was reviewed in detail to identify shared meaningful expressions, ideas, and experiences shared by participants. The coding was conducted in almost the same language as the respondents' responses, without a predefined structure, resulting in a rich primary code set.

As patterns emerged across interviews, these codes were grouped into broader first-order themes through inductive reasoning. Initial codes include saving logistics and fertilizers, regional biogas cooperation, lack of regulation, and trust through certification. Similar codes were clustered based on shared meanings, organizing the data around key aspects of stakeholder interaction, platform participation, market influences, and infrastructural conditions. After this inductive first-order theme, the next stage involves formulating the second-order themes through abductive systematic reasoning. First-order themes were analysed and linked to this emerging empirical pattern and relevant theoretical concepts from SDL and platform theory. This stage moves from inductive description to theoretical abstraction. For example, individual experiences around trust and transparency were grouped under the second-order theme of Trust-Building Mechanisms for Collaborative Value Co-Creation. At the same time, discussions of regulatory instability were connected to the broader theme of Institutional and Regulatory Frictions Shaping Value Potential.

Finally, the second-order themes were synthesized into aggregate dimensions that capture the core processes and fundamental value proposition dynamics in emerging platform ecosystems. The whole process was exhaustively captured to facilitate transparency and the ability to trace information right from the raw interviews to the ultimate theoretical framework.

3.6 Data Structure

The study's data structure is framed to facilitate both theoretical integration and thematic analysis. The primary data sources are interview transcripts, which are coded according to a combination of deductive categories from literature and inductive themes from stakeholder statements shown in Table 4. Codes are arranged randomly based on the themes (200 open codes) to facilitate tracking patterns across co-creation outcomes, engagement mechanisms, and actor roles. This nested structure allows cross-case comparison and longitudinal tracing of advancing platform dynamics. The quotes used in the analysis are ambiguous, such as alphabets, e.g., six biogas users(U1-U6), to detect the quotes easily. Below is Table 5 for a data structure using the Gioia methodology (Gioia et al., 2013).

Table 5 Data Structure

Data Analysis Structure		
1st Order Concepts	**2nd Order Themes**	**Aggregate Dimensions**
Decentralized resource coordination and circularity	Collaborative Resource Utilization	Stakeholder-Driven Value Co-Creation
Strategic visibility for underutilized resources		
Multilevel strategic alignment as a condition for success	Strategic Ecosystem Alignment	
The strategic role of municipalities in ecosystem orchestration		
Co-created ecosystem vision through public-private partnerships		
Need for Sector-Level Peer Learning and Networking	Knowledge Sharing and Peer Networking	
Informal Exchange and Peer Networking		
Governance preferences and platform ownership models	Platform Governance Design	Platform-Enabled Value Proposition
Platform pricing models and access logic		
Neutral facilitation to prevent conflict of interest		
Platform flexibility and modular service design		

Platform as an integrator for fragmented ecosystems	Integrative Platform Infrastructure	
Platform as a boundary object across diverse actor logic		
Platform as a Dual-Sided Marketplace		
Platform as a mechanism for demand aggregation	Platform- Empowered Value Creation	
Platform as a tool for regulatory and policy visibility		
Platform as a Central hub for knowledge sharing		
Platform as a service interface for emerging B2B value models		
Platform Adjustments Based on User Feedback	Iterative Platform Repositioning	
Logistical constraints in value chain execution	Infrastructure and Scaling Challenges	External Factors Shaping Value Evolution
Fragmented infrastructure as a barrier to scale		
Regulatory uncertainty and fragmented policy environments	Regulatory and Policy Barriers	
Policy-driven pricing models and participation conditions		
Investment hesitancy due to planning and permitting complexity		
Demand uncertainty and buyer-side constraints	Demand-Side Market Levers	
Demand creation and public procurement as ecosystem levers		
Technology interlinkages between biogas and hydrogen	Multi-Vector Energy Synergies	
Hydrogen-biogas symbiosis as a long-term innovation driver		
Cross-sector expansion and multi-vector energy strategies		

Integrating the Gioia methodology in the analysis helped to derive detailed descriptive outcomes by inducing a narrative grounded in first-order participants' insights and second-order theoretical interpretation through abductive reasoning. These second-order themes are then organized to develop three aggregated dimensions. The results of this data analysis are illustrated in Table 5 above.

3.7 Trustworthiness of the study

To ensure the reliability of qualitative research in generating accurate and meaningful findings. This study employs the standards by Schwandt et al. (2007) in assessing the research process quality within four dimensions: credibility, transferability, dependability, and confirmability.

Credibility refers to the internal validity or "truth value" of the findings. Various approaches were employed to strengthen credibility throughout the research process.

Triangulation of perspectives was facilitated by interviewing diverse stakeholders, including farmers, city officials, company managers, and technology providers, across the biogas ecosystem. Recurring coding cycles over a long time also helped ensure that interpretations remained anchored in participants' voices. In addition, informal member checking occurred in interviews through summarizing major points and drawing out participant acknowledgement or correction. The analysis also heavily employed thick descriptions, guarding participant voices but ensuring the emerging patterns closely represented their words.

Transferability answers how applicable the findings are to other environments. Because of this study's qualitative and context-dependent character, generalizability was not a goal. Instead, detailed contextual descriptions of the participants, the evolving platform ecosystem, and biogas industry dynamics were provided to enable readers to decide on the possible transferability of the results to other emerging platform ecosystems.

Dependability is a term used to describe the consistency and stability of the research process over time. To achieve maximum reliability, a transparent and systematic coding process was employed following the systematic procedures of the Gioia methodology, with clear stages for open coding to aggregate dimension construction. An exhaustive audit trail, including coding memos, analytic decisions, and versions of the data structure, was maintained throughout the research. Coding categories and theme building were continually monitored and enhanced to ensure internal consistency and methodological rigour.

Confirmability concerns the extent to which findings are constructed from the participants' experiences rather than researcher bias. To maximize confirmability, direct quotations from the participants were utilized extensively to support the development of themes and theoretical conclusions. The abductive process between empirical data and existing theory, namely Service-Dominant Logic, was documented and explained in detail to demonstrate how theoretical ideas were developed from observed phenomena.

Researcher reflexivity was also practised during analysis, where proper consideration was given to the interpretive nature of the researcher while striving to maintain the data-centred, open, analytical process.

3.8 Ethical Considerations

This study follows ethical guidelines Tracy's (2010) "Big Tent" standards, focusing on procedural, situational, relational, and existing ethics throughout the research process. Moreover, all participants were made aware of the voluntary nature of their participation. Informed consent was obtained from the participants before interviews, and they were informed of their rights to edit, review, and erase their data at any point. Interview recordings and transcripts were handled following GDPR guidelines, anonymized to protect personnel identities, and stored securely in the institutional database. Situational ethics were respected in each interview by allowing respondents to choose the time, language, and format that was most convenient and best suited to their circumstances. Reflexive awareness of the researcher's dual role as a project participant in the biogas platform development project and as an academic researcher was exercised to minimize the risk of bias and avoid any privileged status during interview conduct. In line with relational ethics, participants were treated as co-creators of meaning, with sensitivity to their experience and respect for their contextual knowledge. Finally, existing ethics were addressed by carefully considering how findings are presented, fulfilling an obligation that community-specific data is interpreted responsibly and long-term implications are considered. The study attempts to honour the formal ethical standards of social science research and the dynamic, context-sensitive nature of ethical practice in qualitative analysis.

4 Findings

This chapter explains the empirical analysis of how a regional biogas platform ecosystem emerged through stakeholder collaboration, platform-mediated mechanisms, and external factors that impact this emergence, drawing on the generated qualitative data structure of 20 interviews conducted in the context of the actual project case. This study explores how a fragmented network of actors with no organized platform ecosystem transitions into an emerging digital platform ecosystem with an evolved value proposition. This chapter also helps to answer the main research question of the study: *How do stakeholders co-create and evolve value propositions in emerging platform ecosystems?* It also identifies the preliminary explanation of the three sub-questions concerning stakeholder influence, co-creation processes, and external factors and constraints, enabling the shaping of platform ecosystems.

This chapter reveals how a platform value proposition is not built separately but co-developed through interaction, experimentation, and iterative adaptation across stakeholder boundaries. In doing so, this chapter is structured around three interrelated dimensions that were extracted through first and second-order coding (Table 5):

- Stakeholder Driven Value Co-Creation
- Platform-Orchestrated Value Proposition
- External Factors Shaping Value Evolution

A systematic approach showing how these dimensions interact to form a processual understanding of value proposition emergence in an emerging platform ecosystem. An explanation of these dimensions is given below in detail.

4.1 Stakeholder Driven Value Co-Creation

The first and foremost aggregated dimension that shaped the formation of the emerging platform ecosystem is stakeholder-driven value co-creation. It has been evident from the

literature that the platform ecosystem evolution states that the platform cannot emerge overnight. Instead, it begins with gradually aligning its core functions and involving its participants, who recognize shared needs and overlapping constraints in structuring its dynamics. This alignment involves iterative engagement, collaborative resource integration, and stakeholder coordination mechanisms. Through early collaboration and decentralized resource use, stakeholders began co-creating a system of interdependence that laid the foundation for platform emergence.

“Stakeholder-driven Value Creation" captures the foundational processes by which different actors bring their respective motivations, capabilities, and connections into a shared, co-created space. It also represents the service-dominant value co-creation logic, where value emerges from use, interaction, and mutual adaptation rather than isolated fragmentary transactions.

4.1.1 Strategic Ecosystem Alignment

Strategic ecosystem alignment is one of the primary mechanisms through which stakeholders collectively establish the basis for value Co-creation in the emerging platform ecosystem. A stakeholder-driven process based on the collaborative actions of different stakeholders, e.g., municipalities, regional developers, and industry actors, who recognize that creating shared value requires coordination across boundaries.

Under region-specific scenarios, it is evident from the case study that municipalities played an important role in establishing coordinated networks. They act not as platform operators but as facilitators of ecosystem formation. One municipal actor framed their role as a network orchestrator:

> “*… our role as a sub-region in particular, so it is the role of network creators, that we keep our eyes and ears open when we notice such signals coming from different directions, so pull them together*” (A5).

These proactive initiatives are often operationalized through collaborative projects across their authority area. During an interview, one representative explained this stance:

> *"How could they cooperate? I would say projects in almost one word. When municipalities do joint projects and plan together, and when the municipalities are doing something together, the big thing is, of course, that it is understood that the added value is not necessarily always equally allocated to all. However, municipalities seek the overall benefit of the perspective" (A1).*

On the other hand, Municipalities also used institutional tools like zoning and public procurement to shape the value landscape and guide platform-compatible decisions. As one of the city officials stated:

> "*Municipalities may have the incentives to consider in zoning, for example, the province decides that 50% of school buses must be run on biogas or something like that, that can be controlled through competitive tendering, that there are roles for the municipality*" (A4).

Another Raw material provider explicitly highlighted the impactful stance of municipalities, explaining how municipal endorsement can contribute symbolic and strategic value:

> "*The city helped legitimize the platform idea. Even if they don't run it, their support sent a message to industry actors that this was serious*" (RM3).

Another city representative emphasized this:

> *"Municipalities could structure local biogas actions and raw material logistics. It would be a good place to start collaboration*" (A2).

Drawing attention to the concrete impact of municipal coordination on platform formation. One respondent described that this co-created alignment can be extended beyond local boundaries and how public-private actors across the region can form a shared vision:

> "*We are already discussing at the regional level with others. We're not competing. It's about a shared potential, better to work together*" (A3).

While one of the municipal officials stated that the municipality should avoid direct ownership of these emerging platforms to ensure efficiency and long-term viability, they showed interest in actively supporting regional biogas networks and public energy companies to recognize their strategic leverage:

> "*Municipalities can't own the platform, but they can support a regional biogas network or energy company. That would be more efficient and long-term*" (A1).

This same respondent stressed the role of the development institute in uplifting the potential of regional alliances, which helps in shaping national policy outcomes:

> "*I think that the provincial energy strategy and the related entity, when it is created so that it can be influenced by joint patterns, and then when you seek partners from research institutes, development institutes and others, so it can then create the overall picture, but yes, that is the most important thing, that we can influence the national level patterns together*" (A1).

Disorganized strategic orchestration of the nascent platforms reflects a broader awareness that value creation requires alignment not just of data and infrastructure but also institutional visions and policy agendas. As one of the interviewees expressed,

> "*Strategic planning is happening on multiple levels. Municipal, regional, and EU regulations are all affecting company steps. It's not enough to act locally*" (U3).

Another stakeholder supported this stance:

> "*If we don't have feedstock and off-taker contracts locked, no plant will be built. It's the same with infrastructure and public partners. Everyone must be aligned*" (U1).

This alignment directed strategic planning, helped legitimize the platform's purpose, and established value propositions within a shared vision of regional energy autonomy and circularity.

4.1.2 Collaborative Resource Utilization

According to the case study data analysis, it was evident that one of the most tangible early forms of stakeholder-driven co-creation in the platform ecosystem was the collaborative utilization of distributed, underutilized resources. This use case practice was not about waste management but a strategic practice through which local actors shaped emerging value propositions based on circularity, autonomy, and mutual benefit before the platform existed in digital form, producers, processors, and municipalities already engaged in decentralized coordination to extract value from previously unconnected biological streams.

This informal coordination exhibited the core logic of circularity, in which waste materials from one process became productive inputs in another. An experienced biogas distributor explained this phenomenon:

> *"… it's like circular economy; they provide the raw material for the gas production, and instead, they get fertilizer from the reject from the biogas plant. So it is like a win-win situation with a very good circular economy"* (D1).

One farmer described how these two-way flows were combined into farm energy loops:

> *"We apply these biorejects to our own fields and use them to grow oats, wheat, rapeseed, peas. The production rotates, and energy comes all the time from its own activities, which I can use"* (RM2).

These arrangements demonstrate the technical efficiencies and point to a common logic of mutual exchange value creation that builds up because of interactions among farmers, processors, and towns.

In this sense, resource utilization was a means through which actors enacted and redefined roles in the new system. Interaction with the case study participants showed that farmers did not only supply feedstock. They co-created the system value by reinserting digestate, modifying crop cycles, or participating in logistics design. A municipal respondent exemplified this phenomenon as:

> *"We have arable land, animals, and food processors utilizing side streams for energy use, which is one part of developing energy self-sufficiency"* (A1). Another added: *"It brings vitality to the countryside and could become a revenue stream for farmers, plus it reduces price volatility and dependence on fossil fuels"* (A2),

Framing local co-creation as a path to circular flexibility. However, the full potential of resource utilization was limited due to a lack of visibility and coordination mechanisms across the ecosystem. An industry expert responded:

> *"… there would be a huge potential of farmers that would like to connect and have some material that is now going to waste, they throw it somewhere. Instead, they could sell it for, of course, a very low price, but then it gets used for biogas production"* (U3).

This lack of synchronization arises not only due to informational deficiencies but also due to uncertainty regarding resource flows, as referred to by the industrial user:

> *"… the feedstock is not stable; it is cyclical, and sometimes you get it, sometimes you don't, and you're highly dependent on the production upstream"* (U1).

One producer reflected on the remedy of this as:

> *"A separate feed harvesting company could extend the availability of feed"* (P3).

Another respondent repositioned this problem:

> *"There is an interest in receiving AIV fodder or, for example, fat waste suitable for biogas production if needed. In that case, the raw material should be reliably available, and there should be a definite demand for the biogas"* (P3).

So, A joint resource-utilization mechanism is more than a practical building block for an emerging B2B platform. It also serves as a participatory process in which previously fragmented actors define a shared value proposition. By collaborating, they establish the relational, operational, and conceptual foundations of the platform's value-exchange model, enabling the nascent ecosystem to scale and organize around shared resources.

4.1.3 Knowledge Sharing and Peer Networking

This theme explores how informal conversations and knowledge sharing influence the emerging value proposition during the early platform ecosystem's formation phase just as much as technical systems or a formal governance framework. Stakeholders stressed during the interview that the new platform owner should maintain visibility into each actor's actions, ideas, and needs even before formalizing structures or setting governance rules for the nascent platform. These insights provide an extensive

understanding of challenges faced by the actors and opportunities where the platform can be fruitful. This ultimately became the basis for aligning these diverse actors around platform functions and roles.

One municipal actor emphasizes adopting this stance of pre-knowledge acquisition as:

> "*There's no special strategy, but we've seen the value in keeping in touch with actors, hearing what they have to say, and keeping them informed of developments*" (A5).

This quote supports how knowledge sharing is a smooth ecosystem sensemaking process that connects participants in the direction of collective understanding and holds them together as a group in such a way that they are aligned without pre-setting clear objectives. However, another participant pointed to the relational and broad nature of innovation as a result of peer networking, particularly in a time-pressured agricultural context:

> "*We need biogas evenings where people sit and talk. Ideas don't develop alone; they grow through discussion. But farmers don't have time, so networking needs to be enabled*" (RM2).

The quote expresses that an evident tension exists in creating a platform because ideas and value propositions are usually created together socially. However, the people who recommend these ideas often lack the structure, resources, and support to participate in the developed platform afterwards.

Stakeholder-driven value co-creation in emerging platforms often starts with knowledge sharing and peer networking at the initial level. These early interactions help to build trust, shared understanding, and relationships that subsequently help shape and facilitate formal partnership modes in the platform, such as platform membership and

structured governance. By developing trust, exchanging relevant information, and developing a common perspective over time, informal networking and peer learning help transition stakeholder-driven value into cross-sector partnerships at the ecosystem level.

4.2 Platform-Enabled Co-Creation

The early ecosystem value emerges through stakeholder-led initiatives, including decentralized collaboration, formal multi-level coordination, and informal networking. Introducing a digital platform tends to improve the potential to scale, structure, and formalize these co-created value exchanges from existing relationships on an ecosystem level. However, the platform's success depends on how well it caters to the stakeholders' needs by offering desired solutions. It follows the Service-Dominant Logic in how well it repositions the platform’s value proposition, aligning with the evolving platform users' goals.

The second important aggregated dimension that fosters the value pre-created by the ecosystem stakeholders is Platform-enabled co-creation. Digital platforms facilitate the interactions of stakeholders by offering digital tools and digital infrastructure, and they act as mediators to coordinate with external institutional forces. Drawing on interviews with producers, municipalities, users, developers, policy stakeholders, and distributors, the analysis describes how scattered stakeholder activities in Ostrobothnia develop into a digitally mediated, multi-actor platform with an evolving value proposition and how the emerging platform integrates infrastructure, governance mechanisms, and iterative repositioning to enable this value creation.

4.2.1 Integrative Platform Infrastructure

This second-order theme explains the development of an emerging B2B platform in a fragmented ecosystem context, which describes the idea that the platform should provide more privileges to its stakeholders rather than just providing digital services.

Evident in every stakeholder interview was the need for a platform that could act as the connector between disintegrated suppliers, producers, and consumers, which could also manage transactions and make the flow of products and other resources visible. Stakeholders also expressed that value creation did not belong solely to digital matchmaking services or data visibility but also involved integrated infrastructure, which aligns physical operations with the platform's functionality. The platform should be built to bridge systematic connections between different actors, activities, and information systems. One interviewee captured this vision clearly:

> "We *need reliable producer information, what we need, and also what our customers need because they are controlling their demands, and we are just like a service provider in between, the link from producers to the platform and users."* (U4).

This quote justifies that the platform is not viewed only as a data directory but as a dynamic relational bridge, connecting those who possess resources with those who require them in real time.

From an operational perspective, the platform should integrate dynamic tools that connect supply and demand, ensure operational transparency, and support services that facilitate the co-creation of value propositions among its users rather than simply listing the products of producers and feedstock from farmers. During the interviews, several stakeholders highlighted one significant challenge, e.g., logistics, which is how logistical needs (e.g., liquefaction, transport) had to be reflected in platform design. One respondent expressed it:

> *"The platform must handle not just transactions, but also support logistics, transportation, liquefaction, and even digestate handling."* (P3).

This logistical coordination will help the stakeholders address transportation challenges, utilizing platform services, especially for smaller producers who lack transport infrastructure. Another respondent highlighted that this logistics issue is also closely tied to concerns about assuring the quality of the product:

> *"The transportation and quality follow-up to know where to get these qualities would be very important and good information. However, the transportation is mainly because we don't have any transportation there, so that would be a good thing"* (U3).

This quote illustrates that resource flows remain inefficient and fragmented without a coordinated view of supply quality and transport routes. These logistical needs reposition the platform as an active value chain integrator capable of streamlining material flows while supporting traceability, compliance, and operational planning. One Raw material provider stated this fact:

> "*If someone says, 'I have 500 tons of this,' and others can offer, a platform where companies can compete for mass flows could be very useful"* (RM2).

The platform is viewed as a value chain enabler to facilitate resource pooling and enable real-time market offers. In addition to being a value chain enabler, stakeholders wanted to see the platform perform as a two-sided marketplace: A strategic tool supporting both producers' visibility and customer access. A user supported this stance:

> *"We'd be interested in a platform that lists producers and lets us advertise our products. It could function as a full marketplace on both sides"* (U5).

Another respondent elaborated further, narrowing this dual-sided marketplace concept to the biogas domain:

> *“That’s one interesting thing. Maybe there could be some kind of platform where you can show interest in buying digestate or receive digestate or then supply feedstock to the plant with the specifications of the feedstock”* (T1).

This quote proposes that the platform act as a boundary object, accommodating and aligning various stakeholders' diverse logics and needs. This platform function will not work as a resource for producers or just as an interface for buyers but as a relational tool that enables two-way engagement across a whole ecosystem.

Similarly, the platform is not about mapping supply or demand in the same domain but also projecting its value across new markets, e.g., hydrogen and carbon integration. One interviewee showed interest in this type of vertical integration:

> *“We’d be interested in a platform that lists producers and lets us advertise our hydrogen, maybe even carbon”* (U6),

However, to maintain these platforms’ functions and operate smoothly, the platform should also integrate governance mechanisms.

4.2.2 Platform Governance Design

Platform governance plays a significant role in the platform's ability to control its users and sustain its value proposition. This theme explains the mechanism by which platform ownership is structured, how decisions are made, and how operational processes are managed to maintain functional operability, which helps to gain stakeholder trust and encourage their long-term engagement on the platform.

Creating a good governance model for a digital platform comprises dealing with the factors that could affect the platform's long-term viability, such as resolving the contradictions between economic logic, defining collective benefits, and ensuring neutrality and transparency. The fundamental question in developing a governance

framework is the ownership of the platform. During interviews, various stakeholders expressed different views about the best ownership model, particularly based on the intended logic of the platform business. For instance, one participant stated:

> *"If there's a clear earning logic, it could be run as a business. However, if it's more about softer values, a cooperative model makes sense; participants understand it brings costs but also shared benefits"* (A5).

This view captures the dual nature of the platform's potential, highlighted by the interviewee, which implies that the platform could be a profit-generating enterprise or a cooperative facility held in public and sectoral interest. Supporting the latter view, another stakeholder envisioned:

> *"It could be a non-profit or cooperative maintained for shared value rather than profit. Municipalities, farms, and businesses all contributing to a common platform"* (A4).

However, it is argued that public sector-led models would find it hard to justify their neutral stances. Usually, Public platforms without private partnerships tend to be politically charged, influenced, or otherwise remain ineffective. One participant explained it:

> *"…It(platform) needs private companies involved. Otherwise, it goes political, and that doesn't fly. It must be aligned with economic logic, not just public sector processes"* (A1).

Ultimately, a model of shared ownership with a neutral facilitator appears to be the most promising way to solve these competing views at the start of the platform development. To avoid political interference and conflicts of interest, most stakeholders recommend

neutral or shared ownership of the platform in the emerging phase of the platform. One user highlighted the benefits of this approach, stating:

> "*I've seen this work well shared ownership with a third-party provider running the service. That way, you avoid politicization and ensure good support"* (U5).

Empowering the broader vision that no single owner should dominate the platform structure. Another stakeholder opposed the shared ownership perspective:

> *"It would likely need to be a neutral, separate organization to ensure transparency and fairness"* (U5).

These views highlight how important the platform governance arrangements are to sustain inclusivity, transparency, and fairness, which the stakeholders aim to include in the platform while contributing to enhancing its value proposition through interactions. A governance structure that is fair and transparent will encourage more stakeholders to engage on a platform on a long-term basis without fear of competition and competitive disadvantage. The platform's value is co-created through its features and enhanced by the trust in its governance design.

To sustain the business logic and operational functionality, the platform has to impose specific pricing models to sustain itself economically. The platform's price model and the way users gain access to the platform explicitly determine the conditions of user participation in the platform. The participation condition of users highly depends on certain factors related to finances (e.g. Business logic, Profitability), which one participant stated:

> *"We are willing to pay a platform fee if the ratio between fees and income is reasonable. There should also be a guarantee that the platform provides benefits for maintaining production"* (P3).

Upon asking during the interview, stakeholders expressed mixed views on pricing models and conditions to participate in the platform. Many expressed a willingness to pay if they could get clear, proportionate benefits. Users who have high consumption needs favoured subscription model pricing over transaction-based pricing. One such user explained that the former option is better:

> *"A yearly subscription would be better than a transaction-based one, and yes, we would pay a premium for early access to offers we consume a lot, so it's important to be first" (U3).*

Others pointed out that their willingness to invest in the platform would be based on its proven value:

> *"…If I see that it (platform) would be a reality that we will make an investment within a year, then it would be something different" (D1),*

> *"It would depend on the price and how beneficial the platform is for us. If it adds value, we would consider it"* (P1).

There was also an emphasis on the importance of the flexibility of service access and transparency of premium features, as one user stated:

> *"Maybe a yearly fee would work. If we can use the service when we want, that's fine, but I'd need to know what I'm paying extra for before going for a premium model"* (U6).

In addition to governance and pricing, technical design flexibility was another key priority highlighted by the interviewee to enable service flexibility based on their needs. Stakeholders requested that any new platform introduced should have reduced

administrative workloads so that different contributors can interface with the systems. One user connected it:

> *"…It's most efficient if your platform allows direct API or system integration. That way, we don't waste time re-entering data; we want a smart solution"* (U4).

This means modularity and flexible design structure influence the addition of complementary innovations into the platform. These four elements of governance (shared ownership, clear pricing structures, neutral facilitation, and modular design) work together to enable the platform's value proposition. They not only create value during normal business operations but also create the fundamental trust, transparency, and flexibility required for the platform to create value for diverse users in diverse situations and contexts. This allows the platform to be positioned as a trustworthy and versatile facilitator of collaboration and innovation within its ecosystem.

4.2.3 Platform-Empowered Value Creation

This second-order theme explores how the emerging B2B platform enables new forms of value creation by mediating its digital services, like matchmaking, information, visualization, data analytics, etc. From our case study perspective, the platform's role in this emerging biogas environment is limited to its technological architecture, and it is viewed as a facilitator that enables networked actors to co-create value across different supply chains. Based on the data, four prominent mechanisms through which the platform facilitates the value creation are discussed: demand aggregation, knowledge sharing, regulation and policy tracking, and intermediation of services.

Several respondents indicated that the disintegration of supply and demand relationships that already exist is an obstacle to market efficiency. The platform is viewed as a means of joining these interactions and enabling scale, particularly for industrial buyers that require stable quantities and verified sources. As one producer noted:

> *“I think the platform could serve some purpose, but I see it more as a mass balancing system”* (P1).

This quote highlights how the platform could serve as a central matchmaking point for combining supply and demand, even at the initial phase of platform development when direct market trading is in its early stages. Another end-user aware of the platform's potential stated this need as:

> *“…If we think of us as a buyer, then it would be sort of a marketplace that would bring together the gas producers”* (U4).

This quote shows that the platform should act as a digital intermediary to manage the transactions of material flow on a centralized network. Respondents also emphasized that the platform should function as a tool for providing regulatory and policy-related data, supporting actors in fulfilling sustainability requirements and meeting regulatory reporting obligations. One industrial user stated,

> *"As an end-user, we need to report and validate that the gas we have acquired is sustainable according to different regulations. So, a platform could bring significant benefits in this area”* (U2).

This quote describes the platform’s role as a regulatory facilitator, making compliance easier and enhancing certainty in ecosystem supply chain sustainability.

Some respondents (producers and city officials) point out that the platform should also act as a central knowledge hub, providing information-sharing services. The platform should facilitate transactions and function as a knowledge centre, guaranteeing valuable information about material flow, feedstock, and pre-treatment specifications. One farm-based operator stated this necessity as:

> *"I guess it's the interaction and the logistics (material flow information) of it so that it would be easy to see where and how and in what form it comes, and what kind of pre-treatment it requires"* (RM1).

Another technical respondent explained:

> *"…If interested parties can get up-to-date data from one place(platform), that would be a good thing. Especially for digestate or feedstock, it saves time" (T1).*

These quotes explain a desire for the platform to be a one-stop point of access for critical operational and contextual information that optimizes stakeholder efficiency and coordination.

In addition to functioning as a centralized hub for transactions and information base, a few participants suggested that the platform integrate a multifunctional service interface capable of supporting new forms of commercial engagement. One technical expert proposed a model where the platform would integrate transaction tools as well as handle functions like content database, community engagement channels, and subscription-based services all under a single platform:

> *"There has to be some continuous content, something that is interesting for the potential users, maybe games in a very simple form, maybe news, articles, interviews, a type of news channel which could then, at the same time, have the e-commerce functions"* (U1).

This points toward a more dynamic platform concept as a digital services ecosystem offering soft engagement functions (visibility, information, branding) and hard capabilities (matchmaking, e-commerce, logistics planning). The approach highlights the development of an iterative digital environment where B2B interactions are facilitated,

enriched, and contextualized through the platform's built-in community-driven functionalities.

4.2.4 Iterative Platform Repositioning

Another theme extracted from the data was the need for the platform to reposition itself, which means it should evolve with time rather than being portrayed as a developed outcome with fixed digital solutions. Many stakeholders emphasized that the platform must evolve iteratively in response to user feedback and changes in the surrounding ecosystem. This proactive mechanism was evident among developers, coordinators, and technology and service providers who believe the flexibility to evolve is a necessary condition for the long-term viability of the platform. One technical Developer expressed this expectation:

> *"…It is in some way then such an updating, and genuinely permanent and evolving so that it does not remain as a project that becomes outdated"* (T2).

This quote reflects that the platform should be adaptive to evolving conditions. The stakeholders also emphasized that continuous upgrades must remain relevant and functional over time if the platform wants to succeed in the long run. This means emerging platforms that offer only fixed solutions may lose their competitive advantage in a dynamic ecosystem.

Practically, this ongoing repositioning is linked with the platform's technical and organizational aspects. As for the technical side, stakeholders suggested that the emerging platform should not focus on addressing all the needs at once in the early stages of its life cycle. Instead, adopt a modular or staged implementation strategy that will help to enhance its usability, keeping its participants interested and excited. In support of this modular transition, one responded:

> *“The platform must evolve beyond the project phase. If it ends there, it won’t make a difference. It should be adjusted along the way based on what works and what doesn't”* (T1).

This highlights the role of user experience and iterative feedback in shaping the platform's evolution. The digital functions that the new platform introduces over time should be tested in real-world settings and revised according to the responses from the platform users.

Organizationally, this iterative approach is related to platform governance, management, and control. Some respondents expressed concern that developing platform owners might become too fixed or limited to specific models, limiting the flexibility scope in accommodating new actors and shifting roles. One respondent highlighted this:

> *“We need to see if the cooperative model works in practice. Maybe it starts that way, but the governance might need to shift as more users join”* (U2).

This implies that the iterative repositioning concept applies not only to the platform's technical features but also to the platform's institutional structure, which must remain responsive to the ecosystem's changing needs and power dynamics.

4.3 External Factors Shaping Platform Evolution

The development of the emerging platform is driven by stakeholder interaction and the platform's digitally/technically enabled services. Certain external conditions and factors either enable or limit the value of co-creation processes. This includes regulatory and policy-related challenges, infrastructure and logistics constraints, market dynamics, and technology shifts or Energy Synergies. The concept of a platform is often described in terms of its internal functionality or governance, but many participants emphasized that its success would ultimately depend upon how well it adapts to these external factors at the ecosystem level.

4.3.1 Regulatory and Policy Barriers

Regulatory uncertainty and unclear policy dynamics affect the development and perceived value of the emerging platform. In the case study perspective, multiple stakeholders expressed that the main hurdle threatening the scaling of the emerging biogas platform is shifting political priorities, inconsistent legislation, and unpredictable regulatory enforcement, which incorporates a high degree of strategy uncertainty into the ecosystem.

This short-term political decision particularly impacts biogas producers. One producer expressed:

> *"If you look at the politics and the four years, it always comes with new laws, and the next group of politics changes the laws. So that should be more long-term regulations"* (P2).

This perception of uncertainty was supported by other producers claiming a lack of durability in the government support concerning new taxes and changing political agendas:

> *"Unexpected taxes may be imposed. There is little trust that the government, which changes every four years, will provide support for growing or maintaining operations"* (P3).

Such quotes illustrate that regulatory conditions directly impact the strategic planning of the stakeholder businesses. Policies' instability or unawareness lowers the actors' long-term commitment to participate in platform engagement and resource-sharing arrangements.

Some respondents also pointed out the misalignment between the national and EU-level policies. He expressed that although the EU has set ambitious emission reductions and transport decarbonization goals, these goals have not been translated into meaningful support in practice. However, the EU has set ambitious goals for emission reductions and transport decarbonization, but these have not translated into meaningful support for biogas in practice:

> *"EU has chosen the line to go with electric cars. Biogas cars are really forgotten. There are not enough sanctions or incentives to make biogas competitive"* (P2).

This policy irregularity holds the actor's decision towards adopting new, economically viable models.

A second key element of the regulatory challenge was policy-driven pricing mechanisms and market entry terms. Some respondents noted that taxes, fees, and evolving compliance regulations directly affected feedstock costs, gate fee arrangements, and overall gas production model feasibility. As one producer explained:

> *"These regulatory changes and this legislation is constantly waving, now come again a little more sustainability claims, and let's put some small additional taxes there, and a little bit of this and that, and we are always a little tweaking in one direction or another"* (P3).

This quote reflects how regulatory control and ensuring sustainability objectives can create instability and limit the predictability necessary for coordination at the ecosystem level.

It is also evident that investment decisions are highly prone to these policy irregularities. Several interviewees emphasized that participation on the platform in the form of infrastructure commitments would not proceed without clear rules, long-term policies,

and secure contracting terms. One technology developer summarized this position clearly:

> *"We are not going to make investment decisions if we don't have all the ends locked. No plant is going to be built without feedstock and off-taker contracts"* (T1).

This quote exemplifies that actors would always hesitate to invest unless it is confident about the potential future market demand, along with legal and regulatory backing. So, these environmental variables directly shape actor behaviour, risk perceptions, and platform participation.

4.3.2 Infrastructure and Scaling Challenges

Beyond regulatory uncertainties, infrastructure and scaling challenges often arise during a platform ecosystem's early stages. Without a well-organized support structure, it becomes difficult to coordinate activities effectively, making it hard for the platform to operate at full capacity. While many stakeholders recognize the potential of a digital platform to act as a coordination mechanism, its effectiveness is widely seen to depend on enabling infrastructure. From the case study perspective, this is especially true for physical components such as gas collection, processing, storage, and distribution systems. Few respondents mentioned the small scale of current biogas production and poor aggregation capacity as key challenges for value chain execution. One producer put the problem in operational feasibility terms:

> *"The industry is still too small-scale. Scaling up production is the main challenge, along with developing the infrastructure to liquefy biogas for heavy-duty vehicles and the maritime sector"* (P1).

This quote illustrates how scaling up production is a key challenge closely tied to infrastructural constraints. A user specifically mentioned network availability problems in terms of storage and distribution capacities:

> *"It's highly dependent on the storage capacities, and if we have network available, then we can have liquefied system alternative that could be workable, especially for longer-range transport"* (U2).

This point indicates how network coordination will reduce the infrastructure constraints, where connections and coordination support the movement of physical goods.
Meanwhile, fragmented infrastructure is also seen as a barrier that shapes the value evolution of a platform ecosystem. Another respondent framed the issue of network fragmentation as:

> *"You have very many small producers that can produce biogas. But how do you gather all that gas, process it, and get it forward?"* (U3).

This quote illustrates that the infrastructural challenge is not only technically oriented but also organizationally based, which requires alignment between independent actors, transportation systems, and processing sites to form a collaborative network. A second user elaborated further on the specific technical requirement of expansion to serve industrial markets:

> *"Liquefaction is what you need for the marine market, and it requires large-scale plants"* (U6).

Here, the respondent refers to the scale dependency of specific technological solutions. Without centralization or economies of scale, high-value market entry becomes economically and logistically impossible, regardless of digital coordination efforts.

Solutions to Infrastructure and scalability challenges are perceived as necessary to unlock the full potential of the platform ecosystem. Although the platform can serve important functions such as planning, coordination, and data transparency, its value

proposition remains incomplete without physical infrastructure support. This demands the joined connection between digital tools and broader network-building efforts at the ecosystem level.

4.3.3 Demand-Side Market Levers

In a B2B platform ecosystem, reliable supply and visible demands play an important role in deciding the success factor of the platform. It is evident from the previous analysis that the stakeholders emphasized improving production and supply-side coordination. Many stakeholders also emphasized the role of creating and aggregating reliable and visible demand, which is crucial in deciding the long-term viability of the platform and its broader ecosystem. Across the data, demand-side constraints were identified as a structural barrier to platform participation, investment planning, and scaling.

Different respondents from the interview highlighted weak or fragmented buyer commitment as a core limitation to the value enhancement of the emerging platform ecosystem. From a case study perspective, without having apparent demand from end-consumers, especially industrial users or transport actors, producers remained hesitant to engage with the platform or to scale their production capacity. One technology provider explained,

> *“Basically, the biggest challenge at the moment is the market. So, the market price is so low that it's really hard to develop the project. Also, when you think about compressed gas, there really are no users you're switching the traffic for the compressed, it's very low*” (T1).

This statement reflects both the price volatility and the lack of predictable demand volumes, which affect the development of a stable platform-mediated marketplace. Participation in enhancing their production or infrastructure capacity is highly doubtful for small and medium-sized producers unless they are assured of a consistent demand from the buyer.

Even though there is a demand that pre-exists at the ecosystem level, it is more scattered across dozens of small producers, which poses a challenge for industrial buyers regarding how to communicate with them collectively. One energy user commented on this coordination barrier:

> *"It's not realistic for a big industrial company to deal with 20 or 50 small farm biogas units. We need someone to coordinate all these smaller streams into one reliable offering"* (U6).

These quotes highlight a fundamental coordination challenge on the demand side. This challenge enhances the platform value by reinforcing and combining the decentralized supply into a centralized offering system. However, demand-side constraints will always suppress market growth and potential until the Platform fully operationalizes this centralized function.

In answer to demand uncertainty and buyer-side constraints, several participants, especially from the city council and municipal authorities, highlighted the leadership role the authorities could play in activating demand through public procurement and regulatory design. Rather than waiting for market-based demands to emerge, city authorities proposed themselves as possible enablers of platform viability by integrating regulations into offerings. One city official explained it:

> *"The municipality can direct its own procurement in such a way that gives even better points to the operator who uses biogas as a transport fuel for school transport or something like this, where it would be very well suited"* (A5).

While some respondents emphasized that direct support (subsidies, Incentives) cannot be granted due to their limited resources, they can leverage through the implementation of specific policies and regulations, e.g., land-use regulation.

> *"The city cannot offer any financial incentives directly, but in a certain way, through zoning and land use policy"* (A2).

This highlights the role of municipal actors as demand aggregators that do not engage in direct purchases but still shape the dynamics of market operations. So, Public procurement is both a potential demand driver and a tool of ecosystem legitimacy. Another municipal actor emphasized the importance of establishing a broad regional discussion to stimulate market alignment:

> *"The procurement criteria could consider the possibility of conducting a broader market dialogue with regional operators. I would see the market dialogue as a way of being able to reflect and take it forward more widely with the various partners"* (A2).

This quote highlights that demand must be constructed by involving the buyer, seller, and public institutions that can organise multiple actors and effectively frame strategic solutions.

Lastly, some interviewees point out that national-level policymaking is important in unlocking sufficient demand at scale. One policy stakeholder stated:

> *"Scaling up will come after sufficient demand. Demand must arise from national political decisions. Otherwise, it is difficult to scale no matter how ready the region is"* (A1).

Such a view argues that regional coordination may not address the demand uncertainty issues. The future of the platform is jointly connected to more national and international-level political decisions that decide pricing, vehicle infrastructure, and plans for the long term.

Usually, the emerging platforms can potentially address some of these issues related to the demand side over time, e.g., fragmentation and absence of coordination among buyers. However, to eradicate demand uncertainty issues on the ecosystem level, complementary public-sector involvement is required to stabilize and activate demand in a way that will be reliable to both producers and investors.

4.3.4 Multi-Vector Energy Synergies

Multi-vector energy synergies are another external factor affecting an emerging platform's value evolution. Although this niche domain is particularly relevant to the case study, its overall evaluation sums up the impact of vertical integration on the development of B2B platform ecosystem dynamics. During interviews with the participants from different industries, the potential of vector-level synergies was highlighted, enhancing their strategic importance and vision at the ecosystem level. Many interview respondents expressed their interest in biogas integration with hydrogen and other synthetic fuels relevant to biogas production and utilization practices.

Many stakeholders described a direct technology linkage between biogas production processes and hydrogen technologies and how it could shape the exclusiveness of the emerging energy-related platform ecosystem. Methanation, or the combination of captured CO_2 from biogas with green hydrogen, was explained as a process that could enhance biogas yield and system-level efficiency. One producer explained this process:

> *"Hydrogen links to biogas production through CO_2 and the green CO_2, not fossil. So, it's a good opportunity to increase biogas production and make use of green CO_2. You can already collect it in a cheap way"* (P1).

This expands the role of biogas as a source of deriving other valuable byproducts, e.g., CO^2 and hydrogen, which are otherwise treated as waste.

Apart from direct technical advantages, hydrogen-biogas integration was also perceived as a strategic innovation pathway that would position biogas systems in future energy markets. The possibility of producing synthetic methane or e-fuels from local hydrogen and CO_2 from biogas was seen as a way to integrate the platform ecosystem into longer-term decarbonization strategies. One developer articulated this vision as follows:

> *"We are aiming to produce synthetic methane from CO_2 that comes from the biogas plant and locally produced hydrogen"* (T1).

Similarly, a municipal actor emphasized the attractiveness of this synthesis for future-oriented planning as:

> *"When you combine the CO_2 and hydrogen, you get this e-methanol or e-methane, that goes directly to the plate that we are looking for. So of course, that is interesting for every one of us"* (A3).

These views indicate that the stakeholders are looking at the platform beyond being an online coordination tool but also as a broader renewable energy system component. This interest in hydrogen-biogas synergies suggests a shift in how stakeholders envision the platform's role from a logistics and transparency tool to an enabler of strategic innovation. This aligns with the theories of platform ecosystems as a dynamic environment capable of adapting to new technologies over time. However, economic and long-term strategic coordination is needed. So, the platform's ability to evolve and create synergies is shaped by its capacity to align with emerging energy vectors.

5 Discussion

5.1 Overview

This section critically integrates the empirical insights from the analysis of this study with foundational theoretical constructs in platform ecosystem and service Dominant logic (SDL). The objective is to describe how stakeholder engagement, platform architecture, and institutional circumstances lead to value proposition emergence, evolution, and co-construction. There are three aggregate dimensions the Gioia approach reveals as the foundation of the study: (1) Stakeholder-Driven Value Co-Creation, (2) Platform-Enabled Value Proposition, and (3) External Factors Shaping Value Evolution. These findings illustrate how value is created and developed during the initial phases of service-based B2B platform ecosystems. This is particularly important in environments where local conditions and cooperation between the public and private sectors are central. Moreover, the visual processual framework developed from the empirical data serves as a foundation for discussing the theoretical and practical implications of the research. In the context of developing a new B2B platform ecosystem, we now explain how each dimension adds distinctive attributes to the platform's value proposition design.

5.2 Conceptual Framework: A Process-Oriented View of Value Proposition Emergence in the Emerging Platform Ecosystem

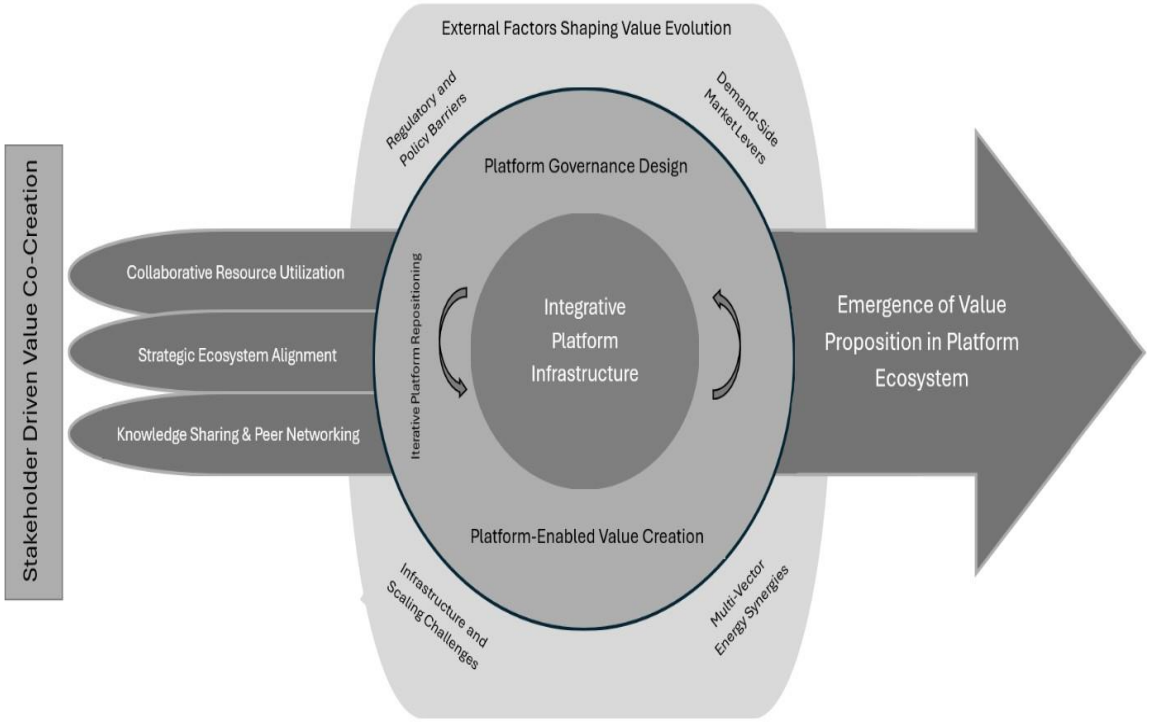

Figure 1 Conceptual Framework: The Emergence of Value Propositions in a Platform Ecosystem (author's own)

The analysis done in the previous section is used to illustrate how value propositions are maintained through iterated, multi-actor cooperation and contribution facilitated by platform-enabled functions in Figure 1. The following model is a process-oriented combination of the findings categorized by data analysis according to the Gioia methodology. This framework emphasizes how stakeholder-driven processes, such as collaborative resource utilization and strategic ecosystem alignment, are used to define platform emergence needs and highlight the critical roles of stakeholders in driving platform development. It also clarifies how external enablers and constraints in the broader environment, such as regulation and market dynamics, significantly impact value proposition initiatives. The process outlined in the framework demonstrates how the scattered dynamics of emerging ecosystems can be aligned through platform-mediated mechanisms such as strategic communication and stakeholder engagement

practices. The analysis indicates that co-innovative value propositions within emerging platforms are not necessarily outcomes of predetermined design decisions or characteristics. Instead, they emerge dynamically under diverse contextual conditions, including institutional configurations, infrastructural capacities, and market-driven conditions. Thus, this conceptual model of an emerging platform ecosystem incorporates empirical findings into an organized energy marketplace reference model, clearly distinguishing how value propositions emerge from the interaction between three interdependent and dynamic factors: stakeholder collaboration, contextual determinants, and cyclical platform development processes.

The framework illustrates how three interconnected processes across an ecosystem interact to create value propositions. First, the relational and organizational processes initiated by ecosystem actors are highlighted through stakeholder-driven value co-creation. These include strategic ecosystem alignment, in which actors coordinate goals and align their strategies with broader policy objectives. Through collaborative resource utilization, stakeholders share assets and capabilities, and through peer networking and knowledge sharing, which enhance learning, trust, and the dissemination of best practices. Platform-enabled value generation is central to the framework. This encompasses governance, digital capabilities, and platform design, all working together to facilitate service delivery, data transparency, and collaboration. The platform enables the operationalization and scalability of value through processes such as demand aggregation, regulatory assistance, and business model trials. External factors surrounding these fundamental processes influence how value evolves. These include technological advancements with the potential to either promote or delay systemic change, regulatory uncertainty, fragmented policies, infrastructural limitations, and market demand constraints. Ultimately, the framework asserts that multi-level alignment across these dynamics produces an advanced value proposition. Rather than functioning independently, the platform is a mediating framework that integrates digital functionality, broader systemic changes, and stakeholder agency. From this perspective, value is a co-evolving process shaped by ongoing feedback, institutional flexibility, and

the capacity to scale both technically and socially. In addition to providing a conceptual basis for situating the findings within broader theoretical discussions on platform ecosystems, co-creation, and digital transitions in sustainability-focused fields, this framework also synthesizes empirical insights into how platforms are co-produced through dynamic actor engagement and contextual responsiveness.

5.2.1 Stakeholder-Led Initiatives: Ecosystem Formation

The findings show that the platform ecosystem did not develop through top-down control alone. Instead, it emerged from bottom-up collaboration among regional actors. This aligns with earlier subsidy mechanisms supported at the regional level. It highlights that value co-creation is rooted in stakeholder interaction and mutual alignment. In B2B ecosystems, this process relies on trust, shared goals, and long-term cooperation (Adner, 2017; Schreieck et al., 2021).

The strategic role of municipalities in orchestrating networks and facilitating public-private projects highlights the necessity of “institutional entrepreneurship” at the local level (Hu, 2022). Unlike traditional platform orchestrators in mature ecosystems, these actors provided legitimacy and structural alignment without necessarily controlling the platform itself. This expands the platform literature by showcasing an influential but decentralized governance role, especially crucial in fragmented and emerging B2B ecosystems.

Institutional tools facilitate early-stage alignment, particularly municipal governance mechanisms like zoning regulations and procurement policy. These governance practices catalyse platform formation (Dang et al., 2022). Aligning diverse actors' interests around common goals, local governments serve as facilitators. They help bridge fragmented interests and promote joint commitment through multi-level coordination efforts, which include project-based alliances and inter-municipal planning bodies.

The public-private collaboration represents another essential axis in stakeholder-driven action, through which private and city actors co-produce collective agendas (Leviäkangas, 2019). These actions enable the system to overcome initial-stage limitations, such as the invisibility of resources and logistical fragmentation. Through collaborative exchanges, actors access underutilized resources (e.g., organic waste, transport capacity), fostering shared resource use practices and configurations that promote circularity (C. C. Mbanefo & Grobbelaar, 2025). Additionally, the shared utilization of dispersed, untapped resources (e.g., digestate, biowaste) represents a form of circular value creation that aligns with service-dominant logic (SDL), where value co-creation occurs through use and interaction (Vargo & Lusch, 2004). Interactions among actors are usually facilitated by stable networks, which strengthen trust-based cooperation, material flow, and know-how synergies.

As such, local co-creation is revealed as a process of building resilience for the circular economy. Through facilitating collective action at the micro-regional scale, actors establish the groundwork for resource allocation flexibility and adaptive value creation. Further, knowledge-sharing and peer-learning mechanisms allow for collective intelligence within the network, supporting alignment towards sustainability-oriented objectives. Most importantly, an independent facilitator tends to become central to managing such interactions, guaranteeing fairness, balancing power relationships, and trust among stakeholders (Dang et al., 2022). Such facilitators are not merely coordinators but also architects of trust, guaranteeing smooth operations in networked co-creation ecosystems. The empirical data attests that stakeholders actively reinterpret their respective roles (e.g., farmers becoming logistics players) to build a collective value logic. This meeting responds to recent demands for examining how platforms develop by reciprocally adapting and re-mapping roles within emerging ecosystems (Nerbel & Kreutzer, 2023).

5.2.2 Platform’s Role as Mediator: Enabling and Structuring Co-Creation

While early value emerged organically, introducing a digital platform formalized and scaled these interactions. Consistent with platform theory (Parker et al., 2016; Tiwana, 2015). The platform serves as a technical infrastructure and a socio-economic integrator. The digital platform becomes an active moderator of value co-creation, transforming previously informal exchanges into formalized and scalable service interfaces. The platform plays a dual role as a technical infrastructure provider and a relational bridge connecting actors through operational transparency and boundary-crossing interfaces (Schwandt et al., 2007).

The infrastructure must be both integrated and modular, enabling simultaneous coordination of logistics, resource flows, and transactional visibility. In doing so, the platform becomes an active value integrator, offering stakeholders information or listings and a system-wide view of the ecosystem’s operations and potentialities. This corresponds with the idea of the platform as a boundary object, a flexible entity that conveys meaning and functionality among various stakeholder groups (Islind et al., 2019)

One element of the platform's moderation potential lies in its collective ownership model. The research illustrates that platform governance is not a one-size-fits-all solution. Stakeholders expressed different preferences, from cooperative to third-party or neutral ownership, depending on the value logic desired (economic, environmental, and political). This supports Gawer's (2021) assertion that platform governance in emerging ecosystems must reconcile plural interests and avoid political or commercial capture. Compared to monolithic governance structures, co-ownership (Spagnoletti et al., 2024)Enhances participation by reducing perceptions of bias or control. Together with unbiased facilitation, such governance frameworks enhance ecosystem inclusivity and ensure alignment between regulations on the platform and the requirements of users. In this context, trust is an essential intangible resource. Its presence or lack thereof directly impacts engagement, investment, and long-term co-innovation (Budde et al., 2024).

In addition, to trust, service flexibility regarding premium feature transparency and modular access is essential for platform legitimacy and user retention (Heikinheimo et al., 2025; C. C. Mbanefo & Grobbelaar, 2025). The technical design must accommodate differentiated user journeys through adaptable and informative interfaces, ranging from small-scale farmers to large industrial off-takers. Finally, platforms in emerging ecosystems must also serve as digital intermediaries, bridging data, logistics, and regulatory frameworks. They act as regulatory facilitators in this capacity, broadly enabling compliance, certification, and policy communication. The result is a multi-purpose service interface featuring feedback loops, co-creation logic, and iterative platform repositioning. The platform evolves through continuous adoption and institutional flexibility as feedback mechanisms mature, responding to real-time ecosystem demands.

Additionally, the findings highlight that repeated platform repositioning in reaction to user reactions and changing stakeholder requirements is a key part of long-term platform sustainability. This echoes the idea of "generativity" in platform studies, where platforms develop through continuous contributions from their ecosystems (Eisenmann et al., 2008). Iteration did not stop at technology but also included governance structures, rules of engagement, and pricing models. In this way, the platform is not a set solution but an ongoing process of trial and readjustment.

5.2.3 Enablers/Triggers of Value Disruption

Despite the promise of platforms to manage value in ecosystems, several remote forces act as drivers of the failure of value creation. These range from regulatory uncertainty to infrastructural limitations and heterogeneous demand structures, all of which create uncertainty in the system and restrict the scalability of platforms.

Policy inconsistency is one of the most pressing disruptors, whereby short-term political cycles and regulatory flip-flopping erode long-term planning. This undermines actor

confidence, impacts investment schedules, and slows ecosystem maturation. Additionally, fragmented infrastructure, especially in biogas collection, storage, and distribution, hinders seamless integration and reduces the system's scalability potential.

The fragmentation of buyer commitment is just as tricky, representing a chicken-and-egg problem for demand-side aggregation. Without steady offtake or procurement signals, upstream players will not invest and, in turn, reinforce a low-scale equilibrium. Price instability in energy and commodity markets also creates market risk, distorting the perceived value of platform involvement.

Public procurement processes can serve as partial enablers in this regard. Governments can indirectly trigger demand and mobilize dormant ecosystem actors by integrating sustainability criteria into municipal tenders or public transportation policies. However, these efforts will typically be in isolation without vertical alignment between municipal, national, and EU-level actors.

Finally, value disruption happens when exogenous shocks, regulatory, infrastructural, or economic, catch up with the change capacity of the platform. To avoid this, platforms must build institutional flexibility into their foundations, with the capacity for dynamic response and external complexity absorption into designable and governable strategies.

5.3 Theoretical Contribution

This thesis contributes to the theoretical understanding of value proposition development in emerging business-to-business (B2B) platform ecosystems by offering empirical and conceptual insights across three primary domains: platform ecosystem emergence, stakeholder-driven value co-creation, and dynamic value proposition evolution.

5.3.1 Extending the Theorization of Emerging Platform Ecosystems

Most existing platform literature has centred on mature ecosystems, such as those of Amazon, Apple, or Google, where network effects, governance structures, and platform functionalities are already established (Alstyne et al., 2016; Cusumano, 2019). In contrast, this study situates itself within the under-explored domain of emergent platform ecosystems where stakeholders lack clear roles, platform infrastructure is still forming, and the value proposition is highly fluid and co-constructed. Focusing on an emergent biogas platform in Finland, the thesis addresses a critical gap in platform literature: the mechanisms through which ecosystems begin to form rather than how they scale or sustain.

This work advances by illustrating how early-stage orchestration is not solely the responsibility of a single "platform owner." However, it is distributed across municipalities, developers, users, and producers who engage in co-creation practices before any formal platform materializes. The study thus challenges traditional models that assume top-down orchestration and instead emphasizes multi-actor, bottom-up orchestration grounded in strategic alignment, peer networking, and resource mutuality.

5.3.2 Reframing Value Propositions as Dynamic, Co-Evolutionary Constructs

Building on Service-Dominant Logic (Vargo & Lusch, 2004) and ecosystem theory (Adner, 2017), this thesis reconceptualizes the value proposition not as a static offering but as a co-evolutionary process shaped by stakeholder interactions, external contingencies, and platform-mediated coordination. The research illustrates that in emerging ecosystems, value propositions are iteratively negotiated, reframed, and repositioned in response to stakeholder feedback, policy shifts, and infrastructural limitations.

Empirical findings from the Finnish biogas platform demonstrate that value is co-constructed through ongoing experimentation and adaptive collaboration among diverse actors, including private firms, public organizations, and technology providers. In

line with recent work (Hawlitschek & Hodapp, 2024), the study determines that emerging B2B ecosystems are characterized by high uncertainty, fragmented interests, and infrastructural immaturity—factors that hinder the application of fixed, top-down platform strategies. Instead, value propositions evolve dynamically as stakeholders respond to changing conditions through informal governance, resource alignment, and joint problem-solving.

This perspective expands upon firm-centric and innovation-centric views of value creation by demonstrating that in early-stage B2B contexts, the platform's value is collectively enacted and continuously reconstructed through adaptive practices such as collaborative resource utilization, feedback loops, and iterative governance experimentation. Moreover, the findings highlight practical challenges often overlooked in existing theory, such as building trust, achieving stakeholder alignment, and negotiating platform control.

Actor engagement is shown to be motivated not only by economic interests but also by broader sustainability goals, particularly in the renewable energy sector, where public interest and regulatory influence play significant roles (Pauli et al., 2021). These findings also expand current theoretical frameworks, such as S-D logic and boundary resources theory, by incorporating external factors like regulation, infrastructure readiness, and market conditions (Ghazawneh & Henfridsson, 2010; Lusch, 2015), providing a more grounded, processual understanding of value co-creation in nascent platforms.

Using the Gioia methodology in this context further contributes to theory by mapping how micro-level actor narratives converge into macro-level patterns of ecosystem development, showing value propositions not as predetermined offerings but as emergent, negotiated constructs within evolving platform architectures.

5.3.3 Integrating External Institutional and Infrastructural Dimensions

Thirdly, this research adds a contextual institutional dimension to platform theory. Whereas much platform literature assumes a relatively stable regulatory and infrastructural environment, this study highlights how regulatory ambiguity, infrastructural fragmentation, and policy inconsistency serve not just as barriers but as active forces that shape the trajectory of ecosystem formation and value proposition design. By incorporating these external constraints into the theoretical analysis, the thesis extends our understanding of platform viability beyond digital or organizational factors to include multi-level systemic contingencies (e.g., regional energy policy, feedstock logistics, permitting complexities). This offers a more comprehensive model for theorizing platform ecosystems that captures technological and stakeholder dynamics and aligns with institutional complexity theory and systems thinking for the development of platforms in resource-intensive and sustainability-oriented sectors like biogas.

5.3.4 Practical implications

The findings from this study present several important practical implications for stakeholders involved in developing and governing emerging digital platform ecosystems, especially in complex, multi-actor sectors like the biogas industry. The study's insights offer valuable guidance to platform designers, policymakers, municipal authorities, and private sector participants on co-creating sustainable, scalable, and inclusive digital ecosystems that generate mutual value.

This research underscores the essential role of engaging stakeholders early in shaping the fundamental structure of platform ecosystems. It illustrates that the successful development of a platform depends more on social coordination, trust-building, and strategic alignment among key players than on technology itself. In this context, municipalities are presented as facilitators rather than mere bureaucratic bodies; they authenticate the platform through policies, zoning tools, and symbolic endorsements.

Consequently, practitioners involved in public-private innovation initiatives should recognize that including municipal actors from the beginning and defining their roles as ecosystem enablers instead of operators can boost platform credibility and encourage stakeholder support.

Second, the study highlights the importance of including decentralized resource flows and mutual circularity in platform value propositions. Instead of concentrating on transactional efficiency, stakeholders can realize substantial value through collaborative logistics, shared infrastructure, and coordinated reuse of biological by-products. For agricultural and industrial operators, embracing a platform approach may create new business opportunities for energy production and cost reduction, price volatility mitigation, and improved regional sustainability.

Besides this, the outcomes call for overcoming pragmatic obstacles toward value co-creation, such as fractured infrastructure and conditional regulatory facilitation, alongside digital development. The regional innovation agencies and platform builders should desist from siloed digital approaches. Physical and infrastructural planning must be accommodated in their platform development approaches accordingly. This may involve the formation of alliances in mutual investments in logistics chains or facilitating digital service design according to regional policy instruments like procurement or eco-mobility incentives.

The research also yields actionable platform governance design recommendations. The call for a collective or neutral ownership approach was a common refrain from the stakeholders, and they called for it, especially in the initial stages of platform development. This finding is relevant to local development efforts at scaling up ecosystem innovation without politicization or capture. Platform builders must incorporate values of mutual ownership and openness mechanisms in their governance framework to earn legitimacy and enduring stakeholder participation.

Furthermore, the study calls for platform iterative building, and feedback and shifting user demands must be used as inputs as soon as possible. Platform companies and providers of technical elements must embrace modular and flexible paradigms and accommodate shifting services and governance structures. User participation must be ongoing, testing must proceed concurrently, and minimal coordination approaches must be pursued to monitor stakeholders and change responses due to shifting ecosystems.

Finally, the results highlight the untapped potential of demand aggregation and knowledge-sharing services for industrial purchasers, logistics coordinators, and technology service companies. A well-designed platform can be a central hub that links fragmented supply chains, boosts regulatory compliance, and increases visibility into resource flows and technological advancements.

5.3.5 Limitations of the Study

This study provides an illuminating insight into how value propositions evolve and form in a regional biogas platform ecosystem. However, acknowledging their limitations will provide room for objective interpretation of the outcome and future research avenues. They are a function of methodological decisions, boundaries on the extent of the study, and contextual conditions that necessarily influence the research's validity, reliability, and generalizability.

The research relies on a single-case study design, which effectively facilitates in-depth qualitative exploration but limits the generalizability of the findings beyond the Ostrobothnia biogas ecosystem in Finland. Although comprehensive, context-specific data were gathered from various stakeholders, the Finnish energy landscape's unique economic, regulatory, and cultural factors might not directly translate to other areas or sectors. Consequently, the interpretations and conclusions of this study should be regarded as insights tied explicitly to the context rather than universal principles of platform emergence.

Second, the study utilizes semi-structured interviews as its primary method for data collection. While these interviews provide depth and flexibility, they also carry a degree of subjectivity. The resulting data is interpretive, influenced by the participants' expressions and the researcher's analytical approach. Although triangulation, iterative coding, and reflexivity reduce interpretive bias, the insights remain co-constructed narratives. Participants might have highlighted specific perspectives or refrained from offering criticisms based on their interests or views regarding the researcher's connection to the project, which could affect the authenticity or completeness of the findings.

Another limitation involves language diversity and translation bias. Interviews were held in Finnish and English, according to participants' preferences. This linguistic flexibility promoted inclusivity but also posed potential inconsistencies in interpretation. Translation, paraphrasing, and cross-language coding might have resulted in subtle shifts in meaning, especially when trying to capture nuanced expressions or culturally specific terms. Despite efforts to preserve semantic fidelity, the risk of misinterpretation remains.

A second important limitation concerns the period of the research. The research traces the early genesis and evolution of the platform and value propositions over a specific time horizon (June to September 2024). Because platform ecosystems naturally evolve, this investigation catches only a momentary snapshot. Tracing those dimensions over a longer time window may identify further evolution of stakeholders' tasks, platform governance changes, or market reactions that could change the inherent value proposition or falsify the assumptions made in this study.

Moreover, regardless of the intentional diversity, the range of stakeholder representation is relatively narrow. The study involved farmers, biogas users, technology providers, municipal governments, and developers, but several potentially important actors, like national regulators, financial investors, or external policy organizations, were not part of the data collection.

Finally, while the methodological reliance on the Gioia approach effectively organizes data into theoretically significant constructs, it may unintentionally result in over-coding or the imposition of data into thematic hierarchies. Although this structured abstraction process aids in theory-building, it may overlook outlier perspectives or non-conforming data that do not easily align with emerging themes yet still provide valuable disruptive insights.

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Appendices

Appendix 1. Sample Questionnaire for one biogas user

Biogas Hubs Project Questionnaire **Biogas Users**	
Questions	**Answers**
1. What type of biogas quality do you need, and in which form is it required: Compressed Biogas (CBG) or liquified Biogas (LBG)? Quality Standard/Format.	
2. How do you acquire (Engagement Mode) needed biogas? **If possible**, specify the quantity—volume (Cubic meter).	
3. What are the main challenges you face in the biogas industry? Could you identify unmet needs that significantly scale up your biogas usage and enhance operational excellence? Needs and Challenges.	
4. What form of platform fee u are ready to try, or how these payment methods would influence your decision to participate in a digital platform (Marketplace) for biogas stakeholders connecting the broader network of 3 different regional biogas digital hubs in the Ostrobothnia region? Reason to join the platform **IF NOT KNOW: Ask for views about transaction-based (revenue sharing) or access-based (subscription, membership, pay once) r**evenue model selection.	
5. What services/offerings should the DBH platform offer to scale up your engagement in the industrial ecosystem within your region? Which services on the DBH platform are linked to hydrogen utilization and transportation? **If there is no answer, then (Options could include marketplace listing, suppliers' access, and Geo-**	

mapping) Value Proposition: What is your preference for paid premium features and services on the DBH platform, such as increased data visibility and advertising options? User Mindset for monetization streams.	
6. What core business opportunities are you looking for when interacting with other actors in the biogas value chain? What level of support and engagement do you expect from the platform organizers? Core Business Opportunities.	
7. What do you think (single owner - group parties) platform control arrangement best suits the DBH digital platform? Who do you think should run the platform? Preference for ownership.	
8. Mention the names of your co-partners or business allies who can be a potential participant in the digital hub platform. Potential Participants for Scalability.	