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RESEARCH ARTICLE

How the Textile and Fashion Industry Become Circular: Collaborative Frontrunner Practices Leading to Decentralized Collaborative Governance of Ecosystems

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Abstract

This paper discusses how the concept of collaborative governance may contribute to our understanding of the dynamics of circular business ecosystems. This is done in three steps. First, the concepts of circular business ecosystem and collaborative governance are discussed and combined. Second, the ensuing theoretical framework is used to analyze the circular business ecosystem behavior of seven frontrunner companies, especially focusing on ecosystem governance configuration and ecosystem role dynamics. Third, based on an identification of three patterns of strategic response among the frontrunners, the paper discusses variations of strategic behavior, ecosystem role dynamics, and changes of governance. By identifying and applying four theoretical insights from the combination of circular business ecosystem thinking and collaborative governance thinking, the paper develops a new framework for analyzing and understanding the interplay between strategic behavior and ecosystem evolution and co-evolution, including how ecosystem sensing and seizing deviate across different patterns of strategic behavior.

Keywords Green Transition · Collaborative Governance · Ecosystems

1. Introduction

This paper focusses on how actors in circular business ecosystems develop new relationships, acquire new dynamic capabilities, assume new organizational roles, and engage in new types of collaboration as the circular business ecosystem evolves. The main focus is on agency as the driving force of ecosystem evolution, where agency expresses itself in terms of strategic behavior, experimentation, learning, and ecosystem governance. While scholarly work on ecosystem evolution and orchestrating is gaining traction (Ferrari et al., 2025; Geissdoerfer, Kanda & Kirchherr, 2025), emphasizing the need to focus on the interplay between actors, actor roles, interactions, flows, and outcomes, and how this interplay changes over time (Geissdoerfer, Kanda & Kirchherr, 2026), less attention has been devoted to how alignment of ecosystems is framed by collaborative governance. This paper aims to fill this gap by integrating our understanding of the evolution of circular business ecosystems and the notion of collaborative governance (Ansell & Gash, 2008; Emerson & Nabatchi, 2015; Bianchi, 2021; Gjerding & Larsen, 2024).

The motivation for this paper originated from an interest in how the textile and fashion industry may contribute to the development of a circular economy. Research has shown that planetary boundaries, as defined by Rockström et al. (2009), are being exceeded (Kitzmann et al., 2025), potentially pointing towards several irreversible tipping points. Being responsible of some 10 % of global carbon emissions (Ninimäki et al., 2020),

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the textile and fashion industry is a major contributor to planetary risks (Centobelli et al., 2022). The predominant textile and fashion material flow is linear (Klooster et al., 2024), and there is a clear lack of circular practices throughout the industry (Lacy et al., 2020). The industry is in need of focusing on sustainable and circular solutions, which, however, are currently hampered by slow development of technological solution, financial resources (especially for SMEs), scalability of existing solutions, quality and longevity of textiles containing recycle fibers, absence of well-established value chains for take-back solutions, and barriers to strategic re-orientation created by existing business models and institutional practices within the companies (Aakko & Niinimäki, 2024; Dzhengiz, Riandita & Broström, 2023; Logan et al., 2025).

Companies within the textile and fashion industry have realized the need to focus on sustainable and circular solutions and have embarked on a journey which is yet to unfold. In this paper, we focus on seven frontrunners in the Danish textile and fashion industry and explore how they develop new practices and new capabilities as they develop new sustainable and circular solutions. An outcome of this exploration is to distill best practices that can be explicated and disseminated to other companies and organizations in the Danish textile and fashion industry, as explained in section 3.

At the beginning of our exploration, we had the idea that new sustainable and circular solutions would lead to new business models and, as such, could be explained by focusing on how circular business models are created and unfold by focal actors who set the direction for circular development along value chains. However, as we dug into the frontrunner companies, we realized that how they create and implement new sustainable and circular solutions requires that they develop new relationships with suppliers, customers, and other types of actors that go beyond the circular business model and involves actors throughout the ecosystem to which the frontrunner belong, and in most cases also lead to ecosystem innovation. In consequence, there is analytical value to gain from substituting a focus on circular business models with a focus on circular business ecosystems, as argued by Kanda, Geissdoerfer & Hjelm (2021). The behavior that we observed among the frontrunners implied new lines of collaboration that frame the type of governance characterizing the ecosystem in which the frontrunner operates. Hence, the notion of collaborative governance became instrumental in understanding the behavior of the frontrunners.

In this paper, we set out to combine the notions of circular business ecosystems and collaborative governance and use this combination for analyzing the ecosystem behavior of the frontrunners. Section 2 outlines how focusing on circular business ecosystems is an alternative to conventional business economics thinking and explicates why circular business ecosystem thinking needs to focus on how actors change roles and capabilities as the ecosystem evolves, and how this line of thinking can benefit from models of collaborative governance. By combining circular business ecosystem thinking and collaborative governance thinking, the paper offers four theoretical insights:

1. The type of collaborative governance characterizing a circular business ecosystem depends on the extent to which ecosystem evolution is driven by focal actors, and the extent to which focal actor dominance can be mediated by ecosystem co-orchestration exerted by other actors.
2. The type of collaborative governance may change over time, as new roles and relationships develop, and ecosystem leadership becomes contested.
3. The extent to which actors are influenced by the governance mode depends on the extent to which actors are embedded in the ecosystem.
4. Strategies of new business endeavors are likely to reflect the prevailing mode of ecosystem governance.

By doing this, we answer the research question of how the concept of collaborative governance contributes to our understanding of the dynamics of circular business ecosystems. Section 5 discusses how this combination helps us understand and learn from the circular business ecosystem practices of the seven Danish frontrunner textile and fashion companies that constitute the empirics of this paper. To create a background for this discussion, section 3 presents the empirical setting and methodology, while section 4 presents the findings of our empirical exploration. Finally, section 6 concludes on the contribution of the present paper.

2. Theoretical Framework

It has been argued that promoting circularity as the basic principle of production and consumption means breaking away from the conventional economic conceptualization of value chains and market structures (Raworth, 2017), an argument which has gained traction during recent years (Shao, 2025). One might imagine that changes promoting sustainability within the textile and fashion industry could be achieved by relying on the market mechanism to coordinate such efforts, provided that the market equilibrating forces operate in favor of green solutions and products as compared to other types of solutions and products. However, while it was long the hope that consumers to an increasing degree would demand textiles originating from more circular production processes, time has shown that this remains a niche (Dzhengiz, Haukkala & Sahimaa, 2023) and that textile and fashion companies experience less attention from customers when it comes to circular initiatives (Amed et al., 2020; Dansk Mode & Tekstil, 2025). Since this is the case, market dynamics could be stimulated by regulating the price mechanism, e.g., through taxes and subsidies, or by policy measures as reflected in the ambitious textile strategy presented by the European Union in 2020 which, however, has since been renounced as environmental measures were rolled back during the Autumn of 2025. Instead, the market needs to be organized to some extent to ensure that the economic actors pursue goals and activities that are non-conflicting and support the emergence and instigation of green activities in a cost-efficient way that ensures competitiveness. Within conventional economic theory, the organization of markets as opposed to pure market mechanisms are typically conceptualized as the creation of hierarchies, i.e., by integrating the various activities and actors within a focal company, as for instance described by the transaction cost perspective (Williamson, 1975; 1981). However, organizing circularity implies complexity that goes beyond traditional hierarchically organized markets, since it requires innovation between economic actors not only along value chains (Todeschini, Cortimiglia & de Medeiros, 2020), but across systems of input and output (Sarja et al., 2025).

What this means for our understanding of circularity in an economic and market context is that instead of focusing on the behavior of focal firms we need to focus on the interaction between collaborating firms within a complex system. As argued by Kanda, Geissdoerfer & Hjelm (2021: 2817), the value creation and capture of circular activities "will not be exclusively undertaken by the focal firm but rather include an extended network of suppliers, partners, and customers", implying that analysis of circular activities requiring coordination between stakeholders involved in developing and implementing circular systems must be undertaken at a system level rather than a firm level. Following this understanding, this section describes the theoretical framework for the subsequent analysis of our empirics by discussing, respectively, the concepts of circular business ecosystems and collaborative governance before presenting theoretical insights on how these concepts can be combined.

2.1. Circular business ecosystems

Ecosystems, as applied in social science, carry a range of definitions, as explained by e.g. Konietzko, Bocken & Hultink (2020) who refer to business ecosystems, innovation ecosystems, service ecosystems, and platform ecosystems. In a circular context, the notion of ecosystem has been referred to as business ecosystems, innovation ecosystems, digital and platform ecosystems, industrial ecosystems, urban ecosystems, entrepreneurial ecosystems, and knowledge ecosystems (Kanda, 2023), later to be supplemented with the notions of service ecosystems and food ecosystems (Geissdoerfer, Kanda & Kirchherr, 2026). In this paper, we focus on circular business ecosystems, which may be defined as "a set of actors with varying degrees of multilateral, nongeneric complementarities that are not fully hierarchically integrated" (Jacobides, Cennamo & Gawer, 2018: 2264), where the dynamics of the ecosystem is characterized by "coordination among diverse actors, including producers, suppliers, service providers, end users, regulators, and civil society organizations to create value for customers" (Kanda, 2023: 4; see also Kanda, Geissdoerfer & Hjelm, 2021).

The concept of ecosystems originated in ecological analysis before the Second World War (Tansley, 1935) and has served as an inspiration for the concept of business ecosystems, which is conventionally attributed to Moore (1993). Moore (1993) envisioned the ecosystem as pivoting around a focal actor where the ecosystem progresses through four phases, i.e, birth, expansion, leadership, and renewal. The ecosystem is born when the focal actor starts working with customers and suppliers on introducing something new to the market and is later expanded by the focal actor scaling up the value proposition in collaboration with suppliers and partners.

Having done that, the focal actor provides leadership in the sense that suppliers and customers are encouraged to work together with the purpose of further development of the value proposition. At that point of time, the ecosystem is fully established, but as markets become saturated and new innovations occur elsewhere in the economic system, the focal actor needs to work with innovators to renew the ecosystem.

As this path unfolds, the stakeholders in the ecosystem assume roles that align their strategic goals and aspirations, and concomitantly their capabilities tend to coevolve as their behavior and activities unfold to support the alignment (Moore, 1996). According to Iansiti & Levien (2004), the roles assumed by stakeholders reflect the match between their strategy and the environment in which they operate (see figure 1). If the environment is turbulent and characterized by a high degree of innovation, but the complexity of relationships with other stakeholders is relatively low, the stakeholder may pursue a *niche* strategy to have competitive advantage within a small segment of the ecosystem. If complexity of relationships is relatively high, but the environment is stable with a low degree of innovation, the stakeholder may pursue a *physical dominator* strategy, i.e., focus on controlling assets and functions, which eventually may lead the stakeholder to become "its own ecosystem, absorbing the complex network of interdependencies that existed between distinct organizations" (Iansiti & Levien, 2004: 74). Finally, a *keystone* strategy is appropriate in a situation where the stakeholder is a focal company, operating at the core of the ecosystem with multiple relationships and a vibrant environment. A keystone strategy implies that the company is able to manage and orchestrate a set of assets distributed among a number of stakeholders throughout the ecosystem.

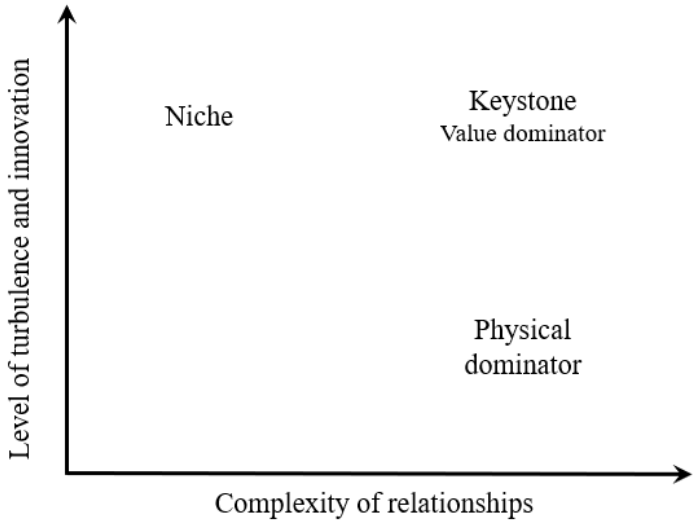

Figure 1. Matching strategy to the environment (elaborated from Iansiti & Levien, 2004: 74).

However, while this approach assumes that actors align their roles to a certain distribution of roles which, to an important degree, is framed or perhaps even orchestrated by the focal firm, there is no reason to expect that a more or less fixed set of roles applies as the ecosystem evolves. Ecosystem leadership is likely to be contested while the ecosystem develops as actors elaborate on dynamic capabilities and as the competition between the ecosystem in question and other ecosystems unfold (Adner & Kapoor, 2010; Adner, 2013; Adner, 2017). This implies that actors change roles over time.

The recognition that actors change roles over time is important to how we understand the business ecosystem concept, because it adds emphasis on the role of agency in the evolution of the business ecosystem. Within business economics, there has been a tendency to focus on either the roles of actors and the co-evolution of roles as the ecosystem matures, or on the activities that must be in place to ensure that the value proposition is efficiently delivered to the market (Adner, 2017), and even though it is possible to reconcile these two differing views (Hou & Shi, 2021), it still presents a somewhat static view of the manifestation of agency through time. The same dilemma can be observed in the field of circular business ecosystems, where there is often a focus on interactions and resource-flows across actors, but seldom an explication of intertemporal change of roles across the set of actors (Geissdoerfer, Kanda & Kirchherr, 2026). However, in the case of circular business systems, the need to focus on intertemporal changes of roles is even more important, because the evolution of a circular business ecosystem means breaking away from the kind of established business-as-usual logic that characterizes linear ecosystems. Instead, actors must collaborate on creating new ways of

envisioning business and materialize the new ways in terms of flows of resources and knowledge, and processes of planning, producing and executing, implying interactions across actors and systems that need to be deeply networked and reflected in the organizational culture and structure of not only individual actors but also across the set of actors that constitute the ecosystem (Sewenet, Boulaksil & Pisano, 2026; Kanda, Geissdoerfer & Hjelm, 2021; Jabbour et al., 2019).

The change of roles might be closely linked to a change of mindset, i.e., how actors perceive their value proposition and industrial activities as they become more and more embedded in circular activities. Gomes et al. (2023) propose that actors change behavior in three phases, as they move from traditional business model behavior and activities to ecosystem-oriented behavior and activities. In the first phase, *broadening view*, actors start developing an understanding of how ecosystem-orientation may change their business. Managers embark on ecosystem reframing in the sense that they recognize "that the firm is part of an ecosystem" (Gomez et al., 2023: 9) and therefore rethink their relationships with partners. This is an ongoing cognitive process guiding the following phases, where actors *integrate* ecosystem-orientation in business activities by demarcating organizational boundaries and roles within the ecosystem, repositioning strategic positions, aligning roles and activities across the ecosystem, and defending the new roles that have been adopted, which lead to *orchestrating* through the development of governance systems.

For the actors who drive the evolution of an ecosystem, the process of becoming increasingly embedded in a circular ecosystem involves development of new dynamic capabilities, as argued by Castillo-Ospina et al. (2025). Actors must be able to *sense* circular economy opportunities by mapping the ecosystem, including the opportunities for circular value cycles, and the kind of competencies and knowledge that is available in the ecosystem and needed for complementing the actor's business activities. Discovering and tapping into complementary activities, competencies and skills are necessary to overcome the structural barriers that circular activities entail (Sarja et al., 2025). Sensing is a prerequisite for *seizing* opportunities which, according to Castillo-Ospina et al. (2025) implies that actors engage in prototyping of new products and business models, innovating together with other ecosystem stakeholders, sharing knowledge across actors, and redesigning the business and structural relationships with other actors, including suppliers and customers. These endeavors lead to *ecosystem integrating* in the sense that internal practices become reconfigured according to the need of the new circular activities, and that actors engage in aligning the elements of the ecosystem. Standardization across products, processes and certifications contributes to alignment and thus becomes an important part of securing a baseline for activities across the ecosystem actors (Castillo-Ospina et al., 2025; Garcia-Ortega et al., 2025).

How actors position themselves in a circular ecosystem depends on the type of business models they apply. As described by Geissdoerfer et al. (2020), stakeholders may combine different strategies for developing a circular business model, see figure 2. They may retain their current business model and diversify into new areas by creating an additional business model within the company, or by acquiring an existing circular business model outside the company. They may transform a current business model into a circular business model, or they may create a start-up as a whole new activity. As they in most cases do not fully devote all their activities and resources to circular activities, but retain a major part of the previous linear business activities, actors are confronted with the need to manage a portfolio of activities based on different kinds of business logics, implying that portfolio management is an important capability when ecosystems are innovated (Gomes et al., 2023a). Furthermore, in the case of start-ups, actors have to take into account that scaling-up activities requires complementary actors, resources and knowledge to seize circular opportunities and mobilize ecosystem dynamics, the set of which is contingent upon the interplay between the economic, political, and social nature of the environment in which the start-up operates, and how the start-up strategically addresses the environment (Tabares & Kanda, 2026). According to Tabares & Kanda (2026), these strategies may take the form of *fit-and conform* or *stretch-and-transform*, where the former represents an adaptation to the existing environment, while the latter focuses on creating change of the environment. The fit-and-conform strategy may take the form of *adapt-and-comply*, where the start-up adapts to prevailing standards and institutional requirements at the market, or *adjust-and-refine*, where incremental changes are applied to "gain traction through the small-scale diffusion of CE principles" (Tabares & Kanda, 2026: 10). The stretch-and-transform strategy may take the form of *renew-and-configure*, where cultural norms, patterns of consumption, and network of actors change through social, organizational, and technical innovations, or *alter-and-replace* where existing technologies and practices are changed, thereby altering industrial structures and institutional logics.

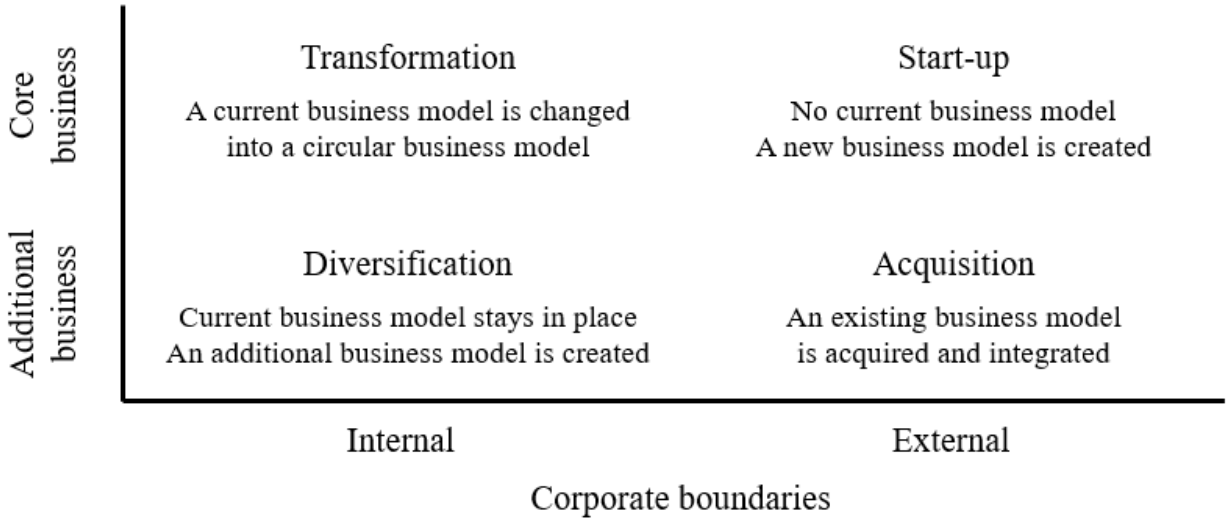

Figure 2. Circular business model innovation (elaborated from Geisdoerfer et al., 2020: 8).

2.2. Collaborative governance

The concept of collaborative governance stems from the fields of political science and public administration, where it has been used to analyze and understand cases where the involvement of stakeholders has been instrumental in solving problems or achieving aims that could no longer be solved or achieved efficiently by public monopoly alone (Gjerding & Larsen, 2024). The main driver of collaborative governance is the occurrence of issues that require more actors to collaborate, because hierarchy fails as institutional setup for problem-solving activity and is substituted by "coordination across multiple organizations and stakeholders from public, private, and non-profit sectors that combine in a network to address a common and shared problem" (Bingham, 2011: 386 with reference to Bevir, 2006), to some extent occurring in the form of wicked problems (Bianchi, 2021). Collaborative governance is often conceptualized as "initiated by public agencies and institutions" (Ansell & Gash, 2008: 544) who through facilitative leadership and mediation ensure deliberate decision-making based on consensus within an institutional design that emphasizes clear rules and transparency of decision-making processes guided by "an explicit and formal strategy of incorporating stakeholders" (Ansell & Gash, 2008: 546). However, as shown by Emerson & Nabatchi (2015), collaborative governance "denotes a system in which cross-boundary collaboration represents the dominant mode for conduct, decision making, and activity among autonomous participants who have come together to achieve some collective purpose defined by one or more target goals" (Emerson & Nabatchi, 2015: 28), which may occur in a variety of forms where shared goals, rules, and processes are not necessarily the outcome of deliberation initiated by a focal actor, but emergent properties that develop as collaboration evolves.

While wicked problems (Rittel & Webber, 1973), as mentioned by Bianchi (2021), to some extent cause collaborative governance to be a relevant institutional set-up, collaborative governance is also important for a more general reason, i.e. that organizations increasingly find themselves as actors in complex systems where specialized knowledge is distributed across a variety of actors who depend on one another for applying and developing knowledge and competencies to problem-solving and development (Ansell & Gash, 2008; Emerson & Nabatchi, 2015). This means that collaborative governance has the potential of being a source of efficiency in cases where hierarchy or market forces are insufficient to mobilize knowledge across interdependent actors. While increased efficiency is often assumed to be an inherent property of collaborative governance, failures occur, which has given rise to an increasing body of scholarly work on how to implement collaborative governance (Bianchi, Nasi & Rivenbark, 2021) and undertake performance management (Waardenburg, Groenleer & de Jong, 2025). The main challenge for implementing and monitoring collaborative governance is that collaborative governance spans a multitude of actors embedded in different contexts and strategies and therefore requires a different approach than can be found in contexts characterized by some form of hierarchy. Collaborative governance implies a number of process challenges related to ensure joint commitment, shared understandings, and learning oriented interaction among the collaborators

(Waardenburg, Groenleer & de Jong, 2025: 746-747; Gjerding & Larsen, 2024), the solution to which depends on the conditions by which collaborative governance is established, and the set-up of the collaborative process (Ansell & Gash, 2008; Kelman et al., 2023). Important to solving the process challenges is the level of trust by which the actors enter the collaboration, and the entry level of trust is to an important extent determined by the interplay between previous history of collaboration and the incentives by which actors engage in collaborative governance. Incentives may offset previous unfortunate experiences of collaboration and reinforce previous fortunate experiences, and trust is developed further if the process of collaboration supports increasing commitment to collaboration. Important factors for a virtuous circle between trust-building and commitment are that power asymmetries are either absent or exerted transparently in a way that supports collaboration, and that actors are aware of being mutually interdependent and thus open to explore and share knowledge and mutual gains.

This implies that actors are not opposed to experimentation and changes of the form of collaborative governance as collaboration develops over time. The form of collaborative governance is determined by the relationship between the actors, and relationships in a multi-stakeholder setup may change as actors develop knowledge, experience, and market power at differential speed. In consequence, any initial relative distribution of power across actors is not a fixed property of collaborative governance but may change as collaborative governance evolves over time.

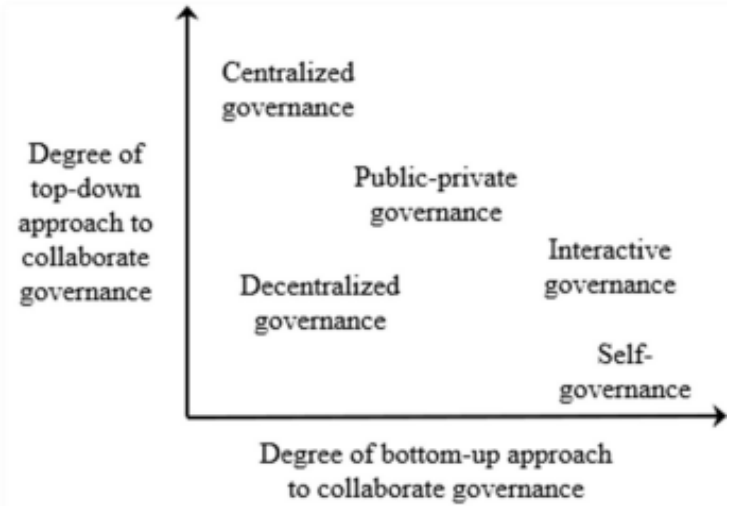

Figure 3. Typology of collaborative governance (adapted from Gjerding & Larsen, 2024: 5).

We propose that this evolution can be identified and analyzed by taking, as point of departure, an inventory of types of collaborative governance that spans from strictly centralized governance to governance where power asymmetries are absent. In doing so, we are inspired by Driessen et al. (2012) who suggest that collaborative governance can be defined in terms of a trade-off between top-down and bottom-up approaches, see figure 3. *Centralized* governance is a top-down structure where a central authority sets goals and strategic aims that are pursued by a selected group of stakeholders according to formal rules. *Decentralized* governance represents the opposite configuration, where stakeholders negotiate how to implement the centrally defined goals and hold considerable influence on practice. *Public-private* governance is a middle position where stakeholders have a final say in implementing centrally defined goals. *Interactive* governance takes this position a bit further in the sense that all stakeholders have an equal say, and goals and implementation are determined through continuous negotiation. Finally, within *self*-governance, stakeholders determine bottom-up which goals and activities to pursue as goals and activities are developed and unfolded through collaboration.

2.3. Combining circular business ecosystems and collaborative governance

Discussing extant literature on circular business ecosystems, section 2.1 emphasized that analysis of circular business ecosystems needs to focus on how actors change roles and capabilities as ecosystems evolve. Changes

of roles and capabilities imply that the governance structure of an ecosystem will develop and probably change over time, and section 2.2 presented the concept of collaborative governance as an avenue for understanding these changes, which is new in how circular business ecosystems are normally perceived and analyzed. We propose that by combining circular business ecosystem thinking and collaborative governance thinking, four new theoretical insights valuable for empirical analysis present themselves.

First, how the types of collaborative governance described above manifest themselves in circular business ecosystems depends on the relative importance of focal actors driving ecosystem evolution and the extent to which ecosystem evolution depends on actors co-orchestrating development. If the focal actor dominates the ecosystem evolution by setting demands and standards to which other actors must comply, the ecosystem will be characterized by centralized governance. However, if there is ample room for experimentation and negotiation, and knowledge flows originate and spread from various actors across the ecosystem, then the ecosystem will be characterized by decentralized governance. If actors operate in parity and have the opportunity to exert considerable influence on ecosystem evolution, the ecosystem will be characterized by interactive governance. Finally, in the case of self-governance, the ecosystem will emerge as activities pursued by actors coincide in the marketplace and give rise to new lines of relationships.

Second, the evolution of ecosystems implies that the governance mode of a circular business ecosystem is not fixed but may change over time as actors assume new roles, relationships across actors develop, and ecosystems leadership is contested. Innovation of circular activities is likely to foster new relationships among actors and give rise to dynamic capabilities that enable actors to change their ecosystem position. As actors become increasingly embedded in a circular business ecosystem as ecosystem integration unfolds, the ability to sense and seize circular opportunities will grow as actors gain experience with ecosystem functioning. Sensing and seizing are not only a prerequisite for engaging in circular activities but will also be strengthened by circular activities through learning processes and the accumulation of knowledge and experience.

Third, the extent to which actors are influenced by the governance mode of a circular business ecosystem depends on the extent to which actors are embedded in that ecosystem. If actors engage in circular activities only as a supplement to more conventional linear activities, they are more loosely coupled to a circular business ecosystem than if circular activities were their main business. This means that the prevailing mode of governance in the circular business ecosystem exerts less influence on the portfolio of activities and business logics enjoyed by the actor. Conversely, this might imply that the actor is less prone to contest ecosystem leadership or ecosystem governance, since the total effect of ecosystem governance on the actor's business activities is relatively small.

Finally, in the case of start-ups, which might also account for new business adventures that are organized in isolation from conventional linear activities and thus could be regarded as intraorganizational start-ups, the strategies for scaling-up are likely to be reflections of the prevailing mode of ecosystem governance. Adapt-and-comply strategies would fit cases where ecosystem governance is centralized, while adjust-and-refine strategies would be more suited to cases of decentralized ecosystem governance. Renew-and-configure strategies which imply institutional change of a collaborative nature would be instrumental to the kind of processes that take place in cases of interactive governance, while alter-and-replace would fit both cases of interactive governance and self-governance.

In the following empirical analysis, we primarily use (1) governance configuration and (2) ecosystem role dynamics as the main analytical dimensions, while dynamic capabilities and business model strategies serve as interpretive mechanisms. We focus on how frontrunner companies through niche strategies engage in experimentation and engage in changes of collaborative governance while developing knowledge, experience, and market power. By using our combination of circular business ecosystem thinking and collaborative governance thinking, we (1) reframe circular ecosystem evolution as driven by niche actors through governance experimentation, (2) show how collaborative governance co-evolves with ecosystem learning rather than being designed ex ante, and (3) introduce strategic temporality as a core mechanism in circular transitions.

3. Empirical Setting and Methodology

The empirical setting for exploring our research questions is a number of case studies and meetings with practioners within the project on "Strategies for Leading Circular and Green Transitions in the Danish Fashion

and Textile Industry" undertaken during 2025 at the Faculty of Social Sciences and Humanities at Aalborg University in collaboration with the Danish trade association Dansk Mode & Tekstil (DMT: Danish Fashion & Textile). The purpose of the project is to compile a number of exemplary cases on green transition that can serve as a source of inspiration for practioners, scholars, and policy makers, which is communicated through research papers, white papers, and practice-oriented seminars. Cases were selected in collaboration with DMT through information-oriented purposive sampling (Flyvbjerg, 2006: 230), i.e. cases were targeted as appropriate for achieving the purpose of the project based on the criteria that they are intentionally selected to "capture major variations rather than to identify a common core" (Palinkas et al., 2015: 536) and to "optimize data sources for answering the research question" (Johnson et al., 2020: 141).

The purpose of the case selection is analytical generalization through pattern identification rather than statistical or industry-level generalization, and the sample comprise seven Danish companies that all can be perceived as *niche players*. More concrete, this means that the seven companies are characterized by a variety of approaches to the market, strategy for working with sustainability, and initiatives focusing on circularity, see appendix 1. This is also the case regarding how the companies approach the 4R framework, i.e. the reduce-reuse-recycle-recover dimensions which are the core principles of the circular economy (Kirchherr, Reike & Hekkert, 2017), see appendix 2.

Interviews at each company were conducted in two rounds, see table 1. The purpose of the first round, which took place during January-March 2025, was to get an overall impression of the company's approach to and experiences regarding circularity as viewed by the executives in charge of this effort. Before the interviews took place, the company was asked by mail to prepare answers to the following questions (our translation from Danish):

- How did you start your journey on responsibility and sustainability?
- Where have you met challenges, and how have you dealt with them?
- Where have you made defining decisions and priorities that have affected your ability to act?
- Retrospectively, where have you been in need for more resources and advice?
- Concluding, based on your current knowledge, what would you have done differently?

Each interview was recorded, and extended minutes from each recording was prepared by one of the researchers who had participated in the interview. Subsequently, the recordings were accessed by each researcher, and the minutes were discussed in the group of the researchers to reach a common understanding of each case. The purpose of this exercise was twofold, i.e. to apply researcher triangulation to reduce researcher bias, and to identify themes of inquiry that could be pursued in the second round of interviews. Prior to this exercise, the companies, representatives from DMT, and representatives from VIA University College who collaborated with DMT on the project, met the researchers at a six-hour seminar to discuss the questions employed in the first round of interviews based on a round of presentations from each company. The purpose of the seminar was to create communicative validity, i.e. by "testing the validity of knowledge claims in a dialogue" (Kvale, 1995: 30) within a "community of validation" (Brinkmann & Kvale, 2015: 290). The seminar was recorded and extended minutes from the seminar were created, each of which was subsequently discussed in the group of researchers to create a common understanding and reduce subsequent bias.

Based on the discussions that occurred at the seminar and the researcher triangulation of the interviews and the seminar, the second round of interviews was undertaken with the purpose of getting insights that were of relevance in each individual case, i.e. signified one or more topics that could explore the approach and experiences of each case in more detail, and that had been specifically emphasized as important by the interviewees in each case during interview and seminar. Prior to each second-round interview, the company received an email with suggestions from the researchers on what was of particular interest to discuss further, which, in all cases, were elaborated on by the interviewees as the second-round interview progressed. The interviews were recorded, minutes were created, and recordings and minutes were discussed within the group of researchers as part of researcher triangulation as in the case of the first round of interviews.

Table 1. Overview of interviews

Case	Interviews in 2025	Interviewees	Interviewers
A	1. round, January 27th Duration 01:12:57	CEO Senior R&D Specialist Director, People & Culture & Communication	Researcher A
	2. round, August 25th Duration: 00:59:12	CEO	Researcher A Researcher B
B	1. round, January 27th Duration: 00:58:28	CEO ESG Manager	Researcher B Researcher C
	2. round, August 24th Duration: 01:32:19	ESG Manager	
C	1. round, March 24th Duration: 01:49:54	Owner & Chief Business Development & Responsibility Officer	Researcher A Researcher C
	2. round, October 3rd Duration: 01:37:06		
D	1. round, February 18th Duration: 01:38:49	CEO Chief Sustainability Officer – ESG	Researcher A Researcher C
	2. round, August 14th Duration: 00:59:47	Chief Sustainability Officer – ESG	
	3. round, August 14th Duration: 01:25:03	CEO Chief Sustainability Officer – ESG	
E	1. round, January 24th Duration: 01:27:50	CEO COO	Researcher A Researcher C
	2. round,September 25th Duration: 01:22:28		
F	1. round, January 27th Duration: 00:51:41	CEO Director, Sales & Procurement	Researcher B Researcher C
	2. round, August 24th Duration: 01:23:12	Director, Sales & Procurement	
G	1.round, February 4th Duration: 01:09:45	CMO	Researcher A Researcher B
	2.round, August 7th Duration: 01:28:16		

The researcher triangulation resulted in the identification of five overriding themes:

- Legislation as driver for incentivizing strategic and operational work on sustainability.
- Innovation as driver for strategic and operational work on sustainability in terms of product, process, organizational, and market innovation.
- The development of dynamic capabilities as part of strategic and operational work on sustainability.
- The role of value chains and networks in strategic and operational work on sustainability.
- Challenges in developing circular activities.

These five themes were subsequently presented at a second six-hour seminar comprising the companies, and DMT and VIA representatives. For each theme, examples from the participating companies were presented by the researchers and subsequently discussed by the seminar participants. The purpose of this discussion was twofold, i.e. to create communicative validity while at the same time disseminating findings to the seminar participants. The seminar was recorded and extended minutes created, once again to be scrutinized by researcher triangulation through discussions within the group of researchers.

Finally, to prepare for research and white papers, an extensive case manuscript was created with a chapter on each case, where each case was described in terms of the company's strategy, activities, approach, ambitions, and challenges regarding sustainability. The chapters were based on the validated insights on each

case that had been created through the process described above but supplemented by secondary data in terms of sustainability reports and other materials that could be accessed through the internet. The purpose of this was to create a narrative on each case that combined what the researchers had learned by interacting with the companies during interviews and seminars, and the image that the companies presented to stakeholders and the public. Each company was asked to reflect on the narrative of the company, and correct misunderstandings and supplement with deliberations that could make the narrative more representative in the eyes of the beholder. Surprisingly few additions or corrections occurred, implying that the preceeding interactions had been instrumental in creating rigor in terms of "depth, appropriateness, and thoughtful alignment" (Tracy, 2026: 250). Overall, we see the preceeding process and the final validation of thick case description as a kind of member reflection that in the words of Tracy (2010: 844), reiterated by Tracy (2026: 251), "allow for sharing and dialoguing with participants about the study's findings, providing opportunities for questions, critique, feedback, affirmation and even collaboration" implying that "member reflections go beyond simple verification. They create new insights" (Tracy, 2026: 251). In the following, the insights pertaining to our research questions are presented.

4. Findings

Across the cases, three distinct yet interconnected patterns characterize how the seven frontrunner companies in the Danish textile and fashion industry navigate green transitions. Focusing on how these firms build practices and capabilities in the pursuit of sustainable and circular solutions, the findings reveal different strategic responses to ecosystem pressures and opportunities, i.e., (1) experimentation-driven learning and the consolidation of niche strategies, (2) the diffusion of green transition practices through relationships with focal actors, and (3) the use of strategic timing and wait-and-see approaches to balance exploration and exploitation. Together, these patterns provide a structured lens for understanding how niche companies position themselves, develop capabilities, and contribute to the gradual reconfiguration of circular ecosystems without occupying formal leadership roles. Table 2 summarizes the analysis presented in sections 4.1 to 4.4.

Rather than presenting case-specific narratives, the analysis adopts a pattern-based approach that synthesizes insights across our seven cases to identify shared configurations and strategic differences. The analysis of patterns is supported by dives into individual cases through description of competitive behavior and interviewees' perceptions illustrated by interview excerpts (tables 2-4) for each pattern.

4.1. Pattern of experimentation, learning, and the consolidation of niche strategies

Several of the frontrunner companies illustrate how green transitions emerge through iterative experimentation rather than linear implementation of predefined circular solutions. Cases B, E and G exemplify how companies positioned as niche actors within predominantly linear value chains engage in trial-and-error processes to identify viable, scalable initiatives.

Case B initially pursued technologically ambitious circular solutions, such as fully degradable carpets and fiber-to-fiber recycling. Early pilot projects, including collaborating with Case A, explored mechanical and chemical separation of carpet components, which revealed technological gaps that made scaling impossible. Rather than abandoning circular ambitions, Case B shifted to a more scalable model of take-back, cleaning, and reselling of used carpet tiles. This shift was first initiated by a sensing process, where the company came to learn that one of their competitors experimented with carpet tiles on other markets and it seemed like a viable business idea. After some screening and stakeholder analysis, the company came to learn that this could become a seizing capability, if the company was able to use this as an emerging opportunity to integrate external pressures (EU regulation etc.) and customer demands into a viable and commercially grounded solution.

The solution leveraged existing competences in durable, high-quality products and aligned with regulatory pressures and customer demands in the construction sector related to CO_2 accounting and extended producer responsibility. Implementing the solution required building new strategic relationships (e.g., cleaning and facility management firms) and new internal routines and resulted in a commercially viable niche business with clear ROI.

A parallel learning dynamic is evident in Case G. Responding to customer and regulatory pressure, the company introduced a take-back system for workwear, but heterogeneous safety regulations, complex garment design and cross-border waste rules made fiber-reuse impossible at scale. Rather than persisting with a non-scalable model, Case G shifted to repair services that extend product lifetimes while generating paid services for customers. Comparable practices in Case E, i.e., repair, resale, and consumer engagement, similarly prioritize longevity over full material circularity, even where direct financial returns are limited.

Across these cases, business model innovation takes the form of diversification rather than transformation. None of the companies pursue a keystone strategy or assume focal ecosystem leadership. Instead, they consolidate niche positions that incrementally reshape value chain relations. Governance remains predominantly decentralized with learning distributed across actors and ecosystem development co-evolving with internal capability building. Parts of the collaboration can be perceived as interactive as the partners in the business ecosystem work together to achieve a collective purpose. Furthermore, the companies apply a stretch-and-transform strategy, more concretely renew-and-configure altering networks through social and organizational innovations.

Table 2. Pattern 1 examples of how companies experiment with different sustainable solutions and trial-and-error processes to identify viable, scaleable initiatives (our translation from interviews)

Case	Excerpts from interviews
B (interview 2)	We had some quite ambitious goals for what we were supposed to have sourced and sold during our pilot phase, which ran until May, and we simply did not reach them… And that was exactly because we identified that there was a missing link. We lacked a resource that could support this… because otherwise it just drowns. It is a business development profile. [We need to approach this more] Hardcore: does this actually make sense as a business? Because we can very well argue that it makes sense from a sustainability perspective, but from experience – from bitter experience – we just know that it also has to be economically viable. It is okay if it is not something we make a huge amount of money on from year one, but we need to be able to substantiate that it can support our strategy, because otherwise it will never become more than a nice story… [Changing focus to carpet tiles] just makes so, so much sense from a sustainability perspective. … second only to not selling any carpets at all, this is actually the best thing we can do. That we reuse until we cannot reuse anymore. So I really see this as, well, truly the first step in how we work with circularity.
E (interview 2)	When things are unforeseen, it becomes incredibly difficult to handle. So you have to acknowledge that premise first, and then you have to make sure that you gear your organisation/company to be able to handle it. Both to handle the fact that suddenly what we thought was going to be our next success, well, maybe it suddenly turns out to be something completely different. You have to gear down one thing and gear up something else. You have to be able to act very quickly, but at the same time you also have to maintain your footing and be able to take a stand… I actually find that challenging… Those strategic things we are doing with resale and things like that still occupy us a lot. We have just developed a digital product passport. I do not even know if you can call it a digital product passport – it is our version. … It is at least a QR code that sits in the clothing. … The EU wants you to be able to trace everything back to the field and all that stuff, but people do not care about that. And that takes up very little space in the company's digital product passport. So we have created resale, so you can sell your products back to us very easily, and we have created repair, so you can get your products repaired. And then we have care – taking care of your clothes.
G (interview 2)	We are still gaining new knowledge in this area, and because of that, we also need to find some of the answers ourselves along the way and help drive the development forward. That is why we see it both as a necessity and an opportunity to take action ourselves, because the field is still evolving. At the same time, we experience a significant gap between what consumers and customers believe is possible in practice and what is actually feasible, and one of the challenges is access to knowledge, regulations, and legislation. … With this take-back system for clothing, we see two purposes: first, how we can contribute to a better climate footprint in the long term, and second, how we can develop and future-proof our business. That is also why we initiated the project. If we want to grow as a company, we need to be innovative and think differently. … We also hope that we can help push boundaries and inspire the ways other companies work. We see this in ourselves as well as we have become much more innovative since we initiated the project.

Table 2 illustrates how experimentation and trial-and-error learning constitute a central mechanism through which niche actors navigate green transitions. Across the cases, managers explicitly emphasise the presence of uncertainty, missing capabilities, and unforeseen constraints, which make linear implementation of predefined circular solutions unfeasible. Instead, circular initiatives evolve through iterative adjustment, where ambitions are continuously recalibrated against technological feasibility, regulatory conditions, and economic viability. The excerpts further show that experimentation is closely tied to strategic judgement about whether

sustainability initiatives can be integrated into a viable business logic, underscoring how learning processes contribute to the consolidation of niche strategies rather than to full business model transformation.

4.2. Pattern of diffusion of green transition practices through focal relationships

A second pattern illustrates how niche actors leverage relationships with focal players to diffuse green transition practices across a wider ecosystem. Cases A, C and D demonstrate how demanding customer relationships become entry points for broader capability development and ecosystem upgrading. These companies operate as suppliers to powerful national and international customers with strict requirements related to certifications, Scope 3 emissions, ethical production, and data transparency. To remain viable collaborators, especially Case A and C have invested substantially in production facilities, data systems, and organizational capabilities. Case C has engaged in B Corp certification, while Case A have applied long-term investments in digitalized ESG and quality systems. These cases exemplify how centralized governance can catalyze internal transformation and reflect the kind of reconfiguring capability that enables firms to realign resources, processes, and structures in response to shifting ecosystem demands.

Over time, however, the acquired knowledge is not confined to individual customer relationships. Instead, it becomes a resource for wider ecosystem development. Case C actively supports smaller customers and suppliers by sharing knowledge on certifications, responsible production, and compliance, thereby repositioning itself as a knowledge intermediary. Governance thus shifts from centralized compliance to more decentralized and interactive learning among multiple actors. This is characterized by a stretch-and-transform strategy, more concretely alter-and-replace where the companies use the knowledge, competencies and capabilities acquired in collaboration with a focal player to shape relationships with other players in the business ecosystem. Thus, actors change their roles and agency over time as a central part of the evolution of the ecosystem.

A similar dynamic is visible in Case D that invests in upgrading existing suppliers rather than switching to new ones, sharing knowledge on legislation, emissions accounting, materials, and packaging. This reflects a sensing capability, as Case D continuously identifies emerging regulatory shifts and customer expectations and translates them into targeted supplier development efforts. While Case D remains a niche actor internationally, its structurally central position in the value chain enables it to combine centralized governance (setting expectations) with interactive governance (joint learning and capability building).

While governance of supplier-customer relationships in these cases originated as highly centralized, where centralization translated into focal actors defining standards and monitoring compliance, the degree of centralization has changed as supplier-customer relationships evolved. Niche actors have actively reshaped ecosystem governance by contributing to a process of decentralization through capability diffusion. Along the way, actors incrementally break away from the established business-as-usual logics that have characterized the more traditional and linear value chains.

Table 3. Pattern 2 examples of how companies leverage relationships with focal players to diffuse green transition practices across the wider ecosystem (our translation from interviews)

Case	Excerpts from interviews
A (interview 1)	There are always customers who are frontrunners in certain areas. You can take [Case B] as an example. We have developed sustainability concepts together with them. … Our real strength is that we develop concepts in such a way that we are ready when our different customers are ready — commercially, mentally, and strategically — to work with sustainable solutions. … We have always had the mantra that our R&D should be at the frontline of innovation… The idea has always been that we could place our R&D team directly with our customers, so they can collaborate on development – (we are) as subcontractors in many situations — and jointly develop products with them. More generally, we have also collaborated extensively with universities around the world… We are working with the leading universities within our industries. The fact that our technicians work closely with our customers' technicians, combined with these links to knowledge centres, has, I think, enabled us to stay slightly ahead of developments.

Table 3 (cont.). Pattern 2 examples of how companies leverage relationships with focal players to diffuse green transition practices across the wider ecosystem (our translation from interviews)

Case	Excerpts from interviews
C (interview 1)	Some of our customers are relatively small companies, while others are very large. You can clearly feel the difference. They are all ambitious and genuinely committed to this development, but the larger companies naturally have more resources to invest in it. In some areas, they help pull us forward as a supplier, and in that sense, it can be an advantage for us to be part of their journey. … When we learn something new from those who are furthest ahead, we always ask ourselves how that learning can be applied to the rest of the market and to our other customers. The knowledge we gain as a company is something we try to use proactively across our customer base.
D (interview 1)	We also do what we can to educate our customers. They sometimes request things where we feel it is necessary to take a step back and discuss whether what they are asking for is actually what they need. It is very much an ongoing dialogue. … In many ways, you pave the road as you go. For example, when we knew that within a couple of years, we would need to be strong on risk assessments, we started working with them early on. We needed to build capabilities and become proficient across a much broader scope. We have tried to take a forward-looking approach by asking ourselves: what do we need to be good at, and what will our customers expect from us in the future? Based on that, we start building the necessary competencies so that we are prepared. For us, ESG is not just a topic in itself – it is a way of working and a way of preparing for the future. Right now, for example, we are working on supporting our suppliers in conducting their own risk assessments. It is a continuous effort, in both directions, to prepare our business partners while also ensuring that we are prepared ourselves.

Table 3 highlights how relationships with focal customers function as critical entry points for learning, capability development, and subsequent diffusion of green transition practices across the ecosystem. In all cases, demanding customers with greater resources and higher sustainability ambitions play a central role in shaping suppliers' practices by pulling them into new forms of collaboration, joint development, and compliance-oriented upgrading. At the same time, the excerpts show how learning acquired in these focal relationships is actively translated and redeployed toward other customers and suppliers, enabling niche actors to act as intermediaries of knowledge and practices. This illustrates how green transition practices diffuse beyond individual dyadic relationships and contribute to broader ecosystem upgrading without niche actors assuming formal leadership positions.

4.3. Pattern of strategic timing and the wait-and-see approach

A third pattern highlights how frontrunner companies manage green transitions through strategic timing and ambidexterity rather than proactive ecosystem shaping. Cases A and F exemplify a deliberate wait-and-see strategy that balances exploratory investments in sustainable solutions with continued exploitation of established products and markets.

In Case A, new sustainable materials are developed in close collaboration with key customers when regulatory or market pressures arise. These projects often result in technically mature products that are retained in the portfolio, only to be activated when customers request them or are required by regulation to adopt more sustainable alternatives. This practice reflects a sensing-seizing process, as Case A captures emerging opportunities by integrating external regulatory signals and customer needs into concrete, market-ready solutions. Parallel product lines with lower sustainability requirements ensure that customers retain flexibility in price, performance, and timing, reducing the risk of overinvestment while supporting gradual customer readiness.

Case F applies a similar logic, selectively investing in sustainability for product categories where the company already has strong capabilities, such as bamboo and wool. Certifications and sustainable materials are applied where customer expectations align with willingness to pay, while other product lines remain less transformed. In both cases, management emphasizes that being too early can be just as risky as being too late in markets where sustainability is not consistently rewarded.

From a governance perspective, this pattern relies primarily on centralized collaborative governance within carefully managed strategic relationships. Ecosystem development remains limited to selected partners, and experimentation is tightly controlled. However, ambidexterity is central: Both companies continuously explore new solutions through R&D and customer collaboration while protecting core business models. This enables

them to remain strategically relevant suppliers in a shifting regulatory and technological landscape without assuming the risks associated with ecosystem leadership.

Table 4 exemplifies how strategic timing shapes firms' engagement with green transitions under conditions of uncertainty. Rather than committing uniformly to early and large-scale transformation, managers describe deliberate choices about when to invest, which initiatives to prioritise, and how to align sustainability efforts with customer demand and regulatory developments. The excerpts underline that being "too early" can be perceived as risky, particularly when markets and infrastructures are not yet ready to reward sustainable solutions. At the same time, investments in data, capabilities, and exploratory research ensure organisational readiness, allowing firms to respond quickly when external pressures intensify. These practices illustrate how ambidexterity and timing become central mechanisms for maintaining strategic relevance while managing the risks associated with circular transition.

Table 4. Pattern 3 examples of how companies manage green transitions through strategic timing and ambidexterity (our translation from interviews)

Case	Excerpts from interviews
A (interview 1)	Foam is used in almost all mattresses, seats, furniture, car seats, and car ceilings — typically polyurethane foam. However, polyurethane foam has a very negative carbon footprint and is difficult to recycle. … Part of the challenge is therefore identifying which materials have a harmful environmental impact and whether we can replace them with materials that either have a lower carbon footprint or can be recycled. … These are some of the areas we find particularly interesting, although much of the work is still long-term research. … One area in which I believe we are frontrunners is that we have spent many years digitising all our production processes. As a result, we have become very strong in data collection, including ESG data. … For many companies, it is a major challenge when they begin if they do not have control over their data - energy consumption, electricity use, motor consumption, and so on. In this respect, we have built a very strong concept.
F (interview 1)	It also becomes a question of what our customers are asking for. And then you can say: will they ask for it earlier? No. Why do they ask for it? Legislation. And then you can say: well, they are told that they need to tick off some quotas of… I often say: when should we do something or not do something, or what is the right path? Well, we need to have the right gut feeling.

4.4. Comparing patterns for similarities and differences

Taken together, the three patterns illustrate how the seven frontrunner companies engage in green transitions through strategic positioning within evolving business ecosystems. Across all cases, green transition activities are characterized by collaboration with multiple stakeholders, ongoing experimentation, and incremental development of practices rather than the implementation of predefined or fully developed circular solutions. Circular initiatives emerge through interaction with customers, suppliers, and other ecosystem actors and are adjusted over time as companies gain experience with regulatory requirements, technological feasibility, and market demand. Despite these shared characteristics, the patterns differ along three observable dimensions, i.e., ecosystem role orientation, governance configuration, and strategic temporality. Table 5 provides an overview of similarities and differences along these dimensions, and the ensuing business model implication.

First, while all companies operate as niche actors, they differ in how they engage with their surrounding ecosystem. Some cases primarily concentrate on consolidating their niche position by adapting to external demands and developing circular initiatives closely aligned with their existing capabilities and customer relationships. Other cases make more active use of insights and competences acquired through collaboration with focal actors by applying them across a broader set of relationships, including suppliers and other niche actors. As a result, companies differ in the extent to which their circular activities remain confined to selected partnerships or are extended across a wider part of the ecosystem.

Table 5. How cases A-G work with green transitions

Case	Ecosystem role	Core approach to green transition	Dominant governance logic	Mode of experimentation and learning	Business model implication
A	Niche (supplier & RD partner)	Customer-driven sustainable innovation with parallel conventional products. Strong focus on timing	Centralized	Controlled experimentation tied to customer needs and regulatory triggers	Portfolio logic: Sustainable and non-sustainable products co-exist
B	Niche	From technological experimentation (recycling) toward scalable take back and resale solutions aligned with construction sector demands	Decentralized	Trial and error across multiple pilots; reorientation based on technological feasibility and market timing	Diversification through second life business model generating ROI alongside core production
C	Niche ➔ ecosystem intermediary	Uses sustainability demands from focal customers to upgrade own capabilities and support smaller ecosystem actors	Extends beyond centralized toward more interactive forms in some relationships	Structured learning through certifications and standards, then diffusion to partners	Sustainability capabilities become strategic asset; ecosystem influence without focal leadership
D	Structurally central niche	Develops suppliers' sustainability capabilities rather than switching partners; long-term ecosystem upgrading	Extends beyond centralized toward more interactive forms in some relationships	Knowledge-based experimentation with suppliers; gradual capability building	Green transition embedded in value chain governance rather than distinct circular business models
E	Niche	Focus on extending product life through repair, resale, and transparency rather than material recycling	Decentralized	Ongoing experimentation with resale and repair platforms despite limited direct profitability	Complementary circular activities support brand, customer acquisition, and long-term positioning
F	Niche	Selective sustainability investments in product lines with strong competence and customer demand	Centralized	Targeted experimentation in materials and certifications; avoidance of premature scaling	Incremental adaptation of selected business lines; ambidextrous strategy
G	Niche	Shift from ambitious take back and recycling toward repair and lifetime extension in response to regulatory and technical constraints	Decentralized	Iterative learning. Initiatives paused or abandoned when scaling proves unfeasible	Service-based extension of core business (repair); selective circularity rather than full transformation

Second, the identified patterns reveal variation in governance configurations. In all cases, green transition activities are initially shaped by either centralized or decentralized governance arrangements, often influenced by focal customers or regulatory requirements. However, governance configurations differ in how bounded or open they are. In some cases, governance remains primarily confined to bilateral or contractual relationships between customers and suppliers. In other cases, collaboration involves a broader set of actors and includes joint learning activities, knowledge sharing, and coordination across multiple relationships. These differences reflect variation in how coordination and decision-making are organized across ecosystem relationships.

Third, the patterns differ with regard to strategic temporality and timing. All companies engage in experimentation, but they vary in how and when resources are committed to circular initiatives. Some cases emphasize readiness and flexibility, aligning investments closely with customer demand and regulatory developments. Other cases commit earlier and more continuously to developing circular solutions and related capabilities. These differences reflect variation in how coordination and decision-making are organized across ecosystem relationships.

The similarities and differences documented in table 5 provide the basis for the discussion that follows. In particular, they raise questions about how niche actors can influence ecosystem evolution without formal

authority, how collaborative governance configurations co-evolve with circular practices, how strategic choices regarding timing and experimentation shape the pace and direction of green transitions in circular business ecosystems, and the relevance of ensuring investment in both internal and external capacity and competencies to remain relevant in the evolution of business ecosystems.

5. Discussion

Our combination of circular business ecosystem thinking and collaborative governance thinking, which was carried out in section 2, pointed to four new theoretical insights. *First*, how the circular business ecosystem can be characterized in terms of type of collaborative governance depends on the extent to which ecosystem evolution is driven by focal actors, and the extent to which dominance by focal actors is mediated by co-orchestration among actors in the ecosystem. *Second*, the type of collaborative governance may change over time as new roles and relationships develop, and ecosystem leadership becomes contested. *Third*, the extent to which actors are influenced by the governance mode depends on the extent to which actors are embedded in the ecosystem. *Fourth*, the strategies of new business endeavors are likely to reflect the prevailing mode of ecosystem governance. The four insights underline that the ability of actors to co-orchestrate a circular business ecosystem is not necessarily confined within a fixed structure of governance, but may evolve as part of a dynamic interplay between governance and interactions among actors, as actors strive for developing unique value propositions within the firm, which due to the collaborative nature of circular business ecosystems leads to further ecosystem evolution.

Regarding the dominant types of collaborative governance, our findings, as portrayed in table 5, show that variety prevails. Centralized governance is found in cases A and F, while decentralized governance applies to cases B, G and E. Centralized governance is to some extent also found in cases C and D, but in a hybrid form since centralized governance in both cases is being pushed towards decentralized or interactive governance. In sum, there is an affinity between types of governance and the pattern of strategic response to ecosystem pressures and opportunities (see table 6).

Table 6. Affinity between types of governance and patterns of strategic response

Pattern 1 Experimentation, learning, and consolidation of niche strategies	*Pattern 2* Diffusion of green transition practices through focal relationships	*Pattern 3* Strategic timing and wait-and-see approach
Decentralized governance	*Hybrid governance* Centralized governance is pushed towards decentralized or interactive governance	*Centralized governance*

Centralized governance is associated with pattern 3, i.e., the pattern of strategic timing and the wait-and-see approach (see section 4.3), and to some extent with pattern 2, i.e., diffusion of green transition practices through focal relationships (see section 4.2). However, while pattern 3 is firmly rooted in centralized governance, pattern 2 shows sign of gradual change where the evolution of roles and relationships transcend centralized governance and pushes the type of governance towards more interactive forms in some relationships. This reflects that the way in which actors respond to pressures and opportunities within the ecosystem contributes to changes in the type of governance as actors develop their relationships with other actors through processes of experimentation and learning. In pattern 3, cases A and F adjust their behavior to the contexts in which they operate, respectively by controlled experimentation closely tied to customer needs and regulatory triggers (case A), or by targeted experimentation in materials and certifications with a strong focus on avoiding premature scaling (case F). In pattern 2, however, cases C and D focus on the diffusion of green practices by, respectively, diffusing the outcome of structured learning to ecosystem partners (case C), or knowledge-based experimentation with suppliers focusing on gradual capability building which contributes to ecosystem evolution (case D). In consequence, pattern 2 points to a movement away from centralized governance towards *decentralized* or *interactive* governance (see figure 3).

Decentralized governance is associated with pattern 1, i.e., experimentation, learning, and the consolidation of niche strategies. This pattern covers a variety of strategic responses to ecosystem pressures and

opportunities. Case B excels in trial-and-error experimentation and learning across multiple pilot projects which are concurrently reoriented according to technological feasibility and market timing. Case E undertakes ongoing experimentation with resale and repair platforms based on an ambition of extending product life, although profitability is limited. Case G adopts a more selective approach where initiatives are tried out through iterative learning but paused or abandoned if scaling proves unfeasible.

Whether the strategies of new business endeavors reflect the prevailing mode of governance depends on the actors' ability to co-orchestrate ecosystem development and, by doing so, contribute to change governance type. This varies across the three patterns that we have identified.

In pattern 1, which is characterized by decentralized governance, case B engages in diversification as described in section 2.1 (see figure 2), while case E is an example of attempts to transform current activities by creating parallel, complementary activities, and case G represents an extension of core business that is something in between diversification and transformation. The great variety of strategies in pattern 1 reflects that actors enjoy a relatively high degree of freedom due to the decentralized nature of ecosystem governance. In pattern 3, which is characterized by centralized governance, new business endeavors appear as small-scale diversification augmenting core business with a focus on existing needs, implying that activities do not disturb the current mode of centralized governance. So, it appears that strategic behavior in patterns 1 and 3 do reflect the prevailing mode of governance. However, when it comes to pattern 2, the reflection becomes blurred in the sense that actors C and D by virtue of their capability to influence ecosystem development engage in business endeavors that pushes centralized governance towards decentralized or interactive governance. So, in the case of pattern 2, the strategies of new business endeavors are not a reflection of the prevailing mode of ecosystem governance, but rather the cause of ecosystem governance change, since the extent to which strategies of new business endeavors reflect the prevailing mode of ecosystem governance is mediated by the actors' capability to push ecosystem change.

The application of *sensing* and *seizing*, as described in section 2.1, varies considerably across the identified patterns of behavior. In pattern 1, sensing and seizing are part of processes of experimentation and learning that lead to alterations of relationships and networks through social and organizational innovations, thus reflecting a renew-and-configure approach. In pattern 2, sensing and seizing occur as the development of dynamic capabilities in the form of green transition practices which are diffused to other actors in a way that contributes to co-evolutionary change of ecosystem governance. This is a kind of renew-and-configure approach in the sense that centralized governance is gradually pushed towards decentralized or interactive governance. Finally, in pattern 3, sensing and seizing are part of an ambidextrous wait-and-see approach, where opportunities are identified and strategic solutions are prepared to be applied as an adjust-and-refine response when the timing seems right. In sum, the three patterns clearly illustrate that processes of sensing and seizing play an active role in ecosystem development, and how sensing and seizing are applied reflects the extent to which actors are able to influence the co-evolution of ecosystem relationships and governance through strategic responses to opportunities and pressures in the circular business ecosystem.

5.1. Implications for theory and practice

Our study shows that valuable theoretical insights for analyzing and understanding dynamics of circular business ecosystems can be developed by combining circular business ecosystem thinking and collaborative governance thinking. In the present case, the combination has contributed to creating a framework for describing the governance logic of ecosystem relationships and thus the context in which actors employ strategic responses to ecosystem opportunities and pressures. The framework has proven useful in analyzing and understanding the kind of strategic responses employed and the dynamic interplay between these responses and ecosystem evolution and co-evolution. In particular, the framework is instrumental in understanding why and how ecosystem sensing and seizing varies across different patterns of strategic behavior. The theoretical combination that has been created and employed in the present study is an example of scholarly strength in cross-disciplinary work, in this case cross-fertilization between ecosystem analysis, political science, and business economics, combined by focusing on relational dynamics.

The present study has focused on a particular setting of niche players within a specific sector. Future lines of research could extend the application of the proposed framework to other sectors and other types of players, e.g., actors that experience changing levels of contextual turbulence and relational complexity. Furthermore,

since the proposed framework emphasizes relational dynamics, future research could benefit from focusing on the role of institutions as both context and potential for ecosystem evolution and co-evolution.

Regarding practice, the present study points to why it is important for managerial action to understand how sensing and seizing circular business ecosystem opportunities and pressures can contribute to profitable green transition. This understanding requires that managerial action is aware of how the interplay between ecosystem properties and governance logic frames the web of relationships in which actors navigate to create opportunities and competitive advantage. Mapping ecosystem actors and resources is simply not enough to identify opportunities and sources of competitive advantage but needs to be complemented by identifying the kind of governance logic that characterizes the ecosystem, and the ensuing outcome space of strategic behavior. In doing so, niche players can identify avenues for contributing to ecosystem change and thus improve their competitive advantage through green transition.

5.2. Limitations of the present study and future lines of research

While the empirical focus on patterns of strategic behavior across a sample of Danish textile and fashion frontrunners has proven useful for the application of the proposed framework, it also limits generalizability to other national and industrial contexts. While generalizability has not been the purpose of the present study, the study could have benefitted from applying the framework to other types of frontrunners within a comparative perspective. Moreover, while the analysis captures intertemporal dynamics through multiple interviews and seminars, future research could benefit from longitudinal designs that follow ecosystem evolution over longer periods. Further studies might also explore how different configurations of collaborative governance interact with power asymmetries, global supply chains, and emerging digital infrastructures in shaping circular transition. By extending such inquiries, future research can build on the insights offered here to deepen understanding of how circular business ecosystem evolve and how collaborative governance can support more sustainable industrial futures.

Finally, the paper might have devoted more attention to how difficulties of collaborative governance emerge from the complexity of systemic properties. As known from the ongoing scholarly debate on efficiency and feasibility of collaborative governance, collaborative governance is often endowed with several paradoxes that need to be resolved (Qi & Ran, 2024). For instance, while diversity of actors adds resources and knowledge to collaborative governance, it also makes consensus-making more difficult, especially when actors find themselves in competitive and contesting relationships. Furthermore, while collaborative governance implies some degree of interorganizational accountability, it might clash with intraorganizational accountability depending on the extent to which actors apply or are forced to apply different standards and procedures or have differential needs for protecting knowledge and capabilities. However, the empirics of the present study do not lend itself to this discussion.

6. Conclusion

The present paper has offered a new framework for ecosystem analysis in terms of a combination of circular business ecosystem thinking and collaborative governance thinking. The combination represents a cross-fertilization between ecosystem analysis, political science, and business economics, which answers the research question posed in section 1, i.e., how can the concept of collaborative governance contribute to our understanding of circular business ecosystems. The framework offers four theoretical insights, the value of which has been demonstrated through analytical application on three patterns of strategic responses to opportunities and pressures offered by the circular business ecosystem contexts of seven green transition frontrunner companies within the Danish textile and fashion industry, all of which are niche players. Three patterns of strategic behavior were identified, i.e., a pattern of experimentation, learning, and consolidation of niche strategies, a pattern of diffusion of green transition practices through focal relationships, and a pattern of strategic timing and wait-and-see approach. The application of the framework shows that there is an affinity between types of ecosystem collaborative governance and patterns of strategic response, and that sensing and seizing activities vary considerably across patterns.

The theoretical insights were derived through separate theoretical discussions of, respectively, circular business ecosystem thinking and collaborative governance thinking, which lead to combining the two lines of

thinking. The empirics on which the theoretical insights were applied consisted of case studies through thick description based on combining interviews, desk study, researcher triangulation and seminars with practitioners and ongoing interaction with interviewees creating communicative validity.

Since the proposed framework proved valuable in the present case of patterns of strategic behaviors among frontrunner niche players in the Danish textile and fashion industry, the paper has suggested that an important line of future research would be to contest the value of the framework by applying it to other types of industrial players, e.g., actors that experience changing levels of contextual turbulence and relational complexity. Furthermore, since the framework occupies itself with relational dynamics, future contest would benefit from an institutional approach. Regarding implications for practitioners, an important implication is that when mapping ecosystem actors and resources, managerial decision making must include the interplay between ecosystem properties and governance logic, and how this interplay frames the web of relationships within the ecosystem.

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Data Availability Insights into the communicative validation process described in section 3 regarding minutes, presentations, and thick case description, can be provided by contact to the corresponding author.

Declarations

Competing Interests The authors declare no competing interests.

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Appendix

Appendix 1. Company characteristics

Company	Products	FTE	B2B or B2C	Strategic approach to sustainability	Circular initiatives
A	Isolation material	706	B2B	Certifications Selected lines work with sustainability	Close collaboration with customers to identify circular alternatives
B	Carpets	605	B2B	Certifications Use of recycled and ecological materials	Take-back solutions
C	Active wear	43	B2C	Certifications to enhance circularity across the company	B-Corp Science-based targets
D	Sportswear & sports gear	215	B2B and B2C	Circularity is approached as a change management project with the goal to be the best version of oneself	SDG approach to identify circularity initiatives
E	Clothing	10	B2B and B2C	Certifications Use of recycled and ecological materials	Resell platform
F	Clothing	590	B2B and B2C	Certifications Selected lines work with sustainability	FSC certified bamboo Organic cotton
G	Work wear	193	B2B	Certifications Take-back solutions	Take-back solution Repair service

FTE: Number of full-time employees is based on publicly available data in the latest Annual Report retrieved on August 20th, 2025

Appendix 2. The 4R approach of the companies

Company	Reduce	Reuse	Recycle	Recover
A	Product development		Substitution	
B	Certifications	Take-back	Take-back	Take-back
C	Certifications			
D	Certifications			
E	Certifications			
F				
G	Certifications	Repair	Take-back	Take-back