

From Startup Support to System Transformation: Intermediaries in Circular Entrepreneurial Ecosystems

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Abstract

This thesis investigates the research objective of how intermediaries support circular startups within entrepreneurial ecosystems (EEs) and how their activities contribute to circular economy (CE) transformation across ecosystem and institutional levels. Although interest in circular entrepreneurship and EEs is growing, existing research lacks an integrated understanding of how intermediaries shape ecosystem structures, relational dynamics, and institutional logics in support of circular startups.

To address this gap, the thesis employs a multi-method research design. A systematic literature review (SLR) conceptualizes circular entrepreneurial ecosystems (CEEs) by identifying how established EE elements require qualitative reconfiguration to meet circular startup needs. Empirical analyses based on social network analysis and expert interviews enrich the conceptualization by examining the structural emergence of CEEs, revealing intermediary-centric, low-density, and trust-based subecosystems. As both studies demonstrate the centrality of intermediaries in shaping CEEs, the third study systematically examines their functions. A second SLR develops a multilevel framework for intermediary influence, mapping configurations, mechanisms, and outcomes across micro-, meso-, and macro-levels. The fourth study explores how these functions materialize within institutional logics. It shows that intermediaries transmit community and entrepreneurial-market logics and cultivate a previously unrecognized transversal circular logic. This logic acts as an additional layer, redefining entrepreneurial purpose, legitimacy, and value creation. Finally, as the prior studies demonstrate that intermediaries form the structural and institutional backbone of CEEs, strengthening circularity requires building on these existing mechanisms. Responding to this need, a design science research approach develops and validates a circular support alignment artifact that enables intermediaries to integrate circularity into their support structures and enhance systemic alignment within CEEs.

Consequently, this thesis offers several contributions. Conceptually, it introduces CEEs as a framework for understanding circular entrepreneurship. Theoretically, it reveals circularity as a transversal institutional logic and positions intermediaries as institutional entrepreneurs contributing to CE transformation. Empirically, it provides evidence of emerging CEE structures and intermediary-driven relational dynamics. Methodologically and practically, it delivers validated design knowledge supporting intermediaries in aligning their activities with circularity and strengthening their systemic role within CEEs.

Zusammenfassung

Diese Dissertation untersucht, wie Intermediäre zirkuläre Startups innerhalb von Entrepreneurial Ecosystems (EEs) unterstützen und wie ihre Aktivitäten zur Transformation hin zu einer Circular Economy (CE) auf Ökosystem- und institutioneller Ebene beitragen. Obwohl das Interesse an zirkulärem Unternehmertum und EEs wächst, fehlt bislang ein integriertes Verständnis darüber, wie Intermediäre die Struktur von Ökosystemen, deren relationale Dynamiken sowie institutionelle Logiken prägen und dadurch die Entwicklung zirkulärer Startups beeinflussen.

Zur Schließung dieser Forschungslücke verfolgt die Arbeit ein multimethodisches Forschungsdesign. Eine systematische Literaturrecherche (SLR) konzeptualisiert Circular Entrepreneurial Ecosystems (CEEs), indem sie aufzeigt, wie etablierte Ökosystemelemente qualitativ neu ausgerichtet werden müssen, um den Bedürfnissen zirkulärer Startups gerecht zu werden. Empirische Analysen auf der Grundlage von einer Sozialen Netzwerkanalyse und Experteninterviews erweitern diese Konzeptualisierung, indem sie die strukturelle Entstehung von CEEs untersuchen und intermediärzentrierte, wenig verdichtete und vertrauensbasierte Subökosysteme identifizieren. Da beide Studien die zentrale Bedeutung von Intermediären für die Gestaltung von CEEs hervorheben, untersucht die dritte Studie ihre Funktionen systematisch. Eine zweite SLR entwickelt hierfür ein Mehrebenenframework intermediärer Einflussmechanismen, das Konfigurationen, Wirkungsmechanismen und Ergebnisse auf der Mikro-, Meso- und Makroebene abbildet. Die vierte Studie analysiert, wie sich diese Funktionen in institutionellen Logiken manifestieren. Die Studie zeigt, dass Intermediäre die Community und Entrepreneurial-Market Logik weitergeben und eine bisher nicht erkannte transversale zirkuläre Logik kultivieren. Diese Logik fungiert als zusätzliche Ebene und definiert unternehmerische Zielsetzung, Legitimität und Wertschöpfung neu. Da die vorangegangenen Studien belegen, dass Intermediäre das strukturelle und institutionelle Rückgrat von CEEs bilden, muss zur Stärkung der Kreislaufwirtschaft auf diesen bestehenden Mechanismen aufgebaut werden. Vor diesem Hintergrund entwickelt und validiert ein Design-Science-Research-Ansatz ein Circular Support Alignment Artefakt, das Intermediären ermöglicht CE in ihre Unterstützungsstrukturen zu integrieren und die systemische Ausrichtung innerhalb von CEEs zu verbessern.

Diese Dissertation leistet mehrere Beiträge. Konzeptionell führt sie CEEs als analytisches Rahmenwerk zur Untersuchung zirkulären Unternehmertums ein. Theoretisch

identifiziert sie Zirkularität als transversale institutionelle Logik und positioniert Intermediäre als institutionelle Unternehmer, die zu einer Transformation hin zu einer CE beitragen. Empirisch liefert sie Evidenz für die Herausbildung von CEEs sowie für intermediärgetriebene relationale Dynamiken. Methodisch und praktisch stellt sie validiertes Designwissen bereit, das Intermediäre dabei unterstützt, ihre Aktivitäten an Zirkularität auszurichten und ihre systemische Rolle innerhalb von CEEs zu stärken.

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List of Abbreviations

AI	Artificial Intelligence
CE	Circular Economy
CEAP	Circular Economy Action Plan
CEE	Circular Entrepreneurial Ecosystem
CBM	Circular Business Model
DSR	Design Science Research
DP	Design Principle
DR	Design Requirement
EE	Entrepreneurial Ecosystem
ESO	Entrepreneurship Support Organizations
EU	European Union
fsQCA	Fuzzy set Qualitative Comparative Analysis
GEI	Global Entrepreneurship Index
IoT	Internet of Things
KIT	Karlsruher Institut für Technologie
MLP	Multi-Level Perspective
NSE	National Systems of Entrepreneurship
NRW	North Rhine-Westphalia
SME	Small- and Medium-sized Enterprises
SDG	Sustainable Development Goal
SLR	Systematic Literature Review

UK United Kingdom

US United States

Part I

Fundamentals

“*If we do not change our consumption of raw materials, we will neither be able to achieve our climate goals nor protect nature. However, it is not enough to rely solely on recycling. We need a genuine circular economy that focuses on prevention and reuse.*

- Rebecca Tauer

(Head of the Circular Economy Program at WWF Germany)

1.1 Motivation

The concept of circular economy (CE) has gained momentum among scholars, practitioners, and policymakers for its potential to address the intertwined crises of climate change, resource scarcity, and environmental degradation (Brehmer et al., 2018; Geissdoerfer et al., 2017; Kirchherr, Yang, et al., 2023). By seeking to decouple economic prosperity from the consumption of finite resources, the CE paradigm challenges the dominant linear model of ‘take–make–dispose.’ Instead, it emphasizes circular systems based on reuse, repair, and closed material loop strategies, aiming to preserve the value of products and materials for as long as possible (Geissdoerfer et al., 2018; Sauvé et al., 2016). Framed as both an environmental necessity and an economic opportunity, the CE is projected to enhance resource efficiency, create employment, and foster industrial resilience (Pinyol, 2022).

Over the past three decades, governments in Europe and China have embedded CE strategies in their policy agendas (McDowall et al., 2017). In 2016, the Netherlands published its ‘Circular Dutch Economy by 2050’ program (Ministry of Infrastructure and Water Management, Government of the Netherlands, 2019). Since 2020, China has issued several CE policies and regulations (Bleischwitz et al., 2022). And Germany recently passed its ‘Nationale Kreislaufwirtschaftsstrategie’ in 2024 (Bundesumweltministerium, 2023). These developments exemplify how circularity has evolved from a niche concept into a mainstream policy priority. Yet despite these ambitious agendas, global progress remains slow: only about seven percent of the world economy can be considered circular (Circle Economy, 2024). This vast circularity gap highlights the difficulty of translating policy aspirations into system-wide economic transformation.

Achieving such a transformation requires coordinated change across sectors and system levels. Businesses play a pivotal role, as they must redesign value creation processes to align with circular principles (Lüdeke-Freund, 2020; Urbinati et al., 2017). In particular, startups and small- and medium-sized enterprises (SMEs) have been identified as key agents of this transformation within markets and value chains (Bocken et al., 2014; Schaltegger et al., 2016). Their agility, openness to innovation, and lack of legacy systems enable them to experiment with new business models that challenge established linear production logics (Antikainen & Valkokari, 2016; Zucchella & Urban, 2019). In Germany, ‘Recup’ has become a prominent example by establishing a reusable coffee cup system that challenges single-use plastic consumption in the catering industry. Similar initiatives, such as ‘againagain’ in New Zealand or ‘Better Cup’ in Australia, illustrate that this development extends across regions.

Emerging research on circular startups have emphasized that these startups have the potential to accelerate the diffusion of circular practices and inspire incumbent firms to adapt (T. J. F. Bauwens et al., 2020; Rizos et al., 2016). They place circular strategies at the core of their business models from the beginning rather than treating them as add-ons (Kanda et al., 2024; Suchek et al., 2022).

However, the systemic transformation towards a CE cannot be achieved by individual firms alone. The concept of circular disruption emphasizes that transformation requires a network of engaged actors and must occur with speed and scale (Blomsma et al., 2023; Kirchherr, 2022). Circular startups depend on supportive environments that provide resources, knowledge, and legitimacy for their innovative activities (Kanda et al., 2024; Theodoraki, Dana, & Caputo, 2022). Entrepreneurship research shows that such support is most effectively organized within entrepreneurial ecosystems (EEs), where entrepreneurs, intermediaries, corporations, educators, investors, and policymakers interact to enable entrepreneurial activity (Isenberg & Onyemah, 2016; Stam & van de Ven, 2021). These ecosystems shape the industry and regional conditions under which circular startups can emerge and grow.

Intermediaries assume a particularly important role within these EEs. They not only provide practical support, such as funding access or mentoring, but also influence broader cultural and institutional conditions that affect startup development (Hallen et al., 2020; Kanda et al., 2020). Acting as connectors between startup-level innovation and ecosystem-level structures, intermediaries can serve as change agents as well as guardrails by linking entrepreneurial activities with wider institutional environments (Kanda et al., 2020; Kant & Kanda, 2019; Kivimaa, Boon, et al., 2019).

As outlined in the preceding arguments, advancing CE requires the interaction of system-wide policy ambitions, industry- and ecosystem-level support structures, and startup-level innovation. EEs and particularly the intermediaries embedded within them

play a central role in aligning these layers. Yet, the intersection of CE, circular startups, EEs and intermediaries remains underexplored (Kanda et al., 2025). Specifically, there is a lack of consolidated reviews, empirical interview studies, or network analyses, which are necessary to make scientifically based statements about, for example, whether prominent CE intermediaries have the power to shape dynamics in established ecosystems and can influence institutional alignment.

To address this research gap, the research objective of this dissertation is to develop an empirically grounded and conceptually informed understanding of how intermediaries support circular startups embedded in established EEs and how these interactions shape CE transformation within their ecosystem and institutional environment. In addition, the dissertation adopts a design science approach to translate these insights into actionable methodological guidance, providing a strategy-alignment artifact that helps intermediaries orient their support toward circular entrepreneurship.

1.2 Research Agenda and Research Questions

The outlined research gap encompasses the four research domains: CE, circular startups, EEs, and intermediaries. To investigate their interconnections and the resulting implications for theory and practice, Figure 1.1 depicts the conceptual framework in which this dissertation is situated.

The framework illustrates how the CE represents the goal system that defines the direction and requirements for change. Circular startups translate CE principles into their business models and thereby act as drivers of transformation within markets and value chains. Business model theory provides the analytical lens to structure the value logic these startups pursue.

EEs provide the structural context within which such transformations unfold, enabling or constraining circular startups through resources, networks, and institutional conditions. This context is examined through the EE element concept and network theory, which together capture how CE reshapes ecosystem requirements and actor relations and interdependencies.

The enabling and orchestrating role of intermediaries within these ecosystems is analyzed through a Multi-Level Perspective (MLP) and institutional theory, revealing how they mediate between startup-level innovation (micro), the broader ecosystem (meso), and institutional dynamics (macro). These actors are supposed to facilitate coordination, legitimacy building, and CE alignment across levels of change.

Taken together, these interrelated domains explain how circular transformation emerges from the interaction between goal system (CE), startup-level innovation (circular startups), structural context (EEs), and orchestrating actors (intermediaries). The applied theoretical lenses offer complementary perspectives on this multi-layered process.

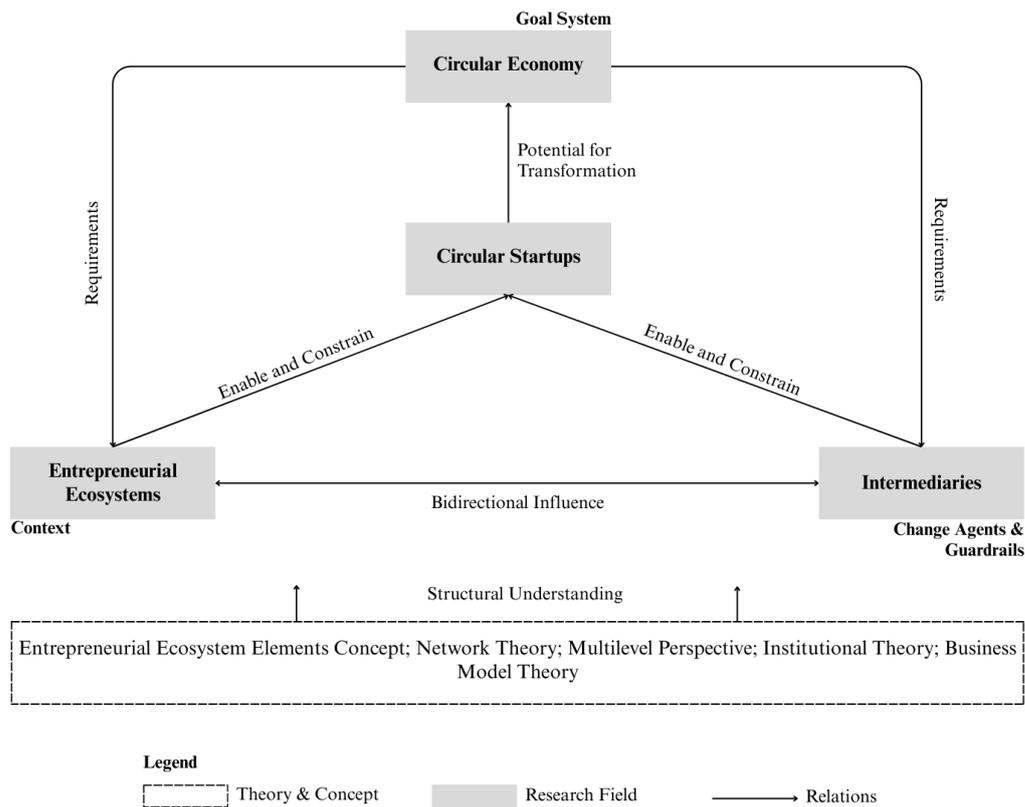


Figure 1.1: Conceptual Positioning of the Dissertation within Four Interrelated Research Domains (Own Illustration)

To comprehensively explore the interdisciplinary nature of intermediaries supporting circular startups embedded in established EEs, this dissertation brings together these complementary perspectives, each highlighting different aspects of the phenomenon under study. Accordingly, five research questions (RQs) guide the research agenda of this dissertation. The first two examine the conceptual and contextual foundations of EEs in a CE context (RQ1–RQ2), the following two focus on intermediaries and their influence within such systems (RQ3–RQ4), and the final one adopts a design perspective to translate theoretical insights into an actionable artifact (RQ5). In the following sections, their rationale will be explicated in greater detail.

The role of intermediaries can only be understood in relation to the structural and institutional contexts in which circular startups are embedded. Therefore, the first RQ focuses on conceptualizing EEs that explicitly support circular startups, so-called Circular Entrepreneurial Ecosystems (CEEs). As the term CEE is scarcely used in the literature, most studies remain situated within the broader EE discourse (Tabas et al., 2025). The underlying study therefore brings together research from entrepreneurship, CE and EE to examine how existing EEs must be adapted to foster circular startups, addressing the following RQ1:

How do established elements and their mechanism of an EE function in the context of circular startups and how can they be adapted to foster circular startups?

The study systematically reviews the literature to analyze how established EE elements enable and constrain circular startups. The review identifies five themes: resources, collaboration, culture, regulatory framework, and digital technologies. These themes explain how EEs evolve toward circularity. The review shows that supporting circular startups requires a qualitative reconfiguration of EE elements to align with circular principles. The study thus conceptualizes CEEs and outlines a research agenda calling for deeper examination of resource dynamics, intermediation, and multi-actor collaboration.

Building on this conceptual foundation, the second study shifts from literature-based insights to an empirical examination of how CEEs take shape in practice. While the first study outlines which EE elements require adaptation, existing research provides little understanding of how CEEs are structured relationally (Berghuis et al., 2023; Kanda et al., 2025; Tabas et al., 2025). This gap is notable because CEEs are inherently network-dependent, given their cross-sectoral resource flows, coordination demands, and reliance on knowledge recombination. Addressing this network dimension motivates RQ2:

How are circular entrepreneurial ecosystems structured, and how do relational dynamics shape their functioning?

To capture both the structural configuration and the interaction dynamics of emerging CEEs, the study employs a mixed-methods design that combines social network analysis (SNA) with semi-structured expert interviews focusing on Germany. The SNA reveals a fragmented network with low density, limited clustering, and a concentration of brokerage roles among intermediaries. The interviews complement these findings by portraying CEEs as trust-based, regionally clustered, and intermediary-centric. Yet, they appear constrained by weak coordination, conceptual misalignment, and unstable resource flows. Overall, the results show that CEEs in Germany are forming as early-stage subecosystems embedded within established regional EEs.

Following the conceptualization and contextualization of CEEs, the importance of intermediaries within these ecosystems becomes increasingly evident. Although research on intermediaries in EEs has expanded over the past decade, it remains fragmented and offers limited insight into how these actors operate in CE contexts. Most existing studies examine immediate, micro-level outcomes, such as startup survival, growth, or access to resources, while overlooking the broader mechanisms that link intermediary action to ecosystem-level change (Hallen et al., 2020; Kanda et al., 2020; Theodoraki & Messeghem, 2017). This narrow focus leaves a gap in understanding how intermediaries

contribute to meso- and macro-level circular transformations, resulting in the following RQ3:

What functions of intermediaries in entrepreneurial ecosystems can be mapped to micro-, meso-, and macro-levels, and how do these functions apply to circular startups?

Drawing on a Systematic Literature Review (SLR), this study develops a conceptual framework that maps how intermediaries influence startup-level, ecosystem-level and system-level dynamics from a MLP. Extending this framework to CE contexts, the study highlights that intermediaries influence spans from startup-specific capability-building, resource brokerage, and legitimacy transfer (micro-level) to ecosystem orchestration, cognitive alignment, and relational cohesion (meso-level), while macro-level outcomes are under researched.

Building on the preceding analysis of intermediary functions, the next study turns from what intermediaries do to how they shape meaning within CEEs and their institutional environment. While prior research has established that intermediaries are structurally influential actors, limited research focuses on their normative influence. Particularly, how they affect the values, beliefs, and behavioral orientations of the startups they support (Klofsten et al., 2024). Institutional theory suggests that intermediaries can transmit institutional logics that guide entrepreneurial action and shape transformational processes (Roundy, 2017). However, it remains unclear whether these actors act as guardrails for circular principles or reproduce dominant market-oriented logics within CE contexts. This ambiguity motivates the formulation of RQ4:

How do intermediaries shape the values, beliefs, and behavior of circular startups in circular entrepreneurial ecosystems and promote a CE transformation?

To explore this question, the study employs an empirical approach and draws on expert interviews with founders operating in emerging CEE subecosystems. The findings reveal that intermediaries exert influence through two dominant logics: community and entrepreneurial–market, which they actively balance and recombine. Circularity emerges as a transversal logic, a cross-cutting normative frame that infuses both logics with sustainability-oriented principles and anchors circularity in founders’ interpretations of startup purpose and success. By shaping how startups define, prioritize, and operationalize circular value creation, intermediaries not only influence individual startup behavior but also contribute to the diffusion and institutional anchoring of circular values and beliefs within the wider ecosystem. This perspective explains how intermediaries enable hybrid coherence between purpose and performance and thereby support broader CE transformation processes within their ecosystem and institutional environment.

Together, these studies analyze three interrelated concepts through which intermediaries drive CE transformation within their ecosystem and institutional environment by supporting circular startup: (1) their network function within CEEs, which positions them as structural anchors and brokers of coordination; (2) their capacity for institutional entrepreneurship, shaped by distinct intermediary configurations and mechanisms; and (3) their role in bridging entrepreneurial–market and community logics through the transversal logic of circularity, which shapes founders’ values, beliefs, and behaviors.

Finally, the insights from the previous studies are integrated into a design-oriented investigation that transforms accumulated theoretical and empirical knowledge into actionable guidance for practice. It adopts a Design Science Research (DSR) approach to develop methodological artifacts that help intermediaries align their existing structures and strategies with CE objectives, resulting in the last RQ5:

How to design new methodological artifacts to enhance the circular support alignment of intermediaries within emerging circular entrepreneurial ecosystems?

Guided by this RQ, two complementary DSR projects are conducted. The first project synthesizes prior findings together with business model theory to derive design requirements (DRs) and translates them into corresponding design principles (DPs). These DPs are then instantiated in the development of a strategy alignment tool for intermediaries, designed to orient ecosystem support toward circularity. The artifact - a taxonomy of circular startup business models - is iteratively refined and evaluated across two design cycles, ensuring both theoretical rigor and practical relevance. To extend the evaluation into a naturalistic setting, the second DSR project focuses on the application of the taxonomy with an intermediary partner. This naturalistic application enables a refinement of the artifact, revealing empirically grounded archetypes of circular startup business models, and generating actionable design insights on how intermediaries interpret startup configurations and derive support implications in practice.

By integrating a design-based inquiry into the overall research agenda, the studies bridge the gap between conceptual understanding and actionable implementation, advancing both scholarship and practice in CEE design.

In sum, this dissertation develops a MLP on intermediaries in CEEs, examining how their actions span from micro-level startup support, over meso-level ecosystem development to macro-level system shaping. Across the five studies, intermediaries are conceptualized as institutional entrepreneurs who actively mediate between entrepreneurial-market and community logic to enable circular transformation within their ecosystem and institutional environment. Circularity is thereby framed as a transversal logic, an integrative normative frame that connects purpose and performance across institutional levels. Together, these insights not only deepen theoretical understanding but also inform practical

design knowledge to develop an artifact for intermediaries navigating the tensions of their transition toward circularity.

1.3 Dissertation Structure and Publications

Following this research agenda, the dissertation is structured into five main parts, as illustrated in Figure 1.2.

Part I Fundamentals	Chapter 1 Introduction with Motivation, Research Agenda and Thesis Structure	
Part II Conceptualization	Chapter 2 - RQ1 Entrepreneurial Ecosystems and Circular Entrepreneurship	Chapter 3 - RQ2 Entrepreneurial Ecosystems surrounding Circular Startups in Germany
Part III Intermediaries	Chapter 4 - RQ3 Mapping Intermediaries in Circular Entrepreneurial Ecosystems	Chapter 5 - RQ4 Circularity as a Transversal Logic in Entrepreneurial Ecosystems
Part IV Design	Chapter 6 - RQ5 Designing Circular Support Alignment for Intermediaries	Chapter 7 - RQ5 Validating Circular Support Alignment for Intermediaries
Part V Finale	Chapter 8 Conclusion with Contributions, Limitations and Future Research	

Figure 1.2: Overall Dissertation Structure (Own Illustration)

PART I (Fundamentals) introduces the research topic by outlining the motivation and research agenda. It summarizes the five guiding RQs and explains how they are addressed throughout the dissertation (cf. Chapter 1). The second part of the dissertation (PART II - Conceptualization), delves into the conceptual framework for CEEs, which is developed in accordance with RQ1 (cf. Chapter 2), with a focus on adapting existing EEs to support the development of circular startups. In Chapter 3, the focus shifts to the continuation of the contextualization of CEEs, with an analysis of their network structure within Germany, in accordance with the results from RQ2. After establishing the foundations for CEEs, Part III (Intermediaries) delves into the intermediary perspective within CEEs. Chapter 4 investigates their multi-level functions from a conceptual standpoint, thereby providing an answer to RQ3. Conversely, Chapter 5 employs institutional theory to analyze the influence of intermediaries from the perspective of circular startup founders, thus addressing RQ4. PART IV (Design) consolidates the theoretical and empirical insights from two design-focused studies. Chapter 6 is concerned with the development and evaluation of DPs and an artifact that assists intermediaries in aligning their support structures with circular entrepreneurship. Chapter 7 extends this by a second DSR study that applies the developed artifact in a naturalistic setting, thereby contributing to its practical refinement. Both DSR studies respond to RQ5. The fifth and final part (PART V - Finale) of the

dissertation provides a comprehensive summary of the findings. In addition, it outlines the implications for both theory and practice, identifies overarching limitations, and puts forward suggestions for future research (cf. Chapter 8).

As with any comprehensive research endeavor, this dissertation has benefited from continuous academic exchange. While each study represents the author's original contribution, they were enriched through discussions with colleagues, conference presentations, peer reviewers, and students. The following publications, conference papers, and supervised bachelor's and master's theses have directly contributed to the development of this work:

Journal Publications and Conference Proceedings

- Finner, A.-S.; Sagnier Eckert, L.; Terzidis, O. (2026). Empowering Circular Startups: Unveiling the Blueprint for Circular Business Models. *Business Strategy and the Environment*, 2026. <https://doi.org/10.1002/bse.70660>.
- Sagnier Eckert, L.; Finner, A.-S., Heinz; D., Satzger, G. (2026). Backcasting the Future of the Automotive Industry: Leveraging Digital Technologies for the Circular Economy. *Communications of the Association for Information Systems*, 58 (1). <https://aisel.aisnet.org/cais/vol58/iss1/30>.
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Currently Under Review

- Finner, A.-S.; Eckerle, C.; Terzidis, O. (Manuscript). Circular Entrepreneurial Ecosystems: From Dream to Reality (minor revision at *Management Review Quarterly*).
- Finner, A.-S. (Manuscript). Emerging from the Margins: The Formation of Circular Subecosystems in Entrepreneurial Landscapes (major revision at the *Journal of Technology Transfer*).

Conference Presentations

- Finner, A.-S.; Eckerle, C. (2025). Building Bridges to Foster Circularity: Structure and Dynamics in Circular-oriented Entrepreneurial Ecosystems. Entrepreneurial Ecosystem Winter School 2025, Bilbao, Spain.
- Finner, A.-S.; Eckerle, C. (2024). Accelerator Programs as an Important Driver for Circular Economy Transformation: Applying Institutional Theory. 2024, März 8. 84. Wissenschaftliche Jahrestagung des Verbandes der Hochschullehrerinnen und Hochschullehrer für Betriebswirtschaft e.V., Lüneburg, Germany.

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Part II

Conceptualizing

While prior research highlights the importance of EEs for circular transformation, it remains unclear how existing ecosystem structures enable or constrain circular startups (Kanda et al., 2025; Klofsten et al., 2024; Tabas et al., 2025). To address this gap, the first two studies examine both the conceptual foundations and the early structural formation of CEEs.

Chapter 2 addresses the first RQ:

RQ1: How do established elements and their mechanism of an EE function in the context of circular startups and how can they be adapted to foster circular startups?

Through a SLR, the chapter analyzes how core ecosystem elements, namely resources, collaboration, governance, culture, and digital technologies, operate in support of circular startups. Building on these insights, it conceptualizes CEEs and identifies key gaps and adaptation needs for advancing circular entrepreneurship.

Chapter 3 builds on this conceptual groundwork and examines the structural network of CEEs, addressing the second RQ:

RQ2: How are circular entrepreneurial ecosystems structured, and how do relational dynamics shape their functioning?

Conducting a SNA and expert interviews in Germany, the chapter reveals early-stage CEEs as regional subecosystems characterized by intermediary-driven trust networks, overlaps with sustainability communities, and fragmented actor constellations. Structural weaknesses, such as limited financing channels, weak coordination, and divergent interpretations of circularity, further illustrate the challenges circular startups face.

Taken together, these two studies establish the conceptual and empirical foundations for understanding CEEs and provide the basis for the subsequent analysis of intermediaries and their multilevel roles in steering circular transformation within their ecosystem and institutional environment.

Entrepreneurial Ecosystems and Circular Entrepreneurship

This chapter draws on a manuscript submitted as: Finner, A.-S.; Eckerle, C.; & Terzidis, O. (Manuscript). Circular Entrepreneurial Ecosystems: From Dream to Reality (minor revision at Management Review Quarterly). Note: For inclusion in this thesis, the title was changed and the abstract removed. In addition, Section 2.2.1 was added to the theoretical background for introductory purposes, and one table was moved from section 2.4 to the Appendix. Tables and figures were reformatted and renumbered to match the structure of the thesis. Chapter and section numbering, cross-references, formatting, and citation style were harmonized accordingly. All references are included in the consolidated bibliography at the end of the thesis.

2.1 Introduction

The accelerating degradation of natural ecosystems, driven by the linear ‘take-make-dispose’ economic model, poses mounting environmental and social challenges. In response, the CE has gained traction as a transformative socio-economic paradigm aimed at fostering sustainability transformations and mitigating ongoing ecological decline (Geissdoerfer et al., 2017; Kirchherr, Yang, et al., 2023). While incumbent firms often face structural inertia in transitioning to CBM, startups have emerged as key agents of change (Lüdeke-Freund et al., 2019). Their flexibility, innovation capacity, and absence of legacy systems allow them to adopt and scale circular strategies with greater agility (D. Han et al., 2023; Henry et al., 2020; Schaltegger et al., 2016).

However, the success of these pioneering startups hinges not solely on firm-level capabilities but on their embeddedness within a supportive EE. In general, EEs provide not only access to resource endowments, such as knowledge, human capital, or finance, but also shape institutions, such as formal institutions, culture, or networks, all of which are crucial elements to minimizing the liabilities of newness and smallness of startups (Stam & van de Ven, 2021; Woolley & MacGregor, 2022). Understanding how EE elements enable circular entrepreneurship is thus essential to unlocking startups’ potential to drive sustainable economic transformation. Following this phenomena, the intersection of EEs and circular entrepreneurship has gained increased scholarly attention, yet the underlying structures and mechanisms that enable or inhibit this connection remain poorly understood (Kanda et al., 2025).

Recent SLRs have examined the intersection of EEs and circularity from multiple angles: analyzing innovation within circular ecosystems, exploring the role of EEs in advancing circular entrepreneurship, focusing on specific industries such as urban manufacturing and fashion, adopting multi-level perspectives to capture cross-scale interconnections, or emphasizing sustainability and circularity in EE-oriented reviews (see Alka et al., 2024; Amjad & Diaz-Elsayed, 2024; Berniak-Woźny et al., 2025; Ferreira et al., 2024; Kim, 2024; Muldoon et al., 2024; Peçanha & Ferreira, 2025; Provensi & Sehnem, 2025; Provensi et al., 2024; Tabas et al., 2025).

However, these studies do not explain how specific EE elements must evolve to better support startups with CBMs, even though understanding the underlying mechanisms of EE elements is crucial for improving their effectiveness (Wurth et al., 2023). Given the unique challenges these startups face, such as longer return horizons, systemic interdependencies, and higher uncertainty, there is a need to critically assess the suitability of existing ecosystem configurations (De Angelis, 2024). Moreover, as established EEs are characterized by structural stability and aim for resilience, their long-term relevance in driving sustainability transformation depends on their adaptive capacity to foster CBM innovation. A systematic understanding of how existing EE elements enable or constrain circular startups, and of the adaptations required to align EEs with the logic of circular entrepreneurship, remains lacking.

Thus, this study addresses this gap by systematically reviewing the academic literature at the nexus of EEs and circular entrepreneurship. The aim is to map the current knowledge base and identify critical ecosystem elements that require adaptation or reinvention to foster circularity. Accordingly, the following RQs guide this review:

RQ1: How do established elements and their mechanism of an EE function in the context of circular startups and how can they be adapted to foster circular startups?

Thereby, this study contributes to the emerging research at the intersection of circular entrepreneurship and EE studies by systematically synthesizing how EE elements enable and constrain the development and scaling of circular startups. Although the EE elements concept has gained prominence in the context of entrepreneurship (Stam & van de Ven, 2021), its applicability to sustainability-oriented startups, particularly those grounded in circular principles, remains undertheorized. By integrating insights from the EE and circular entrepreneurship literature, this review develops an explanatory framework that captures the mechanisms linking circular startups to their EE elements. It identifies five central themes: resources, collaboration, culture, regulatory framework, and digital technologies.

Theoretically, the study advances the understanding of circular-oriented EEs by revealing the elements and mechanisms within them that enable the emergence and scaling of

CBMs. In doing so, it not only synthesizes and structures current knowledge but also identifies research gaps and outlines a research agenda.

Practically, the review translates the identified ecosystem elements into actionable insights for policymakers, intermediaries, and ecosystem architects aiming toward a CE transformation. In doing so, the study bridges theoretical and practical domains by outlining how ecosystem actors can reconfigure support structures, governance arrangements, and digital infrastructures to foster CBMs more effectively.

The remainder of this chapter is structured as follows: After a brief overview of the development of CE and a current state of research on CBMs, their integration within the CE, and the connection to EE support for circular startups, an SLR is conducted to address the RQ. The results obtained from this study are presented in the subsequent section, followed by a critical discussion of the findings. The chapter concludes by highlighting future research avenues and the study's contributions.

2.2 Theoretical Background

2.2.1 A Short History of Circular Economy

The concept of CE has gained momentum among scholars, practitioners, and policymakers due to its potential to address sustainability challenges such as climate crisis, environmental pollution, and resource constraints (Brehmer et al., 2018; Geissdoerfer et al., 2017; Kirchherr, Yang, et al., 2023) while mitigating the depletion of our natural ecosystem. CE is also seen as a multi-billion economic opportunity, for example, by enabling net material savings and reducing external risks such as commodity price volatility, leading to a more resilient economy (EMF & McKinsey, 2012). This attention has increased over the past 13 years since the initial work of the Ellen MacArthur Foundation in 2010 (Geissdoerfer et al., 2017). In recent years, there has been a rapid rise in research and articles on the CE, with around 100+ articles published in 2016 and thirteen times as many in 2021 (Kirchherr, Yang, et al., 2023). Despite CE being a widely discussed topic among academics, industry professionals, and policymakers, only 7.2% of our economy is circular, leaving a massive circularity gap of over 90% (Circle Economy, 2024).

The notion of CE has been derived from numerous preceding concepts, with its foundational principles extending over several centuries. During the 19th century, pioneering figures such as R.W. Hofman accentuated and acknowledged the economic potential inherent in the utilization of waste, positing that in an ideal scenario, there would be no such thing as waste but rather merely products. This assertion thereby established a direct correlation between the minimization of waste and the augmentation of profit (Murray et al., 2017).

Another seminal work that contributed to the development of the modern concept of the CE was Boulding, 1966 ‘spaceship earth’ theory, which posited the notion of a finite absorptive capacity for the planet. According to Boulding, 1966, the human perception of the environment is evolving from a frontier mentality to the recognition of a closed sphere of human activity. The frontier mentality is characterized by the image of an ‘illimitable plane’ and a ‘frontier’ that provides a safety valve for social and environmental problems. This mentality has been associated with behaviors that are characterized by a lack of restraint, exploitation, romance, and violence, which are typical of open societies. Conversely, the closed-sphere perspective acknowledges that the Earth system is a unified entity, akin to a spaceship, with finite resources and no infinite reservoirs for extraction or pollution. This necessitates a shift towards a more sustainable and responsible economic approach.

The concept was revisited in 1994 under the rubric of industrial ecology (Ayres, 1994). In this work, Ayres, 1994 explores the parallels between biological organisms and industrial metabolism, demonstrating that both can be conceptualized as self-organizing systems. Ayres, 1994 proposed that a manufacturing firm serves as the economic analog of a living organism in biology. The activities undertaken by such a firm can be conceptualized as a form of metabolism, with inputs, outputs, and waste products being systematically tracked and analyzed. Within this paradigm, the human component plays a pivotal role in regulating and stabilizing the system. This role can be viewed from two perspectives: direct, as labor input, and indirect, as a consumer of output. In other words, human workers and consumers help balance the system’s supply and demand sides, ensuring that inputs are transformed into outputs in a steady-state condition. However, achieving this balance can be challenging, especially in a decentralized competitive market form. Fluctuations in demand or changes in consumer preferences can disrupt the balance between inputs and outputs, leading to inefficiencies or waste. Furthermore, the use of non-renewable resources or the generation of harmful waste products can negatively impact the environment and human health, further complicating the task of regulating and stabilizing the system. Consequently, policymakers and decision-makers must judiciously evaluate the trade-offs inherent in managing industrial metabolism, aiming to balance economic, social, and environmental factors to attain sustainable outcomes.

In the 1990s, Stahel established the foundation for this field by proposing an economic model as a loop system, thereby introducing an innovative perspective on a design framework that emphasized the importance of resource conservation, waste reduction, and system sustainability (Stahel, 1997). This concept was subsequently elaborated upon in the early 2000s, leading to the formulation of the cradle-to-cradle model. This model emphasizes the importance of endless product life cycles and closed-loop material use, thereby effectively reducing environmental impact and waste (Braungart & McDonough, 2009).

In contrast to the earlier concept of industrial ecology, which placed greater emphasis on the system as a whole, the cradle-to-cradle model places greater emphasis on the product. The cradle-to-cradle model has been shown to promote sustainability by shifting away from the traditional linear model of production and consumption, which has been demonstrated to generate toxic waste and deplete resources (Braungart & McDonough, 2009). In contradistinction, the cradle-to-cradle approach is powered by renewable energy sources and designed to be regenerative, with materials flowing in safe, closed-loop cycles. The overarching objective of this approach is to minimize waste, conserve resources, and promote CE (McDonough et al., 2003).

Since its inception in 2010, the Ellen McArthur Foundation has been instrumental in harmonizing the diverse elements of the CE paradigm. The foundation has encapsulated frameworks such as industrial ecology, cradle-to-cradle, biomimicry, and regenerative design into a cohesive narrative. Since then, the foundation has proactively promoted the transformation to a CE (Ellen MacArthur Foundation, 2025).

CE has also been recognized by political actors as a potential solution to ecological challenges, with the capacity to reduce pressure on natural resources, facilitate sustainable growth, and generate employment opportunities (Pinyol, 2022). Consequently, both Europe and China have incorporated the concept into their future political strategies (European Commission, 2020; Su et al., 2013). Most recently, the European Green Deal aims to drive the linear economy in Europe toward a resource-efficient, climate-neutral, and competitive economy by 2030. It aims to reduce waste by 50% through prevention, reduction and recycling. This is further supported by the Circular Economy Action Plan (CEAP), which offers a framework to accelerate the European Union's (EU's) transition into a more sustainable future (European Commission, 2020). The study of Pinyol, 2022 showed that from 2016 until 2020, the EU member states Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Poland, Portugal, Slovenia, Spain, and Sweden have all published a national CE strategy.

The concept of a CE is frequently cited as a prerequisite for the implementation of sustainable development (Geissdoerfer et al., 2018; Sauvé et al., 2016; Suchek et al., 2021). Sustainable development can be defined as an approach that considers the present, while ensuring the satisfaction of current needs without compromising the capacities of future generations (Brundtland, 1987). The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, aims to transform the world through an action plan for people, planet, and prosperity, and the 17 Sustainable Development Goals (SDGs) are at the heart of the agenda (United Nations, 2015).

In this sense, contemporary work understands CE as a mean to decouple prosperity from resource consumption (Sauvé et al., 2016) and is designed and intended to focus

on recovery and, thereby, replace the end-of-life concept. It is the antithesis of the current linear economy, which focuses on economic goals while ignoring or marginalizing environmental impacts and social concerns (Sauvé et al., 2016). The prevailing linear economic model falters as non-renewable, finite natural resources dwindle and become more expensive (Geissdoerfer et al., 2018). The model in question can be described in an abstract form by the following process: ‘take-make-waste’ (Sauvé et al., 2016). Conversely, CE is predicated on the utilization of renewable energy sources, the limitation of toxic chemicals to facilitate reuse, and the elimination of waste. The overarching objective of the model is to maximize the utility and value of products, components, and materials over time by reducing, closing, and shortening production cycles (Sauvé et al., 2016).

Despite the considerable attention the topic has received in academia since 2016, there are several definitions that demonstrate the concept’s undefined boundaries (Z. Yuan et al., 2006). Kirchherr, Yang, et al., 2023 conducted a comprehensive analysis of 114 definitions, intending to identify a definition that would foster a shared understanding of CE, thereby facilitating the comparability of discussions and research outcomes. The consolidated definition of CE provided by Kirchherr, Yang, et al., 2023 is therefore as follows: “A CE describes an economic system that is based on business models which replace the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations” (p. 224f).

2.2.2 Circular Entrepreneurship

Businesses have been identified as crucial in transforming from a linear economy towards a CE (Lüdeke-Freund, 2020; Urbinati et al., 2017). Research has indicated that this transformation is most accelerated by SMEs and startups (Bocken et al., 2014; Schaltegger et al., 2016; Stewart & Niero, 2018).

Consequently, the notion of circular entrepreneurship has emerged as a focal point within the academic community, as evidenced by the growing body of research in this area. Zucchella and Urban (2019) define it as the “processes of exploration and exploitation of opportunities in the CE domain” (p. VII). Hereby, three aspects are crucial to clarify for this study: 1) the unit of analysis, that is, who explores and exploits the opportunities, 2) the CBMs to act on the identified opportunities, and 3) the so-called ‘circular economy domain’.

Different firms act upon the exploration and exploitation of opportunities in the CE domain: Mature firms that grow circular, “pioneering the idea to do business while doing good for the planet by closing the resources loops” (Zucchella & Urban, 2019, p. 89); and so-called ‘born-circular’ firms who are building a CBM from scratch (Suchek et al., 2022). As mature firms and startup firms differ significantly in their capabilities and ecosystem embeddedness, this study focuses on the latter, which will be referred to as ‘circular startups’ in the following.

The extant literature asserts that circular startups can develop the requisite CBM for a CE (Henry et al., 2020). This is attributable to their relative size and agility, which allow them to adapt to emerging concepts faster than mature firms (Antikainen & Valkokari, 2016). Indeed, researchers have asserted that startups, in particular, can adapt CE principles relatively easily as they build a new company and develop their corporate culture from scratch. The capacity to challenge established linear production systems through radical innovations empowers them to facilitate resource loops and promote environmental and economic transformation (Antikainen & Valkokari, 2016). This also encourages other market participants to adopt CE principles within their business operations (Hansen et al., 2010; Henry et al., 2020; Hoffren & Apajalahti, 2009). Startups are therefore pivotal in encouraging circular transformation, justifying a special focus.

Geissdoerfer et al. (2020) define CBMs “as business models that are cycling, extending, intensifying, and/or dematerializing material and energy loops to reduce the resource inputs into and the waste and emission leakage out of an organizational system. This comprises recycling measures (cycling), use phase extensions (extending), a more intense use phase (intensifying), and the substitution of products by service and software solutions (dematerializing)” (p. 7).

Literature has identified multiple individual drivers as well as barriers for CBM innovation, with distinctions for startups compared to more established firms (see e.g., Geissdoerfer et al., 2022). Compared to established firms, startups frequently exhibit greater agility in implementing CBMs without the risk of cannibalizing existing business models (Klofsten et al., 2024). Startup barriers include developing a CBM from scratch, sector-specific barriers, the influence of institutional contexts, and the liabilities of newness and smallness in securing financial support (Kanda et al., 2024).

Fehrer and Wieland (2021) argue that all business practices are part of larger societal and ecological systems, and a genuine transformation towards sustainability necessitates a coordinated effort among institutions to harmonize the competing pressures of social mission, environmental stewardship, and economic growth. This is emphasized by the definition of the CE domain outlined in Section 2.2.1 by (Kirchherr, Yang, et al., 2023): the supporting ecosystem is a crucial aspect for CBM success.

EEs play a vital role in fostering CE innovation by supporting circular startups throughout their entrepreneurial journey (Bustamante, 2019; Woolley & MacGregor, 2022). According to the definition proposed by Stam and Spigel (2016), an EE can be defined as “a set of interdependent actors and factors, coordinated in such a way that they enable productive entrepreneurship within a particular territory” (p. 1).

These EEs typically include entrepreneurs, corporations, universities, governments, and funding agencies that interact through cooperation, knowledge exchange, and shared resources and infrastructure (Ferreira et al., 2024; Isenberg & Onyemah, 2016; Klofsten et al., 2024). They are complex systems that Stam and van de Ven (2021) conceptualize as comprising three overarching components: institutional arrangements, resource endowments, and entrepreneurial output. Institutional arrangements define the formal and informal ‘rules of the game’ through governance quality, cultural attitudes toward entrepreneurship, and the density of social networks. Resource endowments encompass the tangible and intangible assets that enable entrepreneurial activity, including physical infrastructure, finance, leadership, talent, knowledge, intermediary services, and market demand. These elements are interdependent and co-evolve within a region, forming clusters of mutual reinforcement leading to productive entrepreneurial output.

To define the concept of a circular-oriented EE fostering innovations of circular startups, the authors draw on both the EE and circular ecosystems literature to identify its defining characteristics (Berghuis et al., 2023; Kanda et al., 2023). The promotion of resource circularity constitutes a new value logic strategy that is central to the functioning of circular ecosystems (Geissdoerfer et al., 2020). It is, therefore, the conclusion of Konietzko et al. (2024) that the intended outcome of an ecosystem is circularity. Their study on the development of circular ecosystems highlights the founding phase and the establishment of such ecosystems, in which circular startups play an essential role (Konietzko et al., 2024). Particularly in step 3, identifying and engaging relevant actors, startup-like organizations are well-suited to serve as orchestrators of the ecosystem due to their agility and flexibility in rapidly developing products (Konietzko et al., 2024). Building on this, Suchek et al. (2022) identified three main subcategories of support ecosystems relevant to supporting circular entrepreneurship: interactions with other ecosystem actors, regional governance and determinants, and technological and Industry 4.0 aspects. Kanda et al. (2024) further stress that a circular-oriented EE mobilizes and provides the infrastructure and resources required for circular startups to grow and survive.

Following the aspects above, CEEs can be conceptually defined as a network of actors and factors that specifically focus on exploring and exploiting entrepreneurial opportunities by narrowing, slowing, and closing resource loops sustainably (Aarikka-Stenroos et al., 2021; Bocken et al., 2017; Ferreira et al., 2024; Konietzko et al., 2020). CEEs are not necessarily confined to regional boundaries, as advancing circularity often requires

integrating knowledge domains across geographies. Their effectiveness is thus contingent on collaboration among diverse actors across multiple sectors and contexts and on the engagement of key organizations, such as universities, which can serve as central engines of knowledge creation and diffusion (Kanda et al., 2025). Ideally, such CEEs would optimize resource utilization and contribute to broader socio-economic outcomes (Theodoraki, Dana, & Caputo, 2022).

While emerging studies have begun to conceptualize CEEs, they have primarily examined them from a structural or thematic perspective, analyzing innovation processes within circular ecosystems, exploring the role of EEs in advancing circular entrepreneurship, focusing on specific sectors such as urban manufacturing or fashion, or adopting multi-level perspectives to capture cross-scale interconnections (see e.g., Alka et al., 2024; Berniak-Woźny et al., 2025; Ferreira et al., 2024).

Yet, these studies rarely distinguish between born-circular startups and growing circular firms, which represent fundamentally different entrepreneurial processes, challenges, and support needs (Henry et al., 2020; Suchek et al., 2022; Zucchella & Urban, 2019). Startups, in particular, face the dual challenge of developing viable business models under conditions of institutional novelty and limited legitimacy, which calls for a distinct network of actors and factors.

In line with this, existing research emphasizes the need for a more comprehensive understanding of the elements and mechanisms through which EEs influence circular startups and how these can be shaped to enable productive circular entrepreneurship (Berghuis et al., 2023; Ferreira et al., 2024; Klofsten et al., 2024). Responding to this gap, the present study focuses on circular startups to examine how established elements of EEs function in their context and how they may be adapted to better foster the emergence and growth of circular startups, thereby contributing to CEEs.

2.3 Methodology

To address this gap, this study carries out an SLR following the methodological guidelines of Kitchenham and Charters (2007). The review synthesizes and structures the academic discourse at the intersection of EEs and circular entrepreneurship to identify elements and mechanisms that enable or constrain circular entrepreneurship, revealing adaptation potential. By doing so, it provides an evidence-based foundation for advancing both scholarly understanding and practical development of circular(-oriented) EEs.

Identification. To ensure comprehensive coverage of the relevant literature, the review began with a broad search on circular entrepreneurship, capturing a wide spectrum of practices, entrepreneurial activities, and their integration within EEs. To adequately cover the available literature, EBSCO Host, JSTOR, Scopus, and the Web of Science Core Collection database were chosen due to the extensive coverage of high-quality, peer-reviewed

literature they offer in the research area and the recognized prestige they maintain in the scientific community (Paul & Criado, 2020; Singh et al., 2021). This combination ensured that both the entrepreneurship- and sustainability-related strands of the research domain were adequately represented (Martins de Souza et al., 2024).

The research covered publications from January 2015 to July 2025, reflecting the notable increase in scholarly interest in CE and circular entrepreneurship during this period to ensure relevance and timeliness. An intentionally broad search string was used to capture literature discussing EEs, whether explicitly or implicitly. This approach was critical because many studies relevant to the transformation of EEs for circular entrepreneurship do not use the term ‘Entrepreneurial Ecosystem’ directly but instead examine specific elements, such as policy frameworks, financing structures, support organizations, or cultural factors, that are integral to the EE concept. By initially combining search terms related to entrepreneurship and the CE without constraining the query to EEs, the strategy allowed for the inclusion of such partial or indirect treatments. The following search string was applied:

(“circular econom” OR “circularit*” OR “closed-loop” OR “closed loop” OR “cradle-to-cradle” OR “C2C” OR “cradle to cradle”) AND (“entrepreneur*” OR “start-up*” OR “startup*” OR “start up*” OR “new venture*”).*

Screening. The initial search yielded 2,836 publications. To ensure consistency and comparability, only peer-reviewed journal articles and conference papers published in English and German were included. Furthermore, publications had to be accessible in full text through the available institutional or open-access channels to enable thorough screening and analysis. After removing 857 duplicates, 1,979 publications remained for screening. Figure 2.1 provides a detailed overview of the literature search and selection strategy, including the sequential filtering steps applied during the identification, screening, and eligibility phases.

The titles and abstracts of the remaining articles were screened in a double-blinded process conducted independently by the author and a second researcher. Screening decisions were based on the guiding question: “Does the title or abstract of the article address circular entrepreneurship with a focus on EE or its constitutive elements?”. Studies were included if they demonstrated an explicit or implicit connection between circular entrepreneurship and EEs, including research on individual ecosystem components such as policy frameworks, financial structures, cultural factors, or support organizations. Studies were excluded if they did not address circular entrepreneurship or entrepreneurship more generally, if they focused exclusively on SMEs or CE solutions without linking them to entrepreneurial activities, or if they described novel materials, recycling methods, or processes, without examining their entrepreneurial implications, such as market feasibility,

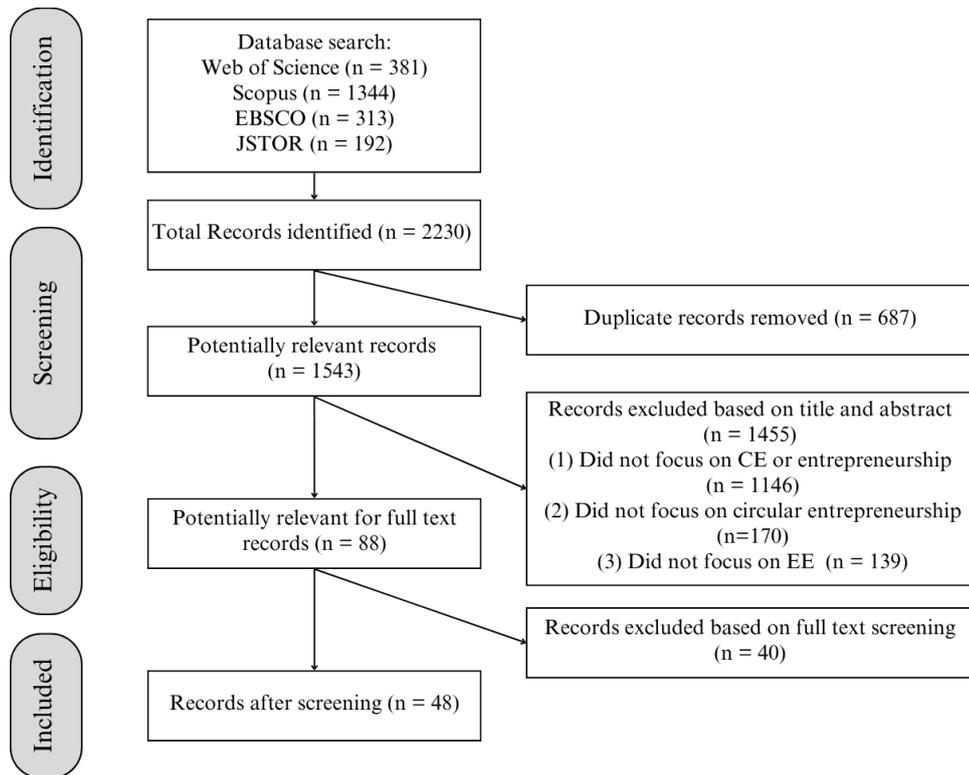


Figure 2.1: Overview of the Literature Search and Selection Strategy (Own Illustration)

ecosystem support, commercialization, or scaling strategies of startups. Disagreements between reviewers were resolved through discussion. If consensus could not be reached, a third author acted as an adjudicator. This process ensured consistency and minimized individual bias in study selection. Applying these criteria reduced the dataset to 121 articles, while 1,858 articles were excluded for failing to meet the inclusion criteria.

Eligibility. A full-paper screening of the 121 articles was conducted to verify their alignment with the research objective and the established inclusion and exclusion criteria. This step was performed independently by the first two authors, with disagreements resolved through discussion and, when necessary, adjudication by the third author. As a result, 60 papers were excluded, leaving 61 articles on EE for circular entrepreneurship for thematic analysis. Following Braun and Clarke (2006), thematic analysis was chosen as it is a foundational method for qualitative research and offers flexibility in identifying and analyzing patterns within qualitative data.

Thematic Analysis. While the extant literature highlights overarching components of EEs (Stam & van de Ven, 2021), the present thematic analysis followed an inductive process to allow themes to emerge organically from the extant literature, as the context of circular entrepreneurship may yield different outcomes. Each of the 61 articles was read in full by the first two authors, who independently coded prominent textual features and subsequently collated these codes into preliminary categories. Codes and their preliminary categories were iteratively refined through constant comparison, grouping similar

concepts, and merging overlapping codes, resulting in five overarching themes. This process was documented in a data structure (see Table 2.1) that traces the progression from initial example codes of individual text passages from the identified literature, over the preliminary categories to the final overarching themes.

Table 2.1: Coding Structure and Development of Overarching Themes

Example Coding of Text Passages in the Identified Literature	Preliminary Categories	Overarching Themes
Higher upfront costs compared to linear competitors, establishment of take-back systems for products or materials	Heightened support needs of circular startups	Resources
Insufficient funding, need for specialized funding instruments for CE startups, lack of robust metrics to communicate circular impacts	Finance	
Building entrepreneurial capabilities, network-building capabilities, peer-learning mechanisms	Talent	
Fostering knowledge exchange, knowledge spillover effects	Knowledge	
Proximity to recycling industries, or makerspaces, facilitates material flow for startups	Physical Infrastructure	
Accelerators, incubators, and makerspaces facilitate connecting startups with other EE actors, tailored accelerator and mentoring programs, selection processes intermediation effectiveness, universities as intermediaries	Intermediation	
Limited market demand for recycled products	Demand	
Collaboration or partnership with incumbent firms or other circular startups, or universities or incubators, connecting residual waste flows	Multi-actor collaboration	Collaboration
Connecting to customers and/or investors, resource efficiency or knowledge-sharing collaborations	Collaboration advantages	
Multi-layered network, digital platforms as network enabler, ecosystem orchestration	Design of the network	
Ecosystem strategy to scale CBM	Strategic infrastructure	
Specific role of intermediaries or universities for collaborations	EE actors supporting role	
Trust and shared vision enable effective collaboration	Enabling values	Culture
Joint vision-building, cultural barriers	Mechanisms	
Outdated or restrictive regulation, tailored regulatory framework	Current situation of regulatory framework	Regulatory framework
Adaptive regulatory governance, transformative regulatory governance (e.g. Tax incentives, targeted subsidies, public tenders), lobbying, enabling infrastructure (e.g. eco-industrial parks, makerspaces)	Adaptation of regulatory framework	

Table 2.1 (continued)

Example Coding of Text Passages in the Identified Literature	Preliminary Categories	Overarching Themes
Digital access drives circular startup formation	Macro-Level digital infrastructure	Digital Technologies
Industrial symbiosis platforms connect EE actors, digital platform bridge information gaps	Digital Technologies enabling Collaboration	
Artificial Intelligence (AI) enhances reverse logistics efficiency, Big Data, Cloud Computing, or Internet of Things (IoT) support remanufacturing and recycling	Advanced Digital Solutions for CBMs	

To ensure conceptual rigor and mitigate superficial categorization, papers were only assigned to an overarching theme if they engaged in a substantive discussion of the concept. Nominal references, such as ‘collaboration’ without analytical elaboration, were not sufficient for inclusion. The resulting categorizations informed the construction of a concept matrix (vom Brocke et al., 2009; Webster & Watson, 2002), providing a structured overview of the literature’s thematic composition (see Table 2.2). This combined methodological approach resulted in the identification of five overarching themes and 19 subcategories, which are presented and discussed in detail in the following section.

Table 2.2: Literature Review Concept Matrix

Authors	Resources	Collaboration	Culture	Regulatory Framework	Digital Technologies
Acquier et al. (2024)		X		X	
Alka et al. (2024)		X	X		X
Alonso-Almeida et al. (2021)		X			
Amaleshwari & Jeevitha (2023)					X
Amjad & Diaz-Elsayed (2024)	X	X		X	
Audretsch & Fiedler (2023)	X				
Batista-Canino et al. (2024)		X		X	
Bauwens et al. (2024)		X		X	
Berghuis et al. (2023)	X	X		X	X
Berniak-Wozny et al. (2025)	X	X		X	
Borrero & Yousafzai (2024)					X
Bragelien & Voldsund (2023)	X	X			
Brown et al. (2019)			X	X	

Table 2.2 (continued)

Authors	Resources	Collaboration	Culture	Regulatory Framework	Digital Technologies
Castro Oliveira et al. (2022)				X	
Charalabidis et al. (2022)					X
Colombo et al. (2025)			X		
Coskun et al. (2025)				X	
Droege et al. (2023)				X	
Fang & Parida (2024)	X				
Fernandes et al. (2023)				X	
Ferreira et al. (2024)		X		X	
Geissdoerfer et al. (2023)	X	X		X	
Greer et al. (2020)				X	
Henry et al. (2024)	X			X	
Hull et al. (2021)	X	X			
Kambanou et al. (2025)	X				
Kanda et al. (2021)		X			
Kanda et al. (2025)		X			
Kaplan (2023)				X	
Kim (2024)	X			X	
Kostakis & Tsagarakis (2022)	X				
Lit et al. (2024)	X	X			
Manea et al. (2021)					X
Millette et al. (2020)	X	X			
Mondal et al. (2023)		X		X	X
Moss et al. (2022)	X			X	
Muldoon et al. (2024)					X
Narayana et al. (2024)	X				
Nielsen & Hakala (2023)				X	
O'Shea et al. (2021)	X	X	X		
Oyinlola et al. (2022)					X
Peçanha & Ferreira (2025)					X
Pizzi et al. (2022)					X
Poponi et al. (2020)		X			
Premyanov et al. (2022)	X				
Provensi et al. (2025)		X		X	X
Provensi & Sehnem (2025)		X		X	X
Rao et al. (2024)				X	

Table 2.2 (continued)

Authors	Resources	Collaboration	Culture	Regulatory Framework	Digital Technologies
Rataj et al. (2024)		X		X	
Re et al. (2023)	X			X	
Rocha et al. (2023)	X	X		X	
Rodrigues et al. (2022)	X				
Roshan et al. (2024)					X
Sehnm et al. (2024)	X				
Sousa Resende et al. (2025)		X		X	
Tuladhar et al. (2024)		X			X
Van Opstal & Borms (2023)	X			X	
Veleva & Bodkin (2018)	X	X			
Velzing et al. (2022)				X	
Wilson et al. (2022)					X
Zhou & Park (2021)	X				

2.4 Content Analysis

Overall, the relationship between EEs and circular entrepreneurship varies across publications. From the analysis of the articles, it became clear that the term ‘CEE’ has not yet been broadly established, but it appears in some of the identified papers. However, all the papers explain EE elements and mechanisms surrounding circular startups.

Emerging in 2018, 61 papers have been published since then, discussing circular startups and EE. The analysis has revealed a discernible trend in the extant literature concerning these intertwined concepts. As illustrated in Figure 2.2, the volume of publications on this topic has steadily increased. This increase is consistent with the broader trend observed in both the CE and EE research domains, where growing attention to sustainable business models and entrepreneurial dynamics has spurred greater scholarly output (Kirchherr, Bauwens, & Ramos, 2023; Thai et al., 2023). The majority of research on circular entrepreneurship focusing on EEs is typically qualitative, with 43 papers including 9 SLRs. This is followed by quantitative research (n=8), mixed-methods research (n=4), and conceptual papers (n=6), see Appendix A.1 for more details.

A clear predominance of qualitative research designs is observable across the reviewed studies published between 2018 and 2025, with particular emphasis on multiple-case (n=17) and single-case (n=9) study methodologies. These studies rely on a variety of data collection techniques, including in-depth and semi-structured interviews, focus groups,

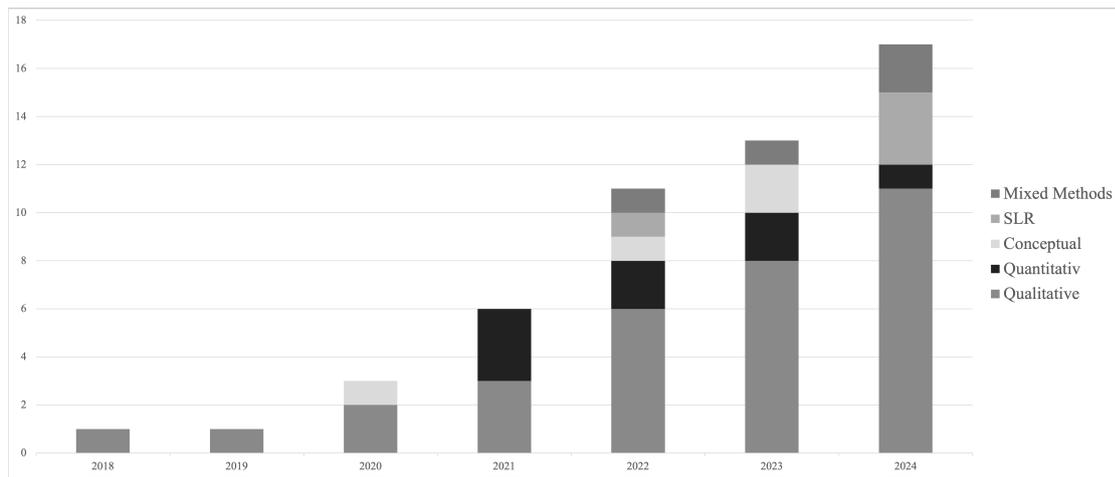


Figure 2.2: Circular Entrepreneurship and Entrepreneurial Ecosystem Publications by Year and Type (Own Illustration)

document analysis, and direct observation. In terms of analytical strategies, content analysis and comparative analysis emerge as the most commonly employed methods, supplemented by inductive and deductive coding to identify themes and patterns within the data. In addition to case study research, six studies ($n=7$) adopted alternative qualitative approaches that reflect distinct methodological commitments. These include abductive reasoning, grounded theory development, and information-oriented sampling strategies, each aimed at theorizing from rich, context-sensitive data. Other studies within this group employed intervention-based designs to test and refine practical programs in real-world environments, focus group-centered approaches to enable interactive meaning construction, and fuzzy set qualitative comparative analysis (fsQCA) to identify causal patterns across multiple cases through a configurational lens.

The quantitative studies ($n=8$) rely heavily on panel data analysis, regression models, correlation analysis, and index construction. While some studies primarily utilize aggregated data from databases (e.g., Eurostat, GEM), others employ survey methods to collect data and apply econometric techniques. The limited number of mixed-methods research studies ($n=4$) frequently employed a survey, followed by interviews or secondary data, to achieve a deeper level of knowledge and provide a more comprehensive explanation of the qualitative analysis results.

Notably, six SLRs were published in 2024. These studies variously examined the intersection of EEs (Muldoon et al., 2024; Provensi et al., 2024), adopted a multi-level perspective on EEs in circular entrepreneurship (Ferreira et al., 2024), investigated how innovation ecosystems themselves can be improved to enable a CE transformation better (Alka et al., 2024), explored urban manufacturing as an entry point for circular entrepreneurship (Amjad Diaz-Elsayed, 2024), and focused on collaboration within the fashion EE (Kim, 2024). In 2025, two additional SLRs further emphasized collaboration in the circular entrepreneurship literature, highlighting the growing importance of

network building and digital technologies in shaping startups' circular business models (Peçanha Ferreira, 2025; Provensi Sehnem, 2025). Collectively, this progression reflects an emerging sophistication within the research domain.

Europe is the predominant focus of the studies employed, investigating specific countries as well as Europe as a whole (n=33). A rising interest could be identified in other countries, such as China, the United States (US), India, Brazil, and African countries. In the context of China and India, the discussion centers on industry parks and manufacturing (Amaleshwari Jeevitha, 2023; Kambanou et al., 2025; Mondal et al., 2023; Narayana et al., 2024; Zhou Park, 2021), while in Africa, the focus is on plastic recycling, reflecting the challenges posed by waste management in developing countries (T. Moss, 2009; Oyinlola et al., 2022). Interestingly, the studies are highly diverse in their focus areas, highlighting a rich, fragmented landscape of circular entrepreneurship and EEs. Studies focus on multi-industries (n=5), concentrate on waste management (n=5), highlighted specific industries such as education (n=4), food (n=4), plastic (n=3), textile (n=3) and manufacturing (n=2), in addition to others, or observed specific actors within this research domain, namely industrial parks, incubators, and makerspaces.

Building on the inductive thematic analysis described in the methodology section (cf. Section 2.3), the literature on circular startups and EEs was synthesized and structured into five themes: 1) Resources, 2) Collaboration, 3) Culture, 4) Regulatory Framework, and 5) Digital Technologies. Some publications are relevant to more than one theme.

The following section will briefly introduce the five identified themes to showcase the elements and mechanisms by which EEs enable and constrain circular startups. Based on the findings, a conceptual framework of CEEs is presented and subsequently discussed.

2.4.1 Resources

The literature on the 'Resources' theme focuses on material and immaterial support provided to circular startups, typically in the form of access to finance, talent, knowledge or consumer acceptance. These elements are frequently discussed together in the literature. While these resource needs are well-known and well-researched in conventional entrepreneurship contexts, the 25 articles show that they remain primarily oriented toward traditional, profit-driven startups rather than circular startups. Thereby, the resource elements in their current form constrain circular startups, despite their dependency on them, due to high operational costs, the challenge of attracting investment for capital-intensive models, the need for specialized knowledge and infrastructure to close material loops, and low consumer awareness of circular alternatives. At the same time, the literature indicates that targeted mechanisms, such as dedicated funding schemes, circular knowledge building, local physical resources, and tailored intermediation services, can enable circular startups to overcome some of these barriers.

2.4.2 Collaboration

The ‘Collaboration’ theme captures how circular startups connect with diverse actors within the EE, including other startups, incumbent firms, intermediaries, universities, civil society organizations, and government agencies. Across 26 publications, these network relations are identified as particularly relevant in CEEs for re-engineering supply chains, connecting residual material flows, linking to customers, facilitating knowledge sharing, supporting technology co-development, and enabling access to financial capital. The literature emphasizes that such networks should be multi-layered, spanning sectors and value chains, and supported by an orchestrator to ensure alignment and coordination. Intermediaries and universities are highlighted as key enablers of these collaborations, while leveraging partnerships itself is increasingly viewed as a distinct scaling strategy for circular startups.

2.4.3 Culture

In the ‘Culture’ theme, four publications highlight the importance of shared values and trust as foundations of collaboration within CEEs. Community-building mechanisms such as joint vision development and regular exchange among geographically proximate partners are identified as key enablers of a supportive cultural environment.

2.4.4 Regulatory Framework

Within the ‘Regulatory Framework’ theme, 29 publications emphasize the crucial role of regulatory structures surrounding circular startups. The literature consistently highlights that existing regulations and financial instruments are primarily designed for conventional entrepreneurship and require adaptation for CEEs. Identified mechanisms include policy reforms and adjustments to regional and international regulatory frameworks, direct market stimulation through public procurement and fiscal incentives, as well as adaptive governance models and coordinated lobbying efforts.

2.4.5 Digital Technologies

The final theme, ‘Digital Technologies’, is understood as an enabling layer within CEEs. 16 publications highlight the positive relationship between digitalization and ecosystem performance, emphasizing the role of digital platforms in fostering collaboration, knowledge exchange, and network orchestration. In addition, technologies such as artificial intelligence (AI), big data, and Internet of Things (IoT) are identified as resources that support the development and scaling of CBMs.

From this analysis, the identified themes were integrated into a conceptual framework of CEEs (see Figure 2.3) from the perspective of circular startups. The model illustrates how

circular startups operate within EEs that are simultaneously shaped by institutional and cultural frameworks and supported by digital technologies. Resource endowments such as finance, knowledge, and talent circulate within these CEEs, enabling collaboration and productive circular entrepreneurship. Co-evolutionary feedback between ecosystems and institutional–cultural environments reflects the dynamic adaptation processes that sustain circular transformation. In the following, the conceptual framework will be critically discussed.

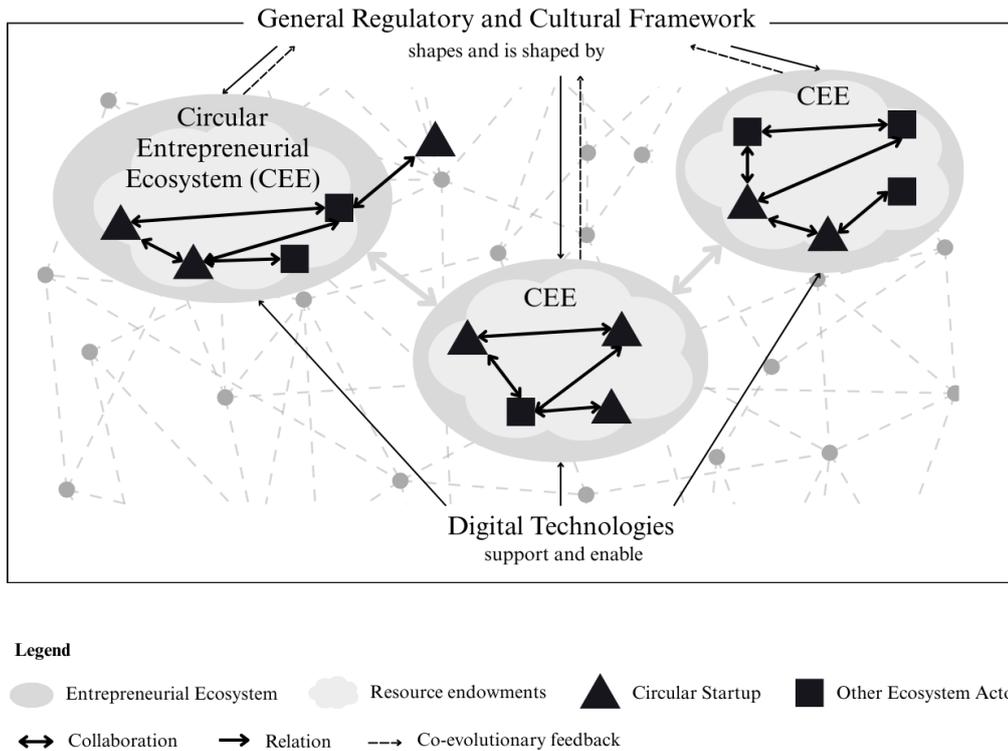


Figure 2.3: Conceptual Framework of Circular Entrepreneurial Ecosystems (Own Illustration)

2.5 Discussion

The literature analysis yielded five overarching themes that capture how EE elements constrain and enable circular startups. The following discussion interprets these findings in light of established theoretical EE concepts and the wider sustainability literature. It examines how the functions of core EE elements manifest and evolve in circular startup contexts, and how adapting these can result in CEEs designed to support circular startups.

2.5.1 Resources

The first theme, ‘Resources’, reveals how the foundational resource endowments described by Stam and van de Ven (2021) require qualitative reconfiguration rather than mere quantitative expansion. In conventional EEs, elements such as finance, talent, and knowledge primarily serve as inputs that enable startup growth. In CEEs, however, these

same elements must operate through mechanisms that facilitate systemic change and long-term value creation (Berghuis et al., 2023; Van Opstal & Borms, 2023). This shift reflects the amplified resource dependency of circular startups, which must simultaneously implement systemic transformations in production, consumption, and waste management while maintaining commercial viability.

Although the following sections discuss individual resource-related elements for analytical clarity, it is essential to note that these elements are inherently interdependent and co-evolve within regional EEs (Stam & van de Ven, 2021; Wurth et al., 2023). Their combined quality, rather than the strength of any single element, determines ecosystem productivity. Table 2.3 summarizes the EE elements and adaptive mechanisms in CEEs.

Entrepreneurial Ecosystem Element	Adaptive Mechanisms in CEEs
Finance	<p>Development of standardized metrics to communicate circular impact and de-risk investment.</p> <p>Expansion of CE-focused investors and blended-finance instruments. Creation of funding schemes that reward systemic and long-term value creation.</p>
Talent	<p>Tailored capability-building programs focusing on circular and systemic competencies (rhetorical, adaptive, resiliency).</p> <p>Mentoring and peer-learning formats to diffuse experiential knowledge.</p> <p>Mechanisms that attract and retain talent with sustainability-driven mindsets.</p>
Knowledge	<p>Facilitation of reverse knowledge spillovers from circular startups to incumbents.</p> <p>Establishment of shared learning platforms and knowledge hubs. Co-development of evaluation logics and metrics for circular performance.</p>
Physical Infrastructure	<p>Integration of localized production facilities, fab labs, and makerspaces that enable experimentation and prototyping.</p> <p>Regional tailoring of infrastructure to circular resource flows and material proximity.</p> <p>Shared facilities for reuse and repair initiatives.</p>
Intermediation	<p>Development of CE-specific accelerators, mentoring, and brokerage programs.</p> <p>Translation of circular values into actionable support mechanisms.</p> <p>Alignment of cross-stakeholder interests to foster collaboration.</p>
Demand	<p>Awareness campaigns and labeling schemes to signal circular value to consumers.</p> <p>Collaborative marketing platforms linking startups with mainstream markets.</p> <p>Public-private partnerships to stimulate circular demand.</p>

Table 2.3: Adaptive Mechanisms in CEEs

Finance. The reconfiguration is most visible in the finance domain, where circular startups face structural constraints that hinder access to capital, underscoring the need for new ecosystem-level mechanisms. High operational costs, often tied to the establishment of take-back or remanufacturing systems, create major financial hurdles (Veleva & Bodkin, 2018). Securing investment for such capital-intensive models is constrained primarily by the low number of CE-focused investors, which are restricted to institutional investors, leaving circular startups with limited access to much-needed growth capital (F.

Fang & Parida, 2024). But also the absence of robust metrics to communicate circular impacts, constrain circular startups, leading to low investor appeal and insufficient funding (Geissdoerfer et al., 2022; Lit et al., 2024; E. Moss et al., 2022; Re et al., 2023; Veleva & Bodkin, 2018). These findings suggest developing standardized impact-measurement frameworks that translate circular outcomes into recognizable financial indicators. Insights from the impact investing literature offer valuable parallels. Empirical research in this field highlights the persistent ‘liability of impact intransparency,’ which mirrors the difficulties circular startups face in communicating non-financial value (Eckerle, 2025). Studies show that the co-development of sector-specific impact metrics and blended value assessment frameworks can mitigate information asymmetries and enhance investor confidence in sustainability-oriented startups (Ormiston, 2019). Translating these insights for CEEs suggests that developing shared circular impact metrics could reduce perceived risk, mobilize capital, and align financial flows with circular value creation.

Talent. Aside from these financial challenges, the literature highlights that the entrepreneurial capabilities required for circular entrepreneurship differ markedly from those in conventional ecosystems. Building rhetorical, adaptive, and resiliency competencies through tailored EE programs is identified as a crucial enabler (Kostakis & Tsgarakis, 2022; O’Shea et al., 2021; R. Rocha et al., 2023; Sehnem et al., 2024). While existing studies often discuss these competencies at the firm level, emphasizing management commitment, organizational culture, team composition, and prior founder experience as key drivers of circular performance (Rodrigues et al., 2022), such findings underline the importance of ecosystem-level mechanisms that nurture these capabilities through mentoring, peer-learning, and talent development initiatives. Beyond individual capability-building, peer-learning within EEs, particularly among diverse circular startups, can serve as a collective mechanism to amplify the value of regional talent. It facilitates knowledge diffusion, shared problem-solving, and the co-creation of circular innovations (Berghuis et al., 2023). Moreover, regional human capital endowments are shown to influence circular firm formation, as localized knowledge spillovers facilitate opportunity recognition across sectors (Zhou & Park, 2021).

At the same time, the talent element should also include strengthening circular startups’ network-building capabilities. These relational competencies are essential for avoiding isolation and for engaging in sustained collaboration with suppliers, customers, intermediaries, and other stakeholders. Such capabilities can be cultivated through structured training and development programs (Narayana et al., 2024). When equipped with these skills, startups can expand their role from innovators to conveners, mobilizing actors and bridging institutional gaps to align fragmented resource flows toward shared circularity goals (Henry et al., 2024).

Knowledge. Talent and knowledge are inherently interlinked: capabilities developed at the individual level gain systemic relevance only when embedded in collective learning and knowledge exchange. Therefore, knowledge exchange emerges as a cornerstone of ecosystem elements for circular startups. Beyond the acquisition of technical expertise and CBM development (Lit et al., 2024), the literature emphasizes reverse knowledge spillovers, where circular startups transfer sustainability-related insights to incumbent firms and local communities (Audretsch & Fiedler, 2023). This extends Stam and van de Ven's (2021) notion of the knowledge element by showing that, in a circular context, knowledge serves a reflexive function: it underpins shared evaluation logics and the co-development of circular performance metrics, reinforcing the earlier mechanism of impact measurement.

Physical infrastructure. In addition to tangible resource elements, access to appropriate facilities and material flows is critical for operationalizing CBMs (E. Moss et al., 2022). Proximity to production facilities, fab labs, makerspaces, and repair or exchange initiatives substantially lowers barriers for experimentation and prototyping (Kim, 2024). This evidence suggests that physical infrastructure must be tailored to regional resource configurations and embedded within place-based support structures.

Intermediation. Finally, intermediaries play a pivotal role in mobilizing and coordinating these resource elements and stakeholder relations. Intermediaries such as accelerators, incubators, and makerspaces facilitate network processes by connecting circular startups with diverse actors across the value chain and by fostering trust and collaboration among participants (Amjad & Diaz-Elsayed, 2024; Berniak-Woźny et al., 2025; Hull et al., 2021; Millette et al., 2020). Through tailored accelerator and mentoring programs focused on circularity, intermediaries can reduce entry barriers and shorten the time-to-market for circular startups (Kostakis & Tsagarakis, 2022; O'Shea et al., 2021; R. Rocha et al., 2023).

Their effectiveness depends on deliberate, multi-stage participant selection processes to align circular startup needs with the intermediation and the integration of complementary stakeholders to enable education on CE and industrial symbiosis (Kambanou et al., 2025; Premyanov et al., 2022). Moreover, this mechanism is influenced by the degree of government involvement, particularly as a funding source, which can shape program priorities; ideally, intermediations should maintain a balance between publicly and privately funded incubators to accommodate diverse stakeholder preferences (Hull et al., 2021).

Beyond accelerators and incubators, universities can also serve as intermediary platforms that facilitate co-creation. They simultaneously build entrepreneurial competencies and foster partnerships between research, industry, and startups to advance shared sustainability goals (Bragelien & Voldsund, 2023).

The findings demonstrate the pivotal function of intermediaries in fostering productive circular entrepreneurship by providing support to circular startups. This assertion is corroborated by research in the field of sustainability. Intermediaries have been shown to facilitate connectivity and knowledge exchange, thereby contributing to the development of productive and sustainable entrepreneurship (Wurth et al., 2023). Yet their effectiveness depends on being explicitly designed to meet startup needs and to nurture sustainable entrepreneurship (Pierrakis et al., 2024; Theodoraki & Messeghem, 2017). These findings suggest that the intermediation element is contributing to productive circular entrepreneurship for circular startups by being adapted to their needs.

Demand. The demand element remains underdeveloped within existing EEs for circular startups. Limited consumer awareness and weak market pull for circular products constrain startups' ability to scale (E. Moss et al., 2022). Building on the reviewed literature, potential mechanisms to stimulate demand may include EE-facilitated awareness campaigns, public-private labeling initiatives, and collaborative marketing platforms that signal the value of circular offerings to mainstream consumers.

Taken together, these findings extend Stam and van de Ven's (2021) conception of resource endowments by illustrating that, in CEEs, resource elements must not only be available but also reconfigured to align with circularity principles. The emphasis shifts from quantitative provision toward qualitative adaptation mechanisms that enable circular value creation, such as developing circular-specific evaluation metrics, fostering capability-building, and facilitating infrastructures for reverse knowledge flows. In this context, intermediaries assume heightened importance as relational orchestrators, integrating and activating these interdependent elements. By coordinating knowledge exchange, capability-building, and financial or infrastructural resources, they facilitate the co-evolution of ecosystem elements and sustain the systemic connectivity required for productive circular entrepreneurship.

2.5.2 Collaboration

Collaboration in CEEs can be interpreted as the manifestation of the network element described by Stam and van de Ven (2021), reflecting the social context and connectedness of actors within an ecosystem. Networks in CEEs extend beyond information exchange and resource sharing; they function as the structural fabric that enables coordination across the value chain and supports systemic circular transformations.

The reviewed literature reveals that circular startups engage in multi-actor collaborations involving incumbent firms, universities, incubators, civil society organizations, and government agencies. Partnerships with incumbent firms are particularly strategic in sectors such as waste management and recycling, as they unlock underutilized resources, enable high-value waste valorization, and support the re-engineering of supply chains

to facilitate circular material loops (Lit et al., 2024; Poponi et al., 2020; Tuladhar et al., 2024). These collaborations are reciprocal, as incumbents adopt new practices and diffuse innovation across the broader ecosystem.

Beyond supply chain partnerships to connect residual material flows, networks connect circular startups with customers and financial partners, opening access to markets and capital (Berghuis et al., 2023; Geissdoerfer et al., 2022; Kanda et al., 2021; Mondal et al., 2023; Provensi & Sehnem, 2025; Provensi et al., 2024; R. Rocha et al., 2023; Veleva & Bodkin, 2018). These connections enhance resource efficiency, foster knowledge sharing, and accelerate technology co-development (Alka et al., 2024; Alonso-Almeida et al., 2021; T. Bauwens et al., 2024; Kanda et al., 2021).

To make the network element effective in CEEs, ecosystems must coordinate multi-layered connections across macro-level policy linkages, meso-level industry clusters, and micro-level firm partnerships (Batista-Canino et al., 2025; Ferreira et al., 2024; Rataj et al., 2024). Digital platforms and symbiotic collaboration increasingly serve as enablers of these meso- and micro-level alignments (Ferreira et al., 2024). Several scholars even call for an ecosystem orchestrator, an actor that manages relationships, aligns visions, and coordinates long-term strategic investments (e.g., funding schemes for incubators) across the ecosystem (Kanda et al., 2021; Kanda et al., 2025; O'Shea et al., 2021). Circular startups, especially with platform-based solutions, are seen as particularly well-suited to assume this role (Acquier et al., 2024).

Recent research further suggests ecosystem strategy as a distinct scaling pathway for circular startups, underscoring that partnerships with diverse stakeholders are not only instrumental for resource access but also serve as strategic vehicles for growth and systemic impact (Sousa Resende et al., 2025). This perspective reinforces the view that networks in CEEs function as strategic infrastructures that enable collective scaling and cross-sectoral transformation.

Again, intermediaries act as connectors within these networks (Amjad & Diaz-Elsayed, 2024; Berniak-Woźny et al., 2025; Hull et al., 2021; Millette et al., 2020). Similarly, universities connect research with industry and circular startups (Bragelien & Voldsund, 2023). Taken together, these findings extend Stam and van de Ven (2021) conception of networks as channels of information and resource flows by highlighting their systemic and integrative role in CEEs. These networks not only distribute knowledge and capital but also coordinate interdependencies, align incentives, and sustain the collective action required for circular transformation.

2.5.3 Culture

The literature emphasizes that the effectiveness of collaboration within circular EEs strongly depends on underlying cultural conditions. Studies reveal enabling values such

as partner motivation, trust, shared vision, transparency, and openness to iterative learning and experimentation (Alka et al., 2024; P. Brown et al., 2019; Colombo et al., 2025; O’Shea et al., 2021). Such a culture fosters a mindset of collective achievement and shared responsibility towards circularity, which is essential for sustaining the long-term cooperation among circular startups and diverse EE actors.

This element can be actively facilitated by joint vision-building among geographically proximate partners and by cultivating transparency through regular exchange and reflection (Colombo et al., 2025). Nevertheless, cultural and mindset barriers, particularly around the sharing of risks and rewards, remain persistent challenges that hinder deeper forms of collaboration (P. Brown et al., 2019).

In line with Stam and van de Ven’s (2021) conception of culture as an informal institutional layer shaping entrepreneurial activity, these findings suggest that CEEs require a broader cultural foundation. Rather than merely valuing individual entrepreneurial success, CEEs’ culture must emphasize trust, reciprocity, and collaborative problem-solving as sources of legitimacy and innovation.

2.5.4 Regulatory Framework

The governance and regulatory structure surrounding circular startups plays a key role in CEEs. These aspects can be summarized under the element of formal institutions, which, according to Stam and van de Ven (2021), define the rules of the game in society, particularly the quality and consistency of governance. This includes the effectiveness of regulatory frameworks and policy coherence, which in the current context often remain misaligned with the requirements of circularity. This finding aligns with sustainability research. Startups that integrate social, environmental, and economic dimensions into their business models depend heavily on the formal institutional dimension of EEs, particularly progressive legislation and policymaking that incentivize sustainable entrepreneurial activity (de Moraes et al., 2025; Martins de Souza et al., 2024).

Across the reviewed literature, the regulatory framework is consistently identified as a constraining factor for circular startups. Outdated or restrictive regulations can significantly impede their progress (Acquier et al., 2024; Geissdoerfer et al., 2022; Provensi & Sehnem, 2025; Rao et al., 2024). Several studies reinforce calls for policy reform tailored to circular startup needs at both national and regional levels, emphasizing the interdependence between macro- and meso-level governance structures (T. Bauwens et al., 2024; Berniak-Woźny et al., 2025; Ferreira et al., 2024; Rataj et al., 2024; Sousa Resende et al., 2025).

Examples of regulatory framework adaptation include bans on single-use plastics, waste reduction mandates, and extended producer responsibility schemes, all of which incentivize the adoption of CBMs (Batista-Canino et al., 2025; Castro Oliveira et al., 2022;

Droege et al., 2023; Mondal et al., 2023; Nielsen & Hakala, 2023; Re et al., 2023; R. Rocha et al., 2023).

A growing stream of research advocates for dynamic, adaptive regulatory frameworks that evolve alongside technological and market developments (Droege et al., 2023; Van Opstal & Borms, 2023). Such approaches rely on cross-sectoral coordination and feedback loops, integrating the perspectives of multiple stakeholders. Within this context, policy entrepreneurs play a crucial role in framing CE as a political and economic priority. Circular startups can act as both beneficiaries and shapers of the regulatory framework, challenging linear norms and demonstrating viable alternatives (Henry et al., 2024; Provensi et al., 2024). Evidence also shows that countries with well-developed National Systems of Entrepreneurship (NSEs) aligned with circular principles provide more favorable conditions for circular entrepreneurial activity (C. Fernandes et al., 2023).

A further mechanism involves collective lobbying and advocacy by ecosystem actors. Coordinated policy engagement can amplify the collective voice of circular startups and accelerate institutional change, yet limited lobbying capacity remains a persistent weakness in many CEEs, allowing restrictive regulations to persist unchallenged (Berghuis et al., 2023; E. Moss et al., 2022).

Furthermore, the regulatory framework could adopt direct interventions, including financial mechanisms such as tax incentives, targeted subsidies, and public tenders (Amjad & Diaz-Elsayed, 2024; P. Brown et al., 2019; Mondal et al., 2023; Rataj et al., 2024; R. Rocha et al., 2023). Policy-driven incentives not only reduce the financial burden for startups but can also actively create market demand, for example, through campaigns that normalize circular consumption patterns, such as reuse in the plastics sector, or preferential procurement schemes (E. Moss et al., 2022; R. Rocha et al., 2023). Public procurement schemes can also stimulate market demand for circular solutions. For example, national tenders and public investments in circular refurbishment projects have generated demand for innovative materials and processes, encouraging startups to develop new competencies (Greer et al., 2021; Velzing et al., 2022).

Institutional support further manifests through the creation of enabling infrastructures. Government-funded regional CE hubs, such as co-working facilities, eco-industrial parks, and makerspaces, illustrate how public policy can operationalize CE objectives by providing startups with access to physical resources, networking opportunities, and proximity to potential partners (Kaplan, 2023; Velzing et al., 2022). Similarly, circular makerspaces, often established with public funding, serve as inclusive infrastructure that fosters collaboration, human capital development, and knowledge exchange, thereby incubating circular entrepreneurship (Coskun et al., 2025). The proximity dimensions identified by Kim (2024) further suggest that coherent local and global policy frameworks should support

material flow networks, knowledge exchange, and trust-building through both physical and digital infrastructures.

Taken together, these findings extend Stam and van de Ven's (2021) conception of formal institutions beyond their traditional role as rules of the game. As in broader sustainability and climate governance literature, the results suggest that complex sustainability challenges cannot be effectively addressed through hierarchical or static forms of government (Soininen et al., 2025). Instead, they require dynamic, adaptive, and multi-level governance arrangements capable of coordinating diverse actors and policy domains.

In this context, transformative governance becomes visible through deliberate policy reforms and adjustments, the design of enabling regulatory frameworks, direct market stimulation through public procurement or targeted subsidies, and coordinated lobbying efforts that seek to realign institutions with circular objectives. At the same time, adaptive governance manifests in continuous learning, feedback processes, and flexible policy instruments that evolve with technological and market developments. Together, these forms illustrate how governance in CEEs combines structural transformation with flexibility and experimentation. This interplay underscores that circular entrepreneurship is a specific expression of sustainability-oriented governance, operationalizing transformation through entrepreneurial and institutional practice.

2.5.5 Digital Technologies

Across the reviewed literature, digital technologies emerge as a core mechanism through which CEEs can orchestrate, connect, and accelerate entrepreneurial activity. While digital technologies are not explicitly defined as an element in Stam and van de Ven's (2021) model, they can be conceptually positioned at the intersection of collaboration, knowledge, infrastructure, and intermediation. Rather than representing an additional resource, they function as a transformative layer that reshapes how these elements interact, enhancing information flows, innovation capacity, and coordination within EEs. EE research increasingly views digitalization as a systemic enabler that expands opportunity spaces and improves process efficiency, with positive associations to national EE outputs (Wurth et al., 2023; Zahra et al., 2023; J. Zhang et al., 2023).

Within CEEs, digital technologies play an equally enabling role. At the macro level, digitalization strengthens the systemic foundations of CEEs by linking technological progress with innovation and circular performance (Manea et al., 2021). Recent studies conceptualize digital infrastructure as a core ecosystem asset that requires universal accessibility, institutional openness, and dynamic capabilities to coordinate cross-sector collaboration and innovation (Roshan et al., 2024). As digital tools blur organizational boundaries and reshape interdependencies, they provide the structural conditions for scaling circular strategies across industries (Muldoon et al., 2024; Peçanha & Ferreira, 2025).

As highlighted in earlier sections, collaboration is a crucial element within CEEs, and digital technologies play a central role in enabling it. Digital platforms connect diverse ecosystem actors, enhance transparency in value chains, facilitate the flow of residual materials, and foster collective learning (Berghuis et al., 2023; Borrero & Yousafzai, 2024; Mondal et al., 2023; Provensi & Sehnem, 2025; Provensi et al., 2024). Case evidence demonstrates that such platforms bridge information gaps, optimize resource recovery, and facilitate cross-sector knowledge sharing (Charalabidis et al., 2022; Oyinlola et al., 2022; Pizzi et al., 2022). Beyond enabling collaboration, digital technologies also strengthen the knowledge dimension of CEEs. AI, Industry 4.0, Big Data, and IoT applications facilitate the implementation of CBMs by improving reverse logistics, enabling consumer education, and optimizing resource allocation (Alka et al., 2024; Amaleshwari & Jeevitha, 2023; Tuladhar et al., 2024; Wilson et al., 2022). These technologies allow CEEs to support startups through knowledge transfer, experimentation, and the adaptation of advanced tools to specific operational contexts.

Taken together, digital technologies extend Stam and van de Ven's (2021) EE elements model by introducing a digital layer that amplifies knowledge creation and accelerates network orchestration. In CEEs, this layer becomes particularly salient: it enables transparency, traceability, and resource optimization while fostering collaborative innovation at scale.

2.6 Conclusion

The goal of this study was to systematically review and structure the growing body of literature at the intersection of EEs and circular entrepreneurship, with a particular focus on circular startups adopting CBMs. To achieve this, an SLR was conducted using an iterative, inductive mapping process. 61 studies were identified as relevant. Although the term CEE is rarely used explicitly, the literature reveals an emerging research stream addressing how EEs can support circular startups. The field largely mirrors the growth trajectory of CE and EE research, but remains dominated by qualitative studies with a strong European focus, while sector-specific analyses remain limited.

Reflecting on the first part of the RQ, how established EE elements function in the context of circular startups, the review identified five interrelated elements that influence circular entrepreneurship: resources, collaboration, culture, the regulatory framework, and digital technologies. Among these, resources and the regulatory framework currently act as constraints and require reconfiguration to meet CBMs' needs. Resource-related challenges concern financing, talent, knowledge, infrastructure, and intermediations. Intermediaries play a crucial role in coordinating knowledge exchange, capability-building, and access to financial and physical resources, thereby sustaining the systemic connectivity of CEEs. Similarly, the regulatory framework, primarily designed for conventional

startups, must evolve toward more adaptive and circular-oriented transformation governance models.

Collaboration was identified as the manifestation of network structures within CEEs. Beyond enabling information and resource flows, networks are central to aligning disconnected value chains, facilitating circular supply loops, and supporting systemic transitions. This is closely intertwined with the cultural dimension, which needs to emphasize trust, reciprocity, and collective problem-solving as sources of legitimacy and innovation for circular startups. Digital technologies, in turn, function as a transformative layer that reshapes how these elements interact, enhancing transparency, coordination, and innovation capacity across ecosystem levels.

In synthesis, the findings demonstrate that EEs must undergo qualitative reconfiguration to effectively foster circular entrepreneurship, answering the second part of the RQ effectively. This entails developing financial metrics that translate circular impact into investor-relevant value, expanding talent and training programs that leverage knowledge spillovers, and tailoring physical infrastructure to regional resource configurations and place-based support structures. Furthermore, intermediation should be redesigned around the specific needs of circular startups. From an institutional perspective, adaptive and transformational governance mechanisms, such as direct market stimulation, feedback integration, and regulations that promote waste valorization, can strengthen alignment between policy and circular startups. In addition to these elements, it is imperative to utilize digital technologies as catalysts, such as digital platforms, to foster collaboration. Moreover, integrating AI, IoT, and big data is crucial to advancing CBM development. Finally, cultivating a culture of circularity across the ecosystem is essential: it requires building trust and reciprocity among actors and raising consumer awareness to stimulate market demand for circular products and services.

Taken together, this study provides an integrated understanding of how established EE elements function and interact within the circular context. It thereby demonstrates that fostering circular startups requires not only structural adaptation of existing EE components but also a more profound cultural and institutional transformation that embeds circularity as a shared approach across EEs.

2.6.1 Future Research

Beyond synthesizing and structuring the literature, this review identifies several gaps that together outline a future research agenda for advancing the study of CEEs, see Table 2.4.

A persistent theoretical gap concerns the conceptual boundaries of CEEs. While some studies explicitly adopt the term, definitions remain vague and fragmented (see e.g., Berghuis et al., 2023; Geissdoerfer et al., 2022; Konietzko et al., 2024). As an emerging research stream, future research should examine how such ecosystems emerge, evolve,

Table 2.4: Future Research Agenda

Theme	Future Research Agenda
Overall	<p>How can CEEs be conceptualized with respect to the formation processes and development trajectories?</p> <p>Which EE mechanisms contribute to CE transformation?</p> <p>Which metrics can capture the economic, environmental, and social outcomes of CEEs?</p>
Resources	<p>How can the circular impact of circular startups be measured to attract investment and enhance legitimacy?</p> <p>How do the interdependent elements talent and knowledge reinforce one another in fostering capability-building and knowledge spillovers?</p> <p>How do regional resource endowments, spatial proximity, and place-based institutions shape the operationalization and scaling of CBMs?</p> <p>How can intermediary functions within CEEs be theoretically conceptualized, and which mechanisms of intermediation most effectively support circular entrepreneurship?</p> <p>How do intermediaries mediate between CEE actors and contribute to a CE transformation?</p>
Collaboration	<p>How can CEEs orchestrate collaboration and steer a long-term circular transformation?</p> <p>Under what conditions do circular startups act as orchestrators, catalysts, or integrators?</p>
Culture & Demand	<p>How are trust, reciprocity, and shared purpose established among CEE actors?</p> <p>How do circular values diffuse from intermediaries to other CEE actors?</p> <p>What mechanisms foster prosumer development for circular products or services, at the micro and meso levels?</p>
Regulatory Framework	<p>How should governance structures and institutional frameworks be designed to effectively support CEEs and adaptive and transformational circular policymaking?</p> <p>How can governmental support for CEEs be systematically measured?</p> <p>How do different CBMs influence startups' interactions with political and regulatory systems?</p>
Digital Technologies	<p>How do digital ecosystems and infrastructure affect the CEE evolution and development?</p> <p>How can the digital ecosystem framework be designed to support CEEs?</p>

and contribute to broader CE transformations. Equally critical is the development of robust, context-sensitive metrics to assess CEE performance, which would enable more systematic comparisons and theoretical consolidation.

Future research should deepen the understanding of the resource dynamics within CEEs. For the finance element, studies could draw on impact investing and sustainable finance research to develop and test circular-specific impact measurement frameworks that improve transparency and legitimacy for investors. Regarding knowledge and talent, more research is needed on how these interdependent elements reinforce one another, specifically, how capability-building and knowledge spillovers can be jointly cultivated

to enhance circular innovation. Investigating physical infrastructure offers another avenue: how do regional resource endowments, spatial proximity, and place-based institutions shape the operationalization of CBMs? Finally, the role of intermediaries within CEEs is undertheorized. While EE research has long recognized intermediaries as crucial enablers, facilitating knowledge exchange, building networks, and shaping institutional frameworks (Negri et al., 2025), their specific contributions within the context of circular entrepreneurship remain underexplored. Only a limited number of studies explicitly address this issue (see e.g., Kim, 2024; Millette et al., 2020; O’Shea et al., 2021), suggesting future studies should unpack how intermediaries mediate between startups, investors, and policymakers and how they ultimately contribute to a CE transformation.

Despite growing acknowledgment of multi-actor collaboration as a driver of circular transition, empirical evidence remains limited. Promising conceptual models, such as the quintuple helix (Borrero & Yousafzai, 2024) and subecosystem approaches (Cloutier & Messeghem, 2022), typically adopted in EE research, should be further developed to explain how CEEs orchestrate collaborations across sectors and value chains. Subecosystem models are particularly well-suited to capture these intra-ecosystem dynamics, while the quintuple helix perspective helps to conceptualize how universities, governments, and civil society actors shape circular-oriented innovation at system level. Thus, these models are not generic ‘add-ons’ but directly respond to the identified gaps concerning multi-actor coordination and systemic boundary-setting in CEEs.

Research should also address the emerging call for dedicated ecosystem orchestrators capable of governing not only information but also material and energy flows (see e.g., Amalleshwari & Jeevitha, 2023; Berghuis et al., 2023; Borrero & Yousafzai, 2024). Future work might investigate who can assume this role, startups, intermediaries, or public actors, and under which institutional conditions such orchestration becomes sustainable.

The cultural dimension of CEEs remains largely overlooked. Future studies could explore how trust, reciprocity, and shared purpose are established among ecosystem actors and how cultural values influence legitimacy and innovation. A particularly relevant question is how circular values diffuse from intermediaries to circular startups, incumbent firms, and consumers. This, in turn, highlights the interconnectedness between culture and the demand for circular solutions. More research could untangle different approaches to incentivize the use of circular products or services (see e.g., Recker et al., 2024) or analyze network effects on prosumer development to foster pro-environmental behavior (Ertz et al., 2022).

Research on the political and institutional dimensions of CEEs is still in its infancy. Recent work in the broader EE literature similarly emphasizes the need for more policy-oriented research agendas, highlighting, for instance, leadership effects, inclusiveness, and the development of appropriate monitoring indicators as central but underexplored

areas (Hess et al., 2025). Future studies should examine how policies can be designed to support CEEs more effectively, including the degree and form of actor participation in governance processes, the use of adaptive and experimental policy instruments, and the development of performance indicators for ecosystem-level transformation. Moreover, the interaction between policy frameworks and CBM typologies warrants deeper investigation: how do variations in CBM design influence the regulatory and infrastructural requirements of circular startups? Comparative policy studies could shed light on how national entrepreneurship systems integrate CE principles and shape ecosystem evolution.

Finally, the role of digital technologies within CEEs remains underexplored, despite their potential to fundamentally reshape ecosystem dynamics. While digital infrastructures and platforms are often highlighted as enablers of transparency, collaboration, and circular resource flows, how they contribute to circular entrepreneurship remains conceptually fragmented. Open questions include how digitized commercial environments affect the feasibility of CE-related sustainable development goals, how socioeconomic conditions shape the growth of digital ecosystems, and how digital sustainability initiatives can integrate businesses that would otherwise be environmentally harmful (Muldoon et al., 2024).

Addressing these questions will not only advance theoretical integration between EE and CE research but also provide a foundation for designing and governing ecosystems capable of enabling systemic circular transitions.

2.6.2 Theoretical Contribution

Previous reviews and conceptual studies have addressed the role of entrepreneurship in the CE (see e.g., Alka et al., 2024; Berniak-Woźny et al., 2025; Ferreira et al., 2024). However, these studies have typically focused on specific aspects and have not systematically examined the influence of EE elements and their mechanisms. Moreover, they rarely distinguish between born-circular startups that embed circularity from inception and growing circular firms that integrate it into existing operations. As a result, limited attention has been paid to how established EE elements function to enable circular entrepreneurship at the startup level. Therefore, this study offers three main theoretical contributions.

First, it advances the emerging literature on CEEs by uncovering how EE elements interact to support circular startups. By contextualizing established EE components within the domain of circular entrepreneurship, the study shows how these elements function and can be adapted to nurture better startups pursuing circular innovation from the outset.

Second, this study extends EE research by conceptualizing CEEs and demonstrating how their core elements interact and evolve in sustainability-oriented contexts. Primarily, it advances EE research by showing that the effectiveness of core EE elements hinges

on qualitative reconfiguration rather than quantitative expansion. Furthermore, specifying context-dependent mechanisms through which ecosystems can be designed to foster productive circular entrepreneurship. This conceptualization provides a theoretical foundation for understanding how ecosystems can be purposefully designed to foster circular and innovation-driven entrepreneurship.

Third, beyond extending EE theory, this study bridges EE research with institutional and transition-oriented perspectives. CEEs can be understood as meso-level systems in which multiple institutional logics coexist and interact through mechanisms of intermediation, collaboration, and governance. By linking ecosystem dynamics to concepts of transformative and adaptive governance, the study aligns CEEs with transition and innovation systems thinking, offering a novel lens to understand how entrepreneurship contributes to systemic sustainability transitions.

2.6.3 Practical Contribution

The systematic review provides a structured overview of the emerging field of CEEs. It offers researchers a foundation for identifying conceptual, methodological, and empirical gaps across multiple levels of analysis. In this way, this study may catalyze future, more practice-oriented research. Additionally, the findings carry several implications for practitioners seeking to strengthen CEEs through ecosystem development.

As boundary-spanning actors, intermediaries play a pivotal role in translating circular objectives into actionable support mechanisms. They should tailor their programs, mentoring activities, and networking formats to the specific challenges of circular startups. Purposefully curated peer-learning spaces and mixed cohorts can accelerate knowledge spillovers and foster a culture of collective achievement within CEEs. As central nodes of knowledge creation and diffusion, universities can strengthen CEEs by fostering transdisciplinary partnerships that connect research, education, and entrepreneurial practice. By integrating circular entrepreneurship into curricula and training programs, universities can cultivate the next generation of talent capable of bridging scientific, technological, and business expertise.

Policy actors can use the insights to design adaptive, transformative governance frameworks and regulatory instruments that reflect the systemic nature of circular startups. This includes integrating feedback mechanisms between startups and policymakers, supporting policy reforms and adjustments, and directly stimulating markets. By embedding CE principles in regional and national entrepreneurship strategies, policymakers can catalyze long-term structural transformation.

For investors, the results emphasize the need to move beyond traditional financial evaluation criteria. Developing standardized and transparent circular impact metrics can reduce uncertainty and attract investment into CBMs. Across all actors, they should push

for establishing circularity as a culture within EEs, emphasizing trust, reciprocity, and collaborative problem-solving as sources of legitimacy and innovation. At the same time, all actors can contribute to stimulating market demand for circular offerings by fostering consumer awareness through public–private labeling initiatives, joint awareness campaigns, and collaborative marketing platforms that signal the value of circular products and services to mainstream audiences. Together, these actions can embed circularity not only as an economic logic but as a social and cultural practice within EEs.

2.6.4 Limitations

While this SLR provides a comprehensive overview of the current state of research on EEs in CE, it is not without limitations. First, the qualitative and thematic nature of the synthesis inevitably entails a degree of subjectivity, which may have influenced the identification and interpretation of themes (Malik & Terzidis, 2025). Second, despite a broad search strategy, potential selection bias cannot be entirely ruled out, as some relevant studies may not have met the inclusion criteria. Third, the relatively small and heterogeneous body of literature constrained the depth of analysis and led to a necessarily selective treatment of some themes.

Entrepreneurial Ecosystems surrounding Circular Startups in Germany

This chapter draws on a manuscript submitted as: Finner, A.-S. (Manuscript). Emerging from the Margins: The Formation of Circular Subecosystems in Entrepreneurial Landscapes (major revision at the Journal of Technology Transfer). Note: For inclusion in this thesis, the title was changed and the abstract removed. Tables and figures were reformatted and renumbered to match the structure of the thesis. Chapter and section numbering, cross-references, formatting, and citation style were harmonized accordingly. All references are included in the consolidated bibliography at the end of the thesis. A preliminary version of this research was presented at the Academy of Management Annual Meeting 2025 (Copenhagen) and appears as an abstract in the Academy of Management Proceedings (DOI: 10.5465/AM-PROC.2025.14222abstract).

3.1 Introduction

A CE aims to maintain products, components, and materials at their highest utility and value. It's potential benefits are manifold, including new opportunities in sectors such as remanufacturing, increased resilience to resource supply risks, and the creation of new employment (Ari & Yikmaz, 2019). Research indicates that circular startups emerge as beneficiaries of these opportunities, capable of driving the transformation toward more sustainable, resource-efficient markets and value chains by developing new value creation models and challenging existing linear systems (Ferreira et al., 2024; Herrero-Luna et al., 2022).

Driving such change requires dense interaction, coordination, and resource exchange across organizational and sectoral boundaries. Circular value creation depends on interdependencies between suppliers, recyclers, technology providers, policymakers, and users, making collaboration a core prerequisite for innovation and scaling (Aryee et al., 2025; Colombo et al., 2025; Ferreira et al., 2024). Consequently, circular startups are highly dependent on their surrounding EEs, which provide access to partners, infrastructures, knowledge, and institutional support (Kanda et al., 2024; Woolley & MacGregor, 2022).

These forms of coordination are enacted through social networks. Prior EE research highlights that networks are central mechanisms through which information, resources,

and legitimacy flow (Stam & van de Ven, 2021; Wurth et al., 2023). Yet, despite acknowledging their importance, the EE literature offers limited insight into the internal relational dynamics that shape coordination, knowledge diffusion, and collective value creation within ecosystems (Guéneau et al., 2022; Neumeyer et al., 2019; Stam et al., 2025).

This gap is even more pronounced for CEEs. While CEEs are increasingly discussed in the literature (cf. Chapter 2), existing research has focused mainly on support mechanisms, institutional barriers, and business model challenges (Kanda et al., 2025; Tabas et al., 2025). However, little is known about the structural configuration of CEEs and the relational dynamics that arise from these structures. Hence, the following RQ is proposed:

RQ2: How are circular entrepreneurial ecosystems structured, and how do relational dynamics shape their functioning?

To investigate this phenomenon, this study employs a mixed-methods approach. First, a SNA of 523 actors in Germany maps the structural configuration of emerging CEEs embedded in regional EEs. This provides novel insights into the composition, connectivity, and influence patterns underpinning circular entrepreneurship. Second, ten semi-structured interviews enrich this structural perspective by illuminating the dynamics through which actors coordinate, exchange knowledge, and build collaborative practices within CEEs.

Building on the concept of subecosystems, the study investigates whether CEEs exhibit the characteristics of specific, interest-driven subsystems nested within Germany's broader EE landscape (Cloutier & Messeghem, 2022). This provides an empirically grounded perspective on the early-stage development of sustainability-oriented EEs.

Thus, this study advances EE research by providing one of the first network-based analyses of CEEs, showing how intermediary-centric architectures and low-density structures shape circular entrepreneurship. Furthermore, it extends subecosystem theory by providing empirical evidence of CEEs as emerging subecosystems, including their early-stage characteristics and developmental barriers. And finally, it enriches CEE literature by adding a structural and dynamic network perspective.

The remainder of this chapter is structured as follows. It begins with an overview of the EE literature, the concept of subecosystems, and CEEs. This is followed by an explanation of the methodological approach used to answer the research question, with a subsequent presentation of the results from both empirical approaches. Section 3.5 discusses the findings, and Section 3.6 concludes with theoretical and practical implications as well as limitations and opportunities for future research.

3.2 Theoretical Background

3.2.1 Entrepreneurial Ecosystems

Research on EEs has become central in understanding how interconnected actors, institutions, and resources collectively foster entrepreneurial activity within specific local or regional contexts (Neumeyer et al., 2019; Stam & Spigel, 2016). Emphasizing the systemic embeddedness of entrepreneurship, the EE perspective shifts focus towards the configurations of regional structures that support entrepreneurial value creation. EEs are commonly characterized as complex systems composed of entrepreneurs, corporations, universities, governments, and funding agencies connected through cooperation, knowledge exchange, and shared infrastructure (Ferreira et al., 2024; Isenberg & Onyemah, 2016).

Over the past decade, EE research has expanded substantially and now draws on diverse theoretical perspectives, including resource dependence theory (Cloutier & Messeghem, 2022), stakeholder theory (Borrero & Yousafzai, 2024; Sehnem et al., 2022), institutional theory (Re et al., 2023), dynamic capabilities (Acquier et al., 2024; Mondal et al., 2023), knowledge spillover theory (Audretsch & Fiedler, 2023), and systems theory (Roshan et al., 2024), to explain how actors coordinate, access resources, and navigate embedded regional contexts. While this plurality has enriched the field, research emphasizes the need for deeper investigation into the internal workings and interdependencies of EEs to refine the understanding of their dynamics and conceptual limits (Stam et al., 2025; Theodoraki, Dana, & Caputo, 2022; Wurth et al., 2022).

One promising avenue for answering this call concerns social interactions. They refer to the relational patterns through which individuals and organizations connect, collaborate, and exchange resources. EE research still lacks fine-grained analyses of network attributes, such as tie strength, relational structure, brokerage positions, or community cohesion, and how these attributes shape EE outcomes and evolve (Guéneau et al., 2022; Neumeyer et al., 2019; Stam et al., 2025). This underscores the need for studies that move beyond aggregate depictions of networks and instead examine the internal relational dynamics that underpin information flows, coordination, and collective value creation within EEs.

Within Stam and van de Ven's (2021) conceptualization of EE elements, these social interactions are captured in the network element, situated within the broader component of institutional arrangements alongside resource endowments and entrepreneurial output. Institutional arrangements define the formal and informal rules of the game, including governance quality, cultural attitudes, and the density of social networks, while resource

endowments encompass the tangible and intangible assets enabling entrepreneurial activity. These elements co-evolve and form mutually reinforcing configurations that give rise to productive entrepreneurship.

The network element describes the social context of actors and the extent of their connections, and is widely regarded as a core mechanism of EE functioning (Prokop & Thompson, 2023; Spigel & Harrison, 2018; Stam & van de Ven, 2021). They ensure information flows, facilitate access to knowledge, labor, and capital, and structure the interactions that underpin entrepreneurial communities (A. J. Fernandes & Ferreira, 2022; Stam & van de Ven, 2021). They also enable connectivity through central dealmakers or brokers who bridge subgroups and shape resource and information exchange (Wurth et al., 2023). From an embeddedness perspective, individuals and organizations are situated within complex networks of social relationships that both enable and constrain their actions (Wurth et al., 2023).

Collectively, these insights highlight that networks constitute a core mechanism of EE functioning. However, network dynamics vary substantially across sectors, domains, and actor groups (see e.g., Guéneau et al., 2022; Neumeyer et al., 2019; Prokop & Thompson, 2023; Sako et al., 2020), a phenomenon that has sparked growing interest in the study of subecosystems.

3.2.2 Subecosystems

Recent research shows that high levels of social interactions emerge in subecosystems (Cloutier & Messeghem, 2022; A. Rocha et al., 2021). Subecosystems are conceptualized as the elementary components of an EE and are drawn from Simon's (1962) hierarchical view of complex systems. Cloutier and Messeghem (2022) define a subecosystem as "a local subsystem that is composed of material, social and cultural attributes, that is open and interacts with other subecosystems of the EE, and that is led by or connected to an actor or group of actors contributing to the dynamics of innovation and entrepreneurship" (p. 614).

This perspective reflects broader insights that EEs are not monolithic systems but nested, hierarchically structured arrangements that can be decomposed into interrelated subsystems (Harrington, 2017; Regele & Neck, 2012; Theodoraki & Messeghem, 2017). An EE typically contains a small number of subecosystems, each comprising multiple sequences of activities that are grouped based on their interaction intensity and shared identities or logics of action (Cloutier & Messeghem, 2022).

Subecosystems do not develop in linear or stable patterns. Instead, they unfold through dynamic, non-linear processes shaped by contextual triggers and evolving actor configurations (Roundy et al., 2018; Sydow et al., 2009). Following a path dependence perspective, their development can be analytically segmented into three overlapping phases (Cloutier

& Messeghem, 2022): (1) Impulse, triggered by events that disrupt existing trajectories; (2) Creation, during which key actors, infrastructures, or governance modes emerge; and (3) Structuring, where rules, routines, and institutional embedding consolidate and stabilize the subecosystem.

The subecosystem lens helps distinguish universal EE characteristics from those tied to local or sector-specific conditions. Subecosystems can be categorized into different types based on their dominant attributes. Transversal subecosystems (e.g., digital) permeate the entire EE and typically exhibit strong material attributes. Specific subecosystems are more strongly shaped by social attributes and local contexts, for example, health or agro-food ecosystems (Cloutier & Messeghem, 2022). They are mostly sectoral or interest-based subecosystems tailored to particular industries, technologies, or communities, such as cultural industries, life sciences, or entrepreneurship education (A. Rocha et al., 2021).

This typology provides a conceptual lens for analyzing ecosystems emerging around societal missions or transformative domains. Building on this foundation, the next section situates CEEs within this framework and examines their specific relational and structural features.

3.2.3 Circular Entrepreneurial Ecosystems as Subecosystems

A shift towards a CE has created a new field of entrepreneurial opportunity that requires both firm-level innovation and ecosystem and system-level coordination. Startups, due to their agility and innovation capacity, play a critical role in advancing CE principles by designing business models around slowing, narrowing, and closing resource loops from the outset (Antikainen & Valkokari, 2016; Bocken et al., 2014; Schaltegger et al., 2016). Their ability to challenge incumbent linear value chains and implement resource-efficient innovations positions them as central agents in structural change (T. J. F. Bauwens et al., 2020; De Mattos & De Albuquerque, 2018; Rizos et al., 2016).

However, the emergence and scaling of such circular startups depends heavily on an enabling environment that supports knowledge exchange, resource mobilization, and the orchestration of interdependent actors, namely, an EE (Woolley & MacGregor, 2022). Circular startups challenge conventional market mechanisms by requiring collaboration across sectors, new actor constellations, and the creation of shared visions and institutional support structures that no single firm can build alone (Ferreira et al., 2024; Geissdoerfer et al., 2022; Tabas et al., 2025).

Building on this, research on CEEs has emerged to examine how ecosystems enable circular startups to explore and exploit opportunities around CE principles (Aarikka-Stenroos et al., 2021; Bocken et al., 2016; Konietzko et al., 2020) (cf. Chapter 2). CEEs are characterized by strong system interdependencies, cross-sectoral actor constellations,

and a pronounced societal mission orientation (Kanda et al., 2025; Tabas et al., 2025). Existing studies provide valuable insights into the challenges circular startups face and the types of support needed, such as specialized knowledge, financing schemes, regulatory guidance, or intermediary services (Berghuis et al., 2023; Kanda et al., 2024; Van Opstal & Borms, 2023). They also highlight that circular startups, more than conventional ones, depend on high levels of coordination and collaboration to overcome the liability of smallness and newness, and mobilize partners (Kanda et al., 2025; Klofsten et al., 2024; Konietzko et al., 2024; Tabas et al., 2025).

Building on the subecosystem perspective introduced above (cf. Section 3.2.2), CEEs can be understood as specific, interest-driven subecosystems within the broader EE landscape. Their emergence is tied to a mission-oriented domain, the CE, that requires tight coordination among heterogeneous actors, shared identities around circular principles, and the development of new material, social, and cultural attributes. These characteristics align closely with the criteria used to distinguish subecosystems (Cloutier & Messeghem, 2022; A. Rocha et al., 2021).

Current research focuses primarily on CEE functions, support mechanisms, and institutional challenges. However, little is known about the relational architecture of CEEs, that is, how actors are connected, which actors function as brokers, bridges, or peripheral participants, and how these network attributes shape coordination, knowledge flows, and collective value creation. This gap is particularly striking given that CEEs are inherently network-dependent due to their cross-sectoral resource flows, coordination intensity, and reliance on knowledge recombination. Addressing this gap requires both mapping network structures and understanding the underlying relational mechanisms that give rise to these ties.

3.3 Methodology

To address this gap, the study adopts a mixed-method approach that combines an SNA with qualitative semi-structured interviews. This approach allows for capturing both the structural patterns of how actors are connected within the CEE and the relational dynamics that underlie coordination, knowledge flows, and collaborative practices.

3.3.1 Social Network Analysis

To examine the structure of CEEs, this study applies SNA. This methodology has been widely used in EE research to map inter-organizational connectivity, identify central actors, detect brokers or bridging positions, and uncover patterns of cohesion and fragmentation within EE networks (see e.g., Apa et al., 2017; Cowell et al., 2018; A. J. Fernandes & Ferreira, 2022; A. Rocha et al., 2021). It offers a robust methodological framework for

analyzing social structures through patterns of relationships among entities, commonly referred to as nodes or vertices, and their ties, which represent interactions, flows, or affiliations (McLevey et al., 2024). This allows researchers to assess not only who is connected to whom but also the strategic positions actors occupy within a network.

Applying SNA is particularly suited to this study because strong interdependencies, cross-sectoral collaboration needs, and high coordination complexity characterize CEEs (Kanda et al., 2025; Tabas et al., 2025). Mapping their relational architecture provides insights into their emergent structure, including the distribution of centrality, the presence of brokers, the existence of cohesive subgroups, and the overall degree of connectivity. These structural indicators are crucial for understanding how circular startups access resources, mobilize partners, and overcome coordination challenges.

Germany was selected as the empirical focus because of its heightened CE activity and its formal commitment to CE transformation, illustrated by the launch of the ‘Nationale Kreislaufwirtschaftsstrategie’ in 2024 (Bundesumweltministerium, 2024). The SNA maps the inter-organizational relationships among actors engaged in circular entrepreneurship across Germany. This nationwide network does not represent a single CEE but rather the structural configuration of actors who collectively contribute to multiple CEEs embedded within different regional EEs.

Sampling Strategy. Given the initial uncertainty about the network’s size and boundaries, a snowball sampling approach was adopted. Snowball sampling is particularly effective for exploring under-researched ecosystems, as it allows the network to be constructed iteratively from an initial set of known actors (Goodman, 1961; Wasserman & Faust, 1994). Starting with one or a few seed nodes, selected based on their centrality or influence, the method traces direct connections to other relevant actors, who are subsequently included in further sampling rounds.

In line with recommendations for digital qualitative research (Kuckartz & Rädiker, 2022), a desk-based web search revealed the organizations ‘UnternehmerTUM’ and its initiative ‘Circular Republic’ as key actors in Germany for promoting circular entrepreneurship. They collaborate with over 100 innovation partners and support more than 50 startups annually, offering a strategically appropriate entry point for tracing broader network connections (UnternehmerTUM GmbH, 2025). Due to their influential role in Germany, they were selected as seed nodes.

Data Collection. Primary data were collected between autumn 2023 and early 2024 through a structured manual internet search, a method commonly used when comprehensive databases are lacking (McLevey et al., 2024).¹ Sources included organizational websites, online reports, commercial registers, Crunchbase, and the Global Startup Ecosystem Report. Actor inclusion followed predefined criteria to ensure relevance and consistency.

¹ The data was acquired during a bachelor theses, supervised by the author; see Boelcke (2024).

For circular startup actors, inclusion was contingent upon meeting the following conditions: (1) Founded between 2016-2024, (2) classified as a startup by European Commission standards (European Investment Bank, 2021), (3) headquartered in Germany, and (4) demonstrated circular orientation based on the framework by Van Opstal and Borms (2023), which includes strategies such as: reduction in material use, prolonged product lifecycles, design for additive manufacturing, use of renewable materials, maintenance and repair, CBMs, and or take-back systems for refurbishment and recycling. At least one of the above circular strategies must be fulfilled by a startup to be included in the network dataset. Supplementary information (e.g., year founded, postal code) was collected for contextual analysis.

Other actor types (e.g., support organizations, investors, policy actors) were included if they (1) had direct or reciprocal interaction with identified startups, (2) were explicitly referenced on a startup's website, and (3) publicly promoted support for circular entrepreneurship. Each actor's geolocation and organizational website were analyzed for content referring to sustainability and CE, forming the basis for semantic coding.

Data Analysis. Actors were classified using the EE framework by Isenberg and Onyemah (2016), which delineates six core actor categories: (1) corporations, (2) educators and developers of human capital, (3) support organizations and event organizers, (4) financial actors, (5) culture impactors, (6) policymakers and public leaders.

To determine sustainability and circularity orientation, websites were semantically coded in German and English. Relevant text fragments were assessed for alignment with circular or sustainability principles based on the presence of key terms and context-specific descriptions. For circularity orientation, indicative terms included cradle-to-cradle, closed loops, remanufacturing, recycling, reuse, eco-design, or product-as-a-service. For sustainability orientation, broader terms such as eco-friendly, carbon reduction, climate-neutral, green innovation, or impact-driven were considered. Synonyms and semantically equivalent phrases were accepted to accommodate diverse terminologies used by different organizations. Manual coding was chosen to preserve contextual nuance, account for ambiguous expressions, and reduce false positives that may occur with automated keyword detection. The analysis therefore focuses on the structural properties of the German network of CEE-relevant actors, providing insights into how circular entrepreneurship is connected and coordinated across regional boundaries.

Network Construction and Analysis. Following data collection and coding, a nodes and edges table was created in Microsoft Excel, defining actors and their relationships. The resulting graph was visualized and analyzed using Gephi, a widely used open-source software.

Both network-level and node-level metrics were calculated in Python to characterize the network’s structural properties and the positional significance of individual actors. Network-level indicators included density, global clustering coefficient, geodesic distance, and the mean betweenness centrality and degree, while node-level indicators comprised degree centrality, betweenness centrality, closeness centrality, and, eigenvector centrality following established SNA practices (Tabassum et al., 2018). The integration of both levels of analysis offers complementary insights: macro-level patterns reveal systemic cohesion, while micro-level attributes highlight key influencers or structural gaps.

3.3.2 Semi-structured Expert Interviews

Semi-structured expert interviews complement the SNA’s findings by providing the interpretative depth needed to understand the relational mechanisms underlying the observed network structure. While the SNA reveals who is connected to whom, how centrality is distributed, and where brokerage or cohesion emerge, it cannot explain why particular ties form, how actors experience collaboration, or which challenges and coordination practices shape interactions within the CEEs. Semi-structured expert interviews, therefore, offer a valuable qualitative perspective.

Ten semi-structured interviews were conducted with individuals representing key actor groups within the network identified in the SNA, including circular startup founders, intermediaries, financial actors, corporations, and policymakers (see Table 3.1).² A purposive sampling strategy was used to ensure representation across different ecosystem roles and organizational types (Bryman, 2012). The sampling frame consisted of 50 actors identified in the SNA dataset (10 per actor category). These actors were contacted via email, LinkedIn, and telephone, resulting in ten confirmed interviews.

Table 3.1: Overview of the Ten Interview Partners

Expert Code	Role	Actor Category
E1	Project Manager	Corporation/Network
E2	Project Manager	Financial Actor
E3	Program Manager	Policymakers
E4	Project Lead	Policymakers
E5	CFO	Circular Startup
E6	Co-Founder	Circular Startup
E7	Program Manager	Intermediary
E8	Strategy Lead & Accelerator Lead	Intermediary
E9	Program Manager	Intermediary
E10	Program Manager	Intermediary

² The data was acquired during a master thesis, supervised by the author; see Smeets (2025).

The interviews took place between April 2024 and March 2025. Interviews, on average, took 44 minutes. The interviews were conducted via Zoom or Microsoft Teams and recorded, with the interviewees providing consent via a consent form. The interview content was then transcribed and anonymized for the following analysis. All interviews were conducted in German, and the coded passages were then translated word-for-word into English, adhering to standard orthography and American spelling conventions. The semi-structured interviews covered the identification of relevant actors and structures within the EE, networking and relationships with other actors and their intensity, perceived support given or received by circular startups, comparisons with other EEs, and the evaluation and optimization of the EE.

Due to limited empirical research on the emergence and structural configuration of subecosystems within CEEs, the data were analyzed using Gioia's methodology to develop a grounded theoretical understanding (Gioia et al., 2013). Following an iterative inductive approach, first-order concepts were derived directly from the interview data, thereby preserving the respondents' perspectives. These concepts were then abstracted into second-order themes, enabling pattern recognition across the interviews. Finally, overarching aggregate dimensions were identified to construct a theoretical model. To enhance rigor, categories were refined through multiple coding cycles.

3.4 Circular Entrepreneurial Ecosystems Structure and Dynamics

The results are presented in two parts, reflecting the study's mixed-methods design. First, the SNA outlines the structural configuration of the social network in CEEs across different regional EEs in Germany. In a second step, the qualitative interviews provide insight into the relational dynamics that account for the observed network structures.

3.4.1 Results from the Social Network Analysis

To address the lack of fine-grained insights into relational structures within the network of CEEs, the analysis begins with the SNA results. The SNA examines the nationwide network of actors involved in circular entrepreneurship in Germany. This network consists of organizations that contribute to CEEs within their respective regional EEs. The SNA maps the connections among these actors, identifies central and bridging organizations, and reveals structural patterns that shape coordination and knowledge flows across regions.

A total of 523 actors and 1,423 ties were identified as part of the nationwide network of organizations engaged in circular entrepreneurship in Germany, see Figure 3.1.

The graph visualizes the inter-organizational connections among these actors, with colors indicating the six actor categories adapted from Isenberg and Onyemah (2016):

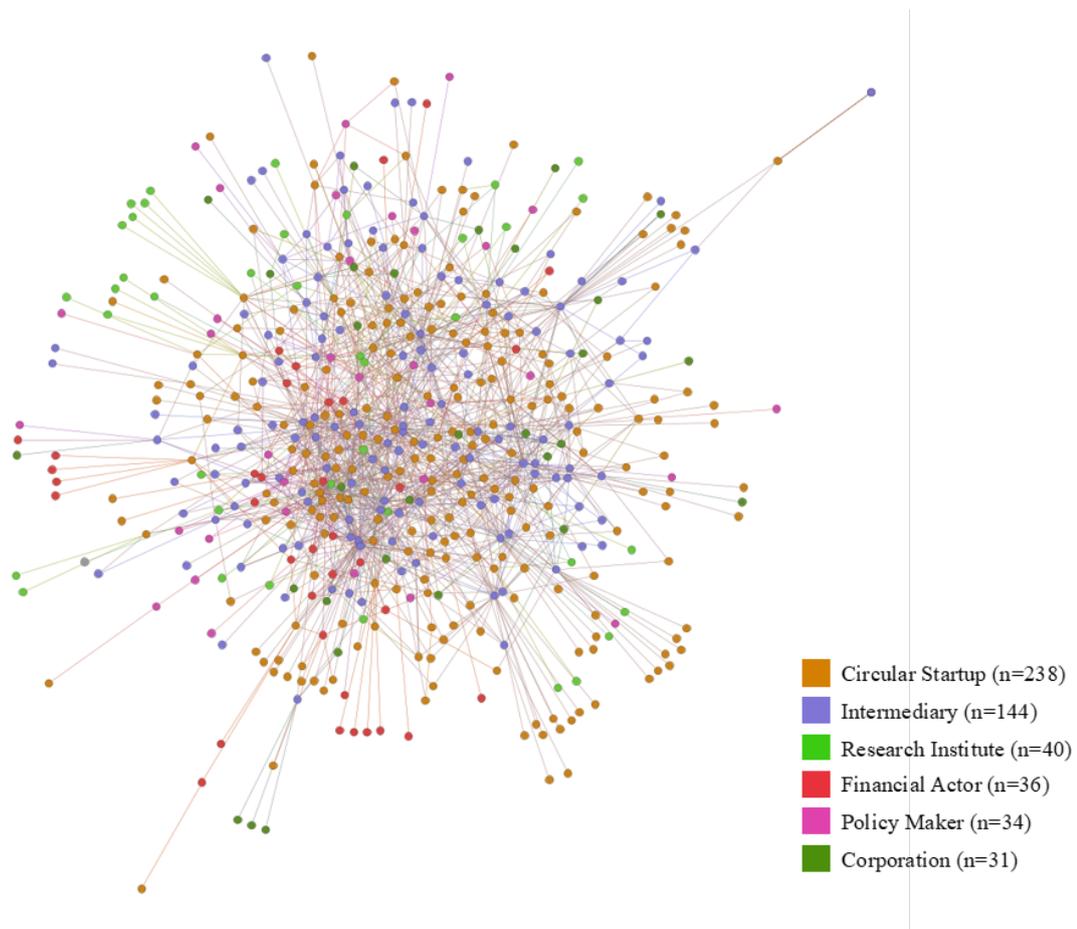


Figure 3.1: German Actors Surrounding Circular Startups (Own Illustration)

orange: Circular startups (CSU), violet: Intermediaries (INT consisting of Alliances, Awards, Foundations, Initiatives, Networks, and Supporters), green: Research Institutes (RI), red: Financial Actors (FA), pink: Policymakers (PM), and dark green: Corporations (CO).

The network displays a centralized, star-like structure, with multiple actors at its center and fewer nodes in the periphery. Several peripheral actors exhibit only a single tie (degree=1), forming structural holes along the outer regions of the network. These nodes are connected to the broader system exclusively through one adjacent actor.

To further characterize the network, both network-level and node-level metrics were assessed. At the network level, the structure shows a low density (0.01), indicating that only a small share of all possible ties is present. The global clustering coefficient is likewise low (0.05), meaning that actors' direct neighbors are rarely connected. The average geodesic distance of 3.63 indicates that actors are, on average, separated by slightly more than three steps. The mean normalized betweenness centrality across all nodes is 0.005.

At the node level, the degree and centrality values reveal substantial variation in actors' positions. A total of 132 actors (25.24%) exhibit above-average normalized betweenness centrality, and the normalized closeness centrality values range from 0.19 to 0.39. This

Table 3.2: Connections Between Circular-Oriented Actors in Germany

Actor Type	Connection in Total	AL	AW	CSU	CO	FA	F	IN	NET	PM	RI	S
Alliance (AL) INT	100	1	0	68	5	4	1	4	4	4	6	3
Award (AW) INT	109		0	90	10	1	0	1	2	1	2	2
CSU	1104			9	46	67	37	188	233	92	53	221
CO	121				1	2	0	18	18	1	4	16
FA	122					1	0	12	17	4	0	14
Foundation (F) INT	51						0	2	6	0	0	5
Initiative (IN) INT	306							12	15	14	12	29
Network (NET) INT	334								15	4	11	9
PM	139									5	0	14
RI	100										2	10
Supporters (S) INT	330											7

indicates that all nodes fall within a relatively narrow band of path-length distances to other actors in the network.

Circular startups represent the largest actor category in the German network, comprising 238 nodes and accounting for 45.5% of all actors (see Figure 3.1). The second-largest category consists of intermediaries (n=174). Research institutes (n=40), financial actors (n=36), policymakers (n=34), and corporations (n=31) each account for less than 10% of the total network. An examination of the edge structure shows that circular startups form more ties with actors outside their own category than within it (see Table 3.2). They maintain a large number of connections with initiatives (188 edges), networks (233 edges), and support organizations (221 edges), including accelerators and incubators.

Intermediaries also appear as highly connected actors within the nationwide network of organizations engaged in circular entrepreneurship in Germany. They account for 1,230 edges in total, of which a majority (837 edges) link them to circular startups. Additional ties exist to other intermediaries (201 edges) and to corporate actors (67 edges).

An examination of the thematic orientation of actors shows that 149 actors (52%), aside from the circular startups, demonstrate an explicit sustainability focus, with 44 actors (17%) specifically emphasizing CE-related activities. The distribution of CE-oriented actors across categories is as follows: intermediaries (n=34), including four alliances, four award programs, four foundations, eight initiatives, 11 networks, and three support organizations; corporations (n=3); financial actors (n=1); policymakers (n=2); and research or educational institutions (n=4).

Analysis at the node level shows variation in actors' connectivity. A total of 69 actors (13%) have more than ten connections (see Figure 3.2). The actors with the highest degree values are UnternehmerTUM, including its initiative Circular Republic (INT) (100), followed by Traceless (CSU) (37) and Startup Portal Munich (INT) (34).

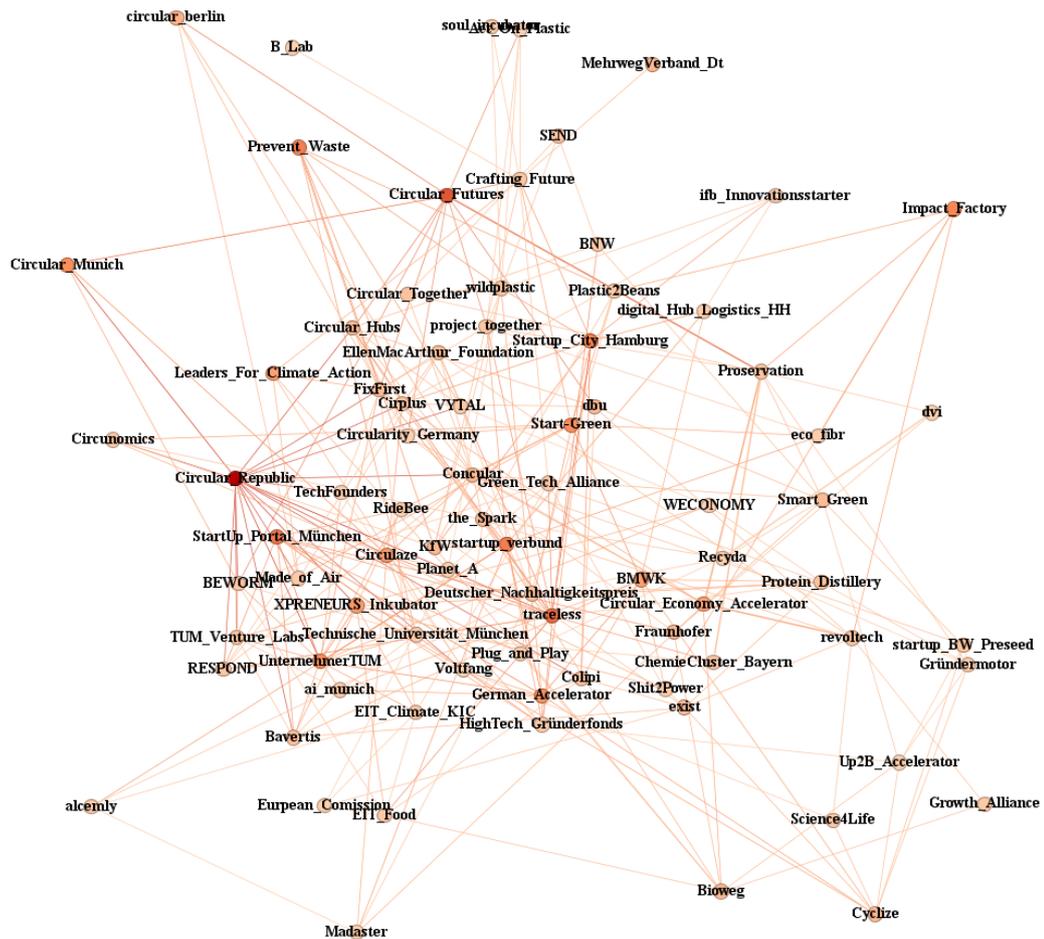


Figure 3.2: Circular-Oriented German Actors with More than 10 Connections (Own Illustration)

Normalized betweenness centrality values also vary considerably across actors. Circular Republic (INT) has the highest betweenness centrality (0.1301), followed by Impact Factory (INT) (0.0823) and Traceless (CSU) (0.0764). In contrast, 150 actors with a single connection (degree = 1) have a betweenness centrality of 0. Examples include eRevol (CSU), Bremen Startups (INT), Start2Group (INT), TU Chemnitz (RI), Wendero (FA), Landkreis Hamburg (PM), and Porsche (CO).

Eigenvector centrality values range from 0 to 1, with Circular Republic (INT) achieving the maximum value. Four other actors show eigenvector centrality scores above 0.5: UnternehmerTUM (INT), Traceless (CSU), Startup Portal Munich (INT), and Circular Futures (INT).

Across categories, research institutes, financial actors, policymakers, and corporations generally show low degree values. Financial actors (n=16) and policymakers (n=10) have higher numbers of internal connections compared to the other categories.

A postcode-based analysis was conducted to examine the geographic distribution of circular startups in Germany. A heat map was generated to visualize postcode density (see Figure 3.3). The visualization shows that circular startups are regionally concentrated, with higher densities indicated in yellow and lower densities in blue.

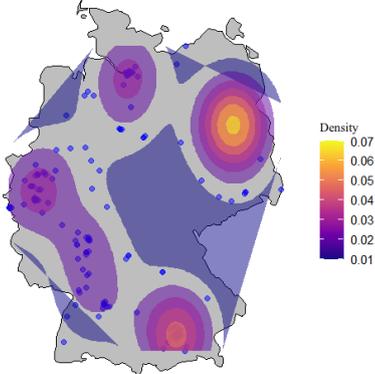
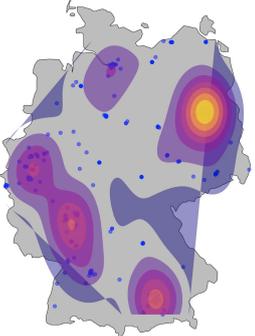


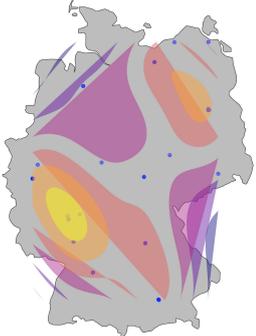
Figure 3.3: Circular Startup Hubs in Germany (Own Illustration)

Berlin contains the largest number of circular startups (n=59), followed by Munich (n=37), Hamburg (n=23), and North Rhine-Westphalia (NRW) (n=22).

A comparison with the geographic distribution of all actors in the dataset shows a similar pattern (see Figure 3.4a). The highest concentrations of actors are located in Berlin and Munich, which correspond to the regions with the largest numbers of circular startups. NRW shows a comparatively large number of CE-oriented actors in the postcode data, while Munich has fewer (see Figure 3.4b). Additional concentrations of CE-oriented actors are observable in Baden-Württemberg and Bavaria.



(a) Geographical Distribution of all Actors from the Network across Germany (Own Illustration)



(b) Geographical Distribution of CE-oriented Actors from the Network across Germany (Own Illustration)

Figure 3.4: Comparison of Geographical Distribution of all Actors and Circular Actors from the Network (Own Illustration)

3.4.2 Results from the Expert Interviews

This section presents the findings from the qualitative analysis of the semi-structured interviews. It aims to shed light on the relational dynamics underlying the network structures identified in the SNA. The interviews provide an essential complementary perspective by uncovering the meanings, motivations, and constraints that shape how actors form ties, collaborate, and navigate within the CEEs. The analysis is structured in two parts: (1) a descriptive overview of how actors perceive the relational environment, interaction patterns, and collaborative practices within the CEE, and (2) a more targeted exploration of perceived structural gaps, coordination challenges, and development needs.

To support transparency, an overview of the Gioia coding structure is provided in Table 3.3, summarizing first-order concepts, second-order themes, and aggregate dimensions derived from the interview data.

Table 3.3: Gioia Coding Structure: Relational Dynamics Derived from Interview Data

First-order Concepts	Second-order Themes	Aggregated Dimensions
Growth support landscape	Temporal dynamics and trends	General Perceptions of circular entrepreneurial ecosystems
Perceived barriers		
Systemic transformation orientation		
Perception of ecosystem size and maturity		
Perceived actor structure		
Accessibility of ecosystem		
Actor satisfaction	Key actors and regions anchors	Structural gaps and needs in circular entrepreneurial ecosystems
Geography of support structures		
Anchor intermediaries		
Actor connectivity patterns		
Startups	Actor relationships and networks	
Structural positioning of intermediaries		
Disconnection of key actor types		
Overarching coordination	Ecosystem-level shortcomings	
Cognitive misalignment		
Government & regulation		
Effective networking	Startup-level challenges	
Financing access problems		

3.4.2.1 General Perceptions of Circular Entrepreneurial Ecosystems

Temporal dynamics and trends. The SNA revealed a network with a relatively small number of highly connected circular startups and intermediaries and a limited number of dedicated CE-oriented actors. The interviews indicate that this landscape is currently undergoing visible expansion. Respondents consistently reported increased activity, interest,

and support offerings related to the CE, which they attributed primarily to rising political attention at the federal and regional levels. One interviewee emphasized the recent proliferation of targeted support initiatives:

“Some accelerators are now really focusing on the topic CE, which may have a general impact on the environment” (E8).

Despite this growth, interviewees expressed ambivalence regarding the long-term stability of these developments. Several participants highlighted the volatility of politically driven trends and questioned whether current momentum is durable.

A recurring theme was the perception that circular entrepreneurship remains a niche within broader innovation narratives, even as interest increases. According to one interviewee,

“the CE is currently still a niche topic [...] and we are trying to get it out of this niche” (E7).

Participants described the CEE as a subsystem of larger innovation ecosystems, with aspirations to achieve greater alignment as the field matures.

Overall, the interviews portray an ecosystem in transformation: growing in visibility, activity, and institutional support, while still lacking broader structural anchoring. The expansion of CE-related initiatives increases engagement, yet the long-term consolidation of these developments remains uncertain.

Ecosystem Characteristics. The SNA revealed a highly centralized network with a small group of core actors, low clustering, and peripheral nodes connected through only a single tie. The interviews complement these structural findings by showing how actors perceive and navigate this configuration. Interviewees consistently described the CEE as a small, familiar, and collaborative environment in which most actors know one another and maintain informal ties. As one founder noted,

“You know each other. You meet somehow. You’ve heard of each other before” (E5).

This perceived ‘bubble-like’ character aligns with the network’s low density and low clustering tendency and is seen by participants as facilitating rapid exchange, visibility, and mutual support. As another interviewee put it,

“The bubble isn’t that big, to be honest. And of course people take notice when someone is doing something cool somewhere else” (E5).

At the same time, interviewees emphasized that access to the ecosystem is mediated through informal practices, including personal recommendations, reputation, and recurring participation in events or online spaces such as LinkedIn. For example, one participant described informal gatekeeping mechanisms:

“If someone is active there and I don’t know them, then they can’t be any good” (E1).

These mechanisms correspond to the SNA’s identification of clear inner and outer circles: core actors are tightly interconnected, while newcomers must navigate informal gatekeeping processes to integrate into the central network.

Several participants noted that this familiarity, while enabling trust, a community feeling, and efficient collaboration, may also restrict broader participation and reinforce the dominance of long-standing CE actors. As one ecosystem insider reflected,

“It’s also a bubble event, and the question is: how do you get out of this bubble?” (E7).

This tension reflects a recurring theme: the challenge of maintaining cohesion and identity while expanding access and enabling new actors to participate in the ecosystem.

Key Actors and Regional Anchors. The SNA indicated geographically uneven concentrations of circular startups and CE-oriented actors, with particularly dense clusters in Berlin, Munich, Hamburg, and NRW. The interview findings help explain these patterns by highlighting how regional infrastructures, support structures, and dedicated intermediaries drive local connectivity and activity levels.

NRW is described as a tightly connected and operationally active region, characterized by frequent interactions and strong access pathways. One participant emphasized the depth of regional connectivity:

“We really benefit from this whole ecosystem here in NRW, which is extremely tightly wired. We have almost all companies or can establish a connection to them” (E3).

Within this region, specialized intermediaries such as Circular Valley and the Impact Factory were repeatedly named as influential anchor institutions.

Berlin and Munich were also consistently identified as central hubs within the German circular startup network. Respondents described them as dual epicenters with complementary profiles:

“There are actually two epicenters: Berlin and Munich. Munich for technology, and Berlin for service and everything that goes a bit in that direction” (E1).

These two hubs are further connected through interregional mobility of startups and talent, which reinforces their joint influence. Both regions host dedicated coordination platforms, Circular Berlin and Circular Munich, that gather experts, mobilize networks, and facilitate knowledge exchange.

Within these regional clusters, Munich, and particularly UnternehmerTUM and its initiative Circular Republic, was frequently cited as one of the most structured, visible, and influential node in the nationwide network of actors involved in circular entrepreneurship. Interviewees highlighted its central role in shaping CE-related support and entrepreneurship. This visibility is amplified by UnternehmerTUM's attractiveness and reach:

“Everyone wants to play [with UnternehmerTUM] anyway, because everyone thinks it's cool [...] We have the opportunity to get people [...] excited” (E7).

Together, these insights reveal that Germany's circular entrepreneurship-related actors are nationally connected but regionally anchored. NRW, Berlin, and Munich function as key hubs whose intermediaries, infrastructures, and narrative leadership significantly shape the distribution and connectivity patterns observed in the SNA.

Actor Relationships and Networks. The SNA revealed strong interconnections between circular startups and nearly all other actor categories, confirming their structurally central role within the ecosystem. The interviews provide insights into how these ties form and are mobilized. Startups describe themselves as deeply integrated into multiple relational layers, frequently collaborating with corporate partners, policymakers, and research institutions.

Circular startups also demonstrate strong intra-group cohesion. Several respondents emphasized mutual support structures and emerging collective initiatives, although they see additional potential for coordination, particularly regarding regulatory influence. As one founder reflected,

“Where we can certainly become even stronger and better is in networking and somehow being the same. [...] We should act with one voice as circular startups.” (E5).

Research institutions emerge as important partners for startups, especially in early development phases. Interviewees highlighted co-development through joint participation in public research projects. As one founder noted,

“We also work together on many research projects that are EU-funded or funded by the German government. This is a mixture of contributing to knowledge creation and funding” (E6).

Intermediaries play a pivotal role as brokers between sectors. Their bridging function mirrors their high centrality observed in the SNA. They facilitate access to corporate partners, provide testing environments, and help startups source materials or experiment with waste streams. One representative described this cross-sector linking as follows:

“It’s extremely beneficial to have many different industries and companies [...] so that you can examine and test [waste streams]” (E10).

Intermediaries also activate alumni networks and serve as primary entry points for newcomers across all actor categories.

Financial actors exhibit selective but strategic connectivity, primarily to circular startups and research institutions. Their involvement is often mediated by intermediaries or initiated when fundraising is part of a programmatic offering. Policymakers, especially those involved in coordinating or funding ecosystem initiatives, are perceived as connecting points across actor groups. Their relational role spans startups, corporations, research institutions, and other policy actors, particularly when multiple programs overlap or align.

Taken together, the interviews reveal a multilayered relational architecture in which startups and intermediaries form the central connective tissue of the ecosystem, supported by targeted but uneven linkages to research, finance, corporate actors, and policymakers.

3.4.2.2 Structural Gaps and Unmet Needs in Circular Entrepreneurial Ecosystems

While the network of CE-oriented actors in Germany is widely perceived as vibrant and collaborative, the interviews also reveal gaps and structural challenges that shape its current development trajectory. These perceived limitations point to areas in which the ecosystem has not yet reached its full potential and where further coordination, institutional support, or capability-building could strengthen its functioning. The identified gaps cluster into two overarching categories: (1) ecosystem-level shortcomings affecting the broader relational and institutional environment, and (2) challenges that specifically impact the startup journey from early development to scaling.

Ecosystem-level Shortcomings. While the SNA shows a network with several strong regional clusters but limited overall density and clusters, the interviews reveal that these structural patterns translate into a perceived lack of overarching coordination within the CEE. Across interviews, respondents emphasized that, despite growing activity and an increasing number of regional initiatives, the ecosystem lacks a national-level structure to align efforts, provide strategic direction, and reduce fragmentation.

This absence of a central orchestrator is experienced as a barrier to visibility, operability, and partner identification. Interviewees reported challenges in navigating the landscape and determining which actors or initiatives should be involved in specific efforts. Similar concerns were raised regarding the transparency of roles, responsibilities, and program offerings, with one expert noting,

“I don’t think the whole landscape is really clear [...] the variety of events and workshops has increased massively, and there is no transparency about who does what” (E4).

Several respondents further highlighted that rapid growth in some regions, particularly NRW, has led to uncoordinated expansion and resource inefficiencies. To address these gaps, interviewees articulated the need for a neutral orchestrator, an actor not bound to institutional agendas, capable of facilitating cooperation across ecosystem layers and bridging circular and linear actors.

At the same time, respondents called for greater specialization among support organizations, noting that sector-specific accelerators or platforms often provide better access to relevant partners than generalist programs:

“It helps more to go to a green tech accelerator than to a Software-as-a-Service accelerator, because we potentially have more contact with the customers” (E9).

Despite a growing density of regional initiatives and institutional anchors, interviewees consistently emphasize the lack of overarching coordination within the EE around CE. This gap is seen as a significant structural limitation, hindering the scalability, efficiency, and strategic alignment of ecosystem activities. Across interviews, the need for greater ecosystem-wide coordination emerges as a pressing challenge. While regional nodes, such as NRW, Munich, and Berlin, appear increasingly institutionalized and interconnected, a national umbrella structure to strategically guide and scale the national ecosystem remains absent.

Although initial regional coordination efforts exist, such as Circular Valley in NRW, Circular Republic in Munich, or local CE coordinators in Stuttgart, these initiatives remain locally bounded. Overall, the interviews point to a systemic coordination gap: the ecosystem lacks a meta-level steering logic to align regional activities, enhance transparency, and enable strategic scaling at the national level.

Beyond structural fragmentation, the interviews highlight a second systemic gap: the absence of a shared conceptual and operational understanding of what constitutes the CE. This **cognitive misalignment** is particularly emphasized by intermediaries, governmental actors, and financial stakeholders, who report that the term ‘CE’ is used inconsistently across the ecosystem. As one interviewee noted,

“We are somehow all talking about the same thing, but we still use different words and sometimes different language” (E8).

This conceptual ambiguity carries practical implications. Several interviewees stressed that it remains challenging to distinguish between startups that genuinely contribute to circularity and those that position themselves within the CE discourse without substantial alignment. As one stakeholder put it,

“It would also be cool if [...] to recognize what is really circular [...] and who is really doing something good?” (E2).

Overall, the interviews indicate that the lack of a unified conceptual framework impedes strategic coherence, complicates communication between actors, and undermines efforts to evaluate impact. This cognitive fragmentation reinforces the structural fragmentation identified earlier.

A third ecosystem-level gap identified in the interviews concerns the role of **governmental institutions and regulatory frameworks**. While policymakers appear only selectively connected in the SNA, interviewees consistently emphasized that regulation represents a critical lever for enabling CBMs.

Actors across intermediary, startup, and financial communities described a misalignment between existing regulatory structures and the operational realities of circular entrepreneurship. Much of the current legislation is perceived as outdated or insufficiently adapted to CE requirements.

Interviewees emphasized that regulation should function as an enabler rather than an obstacle, particularly by providing planning security through clear targets, standards, and interface agreements. Several respondents argued that procurement requirements could stimulate demand for circular products, creating planning security. In addition, interviewees highlighted gaps in CE-specific financial instruments. They called for dedicated funding mechanisms and incentives, including potential tax benefits tied to demonstrable environmental and social impact:

“That financing is also made available or that a legal form is created [...] tax benefits if you can prove environmental and social impact” (E8).

Overall, the interviews portray regulation as a central but underdeveloped pillar. While existing frameworks are often perceived as outdated or misaligned, targeted enabling regulation, clear standards, and CE-tailored financing instruments are seen as essential for unlocking the ecosystem’s full potential.

Startup-level challenges.

The interview findings indicate that circular startups face distinct relational challenges. While the SNA revealed the structural presence of intermediaries and cross-sector connections, the interviews make clear that startups depend heavily on trust-based **relationships** to access resources, partners, and legitimacy.

Startups consistently described intermediaries as crucial relational brokers. Rather than merely offering programs or infrastructure, intermediaries facilitate credible introductions, accelerate trust-building, and open doors to established actors such as corporations or policymakers. One interviewee illustrated this relational leverage:

“Building trust is sometimes possible much more quickly if the entire process is somehow handled or takes place via a recommendation from us or perhaps even in conjunction with us” (E7).

The effectiveness of these linkages increases when intermediaries operate with a sector-specific orientation. Several founders emphasized that generalist startup support is often too broad, whereas specialized programs provide more relevant industry access and customer proximity. Finally, the interviews highlight the importance of peer-to-peer learning among circular startups. Exchanges between early- and later-stage startups support collective problem-solving and accelerate learning cycles.

Together, these findings show that connectivity is not a peripheral enabler but a core requirement of the circular startup journey. Startups rely on intermediaries, sectoral alignment, and peer networks to navigate complexity, access stakeholders, and gain legitimacy.

Financing emerged as a central challenge for circular startups. While capital is widely recognized as essential for developing and scaling circular startups, interviewees highlighted a noticeable decline in investment activity amid broader economic uncertainty. As one founder observed,

“The number of investments being made is also falling due to the tense general situation” (E1).

Despite this constrained environment, perspectives on financing were not uniformly negative. Several respondents pointed to emerging momentum, particularly in public and quasi-public financing instruments.

These insights illustrate that, while circular startups face heightened vulnerability to market fluctuations and limited investor risk appetite, targeted public financial instruments are beginning to address structural funding gaps. However, their reach and effectiveness remain uneven.

3.5 Discussion

The combination of SNA and interview data provides a comprehensive view of the emerging CEEs in Germany. While the SNA maps the structural patterns of connectivity, identifying who is connected to whom, how centrality is distributed, and where fragmentation or brokerage positions occur, the interviews uncover the relational dynamics that shape these structures.

The following discusses: (1) CEE structures, (2) the dynamics that explain the observed structural features, and (3) the CEEs as emerging subecosystems and their current stage of development.

3.5.1 Circular Entrepreneurial Ecosystem Structures

The SNA shows that the network of circular entrepreneurship in Germany involves a broad set of actors typical of EEs, including startups, intermediaries, research institutions, corporations, policymakers, and financial actors. The observed heterogeneity aligns with

prior EE studies demonstrating that diverse multi-actor constellations are characteristic of entrepreneurship-driven ecosystems (see e.g., A. J. Fernandes & Ferreira, 2022; Isenberg & Onyemah, 2016; A. Rocha et al., 2021).

The structural indicators, however, reveal a loosely connected network. Low density, clustering tendencies, and many nodes with only one connection indicate that actors are only loosely connected rather than embedded in tightly knit communities (Neumeyer et al., 2019). This star-like structure of the network suggests that information and resource flows depend heavily on a set of central actors. This reflects a configuration in which brokerage and gatekeeping roles become disproportionately important (Borgatti et al., 2009). Most peripheral actors maintain only a single tie, suggesting limited direct access to ecosystem resources, a condition consistent with sparse or loosely institutionalized ecosystems (Scheidgen, 2021; Spigel, 2017).

Intermediaries emerge as structurally pivotal actors. Circular Republic, UnternehmerTUM, and Startup Portal Munich exhibit the highest degree, normalized betweenness, and eigenvector centrality. This finding resonates with prior research that identifies intermediaries as key brokers in EEs, facilitating cross-sectoral interaction, reducing institutional uncertainty, and accelerating knowledge transfer (Howells, 2006; T. Moss, 2009; van Rijnsoever, 2022). Their centrality in the German network indicates that they perform precisely these connective and coordinating functions.

In contrast, financial actors, researchers, corporations, and many policymakers exhibit low structural embeddedness, as reflected by weak degree centrality and marginal normalized betweenness scores. Although policymakers and financial actors form a small, internally cohesive subcluster, their outward integration into the broader network remains limited. This pattern aligns with previous research showing that weak integration of financiers and research actors can reduce ecosystem effectiveness by constraining knowledge flows, investment readiness, and access to capabilities (R. Brown & Mason, 2017; Prokop & Thompson, 2023).

3.5.2 Circular Entrepreneurial Ecosystem Dynamics

The interviews explain why the national network of actors connected to circular entrepreneurship in Germany appears sparse and intermediary-centric. Consistent with research on early-stage ecosystems (R. Brown & Mason, 2017; Colombelli et al., 2019; Sullivan & Ford, 2014), actors describe the CEE as a small, trust-based community in which access is mediated through informal ties, events, and reputation.

A recurrent theme across interviews is the absence of an overarching orchestrator. This observation aligns with Theodoraki and Messeghem's (2017) argument that EEs, particularly their subecosystems, require coherent structuring and alignment among actors to

function effectively. Interviewees' descriptions of fragmented regional initiatives with limited national integration reflect this pattern.

The strong emphasis on collaboration and interdependence expressed by founders and intermediaries aligns with the systemic nature of circular entrepreneurship (see e.g., Ferreira et al., 2024; Tabas et al., 2025). CE startups depend on cross-sectoral partnerships to integrate value loops, and prior research has shown that such startups require brokering organizations to mobilize partners and reduce institutional complexity (Klofsten et al., 2024; Konietzko et al., 2024). This helps explain the central structural position of intermediaries identified in the SNA.

The interviews also underscore financing barriers, corroborating evidence that circular startups face heightened investor risk perceptions due to technological uncertainty and longer development cycles (F. Fang & Parida, 2024; Veleva & Bodkin, 2018). These insights align with the SNA's weak structural embeddedness of financial actors.

Finally, the lack of conceptual convergence on CE reported in interviews resonates with earlier critiques that CE definitions remain diffuse and inconsistently operationalized (Kirchherr, Bauwens, & Ramos, 2023). This heterogeneity contributes to the observed coordination challenges and hinders the formation of cohesive CEE structures.

3.5.3 Circular Entrepreneurial Ecosystem as Subecosystems

The empirical findings indicate that circular entrepreneurial activity in Germany increasingly exhibits the traits of a specific, interest-driven subecosystem within the broader EE landscape. Subecosystems form when actors gather around a shared thematic identity, participate in repeated interactions, and develop unique relational patterns (Cloutier & Messeghem, 2022; A. Rocha et al., 2021). The interviews suggest that circular entrepreneurship already represents a small but recognizable thematic field with recurring actors and common touchpoints.

The SNA complements this view by revealing geographical concentrations of circular startups and CE-oriented actors in Berlin, Munich, Hamburg, and NRW, regions that function as established entrepreneurial hubs (Bundesverband Deutsche Startups e.V., 2024). This indicates that emerging CEEs are embedded within and draw resources from larger regional EEs (Harrington, 2017; Regele & Neck, 2012; Theodoraki & Messeghem, 2017). Intermediaries occupy central structural positions, consistent with their role in structuring early-stage fields through brokerage and coordination (Ingole & Sohani, 2024; van Rijnsoever, 2020).

Interview data also point to the formation of thematic communities, where founders, intermediaries, and policymakers meet repeatedly, exchange knowledge, and co-shape narratives around CE. These patterns are characteristic of the creation phase of subecosystem

development, in which initial field attributes emerge but remain weakly institutionalized (Cloutier & Messeghem, 2022).

Despite these foundational elements, several key components of mature subecosystems are still underdeveloped. The national network remains sparse and fragmented, with numerous structural holes and heavy reliance on a few intermediaries for connectivity (R. Brown & Mason, 2017). A shared conceptual foundation is also lacking: interviewees interpret CE principles differently, reflecting the absence of stabilizing meaning systems that are crucial for subecosystem consolidation (Cloutier & Messeghem, 2022).

Resource-related structures likewise appear weak. The limited integration of financial actors and perceived investor reluctance align with existing evidence that circular startups face higher risk perceptions and greater capital needs (F. Fang & Parida, 2024; Kanda et al., 2023; Veleva & Bodkin, 2018). This constrains the subecosystem's ability to support scaling and experimentation. Finally, the interviews highlight the absence of ecosystem-wide orchestration. While regional coordination exists, subecosystem research emphasizes that strategic alignment and role structuring are necessary to transform loosely connected actors into a cohesive CEE (Theodoraki & Messeghem, 2017).

Taken together, the results show that CEEs in Germany display several core features of an emerging subecosystem, regional clustering, central brokerage actors, and nascent thematic communities, yet they lack the structural cohesion, shared identity, resource integration, and coordinated governance associated with consolidated subecosystems.

3.6 Conclusion

Using a mixed-methods approach combining SNA and semi-structured interviews, this study examined how actors in Germany are connected within emerging CEEs and which relational mechanisms shape coordination, knowledge flows, and collaboration. Addressing the research question of how networks of CEEs are structured and how their internal dynamics unfold, the findings offer a comprehensive picture of both the structural architecture and the lived interaction patterns that characterize these ecosystems.

The SNA, based on a dataset of 523 actors, reveals a structurally fragmented network with low density, limited clustering, and an intense concentration of brokerage roles among a few intermediaries. Interviews corroborate these insights and provide explanatory depth: actors describe the ecosystem as small, trust-based, intermediary-centric, and regionally clustered, yet lacking overarching coordination, conceptual alignment, and stable resource flows.

Taken together, the findings indicate that CEEs in Germany are developing as early-stage subecosystems embedded within established regional EEs. Particularly Munich,

NRW, and Berlin exhibit the most evident signs of emergent circular subecosystems, although they remain weakly institutionalized and structurally dependent on a limited set of intermediaries.

3.6.1 Theoretical Contribution

Building on these empirical insights, this study contributes to theory in three ways.

First, it advances the understanding of how EEs are structurally configured (Stam et al., 2025), particularly in sustainability-oriented contexts. The study shows how intermediary-centric architectures shape the emergence of circular entrepreneurship. The findings demonstrate that low-density networks depend heavily on trust-based dynamics and informal access channels, an effect that is amplified in domains with high coordination complexity, such as circular entrepreneurship.

Second, the study extends the concept of subecosystems. While research has conceptualized EEs as nested and hierarchically layered systems (Cloutier & Messeghem, 2022; Harrington, 2017; Theodoraki & Messeghem, 2017), empirical evidence on circular subecosystems has remained scarce. This study conceptualizes CEEs as specific, interest-driven subecosystems embedded within broader and more mature regional EEs. The findings show that CEEs in Germany exhibit signs of subecosystem formation while simultaneously lacking key components of consolidation. The results indicate that in collaboration-, coordination- and regulation-intensive domains like circular entrepreneurship, ecosystem support is not optional but foundational for startup development.

Third, the study contributes to CEE research by introducing a combined structural and dynamic network perspective. CEEs appear not only as support environments but also as coordination spaces for broader CE transformation. The analysis underscores that startups in such ecosystems rely particularly on intermediaries to create connective tissue, build legitimacy, and shape CE-oriented narratives, highlighting their role as both structural brokers and cultural framers.

3.6.2 Practical Contribution

The findings offer several implications for practitioners seeking to strengthen CEEs in Germany. First, ecosystem builders and intermediaries can use the insights to enhance coordination across regional initiatives by establishing clearer structures for information exchange, role distribution, and nationwide alignment. Second, the results underscore the need for shared definitions, assessment criteria, and standards for circularity to reduce conceptual ambiguity and facilitate collaboration. Third, policymakers and financial actors can draw on the identified gaps to expand CE-oriented policy building and funding instruments. Finally, intermediaries may leverage the evidence to tailor their programs

more closely to the coordination and collaboration needs characteristic of circular startups.

3.6.3 Limitations and Future Research Directions

While this study provides novel insights, several limitations open up promising avenues for further research. First, the empirical scope of this study is limited to the German context. Additionally, not all actor groups have been interviewed, including corporations and researchers. Although this specificity allows for in-depth analysis, it may limit generalization to other geographies or more mature EEs. Future research could explore how circular subecosystems emerge and evolve across different institutional and cultural contexts, or how social network elements evolve over longer time horizons.

Second, future studies should pay particular attention to the role of intermediaries. While this research has identified their structural centrality and relational significance in the early formation of CEEs, their specific mechanisms of influence remain underexplored. Multi-method, longitudinal research could examine how intermediaries actively shape the direction, inclusivity, and scalability of CE transformations within their ecosystems and institutional environments.

Third, the conceptualization of subecosystems itself invites further theoretical development. Future research should explore how interactions within subecosystems and between subecosystems and their host ecosystems contribute to overall ecosystem performance and sustainable development. Understanding these interdependencies is essential for assessing the systemic value of circular entrepreneurship.

Fourth, this study draws on existing concepts to operationalize the circularity focus of actors. However, the interview data point to a significant cognitive misalignment across the CEEs: actors vary widely in how they define, interpret, and operationalize CE principles. This lack of semantic alignment limits both analytical clarity and the ecosystem's practical functioning. Future research should therefore engage in definitional work, developing typologies, evaluative frameworks, or shared vocabularies that enable a more consistent understanding of CE orientation.

Part III

Intermediaries

The first two studies conceptualized and contextualized the environment in which circular startups operate. Across both chapters, intermediaries emerged as central actors in CEEs: they design curated collaboration, facilitate partnership formation, and provide circular-specific capability-building programs. As a result, the network dimension of CEEs evolves from a set of relational ‘channels’ into a strategic infrastructure that coordinates interdependencies and enables collective scaling. These insights set the stage for the next two studies, which examine the intermediary role more deeply, both structurally and institutionally.

Accordingly, the following research investigates how intermediaries act as institutional entrepreneurs, actors capable of initiating and directing institutional change, across micro-, meso-, and macro-level who shape and transmit emerging logics within CEEs.

The first study (cf. Chapter 4) addresses the RQ3:

What functions of intermediaries in entrepreneurial ecosystems can be mapped to micro-, meso-, and macro-levels, and how do these functions apply to circular startups?

Using a SLR, this study develops a framework to conceptualize intermediary configurations, mechanisms, and outcomes across system levels. These insights are reflected in circular startup contexts.

Building on this structural and functional understanding, the second study (cf. Chapter 5) explores the institutional mechanisms through which intermediaries shape the logics of circular startups. Based on founder interviews, it analyzes how intermediaries transmit values, norms, and belief systems within hybrid community and market logics. This leads to the guiding RQ4:

How do intermediaries shape the logics, values, and practices of circular startups in CEEs?

Empirical insights show that intermediaries not only shape and navigate hybrid logics but also cultivate a transversal circular logic that reframes existing institutional orders. These dynamics provide the foundation for understanding how intermediaries can evolve into institutional entrepreneurs driving a CE transformation.

Multilevel Framework of Intermediaries Supporting Circular Entrepreneurship

Preliminary ideas related to this chapter were presented as a conference presentation at the Entrepreneurial Ecosystem Winter School 2025 in Bilbao, Spain. The Social Network Analysis component of the earlier version is reported separately in this thesis (see Chapter 3).

4.1 Introduction

The transformation toward a CE is not merely a matter of technological innovation, it requires a fundamental reconfiguration of institutional frameworks, market logics, and value creation structures (Kirchherr, Bauwens, & Ramos, 2023). In this context, circular startups are uniquely positioned to act as catalysts for change: unburdened by legacy systems, they design CBMs from the ground up, embedding circularity not only into products and processes, but also into their organizational purpose, stakeholder relationships, and growth logic (T. J. F. Bauwens et al., 2020; Klofsten et al., 2024). However, compared to conventional startups, they often face distinct challenges – including longer product development and validation cycles, sectoral and institutional barriers rooted in linear systems, and the need to navigate complex, interdependent stakeholder constellations essential for implementing circular value chains (Kanda et al., 2024).

To succeed, circular startups depend heavily on their surrounding EEs and, in particular, on intermediaries that provide support, resources, and legitimacy (Klofsten et al., 2024; Woolley & MacGregor, 2022). These intermediaries, such as accelerators, incubators, and network organizations, connect actors, bridge institutional boundaries, and coordinate collaborations that can foster circular startups (S. L. Cohen & Hochberg, 2014). However, it remains unclear whether existing intermediaries are designed to effectively support circular startups or whether they reproduce conventional, growth-oriented support mechanisms that are misaligned with circular principles (van Rijnsoever, 2022).

While research on intermediaries in EEs has grown substantially, it remains fragmented and rarely examines how intermediaries function within CE-specific contexts. The literature provides valuable insights into intermediary mechanisms, but most studies focus on micro-level outcomes, such as startup survival or growth (Hallen et al., 2020; Kanda et al.,

2020; Theodoraki & Messeghem, 2017), while neglecting how these mechanisms operate across meso- and macro-levels of ecosystem dynamics (Theodoraki, Dana, & Caputo, 2022).

This chapter addresses this gap by asking:

RQ3: What functions of intermediaries in entrepreneurial ecosystems can be mapped to micro-, meso-, and macro-levels, and how do these functions apply to circular startups?

To answer this question, this study draws on a MLP as an analytical lens to capture how intermediaries operate across micro-, meso-, and macro-levels (Geels, 2002). Drawing on a SLR, the first step is to synthesize the existing research on intermediaries within the broader EE literature. This synthesis forms the basis for a conceptual framework that maps intermediary configurations, mechanisms, and functions across system levels. While micro-level support functions are relatively well understood, the review reveals that the structural and institutional roles of intermediaries at the meso- and macro-levels remain conceptually underdeveloped.

In the second step, this framework is transferred to the context of circular entrepreneurship. Here, intermediaries are expected to play a particularly critical role in helping circular startups navigate systemic barriers, align actors across sectors, and build legitimacy for CBMs (van Rijsoever, 2022). Because circular startups themselves act as levers for institutional and market reconfiguration, enabling their success through targeted intermediation contributes not only to startup development, but also to the broader transformation of EEs toward circularity. Understanding the multi-level functions of intermediaries is therefore essential to designing support mechanisms capable of advancing circular startups as a systemic transformation strategy.

In doing so, this study contributes to three scholarly conversations: (1) the theorization of EEs as multi-level systems, (2) the strategic role of intermediaries in a circular transformation, and (3) the governance of circular entrepreneurship through adaptive, system-building support structures.

The remainder of this chapter is structured as follows. It begins by outlining the conceptual foundations of EE research and the evolving role of intermediaries within it, complemented by MLP as the guiding analytical framework, with all of the aforementioned in the context of CE. The following section details the identification, selection, and thematic analysis of studies included in the SLR. Based on this methodology, the results are presented. In the discussion a conceptual framework mapping intermediary functions across micro-, meso-, and macro-levels within the EE context is developed and applied to the context of circular entrepreneurship. The chapter concludes with a future research avenues, implications of this chapter for both research and practice and its limitations.

4.2 Theoretical Background

4.2.1 Entrepreneurial Ecosystems as Multi-level Systems

The concept of EEs has gained significant prominence in recent years, yet it remains loosely defined and often undertheorized (R. Brown & Mason, 2017; Stam & van de Ven, 2021). Numerous frameworks aim to capture the complexity of EEs, highlighting their nature as territorially embedded and structurally heterogeneous systems (B. Cohen, 2006; Theodoraki & Messeghem, 2017; Thompson & Purdy, 2024). Stam and Spigel, 2016, for example, define EEs as “a set of interdependent actors and factors (1) coordinated in such a way that they enable productive entrepreneurship (2) within a particular territory (3)” (p. 1) emphasizing both functional interdependence and spatial embeddedness.

Recent contributions have advanced the field by identifying six critical research themes: configurations of EE elements, social interactions, outcomes, evolution, boundaries, and measurement (Stam et al., 2025). These studies collectively open the ‘black boxes’ of EEs, and underscore the need for multi-level analytical approaches that reflect the nested and dynamic interactions among individual startups, support structures, and institutional frameworks (Hess et al., 2024; Negri et al., 2025).

Building on this logic, Theodoraki and Messeghem, 2017 propose a three-layered conceptualization of EEs:

- The **macro-level** encompasses the broad institutional and infrastructural environment that shapes entrepreneurship at the national or supranational level. This includes public policy, regulatory regimes, cultural norms, entrepreneurial spirit, and physical infrastructure (e.g., transport, internet access, rent levels). It is also where industries and ecosystems interact.
- The **meso-level** refers to the organizational and relational structure between support actors (e.g., incubators, accelerators, universities, political institutions), which collectively shape processes of EE development. This level is characterized by inter-organizational trust, complementarity, and legitimacy. The composition and configuration of these actors such as number of support actors or means to support form the material infrastructure available to entrepreneurs.
- The **micro-level** captures the individual startups supported by the configuration of support actors. It is here that these actors exert their most direct influence, through their internal culture (e.g., collaboration among tenants) and material support structures (e.g., office space, tax benefits, administrative assistance). These interactions shape the mindset, skills, resource base, and strategic orientation of startups.

This layered view enables a more precise understanding of how entrepreneurial support mechanisms are embedded within and influenced by systemic and relational contexts. In

Table 4.1: Terminological Landscape of Startup Support Structures

Term	Description	Function	Example References
<i>Incubator</i>	Long-term support (often 1–3 years); infrastructure provision, office space, administrative help; typically non-equity-based	Early-stage support, legitimacy building, network facilitation	Bergek and Norrman (2008), Hackett and Dilts (2004), and Hausberg and Korreck (2018)
<i>Accelerator</i>	Fixed-term, cohort-based program; includes mentoring, education, funding, and demo days; often equity-based	Rapid scaling, investment readiness, market access	S. L. Cohen, Fehder, et al. (2019), S. L. Cohen and Hochberg (2014), and Crişan et al. (2021)
<i>Entrepreneurial Support Organization</i>	Broad umbrella term for structured support entities for startups (including incubators, accelerators)	Enabling and promoting entrepreneurship	Bergman and McMullen (2022), Cloitre et al. (2024), and Negri et al. (2025)
<i>Intermediary</i>	Broad concept for boundary-spanning activities, embedding a community, translating goals, and coordinating multi-actor collaboration	Provision of resources, skills, knowledge broker, coordinator, system-builder	Howells (2006), Kanda et al. (2020), and Kivimaa, Boon, et al. (2019)

the MLP, systemic change results from the dynamic interplay between micro-level innovations, meso-level structures, and macro-level institutional and environmental dynamics (Geels, 2002).

Applying this logic to circular entrepreneurship, an umbrella term capturing entrepreneurial activity based on CBMs, this study focuses specifically on circular startups, new startups founded on circular principles (Zucchella & Urban, 2019). At the micro-level, these startups aim to implement CBMs from scratch and are supported by various entrepreneurial support actors (Ferreira et al., 2024). The meso-level refers to the relational configurations that enable interaction, learning, and coordination processes necessary for developing and scaling CBMs (Ghisellini et al., 2016). The macro-level comprises the overarching institutional, cultural, and infrastructural environment, including public policy and regulatory frameworks that shape the conditions for a CE (Ferreira et al., 2024).

4.2.2 Intermediaries as Cross-Level Actors

The literature on EEs acknowledges the central role of support structures in enabling entrepreneurial activity. However, the terminology used to describe these actors remains fragmented. To bring conceptual clarity, this chapter defines incubators, accelerators, and their umbrella term, entrepreneurship support organizations (ESOs), and their integration into intermediaries, as outlined in Table 4.1.

Among the most prominent support structures discussed in EE literature are incubators and accelerators. Both forms are frequently grouped under the broader umbrella of ESOs,

which encompass a wide array of entities, such as university-based hubs, bootcamps, competitions, and entrepreneurship education initiatives, that aim to enable and promote entrepreneurship through direct or indirect, material or immaterial support (Bergman & McMullen, 2022; Bodolica & Spraggon, 2021; Breznitz & Zhang, 2022; van Rijnsoever, 2022). As such, ESOs constitute key institutional actors within the meso-level of EEs (Theodoraki & Messeghem, 2017).

In contrast, the term intermediary is not limited to formal organizations. It refers to a functional role, actors who operate ‘in-between’ others to bridge gaps in knowledge, resources, or communication (Howells, 2006). Intermediaries can be individuals, organizations, platforms, or networks. Empirical findings from the previous chapter support this functional rather than organizational understanding of intermediation. In Chapter 3 a SNA of EEs surrounding circular startups revealed that support for them is provided not only by formal organizations such as incubators or accelerators, but also by loose networks and platforms. These actors engage in what is often called cross-level work, meaning they coordinate between disconnected stakeholders, broker knowledge or resources, and help align interests across organizational or sectoral divides (Bergek & Norrman, 2008; Roundy, 2017).

These intermediation processes generally fall into three categories: transferring resources (transfer), facilitating new ties between actors (matchmaking), and coordinating collaborations (coordination) (T. Moss, 2009; Spiro et al., 2013). These processes can occur between individual actors in a network, between networks of actors, or between actors, networks, and higher-level institutional structures (Kanda et al., 2020).

Beyond providing transactional support, intermediaries can exert influence that spans multiple system levels. Their activities may not only facilitate startup development but also shape the structures, norms, and relationships within EEs. In this sense, intermediaries can act as change agents that connect micro-level entrepreneurial initiatives with broader ecosystem and institutional contexts at the meso- and macro-level (Kanda et al., 2020; Kant & Kanda, 2019; Kivimaa, Boon, et al., 2019).

Prior research has proposed that intermediary roles vary depending on systemic positioning and intent. Some intermediaries primarily enable startups and projects at the micro-level (process or user intermediaries), while others operate at higher aggregation levels to coordinate networks at the meso-level or translate between policy and practice at the macro-level (systemic or regime-based intermediaries) (Kivimaa, Boon, et al., 2019). This variation highlights that intermediation is not a uniform process but a interplay of roles, contingent on context, phase of ecosystem development, and institutional embedding (Kant & Kanda, 2019).

In sum, intermediaries shape not only the resource flows and learning processes of individual startups, but also the structure, direction, and resilience of EEs. By operating

across multiple levels, they become key enablers or inhibitors of systemic change within their EE and institutional environment.

While this study conceptually draws on the broader intermediary literature, it is important to note that a growing body of research specifically examines sustainability-oriented intermediaries. These studies demonstrate how such actors facilitate systemic change within EEs (Kher et al., 2023). Given the overlaps of circular entrepreneurship and the sustainability paradigm, it is reasonable to transfer these insights to the CE context. Although CE is conceptually distinct from sustainability, it is commonly framed as a condition for, complement to, or trade-off with sustainability (Geissdoerfer et al., 2017). Despite these ambiguities, CE is increasingly seen as a strategic pathway to sustainable development, particularly in terms of resource efficiency, system redesign, and innovation (Ghisellini et al., 2016). Consequently, intermediary functions identified in sustainability-focused research are likely to be relevant for supporting CBMs as well. The framework developed in this study therefore builds on the assumption that such mechanisms can inform the understanding of intermediaries enabling CBMs.

4.2.3 A Multilevel Perspective on Intermediary Influence

Although intermediaries are increasingly recognized as key actors in EEs, the conceptualization of their systemic roles remains fragmented. Existing research predominantly focuses on micro-level outcomes, such as startup survival or growth, while largely neglecting how intermediaries operate across levels and influence structural transformation (Ferreira et al., 2024; Theodoraki, Dana, & Caputo, 2022; Volkmann et al., 2021).

In particular, the role of intermediaries in circular entrepreneurship is underexplored, despite growing expectations that these actors can help overcome systemic barriers, coordinate stakeholders, and build legitimacy for CBMs (van Rijnsouwer, 2022).

To address this gap, this study draws on the MLP, a perspective commonly used in EE research that enables the analysis of entrepreneurial activity across distinct systemic layers, ranging from firm-level initiatives (micro) to ecosystem structures (meso) and broader institutional environments (macro) (Geels, 2002; Kivimaa, Hyysalo, et al., 2019; Theodoraki & Messeghem, 2017). Applying the MLP to circular entrepreneurship enables a more integrated understanding of how intermediaries function as cross-level enablers, translating institutional change into support programs, coordinating ecosystem development, and facilitating bottom-up innovation (Negri et al., 2025).

The MLP is particularly suited to CE contexts, given the systemic nature of the CE challenge. At the macro level, it refers to systemic shifts in economic structures, regulatory frameworks, and societal norms that collectively move economies away from linear logics (Geissdoerfer et al., 2017). At the meso level, transformation unfolds through

the reconfiguration of industries, regional economies, and value chains that adopt circular principles (Theodoraki, Dana, & Caputo, 2022). At the micro level, it is enacted by individual firms - particularly circular startups, that develop and scale business models aligning with circular value creation (Kirchherr, Yang, et al., 2023). These levels are interdependent: micro-level innovations feed into meso-level restructuring, while macro-level policies shape the conditions under which ecosystems and startups evolve.

Circular entrepreneurship thus requires coordinated change across levels: startup behaviors (micro), supportive ecosystems and infrastructures (meso), and enabling institutional environments (macro). Intermediaries play a crucial role in this process by mediating between linear and circular logics, fostering cross-sector collaboration, and helping circular startups access legitimacy and resources in still-dominant linear regimes (van Rijnsouwer, 2022) (cf. Chapter 1).

To synthesize and systematize existing knowledge on these dynamics, this study conducts a SLR of intermediary research in the EE domain. Anchored in the MLP, it develops an analytical framework that maps through which mechanisms intermediaries contribute across micro-, meso-, and macro-levels. The framework serves as a foundation for analyzing how these insights can be transferred to the circular entrepreneurship context to understand the enabling role of intermediaries in CE transformations.

4.3 Methodology

To address the fragmented conceptualization of intermediaries in EEs supporting startups, this study employs a theory-building SLR, as recommended by Schryen et al. (2015). Following established guidelines for SLRs in information systems and management research (Kitchenham & Charters, 2007; vom Brocke et al., 2015), the review was conducted in four stages: identification, screening, eligibility, and synthesis.¹

Identification. Relevant studies were identified through structured searches in three prominent academic databases: Web of Science, Scopus, and JSTOR. These sources were chosen due to their comprehensive indexing of peer-reviewed literature in entrepreneurship studies, and their reputation for academic rigor (Kraus et al., 2020; Paul & Criado, 2020; Singh et al., 2021).

The search was conducted in July 2024 and applied to the titles, abstracts, and keywords of the articles. To ensure comprehensive coverage, no time restrictions were imposed. The search string included variations of key terms relevant to startups, ecosystems, and support structures:

("Entrepr" OR "New venture" OR "Startup" OR "Start-up" OR "Start up")
AND ("Ecosystem*") AND ("Accelerator*" OR "Incubator*" OR "Support*")*

¹ The data was acquired during a master theses, supervised by the author; see Biller (2025).

The initial query retrieved 5,347 articles. After removing duplicates, 3,586 unique records remained for further screening (see Figure 4.1).

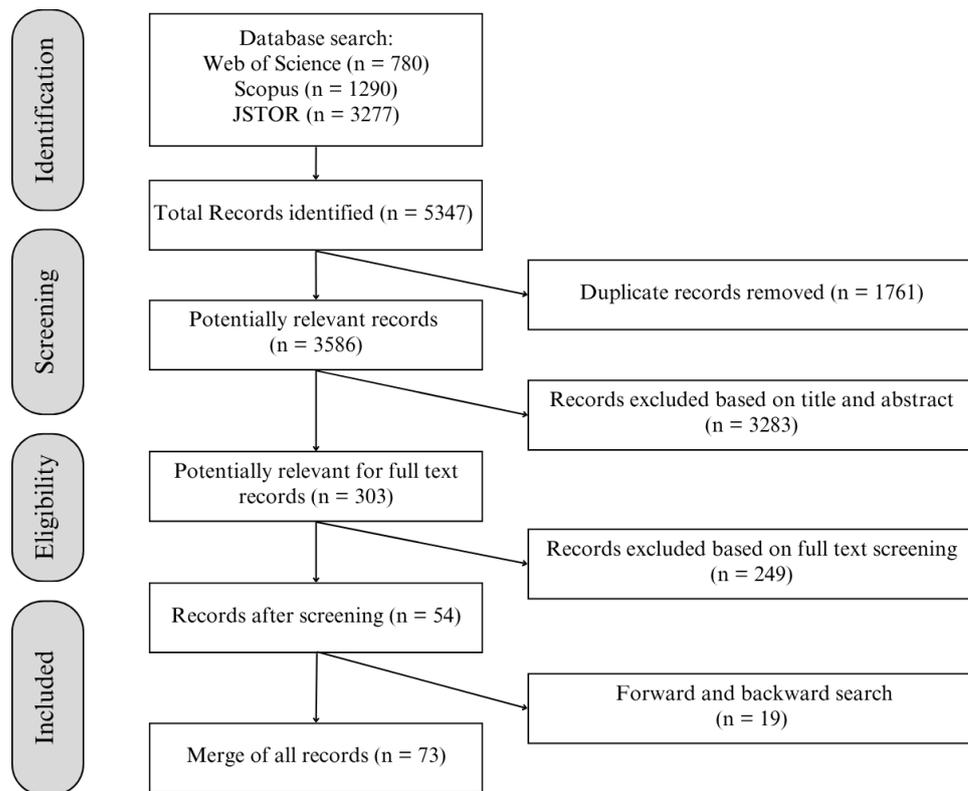


Figure 4.1: Overview of the Literature Search and Selection Strategy (Own Illustration)

Screening. Titles and abstracts of the remaining records were examined for relevance based on a set of inclusion and exclusion criteria, illustrated in Table 4.2. These were formulated to ensure thematic consistency and conceptual relevance. Only peer-reviewed publications were considered to ensure high scholarly quality. In addition, articles were required to demonstrate a clear connection to entrepreneurship research. Given the conceptual differentiation of support actors, only the literature with an explicit reference to EEs was included.

Table 4.2: Applied Inclusion and Exclusion Criteria Throughout the Search Process

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles	Not enough theoretical contributions
English or German language	No access to the full paper
Connection to entrepreneurship research	No significant connection to EEs
Relevant in the scope of support actors	Business and entrepreneurial aspects play only a minor role

Eligibility. In the eligibility phase, the full texts of the 303 selected articles were reviewed to verify their alignment with previously established criteria. Of the 303 full-text articles, 54 were retained.

These were then supplemented by backward and forward citation searches, which identified an additional 19 relevant publications, resulting in a final dataset of 73 peer-reviewed studies. An overview of the search and selection process is shown in Figure 4.1.

Synthesis. To identify conceptual patterns and build an integrative understanding of intermediary roles in EEs, the final set of articles underwent a thematic analysis following the procedure outlined by Braun and Clarke (2006). This approach is particularly well-suited for theory-building reviews, offering a flexible yet rigorous methodology for identifying ‘patterned responses’. Articles were inductively coded based on recurring characteristics, roles, and activities of intermediaries. Codes were iteratively refined and grouped into higher-order themes. The final themes were organized into a concept matrix (vom Brocke et al., 2009; Webster & Watson, 2002).

Table 4.3 illustrates the matrix, which is structured along seven themes related to intermediary functions, mapped across the outcomes and EE levels. This structure serves as the empirical foundation for the multi-level framework developed in the next section.

Table 4.3: Literature Review Content Matrix

Authors	Startup Founding	Startup Growth	Startup Survival	Access to Capital	Macroeconomic Development	EE Development	Sustainability
Almansour, 2022	X						X
Assenova and Amit, 2024		X		X			
Avnimelech and Rechter, 2023		X		X			
Bańka et al., 2022		X					X
Battistella et al., 2017			X			X	
Bergek and Norrmann, 2024		X					
Bergmann and Utikal, 2021							X
Blair et al., 2020		X				X	
Bodolica and Spraggon, 2021	X					X	
Breznitz and Zhang, 2022	X				X		

Table 4.3 (continued)

Authors	Startup Foun- ding	Startup Growth	Startup Sur- vival	Access to Capital	Macro- economic Devel- opment	EE Devel- opment	Sustain- ability
Breznitz and Zhang, 2019		X					
Butz and Mrożewski, 2021							X
Canovas-Saiz et al., 2021		X	X	X	X	X	
Cánovas-Saiz et al., 2020		X					
Carle and Rayna, 2024							X
Chan et al., 2020		X		X			
Cirule and Uvarova, 2022							X
S. L. Cohen and Hochberg, 2014		X	X	X			
S. L. Cohen, Fehder, et al., 2019		X		X			
S. L. Cohen, Bingham, and Hallen, 2019		X	X				
Cuvero et al., 2019	X	X				X	
Dalle et al., 2023				X		X	
De Esteban Escobar et al., 2022			X				
Del Sarto et al., 2020			X				
Fehder, 2024		X		X	X	X	
Fernandez et al., 2019		X					
Gonzalez-Uribe and Leatherbee, 2018		X	X	X			
Goswami et al., 2018			X			X	
Greco and Tregua, 2022		X					
Gutmann et al., 2019		X		X			
Hackett and Dilts, 2004		X	X		X		

Table 4.3 (continued)

Authors	Startup Foun- ding	Startup Growth	Startup Sur- vival	Access to Capital	Macro- economic Devel- opment	EE Devel- opment	Sustain- ability
Hagebakken et al., 2021			X	X			X
Hallen et al., 2014		X		X			
Hallen et al., 2020		X	X	X	X		
Hasan and Koning, 2019		X					
Haukipuro et al., 2019		X		X			
Hausberg and Korreck, 2018		X	X	X	X		X
Hochberg, 2016	X				X		
Hudáková et al., 2019		X	X				
Karahan et al., 2022							X
Karahan, 2024						X	X
Kaur et al., 2024			X	X			
Kher et al., 2023							X
Klofsten et al., 2024						X	X
Lall et al., 2020				X			X
Lin-Lian et al., 2021	X	X	X		X	X	
Lyons and Zhang, 2018	X						
Madaleno et al., 2022		X	X	X			
Metcalf et al., 2021	X	X		X			
Mohammadi and Sakhteh, 2023	X	X					
Qin et al., 2019		X					
Rechter and Avnimelech, 2025		X		X			
Regmi et al., 2015			X				
Rosado-Cubero et al., 2023			X				
Samaniego et al., 2023						X	X
Sanchez-Robles et al., 2023							X
Seitz et al., 2024		X		X			

Table 4.3 (continued)

Authors	Startup Foun- ding	Startup Growth	Startup Sur- vival	Access to Capital	Macro- economic Devel- opment	EE Devel- opment	Sustain- ability
Shetty et al., 2020	X	X	X	X	X		
Silva and Parente, 2022		X	X			X	
Spigel, 2017					X	X	
Stayton and Mangematin, 2019	X	X	X				
Theodoraki, Messeghem, and Audretsch, 2022		X					
Theodoraki et al., 2018						X	X
Trethewey-Mould and Moos, 2024		X			X	X	
Ulmer and Pape, 2022	X	X		X			
Wise and Valliere, 2024			X				
Woolley and MacGregor, 2022			X	X			
Yagüe-Perales et al., 2024		X	X	X			
Yu, 2020			X	X			
X. Yuan et al., 2022		X			X		
Zarei et al., 2022		X		X	X		
L. Zhang and Zhou, 2021		X					
Q. Zhang et al., 2024		X					

4.4 Results

The SLR identified a total of 73 publications focusing on the role of intermediaries in entrepreneurship contexts. Figure 4.2 illustrates the non-linear evolvement of the identified publications over the past two decades. Initial contributions appeared sporadically in 2004 and 2008, primarily focusing on incubation models. The field remained largely dormant until 2014. A phase of accelerated growth followed from 2019 to 2022, with publication numbers peaking in 2022 (n=13). The strong output in the first half of 2024

(n=11 as of July) reflects growing scholarly interest and suggests continued momentum. This surge aligns with the broader development of EE research (Thai et al., 2023).

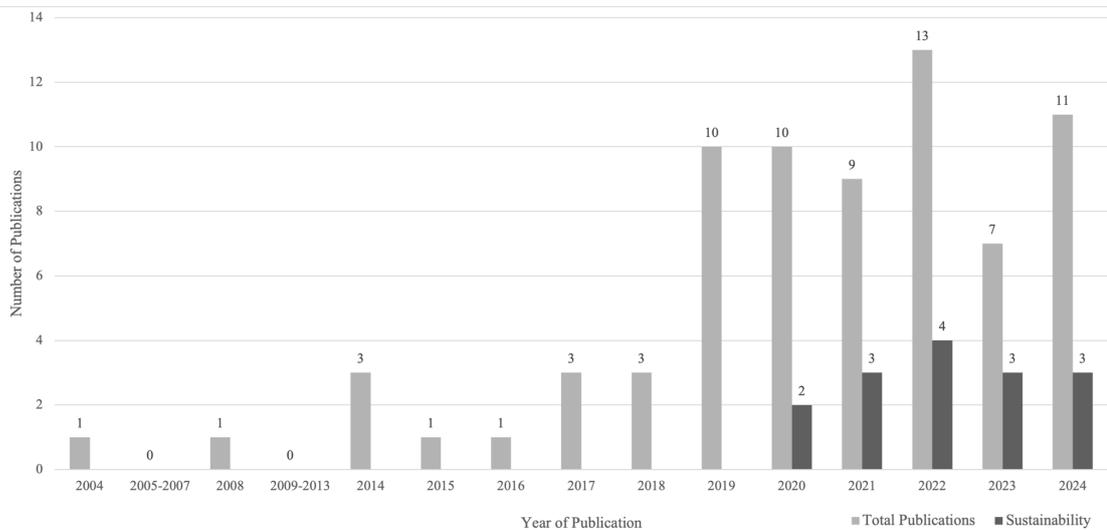


Figure 4.2: Number of publications per Year up to July 2024 (Own Illustration)

Of particular note is the recent rise in sustainability-oriented studies. None of the reviewed articles published before 2020 explicitly addressed sustainability as a core function of intermediaries. From 2020 onward, however, 16 of the 73 included studies (approximately 22%) integrated a sustainability lens. This development mirrors broader trends in sustainable EE research (Theodoraki, Dana, & Caputo, 2022; Volkmann et al., 2021) and resonates with the more recent emergence of CEE scholarship, cf. Chapter 2.

The analysis further revealed 45 distinct journals of publishing intermediary activities in EEs. Five journals stand out as the most frequent publication outlets: *Sustainability* (n=8), *Strategic Management Journal* (n=3), *The Journal of Technology Transfer* (n=3), *IEEE Transactions on Engineering Management* (n=3), and *Small Business Economics* (n=3). Notably, *Sustainability* is also the leading outlet for sustainability-oriented research, publishing 4 of the 16 studies with an explicit sustainability focus. This aligns with broader trends in sustainable entrepreneurship literature, where sustainability-oriented outlets are increasingly shaping discourse on support structures and systemic change.

As depicted in Figure 4.3, quantitative and qualitative approaches comprise 45% and 29% of the total publications. However, mixed methods were utilized in 15% and literature reviews in 11% of the studies. It is evident that empirical work leaned heavily towards quantitative research methods, aligning with the predominant approach in entrepreneurship literature (McDonald et al., 2015). While the number of publications has increased over time presented earlier, the choice of research outlets and methodological approaches has remained largely unchanged.



Figure 4.3: Percentage of Publications According to the Type of Research Methodology (Own Illustration)

The geographical distribution reflecting the regional focus of the studies of the reviewed literature reveals a strong emphasis on Europe (n=26) and North America (n=16), particularly the US (n=10) and Spain (n=6). A total of 18 distinct countries are represented as depicted in Table 4.4. While the US and Spain dominate in national focus, 18 studies adopted a global or cross-country perspective. Europe is addressed both through country-level studies (e.g., Germany, France, United Kingdom (UK)) and broader regional analyses.

Table 4.4: Geographical Distribution of the Reviewed Studies by Country and Region

Region	Country	Amount of Studies
Europe	Spain (6), Germany (4), Europe (3x region-wide), France (3), UK (3), Italy (2), Czech Republic (1), Latvia (1), Norway (1), Portugal (1), Sweden (1)	26
North America	US (10), Canada (4), North America (2x region-wide)	16
Asia	China (3), India (3), Israel (2)	8
South America	Chile	1
Africa	South Africa	1
Global	Worldwide	18
Emerging Market	Unspecified	1

Asia (n=8) and the Global South remain underrepresented, with only isolated cases from Africa, South America, and emerging markets. This skew toward mature EEs reflects the institutional maturity of accelerator and incubator models in high-income countries. As highlighted in the literature, the US-based Y-Combinator and European policy efforts have strongly shaped how intermediary structures are adopted and studied globally (Hochberg, 2016; Mohammadi & Sakhteh, 2023).

The review reveals a distinct concentration on two primary intermediary types: accelerators (n=50) and incubators (n=26). Several studies address both types simultaneously, reflecting their conceptual overlap and shared ecosystem functions. These actors dominate the academic discourse, often serving as empirical entry points for examining how intermediaries influence startup development, resource access, and market orientation. However, the literature also reflects a broader range of support mechanisms, including entrepreneurship boot camps (Bergmann & Utikal, 2021; Hasan & Koning, 2019), innovation hubs (Bodolica & Spraggon, 2021), and award-based competitions (Karahan et al., 2022). While less frequently studied, these structures expand the conceptual landscape of what constitutes an intermediary.

Drawing on the thematic analysis outlined in the methodology section (cf. Section 4.3), the reviewed literature was structured into seven themes that reflect the functional contributions of intermediaries across different levels of EEs. These include support for startup founding (1), startup growth facilitation (2), mechanisms that enhance startup survival (3), providing access to capital (4), the development of ecosystem structures (5), contributions to broader macroeconomic development (6), and intermediary roles in sustainability entrepreneurship (7).

In terms of scholarly attention, startup growth (n=42) emerges as the most frequently studied theme, followed by access to capital (n=27) and startup survival (n=26). Startup founding (n=12), ecosystem development (n=16), sustainability (n=16) and macroeconomic development (n=11) appear less frequently but have gained increasing interest in recent years.

The following results section briefly introduces these seven themes to provide an overview of the functions intermediaries deploy when supporting startups. The first six themes lay the empirical groundwork for the conceptual framework developed in the discussion integrating a MLP. This framework depicts intermediaries influence on startups at the micro-, meso-, and macro-level. The seventh theme, sustainability, functions as a cross-cutting perspective that enables the transition toward analyzing how these intermediary functions manifest in the context of circular startups.

4.4.1 Startup founding

12 studies focusing on ‘startup founding’ consistently link intermediary activity to higher rates of early-stage startup creation. Their activities in the founding phase typically include training, coaching, and administrative support, with university-based programs playing a particularly prominent role. Several publications also emphasize that competitions, coaching formats, and entrepreneurship education enhance entrepreneurial intent and facilitate the transition from ideation to startup registration.

4.4.2 Startup Growth

Across the reviewed studies, ‘startup growth’ is the most frequently examined outcome and is commonly operationalized through indicators such as turnover, profitability, and employment (n=42). Intermediaries are reported to support growth-related development by offering training, mentorship, access to networks, and workspace infrastructures. Several publications highlight the relevance of program design features, including cohort size, mentorship quality, staff intensity, selection procedures, and program duration, all of which shape startup performance. Overall, existing studies document a heterogeneous set of activities through which intermediaries engage with startups during the growth phase, with substantial variation across organizational models and contexts.

4.4.3 Startup Survival

‘Startup survival’ emerges as a central outcome, with 26 publications examining how intermediaries relate to startups’ likelihood of remaining operational in early stages. Empirical work reports that intermediaries frequently provide infrastructures, mentoring, and access to funding networks, and that program experience and network embeddedness are often associated with higher survival rates. The evidence, however, is mixed: geographic context, program design, and organizational characteristics lead to varying results, with some studies documenting non-linear or even negative effects and others finding no statistically significant relationship. Selection strategies and sector-specific support are also identified as important factors shaping survival outcomes.

4.4.4 Access to Capital

Across the reviewed literature, ‘access to capital’ is identified as a central challenge for early-stage startups, and most studies examine how intermediaries facilitate connections to external capital rather than providing funding directly (n=27). Empirical work highlights a broad range of activities, including pitch events, investor matching, and grant preparation, with incubators often linked to public-funding channels and private accelerators more closely associated with venture capital networks. Funding outcomes vary considerably across program types and contexts, influenced by factors such as sponsorship structure, specialization, cohort composition, and participant experience. While elite accelerators tend to be associated with stronger fundraising results, many programs report modest or no effects, and longitudinal analyses show that initial funding advantages may diminish in later rounds.

4.4.5 Ecosystem Development

13 studies show that intermediaries contribute to ‘ecosystem development’ by connecting startups with key actors and increasing the structural density of EEs. Studies report that intermediaries facilitate knowledge and resource exchange, foster shared norms and vocabularies, and support the emergence of common frames that guide collective action. The reviewed literature also highlights how intermediaries promote relational cohesion through repeated interactions, transparency, and reputation transfer, thereby strengthening trust and collaboration among ecosystem participants. However, evidence is mixed: while intermediaries often occupy central ecosystem positions, some studies indicate that coordination challenges and limited alignment among support organizations can constrain their broader ecosystem effects.

4.4.6 Macroeconomic Development

Across the reviewed literature, 16 studies examine how intermediary activity relates to broader ‘macroeconomic outcomes’. Studies report that intermediaries attract entrepreneurial activity to specific regions, generate spillover effects that link startups with investors, corporates, and public actors, and contribute to job creation, tax revenue, and the growth of supporting sectors. Several studies also highlight regional variation: developed ecosystems show higher absolute startup performance, while less mature contexts exhibit stronger relative effects of intermediary participation. In addition, intermediaries are found to anchor sector-specific expertise and networks in particular locations, reinforcing regional specialization and competitiveness.

4.4.7 Sustainability

A subset of studies examines intermediaries that explicitly target ‘sustainability’ entrepreneurship. Empirical findings show that such programs frequently align their activities with ecological and social objectives, and provide sustainability-focused training, mentoring, and networking opportunities. Social and impact accelerators also adapt their selection criteria to include sustainability metrics, and participation in these programs has been associated with higher external equity investment for participating startups. At the same time, several studies note challenges, including underdeveloped measurement systems for sustainability as well as limited capacity to build durable networks, particularly in rural or peripheral EEs.

Taken together, the results show how intermediary activities shape startup development across startup-level processes, ecosystem dynamics, and wider macroeconomic contexts. In the following section, the insights are synthesized into a multi-level framework that maps these functions onto micro-, meso-, and macro-level dynamics. This framework

subsequently provides the analytical foundation for examining how such intermediary roles translate into sustainability- and circularity-oriented entrepreneurial settings.

4.5 Discussion

Building on the results, this discussion introduces the multi-level framework that integrates the identified functions of intermediaries across micro-, meso-, and macro-levels. The framework provides the basis for a subsequent examination of how these dynamics unfold in a circular entrepreneurship context.

4.5.1 Multi-level Framework of Intermediaries Influence

The thematic analysis reveals seven themes that reflect how intermediaries operate across system levels (see Table 4.3). Viewed through the lens of the MLP, the first four themes, (1) startup founding, (2) startup growth, (3) startup survival, and (4) access to capital, represent micro-level influences associated with startup development. Theme (5), ecosystem development, reflects meso-level dynamics, while theme (6), macroeconomic development, concerns the broader institutional and infrastructural contributions of intermediaries at the macro-level.

Although these levels are analytically separated, the literature emphasizes their interdependence. For instance, micro-level growth support may strengthen meso-level networks and contribute to macro-level entrepreneurial culture evolution.

Building on these six themes, the multi-level framework in Figure 4.4 synthesizes how intermediary functions unfold across micro-, meso-, and macro-levels and how they influence outcomes. The framework integrates their roles, relational configurations, and institutional linkages, providing a structured basis for the subsequent discussion of intermediary influence in sustainability-oriented and circular entrepreneurship contexts.

4.5.1.1 Supporting the Startups - Micro-level Perspective

Building on the multi-level framework introduced in Figure 4.4, this section begins with the micro-level, where intermediaries affect startups most directly through their organizational configuration. This includes providing physical infrastructure, administrative and legal support, and embedding startups into supportive environments that foster learning, collaboration, and strategic orientation. Such support structures shape critical dimensions of entrepreneurial development including mindset, skills, capabilities, and resilience of entrepreneurs.

However, the form and intensity of these mechanisms depend strongly on how intermediaries are designed and governed. The literature highlights six configuration factors that moderate how mechanisms unfold and which outcomes emerge.

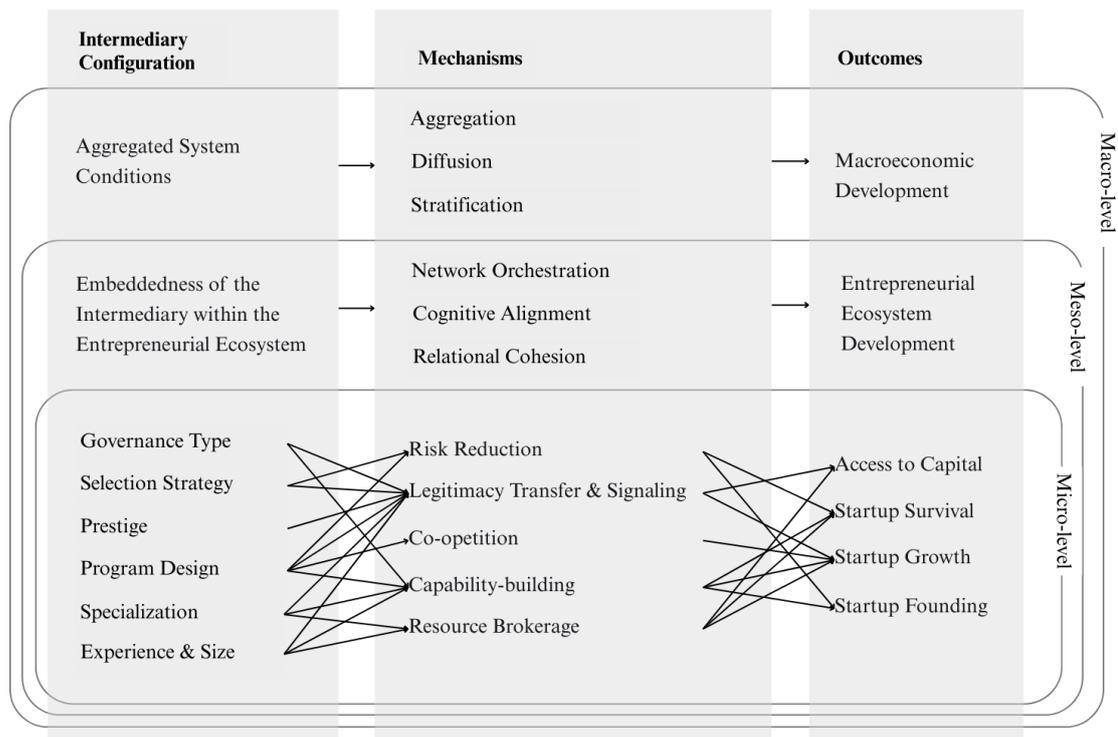


Figure 4.4: Intermediary Functions from a Multi-Level Perspective (Own Illustration)

Experience and size (capability-based) determine how effectively mechanisms are enacted. The management team’s experience and staff size, condition the level of mentoring and resource brokerage, as experienced staff enable a more targeted capability-building support. **Specialization** (structural) influences which mechanisms are activated. It refers to the thematic or sectoral focus of the intermediary and enhances the alignment between program content and startup needs, improving capability-building and network access in specific thematic or industrial domains. **Program design** (structural) determines how mechanisms are performed. It encompasses structural features such as program duration, cohort composition, content, mentoring, coaching, and the scope of physical resource provision (e.g., access to co-working spaces and technical infrastructure) all of which affect capability-building and co-opetition among startups, and legitimacy. **Prestige** (symbolic) affects how strongly legitimacy and signaling mechanisms operate. The intermediary’s reputation within the EE amplifies legitimacy transfer, as affiliation with high-status organizations signals credibility to external investors and partners. **Selection strategy** (structural) determines who benefits from intermediary mechanisms. It defines how startups are chosen for participation and thereby shapes the quality and composition of the cohort, influencing subsequent signaling and risk-reduction effects. Finally, **governance type** (institutional) determines which aims intermediary mechanisms follow. The governance model, whether private, public, corporate, or university-based, shapes strategic objectives and influences mechanisms such as capability-building and legitimacy.

Together, these configuration factors shape the structural and institutional potential of intermediaries to activate mechanisms such as resource brokerage, capability-building, co-opetition, legitimacy transfer and signaling, and risk reduction. These mechanisms translate entrepreneurial intent into startup development outcomes, from startup founding(1), to startup growth (2), startup survival (3), and resource mobilization and legitimacy building through access to capital (4).

The subsequent analysis is therefore structured around these four micro-level outcomes, illustrating how intermediary configurations activate different mechanisms that shape the formation, growth, survival, and access to capital trajectories of startups.

Startup founding is most directly supported by intermediaries at the micro-level through program design features that combine entrepreneurial capability-building with risk reducing interventions. The literature shows that intermediaries, mostly university-based incubators and accelerators, frequently offer targeted training and coaching, legal assistance, and structured formats such as pitch events or competitions (Almansour, 2022; Bodolica & Spraggon, 2021; Metcalf et al., 2021; Mohammadi & Sakhteh, 2023; Ulmer & Pape, 2022). These elements operationalize the program design of intermediaries which activate mechanisms of capability-building and risk reduction.

Capability-building is achieved by enhancing nascent entrepreneurs' opportunity recognition, strategic thinking, and self-efficacy, enabling them to translate early-stage intent into concrete action (Almansour, 2022; Breznitz & Zhang, 2019; Lyons & Zhang, 2018; Metcalf et al., 2021; Mohammadi & Sakhteh, 2023; Ulmer & Pape, 2022). At the same time, intermediaries lower psychological and procedural barriers to entry: mentoring, administrative support, and simulated entrepreneurial environments reduce uncertainty and foster resilience, increasing the likelihood of formal startup creation (Bodolica & Spraggon, 2021; Cuvero et al., 2019; Stayton & Mangematin, 2019; Ulmer & Pape, 2022).

These mechanisms illustrate how startup founding is not merely the result of individual ambition, but a structured outcome shaped by intermediary configurations. This aligns with the broader insight that intermediaries serve as catalysts for entrepreneurial activation by converting intent into action through targeted micro-level support (Hochberg, 2016; Lin-Lian et al., 2021; Metcalf et al., 2021).

Startup growth emerges as the most frequently studied outcome in intermediary research, typically operationalized through performance indicators such as revenue, profitability, or employment (Hausberg & Korreck, 2018; Lin-Lian et al., 2021). The findings of this review suggest that growth is not an automatic consequence of participation in intermediary activities, but is mediated by configurational factors, such as program design, selection strategy, and staff experience, activating mechanisms like resource brokerage, capability-building, co-opetition, and legitimacy transfer and signaling (Breznitz & Zhang, 2019; Chan et al., 2020; S. L. Cohen, Fehder, et al., 2019; S. L. Cohen &

Hochberg, 2014; Trethewey-Mould & Moos, 2024; Yagié-Perales et al., 2024). These configuration and mechanisms shape how startups progress from initial market entry toward startup growth.

Intermediaries strengthen growth trajectories by building strategic and operational capabilities, particularly through thorough program design such as high-quality mentoring and structured entrepreneurial skill development (S. L. Cohen, Fehder, et al., 2019; Seitz et al., 2024).

Through co-opetition mechanisms, intermediaries further shape the learning environment by orchestrating peer-based exchanges that facilitate rapid problem-solving, benchmarking, and selective competition (Hallen et al., 2020; Theodoraki, Messeghem, & Audretsch, 2022).

Beyond these mechanisms, intermediaries contribute to startup growth by transferring legitimacy: the intermediaries' configurational selection strategy and prestige serve as quality signals that improve investor perception and attract external resources (Bergek & Norrmann, 2024; Blair et al., 2020; S. L. Cohen, Fehder, et al., 2019; Gonzalez-Uribe & Leatherbee, 2018; Zarei et al., 2022). These signaling effects are amplified in programs with strong reputational capital and investor networks (Blair et al., 2020; S. L. Cohen, Fehder, et al., 2019; Gonzalez-Uribe & Leatherbee, 2018; Zarei et al., 2022).

Resource brokerage complements these mechanisms by directly connecting entrepreneurs with relevant capital, knowledge, and partner ecosystems (Hackett & Dilts, 2004; Hallen et al., 2020; Hudáková et al., 2019; Metcalf et al., 2021; Mohammadi & Sakhteh, 2023; Trethewey-Mould & Moos, 2024). These curated connections compensate for gaps in market access and enable founders to make more effective use of external opportunities and knowledge. Physical resources such as workspace or prototyping facilities may support growth, but generally play a secondary role compared to relational and cognitive support mechanisms (Breznitz & Zhang, 2019; Gonzalez-Uribe & Leatherbee, 2018).

As shown the effectiveness of these mechanisms is highly dependent on the intermediaries configuration, namely program design, selection strategy, and prestige. Program design, including content, cohort size and program duration, and staff expertise modulate both the intensity and the credibility of support (Seitz et al., 2024; X. Yuan et al., 2022). Notably, incubators tend to enable growth through tailored long-term capability development (Breznitz & Zhang, 2019; S. L. Cohen, Fehder, et al., 2019; Trethewey-Mould & Moos, 2024; Wise & Valliere, 2024). In contrast, the short duration and standardized structures typical of many accelerators explain why growth effects of startups are heterogeneous, and why some startups experience premature scaling pressures that may slow or even undermine performance (Chan et al., 2020; S. L. Cohen & Hochberg, 2014; Yagié-Perales et al., 2024). These differences raise important questions about the sustainability of growth trajectories initiated through short-cycle acceleration models.

Taken together, startup growth outcome is not shaped by standardized ‘treatment’ but by how effectively intermediary configurations activate resource brokerage, capability-building, co-opetition, and legitimacy transfer. Where these mechanisms reinforce each other, intermediaries can meaningfully shape the growth trajectory of startups.

Startup Survival. At the survival stage, intermediaries influence startups predominantly through resource brokerage, capability-building mechanisms, and risk reduction. The survival of startups is shaped by the extent to which intermediary configurations activate these mechanisms in ways that help startups navigate uncertainty, reduce liability of newness and smallness, and stabilize their operational foundations.

Intermediaries reduce early-stage risk by lowering financial and procedural burdens, offering program designs with physical infrastructure, and providing targeted administrative support (Hallen et al., 2020; Lin-Lian et al., 2021). Such risk reduction mechanisms are complemented by resource brokerage, as intermediaries connect startups to funding channels, partners, and support networks (Kaur et al., 2024; Rosado-Cubero et al., 2023). In parallel, capability-building through mentoring and problem-solving support strengthens founders’ capacity to respond to early setbacks and adjust business operations (Silva & Parente, 2022; Woolley & MacGregor, 2022).

The extent to which these mechanisms unfold depends on intermediary configuration. As shown program design is important but also survival outcome improves when intermediaries possess organizational experience, as established routines and embedded local networks allow them to guide startups more effectively through early vulnerabilities (Canovas-Saiz et al., 2021; Hackett & Dilts, 2004; Silva & Parente, 2022; Woolley & MacGregor, 2022). Specialization and targeted selection strategies also play a role, as sector-specific support and curated cohorts increase the fit between startup needs and the mechanisms provided, whereas undifferentiated programs struggle to meet heterogeneous survival requirements (Del Sarto et al., 2020; Hausberg & Korreck, 2018).

Survival outcomes, however, are not uniform. Several studies highlight the role of contextual moderators, showing that geographic location and ecosystem maturity influence how mechanisms unfold. Some US-based programs report higher survival probabilities due to resource depth and institutional density, whereas studies in less mature ecosystems find stronger relative effects of intermediary support, likely because of lower competitive pressure and fewer alternative support options (Canovas-Saiz et al., 2021; Regmi et al., 2015).

Moreover, survival effects can be non-linear or even negative. In some accelerators, the emphasis on rapid scaling can lead to premature expansion or acquisition before product–market fit is achieved, increasing the risk of early exit (S. L. Cohen & Hochberg, 2014). Yet, recent research suggests that such ‘accelerated failure’ may not solely represent a negative outcome but can also be interpreted as a form of efficient learning and

resource reallocation (Hallen et al., 2020; Yu, 2020). By exposing startups to intensive feedback and investor scrutiny, accelerators may help entrepreneurs more quickly and decisively determine the viability of their startups, thereby reducing the costs of prolonged failure and improving overall ecosystem efficiency.

These findings highlight that intermediary influence on survival cannot be reduced to simple positive or negative effects; instead, it reflects how configuration and context jointly determine which mechanisms are activated and at what intensity. Notably, one study explicitly states no statistically significant relationship between accelerator participation and startup survival (Yagüe-Perales et al., 2024) and literature highlights that it is unclear whether the mechanisms are solely attributable to the intermediary or other variables outside the intermediaries context (Gonzalez-Uribe & Leatherbee, 2018; Woolley & MacGregor, 2022).

Access to Capital. The literature reinforces that intermediary influences on startup funding are primarily realized through resource brokerage and signaling mechanisms, providing access to capital rather than direct capital provision. These mechanisms operate most effectively when supported by configurations, including selection strategy, program design, and prestige. This aligns with literature findings that elite accelerators act as certification mechanisms, enhancing investor confidence through prestige and dense network ties (S. L. Cohen, Fehder, et al., 2019; Fehder, 2024).

Resource brokerage refers to the active mediation between startups and financial actors, most visibly through a program design integrating pitch events, investor matchmaking, and grant navigation (S. L. Cohen, Fehder, et al., 2019; Hausberg & Korreck, 2018; Metcalf et al., 2021; Woolley & MacGregor, 2022). These interactions help reduce information asymmetries and lower search costs for both sides, increasing the likelihood of capital access.

Legitimacy transfer operates more subtly, as intermediaries enhance the perceived credibility of startups through their own reputation and selection strategy. Startups affiliated with prestigious accelerators or incubators benefit from their legitimacy that can improve investor trust and attract attention in crowded capital markets (Kaur et al., 2024).

The effectiveness of these mechanisms is shaped by intermediary governance structures, conditioning their funding orientation. While public incubators typically channel startups toward grants and public subsidies, VC-backed accelerators emphasize equity funding and market-based investor relations (S. L. Cohen, Bingham, & Hallen, 2019; Woolley & MacGregor, 2022). Startups emerging from VC-backed accelerators benefit from signaling effects that are directly legible to private investors, while those from public or university-based incubators rely more on institutional credibility (S. L. Cohen, Bingham, & Hallen, 2019; S. L. Cohen, Fehder, et al., 2019). These legitimacy pathways

shape both the mode of resource brokerage and the credibility signals intermediaries can transmit.

However, the effects of intermediation on access to capital remain highly uneven. While some programs generate strong signaling outcomes, others show negligible or even negative impacts, particularly when they lack specialization, credibility, or long-term support structures (S. L. Cohen, Fehder, et al., 2019; Dalle et al., 2023). These disparities underscore the importance of fit between program design and startup needs, suggesting that funding outcomes are contingent not only on program inputs but also on entrepreneurs' ability to leverage intermediary networks and legitimacy. For instance, first-time founders typically face higher barriers in fundraising but may benefit disproportionately from structured exposure through accelerator networks and pitch events (Assenova & Amit, 2024; Yagüe-Perales et al., 2024).

Moreover, emerging evidence indicates that early funding success does not guarantee long-term capital access, especially when selection processes favor short-term readiness over sustainable business fundamentals (Yu, 2020). These findings suggest that intermediary effectiveness in giving startups access to capital is not uniformly replicable, but highly configuration-dependent.

In summary, the micro-level outcomes of intermediation, startup founding, startup growth, startup survival, and access to capital, are shaped by five recurring mechanisms: (1) Resource brokerage, facilitating access to networks, funding and expertise; (2) capability-building, enhancing entrepreneurial skills and strategic orientation; (3) Co-opetition, enabling peer-learning and competition; (4) Legitimacy transfer, signaling startup quality to external stakeholders through reputation and credibility; and (5) Risk reduction, lowering psychological and structural entry barriers. These mechanisms align closely with user- and process-oriented intermediaries (Kivimaa, Boon, et al., 2019), which emphasize adaptive, startup-specific facilitation.

While these mechanisms are well documented, their effectiveness is not uniform. Recent research suggests that startup preferences for support vary systematically (M. A. van Weele et al., 2020), and perceptions of resource needs may diverge from actual capability gaps (M. van Weele et al., 2017). This highlights the importance of tailoring program configurations and adopting assertive facilitation strategies, particularly for early-stage founders who may underutilize available support. Intermediation at the micro-level, therefore, is not only about offering resources, but also about enabling founders to recognize, absorb, and act upon them.

4.5.1.2 Entrepreneurial Ecosystem Development - Meso-level Perspective

At the meso-level, intermediaries shape EE development through their embeddedness within the EE. Their influence unfolds along three core mechanisms: network orchestration, which increases the structural density and connectivity of EEs; cognitive alignment, which fosters shared visions, vocabularies, and frames; and relational cohesion, which builds trust, mutual identification, and collective purpose among ecosystem actors.

Intermediaries appear to contribute to network orchestration by connecting startups with relevant ecosystem actors providing the structural infrastructure for knowledge and resource exchange (Battistella et al., 2017; Bodolica & Spraggon, 2021; Goswami et al., 2018; Lin-Lian et al., 2021; Silva & Parente, 2022). They also foster ecosystem sense-making by aligning narratives and strategic intentions (Theodoraki et al., 2018). Through their anchoring role, intermediaries often stabilize the evolution of EEs around shared institutions and norms, particularly in emerging or fragmented regions (Fehder, 2024). This cognitive alignment helps actors understand their interdependencies, reducing coordination uncertainty and directing collective attention toward innovation and value creation (Dalle et al., 2023). Over time, these mechanisms enhance relation cohesion, creating stability and legitimacy within the ecosystem (Fehder, 2024; Theodoraki et al., 2018).

However, in the case of New Zealand, where accelerators occupy central positions in the national innovation system struggle to generate system-level impact due to misalignment and fragmented orchestration among the intermediaries (Blair et al., 2020). While only one case, it illustrates a broader challenge in meso-level intermediation: the need for ecosystem-wide strategic coherence.

Prior research has described such roles of intermediaries as characteristic of systemic intermediaries (Kivimaa, Boon, et al., 2019), whose influence extends beyond startup-level support toward structuring and stabilizing entrepreneurial environments. These mechanisms are collective and co-evolutionary rather than linear: intermediaries not only shape the ecosystem through their activities but are simultaneously shaped by its structure, norms, and institutional logics. However, empirical evidence on the specific boundary conditions or multi-directional effects that shape these dynamics remains limited.

4.5.1.3 Macroeconomic Development

Beyond their effects on startups and EE development, intermediaries also contribute to broader macroeconomic development. This influence unfolds through three key mechanisms: aggregation, diffusion, and stratification, which collectively shape regional competitiveness and national innovation capacity.

Aggregation refers to the concentration of entrepreneurial activity, resources, and talent in specific localities. By attracting startups, investment, and infrastructure, intermediaries contribute to higher entrepreneurial density and self-reinforcing growth dynamics

(Hochberg, 2016; Metcalf et al., 2021). Diffusion captures spillover effects as intermediaries connect startups with investors, corporates, and public actors. These interactions foster the dissemination of innovation, formation of supply chains, and emergence of ancillary industries, extending the reach of entrepreneurial activity beyond individual startups (Bańka et al., 2022; Hausberg & Korreck, 2018). Stratification, in contrast, highlights how intermediaries reinforce spatial hierarchies over time. Elite accelerators and incubators, through reputational signaling and selective access, attract high-potential startups and resources, creating cumulative advantages that differentiate regions and concentrate innovation assets (Hallen et al., 2020).

Collectively, these mechanisms translate into macroeconomic outcomes such as job creation, regional tax revenue, and sectoral specialization (Hackett & Dilts, 2004; Trethewey-Mould & Moos, 2024; X. Yuan et al., 2022), which ultimately manifest in indicators like GDP growth and national innovation capacity (Shetty et al., 2020). Intermediaries contribute to the spatial structuring of startup landscapes by anchoring sector-specific expertise and networks in distinct regions. This supports regional specialization and long-term competitiveness in domains such as fintech, cleantech, or health innovation (X. Yuan et al., 2022).

Yet, evidence shows that these effects are highly context-dependent. While mature ecosystems (e.g., in the US) benefit from deeper capital pools and institutional maturity, accelerators in emerging ecosystems often demonstrate greater relative impact due to more focused interventions and sharper resource constraints (Shetty et al., 2020; Zarei et al., 2022).

These macro-level contributions position intermediaries not only as enablers of startup development but as important nodes in the spatial and sectoral structuring of entrepreneurial activity. Prior research suggests that intermediaries may act as institutional translators, aligning EE structures with national policy agendas and long-term transformation goals (Kivimaa, Boon, et al., 2019). However, this role could not be empirically substantiated in the present review, as the included studies did not explicitly address how intermediaries influence or reshape institutional frameworks at the macro-level.

Taken together, the framework highlights the multi-level nature of intermediary influence, spanning from startup founding, startup growth, startup survival and access to capital to EE and macroeconomic development. By systematically mapping intermediaries configurations, mechanisms, and outcomes across system levels, this study not only consolidates fragmented insights but also enhances the theoretical understanding of how intermediaries function within and across EEs (T. Moss, 2009; Spiro et al., 2013; Theodoraki, Messeghem, & Audretsch, 2022).

This multi-level framework sets the stage for examining how these functions translate to transformation-oriented domains. The following section therefore explores how the identified intermediary mechanisms enable the emergence and growth of circular startups.

4.5.2 Applying the Multi-Level Framework to Circular Entrepreneurship

While the presented multi-level framework captures the functions of intermediaries across micro-, meso-, and macro-levels, it has thus far been developed from a general entrepreneurship literature perspective. The seventh theme identified in this review, sustainability, is therefore used to reinterpret the framework in the context of circular entrepreneurship. Rather than constituting an additional system level, sustainability cuts across all levels and reframes intermediary mechanisms in light of transformation-oriented goals.

Circular entrepreneurship represents a specific dimension of broader sustainability transformation (Geissdoerfer et al., 2017). Like other sustainability-oriented startups, circular startups operate under higher uncertainty, institutional inertia, and fragmented stakeholder environments (Gebhardt et al., 2025; Hoogendoorn et al., 2019). These conditions often exceed the challenges faced by conventional startups and require tailored support within their EEs. In contrast to sectoral domains like Health Technology or FinTech, where intermediary adaptation typically focuses on technical expertise and regulatory alignment (see e.g., Page et al., 2018), circular entrepreneurship demands a more fundamental rethinking of economic logics, actor configurations, and institutional narratives (Kanda et al., 2020; Kirchherr, Bauwens, & Ramos, 2023). Intermediary strategies developed in sustainability contexts can therefore provide valuable guidance for supporting CBMs.

4.5.2.1 Supporting Circular Startups - Micro-level Perspective

Specialization. At the micro-level, sustainability-oriented intermediaries differ from conventional support structures by design. Rather than treating sustainability as a peripheral objective, their program logic is explicitly aligned with ecological and social goals, often guided by frameworks such as the United Nations' SDGs (Butz & Mrożewski, 2021; Theodoraki & Messeghem, 2017). This strategic alignment reflects a broader trend identified in the review: intermediary effectiveness on micro-level outcomes depends on their degree of specialization and alignment with startup-specific needs. Applying this to circular entrepreneurship suggests that intermediary programs which explicitly tailor their support to the unique requirements of circular startups, such as longer innovation cycles, system-level thinking, and cross-sectoral collaboration, could similarly enhance startup founding, startup growth, startup survival, and access to capital.

Program Design. University Business Incubators and Higher Education Institution programs illustrate how sustainability-oriented intermediaries operationalize **capability-building and resource brokerage** through targeted program design configurations. By embedding sustainability-focused training, and mentoring, they cultivate entrepreneurial skills and strategic orientation toward ecological and social objectives (Almansour, 2022; Karahan, 2024; Samaniego et al., 2023). These capabilities are not generic but tailored to sustainability, promoting systems thinking, lifecycle analysis, and impact measurement. Over time, such intermediaries often evolve from simply ‘greening’ conventional startups toward fostering deeper institutional change through altered governance structures and value logics (Karahan, 2024).

These findings align with the micro-level mechanisms identified in the multi-level framework, where capability-building and resource brokerage emerged as core levers for influencing startup development, particularly with regard to startup founding, startup growth, startup survival, and access to capital. For intermediaries supporting circular startups, this implies the need to reshape their offerings along circular principles: by integrating resource-flow thinking, offering deep-dive experimentation formats, and cultivating access to mentors, experts, and investors with domain-specific circular expertise and risk tolerance (Kanda et al., 2025; Klofsten et al., 2024). While circularity poses distinctive challenges, the underlying mechanism of entrepreneurial capability enhancement remains a transferable anchor for intermediary effectiveness.

Selection Strategy. Social and impact accelerators extend the logic of sustainability intermediation through selection adaptation. By redefining admission criteria to include metrics such as purpose orientation, inclusivity, or carbon reduction, they strategically align startup support with broader sustainability goals (Butz & Mrożewski, 2021). Empirical evidence indicates that participation in such programs is associated with significantly higher levels of external equity investment, suggesting that tailored selection strategies can enhance both **legitimacy and investor signaling** (Kher et al., 2023). These findings confirm that selection strategy, as a configurational element, acts as a trigger mechanism for legitimacy transfer and signaling, ultimately shaping funding outcomes.

Transferring this insight to the circular entrepreneurship domain, intermediaries must adapt their selection logic to identify startups with high circularity potential. However, as the literature emphasizes, standardized criteria for assessing circularity remain underdeveloped, limiting the precision of selection and program targeting (Butz & Mrożewski, 2021). This points to a dual imperative for circular-oriented intermediaries: to develop domain-specific selection frameworks that capture the systemic potential of circular startups, and to strengthen measurement infrastructures that allow for credible signaling toward external stakeholders.

Notably, configuration such as governance type, prestige, and experience and size, as well as mechanisms such as co-opetition and risk reduction, which were prominent in the broader EE literature, remain underexplored in the sustainability intermediary literature. This suggests a potential blind spot in current sustainability support programs and highlights an opportunity for future research and programmatic innovation in circular entrepreneurship contexts.

4.5.2.2 Circular Entrepreneurial Ecosystem Development - Meso-level Perspective

At the meso-level, sustainability-oriented intermediaries reveal key insights for circular entrepreneurship, particularly regarding their embeddedness in the broader EE and their ability to orchestrate actor relationships, cognitive alignment, and relational cohesion.

Effective sustainability transformation rely on sustained, cross-sector collaboration among startups, corporates, universities, and public actors. However, empirical studies show that many sustainability programs lack coherent and context-sensitive strategies for **network orchestration**, particularly in peripheral or resource-scarce regions where institutional density is low (Hagebakken et al., 2021; Hausberg & Korreck, 2018; Karahan et al., 2022).

These insights are directly transferable to the circular entrepreneurship domain. Circular innovation depends even more strongly on value chain integration and sustained interaction across industrial, civic, and regulatory actors. Empirical work by Klofsten et al. (2024) confirms that traditional incubator models struggle to integrate circular startups into regional industrial networks, owing to a lack of long-term, multi-stakeholder alignment. This underscores the meso-level importance of network orchestration in enabling CBMs and that intermediaries' effectiveness in fostering ecosystem connectivity is not solely a function of actor presence, but of relational infrastructure design.

Beyond connectivity, cognitive alignment and relational cohesion are equally crucial. Sustainability-oriented intermediaries actively shape shared visions and vocabularies and cultivate trust through repeated collaboration (Theodoraki et al., 2018). In the circular context, such mechanisms are central to building commitment and enabling long-term cooperation across actors with diverging logics. Intermediaries must therefore strategically invest in ecosystem sense-making by aligning goals, bridging institutional divides, and nurturing shared identity across circular value networks.

These meso-level mechanisms are not only instrumental in supporting individual circular startups but also foundational for the development of CEEs themselves. Given that CEEs are still in the process of emerging (cf. Chapter 3), intermediaries must take on an active role in constructing the relational and cognitive infrastructure that enables circular collaboration. Their ability to align fragmented stakeholders, foster shared values,

and orchestrate cross-sectoral engagement is thus central to embedding circularity within EEs.

In conclusion, configurational influences on mechanisms and outcomes are most visible at the micro- and meso-levels. In contrast, macro-level dynamics remain largely absent from current empirical research. This represents a critical gap, especially considering that circular entrepreneurship not only redefines business practices but challenges deeply institutionalized linear assumptions in governance, infrastructure, and regulation (Kanda et al., 2020; Kirchherr, Bauwens, & Ramos, 2023). This calls for institutional embedding of circular logics, alignment of policy agendas with circularity, and the diffusion of circular transformation narratives.

The following sections reflect on these findings and elaborate their implications for EE and intermediary research as well as circular entrepreneurship.

4.6 Conclusion

This chapter systematically reviews the rapidly growing yet conceptually fragmented literature on the role of intermediaries in EEs. Based on a SLR comprising 73 studies, the analysis follows an iterative, inductive mapping process grounded in the MLP. To structure this analysis, the review identifies seven themes through inductive content analysis. These themes reflect recurring intermediary functions across system levels, including support for startup founding, startup growth, startup survival, and access to capital (micro-level), EE development (meso-level), and macroeconomic development (macro-level). A seventh, cross-cutting theme addresses the role of intermediaries in sustainability entrepreneurship, providing the analytical bridge to CE contexts.

While prior research has predominantly examined individual support mechanisms such as incubators or accelerators, broader system-level effects, such as contributions to ecosystem development and macroeconomic outcomes, have received growing attention. The field largely mirrors the rise of CE and EE scholarship but remains shaped by a European and North American bias.

Addressing the first part of the RQ, how the functions of intermediaries can be systematically mapped across micro-, meso-, and macro-levels, the study develops a multi-level framework. It identifies distinct configurations, mechanisms, and outcomes across levels of intermediary functions. At the micro-level, intermediary configurations (e.g., specialization, program design, prestige, governance type) shape mechanisms such as resource brokerage, capability-building, co-opetition, legitimacy transfer, and risk reduction. These, in turn, influence startup-level outcomes including startup founding, startup growth, startup survival, and access to capital.

At the meso-level, intermediaries' embeddedness within the EE becomes central. Mechanisms such as relational cohesion, cognitive alignment, and network orchestration contribute to EE development, fostering trust, shared purpose, and structural connectivity among ecosystem actors.

At the macro-level, intermediaries interact with the broader economic and institutional environment. Mechanisms such as aggregation (entrepreneurial density), diffusion (spillovers and network externalities), and stratification (reputational differentiation) shape outcomes related to regional competitiveness, innovation capacity, and employment creation.

The second part of the RQ, how these functions enable circular entrepreneurship, is addressed by applying the framework to insights from sustainability-oriented intermediary literature. The seventh themes of the review shows that key mechanisms identified for sustainability intermediaries, such as mission-driven selection strategies, circularity-aligned program design, and long-term stakeholder coordination, are directly applicable to circular entrepreneurship. However, while micro- and meso-level parallels are evident, macro-level dynamics in the circular context remain underexplored.

4.6.1 Future Research

Despite growing scholarly attention, the literature on intermediaries in EEs remains conceptually and empirically fragmented. Future research can build on the insights of this study.

First, expanding the conceptual boundaries of what constitutes an intermediary is a promising future research avenue. While most studies focus on incubators and accelerators, intermediation is a broader process encompassing boundary-spanning, goal translation, and multi-actor coordination. Intermediaries can take the form of platforms, networks, individual actors, or hybrid organizations (Bergek & Norrman, 2008; Roundy, 2017). Exploring these alternative configurations could provide valuable insights into cross-level coordination, particularly how actors broker knowledge and align interests across sectors and institutions.

Second, the geographic concentration of existing studies limits intermediary studies in EEs. With a strong focus on Europe and North America, the role of intermediaries in less mature EEs, particularly in the Global South, remains underexplored. Contextual factors such as political systems, regulatory environments, and institutional density likely condition how intermediaries operate and influence entrepreneurial dynamics. Future research should investigate how these functions manifest and evolve under varying ecosystem maturity and institutional settings.

Third, at the thematic level, important mechanisms such as co-opetition and risk reduction remain understudied, particularly in sustainability and circular contexts. These

mechanisms may be critical for enabling transformation-oriented entrepreneurship, especially in environments characterized by resource scarcity, uncertainty, or institutional fragmentation.

Finally, the macro-level role of intermediaries demands further theorization. While this review identifies mechanisms of aggregation, diffusion, and stratification, the agency of intermediaries in shaping macroeconomic conditions and institutional environments remains poorly understood. Intermediaries are not passive enablers, they can act as institutional agencies who influence narratives, resource flows, and legitimacy structures (Kanda et al., 2020; Kant & Kanda, 2019; Kivimaa, Boon, et al., 2019). Future work should therefore examine how intermediaries align entrepreneurial activity with broader transformation agendas, particularly in the context of circular entrepreneurship where deep-seated linearity thinking must be challenged.

4.6.2 Theoretical Implications

This study contributes to entrepreneurship and EE research in four main ways.

First, it addresses the fragmented and under-theorized nature of EE literature by synthesizing 73 studies into a multi-level framework of intermediation. While prior research has focused on isolated support structures (e.g., accelerators, incubators) in narrow geographic or sectoral settings (see e.g., Almansour, 2022; S. L. Cohen, Fehder, et al., 2019; Metcalf et al., 2021), this framework offers a systematic conceptualization of how intermediaries operate across micro-, meso-, and macro-levels.

Second, it introduces the MLP as an analytical lens to map intermediary configurations, mechanisms, and outcomes across system levels. This responds to calls for greater theorization of ecosystem heterogeneity, territorial embeddedness, and systemic interaction, the so-called ‘black boxes’ of EE research (Stam et al., 2025).

Third, by adopting an intermediary-centric view, the study extends existing work on entrepreneurial support structures and systemic intermediation (see e.g., S. L. Cohen & Hochberg, 2014; Hallen et al., 2020; Kivimaa, Boon, et al., 2019). It emphasizes the enabling mechanisms through which intermediaries shape startups and EE and institutional outcomes.

Fourth, this study bridges entrepreneurship and transformation research by analyzing how intermediary functions contribute to circular entrepreneurship. By mapping how intermediary configurations activate mechanisms that influence startup capabilities, EE and macroeconomic development, it links support structures to broader meso- and macro-level outcomes. This positions intermediaries not only as startup enablers, but as systemic actors capable of advancing CE transformation within EEs and their institutional environment.

4.6.3 Practical Implications

The findings of this study carry important practical implications for intermediary managers, policymakers, and ecosystem builders. The multi-level framework provides a structured lens through which practitioners can assess and configure their own startup support structures. By linking configurational elements to specific mechanisms, the framework helps intermediary managers understand how and under which conditions their actions translate into desired startup and ecosystem and institutional outcomes.

Furthermore, for intermediary managers aiming to support circular entrepreneurship, the framework identifies critical adjustments required to align with circularity goals. These include specializing on circularity by rethinking selection strategies based on circular impact potential, redesigning programs to accommodate long-term experimentation and systemic learning, and strengthening cross-sectoral network orchestration. In doing so, intermediaries can move beyond generic support and position themselves as enablers of circular transformation at startup and EE levels.

Besides, the frameworks provide a strategic orientation for policymakers. It can serve as a diagnostic tool to design or evaluate support infrastructures more effectively, ensuring that funding instruments and program structures are better aligned with the expected outcomes and CE goals. In particular, it highlights the importance of enabling meso-level coordination and long-term transformation capacity, areas that are often neglected in policy design focused solely on micro-level outcomes.

4.6.4 Limitations

While this SLR provides a structured synthesis of intermediary research in EEs and sustainability-oriented contexts, several limitations should be noted. First, the review focused exclusively on peer-reviewed journal articles published in English, potentially omitting relevant insights from grey literature or non-English sources, especially relevant in relatively young research fields like circular entrepreneurship (Paez, 2017) (cf. Chapter 1). Second, the thematic synthesis, though systematic, involved interpretive coding decisions that may reflect subjective judgment. Finally, the framework developed is based on secondary literature and has not been empirically validated, which may limit its applicability across different EE contexts.

The Normative Influence of Intermediaries

5.1 Introduction

Intermediaries assume a particularly important role within EEs brokering resources, offering legitimacy, and fostering learning across ecosystem levels (Hallen et al., 2020; Howells, 2006). Within this role they influence startups, and simultaneously shape broader cultural and institutional conditions that affect startup development (Kanda et al., 2020; Kant & Kanda, 2019).

Research has shown that circular startups are particularly dependent on them (cf. Chapter 2 and Chapter 3). They differentiate themselves from conventional startups by integrating circular practices into their business models from the beginning, aiming to keep resources at the highest possible value within closed loops (Suchek et al., 2022; Zucchella & Urban, 2019). This endeavor presents them with heightened barriers and challenges, such as limited access to finance, sectoral and institutional barriers, and the need to develop CBMs from scratch, because they operate in markets, funding systems, and institutional settings that remain primarily optimized for linear business models (Kanda et al., 2024).

CEEs are conceptualized not as separate ecosystem types but as emerging subecosystems embedded within broader EEs. They represent locally concentrated domains in which circular entrepreneurship, actors, and support structures become increasingly aligned. Through their embeddedness, CEEs both depend on and influence the wider EE. Intermediaries play a central role in shaping these dynamics by connecting, coordinating, and amplifying circular-oriented activities within and beyond the CEE (cf. Chapter 3).

Circular startups are supported by their embeddedness in an EE in the process of removing barriers and overcoming challenges. The intermediaries operating within these ecosystems can provide primary support, while also accelerating a CE transformation within their ecosystem and institutional environment by aligning stakeholders, closing structural gaps, and coordinating systemic change (Bergek & Norrman, 2008; Kivimaa, Boon, et al., 2019) (cf. Chapter 3).

In addition to the extant research that has established the structural and functional role of intermediaries, there is limited research focusing on their normative influence. Particularly, how they affect the values, beliefs, and behavioral orientations of the startups they

support (Klofsten et al., 2024). EE research field studies have indicated that intermediaries exert this influence over hybrid logics, anchored in institutional theory, when interacting with startups (Roundy, 2017). However, the extent to which these effects also apply to intermediaries in CEE influencing circular startups through institutional logics remains unclear. The identification of these mechanisms can enable the formulation of guardrails for intermediaries to support circular startups, thereby promoting the transformation to a CE.

To address this gap, the present study asks:

RQ4: How do intermediaries shape the values, beliefs, and behavior of circular startups in circular entrepreneurial ecosystems and promote a CE transformation?

To answer this question, the study draws on 26 semi-structured expert interviews with founders of circular startups. Taking the founders' perspective allows examining whether and how intermediaries transmit values, norms, and belief systems to emerging startups. The present study analyses the results from an institutional perspective and examines how intermediaries convey institutional logics. It builds on the concept of hybrid institutional logics, which assume that intermediaries balance and convey both community and entrepreneurial-market logics (see Roundy, 2017). This provides insights into the normative influence of intermediaries on circular startups.

In addition to this, the concept of institutional entrepreneurs is employed to establish a framework for intermediaries to implement guardrails that will support the development of circular startups and, by extension, promote CE transformation. This analysis examines how intermediaries who possess resources and interests can intentionally establish or modify institutional arrangements (Jolly et al., 2016; Maguire et al., 2004).

The integration of institutional logic and institutional entrepreneurship enables a holistic perspective on how intermediaries can influence and further promote the transformation to a CE within their ecosystem and institutional environment. On the one hand, by communicating institutional logic at the structural level and, on the other hand, by actively promoting new practices and meanings within their work.

The study proceeds as follows. Section 5.2.1 introduces intermediaries as key pillars in CEEs, followed by section 5.2.2, outlining institutional theory. Section 5.3 explains the qualitative methodology and data collection, while Section 5.4 presents the findings. The final sections discuss the implications (Section 5.5) and conclude (Section 5.6).

5.2 Theoretical Background

5.2.1 Intermediaries as a Key Pillar in Circular Entrepreneurial Ecosystems

The CE is an emerging paradigm seen by scholars as a pathway to overcome pressing environmental challenges, such as the reliability on virgin materials. It is seen as a way of operationalizing sustainable development (Geissdoerfer et al., 2017). Within the entrepreneurial landscape, this paradigm has stimulated the rise of circular startups, startups that develop innovative business models to enact circular principles. Acting as catalysts for a transformation towards a CE, these startups introduce new technologies, services, and models that prioritize resource efficiency and waste reduction (Henry et al., 2020; Kanda et al., 2023). Positioned within broader innovation ecosystems, they challenge entrenched linear production systems and contribute to environmental and economic transformation (Alka et al., 2024).

Circular startups enact CBMs to exploit opportunities in what Zucchella and Urban (2019) call the ‘CE domain.’ CBMs are defined as “business models that are cycling, extending, intensifying, and/or dematerializing material and energy loops to reduce resource inputs and minimize waste and emission leakage” (Geissdoerfer et al., 2020, p. 7).

Despite their potential to push a CE transformation, circular startups face persistent barriers and challenges: the liability of newness and smallness, limited access to finance, sectoral and institutional barriers, and the need to develop CBMs from scratch (Kanda et al., 2023). While generally omnipresent for all startups, these barriers are amplified because circular startups operate within ecosystems still predominantly structured around linear production and consumption models. Consequently, they must simultaneously experiment with novel technologies, educate markets, and navigate policy and funding frameworks that are not yet adapted to circular innovation (van Rijnssoever, 2022).

EEs provide the structural context for circular startups to overcome these challenges and barriers. EEs are “a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (Stam & Spigel, 2016, p. 1). They are territorially embedded, structurally heterogeneous systems in which entrepreneurship emerges through interdependent relationships among policy, finance, culture, human capital, markets, and intermediaries (B. Cohen, 2006; Isenberg, 2011; Theodoraki & Messeghem, 2017; Thompson & Purdy, 2024).

Within this broader structure, CEEs can be understood as subecosystems of EEs in which circular principles increasingly shape actor relationships, norms, and resource flows (cf. Chapter 2). CEEs are therefore not separate ecosystem types but rather develop as specific, interest-driven formations embedded within and connected to larger EEs. Through this embeddedness, CEEs both depend on the surrounding EE infrastructure and, at the same time, have the potential to influence it, for example by diffusing

circular norms, reshaping support practices, and introducing new institutional arrangements.

Within these intermediaries that operate ‘in between’ others play a pivotal role in bridging gaps in knowledge, resources, or communication for circular startups (Howells, 2006). Intermediaries can be individuals, organizations, platforms, or networks that perform cross-level work. Their influence unfolds across multiple levels of the EE: on the micro-level, they provide startups with tailored support, knowledge, and legitimacy; on the meso-level, they shape the structure and connectivity of the EE itself; and on the macro-level, they contribute to the diffusion of new cultural meanings, norms, and policy frameworks that enable the CE to scale (Bergek & Norrman, 2008; Roundy, 2017; Theodoraki & Messeghem, 2017) (cf. Chapter 4).

Existing research has adequately established this structural and functional role of intermediaries. However, research focusing on their normative influence is lacking. The extent to which intermediaries influence the values, beliefs, and behavior of startups they support remains underdeveloped (Klofsten et al., 2024). It is evident that these startups are exposed to the values, beliefs, and behaviors of intermediaries. Through interaction with these entities, they are equally influenced by them. It has been demonstrated that, within the context of CEEs, intermediaries constitute one of the most prominent actor groups in German CEEs, cf. Chapter 2. This observation underscores their pivotal normative influence on circular startups within CEEs. Nevertheless, research on whether and how this normative influence is exerted on circular startups remains limited. Identifying these mechanisms has the potential to facilitate the development of guardrails for intermediaries, with the aim of providing support to circular startups. This, in turn, can contribute to the promotion of a transformation towards a CE.

While previous research conceptualized intermediary configurations, mechanisms, and outcomes functionally across micro-, meso-, and macro-levels, explaining what intermediaries do to enable entrepreneurship (cf. Chapter 4), the present study extends this view by examining how these mechanisms are institutionally enacted. Adopting an institutional lens thus shifts the analytical focus from systemic functions to the underlying meaning systems through which intermediaries shape circular startup behavior and thus CE transformation within their ecosystem and institutional environment. This study, therefore, applies institutional theory to explore how intermediaries shape circular entrepreneurship through institutionalized norms, values, and belief systems, which is elaborated in more detail in the next section.

5.2.2 Institutional Theory in the Context of Entrepreneurial Ecosystems

Institutional theory explains how institutions shape organizational behavior through shared rules, norms, and beliefs (DiMaggio & Powell, 1983; Thornton et al., 2012). It highlights

that organizations do not operate in isolation but adapt to the expectations of their institutional environments, seeking legitimacy by aligning with the prevailing norms and value systems (Arranz & Arroyabe, 2023). As one of the most influential perspectives in management and entrepreneurship research (Alpsahin Cullen, 2023; Bruton et al., 2010; David et al., 2019; Meyer & Höllerer, 2014), institutional theory is particularly suitable for understanding how intermediaries influence startups, not only through tangible resources but also through the diffusion of institutionalized meaning systems.

A central framework here guiding intersubjective interactions are so-called ‘logics’, which are “socially constructed, historical pattern of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio, 1999, p. 804).

Institutional logics thus guide and constrain organizational action (Friedland & Alford, 1991), shaping how actors interpret their environment and legitimate their behavior (DiMaggio & Powell, 1983). Seven generic logics - family, community, religion, state, market, corporation, and profession - form the core meaning systems through which institutions operate (Thornton et al., 2012). Because multiple logics often coexist, organizations must navigate institutional complexity, selectively combining or prioritizing competing rationalities (Alpsahin Cullen, 2023; Besharov & Smith, 2014).

Within sustainability-oriented entrepreneurship, prior research has shown that entrepreneurs frequently face the challenge of reconciling a sustainability logic, grounded in social and environmental responsibility, with a profitability or entrepreneurial-market logic, a domain-specific manifestation of the broader market logic oriented toward opportunity, growth, and financial performance (De Clercq & Voronov, 2011; Spence et al., 2011; Stubbs, 2017; York et al., 2016). Navigating between these competing logics is essential for gaining legitimacy in emerging sustainability fields. In this context, studies have highlighted that intermediaries play a decisive role in shaping how these logics are interpreted and combined.

Gregori et al. (2019), for instance, demonstrate that such support organizations often follow an entrepreneurial-market logic themselves, thereby influencing entrepreneurs’ orientation toward market-compatible sustainability practices. However, they can also act as translators, helping entrepreneurs align sustainability ambitions with business imperatives (Spence et al., 2011). It is further elaborated, that intermediaries within EEs are typically hybrid actors that embody more than one logic (Battilana et al., 2009; Roundy, 2017; Tracey et al., 2011). Their support extends beyond resource provision to the transmission of institutional logics across the ecosystem, socializing startups into shared norms, routines, and belief systems.

Two dominant logics are particularly salient in this context: the community logic and the entrepreneurial-market logic. The community logic emphasizes collective well-being, reciprocity, and shared purpose. Legitimacy stems from trust, solidarity, and the pursuit of collective benefit over individual gain (Georgiou & Arenas, 2023; Reay et al., 2015). Intermediaries enact this logic by fostering social cohesion, creating spaces for interaction, organizing networking events, and encouraging peer-learning that embeds startups in a sense of belonging and mutual support (Roundy, 2017).

By contrast, the entrepreneurial-market logic centers on innovation, competition, and market performance (De Clercq & Voronov, 2011; Gregori et al., 2019). Rooted in market rationality, it prioritizes growth, scalability, and financial viability. Intermediaries convey this logic through activities such as mentoring, investor events, and pitching sessions that socialize entrepreneurs into performance-oriented behaviors (Crişan et al., 2021; Pauwels et al., 2016). Through these interactions, they expose startups to narratives of entrepreneurial success and failure that reinforce market-driven values (Moritz et al., 2022).

Taken together, this body of research underscores that intermediaries are not neutral facilitators but active carriers of institutional meaning. They influence how entrepreneurs interpret and reconcile sustainability and market-oriented demands, effectively shaping the institutional environment in which sustainable startups emerge. Hybrid intermediaries, therefore, serve as translators of institutional logics; actors that make competing or complementary value systems tangible to startups. In doing so, they not only diffuse norms and practices but also demonstrate how community and entrepreneurial-market logics can coexist within an EE (Roundy, 2017). Despite the valuable insights provided by research in the field of sustainability-oriented entrepreneurship, this research has not yet been examined in the context of a circular startups.

In this study, the focus lies not on observing intermediaries directly but on examining their institutional imprint on circular startups, that is, how startups perceive, experience, and internalize the logics transmitted through their interactions with intermediaries. The analysis thus centers on the institutional transmission, exploring how values, norms, and behavioral templates travel through support structures and become embedded in circular startup practices and narratives. Building on the multilevel intermediary mechanisms identified in Chapter 4, this approach interprets practices such as networking, mentoring, and capability-building not only as mechanisms to produce outcomes but as institutionalized carriers of meaning. In doing so, it bridges structural and cultural explanations of intermediary influence, linking the functional mechanisms of EEs with the institutional logics that give them legitimacy and direction.

While institutional logics provide a structural lens, the concept of institutional entrepreneurship introduces an agency perspective, highlighting how actors endowed with

resources and interests intentionally work to create or transform institutional arrangements (Garud et al., 2002; Jolly et al., 2016; Maguire et al., 2004; Tracey et al., 2011). This concept of institutional theory elucidates the actors who act and the characteristics, resources, positions, or strategies these actors possess that render them institutional change agents. The purposive institutional work of these actors can lead to the “creating, maintaining and disrupting [of] institutions” (Lawrence & Suddaby, 2006, p. 215). The nature of the work in question is subject to variation, with potential examples including interaction work, idea work, boundary work, or cultural work (see Phillips & Lawrence, 2012, for more examples). The application of this concept to intermediaries operating within CEEs reveals potential avenues for future institutional work that can promote the diffusion of circular principles from CEEs into the broader EE, thereby establishing a framework of guardrails for their own conduct (Tracey et al., 2011).

Combining the institutional logics with institutional entrepreneurship both allows for an integrated understanding of how intermediaries shape circular startup development and circular practices and how they could promote the CE transformation through institutional work that fosters new practices and meanings. The institutional logic covers the structural perspective, by intermediaries transmitting institutional logics to circular startups, whereas the institutional entrepreneurship and work lens shows action-oriented potential of intermediaries as institutional entrepreneurs.

5.3 Methodology

To address the RQ4, this study follows a qualitative design. 26 semi-structured expert interviews were conducted with founders of circular startups who have interacted with intermediaries. The analysis draws on qualitative content analysis (Mayring, 2014), which is well-suited for identifying and interpreting patterns and meanings within a small corpus of textual data (Rudolph, 2018).

Given that recent EE research highlights the hybridization of intermediaries and their role in transmitting institutional logics, a deductive category development approach was applied. Following Mayring (2014) and Gläser and Laudel (2010), a coding guide was derived from the theoretical framework outlined in the Institutional Theory chapter (cf. Section 5.2.2). Specifically, the two institutional logics, community and entrepreneurial-market, served as initial analytical categories. These logics were interpreted as institutionalized enactments of intermediary mechanisms previously identified in the multilevel analysis of EEs (cf. Chapter 4). Each category included a main code, a definition, and typical anchor examples to distinguish between them. The coding guide was first developed from theory and then iteratively refined during a pilot coding phase to ensure contextual fit and analytical precision (Mayring, 2014). The coding guide is depicted in Table 5.1.

Table 5.1: Coding Guide for Circular Startup Interviews

Main Code	Definition	Anchor Examples
Community Logic	Reflects collective well-being, reciprocity, solidarity, and shared purpose. Legitimacy arises from trust and cooperation among ecosystem participants. Intermediaries enact this logic through activities that foster belonging and social cohesion.	Mentions of mutual support, trust, or altruistic behavior (“fellow startup friendship where you support each other,”); descriptions of networking events (“I don’t think a week has gone by without an event where you could get to know other startups”), peer-learning, or community meetings; expressions of belonging or shared identity.
Entrepreneurial-Market Logic	Centers on innovation, competition, efficiency, and growth. Legitimacy stems from market performance and value creation. Intermediaries convey this logic by promoting entrepreneurial skills, competitiveness, and investor readiness.	Mentions of visibility effects (“a seal of quality,”); focus on mentoring sessions, investor events, or entrepreneurial workshops (“We are both mechanical engineers - sales, marketing: no idea.”) emphasizing profitability and innovation.
Navigating Hybrid Logics	Intermediaries embody and balance both logics. They demonstrate how both logics can coexist in EEs.	Statements describing experienced tensions between growth imperatives and circular values (“the startup capital model doesn’t really work for us”); observations of integration of relational and performance elements; reflections on sequencing of mechanisms and sustaining hybrid practices.

In order to understand the normative influence of intermediaries, the aim of the analysis was not to observe intermediaries directly, but to examine their perceived influence by startups. Accordingly, the focus was placed on how founders described, experienced, and internalized the logics conveyed through their interactions with intermediaries.

Data Collection and Sample.¹ To capture diverse perspectives while ensuring consistency, the sample consisted exclusively of founders or co-founders of circular startups; in only two cases, the founder wasn’t available, but the managing director (E16) and the business developer (E12) were. A systematic sampling process was employed to increase representativeness (Fahrmeir et al., 2023). Startups were included if they met the following criteria at the time of data collection: 1) younger than ten years; 2) between 3 and 250 employees; 3) aiming for significant increase in turnover (European Commission, 2003); 4) categorized into one of the circular startup archetypes defined by Henry et al. (2020); and 5) actively associated with at least one intermediary organization. These criteria were designed to ensure that startups are circular and have interacted with an intermediary in the EE.

¹ The data was acquired during two master theses, supervised by the author; see Biller (2025) and Otten (2024).

Accordingly, potential interview partners were identified by screening the websites of major German intermediary organizations, identified in Chapter 2, such as Axel, Baden-Campus, CircularRepublic, CirculRise, Circular Valley, CyberLab, Germany Startup Accelerator, Impact Hub, and SmartGreen.

The experts were contacted via the social network platform LinkedIn, informed about the research background, and asked to participate in the interview. Upon consent, interviews were conducted via Microsoft Teams or Zoom between January and October 2024. Each interview lasted on average 40 minutes and was audio-recorded with permission either via consent form and or right at the beginning of the interview by announcing to accept the recording. All recordings were transcribed verbatim, anonymized, and translated into English when quoted. Table 5.2 provides an overview of the interviewees.

Table 5.2: Overview of the 26 Circular Startup Founder Interview Partners

Expert Code	Type of Circular Startup	Interview Duration
E1	Nature-based	45:38 min
E2	Waste-based	38:26 min
E3	Waste-based	44:50 min
E4	Waste-based	31:57 min
E5	Service-based	38:59 min
E6	Service-based	43:32 min
E7	Design-based	41:32 min
E8	Design-based	1:03:53 min
E9	Waste-based	38:08 min
E10	Design-based	44:43 min
E11	Nature-based	35:31 min
E12	Design-based	25:48 min
E13	Design-based	34:01 min
E14	Waste-based	23:38 min
E15	Waste-based	37:03 min
E16	Platform-based	21:04 min
E17	Design-based	29:58 min
E18	Design-based	42:15 min
E19	Design-based	27:39 min
E20	Waste-based	31:16 min
E21	Platform-based	31:08 min
E22	Platform-based	35:41 min
E23	Service-based	48:44 min
E24	Service-based	52:23 min
E25	Service-based	43:43 min
E26	Nature-based	39:29 min

A semi-structured interview guide ensured consistency across interviews while allowing flexibility for follow-up questions (Gläser & Laudel, 2010). The guideline comprised

six sections: characterization of the EE; forms of interaction between the startup and its intermediary; perceived influence of intermediaries (resources, mentoring, events, peer-learning); challenges and barriers encountered including intermediary support in overcoming these barriers; and desired future roles and improvements of intermediary support. This structure enabled a comprehensive exploration of both the current and the desired influence of intermediaries, including the perceived transfer of values, norms, and learning processes.

After recording the interviews, the 26 interviews were transcribed and anonymized for the following analysis. Standard orthography was followed for transcription, and non-verbal expressions were omitted. Furthermore, incomprehensible passages were marked (Gläser & Laudel, 2010). Most of the interviews were conducted in German.

Data Analysis. The data were analyzed using qualitative content analysis according to Mayring (2014). In line with the deductive category development, the two institutional logics derived from theory guided the initial coding process. The coding framework identified statements reflecting community or entrepreneurial-market orientations in founders' descriptions of their interactions with intermediaries. Building on the multi-level intermediary mechanisms identified in the previous analysis, these logics were used to interpret how structural mechanisms were institutionally enacted and experienced by startups. During iterative reading and memoing, additional subcodes were inductively generated to capture nuances and emergent aspects, particularly related to circularity and learning processes.

The coding was conducted manually and iteratively revised to enhance reliability and theoretical sensitivity. The results allowed tracing what institutional values and norms are transmitted through intermediaries and internalized within startups' narratives and practices, and how they can enhance this transmission.

5.4 Institutional Logics of Intermediaries in Circular Entrepreneurial Ecosystems

The analysis shows how circular startups experienced and internalized two dominant institutional logics, the community logic and the entrepreneurial-market logic, as transmitted through their interactions with intermediaries: a community logic emphasizing collective orientation and mutual support, and an entrepreneurial-market logic emphasizing performance, growth, and competitiveness. A third, cross-cutting theme captures how startups perceived tensions and hybrid practices between both logics.

5.4.1 Transmission of the Community Logic

The community logic is transmitted primarily through mechanisms that foster interaction, trust, and collective belonging among the EE participants. Across cases, founders consistently described intermediaries as social spaces that enable collaboration and exchange rather than mere providers of technical or financial support, as shown in Table 5.3.

Table 5.3: Mechanisms Through Which the Community Logic is Transmitted

Empirical Theme	Institutional Interpretation	Mechanism of Transmission	Count
Networking	Building social capital and trust-based ties in the ecosystem	Networking events, demo days, final forums	26
Collaborative partnerships	Shared purpose, collective goals	Joint projects and cross-startup collaborations	4
Shared spaces	Institutional embedding and sense of belonging	Shared offices and co-working spaces	10
Peer-learning	Mutual learning, reciprocity, openness	Informal exchanges, cohort discussions	17
Shared language	Collective identity around CE values and common challenges	Networks of actors connected by CE and common problems	4

Networking emerged as one of the most salient expressions of community-oriented practices, mentioned by every interviewee. Across cases, founders portrayed intermediaries not merely as service providers but as ‘social infrastructures’ that facilitated relational embeddedness and trust within the CEE. Access to networks was, for example, consistently cited as a decisive factor for participating in accelerator or incubator programs:

“And that’s why I would definitely base the decision about which accelerator to choose entirely on the network behind that accelerator” (E19).

For many founders, the perceived value of intermediaries lay in their ability to connect heterogeneous actors, other startups, research institutions, political actors, and established industry partners, into a shared space of exchange. One interviewee highlighted this brokerage role vividly:

“[Name of intermediary] has been a very, very good platform for building a network, and I always like to describe it as follows: The more you talk to people from the industry, or perhaps from related industries, the more doors open, and [name of intermediary] has made that possible for us. Through [name of intermediary], we have gained many contacts to companies and individuals who could be potential problem solvers for us” (E5).

Networking opportunities were frequent and perceived as central to the experience, as one founder put it,

“I don’t think a week has gone by without an event where you could get to know other startups” (E6).

These repeated encounters fostered both weak and strong ties that frequently persisted beyond the duration of the programs. Several founders described their networks as a collective of actors connected by shared challenges and a common interest in circularity.

Overall, the network engagement is seen as a mechanism that creates repeated opportunities for exchange and relational embeddedness among startups and other EE actors. It also lays the foundation for collaborative partnerships, where shared challenges and goals translate into concrete joint projects, as discussed in the following section.

Collaborative partnerships were mentioned by 4 founders as the second mechanism through which the community logic is enacted. These partnerships often developed as an extension of networking activities, providing a more concrete channel for cooperation and collective value creation. Founders described collaborations both within their cohorts and with external firms encountered through intermediary initiatives.

Such partnerships were described as opportunities to ‘leverage synergies’ and pursue joint projects that combine complementary capabilities. One founder noted:

“We ultimately found two of our partners through [name of intermediary], with whom we applied for [a] funding project” (E5).

Founders consistently emphasized that these partnerships were grounded in a shared vision of circularity and systemic change.

In this sense, partnerships are experienced by circular founders as mutually reinforcing and a joint pursuit of circularity rather than competitive differentiation.

Shared spaces. Physical co-location further contributes to building community-oriented ties. The founders described shared offices and co-working environments as physical points of convergence where they could meet informally, exchange experiences, and maintain connections beyond scheduled events with their peers. Some intermediaries even extended access to such spaces after the formal end of their programs:

“At the incubator, [name of intermediary 1], we were also provided with workspace, which was really cool. During the program and for a short period afterward, we had access to these spaces. At [name of intermediary 2], we were also given workspace, I believe even for half a year after the program ended” (E26).

At the same time, interviewees also noted limits to the utility of shared spaces. For some founders, co-working offices were less relevant because their teams were based elsewhere or already had their own premises. As one founder puts it:

“You can go there too. But we’re much too far away” (E1).

Others pointed out that standard office facilities did not meet the needs of circular startups, particularly those requiring laboratories, workshops, or storage for prototypes and materials. Some intermediaries partially compensated for the lack of suitable facilities by brokering access to external infrastructures. One founder explained how connections made through the intermediary enabled laboratory collaboration with a local university:

“We wouldn’t have been able to get this laboratory, but we got in touch with the University of Wuppertal. [...] And that’s what ultimately happened through the [intermediary]” (E5).

Overall, founders described shared spaces as important meeting points that enable informal exchange and connections across program cohorts. Even when these facilities were not used daily, their availability was perceived as a valuable opportunity to meet, collaborate, and maintain contact with peers and partners.

Peer-learning. Building on the relational proximity established through shared spaces and networking activities, peer-learning emerges as another central expression of the community logic. Founders repeatedly emphasized the value of reciprocal exchange among startups, describing how interactions with peers fosters the comparison of business models, anticipation of challenges, and discovery of alternative solutions. As one founder explained,

“Hey, they’re doing the same thing as us, they’re at the same stage as us, they have the same questions, and yes, they’ve already solved it” (E2).

Others highlighted the generosity and openness that characterized these exchanges:

“Other startups have been very generous with their knowledge and experience. [...] I mean, at the end of the day, I think every startup in the world faces similar challenges, especially startups in the CE or sustainability sector” (E7).

Several interviewees portrayed these relationships as a form of collective friendship, marked by solidarity:

“It’s a fellow startup friendship where you support each other” (E10).

Startups actively invested time and effort to help one another. The willingness to share scarce experiential knowledge was seen as particularly important in the still nascent field of circular entrepreneurship, where joint learning compensates for the absence of established roadmaps or industry standards.

In sum, founders described peer-learning as a process of mutual exchange and support that fosters collective friendship. Through these interactions, they co-create knowledge and develop a shared sense of belonging around circular challenges and goals.

Shared language. Beyond peer-learning, founders articulated a growing sense of shared identity anchored in the language and values of the CE. The repeated use of similar terms and narratives signals a convergence in how participants frame their work and purpose. As one founder observed,

“All parties are really entrenched in the language of the CE. We can move quickly with discussions and ideas” (E15).

At the same time, some interviewees reflected on the limits of this shared discourse. The language of circularity was perceived by a few as abstract or overly technical, lacking emotional resonance beyond the startup community itself:

“Circularity is like this: what does it mean? It sounds very abstract, somehow complex. [...] It’s a very emotionless term for many people, very neutral, very technical” (E10).

Founders rarely articulated shared values explicitly, but their accounts indicate that such values emerged through repeated participation and continued engagement. Importantly, it was through these ongoing interactions that the shared language of the CEE was reinforced and reproduced. Several described staying engaged with intermediaries after the official program ended, for instance by returning as mentors or attending later events.

“I’m still connected to [name of intermediary] today. I was there again this year and exhibited a little, got to know other startups – it’s a great story” (E1).

These observations show that shared language functions as a core mechanism of the community logic within the CEE. It not only accelerates coordination and mutual understanding but also anchors a sense of shared identity and belonging that persists beyond individual programs. Through continued interactions founders collectively reproduce the linguistic and relational fabric of the CEE, sustaining its community-oriented character over time.

In summary, the transmission of the community logic unfolded through distinct but mutually reinforcing mechanisms that combined relational practices with shared meaning structures. Networking helped build social capital and trust-based ties, while collaborative partnerships illustrated how collective goals and joint problem-solving became embedded in the CEE. Peer-learning fostered mutual support and reciprocal knowledge exchange. Shared spaces enabled everyday interaction and strengthened participants’ sense of belonging. Finally, the emergence of a shared language around CE values and challenges contributed to a growing sense of collective identity.

5.4.2 Transmission of the Entrepreneurial-Market Logic

In parallel to community-oriented practices, intermediaries also transmit a distinct entrepreneurial-market orientation. As summarized in Table 5.4, founders described how intermediary initiatives encourage them to operate according to market-based principles, focusing on visibility, investor access, mentoring, and entrepreneurial skill building.

Table 5.4: Mechanisms Transmitting the Entrepreneurial-Market Logic

Empirical Theme	Institutional Interpretation	Mechanisms of Transmission	Count
Visibility	Establishing legitimacy and market value through exposure and recognition	Public relations, media contacts, graduation forums	21
Investor Access	Translating market logic via access to capital	Investor forums, pitch events, direct introductions	19
Mentoring	Teaching general business knowledge and entrepreneurial habits while conveying a mindset focused on performance and efficiency	One-on-one mentoring, expert guidance, motivational support	24
Capability-Building	Teaching market and management knowledge as the basis for competitiveness	Learning sessions and workshops	21

Visibility emerged as one of the strongest motivators for engaging with intermediaries. Founders consistently emphasized that participation in accelerator or incubator programs increases their exposure to relevant audiences and enhances their perceived legitimacy (n=20).

“Visibility was a big factor, definitely. So pitching here in front of an audience and then being noticed by some, well, relevant people and then getting into conversation with them” (E4).

Startups understood visibility not only as a communication outcome but also as a strategic market signal that could attract investors, partners, and customers. As E2 explained, intermediaries *“can act as a seal of quality.”* Likewise, E26 described how association with a well-known program enhances credibility and access:

“I would also say that the [name of the intermediary] is definitely the most prestigious. If you can say, ‘Hey, I’m currently in that accelerator, and I know this and that person’, it’s much easier than blindly reaching out to a VC”.

Intermediaries actively facilitate such visibility by maintaining connections with media outlets and organizing public events such as demo days and investor forums. These activities were perceived as opportunities for gaining external recognition and signaling growth potential:

“The more often you appear somewhere, the more you will be remembered”
(E1).

Even after the programs ended, founders noted lasting effects of these visibility mechanisms, such as invitations to speak at events or ongoing media attention. However, several interviewees also highlighted frustrations when visibility failed to translate into tangible investor engagement.

Despite such uneven visibility effects, most founders viewed visibility as a crucial asset that improves their market position and enhances their legitimacy in the eyes of external stakeholders.

Access to investors represents a central, yet inconsistently realized, channel through which the entrepreneurial-market logic is transmitted. 19 founders highlighted this aspect. While some intermediaries successfully facilitated valuable introductions, others offered limited or no contact with investors. As one founder recalled,

“And yes, the next day on the way back, I stayed in a hotel, had a nice pizza at the accelerator and then the next day [name of investor] called me” (E1).

However, founders also described significant structural limitations: too few investors, limited sectoral fit, or mismatched expectations between circular and conventional business models. Hardware-oriented startups stressed that their high capital requirements were incompatible with the investor profiles typically connected to intermediaries. In this sense, investment support was less relevant not because capital was unimportant, but because the available investors were structurally unable to meet their needs:

“As a hardware recycling startup, we had relatively high capital requirements even in the early stages [...] and that’s why the investor component was less relevant for us, simply because the ticket sizes didn’t match” (E2).

In other cases, founders expressed disappointment when expected investor interactions failed to occur, reflecting a gap between symbolic visibility and actual market engagement:

“The startups were placed in a separate room [...] the investors had to come to us, which they didn’t” (E11).

Several interviewees linked these shortcomings to the nascent stage of intermediary structures in Germany, emphasizing the need for stronger international networks and greater investor diversity to ‘compete internationally’. Yet, beyond structural issues, deeper normative tensions surfaced. Some founders questioned whether conventional startup capital models, based on rapid growth and short-term returns, are compatible with the regenerative ethos of circular entrepreneurship:

“I mean as [circular] entrepreneurs, the VC model is broken. It doesn’t really work for us. It’s only focused on profit maximization. [...] But we’re really looking for the cultural change with the stable company that can help lead the way. [...] So we’re looking for smaller investments which isn’t always necessarily attractive to VC’s” (E15).

Others deliberately distanced themselves from this logic altogether:

“We didn’t need outside capital. And every time you take outside capital, you also give up a certain amount of control [...] That’s why we didn’t take advantage of this opportunity” (E5).

Overall, some founders reported that investor access reinforced legitimacy and market positioning; for others, it exposed the limits of a growth-oriented model within a sustainability-driven field.

Mentoring represents another crucial aspect through which intermediaries convey entrepreneurial-market norms, mentioned by 24 interviewees. Founders consistently emphasized the value of structured guidance and access to experienced practitioners who can help navigate business challenges and accelerate growth.

Most programs assigned dedicated mentors who supported startups through one-on-one sessions, providing targeted advice:

“There was a team from [name of intermediary] [...] who accompanied us for six months and also clarified all organizational matters” (E6).

The mentors were mainly matched to the startups according to their expertise, ensuring access to applied business and sectoral knowledge. As one founder explained,

“So either it’s experts from larger corporations who are able to provide good support on specific topics, or SMEs where the owner is involved in the topic or is otherwise available to provide support” (E2).

The breadth of mentorship, having multiple mentors with complementary backgrounds, further enhances learning and adaptability:

“If you don’t have a good mentor, the whole accelerator doesn’t really help. [...] We had three or four mentors [...] two were always there, while others joined for specific topics they were knowledgeable about” (E17).

Founders highlighted that access to specialized expertise significantly accelerates problem-solving and business development:

“One of the most important things, [...], was having specialists in specific areas. [...] A lawyer who knows about patents or who is experienced with startups. [...] This specialized knowledge and the ability to ask follow-up questions is really valuable” (E23).

Nonetheless, the founders also reported on the importance but partial absence of suitable mentors. Startups with highly specialized technological models reported that mentors often lacked the necessary domain-specific expertise to provide meaningful guidance. In certain cases, the subjects of their business ideas are so novel that no expertise has yet been developed in this field:

“There are few experts on the topic we are dealing with, and none in [name of intermediary]” (E1).

Overall, founders described mentoring as one of the most valuable but also most volatile elements of their experience. While many emphasized the benefits of targeted advice and motivational support, others noted that the usefulness of mentoring depends strongly on the mentor’s specific expertise and its fit with the startup’s stage of development.

Capability-Building. Learning sessions and workshops further operationalize the transmission of the entrepreneurial-market logic by teaching business fundamentals, financial management, and marketing strategies. Many founders entered intermediary initiatives with strong technical expertise but limited business experience. As one noted,

“When you start out as a startup, you develop a product. We are both mechanical engineers - sales, marketing: no idea” (E8).

Intermediaries respond to this gap by providing structured training on topics such as cash-flow planning, market analysis, customer segmentation, employee management, self-presentation, and tax management. These sessions were particularly valued by less experienced founders, who emphasized the accessibility and breadth of the content:

“Especially when you’re just starting out, a generalist accelerator with many workshops on different topics led by experts who are actually doing or have done it is incredibly valuable. Ideally, these experts would be startup founders in the same industry or people who are really skilled in their field” (E24).

Some founders, however, reported on specific input sessions targeted towards circularity, which they found particularly useful given the distinct mindset and challenges of circular entrepreneurship:

“The Impact measurement course, training that we’ve had [...] is extremely important. [...] [Circular] entrepreneurs are different. It’s great to be in any type of program where you’re engaging with multiple [circular] entrepreneurs because we all think [...] differently [...] than the standard entrepreneur” (E15).

But at the same time, several founders noted that the training content in intermediaries was not adequately adapted to the specific needs of circular startups, as one founder puts it:

“Honestly, I have to say that even with the sustainability-focused supporter, I can’t really remember any sessions [on sustainability]. Either there weren’t any, or they were so insignificant that they didn’t stick to my memory at all” (E22).

Even the material given to the circular startups needed adaptation to their specific needs:

“We were given a template for a financial plan, and then it was provided to one company that was B2B, one that was B2C, and another with a subscription model for software. So, it wasn’t really suitable for anyone, and everyone had to modify it a bit. It was a nice attempt, but it wasn’t exactly what you would need, I would say“ (E23).

Similar, more advanced participants criticized the content as overly basic and repetitive:

“Of course, it was Business Model Canvas and Value Proposition Canvas to no end. You get sick of it - it’s something you’ve done multiple times already” (E25).

Founders expressed mixed views on the learning sessions. While less experienced participants appreciated the introduction to key business topics, more advanced startups often found the content too basic and insufficiently tailored to their needs. Several interviewees emphasized the importance of adjusting workshop formats to the specific challenges of circular startups and to different stages of startup development.

Overall, the entrepreneurial-market logic transmitted through intermediaries equips founders with legitimacy, visibility, and access to critical EE actors, alongside strategic and managerial tools required for market participation. These dynamics unfold through distinct mechanisms: visibility work that raises recognition and signals credibility to external stakeholders; investor access that links startups to finance-oriented actors following conventional growth expectations; mentoring and capability-building that transmit market-oriented templates and skills.

However, tensions emerge where conventional market norms conflict with circular values or when startups perceive missing investor and mentor alignment with their sustainability goals. These frictions point toward the coexistence and potential interplay of market- and community-oriented practices as well as the circularity of the startups.

5.4.3 Navigating Hybrid Logics

While community and entrepreneurial-market logics appeared as distinct patterns of meaning and practice, founders’ accounts also revealed multiple instances where these

logics intersected or conflicted, and where they collided with the circular orientation of the startups. The following section examines how circular startups navigate these tensions and overlaps across different institutional logics.

Experienced Tensions. The interviewed founders frequently described moments where the entrepreneurial-market logic and the circular orientation of their startups came into tension.

The most pronounced conflicts arose around investor access, where the market logic's emphasis on growth capital collided with the circular ideal of sufficiency and autonomy. E8 explained that conventional startup-capital models were incompatible with their long-term sustainability goals:

"When it comes to acceleration, I'm torn. Does a company always have to grow? I mean, if we grow, that means more packaging, which usually has synergy effects, right? Does it make sense to expand quickly?"

Others highlighted the structural bias of accelerator networks toward digital, low-capital startups, illustrating how institutional templates of entrepreneurship still reflect a linear market rationality rather than circular business realities.

Similar tensions appeared in capability-building and mentoring activities, which often reproduced standardized entrepreneurial scripts. While these mechanisms transmit the entrepreneurial-market logic of efficiency and scalability, they fail to accommodate the diverse experience levels, and technical and sector-specific challenges of circular innovation. In this sense, the very mechanisms designed to professionalize startups also reveals the limits of transferring linear market assumptions into circular contexts.

Integration. Founders also described several situations in which community and entrepreneurial-market logics intertwined rather than standing in opposition. Networking activities, for example, strengthened relational cohesion while simultaneously enhancing visibility and investor access. Affiliation with a well-known intermediary converted collective belonging into symbolic market legitimacy, demonstrating how social embeddedness can serve market-oriented goals. As one founder described:

"I think we get more visibility [...] now than we did back then. [...] They do a really good job with the closing event in the city hall, which is super chic, completely full, and attended by important people." (E16)

Beyond traditional business collaborations, several interviewees highlighted the intermediaries' active role in co-developing applications and experimenting with potential uses for their solutions. As one founder put it:

"It's more like learning together, so we don't learn that much from [name of the intermediary]. It's more about where we could use the products, so

it's more like a permanent brainstorming session about where we can do something. [...] So we learn together where we can use our materials” (E1).

This form of cooperation blends communal modes of working, joint exploration, openness, shared experimentation, with a market-oriented aim: identifying viable applications and business opportunities.

Peer-learning was also described as a process of reflexive comparison, helping founders to challenge their assumptions and rethink strategic choices. As one founder explained,

“In the rounds, you always have the [...] comparison with other startups. [...] You always look at what they are doing, how far they are, then you group yourself in. Maybe you start to think: Hey, they're doing the same thing as us, they're at the same stage as us, they have the same questions, and yes, they've already solved them. So, of course, you need to exchange ideas with each other in order to understand how others approach things.” (E2)

While the form of this interaction reflects a community logic, rooted in mutual learning and relational embeddedness, the function it serves is more closely aligned with an entrepreneurial-market logic, as these reflexive comparisons supported strategic decision-making. This illustrates a hybrid enactment in which community-oriented practices are mobilized to advance entrepreneurial reasoning.

Mentoring displays another example of integration of both logics. While structured to develop business competence and goal-oriented behavior, these relationships also evolve into trust-based exchanges that extend beyond program boundaries. As one founder described:

“Yes, that still works today. When I meet one or two of the [former mentors], we talk about current issues and see if there are any points of contact; so that's another confidence-building measure of this accelerator.”

In this way, mentoring acts as a hybrid mechanism through which social embeddedness and market orientation can be pursued simultaneously.

Sequencing. Beyond integration, founders' accounts suggest that the salience of different logics shifts over time. Early-stage interactions with intermediaries were shaped primarily by mechanisms such as entrepreneurial capability building and shared spaces, which helped compensate for limited managerial experience and infrastructure, and fostered community belonging. As startups matured, however, the emphasis moved toward investor access, visibility, and mentoring. These later-stage mechanisms responded to growing needs for capital, credibility, and external recognition. As E22 observed:

“The later a startup is in its development stage, the more individual the topics become that are acutely important for that startup. The focus then clearly shifts towards one-on-one mentoring, where the most value is gained.”

Taken together, the influence of intermediaries unfolds sequentially: community-oriented practices and capability building dominate in the early phases, while market-oriented demands become more pronounced as startups progress.

In sum, the findings reveal a hybrid constellation in which circular startups confront tensions between entrepreneurial-market demands and their circular orientation, while simultaneously drawing on community-oriented mechanisms to reconcile and navigate these pressures. Integration and temporal sequencing illustrate how different expectations are combined, separated, or reordered as startups develop. These dynamics point toward deeper institutional patterns that are explored in the subsequent section.

5.5 Discussion

The analysis confirmed the theoretical basis that CE-oriented intermediaries shape circular startups' behavior by transmitting values, norms, and belief systems rooted in two institutional logics: the community logic and the entrepreneurial-market logic (Roundy, 2017). These logics became visible in distinct patterns of relational embeddedness and market-oriented practices, but also in the hybrid dynamics that emerged when both were combined, overlapped, or came into tension during startup development.

From a community logic perspective, CE-oriented intermediaries act as social arenas that foster collaboration, belonging, and shared purpose (Roundy, 2017). Their networks constitute a central mechanism of this logic, enabling founders to develop both weak and strong ties that facilitate trust-building, knowledge exchange, and ongoing collaboration, often extending well beyond program boundaries. This finding aligns with prior research emphasizing networks as foundational for startup development enabling mutual learning, resource access, and opportunity identification (van Rijnsoever, 2020). Effective intermediaries tailor this network support to the startup's stage, offering technical and sector-specific contacts in early phases, business coaching during commercialization, and strategic introductions in later growth stages (Yusubova et al., 2019). These findings illustrate how networking operates as a central mechanism of the community logic, creating relational infrastructures that support circular startups well beyond program boundaries.

Collaborative partnerships emerged as another key pillar of the community logic, consistent with the findings of De Silva and Wright (2019). These partnerships often took the form of informal joint problem-solving or cross-startup support, enacted without expectation of reciprocity and rooted in shared purpose. Through peer-learning, founders exchanged advice and experiences in ways that reflected trust, solidarity, and mutual openness - core community norms that strengthened relational embeddedness within the CEE (Theodoraki, Messeghem, & Audretsch, 2022).

Shared spaces further reinforced these dynamics by providing both physical and symbolic venues for encounter and exchange. Prior research highlights that such spaces facilitate information flows among diverse actors, including co-opetitors, educators, and investors (Bańka et al., 2022; Del Sarto et al., 2023). Yet their effects are not uniform: basic infrastructure alone is insufficient to enhance performance unless combined with complementary activities such as entrepreneurship training (Gonzalez-Uribe & Leatherbee, 2018). Extending this view, the results of this study suggest that shared spaces also function as symbolic anchors, fostering belonging and showing participation in a collective endeavor.

A shared language of circularity additionally strengthened this sense of community. The repeated use of similar terms and narratives reinforced a collective identity and connected founders to what they perceived as a broader transformation effort, echoing insights from Kivimaa, Boon, et al. (2019) and Theodoraki and Messeghem (2017). Over time, these shared meaning structures contributed to the internalization of communal values, visible in founders' continued engagement with intermediary networks and their mentoring of later cohorts.

In contrast, the entrepreneurial-market logic is transmitted through mechanisms aimed at strengthening competitiveness and enabling market integration (Cunningham et al., 2002; Roundy, 2017). Visibility activities help startups signal credibility, gain external recognition, and attract stakeholders, consistent with signaling research showing how legitimacy cues shape investor and partner responses (e.g., Bafera & Kleinert, 2023; Svetek, 2022). Through investor access, CE-oriented intermediaries further position themselves as market brokers, just like typical EE intermediaries, translating visibility and affiliation into opportunities for capital connections.

Mentoring and capability-building sessions socialize founders into performance-oriented norms, teaching them how to structure business models, communicate with investors, and professionalize operations. Through these mechanisms, these intermediaries convey principles such as efficiency, scalability, and measurable progress, the core assumptions of the entrepreneurial-market logic.

This finding complements existing research demonstrating that mentoring and capability-building positively influence startup development outcomes (Breznitz & Zhang, 2019; S. L. Cohen, Fehder, et al., 2019; Hallen et al., 2020; Trethewey-Mould & Moos, 2024), and echoes insights from sustainability-oriented intermediation studies (Almansour, 2022; Karahan, 2024; Samaniego et al., 2023). The present study extends this work by shifting attention from program outcomes to the underlying normative process, showing that capability-building and mentoring not only develops entrepreneurial skills and knowledge but also transmits institutional norms that shape how founders interpret and pursue startup success.

Beyond transmitting distinct community- and entrepreneurial-market logics, the analysis also revealed hybrid dynamics. Recent research highlights tensions between sustainability orientations and market expectations, but these have largely been examined within hybrid organizations themselves (De Clercq & Voronov, 2011; Gregori et al., 2019; Pache & Santos, 2012). This study extends that work to the intermediary level, showing that CE-oriented intermediaries often reproduce rather than mitigate these tensions, thereby exposing circular startups to unresolved contradictions between circular ideals and linear market rationalities (Battilana et al., 2009). At the same time, the findings demonstrate that these intermediaries facilitate forms of integration, such as co-development and reciprocal peer-learning, and that their influence unfolds sequentially, consistent with prior research on temporal shifts in entrepreneurial support needs (Khodaei et al., 2022; M. A. van Weele et al., 2020; Yusubova et al., 2019).

Taken together, the findings show that CE-oriented intermediaries simultaneously transmit community- and entrepreneurial-market logics to circular startups, while also generating hybrid dynamics that intensify, integrate, or sequence, these meanings and practices. Building on these insights, the next section examines how intermediaries can leverage these mechanisms not only to support individual startups but also to advance a broader CE transformation within their EE and institutional environment.

5.5.1 Enhancing the Institutional Work of Intermediaries

Building on the preceding analysis, this section offers a conceptual framework on how intermediaries can promote a CE transformation within their EE and institutional environment by adapting their institutional work. While intermediaries already transmit both community and entrepreneurial-market logics, the findings highlight several ways in which their work could be strengthened to foster a CE transformation acting as institutional entrepreneurs. Four areas of institutional work emerge: Practice, interaction, boundary, and cultural and value work, summarized in Table 5.5.

Practice Work can be facilitated by intermediaries by providing physical spaces that disrupts dominant digital-market assumptions and supports the material realities of circular entrepreneurship (Zietsma & Lawrence, 2010). Several founders expressed a desire for improved access to physical infrastructure such as laboratories or workshops, especially adapted to the specific needs of circular startups. Research-intensive startups require physical prototyping environments rather than standard office spaces. Similarly, hardware-oriented startups stressed the importance of storage facilities. These examples demonstrate that existing intermediary infrastructures still reflect the assumptions of digital-market thinking, focusing on desk-based scalability rather than material experimentation (see e.g., Crişan et al., 2021). Expanding enabling infrastructures to include

Table 5.5: Identified Opportunity to Enhance Institutional Work of Intermediaries

Area of Work	Description
Practice Work	Strengthening infrastructures that foster experimentation and physical prototyping. This includes expanding physical spaces, such as laboratories or workshops.
Interaction Work	Enhance relational activities for circular startups for tailored peer exchange, and knowledge sharing. This entails targeted peer matching and developing CE-specific mentor networks.
Boundary Work	Aligning market expectations with circular values by connecting circular startups with investors and partners across sectors. This involves developing CE-sensitive investor networks, translating circular principles into market language, and facilitating collaborations beyond the circular community.
Cultural & Value Work	Embedding circular principles into entrepreneurial learning and legitimacy frameworks. This entails integrating CE-specific learning content, recruiting mentors with CE expertise, and using communication strategies to normalize circular entrepreneurship as a viable and valued practice.

production and testing facilities would allow intermediaries to better accommodate the material realities of circular entrepreneurship.

Interaction Work focuses on relational activities of curated cohort design, selective matching, and peer-learning facilitation (Phillips & Lawrence, 2012). Founders emphasized that peer-learning was most effective when participants faced similar challenges. This indicates the need for intermediaries to curate cohort compositions and partner matches based on shared maturity levels, technological focus, or sectoral proximity. Through more deliberate network design and selective matching, intermediaries can improve learning quality and sustain peer-based trust networks, thereby reinforcing the relational dynamics of the CEE (Butz & Mrożewski, 2021). The creation of settings for knowledge exchange further reflects idea work, nurturing and materializing ideas through structured peer engagement (Carlsen et al., 2012).

Boundary Work. A key area where intermediaries can further promote a CE transformation within their EE and institutional environment is by focusing on boundary work that redefines the conceptual and practical boundaries between linear market assumptions and circular forms of value creation (Lamont & Molnár, 2002; Zietsma & Lawrence, 2010). Circular startups often operate in a field where established investors, partners, and customers still rely on conventional growth assumptions and evaluation metrics (Ertz et al., 2022; Veleva & Bodkin, 2018). Intermediaries can therefore focus on extensive discursive work to frame circular principles in market-compatible terms and meaning work to redefine notions of value beyond short-term profitability (Benford & Snow, 2000; Phillips & Lawrence, 2012).

This boundary work includes expanding investor networks and fostering financial instruments attuned to CBMs. Conventional investment frameworks remain ill-suited to the

capital structures and return profiles of circular startups, highlighting the need for intermediaries to cultivate investor communities that recognize value beyond short-term profit (F. Fang & Parida, 2024). Dedicated funding pools or circular-oriented investor networks could help address this gap.

Beyond financial translation, intermediaries can also bridge the cognitive and practical divide between emerging circular ideas and established industrial practices (see e.g., Hansen et al., 2010; Hoffren & Apajalahti, 2009). Many circular innovations require extensive explanation, trust-building, and experimentation before adoption. Intermediaries are well positioned to facilitate this process by supporting startups in co-developing applications with partners, helping them frame their solutions in terms of market needs while retaining their ecological rationale.

Finally, boundary work also entails widening the collaboration horizon beyond the immediate circular community. By enabling partnerships with conventional industries and public actors, intermediaries can promote diffusion of circular principles across institutional boundaries. In doing so, they act as translators and connectors between distinct logics, contributing to the mainstreaming of circular entrepreneurship.

Cultural & Value Work. A further area in which intermediaries can expand their work concerns shaping the cognitive and normative foundations of what counts as legitimate circular entrepreneurial practice. These activities primarily constitute cultural work (Lounsbury & Glynn, 2001). By embedding circular values into learning and mentoring structures, intermediaries can also engage in values work, translating abstract sustainability principles into concrete professional routines (Gehman et al., 2013). This process further involves meaning work, redefining the criteria of entrepreneurial professionalism.

The findings revealed that existing training and mentoring content often remained too generic and insufficiently tailored to the specific needs of circular startups. This indicates a missed opportunity for intermediaries to integrate circular-oriented competence building directly into their curricula. Developing learning formats that combine entrepreneurial skills with circular design would allow intermediaries to normalize these capabilities as integral to entrepreneurial professionalism rather than as optional add-ons. Similar suggestions have been formulated for different contexts of highly specialized industries, such as in digital health (Page et al., 2018), or energy systems (Backhaus, 2010).

Mentoring structures showed similar gaps. Founders working on technologically or materially innovative concepts often faced difficulties in obtaining relevant guidance due to the scarcity of mentors with circular expertise. Recruiting and training mentors with domain-specific circular knowledge could therefore enhance the quality and relevance of guidance while simultaneously diffusing circular reasoning within professional networks.

Finally, while this study did not find direct evidence that intermediaries strategically use visibility to shape public narratives, visibility nonetheless emerged as a potential lever

for normative influence. By framing circular entrepreneurship as both commercially viable and socially valuable, intermediaries could help shift success criteria in the broader ecosystem (Klofsten et al., 2024).

Overall, the findings suggest that intermediaries can strengthen their institutional work towards a CE by: (1) expanding enabling infrastructures that support experimentation, (2) enabling relational activities by curated cohort design, selective matching, and peer-learning facilitation, (3) bridging circular and market domains through dedicated investor networks, partnership initiatives, and translation of circular value propositions into market-relevant narratives; and (4) embedding cognitive and normative foundations that integrate circularity into entrepreneurial learning, mentoring, and competence development.

By advancing these interrelated forms of work, intermediaries can evolve from conventional support providers into systemic enablers, actors that not only facilitate the growth of individual startups but also help reshape the institutional environment in which circular entrepreneurship can mature and scale (Kivimaa, Boon, et al., 2019).

5.5.2 Theoretical Contribution: Circularity as a Transversal Logic

This study advances institutional theory by conceptualizing circularity as a transversal logic that operates across, rather than in opposition to, existing institutional logics. Circularity does not replace community or entrepreneurial-market logics, nor is it the first mechanism through which these logics interact; intermediaries routinely combine relational and market-oriented practices in conventional EEs. What circularity adds is a shared normative orientation that reframes how these existing logics are interpreted and enacted (see Figure 5.1).

Through circularity, community-oriented practices gain a sustainability-oriented purpose, while market-oriented practices are re-evaluated in terms of long-term resource stewardship and ecological value creation. In this sense, circularity provides a higher-order meaning structure that enables startups to integrate, sequence, and sustain hybrid practices in ways that align entrepreneurial competitiveness with ecological responsibility.

Circularity thereby functions as a transversal logic within EEs, one that reshapes the boundaries of legitimate entrepreneurial action and supports the emergence of CEEs as circularly specific subecosystems. It acts as a shared narrative and moral order that unites actors around the goal of CE transformation within and across value chains and CEE structures.

Previous institutional research has conceptualized sustainability and profitability as distinct institutional logics that entrepreneurs must balance to gain legitimacy within their fields (De Clercq & Voronov, 2011). The sustainability logic is rooted in environmental

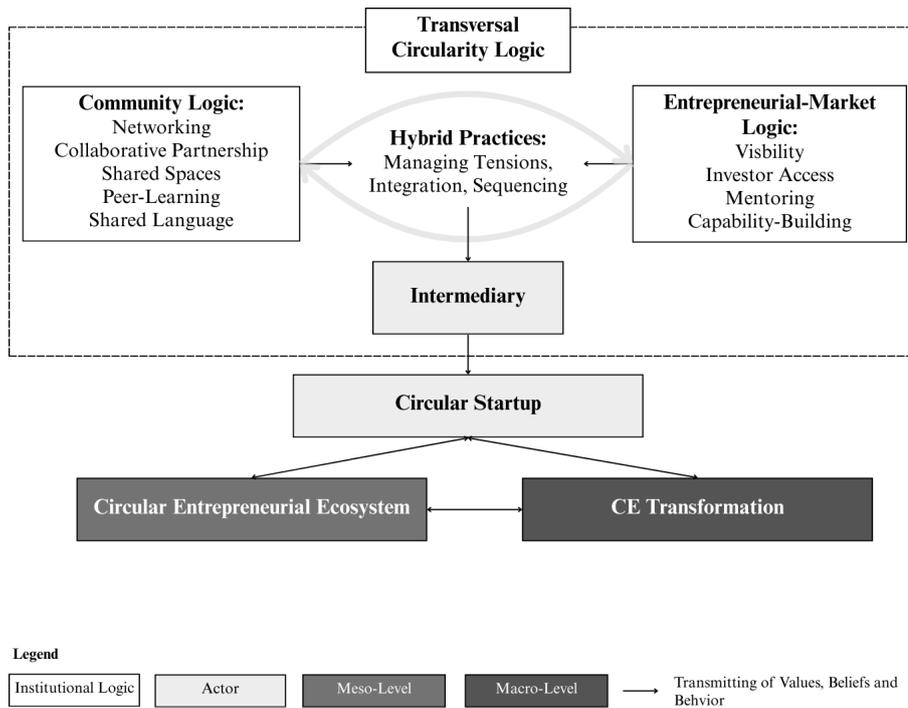


Figure 5.1: Circularity as a Transversal Logic (Own Illustration)

and social stewardship, whereas the profitability logic prioritizes efficiency, competition, and growth. Navigating both logics generates inherent tensions, as these value systems prescribe divergent notions of appropriate behavior and entrepreneurial success. Subsequent studies have shown that intermediaries such as incubators and accelerators can shape how these logics are enacted, influencing early entrepreneurial orientations and mediating conflicts between them (Gregori et al., 2019). Yet, these organizations often remain embedded in a market logic, translating sustainability ambitions into market-compatible narratives without fundamentally reframing the underlying institutional assumptions.

Building on these insights, the present study shifts the analytical focus from individual entrepreneurs to intermediaries as actors who actively mediate between institutional orders. The findings show that intermediaries do not merely transmit community or market-oriented logics but integrate them through hybrid configurations that embed circular principles into entrepreneurial practice. Through program design, partnership facilitation, and mentoring structures, intermediaries translate the abstract goals of the CE into economically actionable forms, framing resource conservation as efficiency, collaboration as innovation, and circularity as a source of market legitimacy.

Conceptualizing circularity as a transversal logic advances institutional logics theory by showing that sustainability-oriented transformations unfold through processes of translation, reframing, and mediation. This perspective highlights the central role of intermediaries as actors who align normative and economic orientations by reframing market and community logics through circular principles. In doing so, intermediaries contribute to

the emergence of new legitimacy structures for circular entrepreneurship and help embed circularity within EEs. This study thus deepens the understanding of how institutional change toward circularity is enacted, not only through individual institutional entrepreneurs but through the situated institutional work of intermediaries that cultivate, stabilize, and diffuse circular meaning systems across EEs and within emerging CEEs.

5.5.3 Limitations and Future Research

This study offers an in-depth perspective on how intermediaries transmit and integrate institutional logics within CEEs, circularly specific subecosystems that develop within broader EEs. However, several limitations must be acknowledged. First, the analysis is based on a specific national context and a limited number of intermediary programs. Future comparative research could explore how different types of intermediaries (e.g., public accelerators, private incubators, or mission-driven hubs) transmit logics to circular startups, and how ecosystem structures or policy frameworks shape these processes (Kivimaa, Boon, et al., 2019).

Second, the study focuses primarily on founders' perceptions, leaving both intermediaries' internal decision-making and differences among startup types less explored. Examining, for instance, how waste-based and design-based circular startups experience intermediary influence could deepen understanding of how hybrid logics are interpreted across sectors (Henry et al., 2020).

Finally, longitudinal research could trace how circularity as a transversal logic becomes institutionalized over time, shaping not only startups but also investors, policymakers, and other actors in the wider EE. Such studies could illuminate how circular meanings, practices, and legitimacy structures stabilize or shift as CEEs evolve.

5.6 Conclusion

Drawing on 26 interviews with circular startup founders, this study examined how intermediaries transmit and integrate institutional logics within emerging CEEs, circularly specific subecosystems developing within broader EEs. The findings show that intermediaries shape startup behavior through two dominant logics, community and entrepreneurial-market, while also navigating their hybrid interplay. Through their structures and practices, intermediaries foster collaboration, legitimacy, and market readiness, yet they also face tensions when conventional growth norms meet circular values.

The study contributes to institutional theory by conceptualizing circularity as a transversal logic: rather than a competing institutional order, it functions as a cross-cutting normative frame that reframes existing logics with circular-oriented meanings and enables hybrid coherence between circular orientations and entrepreneurial performance.

Practically, the results highlight how intermediaries can act as institutional entrepreneurs. Through practice, interaction, brokerage, cultural work, and value work, they can promote a CE transformation within their EE and institutional environment. They can do so by tailoring support infrastructures, connecting circular startups with aligned investors and partners, and embedding sustainability principles into learning and mentoring.

In doing so, intermediaries evolve from facilitators of startup growth into agents of institutional change, aligning EEs with the systemic goals of the CE.

Part IV

Design

In the preceding studies, three theoretical concepts have emerged as central to understanding how intermediaries support the development of circular startups within EEs:

1. The network function of intermediaries as the binding glue in CEEs;
2. The institutional entrepreneurship capacity of intermediaries, which depends on different intermediary configurations and mechanisms;
3. The transversal nature of circularity logics, through which intermediaries bridge entrepreneurial and market-oriented rationalities.

Together, these findings show that effective support from intermediaries for circular startups requires more than structural connections or resource flows; it requires intentionally designed mechanisms that account for the systemic, institutional, and relational dynamics of circular entrepreneurship. Accordingly, this final part of the dissertation addresses the following guiding RQ5:

How to design new methodological artifacts to enhance the circular startup support alignment of intermediaries within emerging circular entrepreneurial ecosystems?

To address this question, two complementary DSR projects are conducted.² DSR provides a methodological paradigm for translating accumulated theoretical and empirical insights into purposeful artifacts that generate both scientific and practical contributions (Hevner et al., 2004; Peffers et al., 2007). The challenge in this endeavor lies in integrating multi-level theoretical insights, systemic, institutional, and design-oriented, into actionable design objectives that guide artifact development. The objectives of the design solution must simultaneously reflect the systemic characteristics of emerging CEEs and the institutional mechanisms through which intermediaries enact change within the broader EE. As shown in Chapter 3, CEEs are not stand-alone structures but emerging subecosystems within existing EEs. This implies that intermediaries do not merely operate in these environments. they actively shape them by creating the relational and cognitive conditions that enable circular collaboration.

² These projects build on the article Finner, A.-S.; Sagnier Eckert, L.; Terzidis, O. (2026). Empowering Circular Startups: Unveiling the Blueprint for Circular Business Models. *Business Strategy and the Environment*, 2026. <https://doi.org/10.1002/bse.70660>. Note: For inclusion in this thesis, the title has been changed and the abstract has been removed. While the article presents taxonomy development as the primary methodological approach, the thesis explicitly frames the work as Design Science Research and elaborates the research process across two studies. The taxonomy and the analytical framework presented in the article are retained; however, the thesis provides a more detailed account of the development of the analytical framework (as the second study) and reports the naturalistic evaluation in substantially more detail. The discussion has been revised to fit the thesis' overarching argument. Tables and figures were reformatted and renumbered to match the structure of the thesis. Chapter and section numbers, the respective cross-references, and the formatting and reference style have been adjusted. The references have been included in the overall bibliography at the end of the thesis.

To address this, the first DSR project follows the process model by Peffers et al. (2007) and derives DRs and DPs from the dissertation's earlier findings. These DRs and DPs constitute the objectives for developing an initial artifact for intermediaries to align their support strategy in the form of a taxonomy of circular startup CBMs. This artifact is conceptually evaluated, but its validation remains primarily non-naturalistic.

The second DSR project addresses this limitation by conducting a naturalistic, empirical evaluation of the taxonomy in collaboration with an intermediary organization. Following Hevner's (2007) three-cycle approach, the taxonomy is applied to a real-life dataset of circular startups and evaluated through a mixed-method cluster analysis and expert-based interpretation. This process leads to a refined version of the artifact, the identification of circular startup CBM archetypes, and the derivation of actionable design insights for intermediary support.

As both DSR projects jointly address RQ5 and cumulatively generate the design knowledge of this dissertation, their findings are integrated in a combined discussion and conclusion chapter.

Designing Circular Support Alignment for Intermediaries

This first DSR project investigates a theoretical design object that aligns intermediaries' support activities for circular startups (Seckler et al., 2021). This research approach has been demonstrated to be efficacious in entrepreneurship research, particularly in addressing complex challenges and establishing a connection between theoretical concepts and practical applications (Terzidis et al., 2023). In line with this, the recommendations of Peffers et al. (2007) are adopted to iteratively develop an artifact that balances rigor and relevance. The process begins with defining objectives, which in this study are operationalized as DPs, followed by the design and development of an artifact that fulfills them. The artifact is then evaluated through two iterative cycles to refine its suitability for intermediaries' needs. After each iteration, the DPs are revisited to ensure their completeness and rigorousness. Accordingly, this study is structured following the six core phases defined by Peffers et al. (2007): problem definition, objective definition, design and development, demonstration, evaluation, and communication, as illustrated in Figure 6.1.

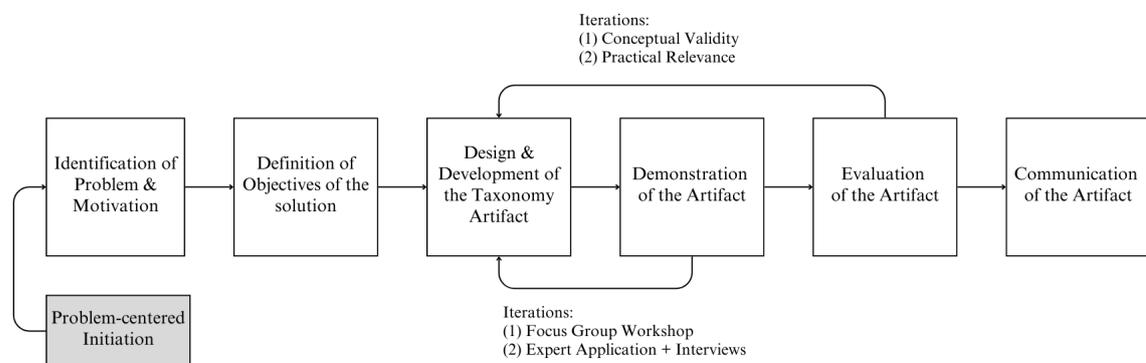


Figure 6.1: Overview of the Iterative Design Process adopted by Peffers et al. (2007)

In the following sections, each phase of the DSR project is presented in detail, entailing the methodological specifics for each step, as well as the findings and implications for the proceeding steps.

6.1 Problem Identification and Motivation

While different guiding principles exist for conducting DSR projects, this study adopts an ‘improvement’ approach. According to Seckler et al. (2021), this approach is most

suitable when the goal or purpose is known - namely, aligning intermediaries' support strategies with the distinct needs of circular startups - but the means to achieve it are not. Typically, these studies follow a process of problem analysis, solution design, and evaluation. Given that the preceding studies in this dissertation have already analyzed the relationship between the CE, startups, and EEs in depth, this research builds on an extensive body of prior knowledge to define the problem, following a problem-centered initiation. Below, a short recap of the main findings from the former studies in this dissertation is presented to illustrate the problem.

The relevance of circular startups is widely acknowledged in the literature, as they represent central actors driving circular disruption and CE transformation processes in markets and value chains (Blomsma et al., 2023; Klofsten et al., 2024). Achieving such transformation, however, requires an extensive network of stakeholders that collectively enable the scaling and acceleration of circular solutions (Kirchherr, Bauwens, & Ramos, 2023). Within this network, EEs play a crucial role by providing circular startups with access to resources, networks, and infrastructure; capabilities they often lack due to their smallness and newness (Audretsch & Fiedler, 2023; Ferreira et al., 2024; Kanda et al., 2024; Maaßen & Urbano, 2024).

The first study, which adopted a systemic perspective, revealed that circular startups exhibit a particularly high degree of dependency on their surrounding EEs, compared to conventional startups (cf. Chapter 2). This dependency arises because circular startups must simultaneously implement systemic changes in production, consumption, and waste management while establishing viable CBMs. Therefore, the study conceptualized CEEs as adaptive extensions of established EEs, specifically equipped to support circular startups. This conceptualization identified a set of elements and mechanisms, such as tailored resources, transformational governance, and culture building, that existing EEs must integrate to evolve toward CEEs.

Within these ecosystems, intermediaries emerged as key orchestrating actors. They act as the binding glue, connecting otherwise fragmented actors and resources (cf. Chapter 3). From a multilevel perspective, intermediaries can influence circular startups at micro-, meso-, and macro-levels (cf. Chapter 4). According to Roundy (2017), intermediaries operate as hybrid organizations, navigating between community and market logics. The preceding study (cf. Chapter 5) extended this view by introducing circularity as a transversal logic, which bridges purpose and performance by integrating, sequencing, and sustaining hybrid practices. Through this hybrid orientation, intermediaries enable startups to combine sustainability values with entrepreneurial competitiveness.

Consequently, the influence of intermediaries depends on their structural design and the contextual characteristics of the surrounding ecosystem. This implies that intermediaries need to offer circular-startup-specific support, aligning program structure, startup

needs, and ecosystem conditions (cf. Chapter 2, Chapter 3, Chapter 4, and Chapter 5), rather than applying generic support oriented toward conventional startups and dominant market logics. However, as Hallen et al. (2020) caution, EEs should “be cautious about rapidly expanding the [intermediary] form, particularly when available mentors and program directors may lack the depth of entrepreneurial and industry experience” (p. 404). This emphasizes that new intermediary structures are not necessarily required nor helpful; instead, existing intermediaries should be leveraged and adapted to enhance their effectiveness and legitimacy in supporting circular startups. Indeed, the previous studies confirmed that an intermediary’s institutional prestige and embeddedness are critical levers for enabling successful circular entrepreneurship (cf. Chapters 4 and 5).

Building on this, the problem is not to design additional intermediary forms, but to improve the circular fit of existing ones. In practice, intermediaries face the task of adapting established program structures, selection logics, and support offerings to the systemic, relational, and institutional characteristics of circular startups, without undermining their legitimacy within the broader EE. However, intermediaries often lack structured, evidence-based means to diagnose circular startups’ resource dependencies, network needs, and institutional constraints, and to translate such insights into targeted support adjustments.

Despite this central role of intermediaries in emerging CEEs, this gap between conceptual understanding and operationalization remains insufficiently addressed. While prior research has identified key mechanisms and roles through which intermediaries can foster circular entrepreneurship (cf. Chapter 4), it remains unclear how these insights can be translated into concrete, actionable support designs for intermediary practice. This unresolved translation problem, how to align intermediaries’ support strategies with the distinct systemic, relational, and institutional needs of circular startups—constitutes the central design problem addressed in this study.

6.2 Objectives of the Solution: Design Requirements and Design Principles

Against this backdrop, this study aims to synthesize and translate the existing body of knowledge into a design-oriented solution that supports existing intermediaries in adopting a circular strategy for their support offerings. Following the process model of Pefers et al. (2007), the study transforms the identified problem into objectives for rigorous and relevant artifacts in the context of circular entrepreneurship, operationalized through DRs and DPs. Following this logic, the objectives of this study are qualitative in nature, describing how intermediaries can align their support mechanisms with the needs and strategies of circular startups.

In line with the recommendations by Kuechler and Vaishnavi (2008), the DPs are formulated to bridge theoretical and practical insights, ensuring that they serve both as conceptual propositions and as guiding principles for design decisions. The derivation of DRs

and DPs thus represents the translation from theoretical knowledge to design knowledge, grounded in the preceding studies and refined through the design process (Peffer et al., 2007).

The subsequent sections elaborate on the rationale and empirical foundation of the DRs (see Table 6.1) and show how they inform the formulation of the DPs.

Table 6.1: Design Requirements and their Theoretical and Empirical Foundations

Num-ber	Design Requirement	Theoretical and Empirical Foundations
1	Ensure the identification of structural and regulatory barriers encountered by circular startups.	Chapter 2: Structural and regulatory constraints. Chapter 3: Institutional misalignment and structural holes. Chapter 4: Systemic and regime-level alignment.
2	Enable analyzing the partnership structure and network potential of circular startups.	Chapter 2: Collaboration is key. Chapter 3: Intermediaries as binding glue. Chapter 4: Network orchestration. Chapter 5: Community-based diffusion.
3	Ensure capturing financial logic and investment dependencies within CBMs.	Chapter 2: High financing needs. Chapter 3: Funding gap. Chapter 5: Market-understandable narratives.
4	Ensure a structured visualization and communication of a startup's CBM.	Chapter 2: Lack of shared understanding. Chapter 5: Normative education.
5	Enable the identification of capability and infrastructure gaps as well as resource needs of circular startups.	Chapter 2: Tailored capability-building. Chapter 3: Infrastructure gaps. Chapter 4: Capability support. Chapter 5: Infrastructure misfit.
6	Ensure the inclusion of decision criteria for strategic startup selection.	Chapter 2: Strategic selection effectiveness. Chapter 4: Startup fit. Chapter 5: Curated peer design and selective matching.

The first and second study (cf. Chapter 2 and Chapter 3) showed that circular startups face substantial structural and regulatory constraints, particularly within the European policy context. These barriers limit the implementation and scalability of CBMs. Chapter 4 further demonstrated that intermediaries hold the potential to act as systemic and regime-based intermediaries, capable of spanning ecosystem boundaries, coordinating multi-stakeholder networks, and building legitimacy for circular transformations within and across value chains and ecosystem structures. In this role, intermediaries can translate startup needs into policy-relevant signals and contribute to the broader realignment of innovation systems with CE. To do so, they require mechanisms for systematically identifying and articulating the structural and regulatory barriers that circular startups encounter.

DR1: Ensure the identification of structural and regulatory barriers encountered by circular startups.

Across all studies, collaborations emerged as a foundational mechanism in CEEs. The first study highlighted that partnerships are essential for circular startups, not only for knowledge sharing, but for coordinating value chains and enabling the implementation of CBMs (cf. Chapter 2). Likewise, Chapter 3 showed that intermediaries function as the structural binding glue within CEEs, connecting otherwise fragmented actor groups. Chapter 4 showed that intermediaries orchestrate networks by mediating long-term collaborations and connecting circular with non-circular actors. Finally, Chapter 5 revealed that intermediaries shape the normative and cognitive conditions under which collaborations become possible, by diffusing values and beliefs through the community logic and fostering shared understanding.

Together, these insights underline that intermediaries require a systematic way to assess where and how circular startups are embedded in their networks.

DR2: Enable analyzing the partnership structure and network potential of circular startups.

The financial element of established EEs was shown to constrain startups in general, with circular startups particularly disadvantaged by high upfront investment costs to realize their CBMs (cf. Chapter 2). Chapter 3 further identified a persistent funding gap within CEEs, reflecting limited investor awareness, inadequate financing instruments, and a misalignment between circular value creation and prevailing market logics. Chapter 5 demonstrated that intermediaries play a key role in translating circular value propositions into market-understandable narratives, thereby fostering legitimacy and helping bridge the cognitive gap between circular and investor expectations.

DR3: Ensure capturing financial logic and investment dependencies within CBMs.

Chapter 2 identified a lack of shared understanding among actors in CEEs, which hampers coordination, sensemaking, and strategic alignment around circular entrepreneurship. This gap concerns not only the meaning of circularity but also the functioning, value creation logic, and system-level implications of CBMs. The final empirical study (cf. Chapter 5) showed that intermediaries play a central role in educating and informing ecosystem actors about CBMs. Through cultural and value work, intermediaries shape the cognitive and normative foundations of what counts as legitimate circular entrepreneurial practice. They clarify CBM configurations, and build the shared understanding required for collaboration and legitimacy within CEEs.

DR4: Ensure a structured visualization and communication of a startup's CBM.

Across all studies, intermediaries were shown to provide access to entrepreneurial capability-building, infrastructure, and resources. However, existing programs often remained misaligned with the specific needs of circular startups. Chapter 2 highlighted the importance of curated peer-learning environments and tailored program formats for circular startups that reflect the complexity of circular value creation of. Chapter 3 revealed

Table 6.2: Overview of the Relationship between Design Principles, Design Requirements, and Theoretical Foundations

DP	DR	Logic	Level (MLP)	Institutional Work	Core Mechanism
DP1 Circularity as Transversal Logic	DR1	Circular (transversal) Logic	Macro	Boundary	Reflexive diagnostics and feedback mechanisms that aggregate startup-level insights for systemic learning and policy adaptation.
DP2 Community-Based Collaboration	DR2, DR4, DR5	Community Logic	Meso	Practice, Interaction, and Culture & Value	Identification and visualization of capability and resource needs, network relations, and CBM characteristics to strengthen collaboration and trust.
DP3 Market-Oriented Legitimacy	DR3, DR6	Entrepreneurial-Market Logic	Micro, Meso	Interaction, Culture & Value, and Boundary	Standardized CBM templates and selection criteria that communicate circular value creation and investment readiness.

persistent gaps in resource access and infrastructure provision within CEEs, limiting the ability of circular startups to coordinate value chains and scale their solutions. Chapter 4 emphasized that intermediaries can act as immediate levers for early-stage capability development, yet they lack mechanisms to systematically assess what types of support circular startups actually need. Chapter 5 further showed that circular startups often require physical infrastructures not typically provided by intermediaries and sector-specific peer-learning formats for capability development.

Together, these findings underline the need for intermediaries to systematically identify capability gaps, infrastructure deficits, and resource dependencies to align their support mechanisms with the realities of circular entrepreneurship.

DR5: Enable the identification of capability and infrastructure gaps as well as resource needs of circular startups.

Finally, the first study showed that intermediary support is most effective when circular startups are selected through multi-stage and strategically designed processes (cf. Chapter 2). Chapter 4 further emphasized that resource mobilization and capability development are more effective when intermediaries deliberately choose startups whose needs align with their support offerings. Finally, Chapter 5 demonstrated that curated peer design and selective matching strengthen peer-learning, relational dynamics, and program effectiveness.

These insights highlight that intermediaries require structured decision criteria to guide strategic startup selection.

DR6: Ensure the inclusion of decision criteria for strategic startup selection.

The six DRs thus serve as the conceptual foundation for deriving the subsequent DPs, which articulate the actionable design knowledge needed to develop a circular support alignment artifact for intermediaries in CEEs. Their aim and rationale are grounded in

three complementary theoretical perspectives that informed this dissertation: institutional logics, MLP, and institutional entrepreneurship. Figure 6.2 presents the connection between the final set of DPs and the developed DRs, represented by their logic, level perspective, institutional work and core mechanisms.

The final three DPs are presented according to their aim (A), context (C), mechanism (M), and rationale (R), based on Gregor et al. (2020) (see Table 6.3).

Collectively, the derived DPs embody the transversal logic of circularity, connecting the community and entrepreneurial-market logics that structure intermediaries' institutional work. In this sense, the DPs illustrate how intermediaries act as institutional entrepreneurs, performing practice, interaction, boundary, cultural, and value work to align EE structures with circular values.

Table 6.3: Design Principles for Developing a Circular Support Alignment Artifact

DP	Aim (A)	Context (C)	Mechanism (M)	Rationale (R)
DP1	To embed circularity as a transversal logic connecting community and market orientations	for circular startup support within CEEs	implement reflexive diagnostic and feedback mechanisms that capture and aggregate startup-level insights	as this allows intermediaries to act as institutional entrepreneurs who embed circularity into existing institutional structures and drive systemic ecosystem transformation.
DP2	To strengthen community-based collaboration, trust, and knowledge exchange	for circular startup support within CEEs	integrate identifying and visualizing startups' resource and capability dependencies, network relations, and CBM characteristics	because this enables intermediaries to act as institutional entrepreneurs who reinforce community-oriented legitimacy through connectivity and shared purpose.
DP3	To enhance market performance, legitimacy, and access to finance	for circular startup support within CEEs	provide standardized CBM templates that communicate circular value creation, and strategic fit with circular ecosystem transformation goals	because this empowers intermediaries to align investment flows and startup selection with the principles of circular ecosystem transformation.

Although the context (C) remains constant, circular startup support within CEEs, each DP operationalizes a specific mechanism through which intermediaries can enhance circular transformation within their ecosystem and institutional context. The first DP operates at the macro level, emphasizing the boundary work of intermediaries. It captures how intermediaries translate startup needs into policy adaptation and institutional advocacy, thereby linking community and market orientations within broader institutional frameworks.

The second DP reflects the meso-level and primarily draws on the community logic. It centers on strengthening collaboration, trust, and shared understanding within CEEs by

identifying and visualizing circular startups' capability and resource needs, CBM characteristics, and network relations. This enables intermediaries to achieve interaction work by fostering relational ties and curated peer-learning, and perform cultural and value work by shaping shared meanings, norms, and legitimacy around circular practices.

The third DP spans the meso-, and micro-levels and emphasizes the entrepreneurial-market logic. It focuses on aligning circular startups with market expectations by translating circular value creation into investment-relevant narratives, and by integrating circularity into selection criteria and decision-making processes. Through this, intermediaries enact interaction work by mobilizing resources, boundary work by linking startups and investors, and value work by shaping the criteria through which circular performance and legitimacy are evaluated.

6.3 Design and Development of the Artifact

With the finalized formulation of objectives, according to Peffers et al. (2007), the next step, design and development, serves to instantiate the derived DPs into a tangible artifact. The knowledge base derived from the previous studies in this dissertation provides the conceptual foundation for this stage, complemented by insights from Business Model Theory. In the following sections, first, the design process of the artifact is explained in detail, followed by a description of the development of the artifact.

6.3.1 Artifact Design

The problem analysis, DRs, and DPs collectively point to the importance of grounding the artifact in a structured representation of how circular startups create, deliver, and capture value. Circular startups differ fundamentally from conventional startups in their resource dependencies, capability requirements, infrastructure needs, and value-network configurations. These differences are encoded in their business models. Accordingly, analyzing CBMs offers a particularly coherent and actionable basis for deriving support implications for intermediaries.

Business model theory provides the conceptual foundation for this approach. Business models describe how organizations structure activities to create, deliver, and capture value (Osterwalder et al., 2005; Teece, 2010). Scholars typically distinguish four core elements in business model frameworks: value proposition, value creation, value capture, and value network (Al-Debei & Avison, 2010; Chesbrough, 2010; Johnson et al., 2008; Morris et al., 2005). The value proposition defines what is offered and to whom; value creation encompasses the activities, resources, processes, and capabilities used to deliver the proposition; value capture refers to the financial and non-financial returns generated;

and the value network includes external actors and partnerships enabling these processes (Chesbrough, 2010; Johnson et al., 2008; Lacy et al., 2020).

To this end, a taxonomy is employed as the design form. Within the IS design science research, taxonomies are not merely descriptive classifications but intentionally designed model artifacts that embed design knowledge that support diagnosis and decision-making in complex domains (Nickerson et al., 2013). They provide structured representations that decompose complex phenomena into their constitutive dimensions and characteristics (Hevner et al., 2004; Simon, 1970). In DSR, taxonomies are recognized as structure-giving artifacts that take the form of models (Nickerson et al., 2013; Oberländer et al., 2018) that embed design knowledge by making relevant distinctions explicit and actionable for users. Such models represent “how things are” (March & Smith, 1995, p. 256), capturing the dimensions and relationships of the phenomena under study. Because of their representational, reductive, and pragmatic properties, they provide an abstracted yet practically useful structure for understanding complex realities (cf. Hevner et al., 2004; Simon, 1970). In this case, the business models of circular startups.

Because the core design problem concerns the alignment of intermediary support with heterogeneous circular startup configurations, a taxonomy is particularly suitable as it enables systematic comparison, pattern recognition, and translation of startup characteristics into support implications.

Thus, the taxonomy represents an instantiation of the derived DPs, functioning as a circular support alignment tool that enables intermediaries to analyze and tailor their support activities to the specific needs of circular startups and to act as institutional entrepreneurs fostering circular transformation processes within their ecosystem and institutional environment.

To iteratively develop the taxonomy, the methodological recommendations of Nickerson et al. (2013) were followed.¹ The iterative taxonomy development process comprises two main phases: (1) defining the taxonomy’s objectives and (2) designing and developing the taxonomy through successive iterations. The taxonomy development process is illustrated in Figure 6.2.

This methodology integrates conceptual rigor with empirical grounding, allowing for a systematic abstraction of business model dimensions from real-world cases while remaining anchored in extant theoretical frameworks. The taxonomy developed in this study organizes and systematizes knowledge on CBMs by identifying relevant dimensions and characteristics of circular startups and reflecting on their interrelations.

The first phase of the taxonomy development process focused on specifying the preliminary objectives. Step (a) involved defining the meta-characteristic of the taxonomy, which

¹ The first taxonomy was developed during a master thesis in three iterations, supervised by the author; see Eckert (2023).

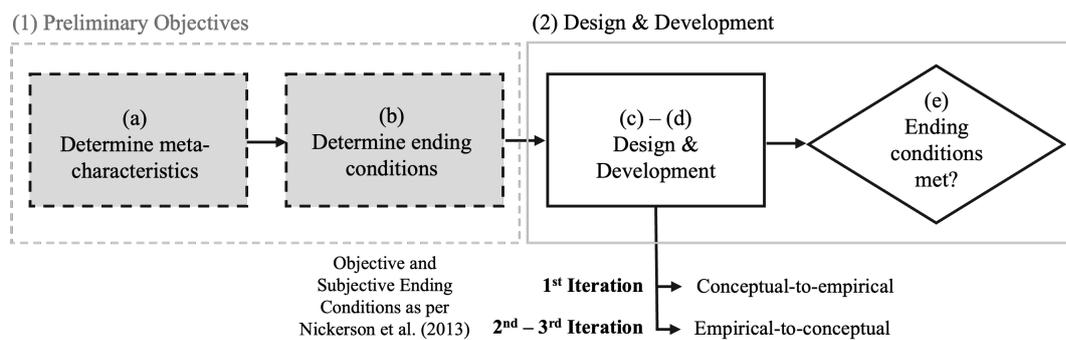


Figure 6.2: Taxonomy Development Process adopted from Nickerson et al. (2013)

guided all subsequent development choices: ‘to facilitate a comprehensive understanding of the key distinguishing dimensions and characteristics of circular startup CBMs.’ In step (b), a set of ending conditions was established to determine when the taxonomy would be considered sufficiently developed following Nickerson et al. (2013). Objective criteria included saturation (no new dimensions emerging) and completeness (at least one characteristic per dimension), for further details see Appendix A.2. Subjective conditions required that the taxonomy be perceived as comprehensive, concise, explanatory, and robust (Nickerson et al., 2013). These criteria ensured a methodologically sound and practically relevant classification system, enabling intermediaries to align their support mechanisms with the needs and strategies of circular startups.

Phase two comprised the iterative construction of the taxonomy across steps (c) to (e). In the first iteration (step c), a conceptual-to-empirical approach was adopted, drawing from the literature on CE and business models to generate initial taxonomy dimensions. In the second and third iterations (step d), an empirical-to-conceptual approach was applied, analyzing 125 real-world startup cases to refine dimensions and characteristics inductively. In each cycle, the predefined ending conditions (step e) were reassessed to determine whether additional iterations were required. The process concluded once the taxonomy met both objective and subjective quality standards. The iterations are explained in more detail below.

1st iteration. In the first iteration, a conceptual-to-empirical approach is employed to build on the current body of knowledge at the intersection of CE, entrepreneurship, and startup business model research (Kundisch et al., 2022). To this end, an SLR was conducted in June 2023, following the methodological guidelines proposed by Kraus et al. (2020). The literature search was performed across two major academic databases, Scopus and Web of Science, using combinations of keywords such as ‘circular economy,’ ‘business model,’ ‘startup,’ and ‘typology.’ This yielded an initial dataset of 1,169 publications. A multi-stage screening protocol was applied: first, duplicates were removed, and only peer-reviewed journal articles in English were retained. Second, titles, abstracts, and full texts were screened to include only those studies that explicitly addressed both CE

and startups' business models. After applying these criteria, the core corpus was reduced to 64 studies. Through backward and forward citation tracking, six additional relevant studies were included, resulting in a final sample of 55 publications (see Figure 6.3).

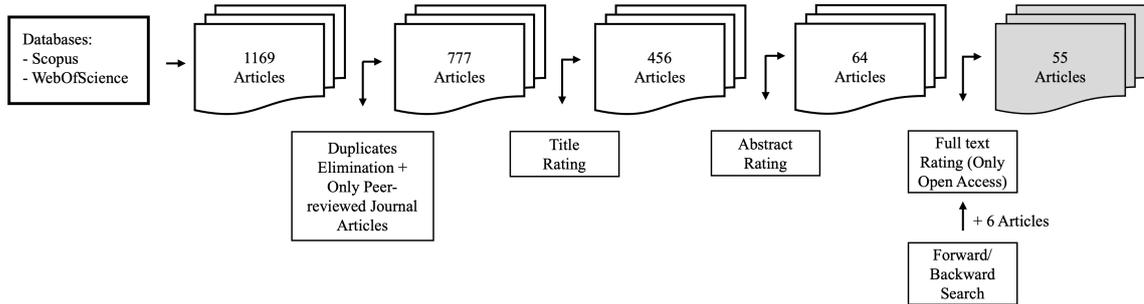


Figure 6.3: Selection process of the SLR (Own Illustration)

From this literature base, recurring concepts were systematically extracted and coded related to how circularity is embedded in startup CBMs, following the qualitative thematic analysis of Braun and Clarke (2006). To synthesize and structure these findings, a concept matrix was constructed (vom Brocke et al., 2009; Webster & Watson, 2002) that mapped conceptual constructs across studies (see Appendix A.3). This process surfaced 15 recurring dimensions, forming the structural basis for the subsequent empirical iterations, as shown in Figure 6.4.

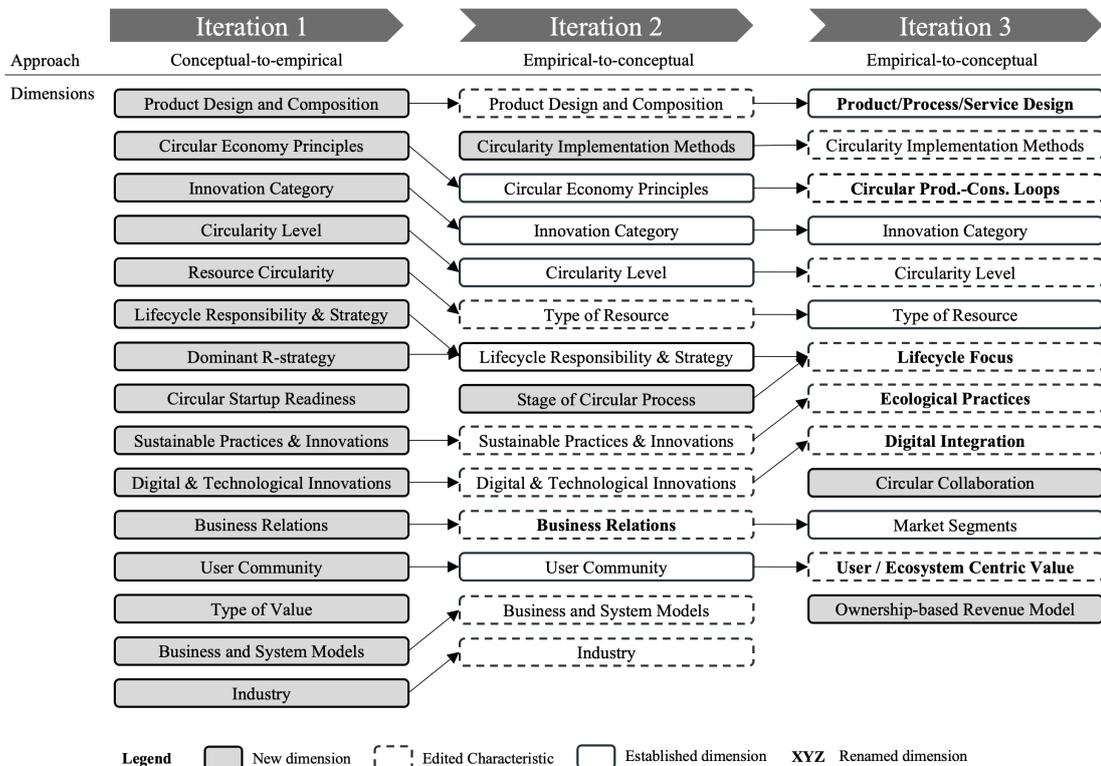


Figure 6.4: Derived Taxonomy Dimensions from Iteration 1, 2, and 3 (Own Illustration)

2nd iteration. A second, empirical-to-conceptual iteration was performed to inductively refine the taxonomy through real-world startup data. A dataset of 125 circular startups was compiled from five curated sources: the Ellen MacArthur Foundation's Circular Startup Index, Crunchbase, Dealroom, EU Startups, and the Circular Startup Landscape by UnternehmerTUM (see Appendix A.4). Each source contributed 25 randomly selected startups. These databases were chosen for their global recognition in entrepreneurship research (Dalle et al., 2017; McCarthy et al., 2023), and their established focus on CE-related innovation.

To ensure conceptual consistency, inclusion criteria aligned with the EU's startup definition (European Commission, 2003): all firms had fewer than 250 employees, were founded between 2018 and 2023, were active at the time of data collection (November 2023), and had annual revenues below 50 million Euros. For Crunchbase, Dealroom, and EU Startups, additional filters were applied to include only startups with a CBM, as outlined in Chapter 2 Section 2.2.2. The two CE-focused repositories already applied these criteria at source.

In this phase, desk research was conducted to systematically assess each startup's CBM using publicly available information (e.g., websites, press coverage, reports). Each case was coded against the preliminary taxonomy dimensions. The presence or absence of characteristics and the noted emerging patterns or inconsistencies were recorded. Where characteristics proved empirically irrelevant, overly broad, or duplicative, they were revised or removed. Conversely, when novel or recurring attributes appeared across cases, they were introduced as new dimensions or characteristics. This inductive analysis allowed the taxonomy to reflect empirically grounded distinctions within startup CBMs. Figure 6.4 depicts the changes in the taxonomies' dimensions. Upon reviewing the ending conditions, it was determined that saturation had not yet been achieved. A third iteration was therefore required to further validate and refine the classification schema.

3rd iteration. In the third iteration, another empirical-to-conceptual approach was performed, aimed at sharpening the taxonomy's clarity, distinctiveness, and conceptual robustness. The same dataset of 125 startups from the second iteration was used to evaluate whether dimensions required further refinement. This involved revisiting all cases with a focus on borderline or ambiguous classifications. Some examples of this refinement include splitting overly broad dimensions, merging overlapping ones, or renaming unclear labels. The revision process was supported by intensive discussions with two entrepreneurship researchers, ensuring interpretive consistency and definitional precision across dimensions. Where relevant, the literature was revisited to triangulate emergent interpretations, thus maintaining the multi-method approach. Throughout iterations two and three, the taxonomy's evolution using an iterative tracking model was documented (see Figure 6.4). It visualized how dimensions were added, collapsed, or restructured.

After evaluating 20 additional startups without uncovering any new characteristics or dimensions, it was determined that theoretical saturation had been reached. All objective ending conditions (Nickerson et al., 2013), including coverage of all cases, at least one characteristic per dimension, and no emerging categories, were fulfilled. Likewise, subjective criteria such as conciseness and comprehensiveness were met. It thus concluded the design phase with a robust, empirically grounded taxonomy, ready for formal evaluation in the next step. The taxonomy had stabilized at 10 dimensions and 48 characteristics, striking a balance between theoretical comprehensiveness and empirical observability.

6.3.2 Taxonomy Development

As the artifact progressed from iteration one to three, the taxonomy underwent a series of changes, a subject addressed in this section.

Several dimensions initially derived from literature, such as ‘Circular Startup Readiness’, ‘Type of Value’, ‘Business and System Models’, and ‘Industry’, were removed. These were either not empirically observable based on publicly available data, lacked discriminative power across cases, or overlapped conceptually with more informative dimensions. Conversely, several novel dimensions, grounded in the empirical data, were identified.

First, a ‘Circularity Implementation’ dimension was introduced to capture how circular practices were enacted, e.g., through reuse, product return, or loop-enabling infrastructure. Second, a new ‘Circular Collaboration’ dimension was added to reflect the depth and function of external partnerships. Third, an ‘Ownership’ dimension was included to distinguish whether a startup retains ownership of its offering or transfers it to the end user. While finer distinctions, such as rental vs. usage-based models, might theoretically yield further insights, they were often not inferable from public sources. For conceptual clarity and coding reliability, a binary categorization was applied: producer ownership (retained) vs. consumer ownership (transferred).

Additionally, several dimensions were refined through renaming, merging, or splitting to enhance analytical clarity and empirical fit. For example, the initially separate categories of R-strategies and lifecycle responsibility were integrated into a unified ‘Lifecycle Focus’ dimension. This consolidated structure captures both the strategic intent (e.g., reduce, reuse, recycle) and the operational locus of circularity across the product lifecycle, from material sourcing to end-of-life management. While some dimensions, such as ‘Lifecycle Focus,’ encompass a broad spectrum of practices, analytical consistency was ensured by grounding them in established conceptual frameworks and clearly delineating subcategories with robust coding rules. These refinements enhanced the taxonomy’s conceptual coherence while maintaining empirical discriminability.

The following section comprehensively presents the final version of the artifact, whereas the subsequent section delineates the refinements of this final artifact along the demonstration and evaluation phase.

6.4 A Taxonomy for Circular Startup Business Models

Following the three iterative design phases and subsequent evaluation cycles, the final taxonomy artifact of CBMs for circular startups was developed. As illustrated in Figure 6.5, the taxonomy is designed as a morphological box comprising ten dimensions with multiple characteristics each. These dimensions are organized along the core components of the business model framework, value proposition, value creation, and value network, thereby reflecting the functional logic through which circular startups generate, deliver, and capture value.

	Dimension	Characteristics									
Value Proposition	Offering	Product						Service			
	Product Design	Low Resource Input	Longevity	Modularity and Adaptability	Material Circulation	Conventional Product Design	No Product Offering				
	Service Design							Algorithm-based (incl. AI)	Collaborative Consumption Platform	Supportive Infrastructure	Conventional Service Design
Value Creation	Raw Materials	Recycled Materials	Recyclable Materials	Biodegradable Materials	Renewable Materials	Traditional Sourcing	No Product Offering				
	CE Operational Logic	Reduce	Reuse	Repair	Recycle	Enable Others	No Contribution to CE				
	Ecological Contribution	Land	Air	Water	Indirect Ecological Contribution	No Ecological Contribution					
	Social Contribution	Employment	Education	Community Engagement	Other	Indirect Social Contribution	No Social Contribution				
Value Network	Value Network Integration	Cross Industry Collaboration	Value Chain Collaboration	Knowledge-Based Collaborations	Other	No Integration					
	Sales Model	B2B	B2C	C2C	B2G	Alternative Models					
	Ownership	Producer					Consumer				

Figure 6.5: The Artifact: Taxonomy for Circular Startup Business Models (Own Illustration)

Beyond structuring circular startup CBMs, the taxonomy instantiates the key mechanisms specified in the three DPs and translates them into a structured, analytically applicable tool that supports intermediaries in aligning their activities with the needs of circular startups. In line with DP2 and DP3, the taxonomy identifies and visualizes startups’ resource and capability dependencies, circular design choices, and network relations, while also making CBM configurations transparent to foster shared understanding among ecosystem actors. In addition, it provides a standardized analytical lens for assessing circular value creation, investment readiness, and strategic fit with circular ecosystem transformation goals.

In line with DP1, the taxonomy embeds reflexive diagnostic capacity: by making structural choices, material dependencies, and value network configurations explicit, it allows intermediaries to surface regulatory constraints, infrastructural gaps, and systemic misalignment that shape startups’ ability to implement circular strategies. In this way, the

artifact supports intermediaries' institutional work at the interface of policy, ecosystem coordination, and startup support.

The sequence of dimensions is intentionally designed to guide analytical application. It begins with the fundamental nature of the startup's offering, product or service, which determines the structural basis of the CBM. Subsequent dimensions capture how circularity is embedded in product or service design, material sourcing, and operational logic. Further dimensions assess ecological and social contributions, enabling intermediaries to evaluate how the previous practices translate into external value. Finally, the taxonomy analyzes value network integration, an element particularly decisive for CBM scalability. But also, collaboration patterns, sales logics, and ownership structures are detailed, all of which shape the capacity of a circular startup to implement and scale circular strategies.

The taxonomy allows non-exclusive, combinatory categorization, reflecting the hybridity typical of circular startups. Certain dimensions apply conditionally (e.g., product design only in product-based models). Yet the taxonomy is designed to capture circularity across the full spectrum of startup activities, including supporting operations and systemic contributions. Thus, the artifact provides a coherent analytical structure through which intermediaries can diagnose startup needs and align their support mechanisms, thus identifying levers to strengthen circular entrepreneurship within EEs, pushing a CE transformation within their ecosystem context.

In the following sections, the taxonomy dimensions and their characteristics are outlined in more detail.

6.4.1 Value Proposition

Offering. The first dimension of the taxonomy, 'Offering,' captures the fundamental nature of what the startup provides to its customers, namely, whether the business model is centered around a physical product, a service, or a combination of both. This high-level differentiation serves as an essential analytical anchor for assessing a CBM, as it determines the structural pathway through which circular strategies may be implemented. A product-based offering may incorporate circular principles through material choices and design for disassembly, whereas service-based offerings often embed circularity through digital integration, platforms, or infrastructure. Based on expert feedback, this initial categorization proved crucial for interpreting downstream dimensions such as product and service design, which detail how circularity is embedded in the specific configuration of the offering.

Product Design. For startups with a product-based business model, the 'Product Design' dimension captures how circular principles are embedded in the physical configuration of the offering. Circular product design can take several forms across different stages of the product lifecycle. Based on the data, six recurring characteristics were identified.

First, some startups pursue low resource input, aiming to minimize the quantity of virgin materials required in production. This is achieved either by using alternative raw materials, often sourced from waste or secondary streams, or by optimizing manufacturing processes to improve material efficiency (Bocken & Ritala, 2021; Manninen et al., 2018).

Second, design for longevity involves increasing product durability and functional lifespan. These models contribute to slowing material loops by minimizing the need for replacement over time (Geissdoerfer et al., 2018; Manninen et al., 2018).

Third, models were observed, characterized by modularity and adaptability, enabling easy repair, upgrade, or reconfiguration of components. Such design strategies allow users to extend a product's utility through interventions during use, and are aligned with circular principles, slowing the material cycle (Pieroni et al., 2021).

A fourth strategy centers on material circulation, where products are deliberately designed to be disassembled and reintegrated into future production cycles. This involves careful material selection, e.g., mono-material components, and design choices that support reuse or recycling at end-of-life (Bocken & Ritala, 2021). The delineated product design strategies are systematically deliberated upon in a process-oriented manner, commencing with production considerations and extending to post-consumer usage scenarios that contribute to the CE ethos. This characteristic is further specified in the 'Raw Materials' dimension.

Startups that do not implement any of these strategies were classified under conventional product design, indicating an absence of deliberate circularity in the product configuration. In cases where the startup does not offer a physical product at all, but is service-based, this dimension was coded as no product offering, to preserve analytical clarity and avoid forced categorization.

Service Design. In business models centered around service provision, the 'service design' dimension captures how circular principles are embedded in the delivery, coordination, and functionality of the service. The taxonomy distinguishes five types of service logic based on empirical patterns and expert feedback. One prominent form involves algorithm-based services, where startups deploy digital technologies such as AI or image recognition to optimize resource flows, for example, improving waste separation, material tracking, or logistics. These services may support different lifecycle stages, from beginning of life (extraction and manufacturing), middle of life (wholesale, retail, logistics, and customer usage), and end of life (repair, reuse, and remanufacturing) recovery (Yang et al., 2014).

A second model type is the collaborative consumption platform, where startups mediate access-based or second-life transactions between users (Lacy et al., 2020). These

platforms extend the lifespan of under-utilized or defective goods by enabling reuse, re-manufacturing, or component harvesting (J. Han et al., 2020). Sharing-based applications such as mobility or equipment rental fall into this category (Bocken et al., 2014).

Third, some startups provide supportive infrastructure for circular ecosystems, for instance, by offering take-back systems, refurbishment logistics, or data management services that facilitate traceability or loop closure for other actors (Antikainen & Valkokari, 2016; Das et al., 2022; Mentink, 2014).

Startups whose service design did not exhibit any of these characteristics were coded as conventional service design, and those without identifiable service components were categorized under no service offering. These characteristics serve to distinguish service-based circularity from product-driven models and to preserve conceptual clarity across the taxonomy.

6.4.2 Value Creation

When looking into the processes and activities, resources, and capabilities within circular startups and how these elements are orchestrated to create value, their CBM can be categorized into four dimensions: ‘Raw Materials’, ‘CE Operational Logic’, ‘Ecological Contribution’, and ‘Social Contribution’.

Raw Materials. The decision to specify the characteristic ‘Material Circulation’ from the product design dimension in a separate dimension ‘Raw Materials’ aimed at illuminating the type and origin of materials used by circular startups in their production processes. This aspect of value creation is crucial for determining and assessing the startup’s CE operational logic and its ecological contribution, as material selection directly affects biodegradability, recyclability, and the potential for closed-loop systems. Based on the data, four distinct characteristics were identified. The first characteristic is ‘upcycled waste streams’ or ‘recycled materials,’ often referenced in industrial symbiosis. These include pre- or post-consumer waste streams, generated during production processes or disposed products, that are reintegrated into production (Blomsma et al., 2019; Potting et al., 2017).

Secondly, a CBM creates value by sourcing recyclable materials, which are easily recyclable under existing infrastructure, typically in the form of mono-materials. Experts emphasized this as a pragmatic yet impactful strategy.

Thirdly, biodegradable materials present a sourcing option. These organic materials can be broken down by microorganisms, such as bacteria and fungi, into natural substances within a reasonable time frame (European Chemicals Agency, 2023). This decomposition depends on environmental conditions such as temperature, moisture, and the presence of microorganisms (Zhao et al., 2023).

Lastly, sourcing renewable materials is a distinct characteristic of circular startup CBMs (Blomsma et al., 2019). Renewable materials are derived from resources replenished naturally over short periods, typically within a human lifespan (Guo, 2024).

Startups that do not fall into any of these characteristics were classified as relying on conventional sourcing. In some cases, the absence of material sourcing altogether was due to the startup offering purely a service-based solution, and was coded accordingly.

To capture the range of sustainability-related effects created by circular startups, it was conceptually differentiated between three dimensions: ‘CE Operational Logic’, ‘Ecological Contribution’, and ‘Social Contribution’. These dimensions operate at different analytical levels. ‘CE Operational Logic’ reflects the overarching CE strategy embedded in the CBM. In contrast, the ‘Ecological Contribution’ dimension captures the tangible environmental outcomes resulting from these practices. Finally, the ‘Social Contribution’ addresses the third pillar of sustainability, encompassing societal outcomes. By conceptually distinguishing between strategic intent and realized impact across environmental and social domains, the explanatory power and practical relevance of the taxonomy were enhanced.

CE Operational Logic. The conceptual breadth of the ‘CE Operational Logic’ dimension was addressed by drawing on the R-Principles framework (Kirchherr, Yang, et al., 2023; Morsetto, 2020), where each ‘R’ represents a different degree of circularity, ordered by its potential environmental impact (see Table 6.4). This framework is commonly used in practice, especially by experts working with startups to assess and support circularity efforts, allowing for consistent categorization while preserving domain relevance. Strategies are distinguished according to the type of action applied to the product or material flow. While strategies such as reduce and recycle primarily affect the material and resource flow during production or end-of-life processing, reuse and repair target the use phase of products by extending functionality.

R-Principle	Definition
Reduce	Increase efficiency in product manufacture or use by consuming fewer natural/limited resources and materials
Reuse	Reuse of discarded product by another consumer which is still in good condition
Repair	Repair and maintain defective products so it can be used with its original function
Recycle	Process materials to obtain the same (high grade) or lower (lower grade) quality

Table 6.4: Circular contribution of startups according to Morsetto (2020)

Aside these R-Principles, ‘enable others’ was also identified as a CE Operational Logic. Accordingly, circular startups operate at the inter-organizational level, enabling circular

practices in other actors or disseminating knowledge rather than implementing a circularity strategy themselves. This form of mediated impact can also apply across both the ecological and social dimensions and has therefore been treated as a valid but distinct mode of contribution within the taxonomy. This differentiation allows for consistent classification across startups with diverse circular operational models.

Ecological Contribution. The ‘Ecological Contribution’ dimension captures the actual or intended environmental effects of the CBM. For this taxonomy, the three broad ecological domains, land, air, and water, have been adopted, which align with established environmental frameworks, such as the planetary boundaries (Steffen et al., 2015). This abstraction emerged as a direct response to expert feedback, which emphasized the need to operationalize ecological contributions in a manner accessible to practitioners without requiring deep ecological expertise. Startups can generate a positive environmental impact on land, for instance, by promoting sustainable land use or enhancing biodiversity. Contributions related to air include mitigating climate change through greenhouse gas reduction or decreasing air pollution by minimizing atmospheric aerosol emissions. The water domain encompasses actions aimed at conserving freshwater resources or protecting marine ecosystems. Importantly, not all startups exhibit direct impact in each domain; in some cases, contributions may be indirect or absent, which is reflected in the coding structure of the taxonomy.

Social Contribution. The ‘Social Contribution’ dimension elucidates whether a startup integrates societal objectives beyond economic and ecological impact into its CBM. Startups may contribute to community development through activities such as local job creation or support for regional education initiatives (Eckerle et al., 2024). Another frequently observed pattern involves community engagement, where startups seek to influence regulatory frameworks in favor of CE principles by collaborating with local stakeholders or advocating for systemic change, an aspect strongly emphasized by expert feedback. Additionally, some startups engage in other or indirect forms of social contribution, such as philanthropic donations or awareness-raising initiatives. However, not all startups exhibit observable activities in this domain; the taxonomy, therefore, also accounts for cases of absent social engagement.

6.4.3 Value Network

While internal capabilities and resources form the core of any business model, the CE paradigm places particular emphasis on external interactions. Circular startups often depend on networks of suppliers, recyclers, customers, and institutional actors to realize material loops, enable take-back mechanisms, or facilitate knowledge exchange (Ferreira et al., 2024; Geissdoerfer et al., 2022; Tabas et al., 2025). As such, the value network is

not merely a supportive structure but a strategic enabler of circularity. The following dimensions assess how startups embed themselves in such networks through value network integration, sales models, and ownership configurations.

Value Network Integration. The CE inherently depends on the integration of diverse actors across organizational and sectoral boundaries, an aspect captured in the dimension ‘Value Network Integration’. This dimension reflects the extent to which startups establish strategic partnerships that support circular value creation and delivery. A common form includes cross-industry collaborations, particularly where startups partnered with manufacturing firms to repurpose industrial by-products, such as textile offcuts, agricultural or food waste, into new circular offerings (Henry et al., 2020). Beyond cross-industry collaborations, also operational collaborations along the supply chain were observed, such as partnerships with logistics or waste management providers to organize reverse logistics and enable take-back systems (Lacy et al., 2020). These systems allow for the structured return of used products or materials from end-users back into the production cycle, often relying on third-party actors for collection, sorting, and reintegration. Expert interviews also revealed occasional instances of knowledge-based collaborations, such as with academic institutions or circularity consultants. Legitimacy-oriented alliances with Non-Governmental Organizations or public sector actors, as a form of engagement, were observed infrequently and lacked consistent documentation across the dataset. As such, they were categorized under a general ‘other’ subcategory to acknowledge their presence without overstating their prevalence. Notably, some circular startups operated with no observable integration into external value networks.

Sales Model. To further unpack the dynamics of the value network within CBMs, the dimension ‘Sales Model’ was included, which specifies the primary customer interface through which the startup delivers its offering. This dimension reflects the nature of the transactional relationship and the intended target group. Most startups in the sample followed a business-to-business (B2B) model, engaging with corporate clients across industries. Others operated under a business-to-consumer (B2C) logic, offering products or services directly to end-users. A smaller subset enabled consumer-to-consumer (C2C) transactions, often through digital platforms that facilitate the reuse of products by sharing or reselling. Notably, several startups pursued public-sector-oriented models, providing circular solutions directly to municipalities, schools, or government agencies, an arrangement that is referred to as government-to-business (G2B) to capture its distinct logic. Finally, some startups adopted alternative models, such as B2B2C, wherein products are sold to businesses that then distribute them to end consumers.

Ownership. The ‘Ownership’ dimension captures the degree to which circular startups retain control over their products or services throughout the lifecycle. It can be distinguished between two main configurations. First, producer ownership is given when the

startup maintains ownership of the product or service throughout its use. This includes leasing, pay-per-use arrangements, product-as-a-service models, and platform-mediated exchanges where the producer maintains legal ownership while users gain temporary access. In CBMs, these alternative ownership structures are often associated with improved resource efficiency, extended product lifespans, and more effective reverse logistics (Bresanelli et al., 2022). These models align with CE principles by enabling the provider to maintain responsibility for the product and ensure its reintroduction into the loop. While leasing and rental arrangements were often explicitly mentioned, it was frequently unclear from publicly available sources whether access was granted through usage-based billing or other pay-per-use mechanisms. To maintain consistency and avoid over-interpretation, these models were therefore aggregated under the broader category of producer ownership.

However, the data indicate that such ownership-retention models remain relatively rare among circular startups. Thus, the second distinction in this dimension is consumer ownership. In most cases, ownership is transferred to the customer upon purchase, reflecting either market constraints or the perceived complexity of service-based revenue models. This binary classification emerged from the data and proved analytically robust across cases.

While more complex hybrid forms exist, especially in platform-based contexts, they align more closely with the producer ownership logic, given the provider's continued control over pricing, conditions of use, and reverse logistics. Nonetheless, the presence or absence of ownership retention plays a significant role in shaping the circular potential of a given business model. It is therefore included as a distinct dimension in the taxonomy.

6.5 Demonstration and Evaluation of the Taxonomy

Before the final taxonomy was realized in its above-introduced form, the fourth and fifth steps of the DSR, according to Peffers et al. (2007), involved the demonstration and evaluation of the developed artifact. These steps serve to assess whether the artifact effectively addresses the defined problem and fulfills the objectives derived from the DRs and DPs. In DSR, evaluation is essential to establish both the utility and validity of the design solution (Hevner et al., 2004; Venable et al., 2012).

Accordingly, the taxonomy was demonstrated and evaluated across two iterative cycles, each contributing to the progressive refinement of the artifact and its contextual fit to intermediary needs. The evaluation strategy followed a formative logic (Venable et al., 2016), combining conceptual and empirical assessments. Each evaluation cycle focused on a different aspect of artifact validation, from theoretical grounding to practical relevance. The overall evaluation design is summarized in Table 6.5.

Table 6.5: Demonstration and Evaluation Approach in three Cycles

Cycle	Demonstration	Evaluation	Type of Evaluation
1	Focus group workshop with ten academic experts	Conceptual validity: Taxonomy's clarity, usefulness, and applicability	Formative / Artificial evaluation: Conducted in a controlled expert environment to test theoretical soundness
2	Expert application from five participants	Practical relevance: Taxonomy's adequacy, applicability, completeness, and relevance	Formative / Artificial evaluation: Performed with practitioners to assess usability and contextual relevance.

The iterative process allowed the taxonomy to be continuously improved, reflecting the DSR's dual aim of rigor and relevance (Hevner et al., 2004). The two evaluation cycles thus combine ex-ante (before full implementation) and ex-post (after application) evaluation activities (Sonnenberg & Brocke, 2012).

Cycle 1: Expert Workshop. The first evaluation stage consisted of a structured focus group workshop conducted in December 2023. A panel of ten academic experts with domain expertise in business model design, sustainable entrepreneurship, and taxonomy development was convened. In line with established guidelines for taxonomy validation (Szopinski et al., 2019), the workshop assessed the taxonomy's clarity, usefulness, and applicability.

The two-hour session began with a walkthrough of the taxonomy, followed by collaborative classification exercises using three real-world circular startups not included in the development dataset. These exercises tested whether the taxonomy could accommodate unfamiliar business models and simulated realistic application scenarios (Cledou et al., 2018). Feedback was collected in real time and used to revise definitions, eliminate redundancies, and enhance practical comprehensibility. These revisions informed the second evaluation phase.

The focus group confirmed the taxonomy's utility for dissecting a startup's CBM core configuration and its potential to guide ecosystem actors in identifying strengths and gaps. Experts emphasized the value of the taxonomy for both analytical and strategic purposes. At the same time, several areas for refinement emerged. First, some dimensions showed partial conceptual overlap. For example, the characteristics under the preliminary 'Circular Production–Consumption Loops' dimension were found to intersect with those in 'Product/Process/Service Design', prompting the recommendation to consolidate or clarify these categories. Second, participants suggested introducing a higher-level distinction between product- and service-based CBMs at the outset of the taxonomy to improve usability and logical flow, prompting the creation of the 'Offering' dimension.

Moreover, the dimension 'Innovation Category' was considered difficult to apply consistently across startups and was therefore recommended for removal to enhance parsimony. The inclusion of a separate dimension for assessing the degree of circularity was also challenged. Experts argued that circularity should emerge from the configuration of

characteristics rather than be predefined as a discrete classification. As such, they proposed treating circularity level as an outcome of the classification process rather than a fixed taxonomy element. Additional feedback addressed terminology: for instance, the label ‘Technical Nutrients’ was flagged as ambiguous and revised for clarity. Finally, participants recommended including open categories (e.g., ‘Other’) in select dimensions such as ‘CE Implementation Method’ and ‘Market Segment’ to accommodate outlier cases.

Cycle 2: Expert Application. The second evaluation cycle examined the taxonomy’s practical utility and user experience, and identified any remaining conceptual or operational gaps. Five independent experts, two ecosystem intermediaries, one circular startup founder, and one researcher in circular entrepreneurship participated. Each received documentation detailing the taxonomy, definitions, and illustrative startup cases. Participants classified these cases and, where relevant, additional startups from their own experience. Feedback was gathered through written reflections and three semi-structured interviews (30 minutes each).

The data were analyzed using structured content analysis (Mayring, 2014) with a deductive coding scheme based on the taxonomy’s meta-characteristics and dimensions. This analysis confirmed the robustness of most refinements from the first cycle and revealed additional suggestions for improvement. Following Kundisch et al. (2022), adjustments (additions, deletions, renaming, reordering) were made to strengthen conceptual precision and user alignment.

Overall, practitioners affirmed the taxonomy’s practical value as an analytical framework for understanding startup CBMs. They emphasized its utility in pinpointing configuration gaps, enhancing circularity, and identifying targeted support opportunities within EEs. Nonetheless, several areas for enhancement were noted. First, the labeling of absent characteristics using generic terms like ‘None’ was deemed imprecise. To answer this call, more explicit descriptors (e.g., ‘No Product Offering,’ ‘No Social Contribution’) are introduced to minimize ambiguity. Second, terminology for material properties, such as ‘recyclable’, was revised to prevent misinterpretation. For instance, experts cautioned that materials deemed recyclable only under specialized conditions should not be uniformly categorized as such without contextual clarification.

The evaluation also prompted refinement of dimensions capturing ‘Ecological and Social Contributions’. While their inclusion was validated, experts recommended greater differentiation within these categories. For example, ‘Indirect Social Contributions’, such as donations and awareness-raising initiatives, were identified as conceptually distinct and thus warrant separate classification. In contrast, the previous structuring of ecological impact along the planetary boundaries’ framework was considered too abstract for non-academic users. Therefore, this dimension was simplified to improve accessibility and practical relevance.

Finally, the taxonomy's structural logic was adjusted to enhance navigability. The sequence of dimensions was re-ordered to reflect a typical business model logic, beginning with the nature of the 'Offering' (product or service), followed by dimensions tailored to each type. This structural refinement aligns with feedback suggesting the taxonomy should offer a guided, intuitive user experience. As a result of the evaluation process, a final set of operations, including additions, deletions, renaming, and reordering of elements, was applied in accordance with the taxonomy design guidelines proposed by Kundisch et al. (2022).

6.6 Communication

The final step of the DSR project is the communication of the resulting artifact and its underlying design knowledge to relevant scholarly and practitioner audiences (Peffer et al., 2007). This dissemination is ensured through multiple channels. First, the present dissertation documents the complete design process, including the derivation of DRs, the formulation of DPs, and the development and evaluation of the taxonomy artifact. Second, the core elements of this research have already gained scientific recognition: a peer-reviewed journal article presenting the artifact and its design rationale has been accepted for publication. This confirms the academic relevance, methodological rigor, and practical value of the design knowledge developed in this study.

Beyond academic dissemination, the artifact directly targets intermediaries within EEs, including accelerators, incubators, and CE programs. These actors represent the primary user group of the circular support alignment artifact. Through ongoing collaborations and established practitioner contacts, the published version of the artifact will be shared with these organizations for potential adoption and further refinement. This ensures that the design knowledge generated in this project does not remain solely conceptual but is made accessible to those who can apply it to strengthen circular entrepreneurship in practice. The second DSR study, which is presented in the following chapter (cf. Chapter 7), builds on this aspect by testing the final artifact against real-world cases in collaboration with an intermediary organization.

Together, these communication channels guarantee that the artifact and its associated DPs contribute meaningfully to academic debates and to practitioner efforts aimed at advancing circular transformation within EEs.

Validating Circular Support Alignment for Intermediaries

7.1 Introduction

This study constitutes the second DSR project of this dissertation and builds directly on the artifact developed in the preceding project, a taxonomy of circular startup CBMs. While the initial project conceptualized the taxonomy and validated its theoretical grounding, its practical validation remained limited. As noted by Venable et al. (2016), design artifacts require not only expert-based assessment but also naturalistic evaluation to demonstrate their utility, applicability, and robustness in real-world environments. This posed a central limitation of the previous study: the taxonomy had not yet been empirically tested through application to an authentic dataset or evaluated in collaboration with practitioners.

The present study addresses this gap by conducting an empirical, naturalistic validation of the taxonomy. It tests the artifact's empirical robustness and analytical applicability through a mixed-method evaluation approach combining (1) the application of the taxonomy to a real-life dataset of circular startups provided by an intermediary organization, (2) statistical assessment through hierarchical and partitioning cluster analyses, and (3) interpretive validation in collaboration with a domain expert. In doing so, this project extends the design, rigor, and relevance cycles of DSR as described by Hevner (2007). It demonstrates how the artifact performs when confronted with empirical heterogeneity, practitioner interpretation, and the complexities of actual CBMs in a CEE.

7.2 Methodology

This study follows the three-cycle view of DSR by Hevner (2007), namely rigor, relevance, and design, while building on the prior DSR project of this dissertation, which created the initial artifact (a taxonomy for circular startup CBMs) (cf. Chapter 6). The process is depicted in Figure 7.1 and ensures both practical relevance and scientific rigor (Baskerville et al., 2018).

The previous project contributed to the rigor, relevance, and design cycles by conceptualizing and evaluating the artifact and deriving DRs and DPs (cf. Chapter 6 Section 6.2). The present study extends this work by completing the relevance cycle through field-based

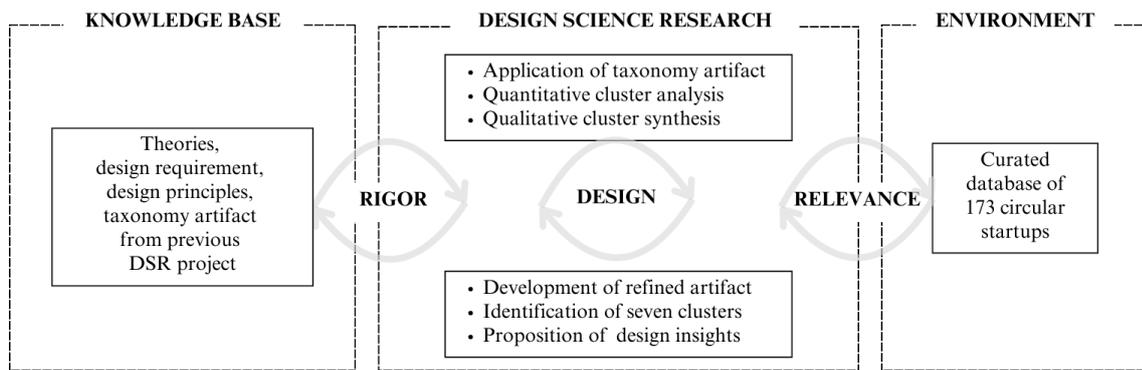


Figure 7.1: Design Science Research Approach according to (Hevner, 2007)

evaluation with an intermediary organization and iteratively refining the artifact based on practical usage. Thus, this DSR study aims to develop an empirical design object that describes the application of the artifact and its effects (Seckler et al., 2021).

In the relevance cycle, a practitioner environment provided both a database of 173 circular startups and practical requirements for using the taxonomy to inform support strategies for these startups. The intermediary was chosen due to its leading activities in the field of circular entrepreneurship in Germany, aiming for a system-level change toward a CE. Its activities include hosting community events for circular startups, running approximately 20 tailored support programs that integrate CE knowledge, and facilitating a network of more than 350 circular startups along with corporate and investor partners (UnternehmerTUM GmbH, 2025).

In the design cycle, the taxonomy was applied in a double-blind coding process, iteratively tested by the intermediary practitioner and the author. To address emerging limitations, particularly the inability of the design of the taxonomy, the morphological box, to reflect interdependencies between characteristics of circular startups' CBMs, the artifact was refined. Drawing on the rigor cycle, the refinement was theoretically grounded in the DPs from the previous study, resulting in a structured yet dynamic analytical framework.

A mixed-method evaluation followed, combining a hierarchical cluster analysis with qualitative interpretation. The results formed seven empirically grounded circular startup clusters, which were jointly interpreted with the practitioner. The evaluation also yielded actionable design insights for intermediary practice, accounting for the objective of describing the effects of the artifact's application as per Seckler et al. (2021). Thereby, the relevance cycle was closed, and new knowledge contributed back into the rigor cycle.

In the following sections, the data collection and sampling, the coding process, and the mixed-method evaluation are outlined in more detail.

7.2.1 Data Collection and Sampling

Consistent with the relevance cycle, the dataset originates directly from the practitioner environment and reflects the information base used by the intermediary for its strategic

decision-making. The intermediary organization provided an initial dataset of 330 circular startups, retrieved through a structured selection process. The sample was compiled from two major startup databases - Crunchbase and Tracxn - chosen for their comprehensive coverage and strong reputation as leading repositories for startup information. Crunchbase provides open-access data, while Tracxn offers curated, proprietary insights. Both platforms are widely recognized in entrepreneurship and management research (see e.g., Den Besten, 2020; Nigam et al., 2020; Roshan et al., 2024; Sabarinathan, 2019).

To refine the dataset, several inclusion criteria were applied. First, the databases were filtered for CE-related themes, such as circular, industrial symbiosis, resource-efficient, or loop. Second, the geographic focus was restricted to Germany, reflecting its strong policy engagement with CE and mature innovation infrastructure (Bundesumweltministerium, 2024; Bundesverband Deutsche Startup e.V., 2025). Third, firms were only included if they were no more than ten years old and employed a maximum of 250 employees, aligning with the European Commission's definition of SMEs (O'Regan & Ghobadian, 2004). Finally, the sample was limited to privately held firms that had not been acquired, merged, or otherwise absorbed into larger corporate entities.

During the coding process, a purposive sampling procedure was simultaneously applied to maintain conceptual balance and avoid over-representation of specific business model types (Bryman, 2012). Startups were included only if they introduced a new aspect to the taxonomy, resulting in a final sample of 173 circular startups. This purposive refinement ensured conceptual completeness of the taxonomy application and maintained internal variance needed for subsequent evaluation. Thus, the final dataset reflects a design-driven sample rather than a representative one, which aligns with methodological recommendations for DSR evaluation (Venable et al., 2016).

7.2.2 Coding Process

Each startup was analyzed using a binary coding scheme derived from the taxonomy's dimensions. Publicly available sources (e.g., websites, press releases, third-party descriptions) were consulted. For every characteristic, a value of 1 was assigned if the feature was present and 0 otherwise.

Coding was performed jointly by the author and a representative of the intermediary organization in a double-blinded, iterative process. Both coders independently coded an initial subsample of 50 startups and then met to reconcile differences, refine definitions, and ensure shared interpretation. This procedure was repeated until full agreement was achieved. The final dataset, comprising binary vectors for 173 startups across 48 variables, served as the input for cluster analysis.

Consistent with the design cycle, the coding procedure functioned as a naturalistic, formative evaluation of the taxonomy (Venable et al., 2016). During this iterative process, coding disagreements and repeated clarification needs revealed a limitation of the morphological-box design: it was unable to account for the relational interdependencies among characteristics of circular startup CBMs. This indicated a partial misalignment with two DPs from the prior DSR project.

First, DP1 (Circularity as Transversal Logic) highlights the need for representing how circularity cuts across and connects different BM dimensions. The additive and non-relational structure of the morphological box constrained the taxonomy's ability to reflect these cross-dimensional linkages. Second, DP2 (Community-Based Collaboration) emphasizes relational understanding of capabilities, interdependencies, and value-network interactions - aspects that cannot be adequately captured through a static, dimension-by-dimension template.

To address these design limitations and to enhance the artifact's ability to support intermediaries, the taxonomy was refined into a structured yet dynamic analytical framework. Drawing on the rigor cycle, this refinement was theoretically grounded in the DPs established in the previous DSR project (cf. Chapter 6, Section 6.2).

7.2.3 Mixed-Method Evaluation

After delineating the interrelations and dependencies within the refined version of the artifact, the dataset was adjusted to ensure conceptual clarity and internal consistency. Redundant or contradictory indicators (e.g., No Product Offering) were removed, and categorical summary characteristics (Product, Service) were replaced by their operational sub-characteristics to guarantee mutual exclusivity. This refinement reflects the rigor cycle, ensuring methodological and conceptual alignment with the artifact's underlying DPs.

To evaluate the refined dataset, a cluster analysis was performed. Cluster analysis groups cases based on shared characteristics and is frequently applied in entrepreneurship research to identify archetypes of business models (Crum et al., 2022). This cycle, therefore, served to explore whether the taxonomy could meaningfully differentiate types of circular startups and thus demonstrate its analytical utility as a design artifact. As part of the design cycle, this evaluation step served as a summative evaluation of the artifact's ability to structure and differentiate circular startup CBMs Venable et al., 2016.

A hierarchical cluster analysis using Ward's (1963) method with Euclidean distance was conducted to explore latent group structures among circular startups. Ward's criterion minimizes within-cluster variance and typically produces compact, interpretable clusters (Ward Jr., 1963). Compared with average- and complete-linkage methods, Ward's approach produced the clearest dendrogram with visible discontinuities, indicating potential cluster boundaries (see Figure 7.2).

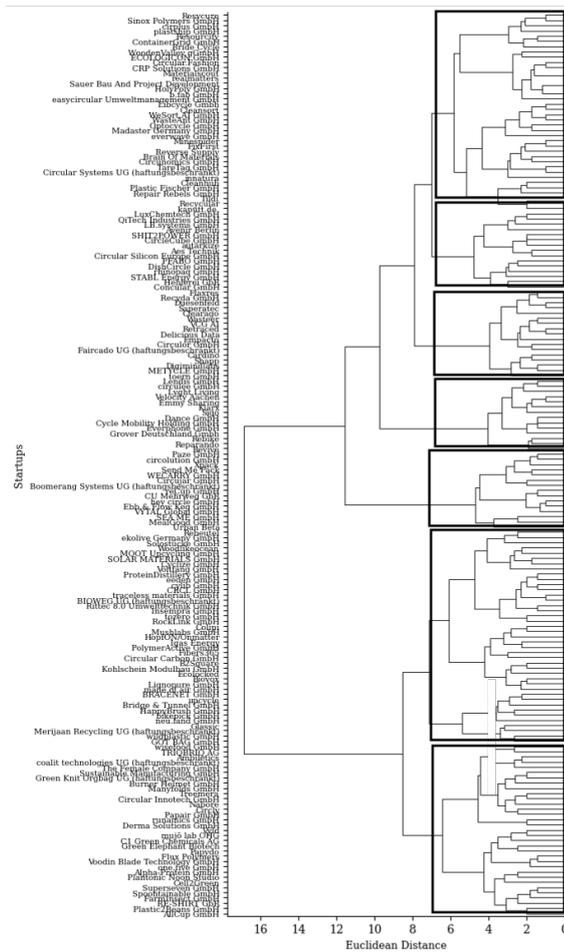


Figure 7.2: Dendrogram based on Hierarchical Clustering using Ward’s Method (Own Illustration)

Following the commonly applied two-step approach (Punj & Stewart, 1983) in entrepreneurship research (see e.g., Weimar et al., 2025), hierarchical results were subsequently refined through k-means and k-medoids clustering and evaluated using silhouette coefficients. Across all tested cluster solutions (k=2-11), silhouette values remained below 0.25, suggesting overlapping feature profiles rather than statistically distinct clusters.

Interpretation and Theoretical Validation. Consistent with the DSR evaluation logic, the quantitative results were complemented with theoretically grounded qualitative interpretation. Frequency distributions of characteristics within each potential cluster were inspected and interpreted in light of relevant theory (Hambrick, 1984). The dendrogram suggested meaningful separations between two and ten clusters. The most interpretable division was a seven-cluster solution, distinguishing in the first place product-oriented from service-oriented circular startups, an outcome consistent with prior coding insights and expert discussions.

Hence, the clustering results are understood as theoretically informed, exploratory archetypes rather than statistically definitive market segments. They demonstrate that the taxonomy can capture empirically observable patterns among circular startups and provide a structured analytical lens for intermediaries.

These findings were subsequently discussed in a joint interpretation workshop with the intermediary partner. This collaborative reflection operationalizes the relevance cycle, as the intermediary translated the cluster-specific CBM profiles into differentiated support needs. This interpretive step transforms the analytical clustering into actionable design insights tailored to intermediary practice, demonstrating how the taxonomy enables intermediaries to derive targeted support strategies from empirically grounded business model typologies.

This empirical analysis confirms that the taxonomy possesses both conceptual clarity and empirical interpretability. Accordingly, this evaluation aligns with Venable et al. (2016), combining formative (conceptual improvement) and summative (empirical confirmation) elements.

In the following sections, the second version of the artifact - the Circular Support Alignment Tool - is presented, followed by the resulting CBM archetypes and the actionable design insight.

7.3 The Circular Support Alignment Tool

The taxonomy developed in the previous DSR project was refined in the design cycle of this study. This refinement was based on the naturalistic, formative evaluation of the taxonomy during its application to a real-life dataset provided by the intermediary organization. The refinement addressed a key limitation identified during coding: the original morphological-box design's inability to represent the interdependencies among the characteristics of circular startup CBMs, which caused partial misalignment with DP1 and DP2. Figure 7.3 visualizes the resulting artifact, a structured, yet dynamic analytical framework that integrates both sequential and relational logics.

First, the straight arrows represent a sequential classification flow that guides users from a startup's core offering (product/service) through value creation, network integration, sales logic, and ownership arrangements. This directional structure mirrors how CBM elements are typically assessed in practice and thereby strengthens the market-oriented logic emphasized in DP3, supporting analyses of investment readiness, selection fit, and aligning support strategies with the startup's CBM.

Second, the curved arrows denote inter-dimensional relations that capture conceptual and operational linkages. For example, how product design constrains material choices, which in turn shape network integration or feasible ownership arrangements. Embedding these relational mechanisms reflects the intent of DP2, as it enables users to diagnose the interdependencies, collaborative requirements, and shared resource needs that underpin community-based coordination within CEEs.

Third, the combination of directional and relational logic enables reflexive diagnostics that aggregate startup-level insights into systemic patterns. This supports DP1's emphasis

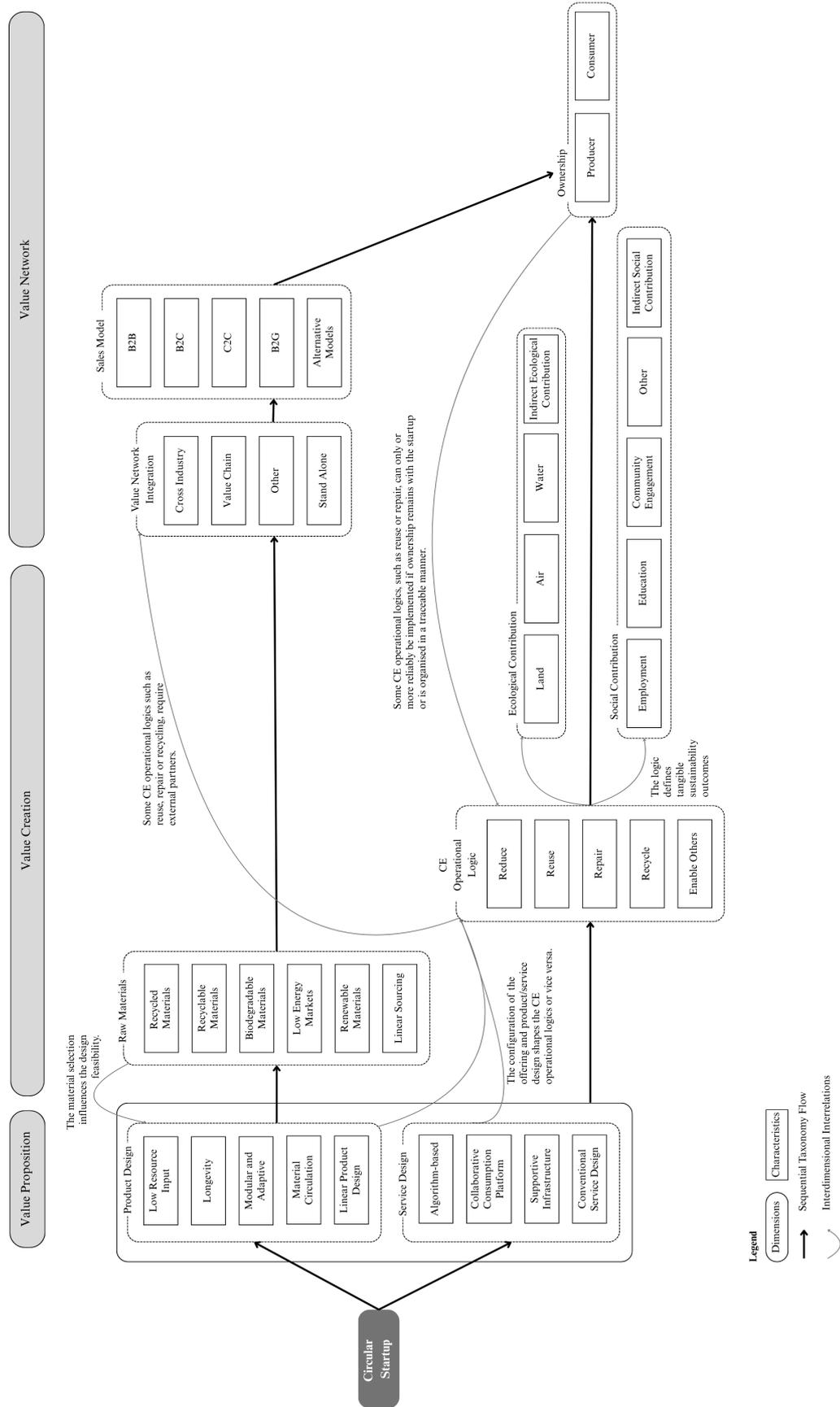


Figure 7.3: Refined Taxonomy Artifact as a Dynamic and Analytical Framework for Circular Startup CBMs (Own Illustration)

on circularity as a transversal logic by allowing intermediaries to identify systemic bottlenecks, shared constraints, and capability gaps across startups and to consolidate these insights for ecosystem-level learning and adaptation.

Overall, the artifact provides a structured analytical lens that helps intermediaries understand not only what a circular startup does but also how its CBM elements interact. This systemic perspective supports more precise support interventions, strategic alignment across actors, and the identification of leverage points for ecosystem development.

7.4 Identified Clusters and Actionable Design Insights for Intermediaries

Based on the quantitative and qualitative procedures of the mixed-method cluster analysis, the refined taxonomy was able to meaningfully differentiate types of circular startup business models. The summative evaluation thus demonstrates the analytical utility of the artifact by revealing seven empirically grounded circular startup CBM archetypes (see Figure 7.4). These archetypes reflect distinct strategic orientations among circular startups and reveal characteristic combinations of offerings, operational logics, value network structures, and sustainability outcomes.

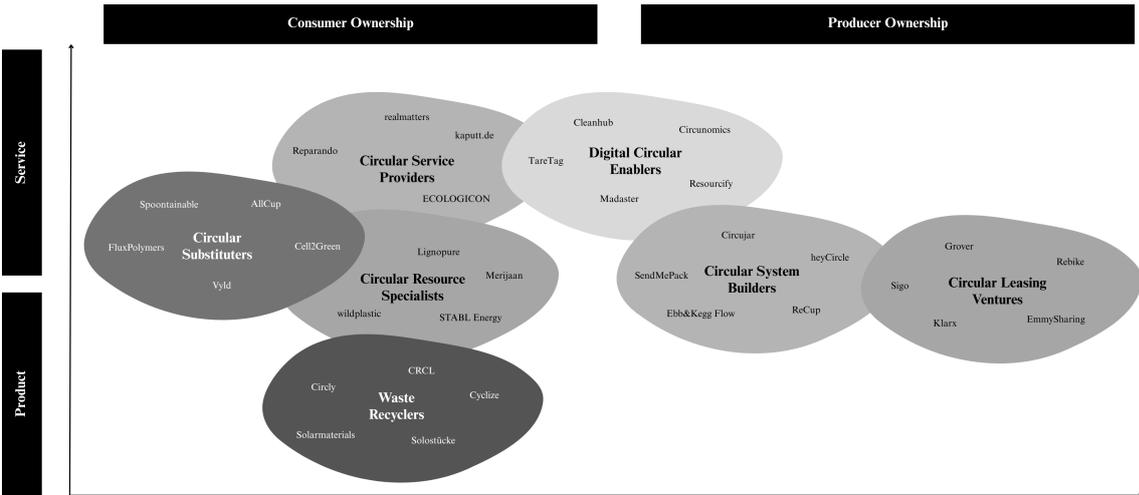


Figure 7.4: Seven Clusters of Circular Startup CBMs (Own Illustration)

7.4.1 Circular Service Providers

The first archetype comprises circular startups pursuing service-oriented business models. These startups primarily offer services that enable their customers, whether firms, public entities, or individuals, to operate more circularly. Their core value proposition thus centers on facilitating circularity rather than producing tangible goods.

Typical examples include consulting and advisory services that help firms transition toward circular practices, often within B2B or B2G contexts. Startups with B2G models

frequently exhibit a social contribution, such as educational initiatives or community-building activities around circularity. In contrast, purely commercial B2B services often display little or no explicit social engagement. A subset of these startups operates under B2C service models, offering product take-back schemes or repair and maintenance services that extend product lifetimes. Across the cluster, these circular startups tend to rely heavily on collaboration along the value chain, though their CBMs rarely exhibit direct ecological contributions in terms of air pollution reduction, land or water conservation.

7.4.2 Digital Circular Enablers

The second archetype also represents service-oriented CBMs but is distinguished by a strong technological component. These startups leverage digital technologies to enable other firms to act circular. Their value proposition centers on providing data-driven transparency, often by mapping or optimizing material flows.

Commonly, these circular startups operate digital platforms that connect buyers and sellers or facilitate reverse logistics. Others act as data providers, equipping customers with actionable insights on waste streams, resource efficiency, or product take-back systems. Some CBMs combine physical and digital elements by offering conventional products enhanced through embedded software or sensor technology. For example, circular startups provide camera-based sorting systems that help firms achieve material purity in recycling processes.

Business models in this archetype typically follow either C2C logics, as in matchmaking platforms, or B2B logics when data analytics or hardware-software bundles are sold to firms. Across cases, explicit social or ecological impact contributions remain rare, as their circular value lies primarily in enabling efficiency and transparency through digital means.

7.4.3 Circular Resource Specialists

This archetype comprises circular startups specializing in material- or product-based innovations. These startups develop new materials or products derived from industrial by-products or residual streams, which can be reintroduced into production or recycling processes. Their offerings typically replace conventional materials with recycled or recyclable alternatives, thereby reducing dependence on virgin resources.

Common examples include packaging alternatives made from waste materials and building materials such as recycled concrete or biocomposites. To access residual material flows, these startups often rely on cross-industry collaborations, forming partnerships across value chains. Beyond the tangible products themselves, many of these circular startups complement their material innovations with a service component. Two primary service patterns are observed: Consulting and advisory services that help clients apply

or integrate the new material effectively and take-back or reverse logistic services, where startups organize or manage the return of their materials and products at end of life.

Most circular startups in this cluster focus on the technical and functional aspects of circularity and exhibit limited explicit social or ecological contributions. One notable exception involves a startup that recycles ocean plastics to produce consumer goods while offering fair employment opportunities to local communities. In this case, circularity serves as a means to ecological and social impact.

7.4.4 Circular Substituters

This archetype is conceptually related to the previous group of material-oriented startups but differs in its approach to material innovation. Startups in this archetype develop new products that replace conventional counterparts by using biodegradable, recyclable, or renewable materials, rather than relying on residual industrial streams. Their goal is to substitute existing linear products with circular alternatives that can be safely reabsorbed into biological or technical cycles at the end of their lifespan.

In many cases, these startups complement their offerings with a supportive infrastructure. This enables partial material recirculation but typically occurs within a limited product–user interface, rather than through broader ecosystem collaboration. Their circularity thus manifests primarily through product-level innovation rather than systemic integration.

Most startups in this archetype demonstrate indirect ecological contributions, such as supporting reforestation projects, while explicit social contributions are rare. Unlike the more network-oriented archetypes, these startups often operate independently, offering their products directly to B2B or B2C markets, transferring ownership to the consumer and assuming limited responsibility for post-use recovery.

7.4.5 Waste Recyclers

This archetype includes circular startups whose CBMs focus on using waste streams to create new products or materials. Most startups rely on bio-based waste that contributes to ecological impact through CO binding, while others process waste from the plastic or fashion industries. These startups therefore operate as upcycler and recyclers, closing loops by reintroducing waste into production.

Some CBMs include a supportive infrastructure, for example, by offering take-back systems for single items, but this remains rare. Ecological contributions are often indirect, such as donations to ecological projects or carbon-offset activities. Explicit social contributions are uncommon, though several exceptions exist, such as community engagement, employment at local sewing facilities, and education and awareness activities.

These startups typically rely on cross-industry collaboration and knowledge transfer along the value chain, as many are technology-based and build on proprietary patents. Most follow a B2B logic, transferring product ownership to the consumer.

7.4.6 Circular Leasing Ventures

This archetype represents circular startups whose CBMs are based on conventional product design and sourcing, but whose innovation lies in the supportive infrastructure that promotes reuse rather than ownership. Many also provide repair or maintenance services to ensure the usability and longevity of their products. These CBMs are mostly active in a certain region.

Typical examples include circular startups offering rental or leasing models for bicycles, furniture, construction machinery, or electronic devices. These CBMs operate in both B2B and B2C contexts, serving households as well as organizations. Most retain product ownership, though some transition to sales models after using a rented product. Ecological contributions are often indirect, such as donations to climate-protection projects. Social contributions are rare, with one notable exception due to its support for social institutions.

7.4.7 Circular System Builders

This archetype represents CBMs that incorporate circularity at a systemic level, combining circular product design with a solution for reintroducing products into the cycle. Their products are designed for longevity and partly made from recycled or recyclable materials, occasionally also from industrial waste streams. These CBMs are mainly active in the food and catering industry, but also in retail, where packaging or container reuse is key.

The materials used vary, ranging from conventional to recycled sources, but recyclability is prioritized to ensure reintegration into closed loops. These CBMs contribute to CE by reducing material consumption, enabling reuse within markets, and, in some cases, recycling returned products themselves. They also drive behavioral change by offering take-back systems that require customer participation.

Their business models are typically B2B2C, as the solution works only if both firms and consumers engage. Some startups sell directly to firms, while others retain ownership to maintain control over reuse and recycling. Ecological contributions are often indirect (e.g., donations to environmental projects), and some startups include social activities such as education on sustainability or regional employment. Many integrate digital technologies to operate their take-back and tracking systems efficiently.

While the archetypes themselves represent an analytical output of the design cycle, they also serve as a basis for deriving actionable design insights for intermediaries, which will be elaborated in the following Section 7.5.

7.5 Actionable Design Insights

While the archetypes represent an analytical output of the design cycle, their practical value emerges through their translation into differentiated support needs.

This translation occurred through a collaborative interpretation workshop with the intermediary organization. In line with the relevance cycle, the intermediary assessed each archetype's characteristic CBM configuration and reflected on the specific challenges and capability gaps these configurations entail in practice. Through this joint reflection, the analytical typologies were transformed into actionable design insights, indicating where, how, and why intermediary support strategies should be adapted to the distinct needs of different types of circular startups. The following sections present these insights, structured according to the seven archetypes.

Actionable design insights for intermediaries supporting **circular service providers** indicate that startups in this archetype typically demonstrate strong domain expertise but frequently struggle with customer acquisition and market legitimacy. Intermediaries can therefore strengthen their impact by providing sales and acquisition training, facilitating network access to potential clients and multipliers, and connecting these startups with scaling partners such as established firms. By doing so, intermediaries help the circular service providers translate their expertise into visible market legitimacy, thereby reinforcing the credibility and diffusion of circular service models.

Intermediaries can strengthen the impact of **digital circular enablers** by facilitating customer acquisition and industry partnerships, particularly with manufacturing and waste-management firms. More importantly, intermediaries act as institutional entrepreneurs by embedding digitalization as a legitimate and integral component of circular practices. They should thus promote affinity toward digital solutions within their EEs and foster collaboration between digital innovators and traditional circular actors.

The intermediary characterized **circular resource specialists** as an overcrowded market, particularly in the area of packaging and material reuse solutions, where access to residual material streams poses a major challenge. Consequently, intermediaries can strengthen these startups by focusing on entrepreneurial capability-building, helping them articulate a distinct value proposition and stand out in a saturated market. Further, intermediaries should facilitate access to finance and customers, as scaling often depends on demonstrating differentiation and market readiness. To address supply chain challenges, intermediaries can raise awareness of the limitations of relying on linear production waste and encourage startups to design for circular feedstocks. Finally, connecting these startups with recyclers at the end of the value chain can spur co-creative material and product development, ensuring that new materials are compatible with existing recycling infrastructures and effectively closing the loop. In addition, intermediaries operate at a broader

ecosystem level by increasing institutional acceptance of circular materials, through advocacy, education, and strategic partnerships, which helps to create market conditions in which these products can be more readily adopted.

Startups from the fourth archetype, **circular substituters**, require a reflective and developmental support approach from intermediaries. The intermediary reported that many startups in this cluster display a narrow interpretation of circularity, focusing primarily on product design rather than systemic impact. Intermediaries can add value by challenging and broadening the startups' understanding of circularity, emphasizing the transversal nature of circular logics across ecosystems. This includes connecting these startups with CE experts and network partners who can help integrate their products into larger material or service loops. Through such support, intermediaries can help these startups evolve from isolated product substitution toward embedded circular innovation, strengthening both their impact and legitimacy within the broader ecosystem.

From the fifth archetype, **waste recyclers**, the intermediary identified recycling as a core field for targeted support. Since many founders have research backgrounds and already possess technical expertise, intermediaries can focus on entrepreneurial capability-building, helping them understand and optimize recycling processes both upstream and downstream. Support should include connecting startups to relevant recycling networks, for example, municipal collection systems or industrial partners, to ensure access to both material inputs and buyers for recycled outputs. At a broader ecosystem level, intermediaries can also help shape the institutional conditions that influence the uptake of recycled materials. This includes supporting startups in navigating standards, certifications, and regulatory requirements, and fostering dialogue with public procurement bodies to expand demand for high-quality recyclates. Additionally, intermediaries should facilitate industry contacts on the supplier and customer sides to strengthen commercialization and scaling opportunities.

Discussions with the intermediary on the six archetype, **circular leasing ventures**, highlighted that these CBMs differ according to time-based and performance-based rental models, which strongly affect revenue logic and resource flows. The main cost drivers lie in maintenance and cleaning, making product design a critical factor for economic and ecological performance. Intermediaries should therefore connect such startups with circular design experts to address design-for-maintenance and design-for-reuse challenges. Additionally, they can foster capability-building in circular behavior change, helping startups evolve from merely leveraging sharing for profit toward actively motivating reuse and shared consumption as part of broader CE transformation strategies.

Lastly, the intermediary described CBMs of **circular system builders** as asset-heavy solutions that require targeted financial support mechanisms. Since many operate in regulated industries (especially food), intermediaries can act as bridges between startups and

regulatory bodies, helping them comply with hygiene or safety standards while maintaining circular DPs. Due to their holistic approach, network integration is essential: intermediaries should connect these startups with supply-chain partners, insurers, logistics providers, and other firms to establish the infrastructure necessary for reuse systems to scale successfully.

7.6 Discussion of Implications from Design Studies I and II

The two DSR studies advance research on CEEs by translating earlier theoretical and empirical insights into actionable design knowledge for intermediaries. While existing research has emphasized the conditions under which circular startups can be supported (Audretsch & Fiedler, 2023; Ferreira et al., 2024; Kanda et al., 2024; Maaßen & Urbano, 2024) or highlighted the hybrid roles of intermediaries in EEs (Roundy, 2017), this dissertation moves beyond descriptive accounts. It develops three DPs that operationalize how intermediaries can align their support mechanisms with the transversal logic of circularity and, thereby, more effectively steer circular transformation within their ecosystem and institutional context.

7.6.1 Theoretical Contribution

From a theoretical perspective, the DPs extend current research on institutional logics (Thornton & Ocasio, 1999) by specifying how circularity functions as a transversal logic connecting the community and entrepreneurial-market orientations of CEEs. This contributes to scholarship on hybrid institutional logics and hybrid organizations by specifying how intermediaries can navigate, mediate, and reconfigure competing rationalities through concrete mechanisms of institutional work. In doing so, this illustrates how intermediaries act as institutional entrepreneurs (Kanda et al., 2020; Kant & Kanda, 2019; Kivimaa, Boon, et al., 2019), enacting practice, interaction, boundary, cultural, and value work to embed circularity into institutional structures.

In addition, the findings expand MLP on circular innovation. Building on the MLP (Geels, 2002; Theodoraki, Dana, & Caputo, 2022), the DPs integrate micro-level startup dynamics, meso-level ecosystem orchestration, and macro-level policy adaptation into a coherent design-oriented understanding of CEEs. This systemic perspective contributes new context knowledge to the broader field of hybrid organizations by illustrating how multi-logic startups require multi-level support infrastructures that are themselves hybrid and institutionally embedded (Battilana et al., 2009; De Clercq & Voronov, 2011; Gregori et al., 2019; Pache & Santos, 2012).

A further theoretical contribution of these DSR projects is to advance the literature on CBMs. Recent work, including the influential archetypes developed by Henry et

al. (2020), has significantly advanced understanding of circular startup business models (Bocken et al., 2016; Lewandowski, 2016; Lüdeke-Freund et al., 2019; Moreno et al., 2016; Urbinati et al., 2017). Yet, these frameworks face limitations in capturing the full diversity, hybridization, and cross-sectoral complexity observed in emerging circular startups. Building on this foundation, these DSR studies develop a refined taxonomy and empirically validate seven CBM archetypes derived from real-world startup data. The taxonomy clarifies how circular startups operationalize circularity across the value proposition, value creation, and value network dimensions. The archetypes extend existing CBM theory by identifying configurations, such as hybrid product–service models, loop-enabling infrastructures, and cross-industry collaborative architectures, that could not be fully classified within prior typologies.

By identifying mechanisms linking operational choices to ecological outcomes and social contributions, the taxonomy responds to calls for integrating social objectives more explicitly into CBM design (Alam et al., 2019; De Angelis & Vesci, 2025; De Keyser & Mathijs, 2023; Ghisellini et al., 2016). Together, these contributions establish circular startup CBMs as a distinct conceptual category and broaden the theoretical boundaries of CBM research.

7.6.2 Design Science Research Contribution

In terms of design science, this study contributes both a theoretical design object (DPs and DRs) and an empirical design object (the refined Circular Support Alignment Tool) (Seckler et al., 2021). The two-stage DSR approach demonstrates how DPs derived from qualitative CEE research can be instantiated, evaluated, and refined through empirical application.

The refined artifact offers a structured yet dynamic analytical framework that reveals interdependencies between CBM dimensions of circular startups, an advancement over morphological approaches that treat characteristics as independent. By validating the taxonomy through mixed-method cluster analysis and practitioner interpretation, the study contributes DSR knowledge on how artifacts perform in naturalistic settings and how formative and summative evaluation can be combined (Venable et al., 2016).

The results advance the understanding of how intermediaries within established EEs can design and adapt their support mechanisms to foster circular startups. This actor-centered approach extends existing DSR work in entrepreneurship (Romme & Dimov, 2021; Terzidis et al., 2023) by specifying strategies to address hybrid institutional logics, extending context knowledge to the wider field of hybrid entrepreneurship (Battilana et al., 2009; De Clercq & Voronov, 2011; Gregori et al., 2019; Pache & Santos, 2012).

7.6.3 Practical Contribution

Practically, the findings provide a design rationale for intermediaries seeking to align their support structures with the distinct needs of circular startups. The DPs guide intermediaries in (1) translating startup-level insights into ecosystem- and policy-relevant learning processes, (2) strengthening collaboration, shared understanding, and relational coordination within CEEs through a clearer articulation of resource, capability, and network interdependencies, and (3) aligning investment flows and selection logics with circular value-creation models. In doing so, intermediaries can reorient their institutional work from merely facilitating entrepreneurship toward actively fostering circular institutional change, bridging community and entrepreneurial-market logics and advancing circular transformation processes within their ecosystem context.

The seven CBM archetypes, derived through empirical clustering and expert validation, further translate the artifact into a practical diagnostic and strategic tool. The tool helps intermediaries differentiate support needs, anticipate capability gaps, design targeted interventions, and navigate the hybrid institutional logics that shape CEE development.

7.7 Conclusion

Intermediaries play a key role in CEEs by supporting circular startups. Yet, it remains unclear how established intermediaries should adapt their structures and support mechanisms to foster circularity. Addressing this challenge, this study developed a theoretical and empirical design object following a DSR approach (Hevner, 2007; Peffers et al., 2007), integrating insights from previous studies and enriching them with a business model perspective. The resulting circular support alignment artifact translates theoretical knowledge into a practical solution for intermediaries seeking to align their support activities with circular principles.

Guided by three DPs, a taxonomy was designed and iteratively evaluated, demonstrating both the application of the DPs and their operationalization in practice. The DPs are grounded in three complementary theoretical perspectives, institutional logic, MLP, and institutional entrepreneurship, that jointly explain how intermediaries can act as institutional entrepreneurs to integrate circularity across systemic, organizational, and relational levels. DP1 embeds circularity as a transversal logic by enabling reflexive diagnostic mechanisms that translate startup-level insights into systemic learning. DP2 reinforces community-based collaboration by visualizing startups' capability dependencies and network relations. DP3 enhances market-oriented legitimacy by providing standardized CBM templates that align selection and investment logics with circular ecosystem transformation goals.

The artifact was evaluated formatively and summatively, as well as ex-ante and ex-post, in line with Venable et al. (2016), ensuring conceptual clarity, contextual fit, and practical utility. Nonetheless, limitations remain. First, contextual scope: evidence is concentrated in one national context, Germany. Other ecosystems under different national regulatory frameworks could reveal additional patterns. Secondly, the sampling and coding are purposive and binary, which precludes the possibility of completely ruling out selection and interpretation biases. Moreover, the resulting clusters showed statistical overlap, and clear differentiation was achieved primarily through qualitative interpretation rather than strict quantitative separation. Future research could apply larger or multi-dimensional datasets to test the stability and external validity of the identified archetypes across different circular startup populations. Third, the DPs were not evaluated independently as standalone principles. Future studies could validate these principles through DSR projects that test their robustness across multiple intermediary configurations.

In sum, the two studies contribute both theoretically and practically by demonstrating how design science can be applied to circular entrepreneurship research. It offers a validated artifact and corresponding design knowledge that helps intermediaries realign their support mechanisms with the transversal logic of circularity, thereby strengthening their role as catalysts of systemic circular transformation within their ecosystem and institutional environment.

Part V

Finale

Summary

The widely taught hockey-stick curve promotes a growth-oriented narrative in which scalability is the ultimate measure of entrepreneurial success. This narrative aligns with the logic of a linear economy, where resource extraction and expansion are prioritized and externalities remain largely unaddressed. However, accelerating resource scarcity, environmental degradation, and social inequality reveal the limitations of this paradigm.

Research and policy agendas increasingly emphasize that achieving climate goals and safeguarding ecological systems requires a genuine CE, one that fundamentally transforms how business models are designed and how institutional conditions evolve alongside (Domenech & Bahn-Walkowiak, 2019; Geissdoerfer et al., 2018). Such transformation is inherently multilevel and depends on the reconfiguration of entrepreneurial infrastructures and institutional arrangements (Berghuis et al., 2023; Klofsten et al., 2024).

Circular startups have emerged as promising actors driving CE transformation at the micro level (Bocken et al., 2014; Schaltegger et al., 2016; Stewart & Niero, 2018). Free from legacy constraints, they develop business models that maintain products and materials at their highest value and offer services that enable circular strategies (Antikainen & Valkokari, 2016; T. J. F. Bauwens et al., 2020; Suchek et al., 2022; Zucchella & Urban, 2019). However their ability to diffuse circular practices depends on their embeddedness within supportive networks that facilitate resource flows, stimulate market demand, and promote knowledge recombination (Bustamante, 2019; Woolley & MacGregor, 2022). EEs provide these enabling conditions, especially intermediaries. However, established EEs have not yet been fully adapted to the specific needs of circular startups (Spigel, 2016; Tabas et al., 2025). Against this backdrop, the research objective of this dissertation was to investigate how intermediaries support circular startups within existing EEs and how their activities contribute to CE transformation at both ecosystem and institutional levels.

To achieve this research objective, five interdependent studies were conducted. RQ1 examined how established EE elements function for circular startups and require adaptation, while RQ2 analyzed how CEEs are structured and how their relational dynamics unfold. As both studies highlighted intermediaries as key actors, RQ3 mapped their functions across system levels applied them to circular startups, and RQ4 explored how they shape the logics, values, and practices of circular startups. Finally, RQ5 guided the design of methodological artifacts that help intermediaries realign their support structures with circularity.

The first study conceptualized CEEs through an SLR, identifying five core ecosystem elements: resources, collaboration, culture, regulatory frameworks, and digital technologies. Although the term CEE is rarely used explicitly, the review identifies an emerging research stream dominated by qualitative, European-focused studies. It reveals that resources, particularly financing, talent, knowledge, infrastructure, and intermediation, and existing regulatory frameworks currently constrain circular startups, as they remain largely designed for linear business models. Collaboration and culture emerged as essential drivers for aligning disconnected value chains and building trust-based environments, while digital technologies function as a transformative layer that enhances transparency, coordination, and innovation capacity. The review thus shows that fostering circular entrepreneurship requires a qualitative reconfiguration of EE elements and positions intermediaries early on as system-shaping actors who sustain the connectivity of CEEs.

The second study provided an empirical analysis of emerging CEEs in Germany, revealing that they currently function as subecosystems embedded within established EEs. The results show that these CEEs are characterized by low density, limited clustering, and a concentration of brokerage roles among intermediaries, with notable regional activity in Berlin, Munich, and North Rhine-Westphalia. While actors describe these ecosystems as trust-based and intermediary-centric, they remain constrained by weak coordination, conceptual fragmentation, and unstable resource flows. These findings underscored the centrality of intermediaries as structural anchors within CEEs and motivated the dissertation's subsequent analytical focus.

Study 3 systematically conceptualized the multidimensional functions of intermediaries in EEs by synthesizing their configurations, mechanisms, and outcomes across levels. At the micro level, the study shows how intermediaries activate capability-building, resource brokerage, legitimacy transfer, and risk-reduction mechanisms through specific organizational configurations such as program design, specialization, and governance type. At the meso level, intermediaries orchestrate networks by fostering cognitive alignment, relational cohesion, and shared vision, thereby contributing to ecosystem density, stability, and collaborative legitimacy. At the macro level, the study identifies mechanisms of aggregation, diffusion, and stratification through which intermediaries influence regional competitiveness, innovation capacity, and the broader institutional environment. These insights demonstrate that intermediary influence is fundamentally multilevel and extends beyond startup support, providing a conceptual foundation for understanding their role within circular contexts.

Study 4 deepened the analysis by examining how intermediaries shape the norms, values and beliefs of circular startups. The study shows that intermediaries act as carriers of two institutional logics, the community logic and the entrepreneurial-market logic, transmitted through concrete relational and learning mechanisms. Through networks, peer

learning, shared spaces, and collaborative partnerships, intermediaries enact the community logic by fostering trust, reciprocity, and a shared sense of circular purpose. In parallel, mentoring, capability-building, visibility activities, and investor access transmit the entrepreneurial-market logic, socializing founders into norms of efficiency, professionalization, and market integration.

Importantly, the study reveals that circularity functions as a transversal logic that permeates and reconfigures both community and market orientations. This transversal logic provides sustainability-oriented meaning structures that guide how founders interpret value creation, legitimacy, and entrepreneurial purpose across levels. It also shapes how tensions between sufficiency ideals and market expectations are experienced, negotiated, and integrated. The findings show that circular startups do not simply adopt a single logic but engage in hybridization dynamics: they experience tensions, combine both logics in integrated practices, and sequence them over time as their startups mature.

Drawing on these insights, the study identifies four areas of institutional work: practice, interaction, boundary, and cultural/value work. Through these, intermediaries can more effectively embed circular principles, bridge market and circular domains, and act as institutional entrepreneurs in advancing CE transformation.

Building on these theoretical and empirical insights, the final part of the dissertation translated the findings into design knowledge for intermediaries following a DSR approach. The fifth study developed a circular support alignment artifact that helps intermediaries adapt their structures and support mechanisms to circularity. Guided by three DPs grounded in institutional logics, the MLP, and institutional entrepreneurship, the study formulates how intermediaries can integrate circularity into their practices. The sixth study complemented these results by applying and iteratively evaluating the taxonomy in a naturalistic setting. It demonstrated how intermediaries can use the artifact to classify circular startups, derive targeted support strategies, and foster shared understanding across ecosystem actors. Across formative and summative assessments, the study provided a refined startup support alignment tool, empirically grounded archetypes of circular startup business models, and actionable design insights for intermediaries to interpret startup configurations and derive support implications in practice. Together, the DSR studies provide validated design knowledge that enables intermediaries to operationalize the transversal logic of circularity within their support structures. They further demonstrate how intermediaries can move beyond conventional startup support and act as institutional entrepreneurs.

Together, the studies of this dissertation advance conceptual and empirical understanding of CEEs and highlight the pivotal role of intermediaries within them. The findings

show how intermediaries support circular startups, coordinate ecosystem dynamics, engage in institutional work, and transmit circularity as a transversal logic that connects purpose and performance across levels.

8.1 Contribution

This dissertation contributes to advancing research on circular entrepreneurship and EEs by examining the research objective of how intermediaries support circular startups and how these interactions influence CE transformation across multiple levels. By integrating conceptual, empirical, and design-oriented perspectives, the dissertation offers a comprehensive understanding of the structural, relational, and institutional mechanisms through which intermediaries operate in circular-oriented contexts. Building on these insights, the following section outlines the theoretical contributions of the dissertation, followed by the practical implications that derive from them.

8.1.1 Theoretical Contribution

This dissertation offers several theoretical contributions that advance research on EEs, circular entrepreneurship, and institutional theory.

First, it contributes to EE research by extending the conceptualization of ecosystem elements and their relational configuration in the context of circular entrepreneurship. Through the systematic review and network analysis, the dissertation identified how established EE elements, such as resources, collaboration, culture, regulation, and digitalization, require qualitative reconfiguration to support circular startups. In addition, through the network analysis, the dissertation advances structural EE research by analyzing the social networks through which ecosystems operate (Neumeayer et al., 2019; Stam et al., 2025). The empirical findings of the SNA further position CEEs as emerging subecosystems embedded within established regional EEs, characterized by intermediary-centric structures, low network density, and fragmented coordination (Cloutier & Messeghem, 2022; Regele & Neck, 2012). By uncovering the relational mechanisms that shape coordination, knowledge flows, and actor embeddedness, the dissertation refines existing EE models and demonstrates how specific, interest-based ecosystems evolve structurally and relationally under circularity-related demands.

Second, the dissertation advances research on transformation processes by elucidating the role of intermediaries within CE-driven transformations (Berghuis et al., 2023; Klofsten et al., 2024). It demonstrates that intermediaries contribute not only to startup-level development but also to ecosystem coordination and institutional change. By shaping inter-organizational collaboration, aligning expectations, and addressing coordination

gaps, intermediaries consolidate their role as key actors in the multi-actor, multi-sector transformation toward a CE.

Third, the dissertation contributes to the multi-level perspective by mapping intermediary functions across micro-, meso-, and macro-levels and showing how these functions interact in circular contexts (Ferreira et al., 2024; Theodoraki & Messeghem, 2017). The findings underscore that intermediaries operate simultaneously as resource providers, network orchestrators, and contributors to agenda-setting and legitimation processes in their institutional context. This multi-level understanding expands the conceptualization of intermediaries as cross-level actors who bridge startup, ecosystem, and institutional dynamics.

Fourth, the dissertation contributes to institutional theory by conceptualizing circularity as a transversal logic, a cross-cutting normative frame that infuses market and community logics with sustainability-oriented principles. The findings show that intermediaries act as institutional entrepreneurs who transmit, adapt, and recombine institutional logics, shaping how startups interpret purpose, performance, and circular value creation. By demonstrating how intermediaries engage in institutional work that stabilizes and diffuses circular norms across levels, the dissertation expands the understanding of logics hybridization and normative change within EEs (Roundy, 2017; Tracey et al., 2011).

Lastly, the dissertation advances theoretical knowledge through its design science projects. Beyond producing an actionable artifact, the two studies contribute to theory by systematizing the value logic of circular startups through a CBM taxonomy and deriving empirically grounded clusters that differentiate how circular value creation, delivery, and network configurations unfold in practice. This refines existing CBM literature by offering a more granular and operationalizable structure for understanding heterogeneity among circular startups (Bocken et al., 2016; Lewandowski, 2016; Lüdeke-Freund et al., 2019; Moreno et al., 2016; Urbinati et al., 2017). In addition, the first study develops DRs and DPs that explain how intermediaries can reconfigure their support activities to activate circular logics, strengthen ecosystem coordination, and expand their institutional entrepreneurship capacity. These insights generate prescriptive design knowledge on how intermediary interventions shape multilevel ecosystem dynamics and contribute to institutional change. Together, these theoretical contributions extend both CBM scholarship and DSR work in entrepreneurship by articulating how design-based reasoning can inform sustainability-oriented ecosystem transformation.

8.1.2 Practical Contribution

Aside from the theoretical contributions this dissertation also offers several practical contributions for actors seeking to advance circular entrepreneurship in real-world settings.

First, the findings provide actionable guidance for intermediaries on how to design and refine their support structures for circular startups. The insights demonstrate which support mechanisms strengthen collaborative capacity, legitimacy, and market readiness, and how these mechanisms can be sequenced to balance circular and commercial objectives. The taxonomy of CBMs further enables intermediaries to assess the strategic profiles of circular startups, identify their value logic, and tailor support activities to their specific circular configuration.

Second, by outlining how intermediaries influence the values, beliefs, and practices of circular startups, the dissertation helps practitioners recognize their role as institutional entrepreneurs. This awareness enables them to mobilize their symbolic and relational resources more effectively to promote circular principles, advocate for regulatory improvements, and stimulate broader ecosystem alignment around sustainability-oriented norms.

Finally, the dissertation provides implications for policymakers and ecosystem builders. The insights on structural weaknesses, such as fragmented coordination, inconsistent definitions of circularity, and reliance on a few central brokers, highlight leverage points for strengthening regional CEEs. These include targeted funding for orchestrating actors, the development of shared circularity frameworks, and the integration of circularity criteria in procurement and innovation policies.

Together, these practical contributions support actors across sectors in shaping more coherent, connected, and effective environments for accelerating the transformation toward a CE.

8.2 Limitation and Future Research

While this dissertation offers theoretical and practical contributions, several limitations need to be acknowledged.

First, the geographical scope of the dissertation is confined to Germany. Germany represents a context with comparatively mature EEs and an advanced CE policy agenda (Bundesumweltministerium, 2024; Bundesverband Deutsche Startups e.V., 2024). These conditions provide a fertile environment for circular startups but limit the generalizability of the findings to countries with less developed ecosystems, different industrial structures, or weaker regulatory support for circularity. Future research should therefore investigate CEEs and intermediary roles in more diverse institutional settings to assess how varying governance regimes, market dynamics, and ecosystem maturity influence circular entrepreneurship.

Second, the dissertation relies primarily on qualitative research. While this approach is appropriate for exploring an emerging phenomenon such as CEEs and for capturing the meaning- and logic-level processes central to circular entrepreneurship, it also entails

limitations in terms of generalizability and causal inference (Suchek et al., 2022; Tabas et al., 2025). Apart from one quantitative network study, the only additional quantitative component was a cluster analysis conducted in the final DSR study. However, due to purposive sampling, binary coding, and a small dataset, the resulting clusters displayed substantial statistical overlap and could only be meaningfully interpreted through qualitative reasoning rather than clear quantitative differentiation. These constraints underline the need for more extensive quantitative data and multidimensional measurement in future research. Large-scale, survey-based, or longitudinal datasets could help validate the stability of CEE configurations, test intermediary archetypes across contexts, and strengthen the external validity of the mechanisms proposed in this dissertation.

Third, although the dissertation highlights the influential role of intermediaries, other actor groups essential to CE transformation remain underrepresented (Kirchherr, 2022; Tabas et al., 2025). The network analysis showed limited engagement from research institutions, financial actors, policymakers, and established corporations, all of which are crucial for scaling circular innovations (cf. Chapter 3). This indicates both an empirical gap and a substantive one: the current composition of CEEs reflects a field still in formation. Future research should adopt more actor-centric perspectives to examine why these stakeholders are weakly integrated, how their participation evolves over time, and how their involvement shapes circular ecosystem development. Longitudinal studies could provide insights into how CEEs mature, how roles and logics shift, and how multilevel governance structures evolve.

Finally, the dissertation foregrounds institutional theory, the MLP, and network theory. While these frameworks offer valuable lenses for understanding intermediary influence and systemic dynamics, other theoretical perspectives remain underexplored. Transition management could illuminate governance and policy alignment challenges; organizational learning could deepen understanding of how circular capabilities diffuse across ecosystems; and policy theory, especially work on adaptive or dynamic regulation, could shed light on how regulatory frameworks co-evolve with circular startups. Integrating these perspectives would further enrich theoretical understanding of CE transformation and its institutional embedding (Droege et al., 2023; Geels, 2002; Van Opstal & Borms, 2023).

Overall, these limitations indicate promising avenues for future research that extend the geographical, methodological, and theoretical scope of this dissertation, while deepening understanding of the actors, mechanisms, and multilevel dynamics shaping CEEs.

8.3 Concluding Remarks

The transformation toward a CE is neither linear nor immediate. It unfolds over years and across multiple domains of economic and societal life. Circular startups offer a glimpse

into what this future may look like: they demonstrate how value creation can be reimagined, how materials can circulate instead of being discarded, and how business models can be designed from the outset around regenerative principles. Their practices illustrate that circular transformation requires not only new technologies or regulatory changes, but also a fundamental shift in how problems, opportunities, and interdependencies are understood.

Yet such startups cannot drive this transformation alone. Circular progress depends on the collective actions of many actors and the networks that connect them, from consumers whose choices shape demand, to organizations whose collaborations create new resource flows, to public institutions that define enabling conditions for innovation. Intermediaries in particular hold a pivotal position. Embedded in diverse networks and trusted by multiple stakeholders, they have the ability to amplify circular practices, broker collaboration across sectors, and strengthen the legitimacy of new economic models.

If intermediaries intentionally mobilize this position, by fostering shared narratives, aligning support structures with circular principles, and advocating for systemic change, they can become powerful catalysts for accelerating the shift toward a CE. Ultimately, circular transformation is a distributed responsibility. But intermediaries, as boundary-spanning actors, are uniquely positioned to translate the ambitions of circular startups into broader institutional and societal momentum.

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Declaration of Authorship

Eidesstattliche Versicherung

Gemäß § 13 Abs. 2 Ziff. 3 der Promotionsordnung des Karlsruher Instituts für
Technologie für die KIT-Fakultät für Wirtschaftswissenschaften

1. Bei der eingereichten Dissertation zu dem Thema "From Startup Support to System Transformation: Intermediaries in Circular Entrepreneurial Ecosystems" handelt es sich um meine eigenständig erbrachte Leistung.
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Ann-Sophie Finner

A.1 Literature Review Matrix Table of Circular Entrepreneurship and EE

Table A.1: Literature Review Matrix Table of Circular Entrepreneurship and EE (Own Illustration)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Acquier et al. (2024)	<i>Qualitative</i>	Single Case Study (SCS)	France (Phenix)	Waste (Food)	Dynamic Capability Theory, Organizational Learning	EE research on CE remains fragmented; need for shared vision and system-level approaches
Alka et al. (2024)		SLR	Not Specified (NS)	NS	None	Collaboration and digital technologies enable eco-innovation and CBMs
Amalleshwari & Jeevitha (2023)		SCS	India	Food	None	Digital technologies can enhance orchestration, but require further theorization
Amjad & Diaz-Elsayed (2024)		SLR	US	(Urban) Manufacturing	Man-None	City-level EEs must integrate CE principles for sustainable urban transitions
Bauwens et al. (2024)		Comparative Study	Netherlands	Construction and Food Industry	System Building	Circular startups depend on supportive markets, tailored policies, and networks to overcome resource limits and sectoral power imbalances
Berghuis et al. (2023)		Multiple Case Study (MCS)	Netherlands (Zwolle Region)	Not specified (NS)	None	Cooperation adds value for circular startups, but local transformative impact remains limited
Borrero & Yousafzai (2024)		Abductive Approach	Spain (Huelva Region)	Multi-industry	Institutional Theory, Stakeholder Theory, Quintuple Helix Model	Quintuple Helix highlights universities as institutional entrepreneurs driving CE transition
Bragelien & Voldsund (2023)		Information-oriented Approach	Norway	Education	None	Circular Economy in entrepreneurship education fosters problem-based learning and external collaboration

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Brown et al. (2019)		MCS	Netherlands	NS	None	Collaboration in CE networks is driven by knowledge sharing and trust, but challenged by competing interests
Charalabidis et al. (2022)		MCS	EU	Education	None	Digital platforms underutilized for CE transition; need for better stakeholder engagement and orchestration
Colombo et al. (2025)		MCS	Italy	Textile Industry	None	Supply chain partnerships succeed through knowledge sharing, goal congruence, and transparent governance that enable CE implementation
Droege et al. (2023)		SCS	Portugal	NS	Policy Entrepreneurship	Institutional voids and weak regulation hinder CE adoption, underscoring the role of policy entrepreneurship
Ferreira et al. (2024)		SLR	NS	NS	Multilevel Framework	CE transition requires multi-level governance and context-sensitive ecosystem interventions
Geissdoerfer et al. (2023)		MCS	EU (Netherlands, Austria, UK, Spain, Germany)	Multi-industry	None	Conceptual ambiguities in CE hinder theoretical integration with entrepreneurship and innovation studies
Greer et al. (2020)		SCS	Netherlands	Food (Catering)	None	Service-based business models can accelerate CE but demand systemic ecosystem reconfiguration

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Henry et al. (2024)		MCS	Amsterdam, London, Berlin, Sydney, Melbourne	Multi-industry	None	Incumbent–startup power asymmetries limit CE innovation; collaborative policy frameworks needed
Hull et al. (2021)		Grounded Theory Approach	Trinidad, Tobago	NS	None	CE ventures require tailored ecosystem support to balance environmental, social, and financial goals
Kambanou et al. (2025)		MCS	India	NS	None	University incubators in India currently lack specific support for circular start-ups and require tailored assistance mechanisms
Kanda et al. (2021)		MCS	Sweden	Biogas	None	Circular ecosystems provide a more suitable lens than firm-level models for analyzing coordination and value creation in CE
Kanda et al. (2025)		Interviews and Focus Group	Partly Sweden	NS	Dynamic Capabilities	Supporting circular business models depends on a shared vision, coordination, and integration of diverse ecosystem actors
Kim (2024)		SLR	NS	Fashion	None	Proximity relations, geographic, cognitive, social, and institutional, are critical enablers of circular innovation in EEs
Lit et al. (2024)		MCS	Netherlands	Plastic	None	Circular start-ups in plastics face systemic barriers but can leverage ambidexterity, networking, and ecosystem support to scale CBMs

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Muldoon et al. (2024)		SLR	NS	NS	None	Entrepreneurial ecosystem research reveals four clusters, with sustainability and CE emerging as key future priorities
Nielsen & Hakala (2023)		SCS	Finland	Food Packaging	None	Circular transition in packaging is driven by external enablers: regulation, politics, socio-cultural, and technology
O'Shea et al. (2021)		SCS	Finland	Waste (Water)	None	Supportive CE ecosystems require collaborative stakeholder coordination and seven key enablers
Oyinlola et al. (2022)		MCS	Africa (Nigeria, Uganda, Zambia)	Waste (Plastic)	None	Digital innovations in Africa (apps, 3D printing) enable circular plastics but need policy and market support
Peçanha & Ferreira (2025)		SLR	NS	NS	None	Digitalization reshapes firm boundaries and interdependencies, requiring dynamic capabilities and open collaboration
Pizzi et al. (2022)		SCS	Italy	Digital Platforms	None	Digital platforms act as ecosystem enablers, coevolving business models toward circularity
Poconi et al. (2020)		MCS	Italy (Latium Region)	Green Economy	None	Academic spin-offs bridge research and practice, driving circular business models

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Premyanov et al. (2022)		Intervention Study	EU (Belgium, Greece, Lithuania, Netherlands, Spain, Turkey)	Makerspaces	None	Makerspaces foster circular innovation, but need entrepreneurship programs for scaling
Provensi et al. (2024)		SLR	NS	NS	None	Circular start-ups act as niche innovators whose scaling depends heavily on stakeholder networks, digital technologies, and policy support
Provensi & Sehnem (2025)		SLR	NS	NS	None	Stakeholder engagement and network formation, supported by Industry 4.0 technologies, are vital for circular innovation in start-ups
Rao et al. (2024)		SCS	Netherlands	Waste (Food)	None	Circular start-ups rely on enabling policies, trusted partnerships, and employee commitment
Rataj et al. (2024)		MCS	Austria, Southern Mediterranean	NS	System Building	Mainstreaming circular innovations differs between developed and emerging economies, with knowledge development and co-creation as key drivers
Re et al. (2023)		MCS	Italy, Finland	NS	Institutional Theory	Institutional environments, rules, norms, and culture catalyze or constrain circular start-ups
Rocha et al. (2023)		Focus Groups	Portugal	NS	None	Education, collaboration, and entrepreneurial skills are key to CE start-up success

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Rodrigues et al. (2022)		SLR	NS	Industry 4.0	None	Critical success factors for circular start-ups 4.0: investment, culture, partnerships, and competencies
Roshan et al. (2024)		Fuzzy-Set Qualitative Comparative Analysis (fsQCA)	Cross-national	NS	System Theory	Digital protection and access are critical drivers for circular startup formation
Sehnen et al. (2024)		MCS	Brasil	Multi-industry	Stakeholder Theory	Stakeholder engagement and Industry 4.0 adoption enable circular business models
Sousa Resende et al. (2025)		MCS	Europe	Packaging & plastics, textiles and food, water & nutrients	Scaling Strategies of Circular Startups Framework	Scaling circular start-ups relies on ecosystem, institutional, and cultural strategies beyond commercial growth
Tuladhar et al. (2024)		MCS	UK (London)	Multi-industry	None	Low-risk collaborations between startups and incumbents advance CE adoption
Veleva & Bodkin (2018)		MCS	US	Multi-industry	None	Strategic partnerships between small firms and corporates drive CE innovation
Velzing et al. (2022)		SCS	Netherlands (Utrecht)	Urban Development	None	Urban CE ecosystems need integrated socio-economic, ecological, and technical policies
Alonso-Almeida et al. (2021)	<i>Quantitative</i>	Structural Equation Modeling	EU, Non-EU	NS	None	Institutional support and collaboration are critical for CE transition
Castro Oliveira et al. (2022)		Correlation Analysis	Portugal	Waste (Electronics)	None	Policy alignment with CE goals remains fragmented; stronger coordination mechanisms needed for EE transformation

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Fang & Parida (2024)		Exploratory performance analysis	Global	NS	None	CE funds face high fees and underperformance, highlighting the need for more viable financing instruments
Fernandes et al. (2023)		Generalized Method of Moments	EU	NS	None	Circular startups face financing barriers; ecosystem-level support crucial to enable scaling
Kostakis & Tsagarakis (2022)		Feasible Generalized Least Squares, Fully Modified Ordinary Least Squares, Dynamic Ordinary Least Squares (Panel Data Estimation Methods)	EU	NS	None	Entrepreneurship, innovation, and socio-economic development significantly drive circularity rates in the EU
Manea et al. (2021)		Correlation-, Regression Analysis	EU	NS	None	CE, digital innovation, and sustainable entrepreneurship jointly advance social progress across EU states
Narayana et al. (2024)		Structural Equation Modeling	India	Manufacturing	None	Network-building capabilities enhance start-up innovativeness, with top management support acting as a key mediator
Zhou & Park (2021)		Negative Binominal Regression Analysis	China	Car Sharing	None	Human capital and venture capital are key enablers for CE startups in the sharing economy
Batista-Canino et al. (2024)	<i>Mixed Methods</i>	Domain-based Review	NS	NS	None	Ecosystems should foster conscious entrepreneurship by addressing transition challenges and enabling factors through policy and collaboration

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Mondal et al. (2023)		SLR, Expert Interviews, Best Worst Method	China	Industrial Parks	Dynamic Capability Theory, Stakeholder Theory, Success Factor Theory	Technology-based enablers and effective infrastructure are key drivers of green entrepreneurship for CE in MSMEs
Moss et al. (2022)		Desk Research, Expert Interviews, Survey	Africa	Waste (Plastic)	None	Reuse and refill solutions remain dominated by start-ups but face scaling barriers requiring systemic support and policy reform
Van Opstal & Borms (2023)		Survey, Interviews	Norway	Education	None	No single CE startup profile; tailored policies and support are required
Audretsch & Fiedler (2023)	<i>Conceptual</i>	N/A	N/A	N/A	Knowledge Spillover Theory	EE perspective helps analyze conditions for CE transition at system level
Berniak-Wozny et al. (2025)					Smart City-Incubator Sustainability Framework	Incubators can act as intermediaries of circular innovation by integrating CE practices, Industry 4.0, and smart city objectives
Coskun et al. (2025)					Framework of socially restorative butterfly for the CE	Circular makerspaces unlock under-utilized human capital and foster collaboration and knowledge transfer
Kaplan (2023)					New Institutionalism	State actors play a catalytic, entrepreneurial role in transforming industrial parks into eco-industrial systems for CE
Millette et al. (2020)					Incubator Framework	CE-focused incubators foster circular entrepreneurship by removing information barriers and connecting diverse stakeholders

Table A.1 (continued)

Authors	Research Approach	Research Method	Regional Focus	Industry	Theory & Concept	Key Findings
Wilson et al. (2022)					None	AI can optimize reverse logistics and accelerate circular entrepreneurship

A.2 Objective Ending Conditions

Number	Objective Ending Condition
1	All objects or a representative sample of objects have been examined.
2	No object was merged with a similar object or split into multiple objects in the last iteration.
3	At least one object is classified under every characteristic of every dimension.
4	No new dimensions or characteristics were added in the last iteration.
5	No dimensions or characteristics were merged or split in the last iteration.
6	Every dimension is unique and not repeated.
7	Every characteristic is unique within its dimension.
8	Each cell (combination of characteristics) is unique and is not repeated.

Table A.2: Objective ending conditions according to Nickerson et al. (2013)

A.3 Content Matrix from Systematic Literature Review

Stimulus	Definition	Integration	Product Design	Lifecycle	Creation	Industry	Business	Research	CE	User	Type of	Complexity	Sustainable	Design	Business
Year of Publication	Keywords	Category	Design	Responsibility	Strategy	Industry	Business	Research	CE	User	Type of	Complexity	Sustainable	Design	Business
Year of Publication	Keywords	Category	Design	Responsibility	Strategy	Industry	Business	Research	CE	User	Type of	Complexity	Sustainable	Design	Business
Vandenberg et al. (2009)															
Colusso et al. (2006)															
Morero et al. (2004)															
Blum et al. (2002)															
Robson et al. (2002)															
Christensen et al. (2002)															
Christensen et al. (2002)															
Calderini et al. (2002)															
Uppathorn et al. (2001)															
Stratton et al. (2000)															
Bonetto et al. (2001)															
Li et al. (2001)															
Vannoy et al. (2001)															
Blum et al. (2001)															
Blum et al. (2001)															
Salvendy et al. (2000)															
May et al. (2001)															
Elger et al. (2000)															
Baron and Engel (2001)															
Potter et al. (2000)															
Levinson et al. (2000)															
Linderoth et al. (2001)															
Calderini et al. (2000)															
Blum et al. (2001)															
Blum et al. (2000)															
Becker and Klein (2001)															
Reid et al. (2001)															
Calderini et al. (2000)															
Garcia et al. (2000)															
Kanungo et al. (2000)															
Vermeir et al. (2001)															
van der Laan and de Wit (2001)															
Algera et al. (2001)															
Morero et al. (2001)															
Chen (2000)															
Brennan et al. (2000)															
Stanton et al. (2000)															
Stanton et al. (2001)															
Potter et al. (2001)															
Power et al. (2001)															
Williams et al. (2001)															
de Koster and Matijevic (2001)															
Uhlir et al. (2001)															
Uhlir et al. (2000)															
Ara and Garcia (2001)															
Potter et al. (2001)															
Calderini et al. (2000)															
de Vries et al. (2001)															
de Vries et al. (2000)															
Blum et al. (2000)															
Potter et al. (2001)															
Bonetto et al. (2001)															
Smith et al. (2001)															
Smith et al. (2001)															
Calderini et al. (2001)															

Table A.3: Content Matrix from Systematic Literature Review (Own Illustration)

A.4 List of Analyzed Circular Startups

Table A.4: List of Analyzed Circular Startups (Own Illustration)

Database	Startup Name	Homepage	Headquarter
crunchbase	Reebelo	https://www.reebelo.com/	Singapore
crunchbase	Greyparrot	https://www.greyparrot.ai	UK
crunchbase	Space DOTS	https://www.space-dots.com	UK
crunchbase	Solarcycle	https://www.solarcycle.us/	US
crunchbase	Recycleye	https://recycleye.com/	UK
crunchbase	Valyuu.com	https://valyuu.com/	Netherlands
crunchbase	Octopus	https://octopus.co.id	Indonesia
crunchbase	OXCCU	https://www.oxccu.com	UK
crunchbase	Dayrize	https://dayrize.io	Netherlands
crunchbase	Re-Fresh Global	https://re-fresh.global/	Israel
crunchbase	Flyp	https://www.joinflyp.com	US
crunchbase	Empower	https://www.empower.eco/	Norway
crunchbase	NorthLadder	https://www.northladder.com/	United Arab Emirates
crunchbase	mircoTERRA	https://www.microterra.com	Mexico
crunchbase	Rebelstork	https://rebelstork.com/	Canada
crunchbase	Posh	https://www.poshrobotics.com	US
crunchbase	SOORT AG	https://soort.eco	Switzerland
crunchbase	NEWE	https://newe.eco/en/	Spain
crunchbase	Gro Club	https://gro.club/	India
crunchbase	Mi Terro	https://www.miterro.com	US
crunchbase	Simplr - Life as a service	https://www.simplr.io/	Spain
crunchbase	Circular Carbon Chemistry	https://www.carbon.one/	Germany
crunchbase	SPRK.global	https://www.sprk.global/	Germany
crunchbase	Recyda GmbH	https://www.recyda.com	Germany
crunchbase	Cyrkl	https://cyrkl.com/	Czech Republic
dealroom	Pretty Plastic	https://www.prettyplastic.nl/	Netherlands
dealroom	amphibio	https://www.amphico.uk/	UK
dealroom	Brickify	http://brickify.xyz	Nigeria
dealroom	CRUST	http://crust-group.com	Japan
dealroom	Pulpex	http://pulpex.com	UK
dealroom	Ottan	https://ottanstudio.com/	Turkey

Table A.4 (continued)

Database	Startup Name	Homepage	Headquarter
dealroom	SwapBox	http://www.swap-box.com	Netherlands
dealroom	Loopfront	https://www.loopfront.com/no/	Norway
dealroom	Carbonade	https://www.carbonade-sys.com/	Israel
dealroom	Lociwear	http://lociwear.com	UK
dealroom	Circunomics	https://www.circunomics.com/	Germany
dealroom	Reclyc8	http://r8iba.com	UK
dealroom	Aris Robotics	http://aris-robotics.com	Denmark
dealroom	GIFTD	http://giftid.app	Germany
dealroom	Nazena	http://www.nazena.com	Italy
dealroom	Quifactum	http://quifactum.com	Belgium
dealroom	Recoveredcarbon	http://recoveredcarbon.io	Estonia
dealroom	CO2Bioclean	http://co2bioclean.com	Germany
dealroom	Local Zero	http://local-zero.co.uk	UK
dealroom	Hier	http://hier.in	Germany
dealroom	Upcycling Forum	http://upcyclingforum.dk	Denmark
dealroom	uptraded	http://uptraded.com	Austria
dealroom	Sublime Systems	https://sublime-systems.com/	US
dealroom	Truecircle	http://safi.co	UK
dealroom	wasted	http://wasted.earth	US
EU-Startups	BikeBox PRO	https://www.bikeboxpro.com/	Germany
EU-Startups	AraBat	https://arabat.it/	Italy
EU-Startups	Boomerang	https://boomerangpack.eu/	Germany
EU-Startups	And-Less	https://and-less.at	Austria
EU-Startups	Refurb Battery	https://www.refurbbattery.eu	Netherlands
EU-Startups	Reztorer	https://www.reztorer.com/	UK
EU-Startups	RE49	https://www.re49.it	Italy
EU-Startups	PersiSKIN	https://persiskin.com/	Spain
EU-Startups	Enzymity	https://enzymity.com	Latvia
EU-Startups	Delphi Data Labs	https://www.delphidata.io/	Austria
EU-Startups	UniCompoST	https://unicompost.com.hr/	Croatia
EU-Startups	F3nice	https://f3nice.com/	Italy
EU-Startups	RiDERgy	https://ridergy.com/	Germany
EU-Startups	freepry	https://www.freepry.com	France
EU-Startups	Sojo	https://home.sojo.uk	Poland
EU-Startups	Reath	https://reath.id/	UK

Table A.4 (continued)

Database	Startup Name	Homepage	Headquarter
EU-Startups	FarmInsect	https://farminsect.eu/	Germany
EU-Startups	Circul'Egg	https://circulegg.fr	France
EU-Startups	VINTEGA	https://www.vintega.eu/	France
EU-Startups	Helios	https://www.helios.do/	France
EU-Startups	aquama	http://www.aquama.com	Switzerland
EU-Startups	Liofyllo	https://www.liofyllo.com	Greece
EU-Startups	Krill Design	https://www.krilldesign.net/	Italy
EU-Startups	tide	https://tide.earth/	Switzerland
EU-Startups	Phononic Vibes	https://phononicvibes.com/	Italy
EMA Foundation	Alara Erten Studio	https://www.alaraertenustudio.com	Turkey
EMA Foundation	Circable	https://www.circable.de	Germany
EMA Foundation	Bioma	https://bioma.id	Indonesia
EMA Foundation	Circulabi	https://www.circulabi.com.br	Brazil
EMA Foundation	Lotta Ludwigson	https://www.lottaludwigson.com	Germany
EMA Foundation	Lynx Technologies Sarl	https://www.lynx.swiss	Switzerland
EMA Foundation	Mission Zero	https://www.mizero.green	US
EMA Foundation	Agave Networks Limited	https://www.agavenetworks.co	UK
EMA Foundation	Circular Exchange	https://www.circular.co	US
EMA Foundation	Infinite Athletic	https://www.infiniteathletic.com	Spain
EMA Foundation	TrashCoin	https://www.trashcoin.eu	Nigeria
EMA Foundation	ZEROW	https://www.zerow.it	Italy
EMA Foundation	Aiya ayiA	https://www.aiyaayia.com	Canada
EMA Foundation	Faircado	https://www.faircado.de	Germany
EMA Foundation	Kvatt	https://www.kvatt.com	UK
EMA Foundation	Mulung Parahita	https://www.mulungparahita.org	Indonesia
EMA Foundation	Redonner	https://www.redonner.fr	France
EMA Foundation	Good Club	https://www.goodclub.co.uk	UK
EMA Foundation	Seenons	https://seenons.com	Netherlands
EMA Foundation	Spruce	https://www.wearespruce.co	UK
EMA Foundation	TOMbag	https://www.tombag.com.au	Australia
EMA Foundation	WhoSki.com	https://whoski.com	UK
EMA Foundation	bioMATTERS, LLC	https://www.biomatters.org	US
EMA Foundation	Inspired Partners Retail Technologies Ltd	https://www.7luckylooks.com	Ireland
EMA Foundation	OSE Systems AB	https://www.ourecolution.com	Sweden

Table A.4 (continued)

Database	Startup Name	Homepage	Headquarter
UnternehmerTUM	One five	https://one-five.com/	Germany
UnternehmerTUM	traceless	https://www.traceless.eu/	Germany
UnternehmerTUM	Rhinopaq	https://www.rhinopaq.com/	Germany
UnternehmerTUM	PÁPYDO	https://www.papydo.com	Germany
UnternehmerTUM	ByRotation	https://www.byrotation.com	UK
UnternehmerTUM	Toolbot	https://toolbot.de	Germany
UnternehmerTUM	NORNORM	http://www.nornorm.com	Denmark
UnternehmerTUM	WeDressFair	https://www.wedressfair.fr/	France
UnternehmerTUM	Vytal	http://www.vytal.org	Germany
UnternehmerTUM	goFLUX	https://goflux.de	Germany
UnternehmerTUM	kooky.	http://www.kooky2go.com	Switzerland
UnternehmerTUM	Circujar GmbH	https://circujar.com	Germany
UnternehmerTUM	betteries	https://betteries.com/	Germany
UnternehmerTUM	STABL	https://stabl.com	Germany
UnternehmerTUM	hey circle	https://www.heycircle.com	Germany
UnternehmerTUM	voltfang	https://voltfang.de/	Germany
UnternehmerTUM	tozero	https://www.tozero.solutions/	Germany
UnternehmerTUM	PHOENXT	http://www.phoenxt.com	Germany
UnternehmerTUM	Solar Materials	https://solar-materials.com	Germany
UnternehmerTUM	beworm	http://www.beworm.org	Germany
UnternehmerTUM	Lizee	http://www.lizee.co	France
UnternehmerTUM	cirplus	https://www.cirplus.com/de	Germany
UnternehmerTUM	circuly	https://www.circuly.io	Germany
UnternehmerTUM	Circulix	https://circulix.tech	Germany
UnternehmerTUM	ContainerGrid	https://www.containergrid.de	Germany