BOM
Catalyzing Change

Whitepaper

Unlocking the potential of circular startups through ecosystem & policy support

From pilot to scale

Executive summary

The circular economy is no longer an obscure or unconventional idea; it is a critical pathway to addressing climate change, securing resource supply, and safeguarding long-term economic resilience. Yet, despite their potential to drive radical innovation and systemic transformation, circular startups still face formidable challenges when scaling from pilot to commercial operation.

Institutional conditions remain slow to adapt, as illustrated by the recent Plastics Summit in Geneva, where policymakers once again failed to reach consensus on key regulations to curb plastic pollution, highlighting the urgency for coordinated action. The recent bankruptcy and restart of PeelPioneers, a promising Brabant-based circular venture, further underscores how even well-positioned innovators can struggle under current conditions, and why stronger support systems are urgently needed to help such ventures scale and endure.

This whitepaper aims to deepen understanding and urge timely action from key stakeholders: policymakers, investors, corporates and ecosystem enablers. Drawing from a dedicated master thesis at Tilburg University and research by BOM, we explore how waste-valorising circular ventures, including PeelPioneers, Protix, Revyve, Recell, Fiber Foods, NoPalm Ingredients, TORWASH and UBQ Materials, leverage their ecosystems to overcome growth barriers and scale effectively. These case studies offer valuable insights into CSU characteristics, challenges, ecosystem composition and the mechanisms through which ecosystem engagement enables progress. Our research highlights how circular startups must offer value propositions that are competitive with linear alternatives to succeed: on price, performance or added customer value. To support this, we propose a success factor framework with four contributing focus areas: market, process, feedstock and ecosystem, each contributing to building a robust and scalable circular business model.

Circular startups must offer value propositions that are competitive with linear alternatives to succeed: based on price, performance or added customer value.

In particular, we take a deeper look at the ecosystem dimension. Our research suggests that a broad set of ecosystem actors, namely customers, scientific institutions, accelerators, media, suppliers, investors, circular startups, governance bodies, incumbents, branch or circular economy associations and engineering organisations, play a crucial role in supporting waste-valorising circular startups. These actors each help address specific challenges across challenge domains. For circular startups to grow and overcome barriers, it is crucial to identify the key players in their ecosystem and work closely with them. At the same time, these ecosystem actors must recognise their own power to accelerate the circular transition by actively supporting and engaging with circular ventures.

We also stress the importance of adjusting systemic conditions. We call on EU legislators to seize the window of opportunity of the upcoming Circular Economy Act to harmonise End-of-Waste criteria, mandate true pricing regulation, and create the legal certainty that allows waste-valorising ventures to scale across borders rather than collapse within them. Beyond regulation, investors must apply tailored financing models that reflect the capital intensity and long-term value potential of circular ventures. Only through committed action across the ecosystem can the circular transition gain the momentum it needs.

The Netherlands, and Brabant in particular, have the opportunity to lead. The time to act is now.

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1. Introduction: circular economy & circular startups

1.1 The linear economy problem

Humanity faces pressing environmental and social challenges that threaten societies globally. A key contributor to this crisis is the linear economy, which follows a "take-make-waste" model: raw materials are extracted, transformed into products, and ultimately discarded by consumers. This model leads to the loss of rare resources and significant greenhouse gas emissions, posing serious societal risks. A telling example of this issue is "World Overshoot Day", which marks when humanity's resource use exceeds Earth's annual regenerative capacity. In 2025, the Netherlands reached Overshoot Day on May 5th, suggesting it would need almost four planets to maintain its current lifestyle.

1.2 Circular economy: concept and importance

The circular economy (CE) is rapidly emerging as a crucial alternative to the traditional linear "take-make-waste" model. By prioritising the reuse, recycling and regeneration of materials, the CE reduces environmental pressure while building a more resilient and future-proof economy. For the Netherlands, the transition to circularity is not just a sustainability imperative; it is a strategic necessity. A circular economy strengthens resource security for the vital Dutch manufacturing sector, offers the potential to reduce Dutch CO_2 emissions by up to 7.2 million tonnes annually [1], and is projected to increase the European GDP by up to seven percentage points in 2030 [2]. Embracing CE means securing long-term competitiveness while contributing meaningfully to climate goals.

For the Netherlands, the transition to circularity is not just a sustainability imperative; it is a strategic necessity.

The circular economy is built on a foundation of R-strategies: practical approaches that organisations can adopt to close resource loops. These strategies range from Refuse (R0) to Recover (R9), indicating a hierarchy of circularity. Strategies higher in the hierarchy, such as Refuse and

Reduce, offer greater circular impact by preventing waste altogether, while lower-tier strategies like Recycle and Recover aim to extract value from existing waste. Brabant's focus includes advancing strategies across this hierarchy, particularly in sectors where resource use is intensive. Adopting these strategies is not merely a technical shift; it requires systemic change. Successful CE initiatives show that progress depends on building interconnected networks, promoting cooperation, and developing innovative exchange mechanisms for sustainable resource management. This transition is thus inherently collaborative, relying on the active involvement of all societal actors.

1. McKinsey Center for Business and Environment. (2016). The Circular Economy: moving from theory to practice.
2. Ecorys, Witmond, B., Dijkhof, Y., TNO, & Rietveld, E. (2021). Bijdrage circulaire economie aan de klimaatopgave. https://publications.tno.nl/publication/34638843/vMmAsg/witmond-2021-bijdrage.pdf

Figure 1: 10R Framework (Potting et al., 2017)

Circular Economy			
Increasing circularity	Smarter product use and manufacture	**R0 Refuse**	Make product redundant by abandoning its function or by offering the same function with a radically different product
		R1 Rethink	Make product use more intensive (e.g. through sharing products, or by putting multi-functional products on the market)
		R2 Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials
Rule of thumb: Higher level of circularity = fewer natural resources and less environmental pressure	Expand lifespan of product and its parts	**R3 Re-use**	Re-use by another consumer of discarded product which is still in good condition and fulfils its original function
		R4 Repair	Repair and maintenance of defective product so it can be used with its original function
		R5 Refurbish	Restore an old product and bring it up to date
		R6 Remanufacture	Use parts of discarded product in a new product with the same function
		R7 Repurpose	Use discarded product or its parts in a new product with a different function
	Useful application of materials	**R8 Recycle**	Process materials to obtain the same (high grade) or lower (low grade) quality
Linear Economy		**R9 Recover**	Incineration of materials with energy recovery

1.3 Circular startups

Circular startups (CSUs) play a pivotal role in accelerating the transition toward a circular economy. These ventures embed one or more R-strategies into their core business models and, unlike incumbents, have the advantage of integrating circular principles from inception. This positions them uniquely to drive innovation, challenge entrenched linear practices, and establish entirely new value chains[3].

Despite their transformative potential, CSUs remain relatively underexplored. As an emerging field, circular entrepreneurship lacks established models or widely accepted blueprints for value creation within circular chains. Recent work, such as InvestNL's Circular Venture Building: Emerging Fundamentals (2024), underscores this point, highlighting that many circular propositions struggle not due to a lack of ambition or innovation, but in part because ecosystem actors lack the knowledge, tools and structures to support them effectively in transforming value chains.

Strengthening the understanding of CSUs among ecosystem actors is therefore essential to unlocking their full potential and accelerating the broader circular transition.

Circular startups play a pivotal role in accelerating the transition toward a circular economy.

3. Utrecht University. (2019, oktober). Disruptors: How Circular Start-ups Can Accelerate the circular Economy transition. https://www.circle-economy.com/resources/disruptors-how-circular-start-ups-can-accelerate-the-circular-economy-transition

1.4 Waste-valorizing (R8-9) circular startups

CSUs are diverse, and their business models can

Description of activities	Implemented R-strategies
Business models implementing regenerative strategies that imitate biological cycles. Residual resources are captured and serve as feedstock for another process in close proximity.	Regenerate: highest R-strategy based on self-sustaining biological ecosystems to maintain and increase the value of resources; not included in the 10R-framework.
Business models based on circular innovations mostly mostly in the pre-market phase, e.g., source material minimization, circular product design (durability, modularity, repairability), or production process efficiency.	R0–R2: Refuse, Rethink, Reduce
Business models implementing sharing/trading models built around B2B, B2C or C2C marketplaces.	R0–R2: Refuse, Rethink, Reduce
Business models embedding products in service-systems (PaaS) to increase usage efficiency and circularity.	R1–R4: Rethink, Reduce, Reuse, Repair
Business models implementing strategies to extend the lifecycle of products or recover and extend their residual value.	R3–R7: Reuse, Repair, Refurbish, Remanufacture, Repurpose
Business models based on recovering resources from internal or external waste streams, including upcycling and recycling.	R8–R9: Recycle, Recover

be classified based on the R-strategies they apply as seen in the figure on page 5. This whitepaper focuses on a specific subset: **waste-valorising CSUs**, which leverage **R8 (Recycle)** and **R9 (Recover)** strategies to extract value from internal or external residual streams. This focus aligns closely with Brabant's strategic ambitions. The valorisation of residual waste is one of the region's key pillars in achieving the Netherlands' national circular economy targets: a 50% reduction in raw material use by 2030 and a fully circular economy by 2050. Alongside high-value reuse and product life extension, waste recovery plays a central role in this transition. This focus on waste valorisation is particularly relevant in regions like Brabant, where large volumes of biomass and industrial residual streams are continuously available, as shown in recent research of the biobased sector in Brabant[5] .

Within the R8-9 CSU segment, meaningful distinctions exist. For instance, startups working with organic waste streams face different operational and regulatory challenges than those valorising non-organic materials. Recognising and addressing these nuances and challenges is key to designing effective support mechanisms and fostering scalable circular innovations.

The valorisation of residual waste is one of the region's key pillars in achieving the Netherlands' national circular economy targets.

4. Brabant is Bright (2023). Circular biobased economy in Brabant.
5. Brabant is Bright (2022). Biobased Economy: An in-depth overview of the biobased sector in Brabant.

1.5 R8-9 circular startup challenges

Like conventional startups, circular startups (CSUs) face typical early-stage challenges: limited resources, organisational growing pains and market entry barriers. However, their commitment

to circular business models (CBMs) introduces a distinct layer of complexity. In addition to general startup challenges, CSUs face both broad and CBM-specific barriers that stem from their efforts to create value in fundamentally different ways. These added challenges can significantly influence their ability to scale, leading to varied growth trajectories across different CBM typologies.

To unlock the full growth potential of circular startups (CSUs), it is essential to understand and address the challenges they face, whether these are startup-general, circular business model (CBM)-general or CBM-specific. In this whitepaper, we categorise these challenges into six core areas, based on established literature on startup and circular entrepreneurship. These categories are: financial, organisational, knowledge and technology, supply chain, market and institutional.

In addition to general startup challenges, CSUs face both broad and CBM-specific barriers that stem from their efforts to create value in fundamentally different ways.

Startup-general and Circular Business Model-general challenges

- **Financial:** Like all startups, CSUs face resource constraints. This is compounded by a lack of investor familiarity with circular propositions and a perception of elevated risk among investors.
- **Organizational:** Limited team capabilities and difficulty attracting specialised talent reflect the typical constraints of early-stage ventures, challenges to which CSUs are equally exposed.
- **Knowledge & Technology:** CSUs and startups in general often struggle with limited access to dedicated testing and scaling facilities, experienced CSU mentors, and suitable production locations.
- **Supply Chain:** Implementing circular solutions requires intensive collaboration across the value chain, an effort often hindered by limited legitimacy, scarce resources and incumbents' reluctance to implement circular solutions.
- **Market:** Consumer behaviour shaped by linear models, along with price competition from established linear alternatives, presents significant challenges for CSUs.
- **Institutional:** Regulatory frameworks frequently lag behind circular innovation, offering limited policy support and legal clarity.

R8-9 CSU Specific Challenges

- **Financial:** R8-9 initiatives typically require capital-intensive operations and high upfront investments, leading to increased investor risk perception and difficulty attracting capital.
- **Organizational:** These ventures require deep industrial know-how and strong alliance-building capabilities to operate effectively in complex ecosystems.
- **Knowledge & Technology:** Adapting technology to waste-based inputs presents unique R&D hurdles, which are difficult to overcome and are further compounded by a lack of specialised scaling expertise, testing facilities and scaling facilities.
- **Supply Chain:** Securing consistent, homogeneous, high-quality waste streams is a major challenge. Inputs are often heterogeneous and geographically dispersed, complicating production processes and requiring costly logistics. Organic feedstocks, in particular, present time-sensitive feedstock sourcing constraints due to perishability of waste streams.
- **Market:** Competing with the efficient supply chains of virgin-material-based alternatives is difficult in terms of both cost and quality. Additionally, in many cases, underdeveloped industry contexts typical for R8-9 CSU propositions lead to customer hesitation to commit.
- **Institutional:** Misaligned regulatory frameworks, such as ambiguity in End-of-Waste regulations, and regulatory gaps in emerging sectors are seen as significant growth barriers for R8-9 CSU development.

PeelPioneers upcycled citrus peel waste into high-end functional fibers.

2. R8-9 circular startup succes factor framework

2.1 Key success factors for R8-9 circular startups

As a relatively new entrepreneurial paradigm, circular startups, particularly those operating in the waste-valorising (R8-9) space, require new approaches to venture building. To better understand what enables these startups to succeed, we conducted exploratory research into best practices and success conditions. This resulted in a preliminary success factor framework, which identifies one overarching key success factor, supported by four contributing focus areas.

Overarching Success Factor

For R8-9 circular startups to succeed, they must do more than deliver on circularity. They must also offer propositions that are competitive with linear alternatives, whether on price, performance or added customer value. Circularity alone is not enough to secure market adoption. There is no green premium being paid.

> Circularity alone is not enough; there is no green premium being paid.

1. Market

Competitiveness is enhanced through market credibility, seamless integration of circular outputs into existing systems, and strategic placement of products in high-value applications. These elements help improve adoption rates and strengthen the economic viability of circular offerings. A telling illustration of this dynamic is **PeelPioneers**, a Brabant-based circular startup that upcycled citrus peel waste into high-end functional fibres. Their flagship product, a premium citrus fibre, was designed for plug-and-play integration into existing food production processes. As a one-to-one replacement for conventional citrus fibres, it required minimal to no recipe adjustments, reducing barriers to adoption. This ease of integration made their proposition attractive to manufacturers and positioned PeelPioneers for

years as a flagship circular venture within the food and cosmetics sectors.

Although the company went bankrupt in 2025, their trajectory underscores how strong integration potential can drive early market traction and has since sparked renewed interest, ultimately leading to a relaunch of the company. It also highlights the importance of creating better systemic conditions for promising circular ventures such as PeelPioneers to scale and sustain their impact.

The trajectory of PeelPioneers underscores how strong integration potential can drive early market traction.

2. Process

Operational excellence is critical. R8-9 circular startups benefit from process flexibility, the ability to handle heterogeneous feedstocks, and innovative use of existing technologies. A compelling example of this is **UBQ Materials**. The company has developed a patented process that transforms 100% unsorted municipal household waste, including food scraps, contaminated cardboard, diapers, garden waste and mixed plastics, into UBQ™, a CO_2-negative bio-based thermoplastic composite. This material serves as a drop-in substitute for fossil-based plastics, seamlessly integrating into existing manufacturing processes. By operating at the very end of the waste chain, UBQ captures value from one of the lowest-cost and most heterogeneous feedstocks available. This approach ensures feedstock security and delivers a strong cost advantage, enabling the company to compete directly with virgin plastics, even when oil prices are low. UBQ's adaptive, waste-to-resource process exemplifies how targeted design can convert challenging inputs into scalable, high-value circular outputs, now adopted by Mercedes and McDonald's.

UBQ's adaptive, waste-to-resource process exemplifies how targeted design can convert challenging inputs into scalable, high-value circular outputs.

UBQ Materials turns unsorted household waste into a CO_2-negative thermoplastic.

Additionally, access to shared R&D infrastructure, such as testing, pilot and scaling facilities, can significantly reduce capital intensity and shorten time to market for circular startups. **The Scale-up Plant of Europe** initiative, led by BOM, illustrates this approach. Its goal is to position Brabant as Europe's leading hub for scaling plant-based and sustainable food innovations by creating a connected network of accessible pilot, demo, and commercial-scale facilities, designed to give startups the physical infrastructure needed to scale their propositions efficiently and bring them to market faster.

Access to shared R&D infrastructure, such as testing, pilot and scaling facilities, can significantly reduce capital intensity and shorten time to market for circular startups.

A compelling example of this approach is **Revyve**, a circular startup that upcycles brewer's and baker's yeast into clean-label, egg-replacing texturising ingredients. By co-locating within Cosun's innovation ecosystem in Dinteloord, Revyve was able to leverage shared utilities, infrastructure and technical expertise, enabling the company to move swiftly from demo to pilot and on to its first commercial production facility.

Revyve turns yeast into egg alternatives and scaled quickly through shared infrastructure.

3. Feedstock

Working with low-value or negative-cost feedstocks is a key lever for cost competitiveness. Ensuring long-term feedstock security, through detailed supply chain mapping and close engagement with sourcing partners, is essential for scaling effectively and reliably.

Wastewater sludge illustrates this principle well: it is abundant, continuously generated at wastewater treatment plants, and typically incurs disposal costs, making it a low- or even negative-value feedstock, meaning operators may even be paid to take and process the waste stream.

TORWASH is a circular venture that leverages this dynamic by applying hydrothermal treatment to convert wet sludge into energy-rich pellets and recover valuable nutrients, while earning revenue from gate fees. This combination of feedstock security and fee-based income underpins TORWASH's competitive business case and accelerates its path to scale.

Working with low-value or negative-cost feedstocks is a key lever for cost competitiveness.

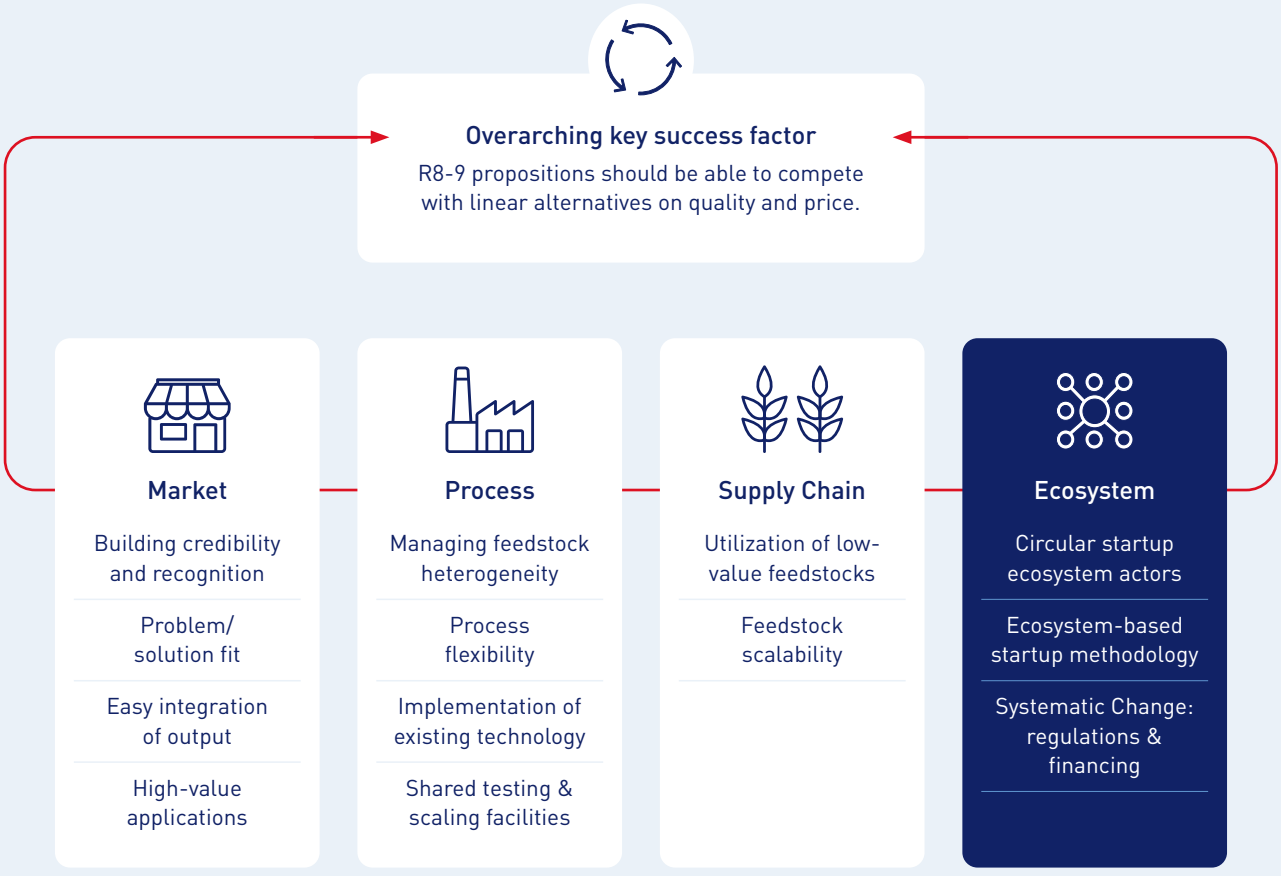
4. Ecosystem

An ecosystem-based approach is vital. R8-9 CSUs must actively engage relevant partners across the value chain to overcome growth barriers and enable supply chain transformation. An example of such collaboration is the **Side Stream Innovation Valley (SSIV)**, a Brabant-based initiative by Rodenburg Biopolymers that aims to transform food-based side streams, such as potato waste, into high-value biobased products. Still under development, SSIV is designed as an integrated hub where startups, industry, and educational institutions co-locate and collaborate to unlock new circular propositions.

Startups will experiment with side stream valorisation, educational partners will contribute applied research and skilled talent, while Rodenburg provides the industrial feedstocks and scaling infrastructure. These actors form a closed-loop system where knowledge, materials and innovation flow between sectors, accelerating the transition from idea to scalable circular solution.

An ecosystem-based approach is vital to overcome growth barriers and enable supply chain transformation.

In the following sections, we explore more in depth how ecosystem composition supports the growth of R8–9 CSUs, drawing on the insights of a dedicated master's thesis at Tilburg University focused on ecosystem dynamics in circular venture development.



3. R8-9 circular startup ecosystems

3.1 R8-9 circular startup ecosystem actors

The success of R8-9 circular startups depends not only on the strength of their internal operations but also on the composition and dynamics of the ecosystems in which they operate. These ventures are embedded in complex value chains and require close collaboration to drive the systemic transformation essential for circularity. As such, ecosystem engagement emerges as a critical enabler for their success.

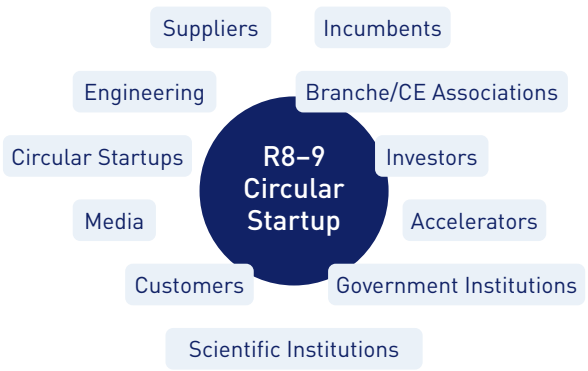
The success of circular startups depends not only on the strength of their internal operations but also on the composition and dynamics of the ecosystems in which they operate.

A dedicated master thesis at Tilburg University, based on academic literature and nine in-depth R8-9 circular startup case studies, explored the ecosystem composition of R8-9 CSUs and how these ventures leverage their ecosystems to overcome key challenges. The study identified a diverse and interdependent network of ecosystem actors, each contributing uniquely to startup development:

- **Suppliers:** Play a vital role in securing stable feedstock supply and enabling circular supply chain transformation. Early and sustained engagement of these actors is essential.
- **Customers:** Key partners in co-developing propositions that replace linear alternatives, going beyond traditional buyer-seller roles. Early and sustained engagement of these actors is essential.
- **Investors:** Provide capital for scaling and strategic support in navigating complex regulatory environments.
- **Scientific Institutions:** Offer research knowledge and access to R&D infrastructure essential for technological development.
- **Engineering Organizations:** Supply critical expertise in scaling capital-intensive technologies not typically found in-house.
- **Government Institutions:** Shape regulatory conditions and offer financial support through grants and other incentives.
- **Branch/CE Associations:** Enhance industry legitimacy and advocate for supportive regulatory frameworks.
- **Media:** Can help strengthen venture credibility and can influence public and institutional support for circular propositions.
- **Accelerators:** Facilitate growth through targeted support, networks, and capability building.
- **Other (Circular) Startups:** Enable peer learning, legitimacy-building, and strategic collaboration.
- **Incumbents:** Can serve as important partners in technology development and market access when engaged strategically.

Active collaboration of R8-9 CSUs with the identified ecosystem actors is essential to overcome barriers and drive systemic change. Understanding how these interactions influence circular venture growth enables both circular startups and their stakeholders to build more responsive, supportive ecosystems, ultimately increasing the potential for circular ventures to scale.

The next section examines how ecosystem actors contribute to addressing specific key challenges that R8-9 circular startups face across different stages of development.



3.2 Ecosystem-based startup methodology

R8-9 circular startups (CSUs), by design, operate within complex and highly interdependent value chains. Their ability to grow and scale is closely linked to how effectively they engage with their surrounding ecosystem. The master thesis research highlights how specific ecosystem actors contribute to overcoming the core challenges these ventures face.

To address **financial challenges**, early-stage impact investors and public investment agencies have proven critical for impact-oriented ventures like R8–R9 CSUs. These actors often operate with broader mandates and are well-positioned to support circular propositions. Evidence from Bpifrance demonstrates the potential impact of such support: companies backed by public capital generated €138 billion in additional turnover and created 8% more jobs across its 2012–2018 cohorts over the three years post-support compared to matched peers. Government institutions further support early-stage ventures through grants. Suppliers and customers can also play pivotal roles by demonstrating early commitment, such as through preliminary feedstock and offtake agreements, that help de-risk investment. Accelerators and media exposure play an important role in improving investor engagement by sharpening communication strategies and building credibility. This visibility helps attract both traditional investors and the crowd.

6. Bpifrance. (2023). The Impact of BPiFrance: Key figures 2022. https://www.bpifrance.com/storage/sites/7/2024/02/2023-12-The-impact-of-Bpifrance-in-2022.pdf

Early-stage impact investors and public investment agencies have proven critical for impact-oriented ventures like R8–R9 CSUs.

When it comes to **organizational challenges**, such as attracting experienced industrial talent, media visibility may help increase exposure. However, the overall influence of ecosystem composition on solving this challenge for R8-9 CSUs remains inconclusive based on current evidence.

Knowledge and technology challenges are often addressed through collaboration with scientific

institutions, incumbents, and engineering partners. Scientific institutions provide valuable R&D infrastructure and research insights, particularly in early development stages. Engineering organisations offer essential expertise for scaling R8-9 technologies, especially during factory construction. Incumbents may facilitate shared facilities or co-location opportunities, which can lower capital requirements and accelerate progress. The Scale-up Plant of Europe initiative, led by BOM, exemplifies this model in practice.

Incumbents may facilitate shared facilities or co-location opportunities, which can lower capital requirements and accelerate progress.

Within the initiative, incumbents such as Cosun and Bodec play key roles in strengthening Brabant's regional scaling infrastructure. Cosun offers industrial-scale co-location and technical expertise, enabling circular startups like Revyve to progress swiftly from pilot to commercial scale. Similarly, Bodec has significantly supported circular food venture Fiber Foods in optimising its production processes. Together, these incumbents help build an ecosystem that lowers capital barriers and accelerates commercialisation for food ventures, including those developing circular innovations.

Supply chain challenges, particularly regarding feedstock quality and security, are most often managed through close supplier collaboration. Effective coordination strategies include aligning value propositions with supplier needs, co-locating near key feedstock sources and using financial incentives, such as adjusted gate fees, to improve quality management and sorting behaviour. A compelling example of co-location comes from **Recell**, a circular venture specialising in cellulose recovery. The company established its demo factory at the wastewater treatment plant in Leek, Groningen, placing it directly at the source of a cellulose-rich residual stream. This stream, consisting of toilet paper remnants in sewage water, is processed into high-purity recycled cellulose, which Recell converts into biobased raw materials for construction, infrastructure and chemical applications. By embedding operations at the feedstock source, Recell minimises logistic needs, enhancing feedstock security and illustrating how co-location can de-risk scale-up and enhance operational efficiency for circular startups.

Supply chain challenges, particularly regarding feedstock quality and security, are most often managed through close supplier collaboration.

To overcome **market challenges**, governance institutions play a central role. Regulatory measures like removal contributions or CO_2 taxes improve the competitiveness of circular alternatives. A proven example of effective regulatory intervention lies in the application of removal contributions for tyres. In many EU countries, producers pay a fee per tyre placed on the market. These funds are used to cover collection and recycling expenses, effectively subsidising the cost of processing end-of-life tyres and reducing the financial burden on recycling operations. This system significantly reduces feedstock costs and improves the economics of recycling ventures, contributing to the 15-35% internal rate of return (IRR) typical for well-managed tyre recycling programmes[7].

Regulatory measures like removal contributions or CO_2 taxes improve the competitiveness of circular alternatives.

7. Donnelly, K. (2025, 25 juli). Tyre Recycling Economics: Complete Cost-Benefit Analysis. Gradeall International LTD. https://gradeall.com/tyre-recycling-economics-cost-benefit-analysis/

Additionally, in underdeveloped industry contexts, collaboration with peer startups plays a vital role in building sector legitimacy. Sector legitimacy and shared industry success helps reassure hesitant customers by offering viable alternatives and reducing perceived risk.

A strong example is **Protix**, a pioneer in the insect protein industry that transforms food waste into high-quality ingredients for animal and pet feed using the black soldier fly. When Protix was founded in 2009, the insect protein sector lacked both regulatory frameworks and a formalised market. To address this, Protix co-founded the International Platform of Insects for Food and Feed (IPIFF) in 2012, together with peer insect organisations. Through IPIFF, they engaged policymakers, raised awareness and advocated for enabling regulatory frameworks, resulting in the approval of insect protein for poultry and pig feed in 2021. This collective effort helped lay the foundation for a new market category and opened trusted adoption pathways for customers.

Tackling **institutional challenges** involves navigating complex regulatory landscapes. Investors, suppliers, engineering firms, and branch associations can help startups interpret, comply with, or influence policy through their existing experience with governance institutions. Targeted media exposure and collective lobbying with peer ventures have also proven effective in advancing regulatory change, as for instance seen in the Protix case.

Importantly, the research indicated that the challenges R8-9 CSUs face, and the support they require, vary with the venture's characteristics, maturity and industry context. As a result, optimal ecosystem composition evolves over time. In early stages, accelerators, scientific institutions, and early investors are particularly critical, while relationships with customers and suppliers often revolve around deep engagement and co-development. As the circular venture scales, engineering partners, regulators, and more transactional supplier and customer relationships become central. Recognising and adapting to these shifting ecosystem needs allows circular startups, and their ecosystem partners, to build environments that support sustainable growth and long-term circular impact.

Optimal ecosystem composition evolves over time.

R8–9 circular startup challenge category actors found to address challenge

Financial challenges	Investors, government institutions, accelerators, media, suppliers, and customers
Organizational challenges	-
Knowledge & Technology challenges	Scientific institutions, incumbents, and engineering organizations
Supply Chain challenges	Suppliers
Market challenges	Government institutions and competing startups
Institutional challenges	Investors, engineering organizations, suppliers, competing startups, the media, and branch/CE associations

3.3 The need for systemic change: regulation and finance

While ecosystem engagement is vital for the development of circular startups, broader systemic changes in regulation and finance are equally essential to enable circular propositions to scale. Currently, misaligned and underdeveloped regulatory frameworks pose significant barriers to the growth of circular ventures. To accelerate the circular transition, policy reforms must better reflect the operational realities of R8-9 circular startups.

3.4 Regulatory reform

Two areas in particular warrant urgent attention. First, misaligned regulatory frameworks remain a major barrier and must be adapted to accommodate circular propositions. For example, European and national End-of-Waste (EoW) criteria have often failed to recognise the outputs of R8–9 ventures as non-waste, preventing circular products from entering the market. A tragic example is Rotterdam-based plastics recycler Umincorp, which declared bankruptcy in 2024. The company had developed a magnetic separation process to produce high-quality recycled plastics from mixed household waste, but new European regulations prohibited the use of plastics not sourced from separately collected waste in food packaging. This regulatory shift blocked access to key markets, undermined Umincorp's business case, and ultimately forced the company to shut down despite its technological potential.

Misaligned regulatory frameworks remain a major barrier and must be adapted to accommodate circular propositions.

Second, regulatory measures that actively stimulate demand, such as true pricing mechanisms and blending obligations, are essential for creating a level playing field between circular and linear propositions. By internalising environmental costs and mandating circular products, such instruments can shift market dynamics in favour of more sustainable solutions. Despite being widely discussed, for instance within the plastics recycling industry, progress on implementation remains slow. The recent Plastics Summit in Geneva once again highlighted this challenge, with policymakers unable to reach consensus on concrete action. This lack of regulatory clarity continues to place substantial

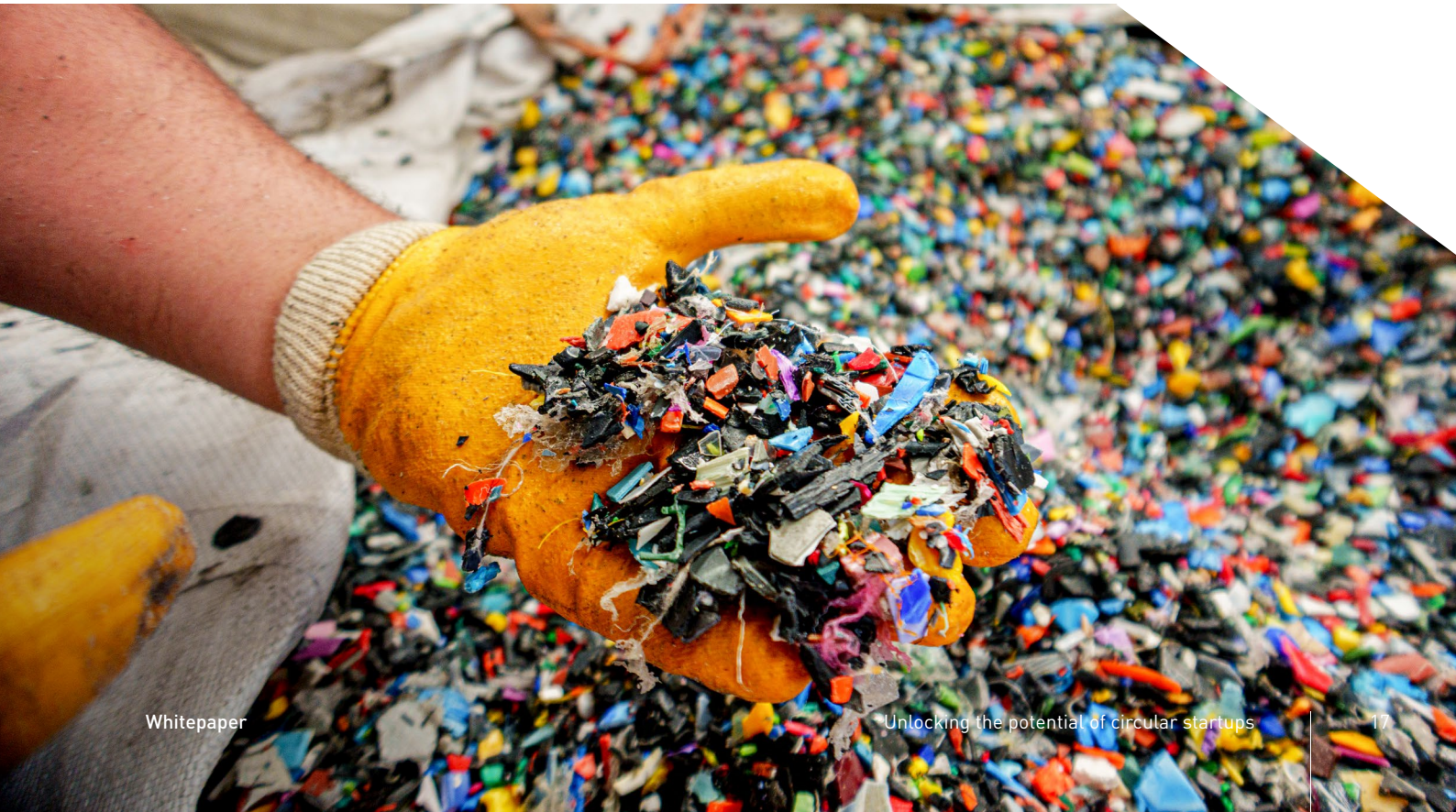
financial pressure on plastics recycling and other circular industries. EU legislators must use the upcoming Circular Economy Act to harmonise End-of-Waste criteria, mandate true pricing on linear externalities, and introduce blending obligations for priority waste streams. Without instruments like these, regulatory conditions will continue to penalise the ventures the EU claims to champion.

3.5 Financing reform

In parallel, the financing landscape must evolve. The current investment logic, built around linear growth models and short-term returns, does not align with the longer, capital-intensive trajectories typical of circular ventures.

The **Kopgroep Circulair Financieren**, a Dutch public-private coalition under the Sustainable Finance Platform, advocates for a different path. The group is pioneering a financing approach that incorporates both linear and circular risks into deal assessment, and shifts emphasis towards measuring long-term impact rather than short-term gain. A key outcome is the development of the open source Circular Risk Scorecard, which enables investors to quantify circular risk profiles and integrate them into credit evaluations, helping to reveal often-overlooked resilience and value potential in circular business models. By normalising these metrics, this approach benefits all stakeholders. Circular startups gain access to better-matched capital that reflects their true value and risk profile. Investors are empowered to finance circular ventures more confidently, reducing perceived risk and diversifying portfolios. And finally, ecosystem actors can use these tools to support circular startups in a more credible and targeted way. Ultimately, unlocking capital for circular ventures requires reorienting both investor mindsets and assessment frameworks towards systemic value rather than conventional returns. The work of the Kopgroep Circulair Financieren sets a strong precedent for how financial systems can evolve to support the circular transition. Alongside regulatory reform, such institutional shifts are essential for creating an enabling environment where circular innovation can truly thrive.

Unlocking capital for circular ventures requires reorienting both investor mindsets and assessment frameworks towards systemic value rather than conventional returns.



4. Key takeaways: enabling circular impact in Brabant and beyond

Circular economy importance

The circular economy should be a strategic priority for Brabant and the Netherlands, not only to advance sustainability but also to safeguard the region's economic resilience in an increasingly uncertain world. Circularity presents the potential to reduce Dutch CO_2 emissions by approximately 7.2 million tonnes annually. In addition, embracing circularity enhances resource security through local sourcing and reduces dependence on global supply chains. It also represents a clear economic opportunity, with the potential to increase the European GDP by up to seven percentage points in 2030.

R8-9 circular startup success factor framework

Circular startups (CSUs) are critical enablers of the circular transition. These ventures develop innovative circular business models, such as those focused on waste valorisation (R8-9), that challenge the status quo. However, circularity alone is not enough. Our research shows that R8-9 CSUs must offer propositions that compete with linear alternatives on price, performance or added customer value. To support this, the circular startup success factor framework identifies four key focus areas: market, process, feedstock and ecosystem, each of which contributes to creating a competitive, scalable circular value proposition.

Leveraging ecosystems to overcome growth barriers

A deeper investigation into the ecosystem dimension, through a dedicated master thesis at Tilburg University, further underscores the importance of ecosystem engagement. R8-9 CSUs are embedded in highly interdependent value chains, and their ability to scale depends largely on how well they activate and collaborate with their ecosystem. The research identifies a broad set of ecosystem actors, including customers, suppliers, scientific institutions, accelerators, media, investors, governance bodies, incumbents, branch associations, engineering partners and peer circular startups, each playing a role in helping overcome specific growth challenges. Founders and stakeholders must understand R8-9 ecosystem composition and strategically engage, or help facilitate the engagement of, relevant actors across different development stages to build an environment capable of supporting R8-9 CSU growth.

Need for systemic change

Beyond ecosystems, systemic changes are needed. Regulatory frameworks must evolve to better support circular propositions, through measures such as true pricing mechanisms and adjusted end-of-waste criteria. The recent Plastics Summit in Geneva once again demonstrated the urgency of action, as policymakers failed to reach consensus on implementing such regulations. Continued delay only deepens the pressure on circular industries. Swift political commitment is required to create a regulatory environment that enables circular innovations to thrive. The forthcoming EU Circular Economy Act offers a decisive opportunity to deliver this, provided legislators use it to harmonise End-of-Waste criteria, embed true pricing, and create the legal certainty circular ventures need to scale. Simultaneously, investors must adopt financing models aligned with the capital intensity and long-term value creation potential of circular ventures, while also facilitating collaboration across ecosystem actors. By enabling both ecosystem and systemic support, Brabant, the Netherlands, and Europe as a whole, can position themselves as a frontrunner in the circular transition: locally resilient, economically competitive and globally relevant. **The time to act is now.**

Brabant, the Netherlands, and Europe as a whole, can position themselves as a frontrunner in the circular transition.

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Do you want to know more?

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About the Brabant Development Agency (BOM)

BOM is committed to accelerating the transition toward a sustainable and circular economy. As an organisation deeply embedded in the entrepreneurial landscape of Brabant, BOM plays a leading role in supporting startups through investment, development programs, and ecosystem facilitation. This whitepaper aligns with BOM's broader mission to foster impactful ventures and strengthen the region's economic resilience.

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