

Who Thinks Managing the Circular Economy Is Difficult? A Comparative Analysis Across Circular Strategies, Firm Maturity, and Role Positions

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Abstract

This study examines perceived relative difficulty across organisational functions when firms implement circular economy (CE) strategies. Using survey data from 115 companies in Flanders (Belgium) that engage with circular strategies, respondents assessed whether managing eight organisational functions is easier, comparable, or more difficult in circular business contexts compared to conventional linear practices. The analysis compares perceptions across circular strategy profiles, firm maturity, and organisational role positions. Core operational functions – product development, procurement, production, and logistics – are most frequently perceived as more difficult, while supporting functions – human resource management and corporate governance – are more often perceived as comparable or, in some cases, easier. Young firms report more pronounced perceptions than established firms, with statistically significant differences for production and logistics. Role-based heterogeneity is also observed. Staff members are more likely to perceive marketing and sales as more difficult, while board members and managers more often report regulatory, standardisation, and supply chain collaboration barriers. These results extend barrier and enabler research by providing a function- and role-sensitive empirical mapping of where circular implementation is experienced as most demanding. The findings inform managers and policymakers by indicating where coordination, capability development, and enabling measures may be most consequential.

Keywords Circular Economy Implementation · Circular Business Models · Organisational Functions · Managerial Challenges · Firm Maturity · Organisational Roles

1. Introduction

Throughout the last decade, scholars have extensively examined barriers and enablers of circular business model innovation (Antikainen & Valkokari, 2016; Geissdoerfer et al., 2023), acceptance (Charnley et al., 2022; Elzinga et al., 2020), and implementation (Asante et al., 2025; Salvador et al., 2020). Beyond technological opportunities and new business models, we need a clear understanding of processes *within* firms. Different organisational functions must be aligned to implement circular strategies and business models. However, these managerial dimensions – such as product development, procurement, production, marketing and sales, financial management, human resource management, and corporate governance – have received limited systematic empirical attention.

Implementing a circular economy (CE) demands a broad and diverse set of skills and capabilities (Burger et al., 2019; Straub et al., 2023). Prior research has shown that circular business model innovation requires

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cross-functional coordination, dynamic capability development, and alignment between operational and strategic units (Geissdoerfer et al., 2023; Santa-Maria et al., 2022). However, most empirical studies analyse barriers and enablers at an aggregate firm level, treating the firm as a relatively homogeneous unit of analysis (Asante et al., 2025; Salvador et al., 2020). Far less attention has been paid to how challenges are distributed across organisational functions or how they are perceived by actors occupying different role positions within the same firm. Although governance mechanisms and role differentiation have been discussed conceptually (Palea et al., 2024; Yawar & Kuula, 2021), systematic empirical evidence on intra-organisational heterogeneity in circular implementation remains limited.

This heterogeneity may also vary by firm maturity. The literature frequently contrasts young, purpose-driven circular start-ups with established incumbents embedded in path-dependent routines (Henry et al., 2020; Hockerts & Wüstenhagen, 2010; Tuladhar et al., 2024). Young firms are often described as flexible and experimentation-oriented, yet constrained by limited resources and market access (Ciccullo et al., 2023; Han et al., 2023). Established firms benefit from scale, networks, and capital, but face organisational inertia and legacy system constraints (Greer et al., 2020; Henry et al., 2023). Despite these recurring distinctions, empirical evidence remains scarce on whether and how perceived managerial difficulty differs between young and established firms across specific organisational functions.

This study investigates perceived relative difficulty across organisational functions in circular business contexts. It draws on survey data from 115 companies in Flanders (Belgium) that can be considered as circular frontrunners or early adopters of CE strategies. Respondents assessed whether managing specific organisational functions is experienced as easier, comparable, or more difficult in a circular business context relative to conventional linear practices. The organisational functions examined include both core operational functions – product development, procurement, production, and logistics – and supporting functions, including marketing and sales, financial management, human resource management, and corporate governance.

The analysis distinguishes between young firms, defined as firms operating for less than five years, and established firms, defined as firms operating for more than ten years. It also accounts for variation across respondent role positions, including owners, board members, CEOs, managers, and staff members. More specifically, this study addresses the following research questions:

- RQ1: Which organisational functions are perceived as easier, comparable, or more difficult in a circular economy compared to linear business practices?
- RQ2: How do these perceptions differ between younger and more established firms?
- RQ3: How do these perceptions differ across organisational role positions within firms?

This study contributes empirically to circular economy implementation research by shifting the analytical focus from aggregate firm-level barriers to function-specific and role-sensitive perceptions of managerial difficulty. By systematically mapping perceived relative difficulty across eight organisational functions and across firm maturity and organisational roles, the study provides a more granular understanding of internal implementation dynamics. It shows that circular implementation is not a uniform organisational challenge but varies across value-creating and supporting functions, and across actors occupying different organisational positions. In doing so, the paper connects CE implementation research with insights from organisational role differentiation and governance perspectives, highlighting how functional responsibilities and information environments shape perceived constraints. These insights support more targeted managerial and policy responses to circular transitions.

The remainder of this paper is structured as follows. Section 2 provides a conceptual background on organisational functions, firm maturity, and role positions in the context of a CE. Section 3 outlines the methodological approach. Section 4 presents the results. Section 5 discusses contributions, implications, and limitations, and Section 6 concludes.

2. Background

This section develops a conceptual foundation for analysing perceived relative difficulty across organisational functions in circular business contexts. It synthesises insights on core and supporting organisational functions, firm maturity, and role positions, and identifies gaps that motivate the empirical analysis.

2.1. Organisational functions and the circular economy

Implementing circular economy strategies requires coordinated change across multiple organisational functions. Prior research has often examined barriers and enablers at an aggregate firm level, while evidence on function-specific challenges remains fragmented.

2.1.1. Product development Product development is central to circular strategies because early design decisions determine environmental and economic impacts across product lifecycles (Jugend et al., 2024). In circular contexts, this function is expanding from technical design to strategic coordination, linking CE objectives with business model innovation, stakeholder engagement, and supply chain collaboration (Diaz et al., 2021).

Empirical studies consistently report higher managerial complexity in circular product development compared to linear settings. Challenges include technological immaturity, high upfront design and infrastructure costs, and organisational inertia (Wang et al., 2022). Designers face complex trade-offs between product durability, modularity, aesthetics, and consumer acceptance (P. B. Jensen et al., 2021), while dealing with limited information flows, fragmented decision-making routines, and insufficient feedback from downstream actors. These issues are particularly acute in established companies, where legacy systems and siloed development routines impede cross-functional collaboration (Diaz et al., 2022; Diaz & Baumgartner, 2024). The integration of new digital technologies – such as IoT, big data, and product passports – has been highlighted as a potential enabler, yet their adoption remains uneven and often limited to incremental improvements (Rusch et al., 2023).

2.1.2. Procurement Procurement represents an often-underestimated organisational function in a CE. Circular procurement entails integrating environmental and lifecycle considerations into sourcing decisions (Xu et al., 2022). Assessing suppliers is often hindered by limited information availability and underdeveloped standards (Qazi & Appolloni, 2022). Internally, insufficient top management support, weak interdepartmental collaboration, and unclear accountability across units frequently constrain progress towards sustainable procurement practices (Bhutto & Shaikh, 2024). Procurement teams often lack the authority or training to question established supplier relationships, particularly when circular options appear more costly or uncertain. Technological enablers such as digital traceability practices can enhance decision-making and transparency, yet their deployment remains limited across many industries (Zhou & Xu, 2024). As a result, procurement processes in many firms remain poorly aligned with CE principles, reflecting cost-driven decision logics, low supplier maturity, and insufficient regulatory or market pressure (Jia & Chen, 2024).

2.1.3. Production In a CE, production and manufacturing refer to core operational processes that aim to minimise waste, optimise resource use, and enable products to be reused, repaired, remanufactured, or recycled. Circular manufacturing increasingly has the opportunity to integrate technologies such as the Internet of Things (IoT), artificial intelligence (AI), and digital twins to support monitoring, predictive maintenance, and closed-loop systems (Atif, 2023; Schöggl et al., 2023). These technologies can reduce input costs and environmental impacts while enhancing resilience and competitiveness (Darmandieu et al., 2022).

Despite these opportunities, transforming production systems from linear to circular remains complex. Established companies often face path dependencies, requiring substantial investments in new technologies, employee training, and supply chain coordination (Lim et al., 2022). Technical uncertainty, resistance to changing work routines, split incentives between organisational units, and limited infrastructure further hinder implementation (Chotisarn & Phuthong, 2025; Van Opstal et al., 2024). Moreover, the continued dominance of recycling-oriented solutions over systemic redesign reflects a tendency to prioritise incremental adaptation rather than fundamental transformation (Barford & Ahmad, 2024).

2.1.4. Logistics In a CE, logistics extends beyond facilitating linear product flows to managing material recirculation, reverse flows, and extended product lifecycles. This expanded role includes both forward logistics, such as distribution and warehousing, and reverse logistics (Katsanakis et al., 2023). Logistics is

central to many circular business models, enabling the collection of post-use products, repair and reuse activities, and the redistribution of refurbished goods (Ji-Hyland et al., 2025). It therefore functions as both an operational backbone and a strategic coordination mechanism across the economic, environmental, and social aspects of circular value chains (Berberoglu et al., 2023).

However, circular logistics introduces substantial complexity compared to linear systems. Reverse logistics involves unpredictable return flows, unstandardised material characteristics, and variable quantities and qualities of recoverable products and materials (Nanayakkara et al., 2022). Logistics networks must often be reconfigured to reduce transport intensity and support decentralised recovery hubs, which is resource-intensive and often constrained by infrastructure, regulation, and data-sharing limitations (Zarbakshnia et al., 2023). Digital tools, collaborative partnerships, and third-party logistics services can support this transition, yet their effectiveness depends on coordination across multiple actors (Boukhatmi & Van Opstal, 2025; Luu et al., 2023).

2.1.5. Marketing and sales In a CE, marketing and sales are no longer solely concerned with promoting product consumption, but also with developing desirable value propositions that foster consumer engagement with circular practices, while supporting feasible and viable business models (Bocken et al., 2022, 2025). As such, the marketing function acts as a bridge between circular business models and consumer acceptance, which can create new challenges.

Primary barriers for marketing in a CE include limited consumer awareness, scepticism towards reused products or recycled materials, and the complexity of communicating non-traditional value propositions such as longevity, modularity, or sufficiency (Mostaghel et al., 2023; Niessen et al., 2023). Marketing systems remain structurally oriented towards promoting consumption, while current theories often neglect post-sale phases like repair, return, or recycling (Leenders et al., 2024). Digital tools and nudging strategies offer pathways to narrow intention-behaviour gaps, particularly through dynamic pricing, personalisation, and improved visibility of sustainability benefits (Rainatto et al., 2024). However, many companies continue to operate in functional silos, limiting integration between sustainability, marketing, and operations (Aguilar-Morales et al., 2023). Firms that succeed in aligning circular practices with coherent marketing narratives and stakeholder engagement tend to benefit from enhanced brand reputation, customer loyalty, and financial performance (Mazzucchelli et al., 2022).

2.1.6. Financial management Financial management encompasses the strategic mobilisation and allocation of capital to support business operations. In the context of a CE, financial management is not merely an internal budgeting function but is embedded in a broader sustainable finance architecture. European regulatory initiatives such as the EU Taxonomy, the Corporate Sustainability Reporting Directive, and the Sustainable Finance Disclosure Regulation aim to redirect capital flows towards environmentally sustainable activities and reduce information asymmetries between firms and investors (EC, 2025; Sustainability Taxonomy Regulation, 2020). However, circular activities remain difficult to classify consistently within existing financial taxonomies, as they are often cross-sectoral and not confined to clearly defined technological categories. This creates uncertainty for both firms seeking finance and financial institutions assessing circular investments.

Circular business models frequently involve high upfront investments, delayed and uncertain cash flows, and asset configurations that do not fit traditional collateral structures. These characteristics challenge conventional financial performance metrics based on short-term return on investment and asset-backed lending (Toxopeus et al., 2021). Recent research on circular business model barriers identifies investment intensity, revenue model uncertainty, and risk exposure as central value capture constraints (Frishammar et al., 2025). Access to external finance is particularly constrained for SMEs and start-ups, which often lack tangible collateral and established track records. As a result, financing circular strategies may require relationship-based lending, forward-looking cash flow assessments, and the development of standardised and verifiable circular assets (de la Cuesta-González & Morales-García, 2022).

The financial ecosystem is an active determinant of CE viability, demanding institutional reform and adaptive infrastructure to accommodate alternative risk-return profiles (Kumar et al., 2024). Although instruments such as green bonds, blended finance, and results-based financing are emerging, their effective uptake requires institutional change within financial organisations (Rataj et al., 2025).

2.1.7. Human resource management Circular human resource management (HRM) practices include recruiting individuals with CE mindsets, providing training to enhance circular competencies, and implementing reward and appraisal systems that support circular objectives (Castro-Lopez et al., 2024). As such, HRM becomes a strategic enabler of circular business models, rather than an administrative support function. Research on circular startups showed the importance of developing transversal skills, including logistics, digitalisation, and technical know-how, for implementing CE strategies (Borms et al., 2023). For established firms, successful adoption of circular business models also depends on reconfiguring existing capabilities and fostering a workplace culture aligned with circular values, which requires strong managerial commitment and employee motivation (von Kolpinski et al., 2023).

In general, HRM plays a pivotal role in promoting employee engagement, distributed leadership, and capacity building across departments (Santa-Maria et al., 2022; Straub et al., 2023). Unlike in linear models, where workforce planning typically follows predictable production-consumption chains, circular models require more dynamic skillsets, responsive organisational learning, and cross-functional collaboration (Jabbour et al., 2019). Moreover, many companies lack awareness or capacity to invest in CE-specific skills, and education systems are often misaligned with skill demands (Van Opstal & Borms, 2024).

2.1.8. Corporate governance Corporate governance refers to a set of relationships between the management, board, shareholders, and other stakeholders of a company. It provides the structure and systems through which the company is directed, its objectives are set, and the means of attaining those objectives and monitoring performance are determined (OECD, 2023). Within circular business models, corporate governance involves embedding circularity into strategic goals, cross-departmental coordination, and performance evaluation systems (Palea et al., 2024).

Corporate governance in a CE transition poses significant challenges. Implementing CE strategies often necessitates reconfiguring the value creation logic of the company, requiring structural and cultural shifts that exceed incremental operational adjustments (Urbinati et al., 2020). Barriers include conflicting strategic priorities, weak internal coordination, and the absence of formal governance mechanisms dedicated to circularity. Institutional investors with long-term horizons may reinforce circular governance by pressuring companies to prioritise waste reduction and ESG performance, whereas short-term investors tend to hinder these shifts due to their focus on immediate returns (Slama et al., 2025). Furthermore, the organisational form and ownership structure of companies affect legitimacy, transparency, and the embedding of CE goals (Yawar & Kuula, 2021).

2.2. Firm maturity and the circular economy

Younger and more established firms play complementary but distinct roles in the CE. Younger firms are often viewed as purpose-driven, agile, and willing to disrupt existing systems through novel business models and rapid experimentation (Hockerts & Wüstenhagen, 2010). More established firms are also seen as critical in sustainability transitions as they can influence socio-technical systems through their market penetration and economies of scale (Tuladhar et al., 2024). However, established firms often operate within path-dependent structures marked by sunk costs, embedded routines, and institutionalised practices that limit radical change (Greer et al., 2020). Younger firms, by contrast, often operate in niche spaces where they can experiment with circular models from the outset (Henry et al., 2020), and tend to embrace more radical approaches to closing, narrowing, or regenerating resource loops (Han et al., 2023).

These structural and cultural differences may translate into distinct barriers and enablers for implementing CE strategies (Awana et al., 2023). Young firms are more likely to experience resource constraints, but often display stronger adaptive capacity and willingness to collaborate (Ciccullo et al., 2023). They face challenges such as limited access to funding, diseconomies of scale, and external stakeholder resistance (Han et al., 2023), while established firms struggle with organisational inertia, employee-level barriers, and complex value chain reconfigurations (Henry et al., 2023). Nevertheless, differences between young and established firms in how organisational functions are perceived and managed remain largely underexplored. However, one cannot simply assume that young firms are inherently circular-oriented or that all established firms resist circular change. Rather, both groups may display heterogeneous environmental management maturity levels and strategic orientations (Prieto-Sandoval et al., 2019).

2.3. Organisational role positions and the circular economy

Distinct role positions within a company are associated with different responsibilities in the formulation and execution of circular strategies. Owners influence overall priorities and determine whether environmental and social aims are incorporated into the purpose of the organisation (Yawar & Kuula, 2021). Board members provide strategic oversight, including the introduction of governance mechanisms such as sustainability committees or circular innovation teams to guide organisational change (Palea et al., 2024). Chief executive officers (CEOs) take responsibility for aligning circular business models with strategic ambitions. Managers oversee departmental coordination and ensure that operational goals align with performance targets. Finally, staff members are involved in the day-to-day implementation of circular practices, often through participation in cross-functional teams or working groups (Moreira & Rodrigues, 2023).

Several challenges affect the implementation of CE strategies across these organisational roles. Internal alignment remains a major barrier when governance responsibilities are unclear or communication between units is insufficient (Van Opstal et al., 2024). Integrating circular metrics into performance evaluation systems may support greater consistency across role positions (Palea et al., 2024). External pressures, such as demands from long-term institutional investors, also influence circular strategy adoption. However, external pressure alone does not ensure circular outcomes unless internal structures and leadership priorities reinforce these objectives (Slama et al., 2025). Organisations with clearly defined and embedded circular objectives tend to achieve greater alignment between day-to-day operations and circular principles (Moreira & Rodrigues, 2023). Nevertheless, the extent to which these role positions differ in their perceptions of organisational functions and associated barriers and enablers remains largely understudied.

2.4. Synthesis and research gap

The literature reviewed above indicates that the implementation of circular strategies introduces different forms of organisational complexity. Operational domains such as product development, procurement, production, and logistics are frequently associated with technological redesign, coordination challenges, and path dependence. Marketing and financial management face uncertainty related to value propositions and funding pathways. Human resource management and governance are linked to capability alignment and strategic embedding. At the same time, research on young versus established firms suggests contrasting constraints related to flexibility, resource endowments, and legacy systems. Governance research further implies that actors occupying different organisational roles operate under distinct responsibility structures and information environments.

Taken together, these perspectives suggest that circular implementation is unlikely to constitute a uniform organisational challenge. Rather than affecting firms in a homogeneous manner, it may generate differentiated constraint profiles across functional domains, across stages of organisational development, and across role positions within firms. However, existing research has largely examined these dimensions in isolation. Studies on circular barriers and enablers typically operate at an aggregate firm level. Research on start-ups and incumbents often remains conceptual or sector-specific. Governance and role differentiation perspectives rarely connect systematically to empirical evidence on circular implementation. Few studies therefore compare perceived implementation difficulty across organisational functions, firm maturity, and role positions within a single analytical framework. The present study addresses this integrative gap by providing a structured empirical mapping across these dimensions.

3. Methods

This study adopts an exploratory survey-based research design to examine how firms perceive the relative difficulty of managing different organisational functions when implementing circular strategies. The focus is on perceived relative difficulty, defined as the extent to which a given organisational function is experienced as more difficult, comparable, or easier to manage in a circular business context compared to conventional linear practices. The study intentionally targets companies that already engage with circular strategies or explicitly explore circular ambitions, allowing for informed assessments of organisational challenges.

The empirical setting is Flanders (Belgium), a region characterised by an active circular economy policy agenda and a well-developed ecosystem of circular support initiatives. The Flemish government adopted a

comprehensive circular economy strategy through “Vision 2050” and the successive Circular Flanders programmes, which integrate policy, business, and civil society actors in coordinated transition pathways (Versluys et al., 2021). Flanders has been identified as an advanced European region in terms of circular policy ambition, monitoring efforts, and stakeholder engagement, with established circular hubs, sectoral roadmaps, and public–private collaboration platforms (D’Adamo et al., 2024; Van Opstal et al., 2025). Flanders provides a particularly suitable empirical context for this study, as the advanced implementation of circular strategies at both firm and ecosystem level offers relevant organisational experience to analyse perceived difficulty across organisational functions, firm maturity, and role positions.

Data were collected between June and November 2023 using an online questionnaire administered via SurveyMonkey. Companies were contacted through regional and local circular hubs, targeted communication from the authors’ research institute, and existing professional networks of enterprises engaged in circular innovation. Contact methods included personalised emails, telephone follow-ups, newsletter announcements, and targeted LinkedIn outreach. No financial or material incentives were provided. This dissemination strategy resulted in 115 completed questionnaires. Given the use of targeted outreach and network-based sampling, an exact response rate cannot be calculated with precision. The sample should therefore be interpreted as a purposive sample of companies that can be considered circular frontrunners or early adopters rather than a statistically representative sample of firms in Flanders. After survey closure, data cleaning procedures included checking for internal consistency, identifying outliers, and verifying alignment between quantitative responses and qualitative comments where applicable.

Each participating company provided one completed questionnaire. The unit of analysis is the individual respondent, reporting perceptions at the firm level. Respondents self-identified their roles within the organisation, including owner, board member, chief executive officer (CEO), manager, or staff member. All respondents were directly involved in strategic decision-making, operational implementation, or oversight of circular activities within their organisation. While respondents differ in their functional responsibilities, the study explicitly treats these differences as analytically meaningful. Board members and CEOs are more likely to assess strategic alignment, governance, and external constraints, while managers and staff members are more directly exposed to day-to-day operational frictions. The analysis therefore captures heterogeneity in perceptions across organisational roles rather than assuming uniform views within firms.

In addition to role position, the survey collected information on personal and company characteristics, including respondent sex, age, and migrant background (proxied by having at least one grandparent born outside Europe), as well as company industry, primary market, turnover, staff size, and company age. These variables are used to characterise the sample and to check for broad compositional patterns. The sample shows an overrepresentation of male respondents, reflecting gender patterns commonly observed in senior managerial and ownership positions. Company characteristics indicate a relatively balanced distribution in terms of turnover and staff size, with a higher share of manufacturing firms, which is consistent with targeted sampling among companies engaging in circular strategies. Descriptive statistics are reported in Appendix A.

The survey questionnaire was developed through an iterative process in collaboration with a steering group of a learning network of regional and local circular hubs in Flanders. Several pilot rounds were conducted to improve clarity, reduce ambiguity, and limit respondent burden, following established survey design principles (Bell et al., 2022; Sovacool et al., 2018). Respondents were asked to evaluate a set of organisational functions, including product development, procurement, production, logistics, marketing and sales, financial management, human resource management, and corporate governance. For each function, respondents indicated on a five-point Likert scale whether managing this function in a circular business context is perceived as *much easier*, *somewhat easier*, *about the same*, *somewhat more difficult*, or *much more difficult* compared to linear business practices. A “*not applicable*” option was provided where functions were not relevant to the respondent’s firm.

In addition, the survey included questions on the implementation of circular strategies, perceived barriers, and perceived enablers. Firms are considered to engage in “circular activities” if they report implementation of at least one circular strategy derived from the 9R hierarchy and its adaptation to business model contexts (Kishna et al., 2019; Potting, 2017). The survey operationalised circular engagement through ten practices reflecting different R-levels. These include design-oriented strategies (e.g., reduced material use, longer lifetimes, additive manufacturing), during-use strategies (e.g., maintenance and repair, sharing production means, circular business models such as as-a-service), and end-of-life strategies (e.g., refurbishment, take-back systems, recycling, and the use of renewable or recycled materials). Rather than applying a binary distinction between “circular” and “non-circular” firms, respondents indicated the degree of implementation of each

strategy on a five-point scale, ranging from *not* to *very extensive*, with a *not applicable* option. Over 90% of respondents report engagement in at least one circular practice. Given that circular implementation remains limited in the broader population of firms, the sample represents an engaged subpopulation rather than a representative cross-section of all enterprises in Flanders. Table 1 provides descriptive information on the distribution of these circular practices across the sample.

Table 1. Circular strategies, adopted by survey respondent (n = 115)

	Not	Limited	Rather limited	Extensive	Very extensive	Not applicable
Product design for reduced utilisation of materials	8.6%	12.0%	11.1%	18.0%	24.8%	25.6%
Product design for longer product lifetimes	9.4%	4.3%	6.0%	23.1%	31.6%	25.6%
Product design with additive manufacturing	13.7%	5.1%	12.0%	17.1%	21.4%	30.8%
Use of renewable or recycled materials	3.4%	12.8%	12.0%	22.2%	38.5%	11.1%
Sharing production means	20.7%	16.4%	19.0%	11.2%	11.2%	21.6%
Circular business models (e.g., as-a-service)	20.7%	11.2%	14.7%	13.8%	23.3%	16.4%
Maintenance and repair	16.4%	5.2%	10.3%	19.8%	23.3%	25.0%
Refurbishment of products	20.7%	2.6%	17.2%	15.5%	22.4%	21.6%
Take back systems for refurbishment or recycling	21.7%	6.1%	19.1%	12.2%	20.0%	20.9%
Recycling of waste, residues, or by-products	7.8%	4.3%	13.8%	22.4%	37.9%	13.8%

To allow structured comparison across different circular activity profiles and to reduce dimensionality, an exploratory factor analysis was performed on the ten circular strategy variables (see Appendix B for methodological details and factor loadings). This analysis resulted in five aggregated circular strategy categories:

- **CE design:** companies engaging in one of the three product design strategies
- **CE repair/refurbishment:** companies engaging in maintenance repair, product refurbishment, or take back systems for refurbishment or recycling
- **CE CBM:** companies engaging in circular business models (e.g., as-a-service models)
- **CE share means:** companies engaging in sharing production means
- **CE recycle:** companies engaging in recycling or the use of renewable or recycled materials.

These aggregated categories are used descriptively to examine whether perceived relative difficulty across organisational functions varies according to different types of circular engagement.

In addition to organisational functions and circular strategies, the survey included a predefined set of barriers and enablers that respondents may experience when implementing circular strategies. This set was designed to allow comparison with earlier empirical research in Flanders and is aligned with Van Opstal and Borms (2023). Barriers and enablers were measured as binary variables indicating whether respondents considered specific factors to constrain or support their circular activities.

The analysis combines descriptive statistics with comparative tests. Relative frequencies are used to map how organisational functions are perceived across the full sample. Differences between groups, including firm maturity, circular strategy categories, and respondent role positions, are examined using Kruskal–Wallis rank tests for ordinal variables and two-sided F-tests for differences in proportions, depending on the measurement level of the variables. Given the ordinal nature of the dependent variables and the exploratory character of the study, the analysis focuses on identifying statistically supported differences in distributions rather than estimating causal effects. Statistical significance is reported at the five percent level, and non-significant patterns are interpreted cautiously.

Finally, the survey included open-ended comment fields that allowed respondents to elaborate on experienced challenges and opportunities related to circular implementation. These qualitative responses were

analysed using deductive content analysis, with comments coded according to the organisational functions examined in the quantitative analysis. The qualitative material is used to contextualise and illustrate the quantitative findings.

4. Results

4.1. Perceived difficulty across organisational functions

Figure 1 presents the distribution of perceived relative difficulty across organisational functions, comparing circular business practices with conventional linear practices. Percentages refer to the share of respondents for whom the respective function was applicable. All respondents evaluated each function using the five-point scale, with the additional option of indicating that a function was not applicable to their firm. The figure shows a clear distinction between core operational functions and supporting or enabling functions.

Core operational functions – product development, procurement, production, and logistics – are most frequently perceived as more difficult to manage in a circular context. Across these functions, around half or more of respondents report greater difficulty compared to linear practices. These perceptions reflect the need to redesign material flows, sourcing practices, production processes, and logistics systems to accommodate reuse, repair, remanufacturing, or recycling. Logistics stands out as particularly challenging, reflecting the complexity of organising reverse flows and closed-loop systems. One respondent noted that *“the organisation of circular processes is far more complex and requires extra manpower, not only in logistics but also on the shop floor”*. In addition, respondents referred to compliance costs: *“Once circular processes are set up, which already feels like a victory, expensive certificates are still required to prove sustainability, making competition with low-cost alternatives very difficult”*.

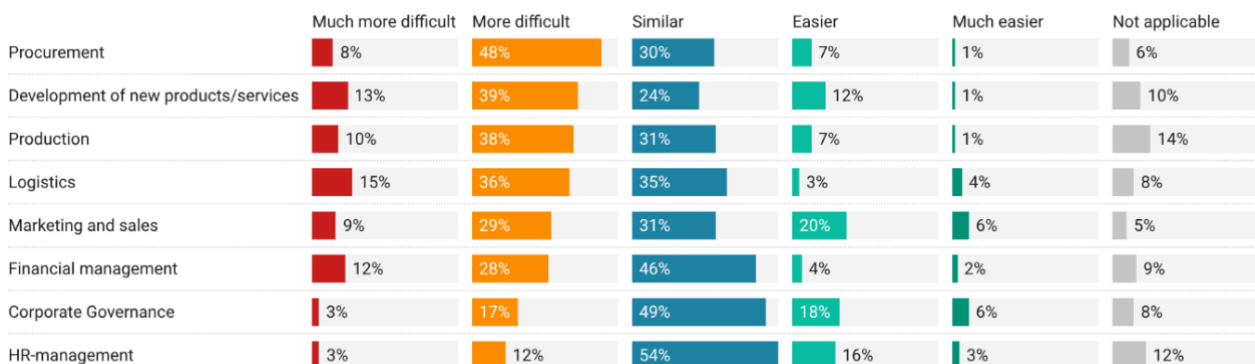


Figure 1. Perceived relative difficulty of organisational functions in circular versus linear business practices (n = 115). (Note: Respondents rated each function on a five-point scale or as “not applicable”.)

In contrast, supporting functions such as human resource management and corporate governance are most often perceived as comparable in difficulty across circular and linear business contexts, and in some cases as easier. Approximately one fifth of respondents indicate that human resource management is easier in a circular context, often referring to the attractiveness of circularity – quoted as a *“sexy topic”* – for recruiting and motivating employees. Similarly, nearly one quarter of respondents perceive corporate governance as easier to manage, which respondents associate with clearer mission orientation and stronger alignment around sustainability objectives.

Perceptions of marketing and sales are more mixed. While some respondents highlight reputational benefits and improved market positioning linked to circular practices – for example, *“more circular is more marketable”* – a substantial share of respondents report greater difficulty. These concerns primarily relate to limited customer willingness to pay price premiums for circular products or services, as illustrated by the remark *“the general public is not yet willing to pay higher prices for comparable circular materials”*. Another summarised: *“Customers do not want to pay more for it.”* They also relate to challenges in communicating non-traditional value propositions such as durability, reuse, or sufficiency.

Financial management is rarely perceived as easier in a circular context. Only a small minority of respondents (6%) report reduced difficulty, while a substantial share indicates comparable (46%) or increased (40%) difficulty. These perceptions reflect challenges associated with higher upfront investment costs, longer payback periods, and uncertainty around material recovery and residual values.

Figure 2 further disaggregates perceived *difficulty* by circular strategy category. Percentages in this figure are conditional on respondents reporting engagement in the respective circular strategy. Across all strategy categories, core operational functions remain the most frequently reported sources of increased difficulty. This pattern suggests that, regardless of the specific circular strategy pursued, adapting value-creating activities requires substantial organisational change.

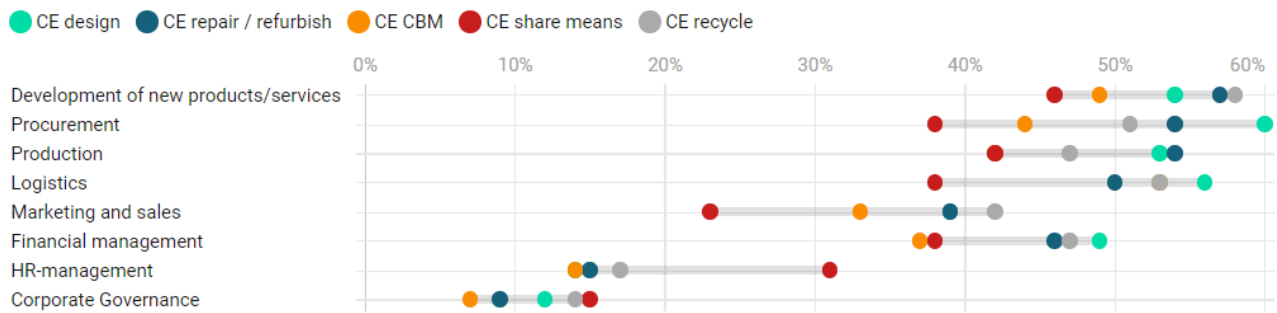


Figure 2. Share of respondents indicating organisational functions as more difficult in a circular context, by circular strategy category. (Note: Percentages are conditional on circular strategy engagement.)

Some strategy-specific patterns are observable. Marketing and sales are more frequently perceived as difficult by respondents engaged in recycling, repair, and refurbishment strategies, which typically require sustained customer engagement beyond the point of sale. Financial management is most frequently ($p < 0.05$ according to F-tests) reported as challenging by respondents engaged in circular design and recycling strategies, both of which tend to involve capital-intensive investments and longer investment horizons. Human resource management is more often perceived as difficult by respondents engaged in sharing production means, potentially reflecting coordination challenges across shared facilities or organisational boundaries. Across strategy categories, corporate governance is least frequently reported as more difficult.

Figure 3 presents the share of respondents who perceive organisational functions as *easier* to manage in a circular context. No statistically significant differences (at the 5% level) are observed across circular strategy categories. Respondents engaged in sharing production means most frequently report functions as easier, with the exception of human resource management, while respondents engaged in recycling show the lowest propensity to report reduced difficulty. Overall, these results indicate that while certain enabling functions may benefit from circular positioning, no circular strategy is broadly perceived as easy to manage across organisational functions.

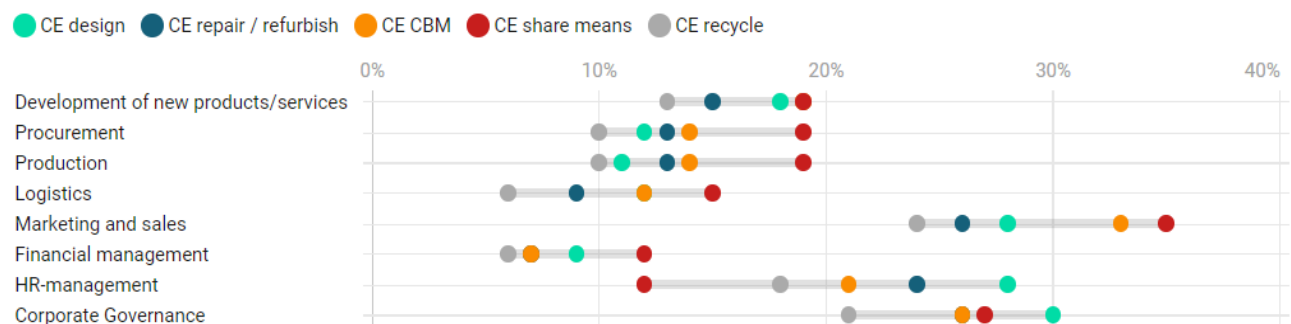


Figure 3. Share of respondents indicating organisational functions as easier in a circular context, by circular strategy category. (Note: Percentages are conditional on circular strategy engagement.)

4.2. Differences by firm maturity: young and established firms

Firm age is used as a proxy for organisational maturity. Firms operating for less than five years are classified as young firms, while firms operating for more than ten years are classified as established firms. These groups account for 22% and 58% of the sample respectively.

Figure 4 compares perceived relative difficulty across organisational functions between young and established firms. Overall, young firms report more pronounced perceptions than established firms, indicating both greater difficulty and greater ease across several functions. Statistically significant differences are observed for production and logistics. Young firms are more likely than their established counterparts to report these functions as more difficult in a circular context, according to Kruskal–Wallis tests. For other organisational functions, differences between young and established firms follow similar directional patterns but do not reach statistical significance.

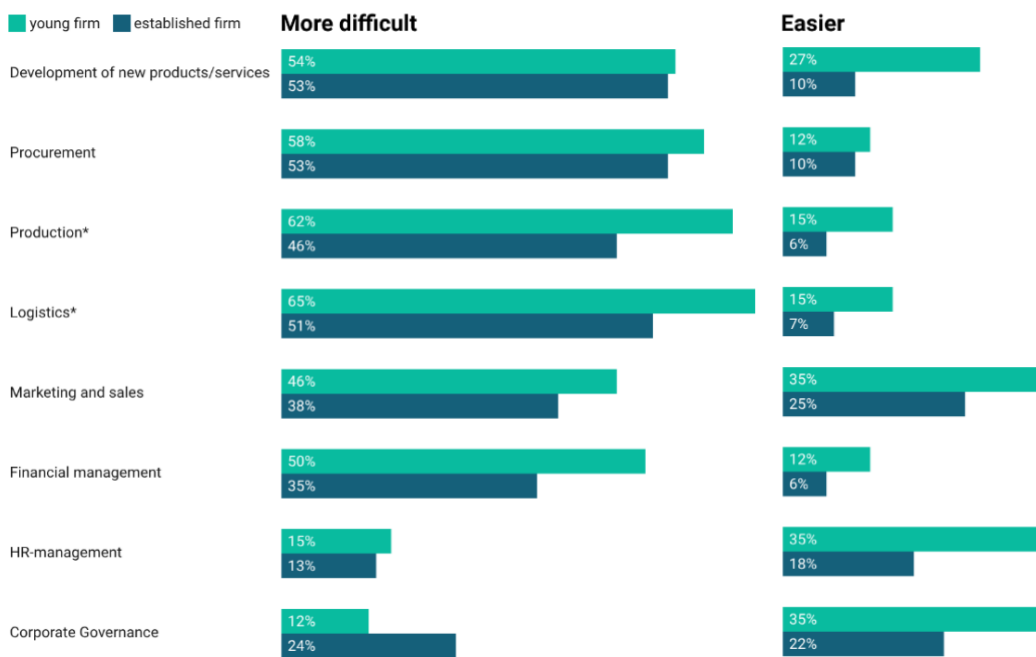


Figure 4. Share of respondents indicating organisational functions as more difficult or easier in a circular context, by firm maturity. (Note: * difference is statistically significant at the 5% level ‘Kruskal-Wallis rank-test along the 5-point Likert scale’)

Perceiving a function as easier than in a linear context does not imply low absolute complexity. To further contextualise these perceptions, Figures 5 and 6 compare reported barriers and enablers across firm maturity groups. Regarding barriers, young firms are significantly more likely to report limited customer interest in circularity as a constraint ($p < 0.05$ according to a two-sided F-test). Established firms more frequently report technological constraints ($p < 0.05$ according to a two-sided F-test). Both groups identify limited supply chain collaboration as the most prevalent barrier.

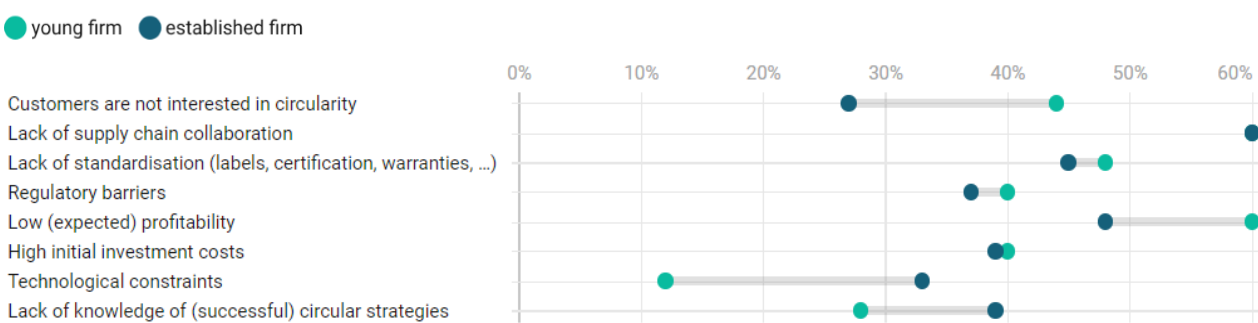


Figure 5. Share of respondents reporting specific barriers to implementing circular strategies, by firm maturity.

Regarding enablers, fiscal policy measures are most frequently reported by both groups. Established firms more often identify research and development as an enabler ($p < 0.05$), while young firms more frequently point to circular public procurement ($p < 0.01$) and customised financial and insurance products ($p < 0.01$). Some respondents expressed concern about policy design and continuity. One remarked: “*Financial support for the transition mainly goes to “innovative” new start-ups, which often still have everything to prove.*” Another argued: “*Support for existing bottom-up initiatives is needed, not only project subsidies for new initiatives.*” These remarks indicate that firms with established circular activities may perceive support structures as insufficiently aligned with long-term continuity.

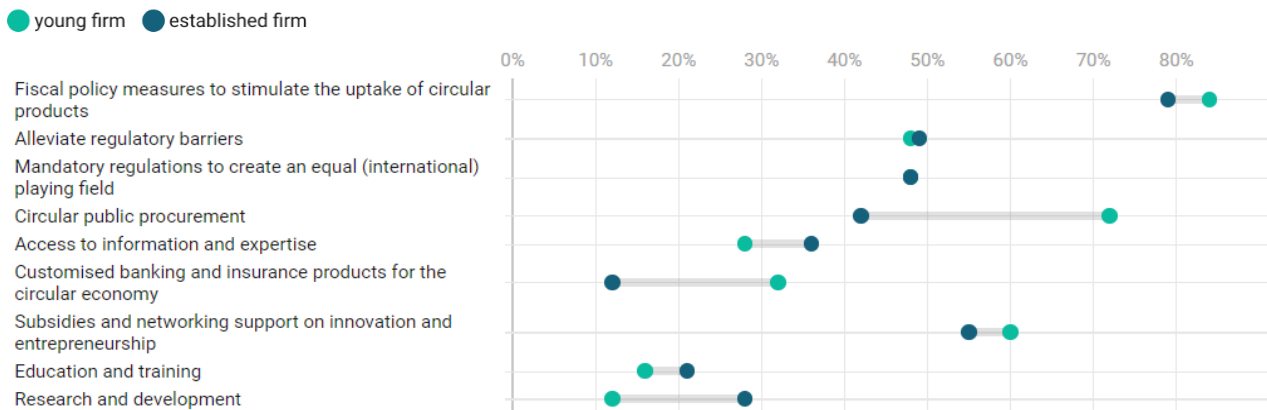


Figure 6. Share of respondents reporting specific enablers to implementing circular strategies, by firm maturity.

4.3. Differences by organisational role position

The sample includes respondents occupying different organisational roles, including owners, board members, CEOs, managers, and staff members. Role positions are not mutually exclusive, as some respondents reported holding more than one role within their organisation. Owners constitute the largest group of respondents (37%), followed by CEOs (26%), board members (21%), managers (21%), and staff members (21%). Over 80% of the respondents only reported one role, while 12% reported two roles, 6% three roles, and one respondent 4 roles. The most common combinations were owner and board member (13 respondents), owner and CEO (10 respondents), board member and CEO (6 respondents), and board member and manager (6 respondents). No statistically significant relationships were found between holding multiple roles and perceived organisational difficulty, barriers, or enablers. Multiple-role responses are therefore retained in the analysis without additional stratification.

Figure 7 presents the share of respondents who perceive organisational functions as more *difficult* in a circular context, disaggregated by role position. Across all roles, human resource management and corporate governance are least frequently perceived as more difficult. Patterns differ across roles for other functions. Owners and CEOs most frequently identify procurement as more difficult. Managers and board members most often point to logistics, while staff members most frequently report marketing and sales as more difficult. Only one statistically significant difference is observed. Staff members are significantly more likely than respondents in other roles to perceive marketing and sales as more difficult in a circular context ($p < 0.05$, two-sided F-test). As noted above, respondents stressed that “*customers do not want to pay more for it.*” Such remarks suggest that employees engaged in day-to-day market interaction experience circular difficulty primarily through price competition and customer resistance.

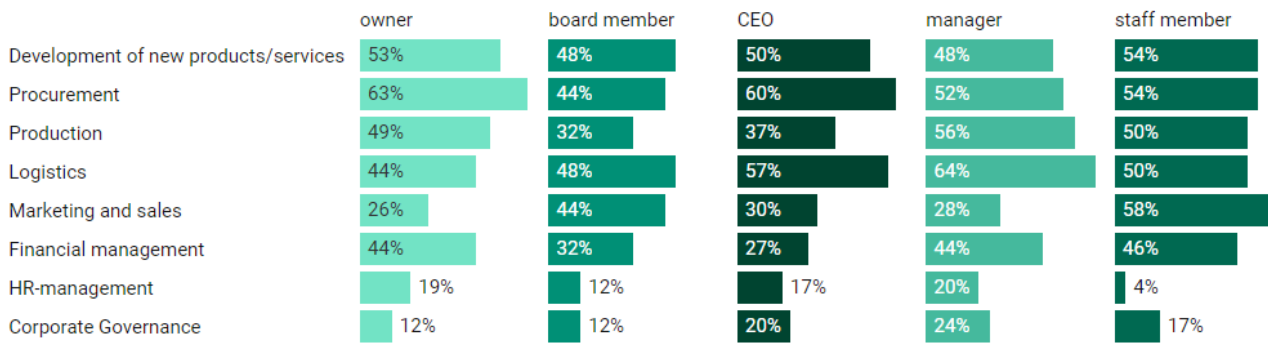


Figure 7. Share of respondents indicating organisational functions as more difficult in a circular context, by organisational role position.

Figure 8 reports the share of respondents who perceive organisational functions as *easier* in a circular context, by role position. Differences across roles are limited. A statistically significant difference is observed for logistics, which staff members more frequently perceive as easier ($p < 0.05$, two-sided F-test).

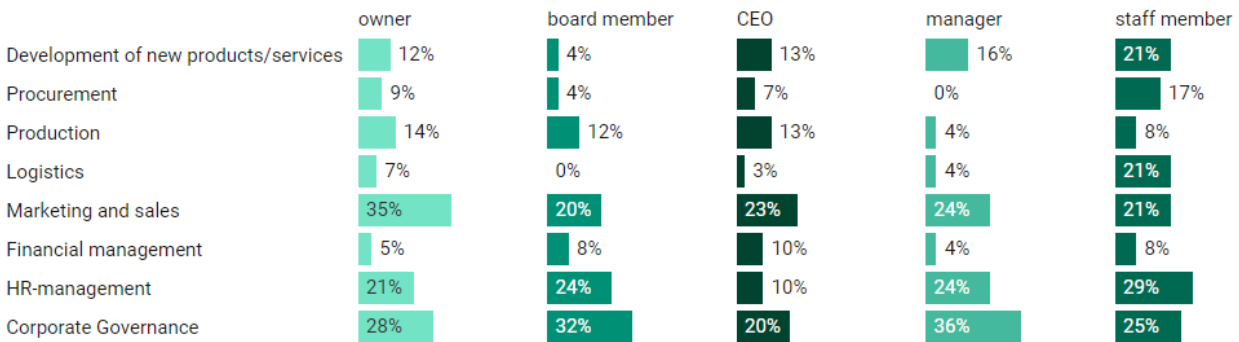


Figure 8. Share of respondents indicating organisational functions as easier in a circular context, by organisational role position.

To further contextualise these perceptions, Figures 9 and 10 present differences in reported barriers and enablers by role position. Several statistically significant differences (at the 5% level, two-sided F-tests) are observed for perceived *barriers*. Board members and managers more frequently report a lack of supply chain collaboration, lack of standardisation, and regulatory barriers. One manager described standardisation as “*the first condition for circularity.*” The same respondent explained participation in sectoral working groups to promote standardisation and circularity in the construction sector. Such concerns align with the broader coordination and oversight responsibilities of board members and managers. CEOs are least likely to report profitability as a barrier, while staff members report profitability concerns most frequently. Staff members also report technological constraints less often than respondents in other roles.

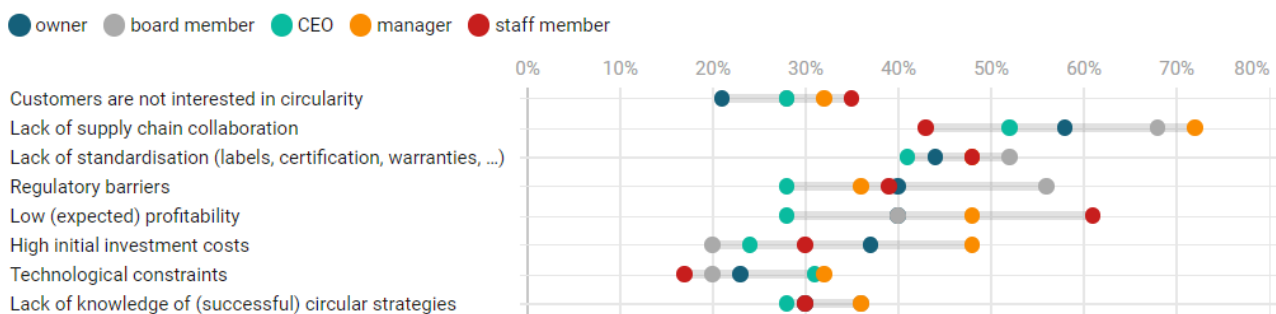


Figure 9. Share of respondents reporting specific barriers to implementing circular strategies, by organisational role position.

Differences in perceived *enablers* across role positions are more limited. Only one statistically significant difference is observed ($p < 0.05$, two-sided F-test). Owners more frequently identify subsidies and networking support related to innovation and entrepreneurship as enabling factors.

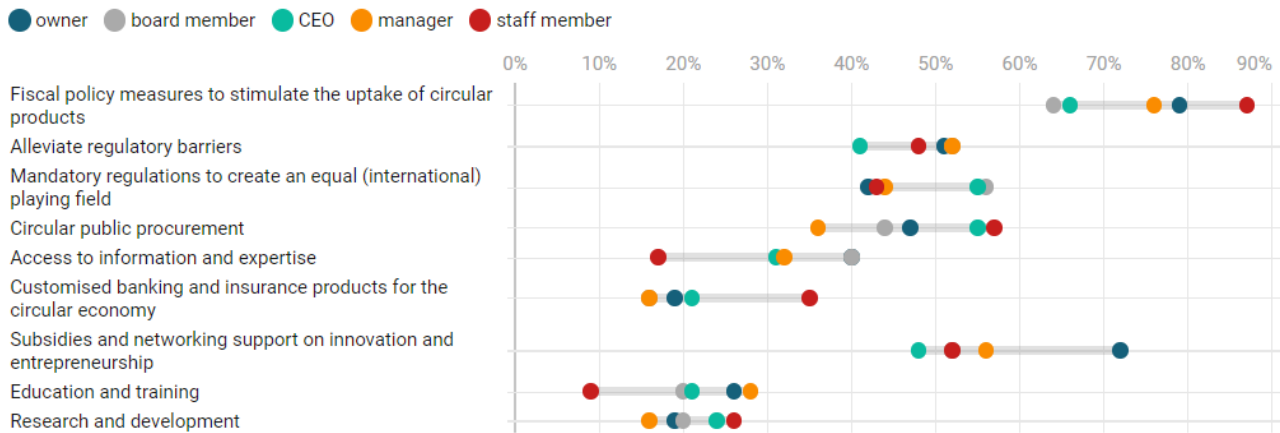


Figure 10. Share of respondents reporting specific enablers of circular strategy implementation, by organisational role position.

5. Discussion

5.1. Empirical contribution

This study contributes to the circular economy literature by systematically analysing how perceived managerial difficulty varies across organisational functions, firm maturity, and role positions. The analysis extends existing barrier and enabler research by providing an integrated empirical perspective on where circular implementation is experienced as most demanding.

5.1.1. Which organisational functions are perceived as more difficult in circular contexts? The findings show that circular implementation complexity is not evenly distributed across the organisation. Core operational functions – product development, procurement, production, and logistics – are consistently perceived as more difficult than in linear contexts, across circular strategy profiles. This pattern indicates a structural concentration of perceived difficulty in value-creating domains where material flows, sourcing routines, and production systems must be reconfigured. While prior research identifies operational barriers such as technological redesign, coordination challenges, and path dependence (Diaz et al., 2022; Jugend et al., 2024; Lim et al., 2022), the present study extends this work by systematically mapping these perceptions across eight organisational functions within the same sample.

Human resource management and corporate governance are frequently perceived as comparable or even easier in circular contexts. This nuances and challenges the implicit assumption that embedding circularity necessarily complicates governance structures (Paea et al., 2024; Slama et al., 2025; Urbinati et al., 2020). In this sample, circularity appears to function as a source of mission alignment and employee engagement, suggesting that normative and identity-based mechanisms may facilitate internal cohesion even when operational strain increases.

Financial management emerges as a persistent source of perceived difficulty. Importantly, this difficulty is not limited to a particular circular strategy. Respondents refer to high upfront investment costs, longer payback periods, and uncertainty regarding market uptake and residual value. These findings resonate with recent work highlighting high initial investments, revenue model uncertainty, and risk management challenges as central value capture barriers in circular business model implementation (Frishammar et al., 2025). Rather than attributing financial strain to specific business model archetypes, the findings indicate structural tensions between circular value creation and conventional financial evaluation logics. Financial management is perceived as difficult alongside operational functions, whereas this is less the case for governance and human

resource management. This reinforces the broader pattern that circular difficulty concentrates in value-creating and value-capturing domains rather than being evenly distributed across the organisation.

5.1.2. How do perceptions differ between young and established firms? The findings indicate that young and established firms do not differ systematically in overall levels of difficulty but in the configuration of constraints they face. Young firms report stronger operational and market-facing challenges, while established firms more frequently identify technological constraints and emphasise research and development as an enabler.

Prior literature frequently contrasts young, experimentation-oriented circular start-ups with incumbents embedded in legacy systems (Henry et al., 2020; Hockerts & Wüstenhagen, 2010; Tuladhar et al., 2024). The present findings nuance and refine this distinction by demonstrating that maturity is rather related to where perceived constraints surface within organisational functions. Young firms appear particularly exposed to market legitimacy challenges and customer demand uncertainty, whereas established firms experience greater technological and infrastructural lock-in.

Rather than reinforcing a binary view, the findings support a configurational interpretation. As argued in research on environmental management maturity, firms differ in capabilities and strategic orientation irrespective of age (Prieto-Sandoval et al., 2019). The results therefore suggest that maturity interacts with functional domain, shaping distinct constraint profiles rather than absolute capability differences. This contributes empirically to a literature that has largely discussed start-ups and incumbents conceptually without systematically comparing their internal managerial perceptions.

5.1.3. How do perceptions differ across organisational role positions? The results show that actors in different role positions emphasise different barriers. Staff members are more likely to perceive marketing and profitability challenges, while board members and managers highlight regulatory barriers, lack of standardisation, and supply chain coordination issues.

These patterns can be interpreted through organisational role differentiation and governance perspectives. Governance research emphasises that board members and senior managers engage in strategic oversight and external alignment (Palea et al., 2024; Yawar & Kuula, 2021), which plausibly increases sensitivity to regulatory frameworks and systemic coordination problems. In contrast, employees involved in operational implementation encounter customer resistance and pricing pressure directly, making profitability concerns more salient. Differences in perceived financial constraints may also reflect agency-related dynamics and variations in information environments (M. Jensen & Meckling, 2000).

By systematically comparing perceptions across organisational roles, the study extends circular economy research beyond firm-level aggregation. Prior work has acknowledged the importance of governance mechanisms and internal alignment (Moreira & Rodrigues, 2023; Van Opstal et al., 2024), but empirical evidence on how different actors experience circular implementation has remained limited. The findings demonstrate that circular implementation is not only functionally differentiated but also cognitively and institutionally mediated by role position.

5.2. Managerial implications

The findings offer several implications for managers involved in the transition from linear to circular business models. They underline that circular implementation is not a uniform challenge but varies across organisational functions, firm maturity, and role positions.

First, the results show that circular strategies place the greatest strain on core operational functions. Product development, procurement, production, and logistics are often perceived as more difficult than in linear contexts. Managers should therefore anticipate increased complexity in value-creating activities and plan for additional coordination, skills, and resources. These findings suggest that circular transitions require more than isolated technical adjustments. They call for deliberate organisational design choices, including cross-functional coordination, clear responsibility allocation, and dedicated transition management structures that support operational change (Osterwalder et al., 2020).

Second, supporting functions such as human resource management and corporate governance are not perceived as more difficult and are sometimes perceived as easier. This indicates that circular positioning can

function as an organisational asset for recruitment, retention, and mission-oriented governance. However, this advantage does not extend uniformly across all support functions. Marketing and sales emerge as a particularly challenging domain for many firms. Managers face difficulties communicating circular value propositions in price-sensitive markets and in contexts where willingness to pay remains limited (Selvefors et al., 2024). These findings underline the need to invest in communication strategies that articulate value beyond price. Emphasising durability, reliability, and long-term customer relationships may help firms align circular offerings with customer expectations.

Third, financial management emerges as a cross-cutting concern, particularly for capital-intensive circular strategies such as circular design and recycling. Financial challenges are not confined to service-based circular models but also affect product-oriented strategies. Managers should therefore integrate financial considerations early in circular strategy development. Proactive engagement with diverse financing actors, including banks, public authorities, and innovation agencies, can help align investment horizons with circular value creation.

Fourth, the findings highlight meaningful differences between young and established firms. Young firms more frequently report market-facing challenges, including customer interest and operational coordination, reflecting limited networks and visibility. At the same time, young firms appear less constrained by technological lock-in and legacy systems. They rely more strongly on external enablers such as circular public procurement and tailored financial products, which provide legitimacy and risk-sharing. Established firms benefit from established customer bases and technological capabilities but face greater challenges in adapting existing systems and routines. These complementary strengths suggest that structured collaboration between young and established firms may support learning and resource access on both sides.

Finally, the results show that perceptions of barriers and enablers differ across organisational roles. Board members and managers are more concerned with regulatory uncertainty, standardisation, and supply chain coordination, while staff members more frequently report profitability concerns (Baldassarre & Calabretta, 2024). These differences highlight the importance of internal alignment during circular transitions. Facilitating structured dialogue across roles and functions can help build mutual understanding and discuss concerns that may otherwise remain unaddressed.

5.3. Policy implications

The findings yield several implications for policymakers seeking to support circular economy implementation. They indicate that circular business models remain more difficult to manage in core operational and financial domains than linear alternatives, creating structural disadvantages for circular firms. These difficulties are not evenly distributed across organisational functions. Logistics, procurement, production, and financial management emerge as recurrent bottlenecks. Policy interventions should therefore place greater emphasis on these domains rather than relying on generic circular economy support measures.

First, the results underline the pressing need for public investment in circular infrastructure. Respondents consistently pointed to logistical complexity as a challenge. Governments can take the lead in planning and co-financing regional and national reverse logistics systems, including collection, sorting, and redistribution facilities. These systems cannot be developed at the company level alone, given the economies of scale and coordination required. Policy can also promote standardisation across such systems to enable interoperability and reduce uncertainty for businesses.

Second, the reported difficulties in circular procurement reflect the absence of supplier networks and compatible sourcing systems. Public authorities can play a dual role. On the one hand, they can support capacity-building programmes that assist suppliers in meeting circular procurement criteria. On the other hand, they can lead by example through ambitious and binding circular public procurement targets. The fact that young firms particularly value circular procurement points to its role as a critical market-making instrument. By setting clear demand signals and offering predictable procurement pipelines, governments can help de-risk early investments and stimulate scale in emerging circular ventures.

Third, the persistent financial barriers reported by respondents - especially those implementing circular design or recycling strategies - reveal a major financing gap. High capital intensity, uncertain returns, and long investment cycles deter private capital and leave companies exposed to liquidity risks. Governments can therefore strengthen the ecosystem of public and blended finance instruments targeted at circular business models. This includes guarantees, innovation grants, and risk-sharing mechanisms. The finding that young firms especially value customised banking and insurance products points to the need for regulators to work

with financial institutions in co-developing CE-relevant risk assessment tools and financial product innovations.

Fourth, the findings point to varying perceptions of barriers across company maturity and role positions, identifying different challenges. This diversity invites consideration of inclusive policymaking that actively involves diverse organisational perspectives in the design and evaluation of CE policies. Regulatory frameworks often reflect perspectives from established firms, but a successful CE transition requires taking into account the specific vulnerabilities of young firms, the operational knowledge of middle managers, and the systemic concerns of boards. Policy consultation and co-design mechanisms must be structured to incorporate these varied perspectives.

Fifth, the fact that education, training, and R&D are under-recognised by companies as enablers, signals the risk of collective underinvestment in these semi-public goods. Governments are therefore recommended to resist the temptation to reduce funding for these intangible enablers, even if they are not immediately providing a visible return to individual companies. Instead, they should reinforce support for technical education, lifelong learning in green and circular skills, and public-private R&D programmes. Moreover, governments should further develop or sustain mechanisms to internalise the positive externalities created by first movers, for instance through R&D tax credits, knowledge-sharing platforms, or pre-competitive collaboration schemes.

Lastly, policymakers should recognise the strategic relevance of cross-firm collaboration and system coordination, which appeared to be a very important barrier in the study. A circular economy cannot be implemented firm-by-firm. It requires systemic change across supply chains, sectors, and regions. Governments should therefore facilitate ecosystem coordination, for example by funding industrial symbiosis platforms, sectoral roundtables, and regional circular hubs. These structures can reduce transaction costs, align actors, and help solve collective action problems inherent in circular transitions.

5.4. Limitations and further research

This study has several limitations that should be considered when interpreting the findings.

First, the geographical scope of this study is limited to Flanders (Belgium), which may affect the generalisability of the findings to regions with different regulatory frameworks, financial systems, industrial structures, or levels of CE ecosystem maturity. Flanders represents a relatively advanced region in terms of CE policy integration, stakeholder coordination, and institutional support (D'Adamo et al., 2024). In less mature CE ecosystems, operational and financial difficulties may be more pronounced or differently configured. Similarly, in non-European contexts with distinct governance systems, capital markets, and sustainability disclosure regimes, the interaction between organisational functions, firm maturity, and role positions may unfold differently. Comparative research across regions with varying levels of CE institutionalisation is therefore needed to assess the contextual transferability of these findings.

Second, the sample consists of 115 companies that were purposively selected because they engage with or actively explore circular strategies. While this sample size is appropriate for the exploratory and comparative analyses conducted, it does not allow for highly granular sectoral segmentation or robust multivariate modelling. Future studies with larger and more diverse samples could further examine how the observed patterns hold across sectors and organisational contexts. Moreover, the cross-sectional design captures managerial perceptions at a specific moment in time. Circular transitions are dynamic processes, and perceived challenges may evolve as firms gain experience, adjust organisational routines, or scale circular activities. Longitudinal research would be valuable to examine how perceptions of managerial difficulty and organisational capabilities develop over time as firms mature in their circular implementation.

Third, each firm is represented by a single respondent. Although respondents were directly involved in strategic decision-making, operational implementation, or oversight of circular activities, perceptions may differ across functions and hierarchical levels within the same organisation. The findings therefore reflect informed individual assessments rather than aggregated organisational consensus. In addition, the study focuses on perceived relative difficulty rather than objective performance outcomes or implementation success. While perceptions are central to managerial decision-making and organisational behaviour, they do not necessarily correspond to measured efficiency, cost, or environmental performance.

Fourth, the survey-based design enables structured comparison across organisational functions and respondent categories but does not capture in-depth organisational processes. While the inclusion of open-

ended responses provides contextual insights, future research could adopt qualitative or mixed-method approaches, such as case studies or interviews within firms, to examine how perceived difficulty translates into concrete organisational practices, conflicts, and capability development over time.

Finally, the analysis centres on firm-level perspectives and does not include the views of external ecosystem actors such as financial institutions, public procurement authorities, consultants, incubators, or supply chain partners. Incorporating these perspectives in future research would help to develop a more comprehensive understanding of the systemic enablers and constraints shaping circular economy implementation.

6. Conclusion

This study examined how organisational functions are perceived when implementing circular strategies, compared to linear business practices, using survey data from 115 companies engaged in circular activities in Flanders. The findings show that core operational functions – product development, procurement, production, and logistics – are most frequently experienced as more difficult in circular contexts. In contrast, supporting functions such as human resource management and corporate governance are more often perceived as comparable in difficulty or, in some cases, easier to manage. These results indicate that the main challenges of circular implementation concentrate in value-creating activities, rather than in enabling or governance functions.

The analysis further shows that perceived difficulty is not uniform across firms or respondents. Young firms report more pronounced perceptions than established firms, identifying both greater challenges and greater ease across several organisational functions, particularly in production and logistics. This pattern suggests that organisational maturity influences how circular complexity is experienced, reflecting differences in flexibility, resource constraints, and exposure to legacy systems. In addition, perceptions vary systematically across organisational role positions. Owners, board members, CEOs, managers, and staff members emphasise different organisational functions as challenging, indicating that functional responsibilities and information environments influence how circular implementation is perceived within firms.

These findings underline the importance of moving beyond aggregate firm-level assessments of circular barriers and enablers. Circular implementation involves heterogeneous organisational experiences that differ across functions, firm maturity, and role positions. Recognising this heterogeneity is important for understanding why circular strategies progress unevenly within and across firms. The implementation of CE strategies within companies generally requires collaboration among various roles to ensure agreement among different stakeholders within the organisation. Therefore, analysing and understanding the perspectives of different organisational roles and departments would be valuable for future studies.

Future research could build on these insights in several ways. Longitudinal studies would allow examination of how perceptions of managerial difficulty evolve as firms gain experience and scale circular activities. Comparative research across sectors and regions would help assess the transferability of the observed patterns beyond the Flemish context. Mixed-method approaches could further deepen understanding by linking survey-based perceptions to detailed organisational processes. Finally, extending the analysis beyond firm-level respondents to include financial institutions, public authorities, intermediaries, and civil society actors would provide a more comprehensive view of the broader ecosystem shaping circular management practices.

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Data Availability Data are available upon request.

Declarations

Competing Interests The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Wim Van Opstal serves as an editor of the Journal of Circular Economy. To avoid any conflict of interest, he had no involvement in the editorial handling, peer review, or decision-making process for this manuscript.

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Use of AI During the preparation of this manuscript, the authors used ChatGPT (OpenAI) to improve clarity and readability of the language. After using this tool, the authors carefully reviewed and edited all content and take full responsibility for the final manuscript. The use of generative AI did not replace original scholarly input at any stage of the research process.

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Appendices

Appendix A – Descriptive Statistics

In Table A.1 we report descriptive statistics on the survey sample.

Table A1. Descriptive statistics of personal and enterprise characteristics (n = 115)

Sex	Relative frequency
Man	70%
Woman	28%
I prefer not to disclose	3%
Age	Number
Minimum	20
P25	38
P50	48
P75	55
Max	69
Average	46,90
Stdev	10,82
Migrant background	Relative frequency
Yes	10%
No	90%
Industry	Relative frequency
Agriculture	1%
Manufacturing	32%
Construction	17%
Services	22%
Quaternary	9%
Work Integration Social Enterprises (WISEs)	9%
Waste management	9%
Markets	Relative frequency
Business-to-Consumer	48%
Business-to-Business	83%
Business-to-Government	32%
Peer-to-peer	4%
Turnover	Relative frequency
No turnover	8%
1 - 10 000 EUR	5%
10 000 - 100 000 EUR	14%
100 000 - 1 000 000 EUR	14%
1 000 000 - 10 000 000 EUR	28%
10 000 000 - 100 000 000 EUR	17%
> 100 000 000 EUR	15%

Table A1 (cont.). Descriptive statistics of personal and enterprise characteristics (n = 115)

Staff size	Relative frequency
No employment	18%
1 - 10 employees	26%
11 - 49 employees	14%
50 - 249 employees	17%
250 - 999 employees	19%
≥ 1000 employees	7%
Company age	Relative frequency
< 5 years	22%
5-10 years	20%
> 10 years	58%
Role position	Relative frequency
Owner	37%
Board member	21%
CEO	26%
Manager	21%
Staff member	21%

Table A2. Descriptive statistics of perceived barriers to implement circular strategies (n = 115)

Barriers	Frequency	%
Customers are not interested in circularity	32	28%
Lack of supply chain collaboration	66	57%
Lack of standardisation (labels, certification, warranties, ...)	52	45%
Regulatory barriers	41	36%
Low (expected) profitability	52	45%
High initial investment costs	43	37%
Technological constraints	29	25%
Lack of knowledge of (successful) circular strategies	42	37%

Table A3. Descriptive statistics of perceived enablers to implement circular strategies (n = 115)

Enablers	Frequency	%
Fiscal policy measures to stimulate the uptake of circular products	89	77%
Alleviate regulatory barriers	54	47%
Mandatory regulations to create an equal (international) playing field	51	44%
Circular public procurement	55	48%
Access to information and expertise	36	31%
Customised banking and insurance products for the circular economy	26	23%
Subsidies and networking support on innovation and entrepreneurship	66	57%
Education and training	23	20%
Research and development	24	21%

Appendix B – Factor Analysis

In this appendix, we show results of a factor analysis on the scores of all 10 circular strategies depicted in Table 1.

Method: principal factors

Rotation: orthogonal varimax (Kaiser off)

Number of params = 40

Number of observations = 115

Retained factors = 5

Table B1. Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Uniqueness
Product design for reduced utilisation of materials	0.8303	0.2369	0.2620	0.1773	-0.0537	0.1515
Product design for longer product lifetimes	0.8806	0.2379	0.2040	-0.0390	-0.0161	0.1246
Product design with additive manufacturing	0.7466	0.4112	0.1081	0.0669	0.1432	0.2368
Use of renewable or recycled materials	0.3149	0.2374	0.7159	0.0722	-0.0555	0.3237
Sharing production means	0.2462	0.3789	0.4423	0.3108	0.0155	0.5033
Circular business models (e.g., as-a-service)	0.2361	0.4851	0.1380	0.3477	-0.0034	0.5689
Maintenance and repair	0.4564	0.6705	0.1648	0.0947	-0.1070	0.2945
Refurbishment of products	0.3292	0.7755	0.2247	0.0465	0.1437	0.2170
Take back systems for refurbishment or recycling	0.3237	0.7439	0.3213	0.0740	-0.0846	0.2260
Recycling of waste, residues, or by-products	0.2687	0.2995	0.6412	-0.0041	0.0908	0.4187