**Research paper**

# Circular Economy Practices in Manufacturing SMEs: Exploration of Stakeholder Pressure, Managerial Perception, and the Mediating Role of Circular Economy Orientation

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## Abstract
This study delves into the dynamics of Circular Economy (CE) practices in Small and Medium-sized Enterprises (SMEs), acknowledging their essential contribution to promoting sustainability. As we explore the various influences on SMEs' adoption of CE, we closely examine the distinct impacts of internal and external stakeholder pressure. Additionally, we highlight the role of positive managerial perceptions and introduce a fresh perspective by framing CE orientation as a mediating force. Employing a survey methodology, our data collection spanned three phases, resulting in 196 responses from the Estonian SMEs. The results challenge the assumptions of uniform stakeholder pressures, unveiling nuanced effects on CE practices. Significantly, a heightened CE orientation emerges as a driving factor in enhancing organisational responsiveness to external stakeholder pressure. This study advances our understanding of the intricate relationships between stakeholder dynamics, managerial perceptions, and CE practices, providing valuable insights essential for SMEs to navigate the path towards sustainable practices. This study presents both theoretical and practical contributions and suggests avenues for future research to further explore the multifaceted nature of the relationships uncovered in this study.

**Keywords:** Circular Economy Practices · Small and Medium-sized Enterprises (SMEs) · Stakeholder Pressure · Managerial Perception · CE Orientation

## 1. INTRODUCTION
Circular economy (CE) has been proposed as a promising alternative to the traditional linear economic model, attracting considerable interest for its potential to address economic, environmental, and social challenges (Cagno et al., 2023; Knable et al., 2022). Research indicates that small and medium-sized enterprises (SMEs) classified by the European Union as businesses with up to 250 employees and an annual turnover of up to EUR 50 million (EC, 2018), tend to lag behind larger companies in the adoption of CE practices due to limited resources and expertise (Dey et al., 2019; Mura et al., 2020), while larger private and public organisations have started integrating CE practices (Garces-Ayerbe et al., 2019; Ghisellini et al., 2016). Given the importance of SMEs to economies, representing approximately 99% of companies in the EU (EC, 2018) and accounting for 50% of the region's GDP (Rodríguez-Rebés et al., 2024) their role in sustainability is undeniable. A gradual adoption of CE practices by SMEs could significantly advance the transition to a CE and emphasise the important contribution of these companies to sustainable development(de Jesus Pacheco et al., 2024; Smith et al., 2022).

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Research has indicated that engaging in CE practices, which entail sustainable production strategies geared towards waste reduction, resource optimisation, prolonged product and material lifecycles, and emphasising resource reuse within closed loops (Ahmadov et al., 2023; Arsawan et al., 2024), offers SMEs opportunities for value creation (Broccardo & Zicari, 2020; Ferasso et al., 2023). According to Ly (2021), it can also improve the firm competitiveness in the short and long term by enhancing operational efficiency, fostering innovation, and aligning business models with evolving consumer and regulatory demands. This enables SMEs to flourish economically, socially, and environmentally.

The transition from a linear economy to a circular economy is accompanied by a number of constraints. Barriers such as lack of demand or social awareness (Geissdoerfer et al., 2023; Kirchherr et al., 2018), regulatory complexities (Govindan & Hasanagic, 2018), and resource limitations (García-Quevedo et al., 2020), combined hinder SMEs ability to adopt circular economy practices. However, alongside these barriers, certain factors also act as enablers, such as supportive regulatory frameworks (Droege et al., 2023), market demand for sustainable products (Godinho Filho et al., 2024), and increasing stakeholder awareness (Baah et al., 2023). Among the factors influencing the adoption of these practices by SMEs, stakeholder pressures have been highlighted as a critical factor of implementation and engagement with CE practices. Both external and internal stakeholder pressure play a pivotal role in driving SMEs to adopt CE practices (Baah et al., 2022; Chiappetta Jabbour et al., 2020; Genovese et al., 2017). The same applies to managers' perceptions of the importance of these practices (Al-Kwifi et al., 2023; Ruokonen, 2021; van Langen et al., 2021). Moreover, CE orientation has garnered recognition in various studies for its beneficial impact on business (Arranz et al., 2023; Jagani & Hong, 2022; Schmidt et al., 2021). There are thus a large number of internal and external influencing factors and actors that together influence the transition to CE in SMEs (Ahmadov et al., 2023; Trevisan et al., 2023). This complexity, characterised by the dual role of factors as facilitators or obstacles, underscores the need for further research that not only recognises but also actively integrates this situation (e.g. Govindan, 2023; Kannan et al., 2022; Salmenperä et al., 2021). Against this background, the present study utilises a theoretical framework (Figure 1) based on stakeholder theory, legitimacy theory and strategic management theory. This framework provides the theoretical lens to better analyse and understand the influencing factors that shape the adoption of CE practices in SMEs.

Stakeholder theory, as articulated by Freeman (1984), examines the relationships and pressures exerted by various stakeholders on organizational processes, shedding light on the broader network of interactions within which organizations operate. Freeman (1984) further posits that stakeholders not only influence but are also influenced by the decisions and outcomes of an organization. Clarkson (1995) expand on this by explaining that stakeholders possess rightful interests and significant stakes in a firm's operations due to their invested financial or human capital. This not only underscores the reciprocal relationship between firms and their stakeholders but also highlights the latter role in supporting or hampering the adoption of CE practices. In the existing CE literature, there are studies that have employed stakeholder theory to establish connections between the adoption of CE practices and the influence of stakeholders (Baah et al., 2022; Salvioni & Almici, 2020). The findings of these studies (e.g., Chiappetta Jabbour et al., 2020; Hernández-Arzaba et al., 2022; Jiao et al., 2020) indicate that stakeholder, such as governments, suppliers, customers, NGOs, and the media, can exert significant pressure on organizations to embrace sustainable practices. Bag et al. (2020) argue that while governments play a role in initiating policies and frameworks to promote the circular economy, it is the immediate stakeholders of firms who are often the most critical drivers of change at the organizational level. While stakeholder theory provides a good perspective to explain the role of stakeholders in driving companies towards environmentally friendly practices, the processes by which companies accumulate the resources required to implement CE practices cannot be explained with this perspective. Legitimacy theory, elucidated by Suchman (1995), explains how organisations maintain societal approval by aligning their actions with prevailing norms and values, shaping managerial perceptions of strategic decisions. This alignment enhances legitimacy and influences managerial perceptions of strategic decisions. For example, Zheng et al. (2023) examine how SMEs in emerging markets leverage Industry 4.0 to enhance their organizational legitimacy with both government and market stakeholders, thereby enabling them to effectively capture value from adopting CE practices in their operations. Eventually, strategic management theory, as outlined by (Goodstein, 1994), underscores the significance of managerial practices that are aligned with organizational missions and values, positing that such practices are more likely to be embraced. For instance, the study by Astuty et al. (2024) has shown

that using strategic management theory is an appropriate perspective to explain how micro-businesses can formulate resilient strategies by aligning internal resources with responsive approaches to bring business performance in line with the 2030 Sustainable Development Goals agenda.

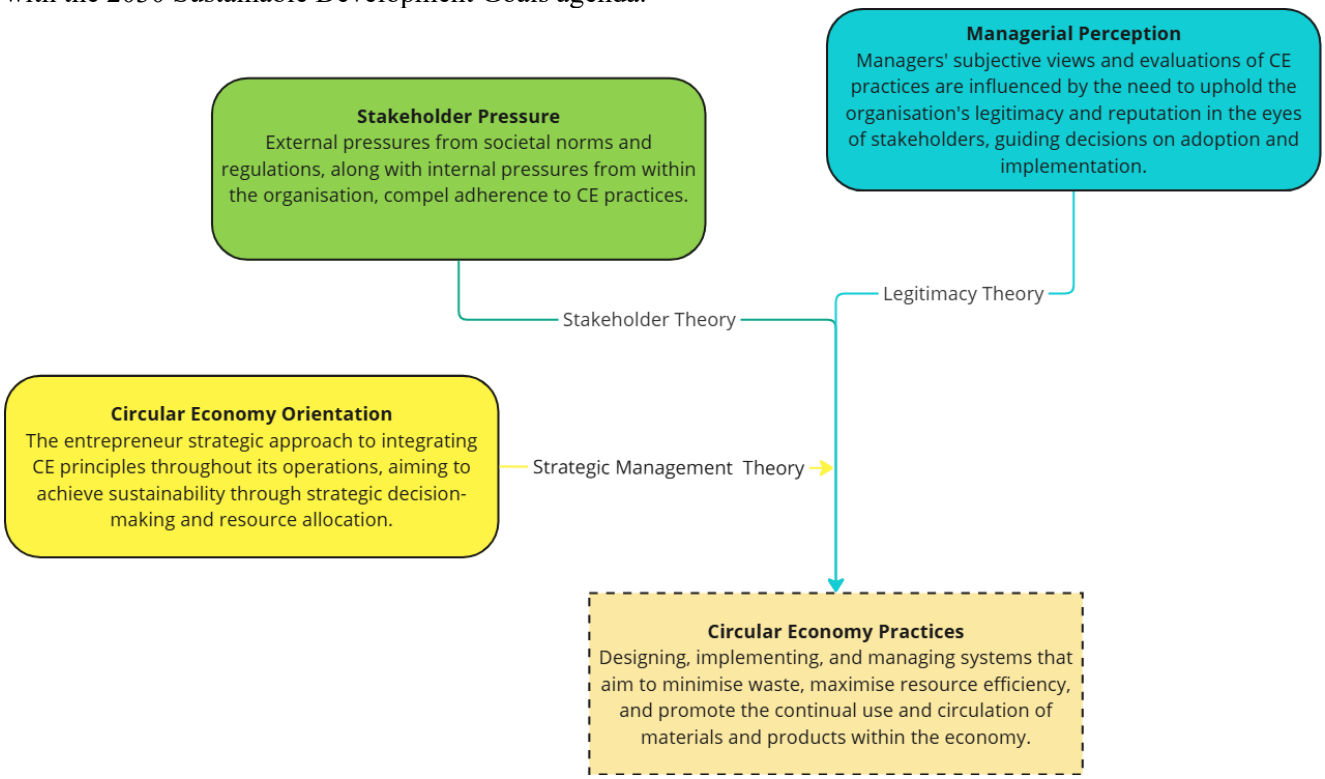


*Figure 1. Theoretical Framework: Exploring the Synergy of Stakeholder Influence, Managerial Perception, and Strategic Orientation in Advancing Circular Economy Practices in SMEs*

Using these three theoretical perspectives provides a useful theoretical framework to better understand and explain the assumptions of CE practices of SMEs. More specifically, the use of these three theories allows for a more holistic explanatory perspective required to understand the multiple forces affecting the adoption of CE practices in SMEs. Consequently, this integrated framework can also be seen as a contribution of this paper to enable more differentiated SME studies and also insights into environmental engagement.

To date, research is lacking on why some companies in Central and Eastern Europe (CEE) practice CE, whereas others are lagging (Ahmadov, 2023; Mazur-Wierzbicka, 2021). Understanding the interplay of the various factors in this process of SMEs practicing CE is crucial in understanding the complexity and drawing implications to support SMEs, as well as inform the literature on CE practices in SMEs to foster the transition towards CE. Therefore, this study aims to deepen our understanding of the dynamics that shape CE practices in these organisations. More precisely, we analyse the influence of different stakeholders on CE practices in SMEs. Research shows that SMEs must work with different stakeholders to overcome any shortcomings associated with smallness (Durst et al., 2020). Therefore, these stakeholders can have a significant impact on SME activities, such as CE practices (Ahmadov, Ulp, et al., 2024; Baah et al., 2022). Acknowledging the critical role of SME owners and managers in CE and its implementation (Prieto-Sandoval et al., 2019), we also want to provide further evidence of managerial perception as a key driver of CE practices in SMEs. Finally, in recognising the pivotal role of stakeholder involvement in shaping CE orientation (Moggi & Dameri, 2021), we decided to integrate CE orientation as a mediating force to explore the intricate relations between stakeholder pressure, SME management perceptions, and CE practices.

This study contributes to the literature by challenging the assumptions of uniform stakeholder pressure (Baah et al., 2023; Chiappetta Jabbour et al., 2020), revealing distinct impacts of internal and external stakeholder pressure on CE practices. Additionally, it emphasises the crucial role of positive managerial perception as a motivator for

embracing CE principles and introduces a novel perspective framing CE orientation as a mediating force between stakeholder pressure, managerial perception, and CE practices. Our findings suggest that a heightened CE orientation enhances organizational responsiveness to stakeholder pressures, advancing our understanding of nuanced mediating mechanisms and emphasising the importance of CE initiatives, particularly for SMEs.

The remainder of this paper is organised as follows. The next section discusses the theoretical background and develops the hypotheses. Section 3 describes the research methodology used in this study. Section 4 presents the results of this study. Section 5 discusses the theoretical and practical implications of this study's findings. Finally, Section 6 discusses the study's limitations and suggests future recommendations.

## 2. LITERATURE REVIEW AND HYPOTHESES

This section outlines the theoretical foundation and hypotheses for the study, focusing on the critical roles of stakeholder pressures, managerial perceptions, and organizational orientation in driving the adoption of CE practices. Drawing from established literature, the discussion delves into the distinct and interconnected influences of these factors, setting the stage for a deeper exploration of their impacts on CE transitions. The section also highlights key gaps in current research, emphasizing the need for a comprehensive understanding of these dynamics to advance sustainable business practices.

### 2.1 Role of Stakeholder Pressure on CE Practices

This discussion underscores the critical role of stakeholder pressure in shaping the adoption of CE practices (Baah et al., 2023; Hernández-Arzaba et al., 2022; Jakhar et al., 2019). Baah et al. (2022) and Rodríguez-Espíndola et al. (2022) emphasised the challenges faced by SMEs in voluntarily engaging with CE, highlighting the pivotal influence of external pressures. This study further notes that without stakeholder pressures, the adoption of CE practices in industrial settings is hampered (Baah et al., 2023). This aligns with growing awareness among stakeholders regarding ecological and social issues, resulting in increased calls for firms to align their operations with environmental and social concerns (Jakhar et al., 2019; Winans et al., 2021).

Examining stakeholder pressure in the context of CE practices, Govindan and Hasanagic (2018) found that the government plays a prominent role in coercing firms to embrace CE practices. Genovese et al. (2017) argue that external stakeholder pressures facilitate CE practices adoption, reinforcing the notion that stakeholder pressures significantly contribute to the integration of CE practices. External stakeholders such as customers, NGOs, competitors, and government agencies play significant roles in shaping the adoption of CE practices. Customers, by driving the demand for sustainable products, exert pressure on firms to embrace CE principles in their operations (Santos et al., 2023). NGOs contribute to raising awareness and advocating for environmental responsibility, potentially influencing organisational behaviour towards CE adoption (Ahmadov et al., 2024; Mazzucchelli et al., 2022). Competitors can exert mimetic pressures, leading firms to emulate the successful CE strategies observed in their industry to maintain competitiveness (Calzolari et al., 2023). Moreover, government policies and regulations represent a form of coercive pressure that can mandate or incentivize the adoption of CE practices, further influencing firms' decisions in this regard (Amjad & Diaz-Elsayed, 2024; Fleischmann, 2019). However, based on the seminal work by Cantele and Zardini (2020), Dubey et al. (2019) and Jansson et al. (2017), it becomes apparent that SMEs are less responsive to top-down regulatory mandates compared to larger enterprises. This nuanced observation suggests that, while external pressure (regulatory pressure) plays a significant role in driving CE practices among SMEs, its impact may vary depending on the size and organizational structure of the enterprise. Internal stakeholders, notably company owners, employees, and shareholders, also have significant influence, potentially surpassing that of external stakeholders in fostering the adoption of CE business models (Chiappetta Jabbour et al., 2020). At the operational level, employee involvement is crucial for the successful implementation of CE practices, ensuring that sustainable initiatives are effectively implemented (Dräger & Letmathe, 2023). Meanwhile, top management's strategic orientations and commitment are pivotal in setting the agenda and providing the necessary resources for CE implementation (Behlau, 2020). Additionally, stakeholder pressures, including those from investors, can influence corporate social responsibility (CSR) participation and the adoption of CE practices, highlighting the importance of internal alignment and buy-in (Baah et al., 2023). SMEs disregarding stakeholder pressures risk adverse consequences such as bad publicity, loss of goodwill, and potential lawsuits, hindering

collaboration and innovation capabilities (Agyabeng-Mensah et al., 2022). Responding to stakeholder pressure is imperative to mitigate these consequences (Chiappetta Jabbour et al., 2020).

To further develop a nuanced understanding, it is crucial to distinguish between internal and external stakeholder pressure. The interplay between internal and external stakeholders profoundly impacts a company's sustainability and competitiveness (González-Rodríguez et al., 2019). Recognising these distinctions is essential for comprehending the complex dynamics that influence the adoption of CE practices. Building on these insights, we propose the following hypotheses:

- *H 1: Pressure from stakeholders positively influences the adoption of CE practices.*
- *H 1a: Pressure from internal stakeholder positively influences the adoption of CE practices.*
- *H 1b: Pressure from external stakeholder positively influences the adoption of CE practices.*

## 2.2 Managerial Perception's Role in CE Practices

Examining managers' perspectives on CE transitions is crucial for understanding the awareness and implementation of CE concepts within organisations. Santos Álvarez and García Merino (2008) characterized managerial perceptions as "the substratum", which is closely connected to the personal attributes of managers and serves as the foundation for determining the most suitable alternative. O'dwyer (2002) defines it as a subjective understanding and interpretation by senior managers within organisations. Firms are more likely to perform behaviours that they perceive can result in better performance than others (Ajzen, 1991). Consequently, we posit that positive managerial perceptions of CE will serve as a motivating factor for companies to embrace CE practices. These positive managerial perceptions stem from the recognised advantages and benefits associated with the adoption of CE principles.

Previous studies (e.g., García-Quevedo et al., 2020; Jiao et al., 2020; Liakos et al., 2019; Masi et al., 2018) have delved into the analysis of how companies perceive and incorporate CE practices. Ormazabal et al. (2018) identified key factors influencing a company's perception of CE, emphasizing material provisions, resource recovery, and cost-savings as primary considerations. Such perceptions often act as a lens through which managers evaluate the feasibility and strategic value of CE practices, shaping their willingness to engage in CE-related initiatives. For example, if managers associate CE practices with cost efficiencies or reputational gains, these perceptions can create a positive feedback loop that reinforces the prioritization of CE within the organization.

CE practices introduce intricate tension among managers. Decisions in this realm necessitate navigating through ambiguous contexts and demanding managerial judgments and perceptions. In line with Wallo et al. (2024), organizational resilience, knowledge management, and a socially sustainable working environment are critical factors for achieving CE. Managerial perceptions play a key role in interpreting these factors, determining whether CE adoption is seen as an opportunity for innovation or as a challenge requiring extensive resources. As CE practices become a part of sustainability issues, increasingly intertwined economic, environmental, and social concerns, key decision-makers, such as owners, must grapple with the complexities of these interconnected dimensions (Hahn et al., 2014).

In the evolving landscape of CE, scholars have recognised the significance of managerial perceptions in the planning and implementation of sustainability initiatives (Al-Kwifi et al., 2023; Peng & Liu, 2016; Ruokonen, 2021; van Langen et al., 2021). Nascent research in this field underscores the pivotal role that managerial perceptions play in shaping the trajectory of CE practices within organisations. These perceptions not only influence strategic decisions but also set the tone for how sustainability goals are integrated into daily operational processes, highlighting their critical impact on organizational commitment to CE practices.

The intricate web of economic, environmental, and social considerations in sustainability further emphasises the role of managerial perceptions as a compass in navigating the complexities inherent in CE adoption. By serving as a bridge between organizational objectives and actionable strategies, managerial perceptions enable firms to align CE adoption with broader sustainability goals, ensuring both strategic coherence and operational feasibility. Building on these insights, we propose the following hypothesis:

- *H 2: Managerial perception positively influences the adoption of CE practices.*

## 2.3 CE Orientation and Its Influence on CE Practices

The examination of CE orientation at the organizational level remains in its nascent stages, with a limited number of research articles identified (Gallardo-Vázquez et al., 2024; Ozkan-Ozen et al., 2020; Schmidt et al., 2021; Shaharudin et al., 2023). Despite its preliminary status, the construct has garnered increasing attention from researchers, hinting at its potential to act as a catalyst for gaining competitive advantage (Afum et al., 2022). Recent study by Gallardo-Vázquez et al. (2024) have emphasized the significance of philosophy of orientation towards the CE as a new paradigm of sustainable management, integrating insights from Institutional and Stakeholders Theories. This growing body of research suggests a rising recognition of CE orientation as a pivotal factor in driving organizational sustainability efforts and gaining competitive advantage. However, the variability in conceptualizations of CE orientation in the literature remains a limitation, potentially affecting the consistency and generalizability of findings.

Addressing this need (absence of an accepted definition for CE orientation) for clarity, Liu and Chang (2017, p.7) introduce the term "closed-loop orientation," defining it as the "strategic orientation towards the recyclability of materials/components/products throughout the entire supply chain loop." This term provides a valuable mechanism for understanding the translation of general strategic orientations into tangible CE practices. Alternatively, Goyal et al. (2018) contribute to the discourse by defining CE orientation as "involving the focus on setting up end-to-end processes for e-waste collection, sorting, and segregation into reusable metal extracts." Meanwhile, Arranz et al. (2023) consider the CE orientation as “adoption of relevant regulations and standards, which requires the development of learning processes and organizational routines that facilitate their implementation”. This necessitates the establishment of learning processes and organizational routines to facilitate implementation, leading to increased efficiency. These processes enable effective waste management, identification of areas for improvement, and prompt responses to monitoring and auditing results.

Synthesising insights from the existing literature (Afum et al., 2022; Arranz et al., 2023; Gallardo-Vázquez et al., 2024; Goyal et al., 2018; Liu & Chang, 2017), the present study defines CE orientation as both minimisation mindset and an operational framework that extends beyond basic waste minimization and recycling efforts. It encompasses a spectrum of initiatives, fostering internal comprehension of CE practices and facilitating seamless coordination among all stakeholders. This definition underlines the critical importance of the alignment of stakeholders and their power and expectations (the underlying notion of stakeholder theory) and of a company management that is aware of which resources are available and how they can be used in the best possible way to create a competitive advantage (in the sense of strategic management theory).

Jagani and Hong (2022) have highlighted the pivotal role of sustainability orientation, integrating economic, environmental, and social factors within firms. This supports companies in the sustainable development of new products and creates a positive cascade effect. The study further suggests that sustainable product development positively influences environmental performance, ultimately correlating with enhanced overall business performance. Schmidt et al. (2021) conducted a study, shedding light on the pivotal role of closed-loop orientation, grounded in CE principles, particularly recyclability, in driving the effective implementation of CE practices. Based on these observations, it can be hypothesized that a CE orientation has a positive influence on CE practices:

- *H 3: CE orientation positively influences the adoption of CE practices.*

## 2.4 Stakeholder Pressures and CE Orientation

Existing research highlights the significant impact of stakeholder pressure on compelling firms to address environmental concerns, engage in active environmental management, and innovate sustainable measures (Jennings & Zandbergen, 1995; Lee et al., 2018; Moggi & Dameri, 2021). However, the transition from responding to stakeholder pressure to embracing CE practices necessitates a strategic mindset that permeates the organization. This strategic mindset, in other word, CE orientation, fosters internal comprehension of CE practices and facilitates seamless coordination among stakeholders (see Section 2.3).

While the literature provides insights into the influence of stakeholder pressure on environmental initiatives (Baah et al., 2022; Jiao et al., 2020), according to the authors’ knowledge, the specific nexus between stakeholder pressure and the development of a CE orientation remains an underexplored domain. This critical gap motivates our investigation, driven by the hypothesis that stakeholder pressure, whether internal or external, serves as a catalyst for cultivating a robust CE orientation.

- *H4: Pressure from stakeholder pressure positively influences the CE orientation.*
- *H4a: Pressure from internal stakeholder positively influences the CE orientation.*
- *H4b: Pressure from external stakeholder positively influences the CE orientation.*

The hypothesises posit that stakeholder pressure acts as a driving force in the development of CE Orientation. This aligns with the arguments presented by Nason et al. (2018), who observed a consensus among various stakeholders on the salience of environmental issues and incorporated these expectations as reference points for environmental performance. Increased pressure is anticipated to stimulate greater efforts to integrate environmental concerns into strategic, tactical, and operational activities, leading to the development of internal knowledge and capabilities to navigate heightened output constraints (Delgado-Ceballos et al., 2012).

Our focus extends to the mediating role of CE orientation in the intricacies of stakeholder dynamics. This study aims to dissect the complex relationships between stakeholder pressure (both internal and external) and the adoption of CE practices within firms. Our rationale for this enquiry stems from the recognition that firms characterised by varying levels of CE orientation may exhibit distinct responses to internal and external pressures.

Our argument asserts that the observed reactions to internal and external pressures are contingent on the inherent level of CE orientation within the company. A higher degree of CE orientation is proposed to intensify a firm's responsiveness to stakeholder pressure, exerting a more pronounced influence on the adoption of CE practices. In essence, CE Orientation is conceptualised as a mediating force between stakeholder pressure and the subsequent implementation of CE practices.

- H 5: CE orientation mediates the relationship between stakeholder pressure and CE practices.
- H 5a: CE orientation mediates the relationship between internal stakeholder pressure and CE practices.
- H 5b: CE orientation mediates the relationship between external stakeholder pressure and CE practices.

## 2.5 Managerial Perceptions and CE Orientation

Examination of managers' perspectives on CE transitions is imperative for understanding the awareness and implementation of CE concepts. Drawing from Ajzen (1991) notion that firms are inclined to adopt behaviours perceived as advantageous, we argue that positive managerial perceptions of CE act as a driving force for companies to adopt CE practices. These positive perceptions originate from the recognised advantages associated with the adoption of CE principles.

However, the implementation of CE practices introduces complex tensions for managers. Decisions in this domain require navigating through ambiguous contexts, demanding nuanced managerial judgments and perceptions. As CE practices, intertwined with sustainability issues, corporate decision-makers grapple with the intricacies of these interconnected dimensions (Hahn et al., 2014). This nascent research highlights the pivotal role managerial perceptions play in shaping the trajectory of CE practices within organizations.

The fusion of managerial perceptions and CE practices is particularly noteworthy, as companies viewing CE as an opportunity for material provisions, resource recovery, and cost-savings are more likely to integrate circular practices into their business models. The intricate interplay of economic, environmental, and social considerations in sustainability further underscores the role of managerial perceptions as a compass for navigating the complexities inherent in CE adoption. Despite the increasing focus on sustainability research, several scholars (e.g., Al-Kwifi et al., 2023; Ruokonen, 2021; van Langen et al., 2021) have emphasized the potential importance of managerial perceptions in planning and implementing sustainability initiatives, as well as recognise the intricate relationship between managerial perception and the practical implementation of CE. Building on these arguments, we propose following hypothesises:

- H 6: Managerial perception positively influences CE Orientation.
- H 7: CE Orientation mediates the relationship between managerial perception and CE practices.

In the following section, we present a comprehensive overview of the literature review, as summarized in Tab 1. This table consolidates key findings and research gaps related to the role of stakeholder pressure, managerial perception, and CE orientation in driving the adoption of CE practices. By synthesizing insights from existing studies, Tab 1 offers a clear and structured presentation of the findings, along with identified opportunities for future research.

*Table 1. Summary of Key Findings and Research Gaps in CE Literature*

| Research Gap | Key Findings | Implications for Future Research |
|---|---|---|
| **Role of Stakeholder Pressure on CE Practices** | • Stakeholder pressure significantly influences the adoption of CE practices (Baah et al., 2023; Genovese et al., 2017)<br>• Government regulations play a prominent role in coercing firms towards CE practices (Govindan & Hasanagic, 2018)<br>• SMEs are less responsive to top-down regulatory mandates compared to larger enterprises (Jansson et al., 2017)<br>• Internal stakeholders, including company owners and shareholders, also influence CE adoption (Chiappetta Jabbour et al., 2020) | • Further investigation into the differential impact of stakeholder pressure on SMEs and larger enterprises (Baah et al., 2022)<br>• Exploration of effective strategies for SMEs to navigate stakeholder pressures (Dubey et al., 2019)<br>• Examination of the nuances in the influence of internal stakeholders on CE adoption (Chiappetta Jabbour et al., 2020) |
| **Managerial Perception's Role in CE Practices** | • Positive managerial perception towards CE serves as a motivating factor for companies (García-Quevedo et al., 2020; Masi et al., 2018)<br>• Managerial perceptions are crucial in navigating the complexities of CE adoption (Al-Kwifi et al., 2023; Peng & Liu, 2016) | • Investigation into the factors influencing managerial perceptions towards CE (García-Quevedo et al., 2020)<br>• Examination of how managerial perceptions translate into actionable strategies for CE adoption (Ruokonen, 2021)<br>• Assessment of the role of leadership styles in shaping managerial perceptions towards CE (van Langen et al., 2021) |
| **CE Orientation and Its Influence on CE Practices** | • CE orientation encompasses strategic mindset and operational framework beyond waste minimization (Arranz et al., 2023; Liu & Chang, 2017)<br>• Sustainability orientation correlates with enhanced overall business performance (Jagani & Hong, 2022)<br>• Closed-loop orientation, grounded in CE principles, drives effective CE practices implementation (Schmidt et al., 2021) | • Development of a standardized definition for CE orientation (Arranz et al., 2023)<br>• Examination of the mechanisms through which CE orientation facilitates CE practices implementation (Ozkan-Ozen et al., 2020)<br>• Exploration of the role of CE orientation in fostering innovation and sustainable product development (Jagani & Hong, 2022) |

Our conceptual model, illustrated in Figure 2, describes the relationships among stakeholder pressure (both internal and external), CE orientation, managerial perception, and their collective impact on CE practices. Developed based on the literature, this model goes beyond a linear representation, incorporating the mediating role of CE orientation in shaping the dynamics between stakeholder pressure and the subsequent adoption of CE practices.

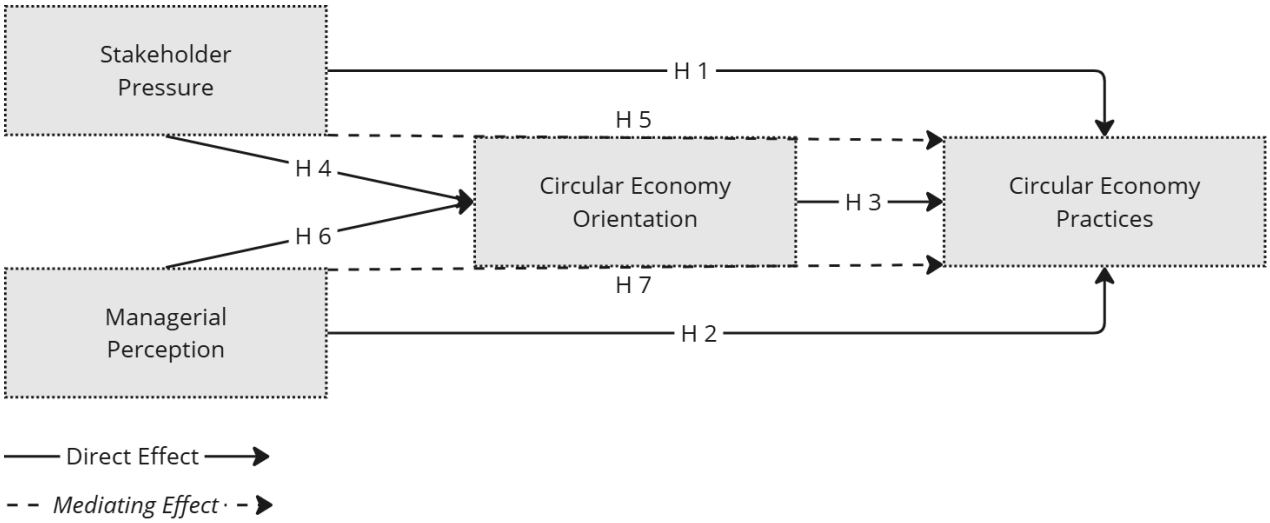


*Figure 2. Conceptual Model (Authors' Own Figure)*

## 3. RESEARCH DESIGN AND METHODOLOGY

The use of quantitative approaches such as surveys, statistics and structural modelling is intended to test the framework of the hypothesis or assess the relationship (correlation) between constructs (Götz et al., 2009; J. F. Hair et al., 2012). In the social science context, this methodology has been used extensively (Tarka, 2018), and it enables researchers to construct and test theoretical models that reflect the complexity of the relationships, thereby providing a deeper understanding of the factors that influence the adoption of CE practices (Chowdhury et al., 2022; Dey et al., 2020; Rodríguez-Espíndola et al., 2022). While causal models, such as Figure 2, are instrumental in exploring complex relationships in management research, they may oversimplify dynamic interactions among variables. Critics argue that such models assume linear causality, which may not fully capture feedback loops or emergent phenomena inherent in stakeholder interactions and CE practices (Bollen & Pearl, 2013). Despite critiques of causal models, this approach enables a systematic examination of the hypothesized relationships, supported by Structural Equation Modelling (SEM), which accounts for measurement errors and captures complex interactions between variables.

### 3.1 Measures of Constructs

The hypotheses in this study were tested using a survey instrument grounded in the existing literature. The constructs employed were adapted from previously established frameworks identified during the literature review to ensure reliability and validity (Churchill, 1979). A five-point Likert scale was used for measurement, ranging from 1 (completely disagree) to 5 (completely agree).

The questionnaire comprised four sections, aligning with the constructs depicted in the framework (Figure 2.). The first section focused on stakeholder pressure, which investigates both internal and external pressures influencing the adoption of CE practices, using items adapted from Adomako and Tran (2022). Internal stakeholder questions focused on the influence of management, employees, and investors. External stakeholder items assessed the impact of factors such as customer environmental concerns, pressure from NGOs, competitors, and government regulations. The second section addressed managerial perception, adapted from Ormazabal et al. (2018). Questions explored perspectives on how circular practices contribute to organizational sustainability, cost-effectiveness, customer retention, competitive advantage, and environmental pollution reduction. The third section explored CE orientation, items were derived and build upon Papadas et al. (2017) to assess the organization's strategic inclination towards CE principles. Questions addressed the provision of CE-related training, recruitment of employees with CE expertise, use of external environmental sustainability support, and the significance placed on waste minimization and resource efficiency. This construct acts as a mediating variable between external pressures, managerial perceptions, and CE practices. Finally, the fourth section focused on CE practices. This section included items adapted from Rodríguez-Espíndola et al. (2022) to measure the implementation of CE practices within organizations. Questions explored areas such as the replacement of non-recyclable raw materials with sustainable

alternatives, collaboration with suppliers for ecological design, use of recycled materials, and policies for resource optimization and waste management. A detailed list of the questions included in the survey is presented in Table 2.

*Table 2. Questionnaire Constructs and Sources*

| Construct | Item | Source |
|---|---|---|
| **Circular Economy Practices** | • In our company, we have replaced non-recyclable raw materials with renewable, recyclable, or biodegradable inputs.<br>• We work with clients/suppliers for the ecological design of products.<br>• During the design stage, we consider the possibility to reuse products after they have served their initial purpose.<br>• We are using recycled materials as inputs in our processes.<br>• We have policies and practices in place to dispose of machinery and equipment on time.<br>• In our company we intentionally make changes to processes to use the least amount of energy and resources | Rodríguez-Espíndola et al. (2022) |
| **Circular Economy Orientation** | • My organization provides Circular Economy related training (e.g., waste minimization, improve recycling) to our employees.<br>• My organization recruits new employees who understand Circular Economy practices.<br>• In our organization, we have a strong understanding of circular economy practices.<br>• In our organization, we use external help for environmental sustainability support (such as sustainability consultants or support).<br>• In our organization, we are able to coordinate effectively with all internal departments, suppliers, and customers in the context of implementing and adopting circular economy practices.<br>• In our organization, we understand the significance of waste minimization and its use. | Papadas et al. (2017) |
| **Stakeholder Pressure** | Internal Stakeholder:<br>• 'Management will' is necessary for taking valuable steps supporting effective CE in the firm.<br>• Employees put pressure on our company to pursue sustainable environmental practices.<br>• Investors put pressure on our company to pursue sustainable environmental practices.<br><br>External Stakeholders:<br>• Environmental issues, such as carbon emissions, critically affect the buying decisions of our customers.<br>• NGOs put pressure on our company to pursue sustainable environmental practices. | Adomako and Tran (2022) |

| | | |
|---|---|---|
| | • Competitors put pressure on our company to pursue sustainable environmental practices.<br>• The government put pressure on our company to pursue sustainable environmental practices. | |
| **Managerial Perception** | • Adoption of circular practices e.g., reduce, reuse, and recycle will help the firm to develop sustainability as an organization.<br>• Adoption of circular practices e.g., reduce, reuse, and recycle will help the firm to be more cost-effective.<br>• Adoption of circular practices e.g., reduce, reuse, and recycle will help the firm to retain customers.<br>• Adoption of circular practices e.g., reduce, reuse, and recycle will help the firm to attract new customers.<br>• Adoption of circular practices e.g., reduce, reuse, and recycle will help the firm to gain a competitive advantage.<br>• Adoption of circular practices e.g., reduce, reuse, and recycle will help the firm to reduces environmental pollution. | Ormazabal et al. (2018) |

To account for potential factors that could influence the adoption of CE practices, four control variables were included in the study: firm age, firm size, internationalization, and industry/sector. Firm age was incorporated to capture the effect of organizational maturity, as older firms may have greater experience and knowledge, potentially enhancing their propensity to adopt CE practices (Li et al., 2019). This variable was measured using a 5-point scale ranging from 1 for firms 5 years or younger to 5 for firms over 30 years old (Jiao et al., 2020). Firm size was included as larger organizations often have greater resources and face higher environmental pressures (González-Benito & González-Benito, 2006; Rivera-Camino, 2012). Size was categorized according to the EU SME classification: 1 for micro firms (fewer than 10 employees), 2 for small firms (10 to 49 employees), and 3 for medium firms (50 to 250 employees) (EC, 2018). Internationalization was considered, as firms operating internationally often encounter more stringent environmental pressures and institutional demands, influencing their eco-innovation and sustainability practices (Ahmadov et al.,2024; Amer, 2023; Marco-Lajara et al., 2023). This variable differentiated firms with international operations from those operating domestically (Barbosa et al., 2022). Finally, industry/sector differences were addressed, recognizing that firms in carbon-intensive industries, such as cement, steel, and electricity, may adopt CE practices more readily to reduce carbon emissions and mitigate financial impacts from carbon taxes (Bendikiene et al., 2019). These control variables ensure a more comprehensive analysis of the factors influencing CE adoption across diverse organizational contexts.

## 3.2 Sample and Data Collection

This study employed an online survey methodology, deployed through the Qualtrics platform, accompanied by an introductory email outlining the study's objectives. A randomized sample of 1,500 SMEs was drawn from the Orbis Europe database to ensure representativeness. Data collection occurred in three phases—comprising the baseline survey and two subsequent follow-up surveys—spanning a period of three weeks. The structured survey was administered on January 10th, 2023, targeted participants from manufacturing SMEs located in Estonia. To accommodate the diverse backgrounds of Estonian firms, the survey was translated into three languages: Estonian, Russian, and English. This approach resulted in a total of 455 responses (30.33% response rate). To enhance the robustness of the data, the "complete case analysis" method was employed to address missing data, in line with the recommendations of Hughes et al. (2019). As a result, questionnaires with incomplete or missing responses were excluded from the analysis. Furthermore, firms exceeding the SME threshold or industry focus (i.e., those with more than 250 employees, or a service companies) were removed from the dataset. Following this data refinement process, 196 complete and valid responses were obtained for analysis, representing a response rate of 13.07% (196 out of 1500).

Adhering to Podsakoff et al. (2003) guidelines to mitigate potential common method bias, various procedures were implemented, ensuring the confidentiality and anonymity of respondent information. The study emphasises the exclusive use of results for research purposes, with randomised question ordering. The study gathered responses from mostly micro firms (68.37%) followed by small (26.53%) and medium-sized firms (5.10%) and from a predominantly male respondent base (79.92% male). Educational backgrounds varied, with 41.33% holding a Diploma/Certificate, and the rest with university degrees. Most participants held positions as owners (75%), while 25% were managers within their respective firms. The respondents in the study represent various sectors of manufacturing, with the highest participation from the manufacture of fabricated metal products (17.35%). Tab 4 illustrates the profiles of the final sample in terms of firm size, years in business, type, industry/sector and respondent's gender, education and positions.

*Table 3. Distribution of Responses by Industry/Sector*

| **Attributes** | **Description** | **Frequency** | |
|---|---|---|---|
| | | (n) | % |
| Firm size | ≤9 | 134 | 68.37 |
| | 10-49 | 52 | 26.53 |
| | 50-249 | 10 | 5.10 |
| Gender | Male | 139 | 70.92 |
| | Female | 57 | 29.08 |
| | Prefer not to say | 0 | 0 |
| Education | Doctorate | 0 | 0 |
| | Master's | 64 | 32.65 |
| | Undergraduate | 51 | 26.02 |
| | Diploma/Certificate | 81 | 41.33 |
| Position in the firm | Owner | 147 | 75 |
| | Manager | 49 | 25 |
| Years in business | Above 30 years | 16 | 8.16 |
| | 21 – 30 years | 40 | 20.41 |
| | 11 – 20 years | 58 | 29.59 |
| | 5 – 10 years | 58 | 29.59 |
| | Less than 5 years | 24 | 12.25 |
| Business Type | B2B (business-to-business) | 66 | 33.67 |
| | B2C (business-to-consumer) | 45 | 22.96 |
| | Both | 85 | 43.37 |
| Industry/sector | Manufacture of food products | 10 | 5.10 |
| | Manufacture of beverages | 7 | 3.57 |
| | Manufacture of tobacco products | 0 | 0.00 |
| | Manufacture of textiles | 6 | 3.06 |
| | Manufacture of wearing apparel | 13 | 6.63 |
| | Manufacture of leather and related products | 2 | 1.02 |
| | Manufacture of wood and of products of wood and cork | 32 | 16.33 |
| | Manufacture of paper and paper products | 2 | 1.02 |
| | Printing and reproduction of recorded media | 7 | 3.57 |
| | Manufacture of coke and refined petroleum products | 0 | 0.00 |
| | Manufacture of chemicals and chemical products | 6 | 3.06 |
| | Manufacture of basic pharmaceutical products | 4 | 2.04 |
| | Manufacture of rubber and plastic products | 7 | 3.57 |
| | Manufacture of other non-metallic mineral products | 3 | 1.53 |
| | Manufacture of basic metals | 7 | 3.57 |

| | | | |
|---|---|---|---|
| | Manufacture of fabricated metal products | 34 | 17.35 |
| | Manufacture of computer, electronic and optical products | 3 | 1.53 |
| | Manufacture of electrical equipment | 1 | 0.51 |
| | Manufacture of machinery and equipment | 20 | 10.20 |
| | Manufacture of motor vehicles, trailers and semi-trailers | 5 | 2.55 |
| | Manufacture of other transport equipment | 3 | 1.53 |
| | Manufacture of furniture | 24 | 12.24 |

## 3.3 Statistical Method

In this study, we employed a comprehensive methodological approach to rigorously analyse our data and test our hypotheses. Firstly, we conduct descriptive analyses to explore the main characteristics of our survey items. Specifically, we investigate the data using different summary measures, including mean and standard deviation to provide insights into the central tendency and dispersion of our variables.

Secondly, to ensure the robustness of our results, we subject all our survey items and constructs to rigorous reliability and validity assessments. To verify that common method bias does not exist in our study, we use Harman's single-factor test to assess whether a single dominant factor could account for the variance in our survey responses (Harman, 1976; Podsakoff et al., 2003). However, as with any survey-based research, there remains a potential tendency for bias to occur due to self-reported data, which may be influenced by social desirability or respondent interpretation. Reliability is assessed through measures such as Cronbach's alpha coefficient (Churchill, 1979; Cronbach, 1951), average variance extracted (Bagozzi & Yi, 1988), and composite reliability (Nunnally, 1978). In the meantime, convergent validity is established through exploratory factor analysis, as we have a relatively large set of variables (Hair et al., 2010). We also conduct correlation analysis to identify patterns of association between our constructed variables. These statistical procedures provide valuable insights into the underlying structure of our measured variables while also ensuring the reliability and robustness of our conclusions.

Finally, to empirically test our hypotheses and shed light on the complex interplay between factors in our models, we employ ordinary least square (OLS) regression and structural equation modelling (SEM). SEM offers several advantages, including the ability to simultaneously assess multiple relationships within an integrated framework (Hayes & Preacher, 2013). Applying SEM enabled us to establish both direct and indirect relationships between variables, including the mediation effect of CE orientation (CO) on the relationship between Circular Practices (CP) and various independent variables.

# 4. RESULTS

## 4.1 Descriptive Statistics

Table 4 presents summary statistics, including means and standard deviations among our variables. Among the five-point Likert scale items, CP6 displayed the highest average value ($\mu = 4.327$), whereas CO4 registered the lowest mean value ($\mu = 2.036$). Additionally, CP5 demonstrated the greatest variability (SD = 1.490), while CO6 showed the least variability (SD= 0.722).

*Table 4. Summary Statistics, Measurement Items, Factor Analysis*

| | Mean | SD | Factor loadings |
|---|---|---|---|
| Stakeholder Pressure | | | |
| IP1 | 4.087 | 0.904 | 0.567 |
| IP2 | 2.153 | 0.991 | 0.680 |
| IP3 | 2.051 | 0.954 | 0.808 |
| EP1 | 2.520 | 1.139 | 0.590 |
| EP2 | 2.245 | 1.003 | 0.759 |
| EP3 | 2.281 | 1.017 | 0.771 |
| EP4 | 2.474 | 1.107 | 0.593 |
| Managerial Perception | | | |
| MP1 | 3.893 | 0.885 | 0.722 |
| MP2 | 3.704 | 1.010 | 0.773 |
| MP3 | 3.730 | 0.941 | 0.883 |
| MP4 | 3.745 | 0.943 | 0.875 |
| MP5 | 3.505 | 0.984 | 0.821 |
| MP6 | 4.276 | 0.807 | 0.825 |
| CE Orientation | | | |
| CO1 | 2.832 | 1.103 | 0.726 |
| CO2 | 2.781 | 1.140 | 0.733 |
| CO3 | 3.378 | 0.923 | vv0.594 |
| CO4 | 2.036 | 1.049 | 0.649 |
| CO5 | 2.980 | 1.062 | 0.593 |
| CO6 | 4.219 | 0.722 | 0.678 |
| CE Practices | | | |
| CP1 | 3.934 | 1.216 | 0.530 |
| CP2 | 3.765 | 1.311 | 0.737 |
| CP3 | 3.984 | 1.303 | 0.676 |
| CP4 | 3.852 | 1.242 | 0.724 |
| CP5 | 3.495 | 1.490 | 0.695 |
| CP6 | 4.326 | 0.748 | 0.510 |
| *Note: Exploratory factor analysis with varimax rotation. Kaiser–Mayer–Olkin criterion = 0.8174*<br>*IP- Internal Pressure; EP- External Pressure; MP- Managerial Perception; CO- CE Orientation; CP- CE Practices.* | | | |

## 4.2 Common Method Bias

To verify that common method bias (CMB) is not a major threat to our results, we use the Harman single-factor test (Harman, 1976; Podsakoff et al., 2003). The results show that a single factor is extracting 21.763% of total variance. Since it is far less than the recommended threshold of 50%, CMB is not an issue in our study.

## 4.3 Reliability and Validity of the Measures

To examine the convergent validity of our constructs, we conduct exploratory factor analysis (EFA) with a varimax rotation (Hair et al., 2010). The results are shown in Tab 4. According to Hair et al. (2010), an acceptable factor loading value should be more than 0.5, therefore all items used in the questionnaire can be considered satisfactory. We also perform Bartlett's test of sphericity and use the value of Kaiser–Meyer–Olkin (KMO) to determine the sample adequacy and the suitability of the data for our models (Cerny & Kaiser, 1977). The results confirm the suitability of our data and models (Chi-square = 2095.8; df = 300, $p<0.01$; KMO = 0.817).

To assess internal consistency reliability, we use Cronbach's alpha (Churchill, 1979; Cronbach, 1951) with a threshold of 0.6 (Hinton et al., 2014) , composite reliability (CR) scores with a threshold of 0.7 (Nunnally, 1978),

and Average Variance Extracted (AVE) with a threshold of 0.5 (Bagozzi & Yi, 1988). All used constructs meet the respective thresholds, except for Internal Pressure, External Pressure, and Shareholder Pressure with an AVE of less than 0.5. However, as their CR values are higher than the acceptable level of 0.7, the convergent validity of these constructs can be considered as adequate (Fornell & Larcker, 1981). Tab 5 shows Cronbach's alpha, CR, and AVE values for our measurement constructs.

*Table 5. Validity and Reliability Indicators*

| | Number of items | Cronbach's alpha | AVE | CR |
|---|---|---|---|---|
| IP | 3 | 0.520 | 0.479 | 0.730 |
| EP | 4 | 0.692 | 0.467 | 0.775 |
| SP | 7 | 0.7794 | 0.472 | 0.860 |
| MP | 6 | 0.873 | 0.669 | 0.924 |
| CO | 6 | 0.800 | 0.441 | 0.825 |
| CP | 6 | 0.728 | 0.425 | 0.813 |
| *Note: AVE = Average Variance Extracted; CR = Composite Reliability; IP - Internal Pressure; EP - External Pressure; SP - Stakeholder Pressure; MP - Managerial Perception; CO - Circular economy Orientation; CP - Circular economy Practices.* | | | | |

Finally, to assess discriminant validity, we show the square root of AVE along with the pair-wise correlation for each of the construct (Fornell & Larcker, 1981). Tab 6 shows that the square root of AVE of each construct is much more than the correlation between any two constructs, discriminant validity is thus supported.

*Table 6. Correlations and Discriminant Validity*

| Variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| (1) CE Practices | *0.652* | | | |
| (2) CE Orientation | 0.280 | *0.664* | | |
| (3) Stakeholder Pressure | 0.088 | 0.472 | *0.687* | |
| (4) Managerial Perception | 0.152 | 0.410 | 0.260 | *0.818* |
| Note: The square root of the AVE is displayed in italics. | | | | |

## 4.4 Hypotheses Tests

We initially tested our proposed direct hypotheses (see Tab 7). Hypothesis 1 posited that stakeholder pressure positively influences CE practices; this is confirmed by our results. As shown in Tab 5, the direct association between CE practices and stakeholder pressure is significant and positive ($\beta$=0.164, $p<0.05$). Recognising the multidimensional nature of stakeholder pressure, we proceed to dissect it into internal and external pressure dimensions for a more in-depth analysis. Our analysis revealed that internal pressure exhibits a significant effect ($\beta$=0.513, $p<0.01$), whereas external pressure does not show a significant effect on CE practices. Furthermore, the results confirm that a positive and significant relationship exists between CE orientation and practices ($\beta$=0.358, $p<0.01$). Thus, Hypothesis 2 is supported. Similarly, Hypothesis 3 is confirmed, showing that management perception significantly impacts CE practices ($\beta$=0.253, $p<0.01$).

Additionally, as shown in Tab 7, our results support Hypothesis 4, indicating that stakeholder pressure, both internal and external, collectively has a significant positive impact on CE orientation ($\beta$=0.421, $p<0.01$). Moreover, internal pressure has a stronger effect ($\beta$ =1.055, $p<0.01$) than external pressure ($\beta$ =0.520, $p<0.01$). Hypothesis 5 is likewise confirmed, showing a significant impact of managerial perception on CE orientation ($\beta$ =0.388, $p<0.01$).

*Table 7. Regression Results. Dependent Variable: CE Practices*

| | Dependent variables | |
|---|---|---|
| | CE Practices | CE orientation |
| Stakeholder Pressure | 0.164** | 0.421*** |
| | (0.0763) | (0.0619) |
| Internal Pressure | 0.513*** | 1.055*** |
| | (0.177) | (0.142) |
| External Pressure | 0.161 | 0.520*** |
| | (0.116) | (0.0975) |
| CE Orientation | 0.358*** | |
| | (0.0801) | |
| Manager Perception | | 0.388*** |
| | | (0.0711) |
| Controls | Yes | Yes |
| N | 196 | 196 |
| Note: Standard errors in parentheses. Control variables include internalization, firm industry, firm size, and firm age. * p<0.1 ** p<0.05 *** p<0.01. | | |

For the mediation analysis, we follow the procedures outlined by Preacher and Hayes (2004). The results, as shown in Tab 8, confirm a mediating effect of CE orientation on all the examined relationships, albeit with varying degrees of influence. CE orientation is found to partially mediate the relationship between management perceptions and CE practices. Concerning stakeholder pressure and CE practices, CE orientation is identified as a partial mediator in this relationship. However, upon further analysis where stakeholder pressure is deconstructed into internal and external pressure, it is noted that CE orientation fully mediates the relationship solely between external pressure and circular economy practices, not internal pressure.

*Table 8. Significance Levels of the Direct and Indirect Effect*

| Path | Indirect effect | Direct effect | Type of mediation |
|---|---|---|---|
| SP-CO-CP | 0.202(0.190) | 0.345 | Partial mediation |
| IP-CO-CP | 0.792(0.229) | 0.380 | Partial mediation |
| EP-CO-CP | 0.217(0.170) | 0.357 | Full mediation |
| MP-CO-CP | 0.195(0.175) | 0.333 | Partial mediation |
| Notes: Values in parenthesis are standardised estimates. IP - Internal Pressure; EP - External Pressure; SP - Stakeholder Pressure; MP - Managerial Perception; CO - Circular Economy Orientation; CP - Circular Economy Practices. | | | |

# 5. DISCUSSION

## 5.1 Theoretical Contributions

The theoretical framework proposed in this study aimed to provide a comprehensive lens for analysing the complex dynamics shaping SMEs adoption of CE practices. By integrating stakeholder theory, legitimacy theory, and strategic management theory, the framework offered a robust foundation for understanding how stakeholder pressures, managerial perceptions and CE orientation interact to influence CE practices within SMEs. However, through empirical investigation and analysis, our study has evolved to offer deeper insights and perspectives on the interplay between stakeholder dynamics, managerial perceptions, CE orientation, and CE practices within SMEs.

One of the key strengths of the theoretical framework lies in its ability to capture the multifaceted nature of the forces at play in SMEs' CE engagements (Baah et al., 2022; Salvioni & Almici, 2020). By considering both the external and internal pressures exerted by stakeholders and the internal dynamics of organizational legitimacy and strategic orientation, the framework acknowledges the diverse array of factors that shape SMEs' decisions regarding

CE practices. This holistic perspective is crucial for developing a nuanced understanding of the challenges and opportunities faced by SMEs in transitioning towards a CE practices.

The investigation into stakeholder pressure contributes by refining the existing understanding of its role in shaping CE practices. The positive relationship between stakeholder pressure and CE practices, as confirmed by this study, aligns with prior research findings (Ahmadov et al., 2024; Chiappetta Jabbour et al., 2020; Winans et al., 2021). However, the distinct influence of internal stakeholders revealed in this study adds nuance to the literature. Previous studies (e.g., Genovese et al., 2017; Govindan & Hasanagic, 2018; Kirchherr et al., 2018) have emphasized the coercive role of external stakeholders, particularly the government, in compelling firms to adopt CE practices. The study results regarding the external pressure that does not have a significant impact on CE practices are quite intriguing. In line with the arguments put forward by Cantele and Zardini, (2020), Dubey et al. (2019) and Jansson et al. (2017) SMEs tend to be less receptive to top-down regulatory requirements than larger enterprises. This finding is supported by the study, which shows that SMEs in Estonia are less responsive to external stakeholders, including regulatory bodies. The current research introduces a crucial distinction by demonstrating that internal stakeholder pressure, notably from company owners and shareholders, also plays a significant role. This finding challenges the prevailing assumption that external pressures uniformly shape organizational behaviour and highlights the need for a nuanced understanding of the diverse influences of different stakeholder categories.

The exploration of managerial perceptions as a driving force for CE practices aligns with Ajzen's (1991) framework, emphasizing the role of perceived benefits in motivating organizations. This perspective expands on previous studies that have delved into how companies perceive and incorporate CE practices (García-Quevedo et al., 2020; Jiao et al., 2020; Liakos et al., 2019). The study adds depth to this understanding by emphasizing the critical influence of managerial attitudes in navigating the complexities of sustainability initiatives.

Moreover, the conceptualization of CE orientation as a mediating force between stakeholder pressure and CE practices introduces a novel viewpoint. The study posits that a heightened degree of CE orientation amplifies an organization's responsiveness to stakeholder pressures. This builds on the insights provided by Jagani and Hong (2022) and Schmidt et al. (2021), who highlighted the pivotal role of sustainability and closed-loop orientation, respectively, in driving CE practices. The current research extends these ideas, suggesting that CE orientation serves as a key mediator in the interplay between external stakeholder pressure and CE practices.

The nuanced mediation analysis conducted in this study reveals additional layers of understanding. External pressure, initially showing no significant impact on CE practices, but a significant impact on CE orientation, becomes influential on CE practices when mediated by CE orientation. This means that external pressure can lead companies to reflect on their environmental impact and adjust their organizational priorities accordingly. As a result, the mediation by CE orientation highlights the transformative effect of external pressures on shaping companies' fundamental approach to environmental practices, ultimately driving changes in their behaviour and decision-making processes. This finding challenges the conventional belief that external pressures alone are sufficient to drive CE practices. Instead, it underscores the importance of having a strategic orientation towards CE within the organization to effectively respond to external pressures.

Similarly, the partial mediation of internal pressure and managerial perception by CE orientation concerning CE practices adds depth to the understanding of the role of CE orientation. These findings emphasize that while CE orientation plays a crucial role in responding to internal pressure and managerial perceptions, it is not the sole determinant. This nuanced perspective encourages future research to explore the multifaceted nature of the relationship between CE orientation and different facets of stakeholder influence on organizational behaviour in the context of sustainability initiatives.

## 5.2 Practical Contributions

The practical implications of our study resonate with organizations navigating the complexities of integrating CE practices into their operational fabric. The delineation of internal and external stakeholder pressures carries substantial managerial implications. The findings highlight the significant managerial implications of distinguishing between internal and external stakeholder pressures. While external pressures have traditionally been perceived as potent drivers of change, the findings underscore the critical importance of internal stakeholders in shaping strategies. By recognizing the influential role of employees, investors, and company owners, organizations are urged to prioritize internal stakeholder engagement to foster a collaborative approach towards CE adoption. This strategic

emphasis aligns with the theoretical insight that internal stakeholder pressure, notably from company owners and shareholders, plays a significant role in shaping organizational behaviour alongside external pressures.

The emphasis on managerial perceptions as catalysts for CE practices underscores the importance of leadership in driving change. The identification of managerial perceptions as key drivers of CE practices underscores the pivotal role of leadership in steering change within organizations. As managerial attitudes significantly influence decision-making processes, organizations are encouraged to invest in fostering positive perceptions towards CE principles among their leadership cadre. This practical recommendation aligns with the theoretical insight that managerial perceptions, shaped by perceived benefits and advantages associated with CE practices, serve as motivational factors in driving organizational adoption of sustainable initiatives.

Moreover, the mediating role of CE orientation in the relationship between stakeholder pressure and CE practices offers actionable insights. The mediating role of CE orientation offers actionable insights for organizations to optimize their responses to stakeholder pressures. By understanding their CE orientation level, organizations can strategically align their responses to internal and external pressures more effectively. For instance, a higher level of CE orientation becomes crucial for translating external stakeholder pressures into tangible CE practices. This strategic alignment empowers organizations to optimize their efforts in pursuing circular and sustainable practices, leveraging their CE orientation as a strategic mediator between stakeholder pressures and organizational behaviour.

## 6. CONCLUSION

Our empirical investigation into the adoption of CE practices within CEE, specifically in Estonia has revealed significant insights into the influencing dynamics. Through the developed theoretical framework, that integrates stakeholder, legitimacy, and strategic management theories the study provided deeper insights into the interplay between stakeholder dynamics, managerial perceptions, CE orientation, and CE practices within SMEs. Crucially, the study's findings challenge prevailing assumptions by highlighting the significant role of internal stakeholder pressure alongside external pressures in shaping CE practices. Moreover, the exploration of CE orientation as a mediating force between stakeholder pressure, managerial perception and CE practices offers a novel perspective, emphasizing its transformative impact on organizational responsiveness to stakeholder pressures and managerial perception. The nuanced mediation analysis reveals that CE orientation is pivotal in driving changes in organizational behaviour, underscoring the importance of strategic orientation towards CE for effective response to external pressures.

However, it is crucial to acknowledge the limitations of our study. Firstly, the research focused primarily on SMEs in Estonia, which may limit the generalizability of the findings to other geographical contexts, cultural settings, or larger organizational structures. Secondly, the study's use of self-reported data from SME managers, which could introduce common method bias, potentially affecting the accuracy of responses and the validity of the results. Despite efforts to mitigate this through anonymity and confidentiality, the possibility of social desirability bias or subjective interpretations remains. Thirdly, while efforts were made to control for various factors such as internalization, firm industry, size, and age, the potential influence of unmeasured variables—such as external market conditions, technological capabilities, or regional regulatory differences—cannot be entirely ruled out. Additionally, the study employed a cross-sectional design, which limits the ability to draw causal inferences or capture dynamic changes over time in stakeholder pressures or CE practices. Lastly, the exclusive use of a quantitative approach, while valuable for hypothesis testing, may have overlooked nuanced qualitative insights that could provide a deeper understanding of the mechanisms underlying stakeholder pressures, managerial perceptions, and CE practices within SMEs.

Building on our findings, several avenues for future research emerge. Firstly, further exploration into the contextual factors that influence the effectiveness of stakeholder pressures on CE practices could provide valuable insights. Comparative studies across different industries, regions, and organizational sizes may shed light on the nuanced dynamics at play and help identify strategies for effectively managing stakeholder relationships to drive sustainability initiatives. Secondly, investigating the mechanisms through which internal stakeholder pressures influence CE practices within SMEs could deepen our understanding of organizational decision-making processes. Qualitative research methods such as interviews and case studies may uncover the underlying motivations and constraints faced by SME owners and shareholders in adopting CE practices, offering practical implications for fostering internal support for sustainability initiatives. Moreover, future research could delve into the role of

managerial perceptions in shaping organizational responses to sustainability challenges. Longitudinal studies tracking managerial attitudes and behaviours over time may provide insights into the evolution of sustainability strategies within SMEs and the factors driving managerial commitment to CE practices. Integrating insights from fields such as organizational psychology and behavioural economics may offer new perspectives on how to cultivate a culture of sustainability within SMEs and incentivize proactive engagement with CE initiatives. Lastly, examining the moderating effects of regulatory frameworks, market pressures, and industry characteristics on the relationship between stakeholder pressures, managerial perceptions, CE orientation, and CE practices could provide valuable context-specific insights. Comparative studies across different regulatory environments and industry sectors may elucidate the contingent factors that shape SMEs' responses to sustainability challenges and inform tailored policy interventions and support mechanisms.

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## AUTHOR CONTRIBUTIONS

**Tarlan Ahmadov:** Responsible for the conceptualisation, data collection, conceptualisation and final editing of this article.
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**Wolfgang Gerstlberger:** Responsible for the data collection, conceptualisation and editing of this article.

## DECLARATIONS

**Competing interests** The authors declare no competing interests.

## REFERENCES


Adomako, S., & Tran, M. D. (2022). Environmental collaboration, responsible innovation, and firm performance: The moderating role of stakeholder pressure. *Business Strategy and the Environment*, *31*(4), 1695–1704. https://doi.org/10.1002/bse.2977

Afum, E., Li, Y. M., Han, P. X., & Sun, Z. (2022). Interplay between lean management and circular production system: implications for zero-waste performance, green value competitiveness, and social reputation. *Journal of Manufacturing Technology Management*, *33*(7), 1213–1231. https://doi.org/10.1108/JMTM-01-2022-0038

Agyabeng-Mensah, Y., Afum, E., Baah, C., & Essel, D. (2022). Exploring the role of external pressure, environmental sustainability commitment, engagement, alliance and circular supply chain capability in circular economy performance. *International Journal of Physical Distribution & Logistics Management*, *52*(5/6), 431–455. https://doi.org/10.1108/IJPDLM-12-2021-0514

Ahmadov, T. (2023). Innovation for circular economy: Overview of estonian enterprises' transition journey. In Muhammed Veysel Kaya (Ed.), *Social and Economic Studies within the Framework of Emerging Global Developments* (3rd ed., Vol. 3, pp. 103–116). Peter Lang. https://doi.org/10.3726/b20968

Ahmadov, T., Durst, S., Gerstlberger, W., & Kraut, E. (2023). SMEs on the way to a circular economy: insights from a multi-perspective review. In *Management Review Quarterly* (Issue 0123456789). Springer International Publishing. https://doi.org/10.1007/s11301-023-00380-2

Ahmadov, T., Foli, S., Durst, S., & Gerstlberger, W. (2024). The transition to a circular economy: different paths for international and non-international micro-manufacturing firms. *Discover Sustainability*, *5*(1), 178. https://doi.org/10.1007/s43621-024-00367-3

Ahmadov, T., Ulp, S., & Gerstlberger, W. (2024). Role of Stakeholder Engagement in Sustainable Development in Estonian Small and Medium - Sized Enterprises. *Green and Low-Carbon Economy*, *June*, 1–13. https://doi.org/10.47852/bonviewGLCE42022504

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/https://doi.org/10.1016/0749-5978(91)90020-T

Al-Kwifi, O. S., Abu Farha, A. K., Obeidat, S., Yildiz, H., & Ahmed, Z. U. (2023). The influence of managerial perceptions on adopting environmental strategies in B2B: An exploratory study from emerging countries. *Industrial Marketing Management*, *115*(December 2022), 550–563. https://doi.org/10.1016/j.indmarman.2023.10.017

Amer, E. (2023). Internationalization, institutional pressures in foreign markets, and environmental sustainability. *Journal of International Management*, *29*(1), 100974. https://doi.org/10.1016/j.intman.2022.100974

Amjad, M. S., & Diaz-Elsayed, N. (2024). Smart and sustainable urban manufacturing for a circular economy. *Environment, Development and Sustainability*, 1–27.

Arranz, C. F. A., Sena, V., & Kwong, C. (2023). Dynamic Capabilities and Institutional Complexity: Exploring the Impact of Innovation and Financial Support Policies on the Circular Economy. *IEEE Transactions on Engineering Management*, 1–15. https://doi.org/10.1109/TEM.2023.3286953

Arsawan, I. W. E., Koval, V., Suhartanto, D., Hariyanti, N. K. D., Polishchuk, N., & Bondar, V. (2024). Circular economy practices in SMEs: aligning model of green economic incentives and

environmental commitment. *International Journal of Productivity and Performance Management*, *73*(3), 775–793. https://doi.org/10.1108/IJPPM-03-2022-0144

Astuty, E., Sudirman, I. D., & Aryanto, R. (2024). Sustainable resilience strategy: unleash the micro-businesses's potential in the digitalization and sustainability era. *Cogent Business & Management*, *11*(1), 2313672. https://doi.org/10.1080/23311975.2024.2313672

Baah, C., Afum, E., Agyabeng-Mensah, Y., & Agyeman, D. O. (2022). Stakeholder Influence on Adoption of Circular Economy Principles: Measuring Implications for Satisfaction and Green Legitimacy. *Circular Economy and Sustainability*, *2*(1), 91–111. https://doi.org/10.1007/s43615-021-00093-2

Baah, C., Agyabeng-Mensah, Y., Afum, E., & Kumi, C. A. (2023). Do circular economy practices accelerate CSR participation of SMEs in a stakeholder-pressured era? A network theory perspective. *Journal of Cleaner Production*, *394*(February), 136348. https://doi.org/10.1016/j.jclepro.2023.136348

Bag, S., Yadav, G., Wood, L. C., Dhamija, P., & Joshi, S. (2020). Industry 4.0 and the circular economy: Resource melioration in logistics. *Resources Policy*, *68*, 101776. https://doi.org/https://doi.org/10.1016/j.resourpol.2020.101776

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94. https://doi.org/10.1007/BF02723327

Barbosa, M. W., Ladeira, M. B., de Oliveira, M. P. V., de Oliveira, V. M., & de Sousa, P. R. (2022). The effects of internationalization orientation in the sustainable performance of the agri-food industry through environmental collaboration: An emerging economy perspective. *Sustainable Production and Consumption*, *31*, 407–418. https://doi.org/10.1016/j.spc.2022.03.013

Behlau, C. F. (2020). The Role of Closed-Loop Orientation in Overcoming Barriers to Circular Economy Practice Development. *Academy of Management Proceedings*, *2020*(1), 16628.

Bendikiene, R., Ciuplys, A., & Kavaliauskiene, L. (2019). Circular economy practice: From industrial metal waste to production of high wear resistant coatings. *Journal of Cleaner Production*, *229*, 1225–1232. https://doi.org/https://doi.org/10.1016/j.jclepro.2019.05.068

Benz, L. A. (2022). Critical Success Factors for Circular Business Model Innovation from the Perspective of the Sustainable Development Goals. *Sustainability (Switzerland)*, *14*(10). https://doi.org/10.3390/su14105816

Bollen, K. A., & Pearl, J. (2013). *Eight Myths About Causality and Structural Equation Models BT - Handbook of Causal Analysis for Social Research* (S. L. Morgan, Ed.; pp. 301–328). Springer Netherlands. https://doi.org/10.1007/978-94-007-6094-3_15

Broccardo, L., & Zicari, A. (2020). Sustainability as a driver for value creation: A business model analysis of small and medium entreprises in the Italian wine sector. *Journal of Cleaner Production*, *259*, 120852. https://doi.org/https://doi.org/10.1016/j.jclepro.2020.120852

Cagno, E., Negri, M., Neri, A., & Giambone, M. (2023). One Framework to Rule Them All: An Integrated, Multi-level and Scalable Performance Measurement Framework of Sustainability, Circular Economy and Industrial Symbiosis. *SUSTAINABLE PRODUCTION AND CONSUMPTION*, *35*, 55–71. https://doi.org/10.1016/j.spc.2022.10.016

Calzolari, T., Bimpizas-Pinis, M., Genovese, A., & Brint, A. (2023). Understanding the relationship between institutional pressures, supply chain integration and the adoption of circular economy practices. *Journal of Cleaner Production*, *432*, 139686.

Cantele, S., & Zardini, A. (2020). What drives small and medium enterprises towards sustainability? Role of interactions between pressures, barriers, and benefits. *Corporate Social Responsibility and Environmental Management*, *27*(1), 126–136. https://doi.org/https://doi.org/10.1002/csr.1778

Cerny, B. A., & Kaiser, H. F. (1977). A Study Of A Measure Of Sampling Adequacy For Factor-Analytic Correlation Matrices. *Multivariate Behavioral Research*, *12*(1), 43–47. https://doi.org/10.1207/s15327906mbr1201_3

Chiappetta Jabbour, C. J., Seuring, S., Lopes de Sousa Jabbour, A. B., Jugend, D., De Camargo Fiorini, P., Latan, H., Izeppi, W. C., Jabbour, C. J. C., Seuring, S., Jabbour, A., Jugend, D., Fiorini, P. D., Latan, H., Izeppi, W. C., Chiappetta Jabbour, C. J., Seuring, S., Lopes de Sousa Jabbour, A. B., Jugend, D., De Camargo Fiorini, P., … Izeppi, W. C. (2020). Stakeholders, innovative business models for the circular economy and sustainable performance of firms in an emerging economy facing institutional voids. *Journal of Environmental Management*, *264*(November 2019), 110416. https://doi.org/10.1016/j.jenvman.2020.110416

Chowdhury, M. T., Sarkar, A., Paul, S. K., & Moktadir, M. A. (2022). A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry. *Operations Management Research*, *15*(1–2), 166–178. https://doi.org/10.1007/s12063-020-00166-9

Churchill, G. A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research*, *16*(1), 64–73. https://doi.org/10.2307/3150876

Clarkson, M. E. (1995). A Stakeholder Framework for Analyzing and Evaluating Corporate Social Performance. *Academy of Management Review*, *20*(1), 92–117. https://doi.org/10.5465/amr.1995.9503271994

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. https://doi.org/10.1007/BF02310555

de Jesus Pacheco, D. A., Rampasso, I. S., Michels, G. S., Ali, S. M., Hunt, J. D., Pacheco, D. A. de J., Rampasso, I. S., Michels, G. S., Ali, S. M., & Hunt, J. D. (2024). From linear to circular economy: The role of BS 8001: 2017 for green transition in small business in developing economies. *Journal of Cleaner Production*, *439*, 140787. https://doi.org/https://doi.org/10.1016/j.jclepro.2024.140787

Delgado-Ceballos, J., Aragón-Correa, J. A., Ortiz-de-Mandojana, N., & Rueda-Manzanares, A. (2012). The Effect of Internal Barriers on the Connection Between Stakeholder Integration and Proactive Environmental Strategies. *Journal of Business Ethics*, *107*(3), 281–293. https://doi.org/10.1007/s10551-011-1039-y

Dey, P. K., Malesios, C., De, D., Budhwar, P., Chowdhury, S., & Cheffi, W. (2020). Circular economy to enhance sustainability of small and medium-sized enterprises. *Business Strategy and the Environment*, *29*(6), 2145–2169. https://doi.org/10.1002/bse.2492

Dey, P. K., Malesios, C., De, D., Chowdhury, S., & Ben Abdelaziz, F. (2019). Could lean practices and process innovation enhance supply chain sustainability of small and medium-sized enterprises? *Business Strategy and the Environment*, *28*(4), 582–598. https://doi.org/10.1002/bse.2266

Dräger, P., & Letmathe, P. (2023). Who Drives Circularity? —The Role of Construction Company Employees in Achieving High Circular Economy Efficiency. *Sustainability*, *15*(9), 7110.

Droege, H., Kirchherr, J., Raggi, A., & Ramos, T. B. (2023). Towards a circular disruption: On the pivotal role of circular economy policy entrepreneurs. *Business Strategy and the Environment*, *32*(3), 1142–1158. https://doi.org/10.1002/bse.3098

Dubey, R., Gunasekaran, A., Childe, S. J., Papadopoulos, T., & Helo, P. (2019). Supplier relationship management for circular economy. *Management Decision*, *57*(4), 767–790. https://doi.org/10.1108/MD-04-2018-0396

Durst, S., Temel, S., & Hinteregger, C. (2020). Influence of network partners on SMEs' innovation activities. *International Journal of Business Environment*, *11*(4), 369–389. https://doi.org/10.1504/IJBE.2020.111393

European Commission. (2018). Annual Report on European SMEs 2017/2018 - SMEs growing beyond borders. Eurostat. *European Commission*, 13–14. https://op.europa.eu/en/publication-detail/-/publication/a435b6ed-e888-11e8-b690-01aa75ed71a1

Ferasso, M., Tortato, U., & Ikram, M. (2023). Mapping the Circular Economy in the Small and Medium-sized Enterprises field: An exploratory network analysis. *Cleaner and Responsible Consumption*, *11*, 100149. https://doi.org/https://doi.org/10.1016/j.clrc.2023.100149

Fleischmann, K. (2019). Design-led innovation and Circular Economy practices in regional Queensland. *Local Economy*, *34*(4), 382–402.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.2307/3151312

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Gallardo-Vázquez, D., Herrador-Alcaide, T. C., & Matin, A. (2024). Circular economy orientation from corporate social responsibility: A view based on structural equation modeling and a fuzzy-set qualitative comparative analysis. *Sustainable Development*.

Garces-Ayerbe, C., Rivera-Torres, P., Suarez-Perales, I., & Leyva-de la Hiz, D. I. (2019). Is It Possible to Change from a Linear to a Circular Economy? An Overview of Opportunities and Barriers for European Small and Medium-Sized Enterprise Companies. *International Journal of Environmental Research and Public Health*, *16*(5). https://doi.org/10.3390/ijerph16050851

García-Quevedo, J., Jové-Llopis, E., & Martínez-Ros, E. (2020). Barriers to the circular economy in European small and medium-sized firms. *Business Strategy and the Environment*, *29*(6), 2450–2464.

García-Quevedo, J., Jové-Llopis, E., Martínez-Ros, E., Garcia-Quevedo, J., Jove-Llopis, E., & Martinez-Ros, E. (2020). Barriers to the circular economy in European small and medium-sized firms. *Business Strategy and the Environment*, *29*(6), 2450–2464. https://doi.org/10.1002/bse.2513

Geissdoerfer, M., Santa-Maria, T., Kirchherr, J., & Pelzeter, C. (2023). Drivers and barriers for circular business model innovation. *Business Strategy and the Environment*, *32*(6), 3814–3832. https://doi.org/https://doi.org/10.1002/bse.3339

Genovese, A., Acquaye, A. A., Figueroa, A., & Koh, S. C. L. (2017). Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. *Omega (United Kingdom)*, *66*, 344–357. https://doi.org/10.1016/j.omega.2015.05.015

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, *114*, 11–32. https://doi.org/10.1016/j.jclepro.2015.09.007

Godinho Filho, M., Gonella, J. dos S. L., Latan, H., & Ganga, G. M. D. (2024). Awareness as a catalyst for sustainable behaviors: A theoretical exploration of planned behavior and value-belief-norms in the circular economy. *Journal of Environmental Management*, *368*, 122181. https://doi.org/https://doi.org/10.1016/j.jenvman.2024.122181

González-Benito, J., & González-Benito, Ó. (2006). The role of stakeholder pressure and managerial values in the implementation of environmental logistics practices. *International Journal of Production Research*, *44*(7), 1353–1373. https://doi.org/10.1080/00207540500435199

González-Rodríguez, M. R., Díaz-Fernández, M. C., & Biagio, S. (2019). The perception of socially and environmentally responsible practices based on values and cultural environment from a customer perspective. *Journal of Cleaner Production*, *216*, 88–98. https://doi.org/10.1016/j.jclepro.2019.01.189

Goodstein, J. D. (1994). Institutional pressures and strategic responsiveness: Employer involvement in work-family issues. *Academy of Management Journal*, *37*(2), 350–382.

Götz, O., Liehr-Gobbers, K., & Krafft, M. (2009). Evaluation of structural equation models using the partial least squares (PLS) approach. In *Handbook of partial least squares: Concepts, methods and applications* (pp. 691–711). Springer.

Govindan, K. (2023). How digitalization transforms the traditional circular economy to a smart circular economy for achieving SDGs and net zero. *Transportation Research Part E: Logistics and Transportation Review*, *177*(June 2021), 103147. https://doi.org/10.1016/j.tre.2023.103147

Govindan, K., & Hasanagic, M. (2018). A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective. *International Journal of Production Research*, *56*(1–2), 278–311. https://doi.org/10.1080/00207543.2017.1402141

Goyal, S., Esposito, M., & Kapoor, A. (2018). Circular economy business models in developing economies: Lessons from India on reduce, recycle, and reuse paradigms. *Thunderbird International Business Review*, *60*(5), 729–740. https://doi.org/10.1002/tie.21883

Hahn, T., Preuss, L., Pinkse, J., & FIGGE, F. (2014). Cognitive Frames in Corporate Sustainability: Managerial Sensemaking with Paradoxical and Business Case Frames. *The Academy of Management Review*, *39*(4), 463–487. http://www.jstor.org/stable/43699260

Hair, J. F. Jr., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: a global perspective* (7th ed.). Upper Saddle River (N.J.): Pearson education. http://lib.ugent.be/catalog/rug01:001321386

Hair, J. F., Sarstedt, M., Pieper, T. M., & Ringle, C. M. (2012). The use of partial least squares structural equation modeling in strategic management research: a review of past practices and recommendations for future applications. *Long Range Planning*, *45*(5–6), 320–340.

Harman, H. H. (1976). *Modern factor analysis*. University of Chicago press.

Hayes, A. F., & Preacher, K. J. (2013). *Conditional process modeling: Using structural equation modeling to examine contingent causal processes.*

Hernández-Arzaba, J. C., Nazir, S., Leyva-Hernández, S. N., & Muhyaddin, S. (2022). Stakeholder Pressure Engaged with Circular Economy Principles and Economic and Environmental Performance. In *Sustainability* (Vol. 14, Issue 23). https://doi.org/10.3390/su142316302

Hinton, P. R., McMurray, I., & Brownlow, C. (2014). *SPSS Explained* (2nd ed.). Routledge. https://doi.org/https://doi.org/10.4324/9781315797298

Jagani, S., & Hong, P. (2022). Sustainability orientation, byproduct management and business performance: An empirical investigation. *Journal of Cleaner Production*, *357*(September 2021), 131707. https://doi.org/10.1016/j.jclepro.2022.131707

Jakhar, S. K., Mangla, S. K., Luthra, S., & Kusi-Sarpong, S. (2019). When stakeholder pressure drives the circular economy: Measuring the mediating role of innovation capabilities. *Management Decision*, *57*(4), 904–920. https://doi.org/10.1108/MD-09-2018-0990

Jansson, J., Nilsson, J., Modig, F., & Hed Vall, G. (2017). Commitment to Sustainability in Small and Medium-Sized Enterprises: The Influence of Strategic Orientations and Management Values. *Business Strategy and the Environment*, *26*(1), 69–83. https://doi.org/https://doi.org/10.1002/bse.1901

Jennings, P. D., & Zandbergen, P. A. (1995). Ecologically Sustainable Organizations: An Institutional Approach. *The Academy of Management Review*, *20*(4), 1015–1052. https://doi.org/10.2307/258964

Jiao, J., Liu, C. G., & Xu, Y. (2020). Effects of stakeholder pressure, managerial perceptions, and resource availability on sustainable operations adoption. *Business Strategy and the Environment*, *29*(8), 3246–3260. https://doi.org/10.1002/bse.2569

Kannan, D., Shankar, K. M., & Gholipour, P. (2022). Paving the way for a green transition through mitigation of green manufacturing challenges: A systematic literature review. *Journal of Cleaner Production*, *368*(May), 132578. https://doi.org/10.1016/j.jclepro.2022.132578

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the Circular Economy: Evidence From the European Union (EU). *Ecological Economics*, *150*, 264–272. https://doi.org/10.1016/j.ecolecon.2018.04.028

Knable, D., Puente, E. D., Perez-Cornejo, C., & Baumgartler, T. (2022). The impact of the circular economy on sustainable development: A European panel data approach. *Sustainable Production and Consumption*, *34*, 233–243. https://doi.org/10.1016/j.spc.2022.09.016

Lee, J. W., Kim, Y. M., & Kim, Y. E. (2018). Antecedents of Adopting Corporate Environmental Responsibility and Green Practices. *Journal of Business Ethics*, *148*(2), 397–409. https://doi.org/10.1007/s10551-016-3024-y

Li, Y., Ye, F., Dai, J., Zhao, X., & Sheu, C. (2019). The adoption of green practices by Chinese firms: Assessing the determinants and effects of top management championship. *International Journal of Operations and Production Management*, *39*(4), 550–572. https://doi.org/10.1108/IJOPM-12-2017-0753

Liakos, N., Kumar, V., Pongsakornrungsilp, S., Garza-Reyes, J. A., Gupta, B., & Pongsakornrungsilp, P. (2019). Understanding circular economy awareness and practices in manufacturing firms. *Journal of Enterprise Information Management*, *32*(4), 563–584. https://doi.org/10.1108/JEIM-02-2019-0058

Liu, S., & Chang, Y. T. (2017). Manufacturers' Closed-loop orientation for green supply chain management. *Sustainability (Switzerland)*, *9*(2), 1–29. https://doi.org/10.3390/su9020222

Ly, B. (2021). Competitive advantage and internationalization of a circular economy model in apparel multinationals. *Cogent Business and Management*, *8*(1). https://doi.org/10.1080/23311975.2021.1944012

Marco-Lajara, B., Úbeda-García, M., Zaragoza-Sáez, P., & Manresa-Marhuenda, E. (2023). The impact of international experience on firm economic performance. The double mediating effect of green knowledge acquisition & eco-innovation. *Journal of Business Research*, *157*(December 2022). https://doi.org/10.1016/j.jbusres.2022.113602

Masi, D., Kumar, V., Garza-Reyes, J. A., & Godsell, J. (2018). Towards a more circular economy: exploring the awareness, practices, and barriers from a focal firm perspective. *Production Planning and Control*, *29*(6), 539–550. https://doi.org/10.1080/09537287.2018.1449246

Mazur-Wierzbicka, E. (2021). Towards Circular Economy—A Comparative Analysis of the Countries of the European Union. In *Resources* (Vol. 10, Issue 5). https://doi.org/10.3390/resources10050049

Mazzucchelli, A., Chierici, R., Del Giudice, M., & Bua, I. (2022). Do circular economy practices affect corporate performance? Evidence from Italian large-sized manufacturing firms. *Corporate Social Responsibility and Environmental Management*, *29*(6), 2016–2029.

Moggi, S., & Dameri, R. P. (2021). Circular business model evolution: Stakeholder matters for a self-sufficient ecosystem. *Business Strategy and the Environment*, *30*(6), 2830–2842. https://doi.org/10.1002/bse.2716

Mura, M., Longo, M., & Zanni, S. (2020). Circular economy in Italian SMEs: A multi-method study. *Journal of Cleaner Production*, *245*. https://doi.org/10.1016/j.jclepro.2019.118821

Nason, R. S., Bacq, S., & Gras, D. (2018). A behavioral theory of social performance: Social identity and stakeholder expectations. *Academy of Management Review*, *43*(2), 259–283. https://doi.org/10.5465/amr.2015.0081

Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). McGraw-Hill.

O'dwyer, B. (2002). Managerial perceptions of corporate social disclosure: An Irish story. *Accounting, Auditing & Accountability Journal*, *15*(3), 406–436.

Ormazabal, M., Prieto-Sandoval, V., Puga-Leal, R., & Jaca, C. (2018). Circular Economy in Spanish SMEs: Challenges and opportunities. *Journal of Cleaner Production*, *185*, 157–167. https://doi.org/10.1016/j.jclepro.2018.03.031

Ozkan-Ozen, Y. D., Kazancoglu, Y., & Kumar Mangla, S. (2020). Synchronized Barriers for Circular Supply Chains in Industry 3.5/Industry 4.0 Transition for Sustainable Resource Management. *Resources, Conservation and Recycling*, *161*(May), 104986. https://doi.org/10.1016/j.resconrec.2020.104986

Papadas, K. K., Avlonitis, G. J., & Carrigan, M. (2017). Green marketing orientation: Conceptualization, scale development and validation. *Journal of Business Research*, *80*(May), 236–246. https://doi.org/10.1016/j.jbusres.2017.05.024

Peng, X., & Liu, Y. (2016). Behind eco-innovation: Managerial environmental awareness and external resource acquisition. *Journal of Cleaner Production*, *139*, 347–360. https://doi.org/10.1016/j.jclepro.2016.08.051

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879. https://doi.org/10.1037/0021-9010.88.5.879

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731. https://doi.org/10.3758/BF03206553

Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R. J., & Ormazabal, M. (2019). Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises. *Corporate Social Responsibility and Environmental Management*, *26*(6), 1473–1484. https://doi.org/10.1002/csr.1761

Rivera-Camino, J. (2012). Corporate environmental market responsiveness: A model of individual and organizational drivers. *Journal of Business Research*, *65*(3), 402–411. https://doi.org/10.1016/j.jbusres.2011.07.002

Rodríguez-Espíndola, O., Cuevas-Romo, A., Chowdhury, S., Díaz-Acevedo, N., Albores, P., Despoudi, S., Malesios, C., Dey, P., Rodriguez-Espindola, O., Cuevas-Romo, A., Chowdhury, S., Diaz-Acevedo, N., Albores, P., Despoudi, S., Malesios, C., & Dey, P. (2022). The role of circular economy principles and sustainable-oriented innovation to enhance social, economic and environmental performance: Evidence from Mexican SMEs. *International Journal of Production Economics*, *248*(June 2020), 108495. https://doi.org/10.1016/j.ijpe.2022.108495

Rodríguez-Rebés, L., Ibar-Alonso, R., Gómez, L. M. R., & Navío-Marco, J. (2024). The use and drivers of organisational eco-innovation in European SMEs. *Research in International Business and Finance*, *70*, 102297. https://doi.org/https://doi.org/10.1016/j.ribaf.2024.102297

Ruokonen, E. (2021). Managerial perspectives on strategies for advancing environmental considerations in the mining industry. *Extractive Industries and Society*, *8*(1), 434–441. https://doi.org/10.1016/j.exis.2020.12.002

Salmenperä, H., Pitkänen, K., Kautto, P., & Saikku, L. (2021). Critical factors for enhancing the circular economy in waste management. *Journal of Cleaner Production*, *280*. https://doi.org/10.1016/j.jclepro.2020.124339

Salvioni, D. M., & Almici, A. (2020). Transitioning toward a circular economy: The impact of stakeholder engagement on sustainability culture. *Sustainability*, *12*(20), 8641.

Santos Álvarez, M. del V., & García Merino, M. T. (2008). Environmental uncertainty: the side object of perception. *Innovar: Revista de Ciencias Administrativas y Sociales*, *1*(SE), 0.

Santos, M. R. C., Rolo, A., Matos, D., & Carvalho, L. (2023). The Circular Economy in Corporate Reporting: Text Mining of Energy Companies' Management Reports. *Energies*, *16*(15), 5791.

Schmidt, C. V. H., Kindermann, B., Behlau, C. F., & Flatten, T. C. (2021). Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs. *Business Strategy and the Environment*, *30*(8), 4171–4187. https://doi.org/10.1002/bse.2863

Shaharudin, M. R., Zailani, S., Tan, K. C., Cross, J., & Hotrawaisaya, C. (2023). Fostering closed-loop supply chain orientation by leveraging strategic green capabilities for circular economy performance: empirical evidence from Malaysian electrical and electronics manufacturing firms. In *Environment, Development and Sustainability* (Issue 0123456789). Springer Netherlands. https://doi.org/10.1007/s10668-022-02832-3

Smith, H., Discetti, R., Bellucci, M., & Acuti, D. (2022). SMEs engagement with the Sustainable Development Goals: A power perspective. *Journal of Business Research, 149*, 112–122. https://doi.org/10.1016/j.jbusres.2022.05.021

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, *20*(3), 571–610.

Tarka, P. (2018). An overview of structural equation modeling: its beginnings, historical development, usefulness and controversies in the social sciences. *Quality & Quantity*, *52*, 313–354.

Trevisan, A. H., Lobo, A., Guzzo, D., Gomes, L. A. D., & Mascarenhas, J. (2023). Barriers to employing digital technologies for a circular economy: A multi-level perspective. *Journal of Environmental Management*, *332*. https://doi.org/10.1016/j.jenvman.2023.117437

van Langen, S. K., Vassillo, C., Ghisellini, P., Restaino, D., Passaro, R., Ulgiati, S., Kevin van Langen, S., Vassillo, C., Ghisellini, P., Restaino, D., Passaro, R., & Ulgiati, S. (2021). Promoting circular economy transition: A study about perceptions and awareness by different stakeholders groups. *Journal of Cleaner Production*, *316*(December 2020), 128166. https://doi.org/10.1016/j.jclepro.2021.128166

Wallo, A., Martin, J., Elg, M., Harlin, U., Gremyr, I., Bozic, N., Skagert, K., & Williamsson, A. (2024). Charting the path to a sustainable, competitive and green industry in an era of rapid change: proposing a research agenda. *Cogent Business and Management*, *11*(1). https://doi.org/10.1080/23311975.2024.2344189

Winans, K., Dlott, F., Harris, E., & Dlott, J. (2021). Sustainable value mapping and analysis methodology: Enabling stakeholder participation to develop localized indicators mapped to broader sustainable development goals. *Journal of Cleaner Production*, *291*, 125797. https://doi.org/10.1016/j.jclepro.2021.125797

Zheng, L. J., Wang, Y. Y. A., Lin, H.-Y. Y., & Liu, W. (2023). Understanding circular economy adoption by SMEs: a case study on organizational legitimacy and Industry 4.0. *Industrial Management & Data Systems*, *123*(4), 1157–1177. https://doi.org/10.1108/IMDS-04-2022-0266