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Patterns of Attention towards Circular Economy Practices: Insights from the Metal Industry in Estonia

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Abstract

The imperative need for sustainable development has driven the integration of the circular economy into strategic agendas across diverse industries. The circular economy offers a promising approach to mitigating environmental impacts, reducing costs, and generating alternative revenue streams through circular business model strategies. In energy-intensive sectors, such as the metal industry, where carbon emissions are significant, circular economy practices present pathways for enhancing resource efficiency and achieving energy savings. Despite these benefits and technological feasibility, the adoption of circular economy remains limited. This study applies the attention-based view of the firm to explore the factors shaping managerial attention on circular economy practices within the metal industry in Estonia. Through a thematic analysis of interview-based secondary data, a number of internal and external factors were identified. The findings contribute to the limited empirical research on circular economy adoption in this context, offering insights for researchers and practitioners focused on sustainability transitions. Additionally, this study addresses the limited research on circular economy practices in Estonia, providing perspectives to support further advancement of circular economy adoption in the country. The results offer practical guidance for decision-makers navigating the complexities of implementing the circular economy and highlight the role of managerial attention as a relevant component in strategic decision-making for sustainable development.

Keywords

Attention-Based View, Circular Economy, Circular Business Model, Metal Industry, Estonia

JEL Classification

Q01, Q56, L60, M14, O31

Introduction

The imperative need for sustainable development has driven the integration of the circular economy (CE) concept into the strategic agendas of many organisations across diverse industries, positioning CE as a promising approach to mitigate negative environmental impacts, reduce costs, and create alternative revenue streams through circular business model (CBM) strategies (Barros et al., 2021; Centobelli et al., 2020; Geissdoerfer et al., 2020). Following this path, incumbent manufacturing companies are increasingly adapting and transforming their business models (BMs) with CE practices, carefully balancing the challenges and opportunities associated with CE implementation (Abdelmeguid et al., 2022; De Vass et al., 2023; Guerra et al., 2021; Urbinati et al., 2021). Among energy-intensive sectors, the metal industry accounts for the highest levels of carbon dioxide emissions, contributing 7% globally and 5% across Europe (Somers, 2022). Given this environmental concern, CE offers promising strategies to improve resource efficiency and achieve energy savings (Densley Tingley et al., 2017; Hagedorn et al., 2022; Ma et al., 2014; Taghipour et al., 2022). Nevertheless, despite the technological feasibility and significant benefits, the full potential of CE remains unrealised due to economic, behavioural, organisational, and managerial barriers (Kim et al., 2022).

Management is recognised as playing a critical role in the successful adoption of CE (Salvador et al., 2020; Santa-Maria et al., 2022). Managers must re-evaluate their companies' strategies, exploring new solutions to integrate CE principles into BMs (Uvarova et al., 2023). However, circular decision-making is complex and often hindered by linear business-as-usual approaches, risk aversion, path dependency within existing practices, and insufficient management attention (Geissdoerfer et al., 2023; Greer et al., 2023; Guldman & Huulgaard, 2020). A cognitive perspective on business strategy suggests that the way decision-makers notice, interpret and prioritise information plays a crucial role in shaping strategic actions and organisational outcomes (Martins et al., 2015). This process is constrained by managers' cognitive limitations and characterised by subjectivity in setting strategic priorities and

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guiding decision-making (Nadkarni & Barr, 2008), potentially leading to oversight of relevant information and alternative options (Barnett, 2008). The attention-based view (ABV) of the firm is grounded in these principles, with its central premise being that “what decision-makers do depends on what issues and answers they focus their attention on” (Ocasio, 1997, p. 187). This notion has informed a substantial body of research (Brielmaier & Friesl, 2023), including studies on BM innovation (Frankenberger & Sauer, 2019; Laszczuk & Mayer, 2020). Nevertheless, as noted by Pietrulla and Frankenberger (2022), while managerial attention is relevant in driving strategic actions within organisations, this perspective has been scarcely applied in studies on CBMs.

The ABV defines attention as “noticing, encoding, interpreting, and focusing of time and effort by organisational decision-makers on both (a) issues; the available repertoire of categories for making sense of the environment: problems, opportunities, and threats; and (b) answers: the available repertoire of action alternatives: proposals, routines, projects, programmes, and procedures” (Ocasio, 1997). Individual, contextual, and structural antecedents of attention allocation shape decision-making and, consequently, organisational behaviour and outcomes. The managerial focus of attention depends on the context in which it is embedded, and is influenced by internal and external factors to which decision-makers attend (Ocasio, 1997). Understanding these contextual factors provides insights into what triggers attention towards specific organisational actions, such as CBM transformation. Building on this, the current paper aims to explore the factors that shape managerial attention towards the CE, addressing the following research question: What internal and external factors influence decision-makers' focus of attention on implementing CE practices within the metal industry in Estonia?

Estonian manufacturing companies are progressing towards sustainable practices (Küttim et al., 2024), although the transition remains slow (Pesor et al., 2024). Recent findings indicate that while CE principles are relatively common in Estonia's metal industry, their implementation is not yet a primary priority (Küttim et al., 2023). Additionally, only a limited number of studies provide empirical evidence on this topic (e.g., Ahmadov et al., 2024; Küttim et al., 2023), highlighting the need for further research on CE adoption in Estonia.

This study provides detailed empirical insights into the factors that shape managerial attention and influence organisational outcomes in the transformation of their current BMs with CE practices within the metal industry in Estonia. It also offers practical guidance for decision-makers to implement CE practices more effectively, thereby enhancing environmental sustainability and promoting economic growth.

The paper is structured as follows: Section 2 provides a brief review of the literature on CE practices in the metal industry and introduces the ABV of the firm. Section 3 describes the methodology and data used in the study. Section 4 presents the results, and Section 5 discusses the findings and their contribution to the broader literature. The paper concludes with an overview of implications, limitations, and avenues for future research.

Literature Review

Circular economy and metal industry

The CE is a means of achieving sustainability by providing an alternative to the linear economic system (Pieroni et al., 2019). The core principle of a CE is to reduce resource consumption and environmental impacts while maximising economic benefits. Literature suggests many definitions of CE, but this work utilises the definition by Geissdoerfer et al. (2020) as “an economic system in which resource input and waste, emission, and energy leakages are minimised by cycling, extending, intensifying, and dematerialising material and energy loops. This can be achieved through digitalisation, servitisation, sharing solutions, long-lasting product design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling”. This includes the process of BM adjustment, improvement, redesign, adoption, or transformation that is needed for linear BMs to move towards circular ones (Johnson, 2022). The factors motivating CE implementation involve an interplay of multiple elements, shaped by specific conditions within a particular context (Ranta et al., 2018; Tura et al., 2019). Through a systematic literature review, Assmann et al. (2023) provided an overview of the determinants of CBM transformation, classifying them into eight macro categories: culture, regulation, market, strategy, business case, collaboration, operations, and knowledge.

The metal industry, being highly intensive in energy consumption, resource usage, and carbon emissions (Liu et al., 2020), is a critical sector for Europe, where efforts to implement CE practices are focused on improving energy efficiency and promoting material circulation (Skoczkowski et al., 2020). The World Steel Association (2023) has emphasised the environmental and economic benefits of reducing, reusing, remanufacturing, and recycling in the steel industry through the promotion of the “4-Rs” concept of a CE. Axelson et al. (2021) identified nine circular strategies for European steel manufacturers, suggesting that steelmaking firms can adopt several decarbonisation strategies without requiring a radical transformation of their core business models for steel production and sales. These strategies include enhancing material efficiency through design modifications, fostering industrial symbiosis, recycling post-consumer scrap, increasing the sustainable value-added of products, employing electric arc furnace steelmaking based on steel scrap, creating markets for and promoting low-carbon products, developing and implementing production processes with reduced emissions, adopting benchmark low-carbon steelmaking

technologies, and utilising carbon capture and storage. In Estonia, although companies in the metal industry have begun incorporating circular practices into their BMs (see Table 1), significant barriers still hinder a full transition to a CE (Küttim et al., 2023).

Table 1. Most used CE related business model elements in metal industry (n=295) (Küttim et al., 2023)

Circular economy related business model element	%
Use of suppliers in the nearby area	83
Input optimisation and/or waste reduction	76
Ensuring durability of products	76
Business sustainability as part of the company's responsibility towards society is considered an important goal	74
Use of sustainable technologies to reduce material consumption and waste	71
Product remanufacturing support by providing component recovery and replacement	63

Attention-based view of the firm

Rooted in Simon's (1947) attentional perspectives on administrative behaviour, the ABV offers a metatheory of strategic action and adaptation, arguing that the focus and distribution of attention significantly influence organisational decisions, actions, and performance in response to changes in both the external environment and internal processes (Ocasio, 1997). The ABV proposes that decision-makers' attention is selective and context-specific, allowing only a subset of issues and solutions to be addressed at a given moment. The internal and external environment provide stimuli that direct the focus of decision-makers' attention and influence the extent to which any given stimulus will be attended to (Ocasio, 1997). This is crucial in strategic initiatives like CE adoption, where the complexity of decision-making demands clear prioritisation and commitment.

The ABV is grounded in three major theoretical pillars: focus of attention, situated attention, and structural distribution of attention. The first pillar, focus of attention (at the level of individual cognition), asserts that decision-makers' strategic actions are shaped by the limited attention they can allocate to specific issues and answers. Consequently, organisational behaviour results from the aggregation of various individual actions within the organisation. The second pillar, situated attention (level of social cognition), emphasises that decision-makers' focus of attention is shaped by the situations they are embedded in, and this attention varies according to changes in the context and broader environment. The third pillar, structural distribution of attention (level of organisation), suggests that formal and informal organisational structures regulate and channel decision-makers' attention. These structures consist of four interrelated attention regulators within the organisations: structural positions, rules of the game, resources and players (Ocasio, 1997).

The literature on ABV has been applied across various domains, exploring areas such as innovation performance (Chen et al., 2015; Filiou & Massini, 2018; Liao et al., 2022), sustainability (Andersén, 2022; Fu et al., 2020; Salvia et al., 2021), and internationalisation (Ambos & Birkinshaw, 2010; Andrews et al., 2022). However, attention allocation in the context of business model innovation, particularly with regard to CBM, remains under-investigated.

Methods

This study is based on secondary data collected through a series of individual and focus group interviews conducted by the Sustainable Value Chain Management Unit at Tallinn University of Technology, on behalf of the Estonian Ministry of Economic Affairs and Communications. The sample consists of export-intensive manufacturing companies within the metal industry in Estonia. The primary export markets for these companies include Finland, Sweden, Germany, Latvia, Lithuania, and Turkey. In total, 20 companies participated in 10 focus group interviews conducted between March and April 2023. The participants in these focus groups included CEOs and managers responsible for key business areas such as production, quality management, human resources, and sustainability. The companies were mostly medium-sized, with an average workforce of 163 employees (ranging from 13 to 508). They have been operating for an average of 20 years (ranging from 7 to 29 years) and are primarily located in Harju County, around Tallinn, the capital of Estonia. An overview of the companies is provided in Appendix 1.

To analyse the factors shaping managerial attention toward CE practices, a thematic analysis following the Gioia methodology (Gioia et al., 2013) was employed. This approach facilitates a systematic and structured process of moving from specific data points to broader themes, ensuring rigour in qualitative analysis. Although this study used secondary data rather than primary data collection, the thematic coding process was conducted as if working directly with interview transcripts to maintain consistency in the analysis.

In the first stage of analysis, open coding was conducted on the interview data to identify first-order concepts. This involved extracting and analysing direct quotes from the interview transcripts to capture specific insights related to managerial focus of attention to CE practices. Next, these first-order concepts were grouped into second-order

themes based on their similarity and underlying meanings. This stage involved interpreting and clustering related concepts to identify patterns and relationships. In the final stage, second-order themes were synthesised into aggregate dimensions, representing overarching concepts that summarise broader patterns within the data. Based on this analysis, the factors shaping managerial attention were divided into internal and external ones. The final data structure is presented in Appendix 2. The data analysis was conducted in MAXQDA software (version 24.4.0).

Results

The interview results reveal that decision-makers' focus of attention to CE practices is shaped by both internal and external factors. Internal factors include an inward-looking perspective within the company, addressing resource management, parent-to-subsidary information flow, and employee engagement. External factors involve customer influence, focus on export markets, regulatory compliance, collaborative learning, and information channels.

Taking a closer look at the results, one of the key internal factors identified is high energy consumption, which is characteristic of the metal industry. Rising gas and electricity tariffs have led decision-makers to focus more on improving resource management efficiency. For example, some companies have switched to a four-day work week or replaced traditional lighting with energy-efficient LEDs to reduce energy costs. As stated by Company 1, 'Prices became so high at one point that it made people think in a completely different way'. This has led, as noted by Company 12, to the point that 'right now the main driver is on the electricity side, focusing on the production of green electricity ... on the energy side, it's essentially about reducing energy use to create the necessary heat or cooling – there is a lot of product development in this area to make things more efficient and reduce extra usage'. Hence, decision-makers are concerned with adapting or changing their BMs accordingly, as Company 4 highlighted: 'Management has consistently been considering which costs they can reduce and how they can turn things to their advantage'. In many cases, this logic justifies the adoption of CE principles. As Company 1 noted: 'Nowadays, innovation means a lot in terms of energy savings – we are trying to find better solutions for energy efficiency in this regard'. The interviews indicate that environmental concerns are frequently addressed through the application of CE principles in business strategies, primarily driven by cost optimisation. As Company 4 explained: 'The main driver is always some form of energy or resource savings, which ultimately also contributes to environmental protection'. Additionally, managers prioritise enhancing the efficiency of production processes by actively seeking and focusing their attention on new, more efficient methods of work and production. As stated by Company 13: 'I think that technological innovation primarily comes from the motivation to increase our efficiency'.

Most of the companies in the sample were subsidiaries of a corporate group, with the parent or holding company based outside Estonia. The shift in attention towards sustainability and CBM transformation was triggered, among other factors, by the parent-to-subsidary information flow. According to Company 1, 'sustainability has only come into focus from the group in the last two or three years'. This group-level influence is a key factor in shaping attention to CE, particularly for companies that are part of larger Scandinavian groups, which tend to align strategies at the group level and frequently discuss and share knowledge on sustainability practices and environmental impact. 'Our biggest partner is our own group ... they indeed bring new innovative ideas', as highlighted by Company 1.

Employee engagement also plays a significant role in driving attention towards CE practices. New ideas and solutions often originate within the company, whether from the production floor or administrative departments. Similarly, new employees bring fresh ideas to the organisation. As noted by Company 9, 'people come with different experiences ... new procurement managers, for example, who bring completely different topics to the table. I prepare to discuss these topics in meetings'. Additionally, Company 6 highlights the influence of colleagues and employees within the company: 'We have about 10,000 employees across the entire group, so I hope that out of these 10,000, more ideas come from within rather than just from the top, let's say, ideas on what to do'. Equally important, managers pay attention to employee satisfaction regarding their company's approach to the environment. As noted by Company 1, 'When we think from a sustainability and future perspective, I believe people are also satisfied that we are not excessively polluting the environment and are utilising resources efficiently. If this mindset is in place, I believe our employees will be satisfied, and so will our customers, leading to profitability'.

Turning to external environment, customer influence is a significant factor shaping decision-makers' attention towards CE. Many customers demand circular solutions, with an emphasis on emissions reduction and resource efficiency. Some companies in the sample view this pressure as beneficial, recognising the substantial business potential in the strategic shift towards CBM. As emphasised by Company 7, 'We have pressure from clients in the sense that more and more attention is being paid to this, and we also measure our carbon dioxide footprint, so we are developing in this direction. It's definitely a relevant and current topic for us'. Company 12 noted in the interview that it 'commits to reducing emissions as a whole group, which will also benefit us with our customers because they expect these reductions and view the localisation of the supply chain positively'.

Additionally, customers can influence the design process, as mentioned by Company 1: 'Customers have sometimes complained that there is too much packaging, asking us to reduce it. We have listened to them and tried experimenting by using thinner or less plastic, or even no plastic at all'. Company 4 highlighted that they actively feel pressure from customers, particularly those committed to carbon dioxide reduction targets,

necessitating collaboration with partners and the setting of clear expectations. This customer pressure is reflected in their interactions, with some clients educating and guiding other companies towards resource efficiency. Environmental protection is also a frequent discussion point, as noted by Company 9: 'Today, practically every month, during customer meetings, we talk about sustainability, and everything related to it'.

Furthermore, the sharing of circular best practices occurs through companies' networks, as described by Company 4: 'Through our customers, suppliers, and former colleagues. Our industrial world is relatively small'. In this context, communication and collaboration are crucial for discovering CE solutions, as much information originates from outside the company. As expressed by Company 15: 'For me, the majority of know-how ideas still come from various audits by clients and suppliers, as well as occasionally from certain trade fairs and conferences'.

Since most of the companies within the sample are export-intensive, their focus on export markets shifts decision-makers' attention toward CE. To compete in these markets, companies must meet local requirements and customer expectations, leading to adjustments in domestic production. As Company 2 highlighted: 'I think our customers are more aware, and they are already focusing much more on sustainability and being green. For example, in Sweden, the raw materials used are of great importance; also, reduction of carbon dioxide is considered'.

The CE and its principles are important topics outside Estonia, as noted by Company 13: 'Our export market is 85%, and this means that we see and follow a wide variety of markets and attitudes towards the green transition and sustainability'. Company 2 pointed out that communication and collaboration are essential for finding new solutions to apply within their BMs, especially for those operating in export markets: 'Our Nordic clients are very sustainability-oriented ... If we want to continue as suppliers, it is very important, and we have to follow them'.

In this regard, regulatory compliance—particularly in export markets—is an important factor influencing the implementation of CE practices. This requirement has forced companies to re-think and develop themselves, as mentioned by Company 4: 'I believe the driving force is legislation. It is what pushes us to think differently, and through this, many ideas certainly come from both society and companies on how to take advantage of all this'. Environmental regulations increasingly pressure companies to consider how to avoid exceeding limits in their production, as noted by Company 1: 'We definitely adhere to all requirements at both the European Union and national levels. We are aware of any upcoming requirements or standards, and we start working on them early to ensure we have implemented our changes well on time'. This also prompts decision-makers to seek new solutions to adapt, as Company 6 noted: 'We are hearing rumours here and there that these requirements, like carbon neutrality, are slowly starting to emerge ... and ultimately, there will be no escaping it anyway'.

Interviewees highlighted that they constantly seek new information from external sources such as partners, conferences, and environmental agencies. For example, Company 15 stated: 'For me, most of the know-how ideas come from various audits with clients and suppliers, as well as occasional trade fairs and conferences'. Collaborative learning from others' experiences and industry trends, both within Estonia and internationally, plays a vital role in directing attention towards CE. As Company 18 mentioned: 'We try to attend as many seminars and workshops as possible'. External resource audits also provide valuable insights, as noted by Company 13: 'What it gave us was perhaps a little more knowledge about what the possibilities are. In addition to the audit, we received consultation on which solutions to use'.

The role of information channels in shaping decision-makers' attention to sustainability issues is also notable. Companies reported that media coverage of sustainability topics has aroused their interest and increased their focus on CE. Company 1 remarked: 'I feel that sustainability has been widely covered in the media and has already reached many people'. This may be because companies 'do not receive a lot of information from the state, and they need to stay alert following the news and regularly checking newspapers', as stated by Company 4.

Discussion

The findings of this study highlight the role of managerial attention in shaping strategic decision-making towards CBM transformation within the metal industry in Estonia. Both internal and external environmental factors significantly influence the allocation of attention, aligning with fundamental assumptions of the ABV (Ocasio, 1997).

Internally, the study identifies efficient resource management as a significant driver of attention towards CBM. Rising energy costs are prompting companies to prioritise energy-saving measures, thus illustrating how operational contexts can refocus managerial priorities. This shift in attention suggests that economic pressures, particularly in energy-intensive industries, create a compelling business case for resource efficiency, advancing CE principles as a strategic priority.

The influence of information flow between parent companies and subsidiaries also emerges as a significant internal factor. In line with Ambos et al. (2010), who demonstrated how subsidiaries can influence the strategic focus of parent companies, our findings suggest that sustainability and CE principles are increasingly being prioritised at the group level. Subsidiaries benefit from shared knowledge and strategic alignment on sustainability practices. This inter-organisational dynamic supports the idea that attention is regulated through corporate structures and knowledge-sharing mechanisms (Dutt & Joseph, 2019).

Employee engagement further underscores the influence of organisational culture in shaping managerial attention towards CBM transformation. This study reveals that new ideas and innovative solutions often originate from employees at various levels within the company. This bottom-up flow of information underscores the importance of fostering an organisational culture that encourages employee participation in sustainability initiatives. This resonates with Martins et al. (2015), who emphasise that managerial cognition and employee input are vital sources for the ideation and design of new BMs.

Externally, customer influence is an important factor that shapes managerial attention. The increasing demand from customers for sustainable and circular solutions pushes companies to adapt their practices accordingly.

Similarly, in export markets, customer demand for sustainable products has increased substantially in recent years, creating market pressures that capture organisations' attention. The need to meet customer expectations for environmentally friendly products is particularly relevant in regions such as the Nordic countries, where local customers often impose higher sustainability standards than those in domestic market. Consequently, export customer demand not only drives innovation but also requires firms to continuously reassess their environmental impact and integrate CE principles into their value propositions. This is consistent with Zhong et al. (2021), who extended the ABV to the demand side, demonstrating that major customers can direct top managers' attention. The empirical results of this study further support the role of customer demand in shaping decision-makers' attention towards CE practices.

Regulatory compliance also emerged as a significant external factor influencing attention towards CE. Anticipation of future regulations drives companies to proactively explore new solutions, reflecting the notion that regulatory compliance can act as a catalyst for the CE. This aligns with findings by Cho and Hambrick (2006), who observed that industry-specific (de)regulation led to shifts in managerial attention and subsequent strategic changes.

Conclusion

In conclusion, this study highlights the role of managerial attention in shaping strategic decisions towards CE practices within the metal industry in Estonia. It provides detailed empirical insights into the factors that shape managerial attention and influence organisational outcomes in transforming existing BMs with CE practices. Additionally, the study offers practical guidance for decision-makers to implement CE practices more effectively, thereby enhancing environmental sustainability and promoting economic growth.

Implications

This study provides a comprehensive analysis of the factors influencing CE adoption within the Estonian metal industry, offering valuable empirical insights into the elements that shape managerial attention. This research deepens understanding of the practical conditions that support CE implementation in the metal industry. These findings contribute to the limited empirical research on CE adoption in this context, offering useful data for researchers and practitioners focused on sustainability transitions. Furthermore, this study addresses the scarcity of research on CE practices in Estonia, making its findings useful for guiding future improvements in CE adoption within the country.

From a practical perspective, this study offers guidance to enhance CE implementation. By understanding the factors that shape managerial attention, companies can develop strategies that respond to economic pressures while leveraging managerial commitment and employee engagement to drive CBM transformation. These insights can help organisations identify critical drivers of attention and adopt CE principles more effectively, contributing to long-term sustainability and competitiveness.

Limitations

This study draws on interview-based secondary data. While this data provides sufficient information to address the purpose of this research, it does not allow for an in-depth exploration of the interplay between attention allocation and the transformation of BMs with CE practices. Consequently, the author was constrained in examining the underlying mechanisms in full, leaving this for future research.

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Appendices

Table A-1. List of sample companies.

Company *	Interview date	Company's field of activity	Company size	Location
Company 1	7 March 2023	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	<250 employees	Pärnu County
Company 2	8 March 2023	Manufacture of fasteners and screw machine products	<50 employees	Harju County
Company 3	14 March 2023	Manufacture of steel drums and similar containers	<250 employees	Harju County
Company 4	15 March 2023	Manufacture of other fabricated metal products n.e.c.	250+ employees	Tartu County
Company 5	15 March 2023	Treatment and coating of metals	<250 employees	Saare County
Company 6	15 March 2023	Manufacture of prefabricated metal buildings	<50 employees	Harju County
Company 7	15 March 2023	Mechanical metal processing	<250 employees	Pärnu County
Company 8	17 March 2023	Manufacture of light metal packaging	250+ employees	Harju County
Company 9	17 March 2023	Manufacture of other metal structures and parts of structures	<250 employees	Harju County
Company 10	17 March 2023	Manufacture of wire products, chain and springs	<250 employees	Pärnu County
Company 11	17 March 2023	Mechanical metal processing	<250 employees	Harju County
Company 12	22 March 2023	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	<250 employees	Harju County
Company 13	24 March 2023	Manufacture of doors and windows of metal	<250 employees	Harju County
Company 14	24 March 2023	Manufacture of other metal structures and parts of structures	<250 employees	Harju County
Company 15	24 March 2023	Mechanical metal processing	<250 employees	Tartu County
Company 16	28 March 2023	Manufacture of other metal structures and parts of structures	<250 employees	Harju County
Company 17	31 March 2023	Manufacture of metal structures and parts of structures	<250 employees	Harju County
Company 18	31 March 2023	Manufacture of metal structures and parts of structures	<250 employees	Harju County
Company 19	04 April 2023	Manufacture of metal structures and parts of structures	<250 employees	Harju County
Company 20	04 April 2023	Manufacture of other metal structures and parts of structures	250+ employees	Ida-Viru County

Note: * Company names have also been used as participants' pseudonyms in the Findings section

Table A-2. Data structure for factors shaping managerial attention towards CE.

1st Order Concepts	2nd Order Themes	Aggregate Dimensions
'Management has consistently been considering which costs they can reduce and how they can turn things to their advantage.' (Company 4)	Focus on cost reduction	Resource management
'We don't directly think about investments as a way to reduce environmental impact. Instead, we consider how to save resources, which results in consuming less electricity, heat energy, etc.' (Company 7)	Resource-efficiency	
'I think that technological innovation primarily comes from the motivation to increase our efficiency.' (Company 13)		
'Focus on sustainability has only come from the group in the past two or three years.' (Company 1)	Group strategy	Parent-to-subsidary information flow
'Our biggest partner is our own group ... they also provide us with innovative ideas.' (Company 1)	Internal collaboration	
'The aspects of the green transition and sustainability have also been taken into account at the group level in the creation of the strategy.' (Company 7)		
'We try to shape all our activities in a way that causes as little harm as possible, and we are very mindful of this.' (Company 14)	Sustainability mindset	Employee engagement
'For example, new procurement managers bring completely different topics to the table.' (Company 9)	Employees	
'We have around 10,000 workers within the group. I would hope that more ideas come from these 10,000 people than from the top, let's say, in terms of thinking about what to do.' (Company 6)		
'We have listened to our customers and tried to experiment with using thinner plastic wrap, using less of it, or not using plastic wrap at all.' (Company 1)	Customer-driven innovation	Customer influence
'There is pressure from our customers in this regard, as more and more attention is being paid to it. We are developing in that direction. It is definitely a relevant and current topic.' (Company 4)	Customer expectations	
'We hear these needs and expectations from our customers and then pass them along the supply chain to our suppliers.' (Company 7)		
'I think they are more aware, and they are already focusing much more on sustainability and being green, for example, in Sweden.' (Company 2)	Exposure to different markets	Focus on export markets
'We have an export market of 85%, and this means for us that we focus on different markets and very different attitudes towards the green transition and sustainability.' (Company 8)	Regional difference	
'The current significant pressure comes from our clients, who are international large corporations.' (Company 3)		
'We definitely adhere to all requirements at both the European Union and national levels. We are aware of any upcoming requirements.' (Company 1)	Compliance with regulations and standards	Regulatory compliance
'Increasingly stringent sustainability requirements, are something we support and are committed to following.' (Company 5)	Innovation driven by legislation	
'I believe the driving force is legislation. It is what pushes us to think differently.' (Company 4)		
'We have received a lot of support from the cross-sector collaboration platform. We joined the platform this fall, and the know-how and support from companies in various fields have been very helpful for us.' (Company 15)	Knowledge and support from platforms and communities	Collaborative learning
'We get quite a lot of information through the cross-sector collaboration platform.' (Company 6)	New insights from collaboration	
'The reason for conducting a resource audit is not to prove or discover that this particular pump is resource-intensive, and you can save 60%. Rather, it is to evaluate the entire company and get new insights, and not just focus on one small saving.' (Company 11)		
'We get all kinds of new and interesting information from the press.' (Company 7)	Media coverage	Information channels
'I feel like sustainability has been widely covered in the media and has already reached many people.' (Company 1)		

Source: Author