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Research Article

Reporting in circles? How public firms navigate ESRS E5 on the circular economy

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Abstract

In 2024, the first annual reports prepared under the CSRD guidelines were published. This study examines how 75 companies listed on the Amsterdam stock exchange report on their performance regarding the circular economy, as framed in ESRS E5, with the aim of understanding the extent to which the principles of the circular economy are embedded in the organization. The results reveal a mixed picture: while a select group of companies demonstrates promising practices by aligning double materiality (identifying Environmental Social or Governance (ESG) topics relevant to the organization), strategy, objectives, targets, actions, and even executive remuneration, the majority limit their reporting to more linear-oriented measures such as waste reduction, use of recycled materials, or product reuse. What is largely missing from the reports, is a long-term vision and a roadmap.

Relevance to practice

This article outlines key points related to circular economy in AEX, AMX, and AScX company reports and highlights reporting challenges. Practical guidance is provided by identifying good practices and missing elements in the application of ESRS E5, enabling organisations to enhance future reporting and contribute more effectively to the circular transition.

Keywords

CSRD, ESRS, EU Taxonomy, reporting, circular economy

1. Introduction

While the transition towards a circular economy (CE) holds significant promise in terms of job creation and economic prosperity (Wijkman and Skanberg 2015; Aiguobarueghian et al. 2024), the global circularity gap has continued to widen in recent years. In 2025, the global circularity rate was measured at 6.9%, down from 7.2% the previous year (Circle Economy 2025). Despite growing efforts, financial incentives, and increasingly stringent regulations – such as extended producer responsibility – there is still little evidence of substantial progress or large-scale implementation of CE principles.

Achieving a CE requires profound organisational transformation, particularly with respect to business models. In its optimal form, a circular business model extends product lifespans, closes material loops, and enables the reuse of resources (Bocken et al. 2016). Realizing this ideal often necessitates intensive collaboration across the value chain. Sudusinghe and Seuring (2022) suggest, based on a systematic literature review research in 82 journals on supply chain collaboration, that the success factors for CE implementation are sharing information, penalties and incentives, sharing responsibility for product recovery, risk-sharing and joint product design. Bocken and Ritala (2022) indicate two critical strategic choices for CE implementations: first an innovation strategy to define circularity for the organisation and how this can be achieved

with internal or external stakeholders and, second, a resource strategy to narrow, slow or close resource loops.

Although the CE presents clear financial opportunities, many of its economic benefits manifest only over the longer term. The availability of financial funds, quality of an organisation's own financial resources and subsidies could contribute to positive outcomes of CE performance (Aranda-Uson 2019) and CE could become a competitive advantage, if embedded in resources and capabilities of the organisation (Vargas-Hernandes and Morales Medrano 2019).

With the introduction of the Corporate Sustainability Reporting Directive (CSRD), publicly listed companies are now required to disclose their sustainability performance in their annual reports. The European Sustainability Reporting Standards (ESRS) outline the topics and criteria to be included, with ESRS E5 specifically addressing circular economy-related disclosures. These standards provide guidelines for integrating sustainability into corporate strategy, policies, actions, and performance indicators, beginning with the 2024 reporting cycle. A key feature of the CSRD is the double materiality assessment, which organisations must conduct in consultation with stakeholders to identify the most relevant sustainability issues to be reported.

This article examines the extent to which 75 Dutch listed companies include information on CE and their approaches related to CE in their annual report. In section 2, we briefly discuss developments in legislation and regulations that are relevant in the context of reporting on CE, as well as existing knowledge based on available international literature. In section 3, we discuss the results of the empirical research into the transparency on CE of 75 listed companies (25 AEX, 25 AMX and 25 AScX). This article also describes promises made and ambitions ventilated as well as examples of current practices. Concluding remarks are provided in section 4.

2. The European institutional context for circular economy

2.1. CSRD

Following the adoption of the European Green Deal in 2015, a wide range of measures has been introduced by the European Union to implement the objectives of the Paris Climate Agreement (European Commission 2019). One such measure is the Corporate Sustainability Reporting Directive (CSRD), which aims to enhance transparency regarding corporate sustainability performance and to facilitate the exchange of sustainability-related information across value chains. The CSRD has been translated into concrete reporting requirements through the ESRS, which the European Parliament formally endorsed in their final version in 2023. These directives must subsequently be transposed into national legislation.

Under the CSRD, organisations previously subject to the Non-Financial Reporting Directive (NFRD) –namely, companies with more than 500 employees – are now required to provide extensive disclosures on their sustainability performance. While the NFRD already mandated limited reporting on specific social and environmental issues, the CSRD is more comprehensive and more rigorously defined. From the 2024 financial year onwards, these companies must report in accordance with the CSRD framework, although this will have not yet been fully implemented in Dutch law (European Parliament & Council of the European Union 2022).

Although the CSRD includes a phased implementation approach for smaller entities in subsequent years, the Omnibus Directive was introduced in February 2025 in response to the significant reporting burden faced by organisations. This Omnibus proposes two main adjustments: a delay in implementation to allow more time for compliance, and a simplification of the reporting obligations through a reduction in the number of required indicators (European Commission 2025). In addition to the CSRD, the Corporate Sustainability Due Diligence Directive (CSDDD) has been introduced (European Parliament & Council of the European Union 2024). This directive requires large companies to develop a transition plan that aligns their operations with climate targets and reduces negative environmental and social impacts. The Omnibus Directive also proposes adjustments to the CSDDD, intended to mitigate its regulatory and practical implications.

Although deliberations on the final adoption of the Omnibus amendments are still ongoing within the European Union, publicly listed companies remain obligated to comply with the CSRD reporting requirements starting from the 2024 reporting year.

2.2. Double materiality

Standard setters emphasise that firms should focus on concise and comprehensive reports concerning only the ESG topics that are material to them. To select these topics, firms are under CSRD obliged to conduct a double materiality assessment, in which ESG topics are assessed on their importance to the organisation, its activities, and performance as well as on the importance for society. However, currently, there is no common definition of materiality or thresholds. This allows room for managerial discretion on materiality decisions. While for financial reports, managerial discretion is limited by mandatory reporting standards and materiality thresholds that are set independently by auditors; for non-financial reports, materiality assessments are conducted by the firm itself or by an external consultant without strict standardised methodologies (Garts et al. 2022).

Transparency about circular economy starts with identifying CE as a material topic. If CE is material, companies are expected to specify the relevant CE topics further and specify where in the value chain CE is relevant. Within the ESRS there is a specific part – ESRS E5 – that focuses on CE. Table 1 shows an overview of the sustainability matters relating to CE that are covered in ESRS E5.

Table 1. Circular Economy topics covered in ESRS E5 (Source: ESRS E5).

ESRS E5	Circular Economy	Influence of resource use, including resource efficiency, avoiding depletion of resources and sustainable sourcing and use of renewables.	• Business model in line with circular economy principles;
			• Actions taken to prevent or mitigate negative impacts arising from resource use;
			• Plans and capacity to adapt strategy and business model in line with circular economy principles.
		Impact, risk and opportunity management	• Processes to identify and assess material resource use and circular economy impact, risks and opportunities.
		Metrics and targets	• Targets related to resource use and circular economy
			• Resource inflows
			• Resource outflows
			• Waste
			• Anticipated financial effects from resource use and circular-economy related impacts, risks and opportunities.

2.3. More circular economy-related legislation

The pressure on organisations to contribute to shaping the circular economy is not only imposed in external reporting. Other legislation and regulations also compel organisations to do so. To gain insight into the government's expectations to be reflected in the external annual reports, this section provides a brief overview of this field of increasing legislation.

The European Union (EU) has become a global leader in embedding CE into legislation, positioning it as a response to resource scarcity, environmental degradation, and competitiveness challenges. The Europe 2020 Strategy and early work by the Ellen MacArthur Foundation (2013) framed CE as an economic opportunity, emphasizing resource efficiency and resilience.

The European Green Deal (2019) set the ambitious goal of achieving climate neutrality by 2050. As part of this package, the Circular Economy Action Plan (CEAP) introduced systemic measures to make products more durable, repairable, and recyclable, while minimizing waste (Bocken and Geradts 2022). The CEAP prioritizes high-impact sectors such as textiles, plastics, electronics, and construction.

A cornerstone of EU CE legislation is the Extended Producer Responsibility (EPR), which requires producers to take responsibility for the full lifecycle of products, including post-consumer waste management. The Waste Framework Directive (2008/98/EC, revised 2018) obliges Member States to establish EPR schemes, covering packaging, batteries, electronics, and – progressively – textiles. Under EPR, producers finance or organize collection, sorting, reuse, and recycling, creating incentives for eco-design and waste prevention. By October 2025, mandatory EPR schemes and payments for textiles have been introduced across the EU, aligning with the EU Strategy for Sustainable and Circular Textiles.

Complementary measures strengthen this framework. The proposed Ecodesign for Sustainable Products Regulation (ESPR) expands eco-design principles to almost all physical goods, setting requirements for durability, reparability, and recyclability. The Digital Product Passport will track material content and environmental performance across value chains, facilitating transparency and consumer choice (Mutambo et al. 2024).

Financial and reporting instruments embed CE into corporate governance. The Corporate Sustainability Reporting Directive (CSRD) requires firms to disclose CE-related risks, opportunities, and key performance indicators. At the same time, the EU Taxonomy links investment flows to circular activities (Kirchherr et al. 2023).

Finally, EU policy emphasizes the social dimension of the transition. The European Pillar of Social Rights Action Plan frames CE as part of a "just transition," addressing labour conditions and equity in global supply chains (Moreira et al. 2022). Emphasising that cooperation between different stakeholders is necessary in order to achieve a circular economy.

European CE legislation combines regulatory mandates (CEAP, Waste Framework Directive, ESPR), financial incentives (Taxonomy, CSRD), and social safeguards. Extended Producer Responsibility plays a pivotal role, ensuring producers bear responsibility for circularity, thereby accelerating Europe's shift from a linear to a regenerative economy.

2.4. Literature

2.4.1. Awareness of circular economy

Awareness of CE among consumers and businesses is increasing. Research on consumer awareness reveals a growing recognition of the environmental and social impacts of industries such as fashion; however, actual purchasing behaviour frequently lags stated values (Jimenez-Fernandez et al. 2023). Barriers include price sensitivity, lack of transparent information, and cultural differences, which prevent consumers from consistently aligning their attitudes with circular practices. Systematic reviews confirm that while recycling and waste separation are widely adopted behaviours, more advanced practices, such as product-as-a-service or remanufacturing, remain limited due to a low understanding and insufficient enablers (Dos Santos Leite Gonella et al. 2022).

Among youth, awareness of CE principles is high in abstract terms, but practical engagement depends on education and institutional support (Krajnc et al. 2022). Similarly, demographic and social norms – such as gender,

age, and peer influence – significantly shape willingness to adopt CE-related behaviours (Jimenez-Fernandez et al. 2023). Globally, awareness tends to be higher in developed countries, yet even there, gaps persist in conceptual clarity and behavioural consistency (Dos Santos Leite Gonella et al. 2022).

For businesses, awareness is also growing, particularly in the manufacturing and fast-moving consumer goods (FMCG) sectors. Firms report adopting resource-efficiency measures and recycling initiatives; however, implementation often remains internally focused rather than being embedded across supply chains (Masi et al. 2018). Barriers include high upfront costs, lack of consumer demand, and uncertainty related to economic benefits. Empirical studies suggest that firms are motivated more by economic opportunities – such as cost reduction and innovation – than by environmental concerns (Liakos et al. 2019; Mishra et al. 2018). Nonetheless, when successfully implemented, circular supply chains can create multiple forms of value, including customer loyalty, cost savings, and brand differentiation (Mishra et al. 2018).

2.4.2. Circular economy in the field of environmental accounting

The integration of CE principles into environmental accounting represents an emerging field that seeks to align financial and non-financial reporting with sustainability objectives. Marrone et al. (2020) highlight that environmental accounting research has shifted from general sustainability concerns toward more specific topics such as the transition to low-carbon and circular economies, ecosystem services, and the Sustainable Development Goals (SDGs). This reflects a growing recognition of accounting's role in addressing resource flows, waste reduction, and broader socio-environmental impacts.

Vysochan et al. (2024) emphasize that accounting in the CE context must evolve beyond traditional material flow analysis to incorporate life-cycle perspectives, resource efficiency, and the disclosure of circular performance indicators. Their bibliometric study shows a rapid growth in publications linking accounting and CE since 2018, underscoring increasing academic and practitioner interest. Accounting is viewed as a key enabler in operationalizing CE, providing reliable information on ecological and social outcomes, and supporting new governance models such as integrated reporting and sustainability-balanced scorecards.

2.4.3. Circular economy reporting: emerging practices and challenges

The CE can be defined in many ways: Kirchherr et al. (2023) identified 224 different definitions. This makes it difficult to prescribe how to report on the circular economy unambiguously within a standardised reporting structure for external annual reports. Furthermore, a key aspect of designing a circular economy is fostering closer collaboration within the supply chain (Govindan and Hasanagic 2018). As they strive for sustainability rather than just increasing profits, supply chains are changing their business paradigm (Meckenstock et al. 2016). The perspective of the entire value chain does not correspond to the organisational perspective on which external annual reports are based, and this is something that should be noted (Hammervoll 2016; Hergert and Morris 1989). This also hinders the creation of a comprehensive external reporting framework for describing the CE. Listed companies have been required to report on their sustainable performance to a limited extent under Non-Financial Reporting Disclosures, but requirements on circular economy were limited. Organisations are free to provide more information in their external annual reports, as indicated by theory on mandatory or voluntary reporting (Cotter et al. 2011). Understanding the similarities and differences between theories on mandatory or voluntary reporting, is important. As well as the type of information disclosed, the context and information need that is of interest to users of the annual report. However, information on the CE and related efforts has remained limited in recent years. This is even though shaping the CE with other market parties requires this kind of information to enable strategic partnerships with the right parties (Anttiroiko 2023).

Traditional sustainability reporting has treated CE mainly superficially, focusing on recycling and waste management, while lacking standardized metrics (Opferkuch et al. 2023; Llena-Macarulla et al. 2023). Recent studies highlight the potential of management accounting and dialogic approaches to provide richer decision-making tools for circular business models. However, accounting functions are often bypassed in practice, with companies relying on informal tools such as life-cycle assessment to foster multi-stakeholder dialogue (Aureli et al. 2022). This underscores the need for new CE-specific accounting metrics and frameworks.

Empirical evidence indicates that corporate governance mechanisms – such as board size, gender diversity, and CSR committees – positively influence the extent of CE disclosure within integrated reporting (Esposito et al. 2023). Integrated reporting is viewed as particularly promising, as it allows CE information to be embedded across financial, environmental, and social dimensions. In practice however, integrated disclosure remains inconsistent, with significant variation across sectors and geographies.

2.4.4. Challenges faced by companies in circular economy disclosures

From a theoretical perspective, sustainability reporting can be analysed through three complementary lenses: agency theory, stakeholder theory, and institutional learning (Hanh and Kühnen 2013). Agency theory views reporting as a governance mechanism to align managerial behaviour with investors' interests and reduce information asymmetry. Stakeholder theory extends this view by

framing reporting as dialogue and accountability toward multiple constituencies. Institutional learning, however, interprets reporting as a reflexive process through which organisations internalise new norms, reinterpret fiduciary duties, and adapt routines over time.

The transition toward CE has intensified demands on companies to disclose information on circular practices, yet significant challenges hinder the quality and comparability of such disclosures. A primary challenge is the lack of standardized indicators and frameworks. Corporate sustainability reports often address CE in fragmented ways, focusing on recycling or waste minimization, while neglecting broader value retention strategies such as product life extension or business model innovation (Opferkuch et al. 2023). The absence of specific CE metrics leads to sporadic and qualitative reporting, limiting comparability across sectors and firms (Llena-Macarulla et al. 2023). This issue is exacerbated by companies' tendency to rely on symbolic rather than substantive disclosures, increasing risks of greenwashing (Opferkuch et al. 2023).

Another challenge lies in the internal measurement and integration of CE activities into accounting systems. Environmental and management accounting practices remain underdeveloped for CE purposes. Companies often adopt informal tools like life-cycle assessment, but these approaches fail to systematically capture financial, environmental, and social dimensions in a way that supports decision-making and external accountability (Aureli et al. 2022). Consequently, CE reporting struggles to move beyond descriptive narratives toward verifiable data.

3. Empirical results

3.1. Research sample and data collection strategy

Following Pollman (2022), from the theoretical perspectives on sustainability reporting, i.e. agency theory, stakeholder theory, and institutional learning, we adopt in our analysis the institutional learning perspective, emphasising how reporting practices evolve as part of broader organisational learning in the circular transition. As Lund and Pollman (2021) argue, corporate governance, hence transparency regulations and habits, operates within an adaptive ecosystem, making institutional learning particularly relevant for understanding how ESRS E5 and the CSRD reshape reporting behaviour and organisational accountability.

This study aims to provide a better understanding of the CE, how organisations navigate the available information and the breadth of the CE concept, and the expectations of stakeholders in annual reports. The study's methodology is based on the expectations set out in the ESRS E5 reporting framework, which describes elements from the perspective of double materiality, strategy, policy, targets and actions.

The focus is therefore on aligning the circular economy concept throughout the organisation. The organisation must provide the mandatory information requested and can also provide voluntary information. This study examines the annual reports of 75 companies listed on the AEX (25), AMX (25), and AScX (25) as of December 31, 2024. An overview of the companies reviewed is included in the appendix. Additional reports, such as an impact report or a separate sustainability report, were not examined.

To analyze the annual reports of the 75 listed companies, an assessment sheet is developed. The criteria in the assessment sheet are defined based on specific requirements as noted in the ESRS. The researchers performed a test round using the assessment sheet to analyze five (random) reports. All three researchers analyzed the same five companies to test for internal and external validity. The results of the analysis were evaluated and discussed. Based on the results, the assessment criteria were further refined. The reports were divided among the three researchers, and the 75 annual reports were analyzed based on the assessment criteria. Finally, cross-checks were performed on each analysis to make sure everyone evaluated the data in the same manner.

3.2. Circular economy as material topic

Most annual reports include a separate chapter that describes the components of the CSRD. This chapter also should outline the process used to determine the organisation's material topics. A few organisations, such as Vastned Retail and Vivoryon Therapeutics, did not perform a Double Materiality Assessment (DMA). Those that have reported a DMA explain in their external report how the process leading to the material topics was carried out. Companies are also obliged to describe how they interacted with their stakeholders to identify their material topics. Sometimes, the stakeholder assessment is only conducted internally.

Organisations that qualify the CE as a material topic (53%) are mainly those that are heavily dependent on raw materials like wood or plastics and are primarily the larger firms (AEX: 64%, AMX: 52%, AscX: 44%). Examples include construction companies (for example BAM and Arcadis) and manufacturing companies (for example Philips and ASML). Nevertheless, in a few situations, service providers have also mentioned their awareness of the impact on the CE. ABN Amro, for example, developed a 'heat map' that also includes the use of raw materials to determine its impact on their credit portfolio.

In some cases, an organisation may be linked to a resource-intensive sector, such as construction, but has not identified CE as a material topic. This applies to real estate organisations such as Wereldhave and Warehouses De Pauw. Their sustainability reports focus on energy consumption rather than resource consumption in relation to sustainable buildings. Nevertheless, Warehouses De Pauw does provide an extensive and clear description of their DMA (WDP annual report 2025, pp 159–165). B&S Group is a good example of a wholesaler that recognises the importance of CE (see Box 1).

Box 1. Example of circular economy as material topic.

B&S Group

The section on sustainability in the B&S Group's 2024 annual report begins with an explanation of the sustainability strategy and governance: 'How we manage sustainability and related reporting'. It identifies the consultation structures and leaders of specific topics within the organisation (change drivers), including data owners and collectors. Following this organisational overview, the strategic pillars of the organisation are presented: 'sustainable value chain', 'empowered people' and 'commercial excellence'. The value chain is then explained, after which the link to the stakeholders is established in the section 'What matters to our stakeholders'. This section refers to a 2022 survey in which various stakeholder groups were questioned. It also explains why these groups are important to the organisation and how they are involved in its developments. The way in which the reader is guided through the embedding of sustainability in the organisation is particularly clear, with value chain thinking integrated logically into the structure of the narrative. This also gives the circular economy a logical place as a material subject.

The analysis showed that most of the companies do not specify specific topics within CE and only use the term CE or circularity in general. This does not provide any insights into which topics within CE are relevant for the company. 41% of the companies do specify specific topics (AEX: 44%, AMX: 44%, AscX: 36%). Topics often mentioned are waste reduction, reduction of material inflow, reduction of packaging and recycling of waste. Looking at the so-called 7R's – Rethink, Revamp, Refuse, Reduce, Repurpose, Recover and Recycle – the focus is still mainly on reduction and recycling instead of on rethink, revamp and refuse (Haezendonck and Van den Berghe 2023). It seems that 'do no harm' principles focusing on having less negative still wins from 'do good' initiatives, focusing on having a positive impact.

Whereas the way to organise raw materials in a circular economy is based on a holistic view, as shown in the butterfly diagram (see Figure 1). This diagram shows how products and materials can flow in a circular economy instead of ending up as waste. On one side, it illustrates how natural materials, like food and wood, can safely return to nature and help regenerate soils and ecosystems. On the other side, it shows how man-made materials, like metals and plastics, can be kept in use for as long as possible through repairing, reusing, or recycling. The diagram highlights that by designing products and systems differently, we can reduce waste and create a more sustainable economy.

To gain better insight for stakeholders on the level of circularity (strategic level required in ESRS E5), companies could identify where in the value chain circularity is embedded. This provides a clearer perspective on the circular potential of a product or service, helps to set measurable goals and to foster collaboration. It provides a more detailed picture of where value is created and where waste and emissions can be minimized. This information

Figure 1. The Butterfly diagram, visualising the circular economy (Ellen MacArthur Foundation 2021).

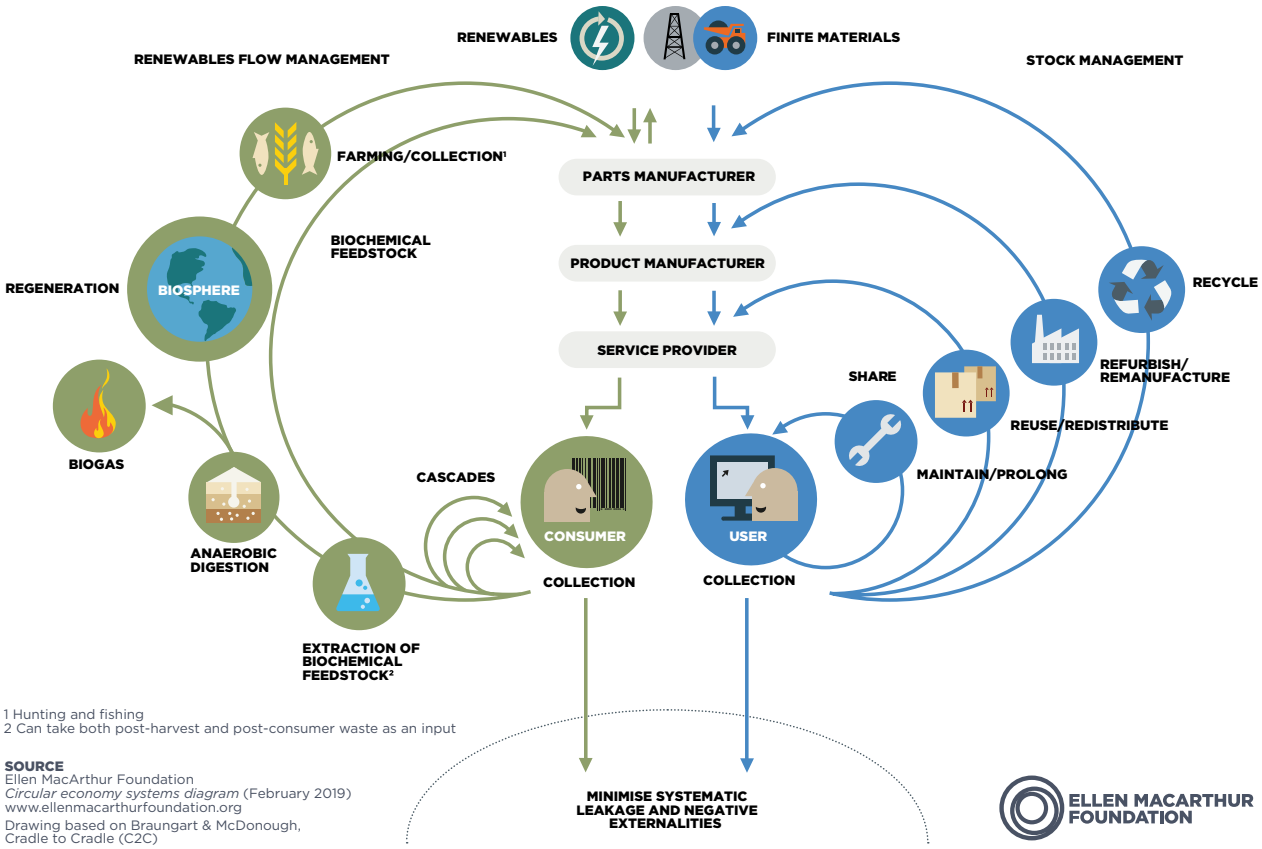

Table 2. Circular economy as material topic, specification and position in the value chain.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Materiality								
Circular economy material topic	16	64%	13	52%	11	44%	40	53%
Circular economy not mentioned as a material topic	9	36%	12	48%	14	56%	35	47%
Total	25	100%	25	100%	25	100%	75	100%
Specification (topics)								
Circular economy topics specified	11	44%	11	44%	9	36%	31	41%
Circular economy topics not specified	14	56%	14	56%	16	64%	44	59%
Total	25	100%	25	100%	25	100%	75	100%
Specification towards position value chain								
Value chain position specified	16	64%	12	48%	11	44%	39	52%
Value chain position not specified	9	36%	13	52%	14	56%	36	48%
Total	25	100%	25	100%	25	100%	75	100%

is crucial for closing the loop and achieving sustainability objectives. 52% of the companies is transparent about the position of risks and opportunities related to CE in their value chain. Mainly the larger firms specify the position of CE in their value chain (AEX: 64%, AMX: 48%, AscX: 44%).

3.3. Circular economy in strategy, policy, actions and targets

Although 53% of all companies recognised that CE is a material issue, only 45% of those surveyed had incorporated it into their corporate strategy. We see that mainly the larger firms include CE in their corporate strategy (AEX: 60%, AMX: 44%, AscX: 32%).

3.3.1. Circular economy in the strategy of the firm

The companies that have included the circular economy in their strategy, often limited their focus to reducing waste streams or conserving raw materials without further elaboration. Only eight organisations – Corbion, CTP, JDE Peet's, Signify, TKH Group, ForFarmers, Heijmans and Renewi – give the term 'circular economy' more substance and strategic direction in their strategy descriptions. JDE Peet's, for example, focuses on 'responsible sourcing' and building ecosystems in the value chain to balance people, planet and profit, as reflected in its Value Creation Plan. Similarly, Renewi prominently links its business model to the CE, creating value from waste streams. Box 2 shows the example of how Signify, with its strong focus on CE, has embedded CE in its strategy.

3.3.2. Circular economy related targets

Including objectives in a strategic plan can indicate the extent to which CE is embedded in an organisation's planning and control cycle, and that the subject is being actively managed. Of the organisations surveyed, 41% have included objectives related to CE (AEX: 48%, AMX: 48%, AscX: 32%), of which 87% are formulated quantitatively and 13% qualitatively. Typical quantitative targets include reducing waste and packaging (e.g. Ahold Delhaize), or more specifically, achieving a recycling rate of over 80% for the most relevant raw materials (e.g. TKH Group) or reducing raw material use (e.g. ASM International).

References to legal frameworks are notable when setting targets, as in the case of Alfen. Regarding the transition to a CE, they state: 'Alfen has a waste management plan in place. For batteries, the company is not required

Table 3. Information on circular economy in strategy.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Information on circular economy in strategy								
Circular economy in strategy	15	60%	11	44%	8	32%	34	45%
Circular economy not in strategy	10	40%	14	56%	17	68%	41	55%
Total	25	100%	25	100%	25	100%	75	100%

Box 2. Example of circular economy in the strategy of the firm.

Signify

Signify describes the context of the lighting industry in terms of the growth of the LED market and connected lightning technology. Within this context, it has adapted its strategic framework to "Professional, Consumer, Original Equipment Manufacturer (OEM), Conventional", where it is pursuing a course of sustainable innovation in the link between end user and maintenance. In all four pillars, the circular economy is mentioned in terms of waste reduction, circular innovation or circular ambitions. Furthermore, in the conventional segment, it is explicitly stated that this will be phased out: 'the business is planning for the gradual phase-out of its conventional products'. In doing so, it has embarked on an integrated transition from linear to circular.

to take back the product at the end of its life, except for those that it imported itself into the European Union. This is followed by a reference to the guidelines for reuse and refurbishment.' This makes it clear that, while CE is an important topic, the organisation's activities are designed with compliance in mind.

business processes: 'Integrating circular principles into our products based on five key criteria: reusability and recyclability; energy efficiency and lifetime; serviceability; connectability; and upgradability'. KPN refers to a CE section in its 'Supplier Code of Conduct and Procurement Policy', which addresses the impact risks

Table 4. Targets on circular economy, time frame and specification.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Totaal (n)	Total (%)
Targets								
Circular economy targets	12	48%	12	48%	8	32%	31	41%
Quantitative targets	*12*	*100%*	*8*	*67%*	*8*	*100%*	*27*	*87%*
Qualitative targets	*0*	*0%*	*4*	*33%*	*0*	*0%*	*4*	*13%*
No circular economy targets	13	52%	13	52%	17	68%	44	59%
Total	25	100%	25	100%	25	100%	75	100%
Time frame								
Timeline specified	10	40%	10	10%	6	24%	26	35%
Timeline not specified	15	60%	15	60%	19	76%	49	65%
Total	25	100%	25	100%	25	100%	75	100%

To make objectives more concrete, some companies also provide specific timelines. This reflects the time horizon within which organisations aim to achieve their objectives. 35% of the organisations have specified a concrete timeline for achieving their objectives (AEX: 40%, AMX: 10%, AscX: 24%). Most of the timelines relate to the following year (i.e. 2025), provide a 5-year horizon (2030) or a 15-year horizon (2040). The remaining 65% of the companies do not specify a timeline, and a stated objective mainly indicates a general direction, such as reducing packaging or waste.

and opportunities associated with the use and disposal of virgin raw materials, as well as the scarcity of critical raw materials.

In 59% of the organisations, actions in the field of CE are reported, which concretises the efforts made by the organisation during the past reporting year. The way in which organisations report varies from detailed results with case studies (Signify) to a structured overview of the most important actions, translated into related activities, their scope in the value chain, stakeholders involved, the intended outcomes and the associated time frame, as for

Box 3. Examples of circular economy-related targets.

BAM

BAM has a clear approach to waste management, focusing on where its influence lies. 'Reporting on waste generation and waste management within BAM has been undertaken for many years. BAM categorises waste into four types: construction, office, excavation and demolition. BAM has direct influence over construction and office waste. This waste arises from the materials BAM brings to its construction sites and the products it brings into its offices. Currently, this is the focus of BAM's waste reduction target."

Furthermore, the organisation continues to emphasise its influence within the supply chain, and the need for cooperation to further progress in shaping the circular economy. 'BAM also contributes to the circular economy by designing buildings and infrastructure in line with its principles.'

3.3.3. Circular economy policy and actions

Policies are translated into activities, performance and implementation of CE principles within an organisation. It should represent the integration of these principles into business processes and structures. Of the Dutch listed firms, 45% of organisations have a CE policy in place (AEX: 60%, AMX: 44%, AscX: 32%). Additionally, 94% of those firms specify the topics covered within CE in their annual reports. However, the degree of specificity of the policy and its impact on business operations varies strongly. In its annual report, Signify refers to a 'Circular Economy Action Plan', which outlines the integrated application of these principles in

example Heineken has reported in its annual report under the CE section. Box 4 shows the approach of Nedap as an example of how CE can be further specified.

With a structured approach like Heineken's, a roadmap is provided that guides the reader through the organisation's plans for achieving its stated objectives. 24% of the companies has included some form of a roadmap looking ahead to the longer term, describing the steps that will be taken in the coming years (AEX: 40%, AMX: 20% and AScX: 12%). Examples of such roadmaps include those of CTP, Fagron and ForFarmers, all of which have a timeline extending to 2030. NN Group has set a target for 2026, focusing on supporting repair activities.

Table 5. Policy and actions on circular economy, specification of issues and roadmap.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Circular economy policy								
Circular economy policy	15	60%	11	44%	8	32%	34	45%
Issues specified	*14*	*93%*	*10*	*91%*	*8*	*100%*	*32*	*94%*
Issues not specified	*1*	*7%*	*1*	*9%*	*0*	*0%*	*2*	*6%*
No circular economy policy	10	40%	14	56%	17	68%	41	55%
Total	25	100%	25	100%	25	100%	75	100%
Circular economy actions								
Circular economy actions	17	68%	14	56%	13	52%	44	59%
No circular economy actions	8	32%	11	44%	12	48%	31	41%
Total	25	100%	25	100%	25	100%	75	100%
Circular economy roadmap								
Roadmap available	10	40%	5	20%	3	12%	18	24%
No roadmap available	15	60%	20	80%	22	88%	57	76%
Total	25	100%	25	100%	25	100%	75	100%

Box 4. Examples circular economy specification.

Nedap

Nedap takes the reader through the development of policy in the field of circular economy, where they indicate that they have developed smaller initiatives from various departments in recent years. In 2024, an initial draft was made for the Sustainable Design Policy for new solutions: "We will determine our actions and targets in 2025. Rather than imposing rigid design standards, the policy will help us weigh the impact of design decisions on our environmental impact. These include decisions such as selecting materials based on their recyclability and designing for repairability. The primary focus of the policy is to design high-quality products that meet customer expectations regarding lifespan, can be easily repaired, have potential for a second life and are optimally recyclable at end-of-use. In previous years, business units initiated various circularity initiatives, working for example with value chain partners to facilitate the repair of defective products, and making targeted investments in software updates to make our solutions future proof." (Nedap, p.48)

3.4. Circular economy and remuneration of the executive board

The CSRD explicitly calls for transparency about the inclusion of material topics in the remuneration of the (non-)executive board. Previous research shows that information about the linking of remuneration to sustainability in the long-term strategy needs to be reported in more concrete terms (Kamp-Roelands et al. 2022). The ESRS E5 suggests that companies align the financial compensation of managers with their ability to achieve positive CE outcomes.

Including CE in remuneration schemes is meant to encourage companies to take CE seriously within their risk management and sustainability strategies. The aim is to make CE objectives concrete and measurable by linking them to the financial interests of executives. Table 6 shows that in our sample six of the AEX firms (24%), one of the AMX firms (4%) and two of the AScX firms (8%) included biodiversity as part of their remuneration. In total 9 of the Dutch listed firms (12%) include CE targets to the remuneration of their executive board including six AEX companies, Philips, Besi, ASML, ASMI, Akzo and Ahold Delhaize, one AMX company, Aalberts, and two AScX companies, BAM, ForFarmers.

For example, at AScX, BAM has incorporated circularity into the executive board's remuneration for 2025. 16.7% of the Long-Term Incentives remuneration is now linked to a Sustainability Scorecard, which covers a variety of topics and targets. As well as circularity, this scorecard covers sustainable topics such as climate adaptation, biodiversity, safety, health and inclusion, social value, and decarbonisation.

Philips shows a good example of how circularity is incorporated into management remuneration, setting specific targets each year (see Box 5).

3.5. Risk management, circular economy scenarios and potential financial impact

3.5.1. Risk management section

Only 11 organisations (15%) explicitly mention CE in the risk section of their annual report. These include four AEX companies (16%), Unilever, KPN, Heineken and EXOR NV, three AMX companies (12%), TKH Group, JDE Peet's,

Table 6. Remuneration linked to circular economy.

Remuneration	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Circular economy in remuneration	6	24%	1	4%	2	8%	9	12%
Circular economy not in remuneration	19	76%	24	96%	23	92%	66	88%
Total	25	100%	25	100%	25	100%	75	100%

Box 5. Example remuneration of the executive board.

Philips

Philips has incorporated sustainable objectives into its long-term incentives, which account for 10% of its management's remuneration. This remuneration is linked to three Sustainable Development Goals (SDGs) – 3, 12 and 13 – and is broken down into five underlying objectives, against which the organisation's performance is measured against a specific target each year. One of these objectives is 'Ensure sustainable consumption and production patterns (SDG 12) Circularity', which is broken down into three sub-objectives: circular revenue, waste to landfill, and closing the loop.

Aalberts, and four AScX companies (16%), Sif Holding, Nedap NV, Kendrion and ForFarmers (see Table 7).

Sif Holding presented the strategic risks according to probability, impact and appetite, identifying 'reduced availability of (raw) materials' as a strategic risk with relatively high impact on the organisation. Mitigating measures mentioned include maintaining strong relationships with suppliers and concluding good payment terms and credit insurance in the pricing of steel.

Another example is Kendrion. Kendrion specifically mentions the risk of disruption to value chains due to extreme weather conditions, increasing material costs, and government measures such as carbon taxes, all of which will increase supply chain costs, in relation to climate change risks. Box 6 provides another example from TKH Group.

3.5.2. Scenario analysis

Scenario analyses were included in 41% of the annual reports examined in this study, mainly provided by the large firms (AEX: 64%, AMX: 28%, AScX: 32%) (see Table 8). Of the companies who developed and reported a CE scenario only two AEX companies, one AMX company and three AscX companies are providing more detail. In Box 7 an example of a CE scenario analysis from Unilever is provided.

3.5.3. Financial impact

Transparency on the financial impact of the occurrence of the aforementioned risks and opportunities are required by the CSRD. The information provided on the financial

Table 7. Circular economy mentioned in the risk paragraph.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Circular economy risks								
Circular economy risk in risk paragraph	4	16%	3	12%	4	16%	11	15%
No circular economy risk in risk paragraph	21	84%	22	88%	21	84%	64	85%
Total	25	100%	25	100%	25	100%	75	100%

Box 6. Examples of circular economy in the risk paragraph.

TKH Group

In the risk section, TKH Group identifies the circular economy as an operational risk. In a section covering multiple sustainability topics, the company indicates that, alongside other sustainability topics such as CO_2 footprint, climate change, pollution and water consumption, resource use and waste management are seen as risks to the strategy and business model. They also refer to the potential impact of future CO_2 tax/pricing and increased operational and compliance costs. Additionally, there are reputational risks associated with non-compliance with ESG and material CSRD issues.

Table 8. Circular economy included in scenario analyses.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Scenario-analyses								
Scenario-analyses	16	64%	7	28%	8	32%	31	41%
Issues specified	*2*	*13%*	*1*	*14%*	*3*	*38%*	*6*	*19%*
Issues not specified	*14*	*87%*	*6*	*86%*	*5*	*62%*	*25*	*81%*
No scenario-analyses	9	36%	18	72%	17	68%	44	59%
Total	25	100%	25	100%	25	100%	75	100%

Box 7. Example circular economy in multiple scenario analyses.

Unilever

In line with the IPCC scenarios, the annual report on page 235 describes four scenarios: The 1.5°C transition scenario; the less than 2°C transition scenario; the less than 3°C physical scenario; and the more than 4°C physical scenario. The organisation has used these scenarios to create a forward-looking overview of revenue, cost of goods sold (COGS) and operating profit, which can be used as a baseline against which to compare gross risks in each scenario.

impact of CE is rather limited, 76% of the listed companies do not provide any information on the potential financial impact of the CE (AEX: 76%, AMX: 64%, AScX: 88%) (see Table 9). Information on the potential financial impact of physical risks is provided by 8% of the companies (AEX: 12%, AMX: 4%, AScX: 8%). The potential financial risks related to CE transition are mentioned a bit more often by 12% (AEX: 20%, AMX: 8%, AScX: 8%). Information on potential financial opportunities is more often provided, by 24% (AEX: 24%, AMX: 36%, AScX, 12%). Of the companies that do report on financial impacts there are nine companies that do report on the financial impact of CE opportunities but not on potential risks – BESI, AirFranceKLM, Alfen, AMG Critical Materials, Aperam, Arcadis, Corbion, CTP, and Avantium.

One of the companies that included information on the potential financial impact related to physical risks, transition risks as well as on opportunities related to CE is AholdDelhaize. Their approach is shown in Box 8.

in their transparency effort. While 53% of firms view CE as important, 45% half incorporate it into their strategy, targets, or policies. This suggests that CE is recognized as a material topic but not yet fully built into business models, management accounting and control systems.

Most of the companies, focus in their disclosures on basic strategies like reducing and recycling, while more ambitious approaches such as refusing, rethinking, or redesigning are rarely mentioned. This aligns with earlier research (Simoens and Leipold 2021; Ampe et al. 2021), which shows that companies often make incremental improvements rather than significantly altering their business models. There is still little evidence that firms are trying out new circular models like product-as-a-service or design-for-reuse.

Transparency regarding the value chain remains limited. Only 52% of companies mention CE-related risks and opportunities in their value chains. This lack of detail makes it harder for companies to work together and

Table 9. Potential financial impact of circular economy mentioned in annual report.

	AEX (n)	AEX (%)	AMX (n)	AMX (%)	AScX (n)	AScX (%)	Total (n)	Total (%)
Financial impact								
Potential financial impact of physical risks mentioned	3	12%	1	4%	2	8%	6	8%
Potential financial impact of transition risks mentioned	5	20%	2	8%	2	8%	9	12%
Potential financial impact of opportunities mentioned	6	24%	9	36%	3	12%	18	24%
Potential financial impact not mentioned	19	76%	16	64%	22	88%	57	76%
Total	25	100%	25	100%	25	100%	75	100%

Box 8. Example financial impact of circular economy.

Example AholdDelhaize

AholdDelhaize has included in its annual report information on the potential financial impact of physical risks, transition risks and opportunities related to circular economy (AholdDelhaize annual report, p97).

Our material sustainability matters, including the related impacts, risks and opportunities

Impact, risk or opportunity	Impact materiality: Negative impact	Impact materiality: Positive impact	Financial materiality: Risk	Financial materiality: Opportunity
Value chain[1]	Upstream	Own operations	Downstream	
Time horizon[1]	Short-term	Medium-term	Long-term	

1. Dark green indicates applicability for the material sustainability matter/impact

Environmental: Circularity

Healthy communities & planet

Packaging: Implementing practices to reduce product and transportation packaging and increase reusable, recyclable or compostable packaging material use, where possible, and working with stakeholders to support the transition to a circular economy for packaging	
Packaging: Impact on the environment through the production, use and disposal of (virgin) plastics, cardboard and other (non-)compostable primary and secondary packaging materials used and sold by Ahold Delhaize's brands	
Packaging – transition risk: Transition risks relating to regulatory pressures for new or stricter product composition and circularity regulations, also impacting supply, as well as the risk of market share loss due to an inability to respond to consumer demands for more sustainable, circularly designed products and/or product packaging.	
Waste: We promote the responsible handling of unsold food to reduce food waste and increase the reuse of unsold food and the recycling of food that is wasted along the supply chain, in distribution and operations as well as in customers' homes. Our aim is to contribute to a food system that is based upon the principles of the circular economy. Other waste components offer opportunities to refuse/avoid, reduce, reuse, repair or recycle, in order to reduce the negative environmental impact.	
Food waste: Impact on the environment and food security through the waste of (scarce) food resources (intended for human consumption) across the value chain	
Packaging waste: Impact on the environment through waste generated by own operations and customers from the use of primary and secondary packaging for products used and/or sold by Ahold Delhaize's brands	

4. Final remarks

The review of the 2024 annual reports of 75 Dutch listed companies shows that, even though the CE is gaining attention as a key topic under European Sustainability Reporting Standards (ESRS) E5, companies are inconsistent

create actual change in the real economy. Collaborating with others in the value chain is crucial for achieving success in the CE but seems not yet to be a common practice based on the Dutch corporate reports. Another challenge identified is related to quantification and accountability. While 41% of companies disclose targets, just over one-

third (35%) provide timelines, and only 12% link CE outcomes to executive remuneration. This confirms earlier academic concerns about fragmented metrics, weak governance, and risks of symbolic disclosure or greenwashing (Opferkuch et al. 2023; Llena-Macarulla et al. 2023).

Scenario analyses and financial implications of CE risks are rarely quantified, despite ESRS requirements. This undermines firms' ability to demonstrate resilience and to inform investors, echoing calls in environmental accounting literature to evolve towards lifecycle-based, CE-specific indicators (Vysochan et al. 2024; Marrone et al. 2020). Genuine circular business models remain rare. Most firms focus on incremental actions such as waste reduction and recycling, while only a handful – such as Signify, Renewi, and Philips – explicitly link their business model to creating value from reuse, repair, and closed-loop systems.

In conclusion, there is still considerable room for improvement in reporting on the CE and related issues. Much work remains to be done to truly internalise what the circular economy entails to be able to disclose the required information. A deeper understanding helps organisations to better recognise risks and opportunities, and to gain more control over their own positioning. Simply adding recycling as a step in a linear process does not yet amount to shaping a circular approach. Experimentation with new business models is still in its infancy, and chain collaboration is hardly visible in current initiatives and actions. Yet such collaboration is essential to developing new structures. Companies could put more effort into translating CE principles into their business models, supply chain collaborations, and integration into management accounting and control systems – so they can steer strategically towards results. Accountants can support companies in this transition by asking the right questions and by continuously emphasizing the importance of turning ambitions into strategy, implementation, and management.

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Appendix 1

Table A1. AEX, AMX and AScX companies as per 31/12/2024.

AEX	AMX	AscX
ABN AMRO Bank NV	Aalberts NV	Accsys
Adyen NV	Air France-KLM	ACOMO
Aegon	Alfen NV	Avantium
Ahold Delhaize	Allfunds	Azerion
Akzo Nobel	AMG Critical Materials	B&S Group SA
ArcelorMittal	Aperam	Royal BAM Group n.v.
ASMI	Arcadis	Brunel
ASML	Basic-fit	CM.COM
ASR Nederland	Corbion	Ebusco Holding
BESI	CTP	Fastned
DSM FIRMENICH AG	Eurocommercial Properties NV	ForFarmers
EXOR NV	Fagron	Heijmans
Heineken	Flow traders	Kendrion
IMCD	Fugro	Nedap N.V.
ING	Galapagos	NSI
KPN	Inpost	NX Filtration
NN Group	JDE Peets's	Pharming
Philips Koninklijke	Just eat takeaway	PostNL
PROSUS	Koninklijke Vopak	Renewi
Randstad NV	OCI	Sif holding
RELX	SBM Offshore	Sligro
Shell PLC	Signify NV	TomTom
UMG	TKH Group	Vastned
Unilever PLC	Van Lanschot Kempen	Vivoryon therapeutics NV
Wolters Kluwer	Warehouses De Pauw	Wereldhave