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How Circular Economy Disclosure Responds to Institutional Determinants Empirical Evidences in Non-Financial European Firms

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Abstract: Despite the increasing attention that the circular economy (CE) has received at the international level in recent years, the literature has paid limited attention to the importance of institutional factors that may influence firms' disclosure of CE. Thus, there is a gap in the study of CE disclosure, especially when compared with other studies dedicated to environmental disclosure. This paper aims to fill this gap by investigating the institutional pressures, in terms of coercive, normative, and mimetic factors, that influence firms' behavior with respect to CE disclosure. This research focuses on a sample of 366 nonfinancial firms, operating in 14 EU countries between 2015 and 2020. The results show that coercive and mimetic institutional pressures positively influence the level of CE disclosure issued by the firms. More specifically, the stringency of the environmental policy (coercive pressure) and the belonging to an environmentally sensitive sector (mimetic pressure) have a positive impact on the CE disclosure provided. With respect to normative pressure, the results are mixed. In fact, only the adoption of Global Reporting Initiatives' (GRIs) standard requirements is positively and significantly related to CE disclosure. The presence of an external assurance, as well as the commitment to the SDGs, is not significantly related to the CE disclosure. The absence of an analytical standard that organically addresses the issue of CE, by guiding companies in their disclosure, may explain the irrelevance of these factors in the process of convergence of the information produced. This research contributes to this area by filling a gap in the CE literature, providing some insights into the determinants of disclosure and the role of institutional pressures in influencing the level of CE information. In addition, the research adds to previous studies on disclosure by measuring the CE information provided by companies with an indicator developed based on specific environmental items collected from the Refinitiv Eikon database, which could be used in future research. The findings of this paper have some important practical implications. In particular, the results confirm to policymakers that stricter regulations have a positive impact on disclosures related to the CE. Thus, a new specific European regulation should promote more homogeneous and analytical CE disclosure, increasing the sensitivity among firms and practitioners on this topic. A similar approach may be followed for the same purpose by other regional or local policymakers. The paper also emphasizes the necessity of introducing more stringent regulations on assurance and SDGs by the regulatory or professional bodies to achieve greater uniformity of behavior by firms.

Keywords: circular economy; sustainability reporting; empirical study; institutional theory; nonfinancial European firms; environmental policy stringency index; GRI; assurance; SDG; environmentally sensitive sector



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1. Introduction

1.1. The Reason for a New Study on Circular Economy Disclosures

The circular economy (CE) has progressively gained more attention in recent years. The CE and circular business model concepts are only relatively recent [1]. In many cases,

the CE has been addressed as a specific feature of the sustainability approach adopted by people and organizations [2].

Regulators and civil society have increased their sensibility toward environmental issues, focusing on the potential consequences for local and global communities arising from inappropriate behaviors. This orientation involves operations of the firms whose involvement in the management of public resources is crucial.

It has been observed how the introduction of CE models can support entities developing their businesses [3].

The CE can produce benefits in the entities' operating activities, aligning products with customers' expectations [4]. Public opinion concerning resource use has changed dramatically over the past few years, and customers have gradually shifted their sensibilities about behaviors in order to be responsible for communities and the planet. People have become more conscious of the dangerousness of some products and prefer greener and safer products. This orientation also involves growth in the economy related to new business models with a consequent ability to create jobs [5].

In relation to this, corporate disclosure can be a tool that encourages companies to spread their strategic vision and management of circular economy models. By doing this, companies legitimize their role in the context in which they operate, engaging with stakeholders and maintaining public support [6]. Corporate disclosures reduce information gaps on sensitive issues like the CE and provide information on emerging issues that could be relevant for stakeholders to make economic decisions.

According to the above, the analysis of the factors determining the level of CE disclosure in corporate reporting appears to be meaningful as a basis for future debates about the role and development of CE and disclosure.

That said, even if regulators are, today, sensitive to the issue of CE, there is a gap in investigating CE disclosures, especially when compared with other bodies of literature dedicated to environmental disclosures [7,8].

The aim is to provide an investigation of firms' CE disclosure behaviors and the impact that institutional pressures related to regulatory, coercive, and mimetic factors may have on them.

1.2. The Institutional Context

In this context, public institutions and regulators require firms to illustrate their sustainability engagement, especially when their operations involve a wide range of stakeholders, providing an ever more exhaustive set of environmental, social, and governance (ESG) disclosures. The European Union (EU) is playing a relevant role in promoting and supporting corporate social responsibility by proposing sustainable finance methods and requiring a standardized set of sustainability disclosures to provide stakeholders with instruments to judge the firms' sensitivity toward ESG issues.

Currently, large European companies, which are public interest entities, are applying Directive 2014/95/EU [9] on the disclosure of non-financial and diversity information ("Non-financial Reporting Directive"—"NFRD"). The directive requires ESG disclosure by providing certain types of environmental information, including resource use, but not CE information.

The NFRD requires that the information provided be based on national, European, or international frameworks by specifying the frameworks adopted. In accordance with international practice, the European sustainability disclosures are usually presented in accordance with the standards issued by the Global Reporting Initiative (GRI) [10], which are technical requirements globally recognized and addressed by financial markets as a symptom of high credibility (KPMG, 2022). Member states may require that the information provided be subject to external assurance from an independent assurance provider.

In the process oriented to provide stakeholders with a comprehensive corporate report, the EU enacted Directive 2022/2464 [11] ("Corporate Sustainability Reporting Directive"—"CSRD"), which expands the number of European companies required to

prepare a sustainability report. This directive requires that sustainability reports be subject to external assurance by an independent assurance provider. CSRD is effective for financial years beginning on or after 1 January 2024.

The directive replaces the term “non-financial information” with “sustainability information”, which is considered more appropriate as it can also be a useful type of disclosure from a financial perspective, in line with international practice (recital 7).

Among other things, the directive requires reporting on resource use and the CE (Art. 29.b). There is an increased focus on the CE, in line with the growing role of the CE in the EU agenda and the increase in initiatives by European institutions.

The EU has taken several policy initiatives to facilitate the transition to a sustainable economy; in this perspective, the European Green Deal [12], enacted at the end of 2019, represents the EU’s biggest initiative, having the ultimate goal of achieving climate neutrality by 2050 [13]. Among these initiatives is the new CE 2020 Action Plan [14]. This plan includes legislative and nonlegislative measures to promote the transformation of a linear economic model into a circular one in order to reduce the dependency on nonrenewable resources and mitigate the environmental impact of production and consumption [15].

The CSRD requires sustainability reports to be prepared in accordance with the European Sustainability Reporting Standards (ESRS), which specify the content and, where applicable, the structure to be used to present the information required by the CSRD.

As a result, the European Commission adopted the first set of ESRS at the end of July 2023, which includes five general environmental standards, including one specific to the circular economy ESRS 5 E5 “Resource Use and Circular Economy”.

ESRS 5 defines the circular economy as follows: “an economic system in which the value of products, materials and other resources in the economy is maintained for as long as possible, enhancing their efficient use in production and consumption, thereby reducing the environmental impact of their use, minimizing waste and the release of hazardous substances at all stages of their life cycle, including through the application of the waste hierarchy. The goal is to maximize and maintain the value of the technical and biological resources, products, and materials by creating a system that allows for durability, optimal use or reuse, refurbishment, remanufacturing, recycling, and nutrient cycling”.

This definition arises in a context where there is a lack of a generally accepted definition by academia and practice. Current definitions of the CE and its application are considered unclear, inconsistent, and controversial [16]. As a result, this lack has an impact on both academic studies and corporate sustainability reporting itself, making homogeneous behavior more difficult.

1.3. Focal Points and Organization of the Paper

Moving from their review of 114 CE definitions, many studies [17,18] state that the recurrent components are as follows: reduce, reuse, recycle, rot, repurpose, and rethink, followed by recover (7R dimensions). Reference [19], trying to find a definition that can reproduce those concepts consolidated in academia and practice, defined the CE as “an economic system that represents a change of paradigm in the way that human society is interrelated with nature and aims to prevent the depletion of resources, close energy, and materials loops, and facilitate sustainable development through its implementation at the micro (enterprises and consumers), meso (economic agents integrated in symbiosis) and macro (city, regions and governments) levels. Attaining this circular model requires cyclical and regenerative environmental innovations in the way society legislates, produces, and consumes”.

The introduction of a definition of the CE in a mandatory reporting standard in an important economic region such as the EU should promote greater homogeneity in CE studies and the reporting of CE information by companies.

According to the neo-institutional theory, the extent and structure of the CE information provided and, thus, its homogeneity depend on the institutional pressures exerted on them [20].

The literature has devoted limited attention to the relevance of institutional factors that may influence the CE-related disclosure provided by companies. The lack of common definitions, objectives, and forms of implementation of CE has made this type of study challenging.

This paper aims to fill that gap by investigating the impact of institutional pressures related to normative, coercive, and mimetic factors on firms' behaviors concerning CE disclosures.

Specifically, this research explores and analyzes the following research questions: H1—the level of environmental policy stringency index has a positive effect on CE disclosure; H2—GRI adoption positively influences CE disclosure; H3—the adoption of assurance has a positive impact on CE disclosure; H4—the level of commitment to SDGs positively influences CE disclosure; and H5—belonging to an environmentally sensitive sector positively influences CE disclosure.

The presented research focuses on a sample of 366 non-financial companies, operating in 14 UE countries between 2015 and 2020, and data are extracted from the Refinitiv Eikon dataset.

This research is based on the institutional theory, examining how the adoption of recognized and standardized tools implemented by companies in response to normative, coercive, and mimetic pressures can affect CE disclosures [21–23].

Specifically, this paper concludes that each form of institutional pressure, which are coercive, normative, and mimetic factors, influences CE information at different levels. As far as normative pressure is concerned, this study stresses that the declaration of the adoption of GRI standards is positively and significantly related to the CE disclosure, while external assurance and the commitment to the SDGs are not significantly related.

Several implications are emerging from this paper. First of all, this study has found that stricter regulations have a positive impact on CE disclosures. Increased disclosure also means that firms pay more attention to the issue of CE. This consequently stresses that the introduction of more stringent regulations on external assurance and SDGs could also imply a more appropriate impact of these instruments on CE disclosures.

This study provides an initial answer on the mechanisms that can foster greater dissemination and homogeneity of information on the CE and contributes to the literature by examining these mechanisms with respect to several countries operating within the same institutional frame of reference.

In order to pursue our objectives, in the following section, the paper presents a relevant literature review and the aforementioned research questions. The next section illustrates the selection and collection of the dataset and presents the methodology used, describing the variables used to capture the coercive, normative, and mimetic institutional factors, as well as the control variables. The study then presents and examines the obtained results, providing some contextual observations on the data collection. Finally, the research conclusions are presented, highlighting the contribution to the ongoing literature, the main implications, and the limitations arising from the research.

2. Literature Review and Research Hypothesis

2.1. Literature Review

CE disclosure has received increasing attention in the sustainability reporting literature in recent years [24,25]. CE disclosures are generally meant as public information related to the CE provided in sustainability reporting. The content of the disclosure depends on how the researchers choose to define CE [16]. As there may be some differences in the CE definitions used in various studies, it follows that, sometimes, the results found in some parts may not be completely homogeneous.

Scholars focus on the CE-related information provided in the sustainability reports of firms operating primarily in the manufacturing industry and its specific sectors. These studies cover countries that have regulated aspects associated with the CE (e.g., the EU and China) and those that do not have specific regulations.

One branch of studies has investigated the content of CE information disclosed by companies in their sustainability report. The authors of [26] analyzed sustainability reports produced by firms from different countries around the world operating in the fast-moving consumer goods sector and found a focus on information related to end-of-life management and sourcing strategies rather than circular product design and business model strategies. The authors of [27] observed that European food retailers mainly disclose information on waste management practices and greenhouse gas emission reductions. The authors of [28] found that the circularity disclosure provided by Italian cosmetics companies is insufficient in the areas of governance, management, strategy, and performance. Other studies confirmed the limited and reductive use of the concept of CE within sustainability reporting [16].

Several studies have examined the extent of CE-related disclosure conveyed by companies in their sustainability reports. The authors of [25] noted that CE disclosure within sustainability reports is often superficial and inconsistent in the European Union. The authors of [29] stated that in Europe, CE disclosure is in an early phase in the financial sector since only a minority of CE issues are disclosed without being subject to external assurance. Other studies found an absence or vagueness in the CE information provided [16,30–33]. The authors of [34] demonstrated a low level of information provided by Sri Lankan companies on specific keywords related to CE principles.

Some research shows that only a minority of companies adopt a specific set of quantitative key performance indicators (KPIs) on CE issues [16,28,35,36]. According to [24], this is due to the vagueness and inconsistency of CE disclosure guidance.

The authors of [28] emphasized the importance of reducing the number of reporting guidelines available in practice to promote more homogeneous and comparable reporting by companies. Some scholars have pointed to the need for increased institutional pressure through new regulatory requirements as a way of meeting stakeholders' expectations [28,33]. However, it should be mentioned that this need for regulation is less felt for certain types of firms or in certain sectors.

Some research has investigated those corporate factors that may influence the level of CE disclosure through sustainability reporting. The authors of [37] demonstrated that some characteristics of the board (e.g., size and gender diversity, presence of the sustainability committee) have a positive impact on the level of CE disclosed by European companies. The authors of [38] found a positive relationship between CE disclosure and firm size, financial leverage, and company profitability, while [39] demonstrated that for Chinese companies, ownership concentration, asset size, and institutional pressure have a positive impact on CE disclosure.

Other studies have focused on institutional factors that may influence CE disclosure. The authors of [40] showed that in China, larger and environmentally sensitive companies tend to disclose more CE information to meet stakeholders' needs. Similar results were provided by [41], who observed that Spanish companies operating in industry sectors that are more sensitive to institutional pressures (e.g., the oil and energy sector) are more active in disclosing information on the CE. The authors of [33] observed that, internationally, companies operating in the automotive sector are more engaged in disclosing CE-related information than those operating in the defense, transportation, and aerospace sectors.

Few studies analyzed the impact of the different institutional forces on the dissemination of CE disclosure through sustainability reporting. Specific attention was given by [39] who found that European manufacturing companies seek to legitimate their actions by reflecting the institutional logic focused on normative and mimetic (best practices) rather than coercive factors. The authors of [39] highlighted that listed Chinese companies that are required to disclose sustainability information tend to disclose more CE information, providing investors with a more comprehensive understanding of the company's circularity activities to reduce negative environmental impacts.

The literature has devoted limited attention to the relevance of institutional factors that may influence the CE-related disclosure provided by companies. Thus, there is a gap

in empirical research in this area compared with other areas of sustainability disclosure where the topic has been widely studied [8,40–42].

2.2. Theoretical Framework and Hypothesis

2.2.1. Institutional Theory

The neo-institutional theory argues that the success and future survival of companies depend on the sociopolitical and economic system in which they operate [23,43].

To carry out their activities, firms need to be accepted by the key stakeholders in their institutional environment [44].

Companies, therefore, have a problem of legitimacy. Legitimacy is defined by [27] as a “generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within the same socially constructed system of norms, values, beliefs and definitions”. Legitimacy is, on the one hand, a prerequisite for a continuous flow of resources and the continued support of stakeholders and institutions and, on the other hand, a critical resource for the survival and success of the firm [45].

Legitimacy is achieved both by conforming actions to existing social norms and by communicating the actions taken. Sustainability disclosure and, therefore, CE disclosure are tools used by companies to legitimize themselves in the context in which they operate, to meet the expectations of stakeholders and institutions, and to maintain appropriate public support [6,46,47].

The pressure of the institutional environment leads firms to adapt their processes and practices to follow homogeneous behavior [48]. Consequently, in a homogeneous institutional environment, firms tend to become more similar in structure and performance—hence, the realization of processes of institutional isomorphism and, thus, alignment in the organizational behavior of firms. This alignment also affects sustainability reporting and CE reporting [30,49].

The isomorphic forces, i.e., the institutional pressures that drive this homogenization process, are of different kinds. Although they often operate together, there are three main mechanisms: coercive, normative, and mimetic [21].

Coercive isomorphism arises from political, legal, or regulatory influences. It is the result of formal and informal forces exerted by the state or other controlling organizations [50].

Coercive isomorphism occurs when external authorities, like government bodies, impose pressure to conform. Normative isomorphism refers to the pressure to adhere to established standards, norms, values, and cultures, as well as to adopt systems and techniques that are recognized as legitimate by relevant professional groups. Mimetic isomorphism arises from the pressure to copy or imitate the managerial practices of successful organizations [51,52].

In this frame, this paper aims to analyze the extent to which these isomorphic forces (coercive, normative, and mimetic isomorphism) influence the CE disclosure provided by European companies.

To assess the existence and magnitude of the effect of isomorphism in a homogeneous institutional context, this paper examines a set of leading European firms operating in a homogeneous institutional context (EU countries) over a homogeneous period (2015 to 2020). For this purpose, specific parameters have been identified and used in this paper to measure the existence of different types of isomorphism.

2.2.2. Coercive Isomorphism and CE Disclosure

Coercive isomorphism arises from political, legal, or regulatory influences. It is the result of formal and informal forces exerted by the state or other controlling organizations [50]. This mechanism operates mainly through norms, regulations, sanctions, and controls. The stricter the norms and their enforcement, the stronger the isomorphic pressure on firms; environmental reporting legislation is an example of this type of pressure [53].

The level of the environmental policy stringency index is an indicator of government coercive pressure on companies to disclose the CE (see Section 3.2). This indicator is expected

to have a positive effect on CE disclosure. Thus, as the level of the environmental policy stringency index increases, the CE information disclosed by companies should increase.

Therefore, the first hypothesis of this study can be stated as follows:

Hypothesis 1 (H1). *The level of the environmental policy stringency index has a positive effect on CE disclosure.*

2.2.3. Normative Isomorphism and CE Disclosure

Normative isomorphism is associated with the standards and practices adopted by professionals in a particular field or industry. These rules are the result of interaction between professionals, industries, and other organizations operating in a specific field. These rules are assimilated by practitioners through training and experience until they become a genuine form of self-regulation (soft law) that leads to consistency [23,54,55]. This force is primarily the result of professionalization and is based on a social consensus about the ‘right thing to do’—so much so that compliance with specific professional rules is taken for granted [56]. Sustainability standards are an example of professional rules. They, if generally accepted, standardize the way of acting in companies so that they come to behave in a similar way.

Internationally, there are various sustainability frameworks and standards issued by professional bodies. Currently, the most widely used and recognized standards worldwide are those published by the GRI (KPMG, 2022). In fact, GRI has gained wide recognition among firms in recent decades and is considered the most consistent reporting methodology [57]. The GRI helps companies disclose their sustainability activities and, also, requires companies to report qualitative and quantitative indicators to describe and measure their circularity activities. The GRI is a key normative body for sustainability disclosure and CE information [49]. The authors of [58] argued that the adoption of GRI guidelines plays a role as a solicitor toward companies to release CE information. The adoption of the GRI requirements for the disclosure of CE information is an indicator of the existence of normative pressure. This study, therefore, hypothesizes the following:

Hypothesis 2 (H2). *GRI adoption positively influences CE disclosure.*

Another practice that indicates the existence of normative isomorphism is the use of external assurance on sustainability disclosure and, by extension, on CE disclosure. Companies may use external assurance from an independent third party to increase the credibility of the information provided. Previous research on this topic has produced conflicting results. Some studies recognize the positive effect of external assurance on the information produced. The authors of [30] found that companies that provide voluntary external assurance report more environmental performance indicators from a CE perspective than companies that do not provide such assurance. The authors of [20] found that voluntary assurance acts as a legitimization tool used by companies in response to, among other things, normative pressure. Other studies show that shareholders react negatively to environmental information subject to assurance due to the questionable quality, independence, and transparency of these practices [59]. The authors of [29] found that CE disclosures in the financial sector are not subject to external assurance. This issue, therefore, merits further investigation. In line with the findings of the only study to examine the issue from a CE perspective in the manufacturing sector, it has been expected a positive impact of external assurance on CE disclosure. Thus, this study hypothesized the following:

Hypothesis 3 (H3). *The adoption of assurance has a positive impact on CE disclosure.*

The level of commitment to the Sustainable Development Goals (SDGs) is another variable used to measure the normative pressure. The SDGs were issued in 2015 by the United Nations with the aim to promote the worldwide adoption of sustainable behaviors

and achieve sustainable development. In response to the issue of the SDGs, countries, citizens, organizations, and firms adopted different actions, presenting various degrees of compliance with the SDGs, revealing a different level of attention toward sustainability practices [60,61]. The CE can contribute to achieving many SDGs, not just the closest one (SDG 12: Sustainable Consumption and Production). The authors of [25,62] found the existence of a direct relationship between the CE and SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), and SDG 15 (Life on Land).

In line with these considerations, this research expects that higher degrees of commitment to the SDGs are positively associated with greater levels of CE disclosure, proposing the following hypothesis:

Hypothesis 4 (H4). *The level of commitment to the SDGs positively influences CE disclosure.*

2.2.4. Mimetic Isomorphism and CE Disclosure

Mimetic isomorphism is often a response to institutional uncertainty, leading companies to imitate the behavior and practices of successful firms to strengthen their legitimacy. Firms tend to imitate competitors that constitute the benchmark in the industry [63]. Thus, they follow the path taken by successful competitors [53].

Mimetic pressure is particularly relevant in times of institutional change and is a response to the uncertainties caused by these changes [7]. The behavior is to copy successful firms. More environmentally sensitive firms face a situation of uncertainty, given the recent focus on the issue by stakeholders and institutions. It is, therefore, likely that these firms provide more information on CE by referring to leading firms. In previous studies, this relationship was found in specific sectors [41] and in China [40]. This study extends the analysis to other sectors and a different geographical area. It is assumed that this positive correlation is also found in these sectors and the EU area.

Therefore, the hypothesized relationship between the environmentally sensitive sector and CE information is stated as follows:

Hypothesis 5 (H5). *Belonging to an environmentally sensitive sector positively influences CE disclosure.*

3. Method

3.1. Sample Selection and Data Source

This study is based on a sample of 366 companies and 1261 observations of European non-financial companies operating in 14 European countries between 2015 and 2020.

The analysis considered the time interval from 2015 to 2020 to investigate what happened after the introduction of some limited form of CE regulation (the first CE Action Plan was issued in 2015). Moreover, 2015 was chosen as the starting year because it was the year following the enactment of Directive 2014/95/EU, by which the European legislature introduced a requirement for specific categories of large companies to disclose non-financial information in sustainability reports (SRs). The last year analyzed was 2020 because it was the first year after the issuing of the report on the implementation of the new CE action plan and the European Green Deal.

Through the Refinitiv Eikon dataset, it was possible to collect accounting and financial data, as well as environmental information (Table 1).

Table 1. The sample.

Panel A. Sample I by Geographic Zone					Panel B. Sample I by Industries				
Country of Headquarters	n. of Firms	n. of Obs	% of Obs		Sector	n. of Firms	n. of Obs	% of Obs	
1 Austria	15	39	3.09%	1	Accommodation and Food Services	6	19	1.5%	
2 Belgium	17	57	4.52%	2	Admin. and Supp., Waste Manag., and Remed. Services	7	22	1.76%	
3 Czech Republic	1	1	0.07%	3	Agriculture, Forestry, Fishing, and Hunting	1	2	0.15%	
4 Denmark	10	39	3.09%	4	Arts, Entertainment, and Recreation	2	3	0.23%	
5 Finland	29	114	9.04%	5	Construction	25	69	5.57%	
6 France	82	314	24.90%	6	Educational Services	1	1	0.07%	
7 Germany	97	252	20%	7	Health Care and Social Assistance	2	3	0.23%	
8 Hungary	1	2	0.15%	8	Information	42	122	9.87%	
9 Ireland	9	40	3.17%	9	Manufacturing	154	634	50.30%	
10 Netherlands	25	98	8%	10	Mining, Quarrying, Oil and Gas Extraction	5	20	1.58%	
11 Poland	1	1	0.07%	11	Other Services (except Public Administration)	1	2	0.15%	
12 Portugal	11	19	1.50%	12	Professional, Scientific, and Technical Services	21	57	4.52%	
13 Spain	42	56	4.44%	13	Real Estate, Rental and Leasing	31	94	7.42%	
14 Sweden	26	229	18.16%	14	Retail Trade	23	61	4.73%	
Tot.	366	1261	100.00%	15	Transportation and Warehousing	20	66	5.23%	
				16	Utilities	18	57	4.42%	
				17	Wholesale Trade	7	29	2.27%	
					Tot.	366	1261	100.00%	

3.2. Dependent, Independent, Moderating and Control Variables

Table 2 summarizes all the variables used in the analysis, specifying the ways in which they were measured and the source of data for each one.

Table 2. Description of variables and measurement.

Variable	Description	Measurement	Source
<i>CEDisc</i>	CE-related disclosure	Disclosure index is given by the unweighted sum of the different environmental items disclosed by companies related to the circular economy; it is assigned 1 when the company presents information on that environmental aspect; otherwise, it is assigned 0 [64–67].	Eikon
<i>Stri_Env_Reg</i>	Environmental Policy Stringency Index	This index represents a country-specific measure of the stringency of environmental policy. The index varies from 0 (not stringent) to 6 (highest level of stringency).	OECD
<i>GRI</i>	Global Reporting Initiative	The GRI variable takes the value 1 if the company adopts GRIs and discloses information about them; otherwise, it takes the value 0.	Eikon
<i>ASS</i>	Assurance	This variable takes values 1 if the company obtains the assurance; otherwise, it takes 0.	Eikon
<i>Commitment_SDG</i>	Commitment SDG	This variable measures what percentage of the SDGs has been achieved, measuring a company's total progress toward achieving all 17 SDGs. A score of 100 represents that the company has achieved all SDGs [68].	Eikon
<i>EnvSensSect</i>	Environmentally Sensitive Sectors	This variable is dichotomous: it takes the value of 1 if the company belongs to the ecological sector with environmental sensitivity; otherwise, it takes 0 [3,69–72].	Eikon
<i>FirmSize</i>	Firm Size	Natural logarithm of total assets.	Eikon
<i>Lev</i>	Leverage	Long-term debt divided by total assets.	Eikon
<i>ROA</i>	ROA	Return On Assets.	Eikon
<i>year</i>	Year	This variable represents the dummies to control for their fixed effects.	Eikon

The dependent variable, CE-related disclosure (*CEDisc*), is the result of the unweighted sum of 11 environmental items entered into the Refinitiv Eikon database, measuring a company's level of environmental disclosure on CE transition issues. To each of the 11 items considered, a score of 1 was assigned when the company disclosed specific environmental information; otherwise, a score of 0 was assigned [64–67].

The 11 environmental items used to define the *CEDisc* value belong to three different categories as follows: 6 items, emissions; 3, innovation; and 2, resource use (see Table 3). The emissions category contains information regarding the company's commitment and success as a function of reducing environmental emissions in production processes. The innovation category defines companies' willingness to reduce environmental costs and obligations by making use of new green technologies and circularity [73]. Finally, the category of resource use defines the behavior of companies toward adopting the 7Rs paradigm, pursuing the goal of ensuring that future generations also use resources in a manner consistent with the SDGs, improving supply chain management.

Table 3. Description of environmental disclosure items related to circular economy.

CE-Related Disclosure		
Emissions Category	Innovation Category	Resource Use Category
Title	Title	Title
Description	Description	Description
VOC or Particulate Matter Emissions Reduction	Eco-Design Products	Environmental Materials Sourcing
The company discloses information regarding initiatives to reduce, replace, or eliminate volatile organic compounds (VOCs) or particulate matter less than ten microns in diameter (PM10).	The company provides information on products specifically designed with the aim of being recycled, reused or disposed of without negative impacts on the environment (discussion intended as an explanation of the possible environmental concerns that arise from the design of the product).	The company is required to state whether it uses environmental criteria to source or dispose of materials such as life cycle assessment.
NOx and SOx Emissions Reduction	Take-back and Recycling Initiatives	Toxic Chemicals Reduction
Does the company report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx (sulfur oxides) or NOx (nitrogen oxides) emissions? - Any new project undertaken or initiated to reduce NOx (nitrogen oxide) and SOx (sulfur oxide) emissions; - General legal compliance is not qualified data; - In line with the legal compliance or government-imposed processes to reduce SOx (sulfur oxides) or NOx (nitrogen oxides), which are well described and qualified; - Follow greenhouse gas (GHG) protocol for all our emission classifications by type.	Does the company report about take-back procedures and recycling programs to reduce the potential risks of products entering the environment? - Take back or recycle the company's own product at the end of use; - Waste management company collecting various products and recycling is not in the scope; - A product recall is not considered qualified data.	The company is required to disclose information on reducing, reusing, replacing, or phasing out toxic substances or chemicals, such as PBT (persistent and bioaccumulative toxicants) and PVC (polyvinyl chloride).
VOC Emissions Reduction	Product Impact Minimization	
Does the company report on initiatives to reduce, substitute, or phase out volatile organic compounds (VOC)? - Processes, mechanisms, or programs in place as to what the company is doing to reduce or phase out volatile organic compounds in its operations; - Any new project undertaken to reduce VOC emissions; - General legal compliance is not qualified data; - In line with the legal compliance or government-imposed processes to reduce VOC, which are well described and qualified.	Does the company report on take-back procedures and recycling programs to reduce the potential risks of products entering the environment or does the company report on product features or services that will promote responsible and environmentally preferable use?	
Particulate Matter Emissions Reduction		
Does the company report on initiatives to reduce, substitute, or phase out particulate matter less than ten microns in diameter (PM10)? - Initiatives that the company has put in place to reduce, substitute, or phase out particulate matter less than ten microns in diameter (PM10); - Any new project undertaken, focusing on the reduction of particulate matter emissions; - Dust, fugitive dust, and soot are also considered particulate matter.		
Waste Reduction Initiatives		
Does the company report on initiatives to recycle, reduce, reuse, substitute, treat, or phase out total waste? - Initiatives to reduce any type of waste generated by reporting organization; - Partnership with waste management companies to treat waste generated; - Does not include the data on waste management companies that collect and recycle the waste for their customers.		
E-waste Reduction		
Does the company report on initiatives to recycle, reduce, reuse, substitute, treat, or phase out e-waste? - Any initiatives that the company has put in place to reduce e-waste; - E-waste is used as a generic term embracing all types of waste containing electrically powered components; - E-waste may contain hazardous materials that require special handling and recycling methods; - Includes all products covered under WEEE (waste electrical and electronic equipment) regulations, like fluorescent tubes, sodium lamps, computers, mobiles, telephones, fax machines, copiers, printers, washing machines, dryers, refrigerators, air-conditioners, televisions, VCR/DVD/CD players, Wi-Fi sets, radios, drills, electric saws, sewing machines, batteries, toner cartridges.		

The model used different independent variables to measure the coercive, normative, and mimetic pressures. More specifically, we used *Stri_Env_Reg*, referring to the envi-

ronmental policy stringency index developed by the OECD [74]. This index represents a country-specific measure of the stringency of the environmental policy. The OECD defines stringency as the level to which environmental regulations identify a price on polluting or environmentally detrimental behavior. The index varies from 0 (not stringent) to 6 (highest level of stringency). This score represents coercive pressure.

To measure the normative pressures, the model considered the *GRI* variable, which takes the value of 1 if the company adopts GRIs and discloses information about them; otherwise, it takes the value of 0, and the *Ass* variable, which takes the value of 1 if the company obtains the assurance and 0 otherwise. Moreover, it has used the *Commitment_SDG*, which represents the percentage of SDG achievement, measuring a company's total progress toward reaching all 17 SDGs. A score of 100 means that the company achieved all SDGs.

In the end, the regression considered *EnvSensSect* as an independent variable measuring mimetic pressure. In particular, this variable is dichotomous, so it takes a value of 1 if the company belongs to the ecological sector with environmental sensitivity and a value of 0 otherwise [3,69–72].

In addition, the model included some control variables to resolve possible endogeneity problems due to the omitted variables and to avoid biased results:

- Firm Size (*FirmSize*): natural logarithm of total assets;
- Leverage (*Lev*): long-term debt divided by total assets;
- ROA (*ROA*): return on assets;
- Year (*Year*): dummies to control for their fixed effects.

3.3. Regression Analysis

To test the above hypotheses, this research developed the following regression models:

$$CEDisc = \alpha + \beta_1 StriEnvReg + \beta_2 ASS + \beta_3 Commitment_SDG + \beta_4 EnvSensSect + \beta_5 FirmSize + \beta_6 BoLev + \beta_7 ROA + \beta_8 year + \varepsilon \quad (1)$$

4. Results

4.1. Descriptive Statistics

Table 4 shows the descriptive statistics of all the variables included in the analysis.

Table 4. Descriptive statistics.

Variables	n. obs	Mean	Sd	Min	Max
<i>CEDisc</i>	1.261	3.972286	2.238651	0	10
<i>Stri_Env_Reg</i>	1.261	3.636359	0.5958519	2.44	4.89
<i>GRI</i>	1.261	0.9913725	0.0925188	0	1
<i>ASS</i>	1.261	0.9040562	0.2946291	0	1
<i>Commitment_SDG</i>	1.261	82.56549	2.250169	79.01	86.51
<i>EnvSensSect</i>	1.261	0.6481909	0.4777187	0	1
<i>FirmSize</i>	1.261	22.88108	0.12383503	18.86	26.93
<i>Lev</i>	1.261	0.2113934	0.1283503	0	0.86
<i>ROA</i>	1.261	0.0437875	0.061055	−0.33	0.41
<i>Year</i>	1.261	2017.999	1.721566	2015	2020

The analysis shows that, on average, companies in the sample published about the four indicators on environmental issues, noting little attention to issues related to the CE paradigm. The variable assumes a value from 0 to 10.

This means that companies provided information on less than half of the CE-related items identified, showing little attention to CE-related issues.

It can be seen in Table 4 that some companies disclosed little information regarding the CE, and the minimum value is 0.

The ranking of *Stri_Env_Reg* varies between 2.44 and 4.89, with a mean of 3.63%, indicating that values near 0 present policies defined as “not stringent”, while those near 6 are considered “highest

level of stringency” policies. The mean value is 3.6, indicating that half of the sample companies operate in the state, presenting policies with a relatively high level of stringency.

The *GRI* takes minimum and maximum values of 0 and 1; the mean value is 99%, revealing that almost all companies in the sample referred to the *GRI* and disclosed information in this regard for the period analyzed. The minimum and maximum values of *Ass* are 0 and 1, respectively; the mean value is 90%, revealing that not all companies decided to have their report assured.

The percent of *Commitment_SDG* is 82.56%, highlighting a limited achievement of the *SDGs* by the companies analyzed. It varies relatively among the companies in the sample, ranging from 79.01 to 86.51.

The sampled companies have a mean *EnvSensSect* of 0.64. This means that 64 percent of companies operate in an environmentally conscious sector.

In terms of the control variables, the average value of *ROA* is 0.43%, assuming values from −33 to 41. *Lev* assumes values from 0 to 86, with a mean of 21.10%.

Before performing the regression analysis, the correlations between variables were analyzed (Table 5).

Stri_Env_Reg is positively correlated with *CEDisc*. *Commitment_SDG* is negatively correlated with *CEDisc*. *Ass* and *GRI* are positively correlated with *CEDisc*. *EnvSensSect* is also positively correlated with *CEDisc*. In addition, almost all control variables are correlated with *CEDisc*. In particular, *FirmSize* is positively correlated with *CEDisc*. *ROA* is positively correlated with *CEDisc*, while *year*, on the other hand, is negatively correlated with *CEDisc*.

Table 5. Correlation Matrix.

	<i>CEDisc</i>	<i>Commitment~G</i>	<i>EnvSensSect</i>	<i>Stri_Env_Reg</i>	<i>GRI</i>	<i>Ass</i>	<i>FirmSize</i>	<i>Lev</i>	<i>ROA</i>	<i>Year</i>
<i>CEDisc</i>	1.0000									
<i>GRI</i>	0.0483 *	1.0000								
<i>Ass</i>	0.1263 ***	−0.0307	1.0000							
<i>Commitment_SDG</i>	−0.0531 *	−0.082 ***	−0.1448 ***	1.0000						
<i>Stri_Env_Reg</i>	0.1421 ***	−0.0330	0.0735 ***	0.2210 ***	1.0000					
<i>EnvSensSect</i>	0.3244 ***	−0.0322	−0.0898 ***	0.1149 ***	−0.1189 ***	1.0000				
<i>FirmSize</i>	0.3840 ***	−0.0049 *	0.2586 ***	−0.2957 ***	−0.0267	0.0535 **	1.0000			
<i>Lev</i>	−0.1729 ***	0.00813 ***	−0.0034	−0.1768 ***	−0.0214	−0.3503 ***	0.0899 ***	1.0000		
<i>ROA</i>	0.0164	−0.2507 **	−0.0770 **	0.1933 **	−0.0631 *	0.0806 ***	−0.1307 ***	−0.2579 ***	1.0000	
<i>Year</i>	−0.0468 *	−0.0053	−0.0048	−0.0340	0.1000 ***	−0.0172	−0.1758 ***	0.1777 ***	−0.1270 ***	1.0000

Note: ***, **, * represent significance at 1%, 5%, 10% levels, respectively.

4.2. Regression Results

Table 6 shows the results of the regression analysis conducted using Stata 16 Software. More specifically, the table reports the findings for the tests of H1, H2, H3, H4, and H5.

Model OLS shows the findings for the test of the direct effect of all the independent variables on CE-related disclosure.

In the ordinary least squares regression (OLS), the year variable was inserted to control for its fixed effects. The results reported in the OLS model confirm hypothesis H1, showing a positive and significant relationship between *Stri_Env_Reg* and CE-related disclosure. More specifically, the coefficient of *Stri_Env_Reg* is positive and statistically significant at better than the 1 percent level to explain variations in *CEDisc* ($\beta = 0.7292$, $p < 0.01$).

This result is in line with the findings of most previous studies that investigated the relationship between *Stri_Env_Reg* and the wider concept of environmental disclosure, highlighting that the presence of *Stri_Env_Reg* increases the level of environmental information disclosed by companies [40,67,75–80].

Therefore, companies operating in countries characterized by higher levels of regulatory quality tend to release more information to respond to coercive pressure. Although there are other forms of coercive pressure, such as the country’s legal system and market regulation [30], the presence and issue of specific rules are considered the main source of coercive isomorphism, leading companies to provide environmental disclosure to be compliant with laws [81].

Hypothesis H2 is confirmed, showing that *GRI* positively influences CE-related disclosure. More specifically, the coefficient of *GRI* is positive and statistically significant at better than the 1 percent level to explain variations in *CEDisc* ($\beta = 3.1585$, $p < 0.01$).

This result confirms the findings of previous studies on the positive effect of the adoption of *GRI* standards on environmental disclosure [30], revealing that companies release CE disclosures to follow the standards issued by professional organizations [82]. This way, companies operate in a way that is considered right according to the professionalization of the specific field.

Table 6. Regression results.

Variables	Model (1)	
	Ordinary Least Squares Regression (OLS)	
<i>Stri_Env_Reg</i>	0.7292799 (0.0954462)	***
<i>GRI</i>	2.158516 (0.5965779)	***
<i>Ass</i>	0.3504524 (0.190078)	
<i>Commitment_SDG</i>	−0.0366598 (0.0264842)	
<i>EnvSensSect</i>	1.422219 (0.1244045)	***
<i>FirmSize</i>	0.6007197 (0.6007197)	***
<i>Lev</i>	0.428213 (0.475077)	***
<i>ROA</i>	2.38054 (2.38054)	***
<i>Year</i>	9539686 (0.0327912)	
<i>Constant</i>	−79.71523 (66.5745)	

Note: *** represents significance at 1% levels.

Hypothesis H3 is not confirmed because the coefficient of *Assurance* is not statistically significant.

Hypothesis H4 is not confirmed, showing that the coefficient of *Commitment_SDG* is not statistically significant.

Hypothesis H5 is confirmed because *EnvSenSect*, representing mimetic pressure, has a good influence on the disclosure related to the CE. More specifically, the coefficient of *EnvSenSect* is positive and statistically significant at better than the 1 percent level to explain variations in *CEDisc* ($\beta = 1.4222$, $p < 0.01$), revealing that companies tend to adopt the same behaviors of other companies operating in the same industry. The findings of the present study confirm those of previous research according to which the presence within an industry of companies that release environmental information positively influences the environmental data provided by the other companies operating in the same sector [30,75].

With respect to the control variables, Table 6 reports that firm size positively and significantly influences the level of CE disclosure ($\beta = 0.6007197$, $p < 0.01$). In line with the findings of previous studies, these results reveal that the bigger the company is, the higher the level of CE disclosure provided [38]. From a stakeholder theory perspective, bigger companies tend to attract interest from a greater number of stakeholders and, therefore, present greater visibility. To satisfy the interests of all these stakeholders, larger companies tend to release more information [7]. In addition, bigger companies have more resources to invest in the communication process [83].

Table 6 also reveals that the leverage negatively and significantly affects the CE disclosure released ($\beta = -1.677465$, $p < 0.01$). Although, according to the stakeholder theory, companies with higher levels of leverage should release more data to satisfy the information needs of debtholders [84], the findings of this study show a negative association between leverage and CE disclosure. A possible explanation could be that companies tend to privately provide information to banks, reducing the corporate disclosure publicly released to all stakeholders [85]. This happens especially in companies operating in bank-oriented countries, such as Italy.

4.3. Robustness Tests

This study could benefit from more robustness tests. More specifically, different proxies were used to measure the dependent variable. The *CEDisc* was split into its three components: the emissions category, the innovation category, and the resource use category.

The proxy can be used without any or with minimal application code modifications.

Regarding this, it seems appropriate to test different OLS regression models.

The first proxy used as the dependent variable is the emissions category, and by conducting an OLS analysis, the following variables are found to be statistically significant: *Stri_Env_Reg*, *EnvSensSect*, and *GRI*. These results confirm hypotheses H1, H2, and H5 regarding their positive relationship with CE disclosure. Therefore, coercive, normative, and mimetic pressures have a positive impact on the disclosure of the CE.

The second proxy is composed of the innovations category; in this case, the regression results show that H1 and H5 are confirmed.

The third proxy concerns the resource use category and confirms the H1 and H2 hypotheses in line with the results of the main model.

The details of the robustness analysis are not presented here but are available from the authors upon request.

5. Discussion

The findings of this paper show the relevance of institutional factors in influencing the CE-related disclosure provided by companies.

On the side of coercive pressure, this paper analyzes the impact of *Stri_Env_Reg* on CE disclosure to understand whether and to what extent formal and informal forces exerted by the rules [50] succeed in stimulating a greater and more homogeneous production of CE information. *Stri_Env_Reg* greatly increases the level of information dissemination regarding the CE.

This finding is consistent with the results of empirical research on environmental reporting [30,76], according to which companies tend to provide more and more consistent information after the introduction of stricter regulations. Hence, some scholars call for new regulations for more comprehensive and analytical CE disclosure [28,33].

This result suggests that there may be an improvement in the quantity and homogeneity of CE information as a result of the more stringent European sustainability legislation (CSRD and ESRS S5).

It should be noted, however, that this coercive effect does not mean that the quality of disclosure will automatically improve. Some research has found that *Stri_Env_Reg* is not a driving factor for better CE disclosure because when regulations are too stringent, companies are more concerned with complying with the specific existing regulation(s) than disclosing CE information [60,64,74]. On the other hand, isomorphism satisfies the need for legitimacy but not the need for organizational efficiency and transparency [23]. Companies may engage in behaviors that appear to meet stakeholder expectations in order to create a positive image of themselves while masking their actions [86,87]—hence, the risk of greenwashing, even in the presence of stricter regulations [88].

On the side of normative pressure, this paper examines the impact of GRI, external assurance, and SDGs on CE disclosure. The obtained results are mixed.

GRI adoption positively influences CE disclosure. Thus, under normative pressure, firms tend to comply with GRI requirements. The findings of this paper reveal that coherently with normative isomorphism, companies have widely internalized the GRI standards, probably because they consider these standards the ‘right thing to do’ [7]. The GRIs, in fact, are the most widely used standards worldwide [11,89,90]. More probably, this could be the consequence of their normative nature, reported in the purpose paragraph of GRI 1 Foundation: The GRI standards enable an organization to publicly disclose its most significant impacts on the economy, environment, and people, including impacts on their human rights and how the organization manages these impacts (GRI 1 Foundation).

This result should be interpreted together with the findings revealing the low amount of CE disclosure released. Several studies have found low levels of CE disclosure [16,25,32,33].

The wide adoption of the GRI by companies may partly explain these findings.

The GRI guidelines only address some aspects of the CE [34], so the CE is never mentioned in the consolidated GRI sustainability reporting standards (GRI, 2016). The disclosure of the CE required by GRI lacks an organic view of the CE, in line with what happens in other sustainability frameworks [24]. Consequently, the lack of a CE standard could explain the paucity of disclosed CE information.

In Europe, this critical issue is expected to be addressed with the adoption of ESRS, which includes a specific standard on CE: ESRS 5 E5 “Resource Use and Circular Economy”. This will help companies understand what actions they need to take to comply with regulatory requirements and, thus, what types of CE information they need to provide in their sustainability report.

The other variable that indicates the existence of normative isomorphism is the use of external assurance in sustainability disclosure and, by extension, in CE disclosure. Assurance, provided by an independent third party, increases the credibility and reliability of the information provided. Assurance acts as a legitimization tool for stakeholders [91] and is used by companies in response to external pressure. This research shows that assurance does not statistically affect CE disclosure. The non-stringent provisions of the GRI, especially for CE disclosure, may explain this result. While the use of assurance practices helps to improve the credibility and completeness of the information disclosed [77], it loses its usefulness when it refers to general provisions. The lack of detailed rules to refer to makes it more difficult to perform assurance because there is no specific parameter to which

the completeness and accuracy of the information disclosed can be referred (CSRD, 2022). This could explain the lack of a significant correlation between assurance and disclosure of the CE disclosed.

Regarding the level of *Commitment_SDG*, the findings show that it does not have a positive effect on the diffusion of the CE. This result is partially consistent with [68] that found that the level of commitment to the SDGs has a weak accelerating effect in this dimension. These findings seem to indicate a limited perception in practice of the link between the different SDGs and the CE. The introduction of specific guidelines could help practitioners to make this link more explicit.

Finally, on the side of mimetic pressure, the environmentally sensitive sector has a positive relationship with the dissemination of CE information.

There is a lot of uncertainty around the CE. There are numerous EU initiatives on the CE as part of the Green Deal 2019. The EU set out its own action plan on the CE, which aims to facilitate the EU's transition to a circular economy by creating sustainable growth and jobs. The plan includes both legislative and nonlegislative measures.

Companies tend to provide more homogeneous information on CE in response to the existing economic and regulatory uncertainties that this situation creates [7,92]. To this end, companies benchmark their activities and disclosures against leading companies that are recognized as best practices in their institutional context [93]. Thus, there is a convergence of practices as a result of mimetic pressure.

Our finding is consistent with previous studies that have found that environmentally sensitive firms tend to be more active in disclosing information on the CE [40,41].

6. Conclusions, Implications, and Limitations

This study uses neo-institutional theory to analyze the CE disclosure of a set of 366 companies, not restricted by sector, operating in 14 EU countries between 2015 and 2020. The year 2015 was selected as this was the year after the adoption of the NFRD, while 2020 was the first year after the publication of the report on the implementation of the European Green Deal (2019) and the new CE Action Plan (2020).

This study aimed to understand the forces influencing the disclosure of CE information in the sustainability reporting of European companies and their convergence toward common practices after the introduction of mandatory disclosure by law and some relevant EU initiatives in the field of the CE (CE Action Plan).

This paper shows that the institutional pressures exerted by coercive, normative, and mimetic factors affect the CE information disclosed by a category of listed large European non-financial firms under study. The results show that all three forms of institutional pressure influence the level of CE disclosure issued by the firms.

More specifically, the stringency of the environmental policy (coercive pressure), as well as the adoption of the GRI standards (normative pressure) and belonging to an environmentally sensitive sector (mimetic pressure), influences the level of the information provided.

However, with specific regard to the normative pressure, the results obtained are mixed. In fact, the exclusive adoption of GRI is positively and significantly related to the CE disclosure. The presence of an external assurance, as well as the commitment to the SDGs, is not significantly related to the CE disclosure. The absence of an analytical standard that organically addresses the issue of CE, by guiding companies in the provision of their information, may explain the irrelevance of these factors in the process of convergence of the information produced.

According to [24], to date, only five documents refer to the CE—the documents are issued by the following organizations: GRI, World Economic Forum (WEF), Eco-Management and Audit Scheme (EMAS), British Standards Institute (BSI), and Underwriters Laboratories (UL). The last three documents illustrate how the companies can implement the CE principles within their organization, providing only indirect suggestions on the CE information to report. On the other hand, the GRI and WEF specifically give suggestions on the CE information to disclose. More precisely, the GRI 306 illustrates the information to release on waste management, and the WEF provides suggestions on the quantitative metrics to release on resource circularity. However, there is no unique standard that provides suggestions on the information, both quantitative and qualitative, to release on all aspects of the CE.

It should be verified whether CSRD requests to adopt ESRs and produce a mandatory assurance on sustainability disclosures (and, then, also on ESRs 5) can determine a different orientation.

This research adds to previous studies on the determinants of disclosure in different ways.

First, it focuses on CE information, which is a less studied topic compared with the widely conducted studies on environmental or sustainability disclosure.

Moreover, this study adds to previous studies on the determinants of sustainability disclosure by analyzing the institutional factors rather than the widely investigated firm-specific and corporate governance factors. Most previous studies demonstrated that both firm-specific factors, such as the firm size, leverage, or profit, and the corporate governance characteristics, such as the composition of the board of directors, influence the amount of environmental or sustainability information disclosed by firms. However, few studies investigated the role of institutional pressures in influencing the level of disclosure, particularly CE information. In doing so, a doctrinal gap is filled by helping to complete the studies on the subject.

Finally, this research adds to previous studies on disclosure by measuring the CE information provided by companies with an indicator developed on the basis of specific environmental items gathered by the Refinitiv Eikon database, which could be used in future research.

The findings of this paper have some important practical implications, particularly the following:

- This paper provides evidence for policymakers that stricter regulations have a positive impact on disclosures related to the CE. Increased disclosure also means that firms pay more attention to the issue of the CE. To provide transparency, firms must organize themselves to monitor and communicate outcomes pertaining to the matter disclosed. Therefore, one possible way to enhance the companies' attention toward CE topics could be to increase the rules and standards devoted to this issue. In this regard, the recent European initiatives on CE disclosure (CSRD and ESRS) are commendable. The issues of CSRD and ESRS should promote more homogeneous and analytical CE disclosure, resulting in increased sensitivity among firms on this topic. A similar approach may be followed for the same purpose by other regional or local policymakers.
- This paper emphasizes the necessity of introducing more stringent regulations on assurance and SDGs by the regulator or professional bodies to achieve greater uniformity of behavior by firms.
- This paper offers scholars and practitioners measurement tools to build more precise and comprehensive models that measure the relationship between institutional mechanisms of isomorphism and CE reporting.

This research has limitations.

First, the selected variables are not the only possible options, others can be chosen as well.

Second, although it is a longitudinal study, the research does not investigate the years prior to the issuance of any kind of regulation on the non-financial information to be disclosed (NFRD). Future research could extend the analysis to the period before 2015 to further understand whether the issue of disclosure regulation is an institutional factor that influences the company's decision to disclose CE information.

Future research could also extend the analysis to the period after 2020—that is, after the issuing of the report on the implementation of the CE Action Plan and the European Green Deal—to understand their institutional pressures on companies' disclosure behavior. At the same time, similar studies could investigate the CE disclosure after the enactment (and the adoption) of the CSRD and ESRS 5. Finally, this research exclusively investigated the quantity of the CE information released, and it did not consider the quality of disclosure.

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