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IMPACT OF NON-FINANCIAL REPORTING DIRECTIVE ON ENERGY INDUSTRY: CASE OF CZECH REPUBLIC

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Abstract

The objective is to assess the quality and quantity of non-financial disclosures required by Directive 2014/95/EU for companies operating in the energy sector in the Czech Republic before and after the introduction of the obligation of non-financial disclosure for large publicly traded companies. The information disclosed by companies is the subject of quantitative research. Non-financial information in the form of annual reports or sustainability reports before (2015, 2016) and after (2017–2021) the introduction of the duty of non-financial reporting was the subject of the analysis. The textual analysis of these reports was carried out using IRAMUTEQ software and used to assess the quality of non-financial reporting of Czech energy companies. The quality of disclosures was evaluated in two ways: the length of non-financial reports (number of words, sentences and pages) and the incidence and number of occurrences of identified words. A paired t-test was employed for the evaluation. It was confirmed that those companies that were required to report non-financial information related to their operations in 2017 increased their disclosures in areas with the strongest environmental impact. This method could allow stakeholders to assess the quality of disclosure and its evolution over time with relative ease.

Implications for Central European audience: Companies should offer transparent information about the environmental impact of their activities and how they engage with employees and other partners. Non-financial reporting plays a crucial role in achieving this transparency. Given the substantial environmental footprint of companies in the energy industry, the objective of this paper was to assess whether companies operating in Central Europe provide stakeholders with pertinent information and to examine the impact of the Non-Financial Reporting Directive on the disclosed information.

Keywords: Non-financial reporting; environment; corporate social responsibility; energy industry; textual analysis

JEL Classification: M14, M41, M48

Introduction

The economic activities of companies are not only associated with positive effects, but they can also generate negative consequences, particularly for the environment and society. Industries such as mining and energy, in particular, have substantial adverse environmental and social impacts. The extraction and subsequent utilisation of energy in forms such as gas and electricity are generally linked with harmful outcomes. Among the most significant impacts are air and water pollution, landscape erosion, challenges in managing hazardous waste produced during their extraction and processing, climate change and more.

Electricity generation also contributes significantly to harming of ecosystems and human health. These effects are commonly referred to as negative externalities, which can be measured to some extent but are not directly reflected in a company's financial statements. Consequently, they are not substantially passed on to consumers but rather constitute a burden on society as a whole. In addition to the environmental impacts of their operations, companies have a responsibility to act as conscientious entities towards their surroundings in other areas. This responsibility encompasses not only the environmental facet but also extends to community activities and the well-being of individuals associated with the company, whether directly or indirectly. This behaviour is known as corporate social responsibility (CSR), which, as the name suggests, reflects the social or societal influence of a business. It is imperative to weigh the benefits of business in a particular industry against its environmental and social impacts and to adhere to the principles of sustainable development to ensure the safety of our planet for future generations. Consequently, it becomes crucial for companies to furnish stakeholders with high-quality and comparable information regarding their approach to addressing all activities and their societal impact.

The EU introduced new regulations on non-financial disclosure in October 2014. Directive 2014/95/EU, amending the Accounting Directive 2013/34/EU, outlines requisites for integrating CSR activities into business strategies and for consistent presentation of the outcomes of these activities through disclosures. The deadline for incorporating the directive into the national legislation of member states was 6 December 2016. Companies started complying with the new disclosure mandates as per locally implemented laws starting in 2018. It becomes crucial to evaluate the extent to which the goals set by this directive have been met; this implies assessing how these objectives have been reflected in the information disclosed by companies required to comply with CSR standards. Despite the obligation for large companies to disclose non-financial information, there currently exist no universally binding regulations dictating the content and format of such disclosures. Companies may opt to follow various recommendations, such as the Global Reporting Initiative (GRI) Standards, the non-binding Communication of the EC (2017/C 215/01), the common reporting standards published by the OECD, or the yet-to-be-implemented International Sustainability Standard Board (ISSB) standards, or they may even devise their own approach to non-financial information disclosure. This diversity indicates that information may not be entirely comparable, and each company might adopt a distinct approach to disclosure.

The effect of industry on CSR reporting was identified quite early, as early as 1977. Sturdivant and Ginter (1977) highlighted in their research the link between a company's sector and its involvement in CSR reporting. Boutin-Dufresne and Sacaris (2004) confirmed this view and

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highlighted that firms in certain sectors may naturally tend to be more socially responsible due to the very nature of their activities. This fact was highlighted by Waddock and Graves (1997), who found considerable variation in CSR disclosure practices across industries. Differences at the industry level also come to the fore in subsequent studies. Researchers such as Fifka (2013) and Sweeny and Coughlan (2008) have reinforced this idea and identified sectoral affiliation as a key influencing factor for CSR reporting. Sectoral nuances do not allow a one-size-fits-all approach to assessment. For the purpose of assessing the quality of non-financial reporting, a sector has been selected which is one of the sectors with a significant environmental impact and is also prioritised by the GRI – energy. Furthermore, the way of presentation can significantly influence stakeholder perspectives, as demonstrated by Mućko (2021), Naughton et al. (2019) and others.

The paper is founded upon an analysis of the existing body of knowledge within the realm of non-financial reporting and the subsequent identification of a research gap in this domain. This constitutes the subject matter of the Literature Review section. The next section provides an exposition of the research population and the methodological approaches employed. The third section is dedicated to presenting the outcomes of the present research and discussion.

Consequently, the primary research question emerges: “To what extent does the quantity and quality of disclosed non-financial information correlate with the non-financial reporting mandates outlined in Directive 2014/95/EU?”

1 Literature Review

The concept of sustainable development, as defined by the United Nations World Commission on Environment and Development in 1987, centres on progress that satisfies present needs while preserving future generations' ability to meet their own needs. This idea gained further traction in 2015 with the establishment of the 2030 Agenda for Sustainable Development, which transformed sustainable development principles into 17 distinct sustainable development goals (SDGs) spanning the period from 2015 to 2030. These SDGs serve as a comprehensive framework for corporations, among the largest wealth generators globally, to institute policies and practices that foster a positive global impact. This concept, known as corporate social responsibility (CSR), encompasses initiatives that companies undertake beyond their legal obligations, aiming to create a constructive societal and environmental influence. Among these initiatives are environmentally conscious practices, workplace equality promotion, diversity and inclusion advocacy, fair employee treatment, charitable support and ethical business decision-making.

Within European Union (EU) member states, the European Commission's CSR definition holds significant weight in translating CSR into tangible action. As per the EC (2011), CSR embodies a company's responsibility for its societal impact, demanding proactive involvement from companies themselves. Achieving social responsibility requires businesses to incorporate social, environmental, ethical, consumer and human rights considerations into their operational strategies while complying with prevailing legal standards.

On 28 November 2022, the EU Council approved the Corporate Sustainability Reporting Directive (CSRD), taking steps towards the EU's climate neutrality target. Member states are now required to incorporate the directive into their legislation within 18 months of its publication

in the Official Journal of the EU, and the regulations will be effective from 2024 to 2028. EU Directive 2014/95/EU, which came into force in December 2014, requires large EU companies to share non-financial information from 2017. The main objectives of this directive are to improve environmental and social performance, enhance stakeholder trust, monitor the consequences of business activities and improve communication. In addition to the directive, the European Commission has issued non-binding reporting guidelines (EC, 2017) detailing how to report non-financial information, including key indicators. The directive proposes that companies adopt globally recognised frameworks and standards when preparing and sharing information. A consistent approach should aim to facilitate better stakeholder understanding and reduce information gaps and the potential for incorrect decisions. However, to date, most companies mandatorily disclosing non-financial information do not disclose information in a comparable manner.

Academic research is rich in exploring CSR and non-financial reporting practices and their societal implications. A total of 1,963 results in the Web of Science Core Collection are related to "non-financial reporting", with 1,619 of these results appearing since 2014. Similarly, there is a significant stock of 24,122 records for CSR over a considerable time span, of which 15,566 have appeared in the last five years. This steady increase in research into non-financial disclosure has been a consistent trend since the 1980s (Wang, 2016). At the core of many of these studies is the examination of the consequences of CSR activities on multiple fronts, including the examination of aspects such as investment recommendations and financial performance (Wang & Choi, 2013; Eccles et al., 2014; Kim et al., 2018), competitive advantage (McWilliams & Siegel, 2011; Du et al., 2011), earnings management (Kim et al., 2012), tax payment (Hoi et al., 2013; Davis et al., 2016) and the dynamic environment of investor responses. Within the realm of CSR, a cluster of studies particularly investigates the nexus between CSR and financial performance.

In the area of non-financial reporting, there is a strong emphasis on assessing a company's environmental footprint, particularly its environmental impact. Kolk (2016) underscored this prevailing trend and highlighted that a substantial body of research examines a company's activities in relation to environmental factors. This includes various dimensions such as pollution originating from production processes, the adverse impacts of resource extraction and the consequences of product use. Examining firms' environmental disclosure practices provides further insights. In particular, Burgwal and Vieira (2014) contributed to this discussion by revealing a positive correlation between the extent of environmental disclosure and firm and industry size. Their approach, using content scoring analysis and data from 28 Dutch listed firms, revealed a complex interplay within this dynamic. Rupley et al. (2012) focused their investigation on a range of firms operating in environmentally sensitive industries. They surveyed more than 120 Dow Jones Global Index companies operating in industries such as chemicals, oil and gas, electric power, pharmaceuticals and food and used the GRI framework to measure voluntary environmental disclosure. Their findings reveal a remarkable pattern: firms tend to increase their voluntary disclosure efforts, especially when faced with negative environmental media attention, presumably as a strategic move to address institutional investor concerns.

The link between voluntary disclosure of environmental information and financial aspects is also the subject of research. Plumlee et al. (2010) revealed a positive correlation between the level of voluntary environmental disclosure and different financial indicators. These include the cost

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of equity capital, an indicator of enterprise value and expectations of upcoming cash flows. The findings of Clarkson et al. (2013) suggested a positive correlation between actual toxic emission data and cost of capital.

In the CSR research, energy is becoming a central pillar of the economy. Milojević et al. (2020) and Lloyd (2017) argued that energy plays a key role in supporting economic activity. However, the heavy reliance on energy sources, including some renewable sources that emit greenhouse gasses, such as fossil fuels and biomass, leads to unwanted environmental burdens. The 2030 Agenda for Sustainable Development presents energy companies with a huge challenge. This challenge includes the complex task of meeting escalating energy demand while protecting the environment. Energy production, despite its pivotal role, carries a burden of negative externalities, encompassing air pollution, emissions of nitrogen and carbon oxides, depletion of biodiversity, landscape degradation and more. Evidently, this predicament has elicited the attention of numerous academics, resulting in a substantial body of research. A search in the Web of Science Core Collection, accurate up to 18 August 2022, yielded 1,375 entries for this area. A closer focus on the last five years showcases 672 studies specifically investigating corporate social responsibility (CSR) in the energy industry. In the context of the energy sector, a noteworthy share of research efforts comes from Polish scientists. Piesiewicz et al. (2021) offered an illuminating study in this area. They examined the content of individual reports coming from a sample of 57 Polish listed companies and revealed substantial differences between entities in the energy and non-energy sectors. The comparative analysis of these sectors offers intriguing insights. In this respect, the findings of Piesiewicz et al. (2021) stand out. Their investigation underscored that companies operating in the energy sector exhibit a marked penchant for disseminating higher-quality information compared to their counterparts in other sectors, indicative of a heightened commitment to non-financial reporting.

Szczepankiewicz et al. (2022) delved into the annual reports of Polish energy companies. Their inquiry extended to the domain of non-financial disclosures, investigating their potential to illuminate threats, business risks and the trajectory towards sustainable development (SD). The authors noted strides in the identification of corporate risks, underpinned by insights from non-financial reporting in the realm of energy companies. Gasior (2012) contributed to this exploration by dissecting the economic dividends stemming from CSR reporting among Polish energy firms. Her conclusions resonate – those enterprises integrating CSR principles into their operations tend to reap tangible financial benefits. Chwilkowska-Kubala et al. (2021) probed the symbiotic relationship between CSR practices spanning social, economic and environmental pillars and the trajectory of digitisation in Polish energy entities. Intriguingly, their findings underscore a ripple effect – the influence of social CSR practices transfers onto economic and environmental spheres, concurrently affecting the level of digitisation.

Also, Kurowski et al. (2021) selected a sample of 1904 companies in 41 countries and sought to identify the penetration of the CSR paradigm into energy production and distribution entities. Remarkably, their findings reveal convergence, with energy generation and supply companies closely matching their cross-sector counterparts that exhibit parallel levels of CSR concept implementation. Zieliński et al. (2021) examined the relationship between financial profitability and CSR activities of energy companies in Poland over the period 2009–2019 and found no

relationship between the level of profitability indicators and stock market listings and the stability and CSR compliance statements of companies.

Stuss et al. (2021) looked at how CSR activities are standardised in these companies. They suggested that an approach similar to CSR should be used by all companies, including those in the energy sector. Kowal and Kustra (2016) studied reports from Polish energy businesses. They found that Directive 2014/95/EU made these companies share more non-financial details with the public. On the other hand, Manes-Rossi and Nicolò (2022) reached different conclusions through an analysis of a sample of European companies operating in the energy sector. Their objective was to uncover key environmental areas that these European energy companies often address. They revealed that the changes brought about by the introduction of non-financial reporting obligations in these companies are more symbolic than bringing about significant fundamental shifts.

Koh et al. (2023) used a US sample of CSR reports for their research. They evaluated the relationship between CSR performance and the quantity and quality of CSR disclosures. They concluded that better CSR-performing firms issue longer CSR reports and provide incremental information in their CSR reports relative to their annual financial reports. The study contributed to understanding how CSR performance affects stakeholder engagement through the characteristics of textual content in standalone CSR reports.

Furthermore, Nazari et al. (2017) employed textual analysis to explore the connection between the complexity of CSR reports and actual CSR performance. Their study proved a positive correlation between successful CSR performance and reports that are easier to comprehend and are longer. To delve into this, they examined CSR reports from significant US corporations. The results of their study revealed that enhancing the clarity of CSR information and crafting reader-friendly CSR reports are linked to enhanced CSR performance.

Romanian researchers Voicu et al. (2022) conducted a content analysis to evaluate non-financial reporting (NFR) in line with Directive 2014/95/EU. Their findings, which are consistent with agency and stakeholder theories, showed a positive correlation between NFR quality and factors such as corporate governance ratings, company size, environmental impact, monopoly position and strategic government interests. In contrast, a negative correlation was observed with the concentration of state ownership.

Clarkson et al. (2020) utilised computerised text analysis to analyse disclosure tendencies in a selection of US corporate social responsibility (CSR) reports spanning the years 2002 to 2016. A total of 466 features frequently employed in the field of computational linguistics were identified. Their findings demonstrated that the linguistic cues and patterns inherent in CSR reports hold the potential to effectively forecast the actual performance category of CSR-reporting entities. Moreover, their study indicated that the most widely employed disclosure trait count and sentence count alone could accurately predict the CSR performance category of reporting firms with an 81% success rate. These outcomes underscore the significance of the linguistic attributes of CSR disclosures as a tool for discerning the nature of a firm's CSR performance.

Relatively few studies have addressed the issue of the quality of non-financial reporting. The following studies have been identified: Koh et al. (2023), Schröder (2022), Voicu et al. (2022), Carungu et al. (2020) and Di Chiacchio (2024). In their study, Koh et al. (2023) used a relatively simple methodological approach. They employed textual analysis to examine whether reports

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filed by accounting units mention the following six areas: community, diversity, employee relations, environment, product and human rights. They used scaling to subjectively assess quality, focusing on a two-year research period. Schröder (2022) and Voicu et al. (2022) focused on assessing the quality of non-financial reporting in the banking sector. Carungu et al. (2020) were the only ones to use a similar text analysis software tool (Nvivo) to assess changes in reporting quality when transitioning from voluntary to mandatory disclosure. Their research spanned two years and focused on Italian companies across various sectors. Di Chiacchio et al. (2024) conducted the most extensive research in this area to date, covering companies from Germany, the UK and China. In addition to textual analysis, they also examined the visual aspect of published reports.

It is evident from the above that there is still no standard methodological procedure for assessing the quality of non-financial reporting. Textual analysis tools can be effective for this purpose. Current methods rely solely on subjective evaluation and typically cover short time periods (two years). Our research extends over a seven-year period and focuses on a comprehensive dataset of firms with non-financial disclosure obligations in the industry.

2 Research methodology

2.1 Data

This study centres on all Czech EU-based companies operating in the energy sector (NACE D-35). These companies primarily earn their revenues through energy production and distribution, employ over 500 staff within a consolidation group, and are obliged to disclose non-financial information as per the directive. The file comprises ČEZ, E-ON, EPH and VEOLIA, all active in the energy industry and subject to obligatory non-financial reporting. However, Innogy, a significant firm operating in the Czech Republic's energy sector, was excluded from the survey due to its merger during the review period, which hindered the comparability of data. Furthermore, ALPIQ, which was not established in the EU and not subject to directive regulation, was also not included in the study. The sample encompasses both the era before non-financial information disclosure became compulsory (2015–2016) and the period when non-financial reporting adjustments were effective (2017–2021), amounting to a total of 28 company years.

2.2 Methods

The research method employed in this study involves content analysis. Content analysis is a systematic approach aimed at objectively and quantitatively describing the apparent content of communication (Berelson, 1952). The messages under examination, specifically annual reports and sustainability reports are approached quantitatively. The data subjected to analysis can be quantified through methods such as word frequency counting, facilitating subsequent statistical treatment (Loughran & McDonald, 2015).

For the purpose of quantitative text analysis, the study utilised IRAMUTEQ, a specialised software tool. As expounded by Camargo and Justo (2013) and Glińska-Neweś and Escher (2018), this software serves to extract data from textual sources, identify significant keywords and transform them into numerical variables for subsequent statistical analysis. The application

of IRAMUTEQ thus proves instrumental in a comprehensive exploration and rigorous interpretation of textual content, enhancing the depth of our investigation.

To assess the quality of non-financial reporting, this study utilised the non-financial reports of leading global companies operating in the energy sector, identified through Thomson Reuters' TOP100 Energy Leaders. From this selection, the annual reports of European Union-based entities operating in energy production were analysed to identify keywords characteristic of each CSR pillar. Specifically, reports from ČEZ, E-ON, EPH and VEOLIA for the period 2015–2021 were selected for analysis.

An in-depth textual analysis of these reports was conducted using the IRAMUTEQ software, with a particular focus on quantifying the prevalence of corporate social responsibility (CSR) terms. These identified terms were used to assess the quality of energy companies operating in the Czech Republic based on their obligation to disclose non-financial information. The terms were categorised into three distinct pillars: environmental, social and economic. The following words were identified for individual pillars:

Environmental: ecosystem, ecological (ecology), electricity, emission, fauna, flora, fossil, photovoltaic, GWP, noise, climate (climatic), contamination (contaminate), safety (safe), renewable, waste, responsibility (responsible), protection (protect), warming, dioxide, fuel, planet, devastating (devastate), prevent (prevention, preventive), soil, greenhouse, solar, harmful, sustainability, sustainable, carbon, health, healthy, pollution, environment(/al/ally), biodiversity, biogas (biofuels), biomass.

Social: benefit (beneficiary, beneficent), donor (donate, donation), donorship, fund, human, foundation, personnel, support, allowance, social, employee, community, gender.

Economic: innovation (innovative), corruption, management, fine, governance, bribe, government, customer, source, resource.

The frequency of these terms in the annual and sustainability reports of the examined Czech entities was then evaluated in the context of each respective pillar as well as in an overall sense. Following this, fundamental descriptive statistical techniques were applied to analyse various aspects of the data. This encompassed an examination of the temporal evolution of the annual report breadth, measured by page count and word count, alongside the non-financial component of both the annual report and the sustainability report. Additionally, the progression over time of the aggregate count of terms relevant to the areas under evaluation (individual pillars and overall) was analysed.

Given the overarching objective of this research, which centres on evaluating the impact of mandatory disclosure of non-financial information in alignment with the EU directive, the collected data were segregated into two distinct time frames: prior to the introduction of obligatory non-financial reporting (2015, 2016) and during the period of mandatory reporting (2017–2021). This temporal categorisation forms the foundation for assessing the influence of regulatory directives on the nature and extent of non-financial information disclosure.

In this study, a paired t-test was used to compare the means of two distinct sets of data: one collected before the introduction of the obligation to disclose non-financial information and the other after the introduction of this obligation. These two datasets were labelled X_1 (representing the pre-change dataset) and X_2 (representing the post-change dataset). The respective mean values of these datasets were denoted as μ_{X1} and μ_{X2}.

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The formulation of the null and alternative hypotheses was as follows:

Null hypothesis H_0: The mean of the two datasets is equal, i.e., H_0: $\mu_{X1} = \mu_{X2}$.

Alternative hypothesis H_1: The mean value of the dataset before disclosure (X_1) is less than the mean value of the dataset after disclosure (X_2), i.e., H_1: $\mu_{X1} < \mu_{X2}$.

$$T = \frac{\bar{z}}{s_z}\sqrt{n} \quad (1)$$

The choice of the alternative hypothesis was influenced by the expectation that companies surveyed, which are now obligated to disclose non-financial information in annual reports due to Directive 2014/95/EU, would likely exhibit environmental and social disclosure improvements. This led to the selection of a left-sided test.

Introducing the random variable Z, defined as the difference between the random variables X_1 and X_2 ($Z = X_1 - X_2$), each pair of observations could be represented as z_i, which is the difference between individual observations ($z_i = x_{1,i} - x_{2,i}$). When both datasets share the same mean, the random variable Z is expected to have a mean of zero, i.e., $\mu_Z = 0$ under the null hypothesis (H_0). Conversely, if the second dataset (X_2) has a higher mean, the Z variable would have a distinctly negative mean, i.e., $\mu_Z < 0$ under the alternative hypothesis (H_1). Consequently, the scenario of a two-sample test effectively translates into a simplified one-sample t-test conducted on the Z variable. This approach facilitates a comprehensive comparison of the mean differences between the two datasets and provides insights into the effect of the non-financial information disclosure obligation.

3 Results and Discussion

A preliminary quantitative assessment of the dataset was conducted prior to the start of the analysis. Specifically, it focused on the size of the annual reports and their respective non-financial parts (number of pages and word count). In line with the findings of Grove Ditlevsen (2012), it can be concluded that corporate identity and visual elements are used in annual reports tactically to systematically shape and align corporate identity with organisational strategy in order to position the company attractively for investors and other stakeholders. To ensure that our methods are sound, we carefully examined the timing of each report. We then found that measuring the length of the report in terms of page count was a useful way to measure how the extent of the report changed from year to year. It was initially expected that the introduction of mandatory non-financial reporting would lead to an increase in the length of annual reports. However, it was not possible to confirm this assumption unequivocally from the available data. The results of this quantitative assessment are presented in Tables 1 and 2.

Table 1 | Length of annual report in words

Year/ Company	2015	2016	2017	2018	2019	2020	2021
ČEZ	15,580	121,951	9,800	11,271	15,892	20,384	6,066
E-ON	4,599	4,504	4,928	7,912	9,640	11,114	13,156
Veolia	30,222	40,556	23,943	34,228	55,872	19,643	54,171
EPH	67,893	73,663	83,333	94,450	99,939	106,554	72,457
			Of which the non-financial part				
ČEZ	1,420	9,551	543	663	1,236	2,094	264
E-ON	406	376	389	705	699	781	1,010
Veolia	3,807	7,387	3,562	8,118	10,212	7,589	29,849
EPH	2,012	2,970	1,770	2,437	1,802	1,980	1,751

Source: Authors' processing based on annual reports.

Because companies typically present annual reports and other documents intended for stakeholders in a consistent visual style, it becomes possible to compare changes in the scope of information by analysing the number of pages in individual reports.

Table 2 | Length of annual report and sustainability report in pages

Year/ Company	2015	2016	*	2017	*	2018	*	2019	*	2020	*	2021	*
ČEZ	329	332	1.01	356	1.07	374	1.05	370	0.99	370	1.00	369	1.00
E-ON	232	240	1.05	240	1.00	256	1.07	248	0.90	256	1.08	296	0.99
Veolia	119	120	2.03	121	1.01	156	1.29	186	1.05	176	1.02	98	1.04
EPH	99	124	1.10	142	1.15	155	1.09	163	1.01	269	1.11	183	1.03
					Of which the non-financial part								
ČEZ	30	26		20		22		30		38		16	
E-ON	20	20		19		23		18		18		21	
Veolia	15	14		18		37		41		68		54	
EPH	3	5		3		4		3		5		3	
					Sustainability report								
ČEZ	N/A	102	N/A	124	1.22	152	1.23	141	0.93	234	1.66	102	0.44
E-ON	217	173	0.8	134	0.77	112	0.84	122	1.09	147	1.20	146	0.99
Veolia	**	**		**		**		**		**		**	
EPH	89	110	1.24	103	0.94	112	1.09	149	1.33	145	0.97	163	1.12

Source: Authors' processing based on annual and sustainability reports.
* Index current year/previous year.
** Veolia disclosed the sustainability information for the researched period in various ways (integrated report, sustainability report, CSR overview).

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As not all the companies have complied with the recommendation to report non-financial information through a separate sustainability report, some have chosen to include the necessary information in their annual reports. Subsequently, an assessment of the annual reports themselves was carried out. Prior to evaluating the means of the study sets using a paired t-test, an investigation was conducted to confirm the normality of the dataset. The null hypothesis of this test assumes that the population follows a normal distribution. Due to the sample size ($n \leq 50$), the Shapiro-Wilk test was used, and its p-value was calculated. Specifically, the calculated p-value is 0.5461, which corresponds to a probability of $P(x \leq -0.1157) = 0.4539$. Since the obtained p-value exceeds the specified significance level (α), we accept the null hypothesis, which implies a normal distribution of the data.

The results of the subsequent paired t-test are presented comprehensively in Table 3 for reference.

Table 3 | Paired t-test

Statistical characteristic	Sample 1 (before 2017)	Sample 2 (after 2017)
Average	199.375	239.2
Variance	10,879.06	9,530.48
Pearson correlation coefficient	0.979428407	
Hypothetical difference in mean values	0	
Difference	3	
t-statistic	-3.6994827	
P(T<=t) (1)	0.017145134	
t crit (1)	2.353363435	
P(T<=t) (2)	0.034290269	
t crit (2)	3.182446305	

Source: Authors' processing

For the groups analysed, the result of the calculated t-statistic is -3.6994827, and the corresponding p-value is 0.017145134. Due to the nature of our left-sided test, we reflect the critical area to the left of zero by negating the value. Consequently, the critical area, expressed as an interval, is represented by $W = (-\infty, -2.353363435\rangle$. Since the calculated p-value is less than the predetermined significance level (α), we proceed to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), thus confirming that the mean of the original dataset is indeed lower than the mean of the subsequent dataset. Put simply, the values preceding the observed change are lower than the values following the change.

To assess the extent of differences between the compared datasets, we used Cohen's effect size coefficient, also known as Cohen's d test (Cohen, 1994). This measure helps determine the magnitude of differences between the groups being compared. Cohen's d, proposed by Cohen (1994), quantifies the relative change in means in a dataset related to the standard

deviation of the measurements within a group. A significant advantage of this coefficient is its independence of sample size, making it a valuable tool for discriminating the significance of effects. Conventional comparative criteria further assist in the interpretation of the coefficient values. If Cohen's d exceeds 0.8, this indicates a large effect; an effect between 0.5 and 0.8 indicates a medium effect and an effect lower than 0.2 is considered small. Cohen's d test is often used in text analyses to evaluate the qualitative differences in achieved results, for example, to assess whether the monitored variable has improved or not (e.g., Sripathi et al., 2024; Feay, 2003; Kraft, 2020). Cohen's d test is also used in the context of text message analysis. It has been used by Penney et al. (2023) or Kumar (2022) for the purpose of evaluating non-financial reporting.

Table 4 below shows Cohen's d values for each company analysed. It is noteworthy that a significant difference (exceeding 0.8) between the "before" and "after" periods was observed exclusively for ČEZ and E-ON. Of the companies examined, the most significant difference between the “before” and “after” periods is particularly evident for ČEZ.

Table 4 | Cohen’s d coefficient for each company

Company	Cohen’s d coefficient
ČEZ	Cohen's d = (365 - 330.5)/12.369317 = 2.78915966
E-ON	Cohen's d = (248 - 236)/6.324555 = 1.897367
Veolia	Cohen's d = (147.4 - 1195)/2,349,297.226671 = 0.000119
EPH	Cohen's d = (1485 - 1115)/3,202,998.558523 = 0.000116

Source: Authors’ own calculation

The calculation of Cohen's d was further extended to include the individual pillars in the annual reports over the entire time period of interest from 2015 to 2021. This calculation facilitated a comparative analysis of the magnitude of differences observed in the three individual pillars, namely environmental, social and economic. Through this examination, it is possible to identify which specific pillar has made the most significant progress. The results are presented in Table 5.

Table 5| Cohen’s d coefficient for each pillar

Pillar	Cohen’s d coefficient
Environmental	Cohen's d = (1921.8 - 1582)/175.534269 = 1.935804
Social	Cohen's d = (530.2 - 491.5)/99.000909 = 0.3909055
Economic	Cohen's d = (673.2 - 653)/33.14785 = 0.609391

Source: Authors’ own calculation

In the context of the evaluation of the three different pillars, the most significant progress was observed in the environmental pillar. In this pillar alone, Cohen's d coefficient exceeded the 0.8 threshold, indicating a significant change.

The original hypothesis concerning the expansion of sustainability reporting was confirmed, as indicated by the significant differences revealed by Cohen's coefficient between the “before” and “after” values. The subsequent analysis relates to the size of this expansion among the

reports analysed. On average, there was a 27% expansion of sustainability reporting in the companies studied during the period analysed. Specifically, the expansion was 11% for ČEZ, 10% for E-ON, 23% for Veolia and a remarkable 63% increase for EPH.

It is worth noting that a detailed analysis of the specific pillars revealed a striking increase in the number of environmental words, which represented a rise of almost 20%. Conversely, the economic and social pillars saw an unforeseen decline in word count of 2% and 12%, respectively.

It is important to note that, as Schröder (2022) further emphasised, there is a gap in the literature regarding the assessment of the quality of non-financial reporting for European companies that are required to comply with the European Union's Non-Financial Reporting Directive (2014/95/EU) as of 2017.

The quality of non-financial reporting (NFR) of Italian companies in the light of Directive 2014/95/EU was assessed by Carungu et al. (2020). They used qualitative research – a content analysis of non-financial reports of companies that were previously involved in the NFR process on a voluntary basis. They then assessed the quality of the NFR changed from a voluntary to a mandatory basis. The study concluded that the quality of NFR does not increase when moving from a voluntary to a mandatory basis, particularly for the 25% of companies that publish supplementary reports and/or sustainability plans. These findings are in contrast to our conclusions.

Conclusions

Based on the presented results, it can be concluded that companies operating in the energy production sector in the Czech Republic, which have been required to report non-financial information regarding their activities since 2017, have increased the volume of information disclosed in those areas. During the period when the directive was in effect, it was noted that both the Non-Financial Reporting Directive itself and its incorporation into national law mandated this obligation only for a specific set of reporting entities without addressing the reporting method. In the absence of standardised regulations in this domain, a textual analysis approach was employed to assess compliance with this obligation. Our approach relied on analysing the frequency of terms occurring among different pillars of corporate social responsibility (CSR). Progress was quantified based on the frequency of term occurrences in the annual reports of reputable companies operating in the energy production sector within the European Union. These companies had voluntarily adhered to and disclosed CSR principles even before this obligation was introduced.

Using a paired t-test, a hypothesis regarding the expansion of sustainability reports due to the implementation of Directive 2014/95/EU was examined. The assumption was that the mean value of the dataset prior to the directive introduction was lower than the mean value of the dataset after its introduction, leading to the application of a left-sided paired test. As the p-value is lower than the significance level (α), the null hypothesis was rejected. This confirmed the hypothesis, stating that the mean of the initial dataset was lower than the mean of the subsequent dataset. In simpler terms, the scope of the analysed sustainability reports was narrower before the change compared to the reports after the change.

We employed Cohen's effect size coefficient to measure the differences between the sustainability reports that we compared. A significant distinction emerged between the “before” and “after” periods for both ČEZ and E-ON. Notably, ČEZ exhibited the most substantial increase in its sustainability reports. When considering the three areas, environmental, social and economic environmental aspects demonstrated the most significant growth, as indicated by Cohen's effect size coefficient.

When we examined the percentages, we found that the sustainability reports for the companies studied grew by about 27% on average over the period analysed. In particular, the part that showed the most notable increase in the number of words was the environmental aspect, which saw a rise of nearly 20%.

Regarding the explanatory value of the analyses, we acknowledge the limited number of entities included in the dataset. Nonetheless, this dataset encompasses all the companies in the sector that are obligated to provide non-financial information under Directive 2014/95/EU. To address this, we plan to expand our research in the future by comparing it with larger companies operating in the same sector but are required to reveal non-financial data as per the directive.

The text analysis confirmed an amplification in both the quantity and comprehensiveness of information released in this domain. However, it is essential to note that the methodology used and the lack of established standards governing the content of this information hinder the assessment of its quality, which is a concern supported by prior studies. In the absence of clear guidelines, companies frequently opt to reveal positive aspects of their conduct while omitting negative details or presenting unfavourable information in a more favourable manner.

To assess adherence to CSR principles and facilitate both temporal and peer-based evaluations, the European Commission has introduced the CSR Directive. Approved as of November 2022, this directive broadens the mandate for disclosing CSR information to a wider array of reporting entities. Furthermore, in pursuit of more exhaustive coverage, two additional standards have been formulated. Consequently, our research stands to be further expanded and enriched in the future. This expansion is driven by the anticipated substantial increase in the numbers of companies mandated to disclose non-financial information stemming from these new developments.

Based on the literature review and results of our research, it is evident that there is no obligatory form and structure for the disclosure of non-financial information. This is the main reason why the above methodology was used to evaluate the quality of non-financial information.

This implies the need to identify and establish a uniform set of information that must be disclosed mandatorily in different sectors, such as environmental, social and economic. This standardisation is necessary to avoid a scenario where only favourable details are presented or negative aspects are portrayed in an overly positive light.

Limitations of the study and future research

It is acknowledged that the scope of this research encompasses a limited number of surveyed entities. However, it holds implications for all accounting units mandated to disclose non-financial information in the Czech Republic.

Given the forthcoming expansion of the CSR Directive, slated to broaden the scope of entities obligated to disclose non-financial information in 2023 and 2024, there is some potential to

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implement the present methodology across a broader spectrum of entities in future. We also intend to focus our research on the economic consequences of non-financial reporting, specifically in the energy sector, with potential extension to other sectors.

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