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The non-financial reporting practices of Hungarian listed public interest entities considering the 2014/95/EU Directive

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Abstract

Purpose – This paper aims to investigate the non-financial reporting (NFR) practices of Hungarian listed public interest entities for 2016–2018 in terms of the required disclosure content based on the 2014/95/EU Directive (ED).
Design/methodology/approach – The authors apply content analysis methodology on Hungarian firms subject to mandatory reporting under the ED. The target variable in the multivariate model is the reporting quality (Q_i) measured by a combined index.
Findings – The authors find that the ED had a moderate impact on Hungary's reporting quality because the overall disclosure of the sample only increased from low to medium level. The authors found that the value of intangible assets is a determinant of the reporting quality before and after the implementation of the ED. The findings support the effect of coercive isomorphism on Hungarian NFR practices.
Research limitations/implications – The limitation of the research is the number of firms examined. However, the authors covered the entire (non-bank) community of the Hungarian firms subject to the ED.
Practical implications – The authors suggest that reporting entities build upon the synergy between intellectual capital disclosure and NFR when elaborating their reporting strategies. The authors recommend the integration of ethical matters into corporate strategies and policies. Policymakers may consider the revision of the Hungarian regulations. The authors suggest academics embrace these topics in teaching.
Originality/value – To the best of the authors' knowledge, this is the first study that investigates the impact of ED in the context of Hungary. The authors contribute to the existing literature by adding the results of the ridge regression model, highlighting the importance of intangible assets.

Keywords Non-financial reporting, Directive 2014/95/EU, Hungary

Paper type Research paper

1. Introduction

Corporate reporting has gone through enormous changes over the last decades due to external and internal stakeholders' varied information needs (Flammer, 2013; Juhász, 2016; de Villiers and Sharma, 2020). Integrated reporting practices have emerged to ensure transparency and combination of financial and non-financial data (Burke and Clark, 2016; Dragu and Tiron-Tudor, 2013). Different frameworks [e.g. Global Reporting Initiative (GRI)

JEL Classification — M14, M41

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and Integrated Reporting Framework (IRF)] have also been created to define the content of such reports (in summary, non-financial reports) (Matuszczyk and Rymkiewicz, 2018). According to a survey by KPMG International (2020, p. 12) examining the largest entities of different regions, the sustainability reporting rate of Western Europe is 85% but significantly lower in Eastern Europe (74%). Central-Eastern European (CEE) countries were considered a separate cluster of emerging economies within Europe, with similar positions and prospects (Farkas, 2018, p. 201), sharing a need for substantial institutional changes to maintain convergence to the Western member states (Farkas, 2019).

Our research evaluates the NFR quality amongst Hungarian public interest entities considering the regulations of ED. As this research is elaborated in a CEE environment, we chose to apply the methodology developed by Dumitru *et al.* (2017). The item list disclosed by the authors based on the requirements of the ED is in line with the guidelines of European Commission for non-financial reporting (NFR) 2017/C 215/01 (EUG), which provide a methodological guidance on the reporting obligation of non-financial information (NFI) that adds even more detail to be published compared with GRI (Manes-Rossi *et al.*, 2018). The EUG offers a detailed explanation of the items to be disclosed in the statements. Hence, the author executing the scoring enhanced the objectivity of the content analysis by depending on the guidelines.

We added new results to this area of research in CEE countries by including Hungary's case. Several scholars have investigated the Hungarian tendencies regarding intellectual capital or sustainability-related communication and disclosure of firms (Buzás and Lukovics, 2019; Kovács and Lippai-Makra, 2018; Ligeti and Oravecz, 2009; Lippai-Makra *et al.*, 2019; Lukovics and Fisher, 2017). However, to the best of our knowledge, this is the first content analysis carried out in relation to the impact of the ED in Hungary. We contribute to the existing literature by adding the results of our multivariate model that defines the value of intangible assets as a determinant of non-financial disclosure pre and post ED.

Our empirical results reflect the connection between the two research areas of NFR and intangible capital disclosure. The data verify an association between the magnitude of the intangible assets of sample entities and the quality of their non-financial disclosure in the Hungarian setting. This may be considered another reason for the researchers of the two territories to make joint efforts in investigating disclosure practices because the entities of interest for the two parties may form a common sample during cooperation.

This paper is structured as follows: After introducing our theoretical model based on the literature review, the applied methods for data processing and analysis are presented. Moreover, we will interpret our results of the ridge regression model before we conclude this paper.

2. Literature review

Several theories have emerged in relation to corporate disclosure, e.g., legitimacy theory, stakeholder theory, signal theory and agency theory (Lakatos, 2013; Shehata, 2014), of which legitimacy theory is connected to NFR by most authors (Manes-Rossi *et al.*, 2018; Ortas *et al.*, 2015). According to the theory of organizational legitimacy, an organization can only operate within a framework that is established by members of society (Pereira Eugénio *et al.*, 2013). The theory, therefore, is based on preconceptions about society and social relations and suggests that managers should communicate information that influences users' perceptions of their organizations (Cormier and Gordon, 2001; Deegan, 2002).

2.1 The impact of ED

A crucial step ahead of the road toward standardized NFR has been the publication of the EU Directive 2014/95/EU (ED) (Ştefănescu *et al.*, 2020). The Hungarian Accounting Act (HAA) regulates the content of the annual financial statements and the attached business reports to

be published by local entities. The HAA had required firms to disclose environmental information in both the supplementary notes and the business reports long before the publication of the ED. However, information related to the social, employee and ethical matters was not included. This implies that local entities have preliminary experience about reporting environmental issues but may experience challenges regarding other areas. As of 2017, since Hungary's implementation of the ED in local law, public interest entities were required to disclose NFI as part of their business reports. The actual regulations of HAA do not extend the circle of entities subject to the new regulations as permitted by the ED, but they rather narrow the scope based on net sales revenue and total assets. This narrowed-down scope and the accessibility of the business report put the effectiveness of the new regulations in question and further emphasizes the crucial role of the country-specific legislative implementation and context in reaching the goal of transparency (Korca and Costa, 2021; La Torre *et al.*, 2018).

Reporting practices, compliance and the possible effects of the ED had been investigated with content analysis even before the implementation started (Dumitru *et al.*, 2017; Hoffmann *et al.*, 2018; Matuszak and Różańska, 2017; Peršić and Lahorka, 2018; Venturelli *et al.*, 2017, 2019). The series of research continued after the introduction of ED, examining the disclosure before and after the ED to explore its effects (Caputo *et al.*, 2020; Matuszak and Różańska, 2021; Mio *et al.*, 2020; Mion and Loza Adaui, 2019; Sierra-Garcia *et al.*, 2018; Tiron-Tudor *et al.*, 2019).

The two territories of NFR and intangible disclosure are closely connected under the broad topic of corporate reporting (Tarquinio and Posadas, 2020; Zambon *et al.*, 2020). Content analysis has been serving as a well-established research method in the case of intangible capital and R&D-related disclosure (Jones, 2007; Kang and Gray, 2011; Kumar, 2013; Li *et al.*, 2008; Ragini, 2012). According to Ragini (2012), environment and social responsibility-related items were included in the author's list of intangible disclosure elements. The set of categories applied by Stolowy and Paugam (2018, p. 540) also reveal a remarkable overlap between the content of non-financial disclosure and intangible elements, such as human resource, strategy, and value creation. Meanwhile, according to Badia *et al.* (2019), integrated reporting can play a special role in mobilizing intellectual capital elements. Moreover, Corbella *et al.* (2019) explored how the preparers of integrated reports engage with intellectual capital during the process.

2.2 Reporting quality and coding

Neither a common meaning nor a generally accepted definition of NFI exists (Haller *et al.*, 2017; Tarquinio and Posadas, 2020), and different authors used different categorizations according to the focus of their research. For the issue of reporting quality, subjectivity in the interpretation is significant, and no uniform definition is available in the literature (Beattie, 2014; Ottenstein *et al.*, 2021; Venturelli *et al.*, 2019). Some scholars (e.g. Ragini, 2012) measured disclosure quantity with dichotomous coding schemes where one score is given for the presence of a certain item, but no score is added for repeated disclosure. Any modification on the dichotomous model can be considered an involvement of reporting quality in the research. Li *et al.* (2008) further elaborated the scoring by distinguishing the types of disclosure into narrative, quantitative or graphical. Another way to approach quality is to use weighted scores, which assign uneven scores to narrative and quantitative data (Dumitru *et al.*, 2017). We can also grasp quality based on other indicators, such as availability, credibility and strategic anchorage of NFI (Mion and Loza Adaui, 2019). Vitolla *et al.* (2019) completed the evaluation of content with several concepts, including background, assurance, reliability and form to assess quality. Fiandrino *et al.* (2021) highlight the importance of examining NFR quality in the light of the regulation.

Several authors have argued about the manual versus computer-based coding applied in the case of content analysis (Beattie and Thomson, 2007; Castilla-Polo and Ruiz-Rodríguez, 2017; Dumay and Cai, 2014; Krippendorff, 1989). Undoubtedly, great opportunities related to software-based coding are available (Bagnoli and Redigolo, 2016; Fenyves *et al.*, 2018). However, other researchers (e.g. Bellora and Guenther, 2013; Li *et al.*, 2008; Oliveira *et al.*, 2006;

Striukova *et al.*, 2008) opted for manual coding, which can help interpret the text and deal with firm-specific terms, synonyms and multiple meanings.

Albu *et al.* (2017) pointed out some special reporting features of CEE countries, which underwent several reforms but still needed development of the institutional infrastructure to improve accountability. The authors also supported the publication of country-specific data based on the analysis of reports written in different languages because the community of international researchers can obtain an insight into the reporting tendencies this way. We found inspiration based on the literature to carry out an investigation on Hungary's pre and post ED disclosure practices. By adding the case of Hungary to the scientific debate we hope to address the literature gap related to this emerging country (Korca and Costa, 2021). Since non-financial disclosure has become mandatory, more and more authors link it with institutional theory and especially coercive isomorphism (Dumitru *et al.*, 2017; Tiron-Tudor *et al.*, 2019); it can be assumed that, as a result of formal pressures, the differences in companies' NFR practices will decrease.

3. Empirical research

The content analysis methodology applied in this paper was adopted from Dumitru *et al.* (2017) and later completed with another type of coding based on Li *et al.* (2008) to determine the impact of weighting on the results. We concluded that despite the obvious advantages of computer-based search methods – such as objectivity, time saving and better comparability – at this point, no such solution was available for us that would have provided the same accuracy of understanding and interpreting the data as in the case of human coding. The first author carried out the scoring in a two-stage process by double-checking and critically evaluating the initial coding. Our analysis is presented in sentence levels, which are analysed in the context of their surrounding text (Dunne *et al.*, 2020). We looked for those Hungarian firms that meet the requirements set by the ED and the corresponding sections of the HAA to build a sample. In addition, we chose the time frame of the study (2016–2018) to focus on the before and after the report contents in line with Korca and Costa (2021).

3.1 Sample and basic approach

We downloaded the annual financial statements from the websites of the entities. The ED does not specify the source document of the NFI; thus, we also extended the search for the supplementary notes and the attached business reports and included any other annual or sustainability statements in the analysis. This is in line with the general approach described by Dumay and Cai (2014) who examined intellectual capital disclosure-related studies (1999–2013). The authors pointed out that 79% of the articles use annual reports as a data source, whereas significantly fewer studies used other sources; for instance, only six pieces of literature relied on interviews.

As a first step, we looked for public interest entities that fit the ED requirements and targeted the firms listed on the Budapest Stock Exchange. We found 12 entities with more than 500 employees as required by the ED (European Union, 2014). Similar to Dumitru *et al.* (2017), or Stolowy and Paugam (2018), we excluded all listed or non-listed participants of the banking and insurance sector at this phase due to financial institutions having different reporting requirements and special features compared with the other sectors. Another reason for this was that Hungarian regulations (Act CCXXXVII: 2013 on *credit institutions and financial enterprises*) exclude certain entities from the list of those subject to the ED. No other possible subjects of mandatory NFR exist because the Hungarian legislation did not add any other circle of entities based on the nature of their business and the size or the number of their employees as permitted by the ED. Moreover, Hungarian regulations define criteria (based on firm size) for being subject to the ED, which is more restrictive than the original circle. We worked with a final sample of eight Hungarian entities [1].

3.2 Data analysis

We chose the methodology elaborated by Dumitru *et al.* (2017), because they provided a comprehensive list of items included in the content analysis carried out on a CEE sample. They constructed a research instrument covering 20 non-financial items relating to four categories (Appendix 1) and searched the reports for the respective items. They developed a scoring system that also reflects both the intensity and the quality of disclosure: 0: no presentation; 1: narrative presentation; 2: presentation using KPIs or other numerical/quantitative data; 3 (2+1): narrative plus quantitative data presented at the same time. Consequently, the maximum score available for the reports was 60 (20*3), and higher scores mean better quality disclosure.

Following Dumitru *et al.* (2017), we calculated four indices for each sample company based on the assigned scores and the maximum number of points per category. The indices are constructed as follows:

$I_1 = \left(\frac{P_1}{12}\right)*100$; $I_2 = \left(\frac{P_2}{21}\right)*100$; $I_3 = \left(\frac{P_3}{24}\right)*100$; $I_4 = \left(\frac{P_4}{3}\right)*100$, where P is the number of points assigned to the entities in the respective categories.

Moreover, to evaluate the overall non-financial disclosure quality, we calculated the following combined index:

$$I_{combined} = \frac{(I_1 + I_2 + I_3 + I_4)}{4}.$$

We found other methods for measuring the disclosure quality in the literature; therefore, we applied an alternate scoring system on the reports of the sample. The aim was to observe the effects of an alternative weighting of the different types of disclosure. Based on Li *et al.* (2008), we recalculated the scores by considering not only the narrative and numerical data but also graphic illustrations (i.e. graphs, not including photographs). Thus, the modified scoring (denoted later as: $I_{combined,mod}$) involves the following: 0: no presentation; 1: narrative presentation; 1: presentation using KPIs or other numerical/quantitative data; 1: graphic illustration. The maximum score was 3 per item and 60 per report in this alternative scoring method, which meant that the entity provided narrative, qualitative and graphic information on all 20 items from the list.

We attempted to find some company-specific independent variables which have a significant impact on the reporting quality. Based on the literature, we assume that larger (Mion and Loza Adaui, 2019; Sierra-Garcia *et al.*, 2018), R&D-intensive (Ortas *et al.*, 2015) and more profitable companies (Dalal and Thaker, 2019) can obtain better quality of reporting. We also included dummy variables based on the literature.

The relatively small sample size allows us to use only a limited number of variables; therefore, to describe reporting quality (Q_i), this study uses four different variable groups to represent the size (S_i), know-how-specific assets (A_i), profitability (P_i) and reporting-specific dummies (d_i) for each ith company (1).

$$Q_i = const. + \beta_{1:2}S_i + \beta_{3:5}A_i + \beta_{6:8}P_i + \beta_{9:11}d_i + \varepsilon \quad (1)$$

We were looking for the best fitting model, following a horse-race approach, where the residuals (ε) met the statistical requirements (normal distribution, no autocorrelation), and we could have the highest number of statistically significant variable groups ($p < 0.1$). This was the core principle of selecting one variable from each group:

(1) The size of the company (S_i) is represented by the number of employees (no_i) and total assets (BS_i): $S_i \in (no_i, BS_i)$ (Mion and Loza Adaui, 2019; Sierra-Garcia *et al.*, 2018);

(2) The know-how-specific assets of the company (A_i) are represented by fixed assets (FA_i), intangible assets (IA_i) or the ratio of intangible to long-term assets (ILA_i): $A_i \in (FA_i, IA_i, ILA_i)$ (Ortas *et al.*, 2015);

(3) The profitability (P_i) of the company is represented by net sales (NS_i), operational profit (OP_i) or pre-tax profit (PTP_i): $P_i \in (NS_i, OP_i, PTP_i)$ (Dalal and Thaker, 2019);

(4) The reporting-specific dummy variables (d_i) are covering the issues of index SI (dI_i) (Dumitru *et al.*, 2017) and environmental sensitivity (dS_i) (Barbu *et al.*, 2011; Dumitru *et al.*, 2017) or the audit is conducted by the so-called Big Four companies ($d4_i$): $d_i \in (dI_i, dS_i, d4_i)$ (Dumitru *et al.*, 2017; Manes-Rossi *et al.*, 2018).

The following is an anticipated assumption for the model coefficients: An increased corporate size can contribute to the quality of reporting ($\beta_{1:2} > 0$), whereas the sheer size of know-how-specific assets should be represented in higher quality ($\beta_{3:5} > 0$). However, pairing profitability with an intuitive coefficient is difficult because companies in losses can be motivated more to report to calm investors and creditors ($\beta_{6:8} \sim 0$). Meanwhile, dummy variables represent corporate-specific distortions for the sample to support the normal distribution of the residuals.

Our target variable in this paper is reporting quality (Q_i) measured in terms of combined index based on Dumitru *et al.* (2017) or Li *et al.* (2008). Based on the scores obtained from the content analysis, we attempted to find cause and effect relationship between the disclosure scores representing reporting quality (Q_i) as the dependent variable and the following independent variables:

(1) *Organizational size (S_i):* measured in terms of employee number or total assets (Sierra-Garcia *et al.*, 2018; Mion and Loza Adaui, 2019).

(2) *Know-how-specific assets (A_i):* measured in terms of fixed assets, intangible assets or the ratio of intangible to fixed assets (Ortas *et al.*, 2015).

(3) *Profitability (P_i):* measured in terms of net sales or operational profit, or pre-tax profit (Dalal and Thaker, 2019).

Reporting-specific dummy variables are:

(4) *Sustainability Index*, which takes the value of 1 if the company is selected to a special index, such as DJSI, and 0 otherwise (Dumitru *et al.*, 2017).

(5) *Environmental sensitivity*, which takes the value of 1 if the company operates in an environmentally sensitive domain, and 0 otherwise (Barbu *et al.*, 2011; Dumitru *et al.*, 2017).

(6) *Big 4*, which takes the value of 1 if the company's audit was conducted by one of the so-called Big Four companies (Dumitru *et al.*, 2017; Manes-Rossi *et al.*, 2018).

3.3 Methodology

Emerging and small economies are generally affected by the undercapitalization of the stock market, indicating a significantly low set of public listed enterprises compared with the developed economies (especially in the micro- and small-capitalization segments). This can be motivated by the higher funding cost due to the scarcity of the available liquidity, regulation discrepancies and the emergence of private corporate sector (especially in the European transitional economies) (Efird, 2008). This phenomenon has an important influence on the applied methods of this paper: To overcome the potential statistical biases of the small set of data, we used ridge regression during our analysis.

Input data for regressions should be similarly scaled, which can be achieved easily through the logarithm of the data. However, due to the occurrence of negative data in our case, the annual Z-score was calculated for each annual variable vector to standardize them (2):

$$zv_{i,t} = \frac{v_{i,t} - E(v_{i,t})}{\sigma(v_{i,t})} \tag{2}$$

Classical linear regression assumes that grouped data mean fall on some linear surface, and the parameters can be estimated on this basis. Ordinary least squares (OLS) regression offers a model: $\min_{\mu \in \Re} \sum_{i=1}^{n} (y_i - \mu)^2$ for random y and μ unconditional population mean:

$$y = const. + \beta_1 x_1 + \cdots + \beta_n x_n + \varepsilon \tag{3}$$

where the residuum (ε) of the regression is not autocorrelated (Durbin–Watson statistics are between 1.8 and 2.2) and have a normal distribution (Jarque–Bera test p-value > 0.1).

However, due to the previously mentioned structural reasons behind the small size of the available data, this study used ridge regressions to overcome the following limitations. The Gauss–Markov theorem requires that the least squares estimator has the smallest variance amongst the other linear unbiased alternatives; however, infinite variance and therefore biased results will occur if some of the explanatory variables ($X \in (x_1, \ldots, x_n)$ are perfectly correlated. Even under more realistic common movements, the following symptoms can occur: Small changes in the data can contribute to wide swings in parameter estimates, and coefficients can have high standard errors or counterintuitive signs or magnitude. The bias of multicollinearity appears mostly when the data set is short. The need for more information does not require more observations, but dropping variables responsible for the bias can be one possible way. Although the least squares estimator can be written as $\widehat{\beta}_{ls} = (X'X)^{-1}X'y$, the ridge estimator contains a biasing parameter ($k > 0$) to multiply a diagonal matrix (D) to secure an unambiguously smaller covariance matrix: $\widehat{\beta}_r = (X'X + kD)^{-1}X'y$. Even if the bias parameter involves some sort of bias at the regression parameters, the estimation with a $1 > k > 0$ will still be more efficient than what we can find at the OLS model (Greene, 2003; Kovács, 2008). Therefore, both the ridge regression results and the OLS will be presented in this paper to provide control.

4. Results

After determining the results of the sample entities (Table 1), we applied the same four levels of disclosure quality used by Dumitru *et al.* (2017): 0 = no disclosure; 1–30% = low-quality disclosure; 31–70% = medium-quality disclosure; 70–100% = high-quality disclosure. Based on the $I_{combined}$ index, we conclude that the ED has a moderate impact on the NFR practices of the sample firms, because the 3% increase in average disclosure score is only enough to bring the sample to medium-level quality. Moreover, the effect of the Hungarian local regulations is visible: Entities provide considerably more environmental information in the reports than the other categories. Standard deviation of the disclosure scores of entities is relatively high for Hungary but decreased as a result of the ED. The results can be interpreted as an evidence for coercive isomorphism and especially the influential role of national regulations. Social and employee-related matters show the largest increase over the three years, yet the level still remains medium in this category.

4.1 Overall picture

The sample shows a mixed picture of applying standards (GRI) or relying on their own reporting formats. We agree with Venturelli *et al.* (2020) in that reaching the goal of comparability will be critical for the upcoming years. The results reveal that the overall reporting quality of the

Table 1.
Non-financial disclosure quality scores in Hungary

	1	2	3	4	5	6	7	8	Avg.	Max.	Min.	SD
Index 2016												
I1. Business model	25.00	66.67	8.33	66.67	0.00	8.33	75.00	0.00	31.25	75.00	0.00	30.54766
I2. Environmental matters	14.29	100.00	4.76	100.00	0.00	19.05	100.00	0.00	42.26	100.00	0.00	45.14009
I3. Social matters	4.17	54.17	8.33	87.50	0.00	8.33	45.83	0.00	26.04	87.50	0.00	30.45873
I4. Ethical matters	0.00	33.33	0.00	100.00	0.00	0.00	0.00	0.00	16.67	100.00	0.00	33.33333
I combined	10.86	63.54	5.36	88.54	0.00	8.93	55.21	0.00	29.06	88.54	0.00	32.39981
Category	Low-q.	Med.-q.	Low-q.	High-q.	No discl.	Low-q.	Med.-q.	No discl.	Low-q.			
Index 2017												
I1. Business model	16.67	66.67	16.67	66.67	33.33	8.33	50.00	16.67	34.38	66.67	8.33	22.21951
I2. Environmental matters	14.29	100.00	19.05	100.00	0.00	23.81	100.00	28.57	48.21	100.00	0.00	40.85519
I3. Social matters	4.17	54.17	25.00	87.50	16.67	4.17	45.83	16.67	31.77	87.50	4.17	26.99806
I4. Ethical matters	0.00	33.33	0.00	100.00	0.00	0.00	0.00	0.00	16.67	100.00	0.00	33.33333
I combined	8.78	63.54	15.18	88.54	12.50	9.08	48.96	15.48	32.76	88.54	8.78	28.45108
Category	Low-q.	Med.-q.	Low-q.	High-q.	Low-q.	Low-q.	Med.-q.	Low-q.	Med.-q.			
Index 2018												
I1. Business model	16.67	66.67	16.67	66.67	50.00	8.33	33.33	16.67	34.38	66.67	8.33	22.21951
I2. Environmental matters	14.29	100.00	19.05	100.00	14.29	23.81	33.33	19.05	40.48	100.00	14.29	34.83033
I3. Social matters	4.17	58.33	25.00	87.50	16.67	4.17	79.17	16.67	36.46	87.50	4.17	31.44039
I4. Ethical matters	0.00	33.33	0.00	100.00	0.00	0.00	33.33	0.00	20.83	100.00	0.00	33.07189
I combined	8.78	64.58	15.18	88.54	20.24	9.08	44.79	13.10	33.04	88.54	8.78	27.96649
Category	Low-q.	Med.-q.	Low-q.	High-q.	Low-q.	Low-q.	Med.-q.	Low-q.	Med.-q.			

Source(s): Own construction

Hungarian sample is low with a combined index value of 29.03 in 2016. It only slightly increases above the medium limit (to 32.76 and 33.06) in 2017 and 2018, respectively.

The environmental matters category produced the highest average scores throughout the whole period. As in Hungary, HAA had already required environment-related disclosure long before the ED; this is in line with the phenomena found by Dumitru *et al.* (2017) and Tiron-Tudor *et al.* (2019) for the case of Romania where business model had been required by local regulation pre ED and consequently favoured in disclosure in the sample.

The category with the lowest index is about ethical matters similar to the case for Poland and Romania (Dumitru *et al.*, 2017). Many of the Hungarian entities still did not disclose any information on ethics in 2017–2018. The other two sections (business model and social) remain on a medium level around 31–34 and 26–36, respectively, with the latter showing the greatest increase (over 10%) in the period.

Concerning entities, we observe that two of them had not disclosed any information on environmental, social and ethical matters before the ED but had started to do so after the implementation of the new regulations. One of the three members of the low-quality disclosure group performed a significant increase (5.36–15.18); others remained virtually on the same level and in the same category. The members of the medium-quality and high-quality disclosure categories also remained on similar levels, with one entity having falling scores. The reporting practices of these latter firms who reported NFI on formation on a voluntary basis did not significantly change, plausibly because their incentives come from the information needs of the stakeholders, which is more of a voluntary motivation and unrelated to the ED which is consistent with the results of Matuszak and Różańska (2021).

Furthermore, we also examined the number of disclosures of different kinds for the 20 items included in the content analysis to see which ones resulted in the most and least information for the report users (Appendix 1). The top six items remain the same across 2016–2018: impact on the environment; business model – brief description; GHG emissions; actions taken to ensure the protection and development of the local communities. Regarding fifth and sixth place, health and safety and working conditions, respectively, became much more frequent in 2017–2018. The items with the lowest score vary for the three years but two of them remain in the list of the four least-disclosed data: prevention of human rights, corruption and bribery and the implementation of fundamental conventions of the International Labour Organisation (see Tables A1 and A2).

4.2 Multivariate model

The theoretical model was tested with ridge regression (Table 2), where each model group was tested, and our results were filtered through the above-mentioned horse-race strategy. In this section, we discuss the result of the most representative models, but Appendix 2 contains the similar results of the OLS regression to present the robustness of our results. The OLS provided more significant results, but these results may be biased by anomalies regarding the small sample size because all coefficients were large, and the size had a counterintuitive value.

The $I_{combined}$ approach proved to be more useful in describing the main characteristics of the companies in the high-quality reporting category in the first two years, whereas the $I_{combined,mod}$ provided better results in 2018. This indicates that the weighting used in the scoring methodology is a factor that influences the applicability of statistical methods.

Focussing on the details, we can assume corporate size as a key variable in determining reporting quality, but it was counterintuitive in 2016 and insignificant in 2018. This means that larger companies do not necessarily disclose more NFI than smaller entities. However, intangible assets can contribute to the value-added of the company because of their significant positive impact. Not surprisingly, intangible assets were filtered out in all cases, meaning that intangible assets require special attention from a reporting point of view to maintain transparency. Profitability had no stable representation in this case, but it provided

Table 2.
Ridge regression results

		2016				2017				2018			
		I_comb		I comb-mod		I_comb		I comb-mod		I_comb		I comb-mod	
		Coeff.	*p*	Coeff.	*p*	Coeff.	*p*	Coeff.	*p*	Coeff.	*p*	Coeff.	*p*
Const.		−0.746	0.1130	−0.723	0.2521	0.578	0.604	0.496	0.2498	0.1118	0.3192	0.3613	0.401
Size	No												
	BS	−0.9273	0.317	0.1546	0.5503	1.6880	0.013	10.874	0.175	0.3286	0.3762	−0.6750	0.2533
Asset	FA												
	IA	0.6379	0.004	0.6278	0.012	0.3460	0.006	0.4871	0.011	0.6635	0.133	1.2647	0.042
	ILA												
Profit	NS									0.4336	0.2735	1.4155	0.649
	OP					−0.9267	0.066	−0.4289	0.1471				
	PTP	1.4928	0.080	0.3867	0.1825								
Dummy	Index									−0.4510	0.2592	−1.4474	0.298
	Sens.	0.1992	0.483	0.1949	0.1287	−0.1541	0.235	−0.1325	0.1299				
	BIG4												
Diag.	DW	2.1946		1.9907		20.894		2.1711		2.2443		2.0457	
	R^2	0.9980		0.9951		0.9993		0.9978		0.9920		0.9923	
	Normal		0.5000		0.5000		0.5000		0.5000		0.1267		0.1742

Source(s): Own construction

the highest coefficient in the model. This result can be interpreted as a consequence of cyclicality and requires further investigation of longer time periods.

Operating in an environmentally sensitive domain or participating in a sustainability index proved to be meaningful to manage corporate-specific biases. However, the sample size does not allow us to make further statements because we only used these dummy variables to achieve non-autocorrelated and normally distributed residuals.

From an investor viewpoint, this means that users of financial statements can expect to obtain more NFI from participants of more intangible-intensive sectors. This is not surprising because the common ground between intellectual capital reporting and NFR is that both areas challenge the traditional accounting paradigm. However, the stakeholders require NFI from all sectors; therefore, the role of policymakers and standard setters is still crucial on the path toward a new era of integrated reporting.

5. Conclusion

This study contributes to the literature by demonstrating the fact that the ED led to an increase of the level of NFR disclosure in Hungary similar to other countries examined by prior research (Caputo *et al.*, 2020; Matuszak and Różańska, 2021; Tiron-Tudor *et al.*, 2019; Venturelli *et al.*, 2019). Our results show that the ED had a larger impact on companies that have not reported NFI voluntarily before the new legislation, and on matters that have not been regulated earlier. These findings support the effect of coercive isomorphism on Hungarian NFR practices.

The limitation of the research is the number of firms examined. However, we covered the entire (non-bank) community of the Hungarian firms subject to the ED. Nevertheless, financial institutions should be considered as subjects of further research since they may become prominent participants in promoting sustainable practices by monitoring non-financial impacts during funding provision as well (Cosma *et al.*, 2020).

Another possible research direction is the impact of the disclosure of the corporate contributions to the UN SDGs and its impact on the content and format of NFR (Győri *et al.*, 2021; Pizzi *et al.*, 2021).

Since the EU will extend the scope of the ED (Ottenstein *et al.*, 2021), it is crucial for listed entities to be prepared. We recommend policymakers to widen this group by deleting the limit related to sales revenue and total assets from HAA to achieve better compliance with the aim of the ED. We suggest that Hungarian entities prepare for boarder mandatory NFR disclosure and to develop systems to gather, maintain and report NFI to provide higher quality disclosure, especially in the field of ethical matters.

This paper provides practitioners and academics some new insight into the NFR practices of Hungarian listed public interest entities in the light of the ED. We suggest academics embrace this issue in teaching to support the education of the new generation of accounting professionals.

Environmental information is the most frequent in the reports of the sample firms, which supports the notion that previous financial accounting regulations are drivers of NFR. We find the largest increase in social and worker-related data, which means that preparers have overcame reporting barriers here. Managers may consider drawing upon the experience and successful measures employed at this area to excel at more challenging grounds as well. The area which seems to cause the most difficulty in reporting is the ethical matters. Low disclosure can be addressed by ensuring that ethical issues form a substantive part of the corporate strategy and the procedures to handle these matters are properly established.

The multivariate model revealed the special role of intangible assets as strong determinants of NFR practices regardless of the launch of the new regulation. This implies that those investors who prefer transparency may turn their attention to the intangible-intensive industries. Moreover, preparers may build upon the synergy between intellectual capital disclosure and NFR when elaborating their reporting strategies.

Note

1. The sample companies are engaged in various industries including oil and gas, pharmaceutical, other manufacturing and also service sectors. Based on their 2018 annual statements, their size is the following: net sales: 81–12,847 million euros, total assets: 55–13,162 million euros, number of employees: 848–25,855. The age of the entities: 21–167 years.

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Appendix 1

2016	0	1	2	3	Sum
I. Business model, policies, risks related to CSR issues					
1. Business model – brief description	3	1	0	4	13
2. Policies related to environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters	5	3	0	0	3
3. Principal risks related to environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters	6	2	0	0	2
4. Non-financial KPIs.	6	0	0	2	6
II. Environmental matters					
1. Impacts on the environment	2	1	0	5	16
2. Impacts on health and safety	5	0	0	3	9
3. Use of renewable energy	5	0	0	3	9
4. Use of non-renewable energy	5	0	0	3	9
5. Greenhouse gases (GHG) emissions	4	1	0	3	10
6. Water use	5	0	0	3	9
7. Air pollution.	5	0	0	3	9
III. Social and employee-related matters					
1. Actions taken to ensure gender equality	5	0	0	3	9
2. Implementation of fundamental conventions of the international Labour Organisation	8	0	0	0	0
3. Working conditions	4	3	0	1	6
4. Respect for the right of workers to be informed and consulted	4	3	0	1	6
5. Respect for trade union rights	5	2	0	1	5
6. Health and safety at work	5	1	0	2	7
7. The dialogue with local communities	5	1	0	2	7
8. Actions taken to ensure the protection and the development of the local communities	4	1	0	3	10
IV. Ethical matters					
1. Prevention of human rights abuses, instruments in place to fight corruption and bribery	6	1	0	1	4

2017	0	1	2	3	Sum
I. Business model, policies, risks related to CSR issues					
1. Business model – brief description	1	4	0	3	13
2. Policies related to environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters	1	6	0	1	9
3. Principal risks related to environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters	5	3	0	0	3
4. Non-financial KPIs.	5	0	1	2	8
II. Environmental matters					
1. Impacts on the environment	1	0	0	6	18
2. Impacts on health and safety	5	0	0	3	9
3. Use of renewable energy	5	0	0	3	9
4. Use of non-renewable energy	5	0	0	3	9
5. Greenhouse gases (GHG) emissions	2	2	0	4	14
6. Water use	5	0	0	3	9
7. Air pollution.	5	0	0	3	9

Table A1.
Number of disclosure types in Hungary

(*continued*)

2017	0	1	2	3	Sum
III. Social and employee-related matters					
1. Actions taken to ensure gender equality	5	0	0	3	9
2. Implementation of fundamental conventions of the international Labour Organisation	8	0	0	0	0
3. Working conditions	0	7	0	1	10
4. Respect for the right of workers to be informed and consulted	4	3	0	1	6
5. Respect for trade union rights	5	2	0	1	5
6. Health and safety at work	3	2	0	3	11
7. The dialogue with local communities	3	3	0	2	9
8. Actions taken to ensure the protection and the development of the local communities	3	1	0	4	13
IV. Ethical matters					
1. Prevention of human rights abuses, instruments in place to fight corruption and bribery	6	1	0	1	4
2018	**0**	**1**	**2**	**3**	**Sum**
I. Business model, policies, risks related to CSR issues					
1. Business model – brief description	2	3	0	3	12
2. Policies related to environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters	7	0	0	1	3
3. Principal risks related to environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters	5	0	0	3	9
4. Non-financial KPIs.	5	0	1	2	8
II. Environmental matters					
1. Impacts on the environment	0	0	0	8	24
2. Impacts on health and safety	5	1	0	2	7
3. Use of renewable energy	6	0	0	2	6
4. Use of non-renewable energy	6	0	0	2	6
5. Greenhouse gases (GHG) emissions	2	3	0	3	12
6. Water use	6	0	0	2	6
7. Air pollution.	5	1	0	2	7
III. Social and employee-related matters					
1. Actions taken to ensure gender equality	5	0	0	3	9
2. Implementation of fundamental conventions of the international Labour Organisation	8	0	0	0	0
3. Working conditions	0	6	0	2	12
4. Respect for the right of workers to be informed and consulted	4	2	0	2	8
5. Respect for trade union rights	5	1	0	2	7
6. Health and safety at work	3	2	0	3	11
7. The dialogue with local communities	3	3	0	2	9
8. Actions taken to ensure the protection and the development of the local communities	3	1	0	4	13
IV. Ethical matters					
1. Prevention of human rights abuses, instruments in place to fight corruption and bribery	6	1	0	1	4

Source(s): Based on Dumitru *et al.* (2017, p. 304), own construction

Table A1.

Appendix 2

Table A2.
Ordinary least square regression results

		2016				2017				2018			
		I_comb		I comb-mod		I_comb		I comb-mod		I_comb		I comb-mod	
		Coeff.	*p*	Coeff.	*p*	Coeff.	*p*	Coeff.	*p*	Coeff.	*p*	Coeff.	*p*
Const.		−0.7599	0.003	−0.6759	0.248	−1.2155	0.105	−0.9483	0.406	−3.3209	0.013	−2.1608	0.027
Size	No	−1.2078	0.006	−0.7615	0.883	−0.4119	0.1654	−0.1751	0.5916				
	BS									7.9210	0.071	4.9646	0.164
Asset	FA									3.3806	0.173	2.9610	0.157
	IA												
	ILA	0.7449	0.001	0.6339	0.052	3.5416	0.047	2.9000	0.171				
Profit	NS												
	OP	1.9012	0.001	1.5051	0.142	1.1775	0.118	10.050	0.361	−10.7371	0.014	−7.1605	0.028
	PTP												
Dummy	Index Sens.												
	BIG4	0.8685	0.003	0.7725	0.214	0.7018	0.322	0.5209	0.1182	3.7953	0.012	2.4695	0.026
Diag.	DW	2.0833		2.1167		2.1806		2.1809		1.9550		20.138	
	R^2	0.9994		0.9907		0.9898		0.9828		0.9931		0.9951	
	Normal		0.5000		0.5000		0.5000		0.5000		0.1257		0.3895

Source(s): Own construction