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Board characteristics and the choice between sustainability and integrated reporting: a European analysis

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Abstract

Purpose – The role that the board can have in influencing the adoption of non-financial reporting (NFR) by companies is a topic that has raised interest in the recent literature. However, very few have so far been said on the logic that underpins the selection by corporate boards of a particular model (sustainability and/or integrated). This study aims to examine if and to what extent board characteristics may influence the choice of companies to voluntarily publish a sustainability report, an integrated report or both of them, and if moderating variables, relating to incentives towards corporate transparency, may have an influence. Both of these types of reporting tools are in fact aimed at improving company disclosure towards sustainable development.

Design/methodology/approach – Through a multi-nomial regression analysis, this study tests the assumptions in a sample of companies listed on the Eurostoxx600 that adopt integrated or sustainability reporting or both of them for the period 2015–2018 for a total of 2,103 firm-years observations.

Findings – The results reveal that sustainability reporting is associated with board independence only, whilst the adoption of integrated reporting is influenced by board size and board independence. The same two variables influence also those companies that jointly adopt both sustainability and an integrated report. This confirms that integrated reporting requires more competencies and monitoring to be adopted. Furthermore, the results provide evidence that information asymmetry and financial constraints influence the decision of companies to publish the integrated report, sustainability report or both, whilst growth opportunities do not. Hence, moderating variables can have a role in explaining this association, and especially those that are related to the firm's incentives related to the provision of financial capital by investors.

Research limitations/implications – This study contributes to the literature in three ways. First, it proposes an incremental analysis of the relationship between board characteristics and voluntary disclosure of integrated reporting, considering the effects of moderating variables on this association. Second, the above relationship is examined in a comparative way *vis-à-vis* the adoption of sustainability reporting. Third, it demonstrates that the analysis of these reporting tools can benefit from an understanding that relies on both

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agency and stakeholder theories, that have to be conceived somehow complementary. In terms of limitations, this study is exclusively focussed on larger European listed firms, and therefore, the findings may not be valid for small and medium firms and for companies operating outside Europe.

Practical implications – This study provides useful insights for managers and policymakers to better understand which are the characteristics of the board composition that can best encourage a company to pursue a reporting strategy based on sustainable development. This results to be particularly relevant and timely in the European context if the authors take into consideration the developments of the European Parliament and Commission towards the launch of a new legislative proposal on sustainable corporate governance in 2021.

Originality/value – The study contributes to the existing literature in two ways. First, it offers a unique perspective on the direct and indirect effects of board characteristics on the adoption of integrated and/or sustainability reports by examining it in a comparative perspective. Second, it further demonstrates that the analysis of NFR and especially integrated reporting might benefit from the adoption of multiple conceptual lenses, in this case, agency and stakeholder theories.

Keywords Corporate governance, Board characteristics, Moderating variables, Sustainability reporting, Integrated reporting

Paper type Research paper

1. Introduction

Corporate reporting and corporate governance are closely linked and their respective evolution influences each other. The way in which companies report externally on their activities and performances can be seen as the result of the mindsets and behaviour of those who govern them, namely, the board and the management team. Therefore, it is not surprising that with the expansion of voluntary disclosure and in particular, of reporting formats other than the traditional financial ones, a growing level of attention has started being paid to the corporate governance determinants that lie behind the decision to adopt these non-financial formats.

At a professional level, in 2017 the International Corporate Governance Network has recommended in its global governance principles that boards should produce an integrated report (Principle 7.5). From a legal viewpoint, national corporate governance codes have started moving towards the recognition and inclusion of this new, non-financial, language (Girella, 2021). At a European level, the Parliament has recently approved a non-legislative report that calls for more responsible business conduct and the Commission following two public consultations hold in 2020 and early 2021 is planning to launch a new legislative proposal on sustainable corporate governance in the second quarter of 2021. Interestingly to note, the summary report of the last consultation has pointed out the importance of taking into consideration, as part of the director's duty, also stakeholders' interests, possibly in a balanced way (European Commission, 2021; May Summary report – public consultation).

From an academic viewpoint, many studies, based on several theories such as the agency, stakeholder, resource-based-view, legitimation, signaling and proprietary cost, have investigated the corporate governance mechanisms as explanatory factors of different types of disclosure such as the corporate social responsibility (CSR) and intellectual capital (IC) disclosures. However, few studies (Frias-Aceituno *et al.*, 2013b, 2014; Melloni *et al.*, 2017; Fiori *et al.*, 2016; Busco *et al.*, 2019; Wang *et al.*, 2020; Velte and Gerwanski, 2020; Girella, 2021) have so far analysed the influence of corporate governance variables on the adoption of integrated reporting (de Villiers *et al.*, 2017). Even fewer have done so by taking into consideration the role of moderating factors (if any) (García-Sánchez *et al.*, 2019) and the comparison with sustainability report. Jensen and Berg (2012) have examined the comparison between these two reporting tools from an institutional viewpoint and not from a company's one. The latter is mainly because integrated report is often conceived as the evolutionary step of sustainability report. However, this is not the case. An integrated report differs from a sustainability report at

least in three main respects, purpose, audience and scope. The purpose of an integrated report is to explain financial capital providers how an organisation will continue to create value over time whilst from a sustainability report perspective, the focus is on communicating the organisational social and environmental impacts, as well as its strategies and goals. It derives that the target audience of an integrated report is embodied by providers of financial capital first and then all stakeholders. A sustainability report addresses all stakeholders. Finally, in terms of scope, an integrated report covers strategic, governance, performance aspects with a multi-capital view, a sustainability report is mainly centred on environmental, social and governance (ESG) elements.

To fill this gap, the aim of this paper is to investigate if and to what extent corporate board characteristics can be a determinant for the adoption of integrated reporting, sustainability reporting or both of them and if moderating variables such as growth opportunities, financial constraints and the information asymmetry could influence the relationship. On the basis of a multi-nomial logistic regression, we analyse a sample of companies listed on the Eurostoxx600 that have adopted either an integrated or a sustainability report or both of them, for the period 2015–2018 for a total of 2,103 firm-years observations. As previously mentioned, the European focus relies on the momentum that corporate governance is witnessing also from a legal viewpoint.

Our results demonstrate that, although often conceived as similar, these two reporting tools present significant differences, especially when it comes to corporate boards. Sustainability reporting is associated with the presence of independent directors on the board whilst the adoption of integrated reporting and both types of reporting are influenced by larger and independent boards. Hence, it is possible to note that although these reporting devices share some commonalities, integrated reporting results to be much more articulated, thus requiring more competences, discussion and alignment between management and shareholders' interests.

Finally, our results provide evidence that moderating variables have an effect on the association between the board characteristics and the decision of companies to adopt integrated report, sustainability report or both, this suggesting that this is not a linear association. Information asymmetry and financial constraints have shown to have a mediating role whilst growth opportunities do not.

This way, our study intends to make several contributions to the literature on non-financial reporting (NFR). At first, it complements previous research on the effects of board characteristics in influencing the voluntary adoption of integrated reporting, controlling for other factors such as the growth opportunities, the financial constraints and the information asymmetry. In addition, we extend the findings of previous studies by comparing the role played by certain features of corporate governance in the adoption of integrated reporting with the influence of the same characteristics on the voluntary adoption of sustainability reporting. Hence, it offers useful insights for better understanding the existing similarities and differences amongst these two reporting formats, as well as the strength of variables moderating or mediating the association between the corporate governance characteristics and different types of reporting.

The paper is organised as follows. Section 2 describes the literature that addresses the corporate governance mechanisms in the remit of corporate social disclosure, IC and integrated reporting from an agency and stakeholder theories perspective and draws on this literature to formulate the research hypotheses. Section 3 explains the research methodology, the data and the sample whilst Section 4 discusses the results. Section 5 illustrates the robustness analysis and Section 6 concludes the work, by pointing out the limitations and suggesting future research paths.

2. Theory, literature review and hypothesis development

This section provides an overview of the theoretical and empirical literature regarding the linkages between CSR disclosure, IC disclosure, integrated reporting and corporate governance in the remit of agency and stakeholders theory. The decision to focus on these two theoretical frameworks rely on the nature of these reporting tools. As previously mentioned, integrated reporting is focused on providing material, connected and concise information on how a company has continues and will create value in the future on the basis of a multi-capital approach primarily to financial capital providers and then other stakeholders. Sustainability reporting is mainly targeted to stakeholders. Hence, by taking into consideration both the above theories will allow us to capture the specificities of the two reporting practices under examination. Agency theory is better placed to capture the rationale of integrated reporting, even though, as pointed out by Girella (2021), with reference to this reporting device there is the need to overcome the traditional separation between agency and other stakeholders-based theories, in that it is addressed to both investors and other stakeholders. Stakeholder theory can best underlye the logic of sustainability reporting (Martin, 2002; Newcombe, 2003).

On this basis, the hypothesis is then developed.

2.1 Corporate governance and corporate social responsibility reporting

The relationship between corporate governance and CSR has been a widely debated one in the literature. Growing attention, especially during the past decades, can be amenable to the occurrence of several corporate scandals, such as Enron and WorldCom that have heavily impacted on the international financial system. This focus has also nurtured the academic debate, even though mainly starting from mid of the 2000s. Money and Schepers (2007) noted that “there is little existing knowledge from a corporate perspective as to the extent of alignment between corporate governance and CSR” (p. 5). Some previous studies have used proxies, such as the country of origin (Van der Laan Smith *et al.*, 2005), later ones a limited number of corporate governance variables (Haniffa and Cooke, 2005; Faisal *et al.*, 2012). Others have investigated the impact of a wide range of variables on the environmental performance on companies, but not on their reporting practices (Wang and Coffey, 1992; Webb, 2004; Bear *et al.*, 2010; De Villiers *et al.*, 2011; Shaukat *et al.*, 2016; Cuadrado-Ballesteros *et al.*, 2017). Following these pioneer studies, Prado-Lorenzo and Garcia-Sanchez (2010) in the Spanish context represented by 99 non-financial listed companies observed that social disclosure can largely be explained by the pressure exerted by stakeholders, as well as dispersed ownership structure. This is further reinforced by the presence of external directors on the board.

Michelon and Parbonetti (2012) examined the relationship between board composition, leadership and structure and the disclosure of sustainability-related information in a comparative exercise between Europe and the USA. Similarly, to previous studies, they depart from the premises that good corporate governance can represent a vehicle towards better communication with stakeholders. It is in fact the board that takes decisions and enact disclosure policies. They demonstrate that the traditional difference between insiders and independent directors is not sufficient to understand this relationship. The specific characteristics of each director become then fundamental. Always in the US context, Mallin *et al.* (2013) examined the impact of the corporate governance model on social and environmental disclosure. They centre the investigation on the top 100 US best corporate citizens in the period 2005–2007 and examine both the quality and the quantity of social and environmental information to understand whether the disclosure can be seen as a real commitment by the board towards stakeholders or as a signal or a legitimacy tool. They

found that a strong monitoring function exercised by the board increases this type of disclosure In the post-Sarbanes-Oxley era US context, Zhang *et al.* (2013) demonstrate that two are the key components of a board to adopt CSR disclosure, independence and diversity in terms of the presence of women.

The work by Khan *et al.* (2013) has probably been one of the first one on the investigation between the effect that the board of directors can have on CSR disclosure, especially in an emerging market, i.e. in the annual reports of Bangladesh companies. They observe that despite there is a negative association with managerial ownership, this turns into positive and significant for export-oriented companies. Also, public ownership, foreign ownership, independence of the board of directors and the presence of the audit committee have positive effects on the CSR disclosure. On the contrary, chief executive officer (CEO) duality does not have any effect. Javaid Lone *et al.* (2016) in examining this possible association in the annual and sustainability reports of Pakistan companies, after the introduction of the CSR voluntary guidelines by the Securities and Exchange Commission of the country aimed at encouraging companies to disclosure this type of information, observe that board independence, diversity (in terms of gender) and size affect this decision.

In Europe, and specifically in Spain, Fuente *et al.* (2017) examine the disclosure of CSR-related information according to the global reporting initiative (GRI) standards in a sample of 98 non-financial listed Spanish companies over a six-years period. They point out that the presence of independent and proprietor directors is key in encouraging companies in implementing this disclosure practices. Furthermore, in terms of CSR standards adopted, the existence of a CSR committee is correlated to the GRI ones. Ramón-Llorens *et al.* (2019) further refine the analysis of board characteristics and pointed out that CEO power is key in encouraging outside directors and specifically business experts and support specialists in adopting CSR reporting. However, it is not sufficient to compensate the negative effect of directors with political ties. In the UK, Jizi (2017) investigates this linkage in a sample of Financial Times Stock Exchange 350 firms for a five-years period. It is noted that board independence, as well as women presence are a determinant for CSR reporting.

In Australia Rao and Tilt (2016) investigate the extent to which board composition and in particular its diversity impacts on CSR reporting by taking into consideration five corporate governance variables, being independence, tenure, gender, multiple directorships and overall diversity measure. The sample is composed by 150 listed companies over a three-years period. It is observed that all the variables positively affect this type of reporting disclosure, with the exception of independent directors.

Hence, it can be said that also in the case of CSR disclosure, no convergence is achieved on the features that can encourage companies to disclosure sustainability-related information. Interestingly to note, the independence of the board has emerged as being a variable that is in most of the cases positively associated with it under different theoretical assumptions.

2.2 Corporate governance and intellectual capital reporting

In addition to ESG factors, also intangibles resources, namely, human, organisational and relational capitals have a prominent role in explaining a company's performance and especially, the difference between market and book ratio. Hence, it is not surprising that corporate governance mechanisms have demonstrated to be a critical factor in influencing also its level of disclosure because, similarly to CSR, they can reduce investors and stakeholders' uncertainty about firms' value, performance and behaviour. However, as compared to the CSR strand of literature, few empirical studies have investigated the association between corporate board characteristics and IC disclosure (Cerbioni and

Parbonetti, 2007; Li *et al.*, 2008; Abeysekera, 2010; Hidalgo *et al.*, 2011; Abdul Rashid *et al.*, 2012; Muttakin *et al.*, 2015; Baldini and Liberatore, 2016; Rodrigues *et al.*, 2016; Tejedo-Romero *et al.*, 2017a, 2017b, Nadeem, 2019).

In the European context, Cerbioni and Parbonetti (2007) first and Li *et al.* (2008) after, found that some of them can influence the disclosure (in terms of quantity and/or quality) of IC. Identifying a sample of 54 European biotechnology firms listed on the stock market of a European country, Cerbioni and Parbonetti (2007) have analysed the impact of a company's board size, composition (in terms of proportion of independent outside directors), CEO duality and board structure on the type and amount of IC an organisation discloses. The examination is conducted on their operating financial reviews in the period from 2002 and 2014 (included). Evidence demonstrates that board structure, CEO duality and size are negatively correlated to disclosure, whilst the proportion of independent directors is positively associated. However, in terms of the quality of the disclosure, it is found that the presence of independent directors affects only information on internal capital. This is not the case for the disclosure of forward-looking information and bad news. Li *et al.* (2008) have examined if and how the corporate governance characteristics of 100 UK firms listed on the London Stock Exchange and belonging to seven IC-intensive industries can influence IC disclosure in annual reports. The time period is for financial year-ends between March 2004 and February 2005. Taking into consideration five characteristics (board composition in terms of proportion of independent non-executive directors (NEDs), role duality – where the same person undertakes both the role of chief executive and chairman –, ownership structure/share concentration, audit committee size and frequency of meetings, they observe that role duality is not found to influence IC disclosure and that share ownership concentration is negatively associated to it, this meaning that in the presence of dominant shareholders there is less pressure for the reporting of this type of information. The other three variables are found to be significantly and positively associated. As for the influence that corporate governance mechanisms have on the disclosure on the three sub-categories of IC, human, structural/organisational and relational, it results that the presence of independent NEDs' results in the disclosure of more information related to human, structural and relational capitals whilst the presence of block shareholders appears to lead to more disclosure on relational capital. In Italy, Baldini and Liberatore (2016) study the association between some corporate governance internal mechanisms and the level of intellectual capital disclosure (ICD) in general and of its main components, investigating the annual reports of 172 listed companies at 31 December 2010. Their findings indicated that only board size and board independence have a significant positive effect on ICD. In Portugal, Rodrigues *et al.* (2016) explore the influence of boards of directors on the voluntary disclosure of information concerning IC of 15 listed companies over a period of five years during the Portuguese financial crisis. In analysing IC disclosure in annual, sustainability and integrated reports, they find that it remains constant even during this particular time. More specifically, it increases with dual corporate governance models and with a larger board size up to a maximum point (thus confirming a quadratic relationship) but is reduced by CEO duality and by a higher proportion of independent directors on boards. The presence of women on the board is not found to be statistically significant. In Spain, Tejedo-Romero *et al.* (2017a, 2017b), analysing the annual reports of 35 listed companies over a period of five years, examine the effect of the board size, board independence and CEO duality on ICD. Their results find that board size and CEO/Chairman separation are positively affecting ICD. Conversely, board independence has negative effect on the ICD.

In developing countries, Abeysekera (2010) explores the influence of board size on six types of ICD, conducting this analysis on the annual reports of 26 Kenyan listed companies

in 2002 and 2003. They demonstrate that the firms disclosing more tactical internal capital and strategic human capital have larger boards. The positive impact of board size on the ICD disclosure is also confirmed in the Mexican context by the study of Hidalgo *et al.* (2011). In contrast, they find no association between the CEO duality and independence of the board and the ICD. In Malaysia, the research of Abdul Rashid *et al.* (2012) investigates the board factors influencing the disclosure of IC information in an initial public offering prospectus. Their results provide evidence that the board size and board independence impact positively on the IC disclosure score. Finally, in an emerging country such as Bangladesh, the research of Muttakin *et al.* (2015) confirms that the independence of directors increases the quantity of disclosure. In relation to gender diversity, some academics (Nadeem, 2019) have explored, in detail, the relationship between the presence of the woman in the board and the ICD, demonstrating that several characteristics of woman can influence companies to improve the disclosure to meet the needs of different type stakeholders.

2.3 Corporate governance and integrated reporting

Despite the inherent link that exists between corporate governance and integrated reporting, to date only a peripheral number of studies have investigated which are the board characteristics that can act as determinants of the voluntary adoption and or the quality, of integrated reporting.

As for the former, Frias-Aceituno *et al.* (2013b) analysed a sample of 568 companies from 15 countries, for the period 2008–2010. They argue that some board characteristics (board size, board diversity, the composition of the board) in reducing the information asymmetries between managers and stakeholders, can impact on the decision to disclose integrated information. The results of this study show that only board size and board gender diversity have a role in the decision of companies to publish the integrated reporting. The same results are confirmed by a later study by Fiori *et al.* (2016) that examines only the firms partecipating in the International Integrated Reporting Council (IIRC) Pilot Programme in 2011. Also, Alfiero *et al.* (2017) in focusing on the European setting observed that in a sample of 1,047 companies adopting this reporting tool in 2015 board size, the presence of women and an average age of 55 years of board members are positively associated. Girella *et al.* (2019) extend the latter works analysing the companies considered <IR> reporters by the IIRC according to the <IR> examples databases. However, they found that only the size of the board is a determinant, whilst the presence of women and of independent directors is not.

In the impression management strategies literature, Melloni *et al.* (2017) and Busco *et al.* (2019), adopting a manual content analysis and a statistical investigation of all the reports identified as emerging practices in the IIRC examples database and in the Stoxx Europe 600 Index for the period 2002–2015, document, respectively, the drivers of the tone of business models and the different levels of information integration. In the first study, the authors find that bigger boards influence the positive tone of business model disclosure, thus decreasing the reports' transparency and increasing the possible manipulation of information by management. The presence of independent members in the auditing committees is not significantly associated. The results of the second study confirm that only board size influences the levels of integration, the frequencies of meetings and the independence of the boards do not.

Moving to the quality of the reports, Wang *et al.* (2020), integrating economic-based and socio-political theories, investigate the relationship with traditional and sustainability-oriented corporate governance mechanisms and the credibility of integrated reporting in the South African context. Their results show that traditional corporate governance measures such as the quality of the board and the audit committee (intended as a composite score of independence, diligence, size and expertise of both) have a lower impact than the presence of

a high quality sustainability committee and non-financial performance measures in executive compensation. In an international sample of 134 firms selected from the leading practices and the <IR> reporters section of the IIRC examples database, Vitolla *et al.* (2020) found that size, independence, gender diversity and activity of the board determines the high quality of the documents, whilst the presence of a CSR committee does not.

2.4 Hypotheses development

On the basis of the above literature review, the following hypothesis is developed. The choice to focus on board size, board meeting frequency and board independence as board variables relies on the contrasting role that they have been found to have in relation to the adoption sustainability and integrated reports. This is further explained in each of the following sections. As for the inclusion of moderating variables, especially those linked to firms incentives, as also stated by García-Sánchez and Noguera-Gámez (2017) and García-Sánchez *et al.* (2019), very few studies have so far analysed if they can play a role in the association between corporate governance and voluntary adoption of NRF practices.

2.4.1 Board size. Board size is considered as one of the main determinants of board effectiveness (Lee and Chen, 2011; Amran *et al.*, 2014). A larger board is more efficient with respect to smaller boards, but it is less effective due to communication and coordination problems. However, the presence of different expertise and experience in a larger board can increase the quality and quantity of disclosure, thus reducing the information gap between managers and stakeholders (Akhtaruddin *et al.*, 2009). The existing empirical literature provides a controversial association between board size and CSR disclosure. For example, some studies provide a significant positive relationship between board size and corporate sustainability disclosure (Veronica Siregar and Bachtiar, 2010; Ahmed Haji, 2013; Giannarakis, 2013, 2014a; Barakat *et al.*, 2015; Majeed *et al.*, 2015; Supriyono *et al.*, 2015; Alotaibi and Hussainey, 2016; Javaid Lone *et al.*, 2016). In contrast, the studies of Razak and Mustapha (2013), Kiliç *et al.* (2015), Deschênes *et al.* (2015) and Ling and Sultana (2015) find insignificant and positive impacts of board size on CSR disclosure. Relating to the voluntary adoption of IC disclosure, the main results of the literature review (Cerbioni and Parbonetti, 2007; Abeysekera, 2010; Hidalgo *et al.*, 2011; Abdul Rashid *et al.*, 2012; Baldini and Liberatore, 2016; Rodrigues *et al.*, 2016; Tejedo-Romero *et al.*, 2017a, 2017b) demonstrate that the larger board has a positive and significant effect on IC disclosure. These findings are also confirmed by the research studies about integrated reporting (Frias-Aceituno *et al.*, 2013b; Fiori *et al.*, 2016; Girella *et al.*, 2019; Busco *et al.*, 2019). Hence, we hypothesise that the board size is positively associated with the voluntary adoption of sustainability reporting and integrated reporting as follows:

H1. The board size is positively associated with the voluntary adoption of sustainability reporting and integrating reporting.

2.4.2 Board meeting frequency. Sustainability problems are very important matters to discuss during the board meeting to protect the shareholder and stakeholders from social and environmental problems. However, there is no consistent and shared evidence for the significant association between the number of board meetings and CSR disclosure. For example, some academics find an insignificant positive and negative association between frequency of board meetings and CSR Disclosure (Giannarakis, 2013, 2014a, 2014b; Ahmed Haji, 2013; Alotaibi and Hussainey, 2016). This result is in contrast with the findings of Rodrigues *et al.* (2016) about IC disclosure and the results of Melloni *et al.* (2017) and Busco *et al.* (2019) relating to the business model disclosure in integrated reporting. Hence, we

hypothesise that the board activity is positively associated with the voluntary adoption of sustainability reporting and integrated reporting as follows:

H2. The frequency of board meetings is positively associated with the voluntary adoption of sustainability reporting and integrating reporting.

2.4.3 Board independence. The composition of the board can influence the effectiveness of the board by reducing the agency problems (Akhtaruddin *et al.*, 2009). The presence of independent or NEDs can assure the supervision of the activity of executive directors against the interests of the management (Jensen and Meckling, 1976), and thus increase transparency.

Some studies find a significant both positive and negative relationship between NEDs and CSR disclosure (Haniffa and Cooke, 2005; Lim *et al.*, 2008; Khan *et al.*, 2013; Sundarasen *et al.*, 2016). In contrast, few studies provide no association between NEDs and CSR disclosure (Haniffa and Cooke, 2002; Cullen and Christopher, 2002). The studies about IC disclosure (Cerbioni and Parbonetti, 2007; Li *et al.*, 2008; Abdul Rashid *et al.*, 2012; Muttakin *et al.*, 2015; Rodrigues *et al.*, 2016; Tejedo-Romero *et al.*, 2017a) provide evidence that the IC disclosure is reduced by a higher proportion of independent directors on boards. In contrast to these results, the literature review of integrated reporting (Frias-Aceituno *et al.*, 2013b; Fiori *et al.*, 2016; Girella *et al.*, 2019; Busco *et al.*, 2019; Velte and Gerwanski, 2020) finds no association between the board independence and the voluntary adoption of integrated reporting. However, we hypothesise that board independence is positively associated with the voluntary adoption of sustainability reporting and integrated reporting as follows:

H2. The presence of independence directors is positively associated with the voluntary adoption of sustainability reporting and integrated reporting.

2.4.4 The moderating role of firm's incentives. Previous theoretical and empirical literature (Diamond and Verrecchia, 1991; Lambert *et al.*, 2007) states that analysts can estimate earnings more accurately if they have better-quality information, via corporate reporting (Lang and Lundholm, 1996; Barron *et al.*, 1999; Bozzolan *et al.*, 2009; Glaum *et al.*, 2013). In relation to sustainability and integrated reporting, some studies find a significant and negative association between the publication of these reports and the analyst forecast accuracy as a proxy for information asymmetry (Dhaliwal *et al.*, 2012; Zhou *et al.*, 2017; García-Sánchez and Noguera-Gámez, 2017; Bernardi and Stark, 2018; Flores *et al.*, 2019). However, the studies of Wahl *et al.* (2020) and Garcia-Sanchez *et al.* (2020) find no significant association between the adoption of the integrated reporting and the forecast errors, demonstrating that the voluntary nature of integrated disclosure could not improve the information environment. Moreover, the information asymmetry between shareholders and companies could influence the access of companies to external funds because the problems of adverse selection and the moral hazard posed to the investor lead the company to use their fund increasing the financial restriction. Extant literature (Khurana *et al.*, 2006) provides evidence that the disclosure reduces the adverse selection costs and the financial costs. Previous studies about CSR disclosure (Goss and Roberts, 2011; Chan *et al.*, 2017) find that CSR performances are linked to lower bank rates, long-term debt and lower financial constraints whilst García-Sánchez *et al.* (2019) show that the KZINDEX as the measurement of financial constraints is not associated with the adoption of integrated reporting. Finally, Kim *et al.* (2012) document that companies more engaged in CSR has more opportunities for growth and better economic performance than companies that are less socially engaged, demonstrating that this variable moderate the association between the CEO ability and the CSR investment. Extending this result to the adoption of integrated

reporting, García-Sánchez and Noguera-Gámez (2017) have shown that companies tend to disclose according to this reporting practice as a result XX.

García-Sánchez *et al.* (2019) have investigated this possible association in a munificence context, which is when an industry witnesses an abundance of resources. By means of the principal component analysis of board characteristics that synthesises its effectiveness, namely, independence, gender diversity, experience, expertise and the probability of referring external consultants applied to an international sample composed of 956 firms belonging to different industries and 27 countries through a longitudinal period (2006–2014), they observed that the strength of the board can diminish the discretionary role of managers in disclosing less voluntary information. More recently, Garcia-Sanchez *et al.* (2020) show that the growth opportunities increase the CEO opposition to disclose integrated information. On the basis of the results of the previous literature review, we hypothesise that the financial constraints, the information asymmetry and the growth opportunity influence the association between board characteristics and the voluntary adoption of sustainability reporting and integrated reporting as follows:

H4. The information asymmetry moderates negatively/positively the association between the board characteristics and the adoption of integrated reporting and sustainability reporting.

H5. Financial constraints moderate negatively/positively the association between the board characteristics and the adoption of integrated reporting and sustainability reporting.

H6. Growth opportunity moderate negatively/positively the association between the board characteristics and the adoption of integrated reporting and sustainability reporting.

3. Research design

3.1 Sample selection and data collection

To analyse the voluntary adoption of several types of reporting practices (sustainability reporting, integrated reporting or both sustainability and integrated reporting) by European companies, this paper started by examining the companies listed on the Eurostoxx 600. In particular, by taking into consideration those that have published integrated and/or sustainability reports between 2015 and 2018. The time frame is chosen because the International Integrated Reporting Framework (IRF) was published for the first time in December 2013, thus we decided to exclude the first year of the IRF application (2014). The information on whether a company discloses an integrated report was collected via the <IR> examples database, <IR> reporters section, which showcases those organisations whose reports refer to the IIRC or the International <IR> Framework or are influenced by the framework through participation in <IR> networks. Hence, the focus is not on leading practices. The information on whether a company discloses a sustainability report was collected through the sustainability disclosure database administered by the GRI in line with the previous studies (Jensen and Berg, 2012; García-Sánchez *et al.*, 2013; Sierra-García *et al.*, 2015; Vaz *et al.*, 2016). When data on the presence of an integrated and/or a sustainability report was not available or unclear in the above databases, we manually checked on the organisation's websites. The list of resulting companies was then cross-referenced to understand whether a company publishes both an integrated and a sustainability report. The initial sample was composed by 2,400 observations (600 firm observations by each year of analysis). After the deletion of missing data values for the

independent variables, the sample consisted of 486 observations in 2015, 500 observations in 2016, 543 observations in 2017, 575 observations in 2018, that can be grouped into the following four categories:

1. Firms that issue an annual report;
2. Firms that issue a sustainability report;
3. Firms that issue an integrated report; and
4. Firms that issue both sustainability and an integrated reporting.

Firms belonging to the first group were included as a benchmark group. The economic and corporate governance data related to the independent variables were collected, respectively, by Datastream and Thomson Reuters Asset 4 whilst the country variables were retrieved from the World Bank open database.

Table 1 Panels A, B and C report the distribution of the sample by year, country and activity and by type of report.

Table 1 Panels A, B and C report the distribution of the sample by year, country and activity and by type of report. Panel A presents the sample distribution by year, showing that the distribution of the sample for different types of report tends to be consistent throughout the years, even though it is possible to note that in 2018 the trend has increased for sustainability and integrated reports probably following the adoption of the European Union (EU) Non-Financial Reporting Directive (EU NFRD) by almost all member states in 2017 (2018 reports, see Table 2 for major information on the CSR requirements in each of the country considered). In 2015 8% of companies publish only annual reports, 78% of companies publish only sustainability reports, 8% of companies publish only integrated reports and 6% of companies publish both integrated reports and sustainability reports. In 2016 7% of companies publish only annual reports, 79% of companies publish only sustainability reports, 8% of companies publish only integrated reports and 6% of companies publish both integrated reports and sustainability reports. In 2017 5% of companies publish only annual reports, 91% of companies publish only sustainability reports, 7% of companies publish only integrated reports and 8% of companies publish both integrated reports and sustainability reports. In 2018 5% of companies publish only annual reports, 96% of companies publish only sustainability reports, 9% of companies publish integrated reports and 7% of companies publish both integrated reports and sustainability reports.

Panel B reports the country distribution. It shows that companies located in the UK (22%), Switzerland (14%) and Germany (13%) disclose proportionally the highest number of annual reports only. Companies located in the UK (23%), France (16%) and Germany (12%) disclose proportionally the highest number of sustainability reports. Finally, companies located in the UK (27%), The Netherlands (18%) and France (11%) publish the highest number of integrated reports, whilst the companies located in the UK (49%), in Italy (16%) and Switzerland (10%) publish both integrated reports and sustainability reports. This can be explained by the fact that in the UK since 2013 companies are required to issue a strategic report which tends to take the form of annual, sustainability and/or integrated reports (Table 2). In Switzerland, no specific CSR disclosure is recommended. In Germany it is mandatory for annual reports to include a Management Report and Corporate Governance Report, where CSR/value creation-related information can have a place. In France, the Grenelle Act II has made it mandatory for companies to include environmental and social information in annual reports. This has been reinforced by the adoption of the EU NFRD. In The Netherlands, it is mandatory for publicly traded Dutch companies to issue a CSR report and the EU NFRD has recommended the annual management report, which is often the

Panel A-year distribution									
		2015	(%)	2016	(%)	2017	(%)	2018	(%)
Reporting	AR	40	8	33	7	28	5	31	5
	SR	377	78	396	79	443	91	468	96
	IR	38	8	40	8	34	7	42	9
	SR and IR	30	6	31	6	38	8	34	7
	Total	485	100	500	100	543	112	575	119

Panel B-country distribution	AR		SR		IR		SR and IR	
	N	(%)	N	(%)	N	(%)	N	(%)
Austria	0	0	34	2	0	0	0	0.0
Belgium	15	11	38	2	4	3	0	0.0
Denmark	3	2	73	4	4	3	0	0.0
Finland	0	0	54	3	4	3	4	3.0
France	2	2	262	16	17	11	5	3.8
Germany	17	13	209	12	8	5	4	3.0
Ireland	4	3	40	2	0	0	0	0.0
Italy	12	9	49	3	11	7	21	15.8
Luxembourg	9	7	12	1	0	0	4	3.0
The Netherlands	12	9	65	4	28	18	5	3.8
Norway	1	1	50	3	0	0	0	0.0
Poland	4	3	16	1	3	2	1	0.8
Portugal	0	0	10	1	2	1	0	0.0
Spain	0	0	76	5	16	10	8	6.0
Sweden	16	12	151	9	10	6	3	2.3
Switzerland	18	14	162	10	6	4	13	9.8
UK	19	14	383	23	41	27	65	48.9
Total	132	100	1,684	100	154	100	133	100.0

Panel C-industry distribution	AR	(%)	SR	(%)	IR	(%)	SR and IR	(%)
Basic materials	3	2	93	6	29	19	27	20
Consumer discretionary	14	11	253	15	9	6	9	7
Consumer staples	2	2	138	8	11	7	17	13
Energy	2	2	54	3	7	5	11	8
Financials	37	28	291	17	30	19	20	15
Health care	24	18	153	9	8	5	8	6
Industrials	19	14	374	22	27	18	13	10
Real estate	14	11	109	6	3	2	4	3
Technology	10	8	81	5	6	4	1	1
Telecommunications	7	5	56	3	17	11	2	2
Utilities	0	0	82	5	7	5	21	16
Total	132	100	1,684	100	154	100	133	100

Table 1.
CSR disclosure requirements by country for the period considered (2015-2018)

positioning of the integrated report, because of its value creation perspective. Finally, the adoption in Italy of both sustainability and integrated reports can be deemed to the suggested positioning of this type of information in the management report.

Panel C presents the sector distribution showing that financial (28%), health care (18%) and industrial's (14%) ones disclose the highest percentage of the annual report. Companies operating in industrial (22%), financial (17%) and consumer discretionary (15%) publish a higher number of sustainability reports. Finally, industrial, financial and basic materials sectors publish the higher percentage of an integrated report, respectively, 18%, 19% and

Table 2. CSR disclosure requirements by country for the period considered (2015–2018)

Country	Requirements of disclosure of CSR reports/non-financial statements (for listed companies)	Voluntary/mandatory	Target organisations	Disclosure instrument
Austria	2004	Voluntary sustainability report	All companies	Sustainability report
	After 2017	Mandatory through the transposition of EU NFRD – Sustainability and Diversity Improvement Act 257/ME	Listed companies Credit institutions insurance undertakings Capital market-oriented enterprises >than 500 employees	Management report NFR
Belgium	1995 Vlarem II (Article 4.1.8)	Mandatory that certain companies issue an annual environmental report (only applicable for the region of Flanders)	All organisations except those in the public sector	Environmental report
	2003, 2008, 2012 and 2013	Mandatory social balance sheet as part of their annual accounts	Companies that employ staff, (large and very large) non-profit institutions and foundations	Social balance statement
	2017	Mandatory through the transposition of EU NFRD	Companies with a balance sheet totaling more than €20m or a net turnover of more than €40m >than 500 employees	Annual report Management report
Denmark	2015 (Transposition of EU NFRD: Financial Statements Act (from 2005, including 2008, 2013 and 2015 amendments)	Mandatory	Listed companies and to state-owned limited liability companies, irrespective of their size	CSR report Annual report
	2016	Mandatory	Companies in class C and D with 500+ employees	Annual report
Finland	1997	Mandatory to include material non-financial issues (personnel and environmental factors and other potentially significant matters impacting on the operations of the reporting entity) in the director's report of the annual/financial report	Large private and listed companies	Annual report

(*continued*)

Table 2.

Country	Requirements of disclosure of CSR reports/non-financial statements (for listed companies)	Voluntary/mandatory	Target organisations	Disclosure instrument
	2006	Mandatory to record, account and disclose environmental issues as part of the legally required financial statements	Large private and listed companies	Board of Directors' report
	After 2017	Mandatory through the transposition of EU NFRD	Large private and listed companies	Annual report Separate report
France	2010 Art 225 Grenelle Act II	Mandatory to include information on environmental and social performance, including all of the company's subsidiaries, in the annual report Companies listing securities and companies with an annual balance or turnover of €100m and an average of 500 permanent employees are obliged to disclose certain social and environmental information, as well as information relative to societal commitments in favour of sustainable development inside their annual management report	Large private and listed companies	Annual report
	Since 2016: NFRD	Mandatory through the transposition of EU NFRD	Companies with more than 250 employees; or – Turnover exceeding €50m or total annual balance sheet exceeding €43m	NA
Germany	2015	Mandatory for annual reports to include a management report and Corporate Governance Report	Listed companies	–

(*continued*)

Table 2.

Country	Requirements of disclosure of CSR reports/non-financial statements (for listed companies)	Voluntary/mandatory	Target organisations	Disclosure instrument
	After 2017	Mandatory through the transposition of EU NFRD	Capital market-oriented companies 500+ employees	Annual report
Ireland	After 2017	Mandatory through the transposition of EU NFRD	Large private and listed companies	Non-financial statement Director report
Italy	Before 2017	Voluntary on the basis of Article 2428 of the Italian civil code to provide limited CSR information	Large private and listed companies	Directors' report Management report
	Since 2017: NFRD	Mandatory through the transposition of EU NFRD	All and 500+ employees	Management report
Luxembourg	After 2017: NFRD	Mandatory through the transposition of EU NFRD	Large private and listed companies	Management report
The Netherlands	Since 2010	Mandatory CSR report for publicly traded Dutch companies	Listed companies	–
	Since 2017: NFRD	Mandatory through the transposition of EU NFRD	Large private and listed companies	Annual management report
Poland	Since 2017: NFRD	Mandatory through the transposition of EU NFRD	Large private and listed companies	Operational report Annual report
Portugal	Since 2009	Mandatory to issue a Social Balance report, which includes information on employment, labor/management relations, occupational health and safety, training and salaries	Listed, all companies with more than 100 employees	–
	Since 2017: NFRD	Mandatory through the transposition of EU NFRD	Large private and listed companies	Annual report Sustainability report
Spain	2002	Mandatory for organisations to include environmental assets, provisions, investments and expenses in their annual financial statements	Large private and listed companies	Financial statements

(*continued*)

Table 2.

Country	Requirements of disclosure of CSR reports/non-financial statements (for listed companies)	Voluntary/mandatory	Target organisations	Disclosure instrument
	Since 2017: NFRD	Mandatory through the transposition of EU NFRD	Large private and listed companies	Sustainability report
Sweden	1999, 2006	Mandatory for certain companies has to include extensive non-financial information	Large private and listed companies	Annual director's report
	Since 2017: NFRD	Mandatory through the transposition of EU NFRD	Large private and listed companies	Annual report Sustainability report
Switzerland	–	–	–	–
UK	2013	Mandatory for all UK companies to produce a standalone strategic report that replaces the existing business review. The report on their strategy and business model, as well as on greenhouse gas emissions, human rights and diversity in the company	All companies (small companies are exempted with conditions)	Strategic report Director's report

Source: Adapted from carrots and sticks' database (www.carrotsandsticks.net/reporting-instruments/?status=Forthcoming&status=Current)

19% over the total, whilst the basic materials (20%), utilities (16%) and financials sectors (15%) publish the higher number of both sustainability and integrated reporting.

3.2 Variables

The dependent variable is represented by a categorial variable that takes value 0 if a firm presents an annual report (AR), 1 if a firm presents only a sustainability report in addition to the annual report (SR) and 2 if a firm develops only an integrated report (IR) (Jensen and Berg, 2012; García-Sánchez *et al.*, 2013; Frias-Aceituno *et al.*, 2013a,2014) and 3 if a firm develops both an integrated report and a sustainability report (IR and SR).

As independent variables, we focus on three main variables. Some of them, namely, the board size, board activity and board composition, have already been used by previous studies to examine the association between corporate governance and integrated reporting (Alfiero *et al.*, 2018; Fasan and Mio, 2017; Girella *et al.*, 2019). The variable board size is measured as the total number of board members, the variable board frequency meeting is measured as the total number of meetings held in a year, the variable board composition is measured as the number of NEDs on the board (Frias-Aceituno *et al.*, 2013a; Fiori *et al.*, 2016; Girella *et al.*, 2019).

As for moderating variables, following the study of Garcia-Sanchez *et al.* (2020), we selected three variables that can be used as a proxy of incentives towards corporate transparency, namely, information asymmetry, financial constraints and growth opportunity.

In terms of information asymmetry, following Lang and Lundholm (1996) and Glaum *et al.* (2013), we focus on analysts' forecast error in the fiscal year *t*, the year in which the reporting forms for the fiscal year *t* becomes public. The variable forecast errors ($Error_{i,t}$) is computed as the absolute difference between the actual earnings and the analysts' earnings forecasts, as follows:

$$\text{Error}_{i,t} = \frac{|EPS_{i,\ t} - \ Forecast\ \ EPS_{i,t}|}{P_{i,t}}$$

where $EPS_{i,t}$ are the realised EPS of a company i in year t, forecast $EPS_{i,t}$ is the median EPS consensus forecast provided by I/B/E/S for a company i for year t and $P_{i,t}$ is the median stock price for the year t. In our final models, we use the natural logs of the analysts' forecast errors because, in line with prior literature (Alford and Berger, 1999). That log induces normality and reduces influential observations in the right tail of the distributions.

As the measurement of financial constraints, we use the K-INDEX of the Kaplan-Zingales (KZ) index of Kaplan and Zingales (1997). In following Cheng *et al.* (2014), we construct the index on the basis of a linear combination of five ratios:

$$K - INDEK = -1{,}002\frac{CF_{it}}{A_{t-1}} - 39{,}368\frac{DIV_{it}}{A_{t-1}} - 1{,}315\ \ \frac{C_{it}}{A_{t-1}} + 3{,}139LEV_{it} + 0{,}283Q_{it}$$

where CF_{it}/A_{it-1} is cash flow over total assets; DIV_{it}/A_{it-1} is cash dividends over total assets; C_{it}/A_{it-1} is cash and cash equivalents over total asset assets; LEV_{it} is leverage; and Q_{it} is the market value of equity, measured as price times shares outstanding plus assets minus the book value of equity over assets). A higher value of K-INDEX means that companies has more capital constraints.

The growth opportunity is measured as the mean variation of the sales in the past five years (Garcia-Sanchez *et al.*, 2020). To test the effect of moderating variables on the board characteristics we create the following nine interaction terms: Board Size*LogNetSales, Board Activity*LogNetSales, BoardIndip*LogNetSales, Board Size*K-Index, Board Activity*K-Index, BoardIndip*K-Index, Board Size*LogFE, Board Activity*LogFE and BoardIndip*LogFE.

As control variables, we selected the following firms determinants of voluntary adoption of sustainability and integrated reporting (Girella *et al.*, 2019; Lai *et al.*, 2016; Melloni, 2015): Size, return on assets [return on assets (ROA)], Leverage and Market-to-Book ratio. The variable Size is measured by the natural logarithm of total assets and by the natural log of net sales, the variable ROA is measured by the return on assets and the variable, Leverage is measured by the debt to asset ratio (Lai *et al.*, 2016). Market to book ratio represents the growth opportunities on a more medium-long-term basis because a persistent difference between market and book value signals the presence of intangibles/IC able to determine company growth in the future (Frias-Aceituno *et al.*, 2013a, 2013b, 2014; Lai *et al.*, 2016). The institutional characteristics of the countries where the companies are located are also taken into consideration. The gross domestic product (GDP) level and the legal framework of the country where the company is located are also taken into account, the latter through a dummy variable (Common Law) that equals one for all the firm-year observations operating in a common law country. To test the investor protection exerted by the existing disclosures, the disclosure score provided by the World Bank (DISCSC) is included and measures to which extent investors receive information on ownership and financial data on a scale ranging from zero to ten. To test the strength of the legal right, the variable legal right provided by the World Bank is included. It measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders, and thus facilitate lending. The index ranges from 0 to 12, with higher scores indicating that these laws are better designed to expand access to credit.

4. Regression models

The regression analysis builds on a multi-nomial logistic regression to evaluate the probability for each firm to develop an integrated report or a sustainability report or both of them, considering the above described independent variables related to board characteristics.

Applicating this model to our data, we obtained the following five equations:

$$\log\frac{P(X)}{P(0)}_{it} = \beta_0 + \beta_1\text{Board Size}_{it} + \beta_2\text{Board Meet}_{it} + \beta_3\text{Board Independ}_{it} + \beta_4\text{LogFE}_{it} + \beta_5\text{K} - \text{Index}_{it} + \beta_6\text{Net sales Growth}_{it} + \sum_{k=7}^{11}\text{Firm Characteristics}_{it} + \sum_{J=12}^{15}\text{Country Characteristics}_{it} + \beta_{16}\text{Country}_{it}\,\beta_{17}\text{Industry} + \beta_{18}\text{Year} + \varepsilon_{it} \quad (1)$$

$$\log\frac{P(X)}{P(0)}_{it} = \beta_0 + \beta_1\text{Board Size}_{it} + \beta_2\text{Board Meet}_{it} + \beta_3\text{Board Independ}_{it} + \beta_4\text{LogFE}_{it} + \beta_5\text{K} - \text{Index}_{it} + \beta_6\text{Net sales Growth}_{it} + \beta_7\text{Board Size*LogFE}_{it} + \beta_8\text{Board Meet*LogFE}_{it} + \beta_9\text{Board Independ*LogFE}_{it} + \sum_{K=10}^{15}\text{Firm Characteristics} + \sum_{K=15}^{18}\text{Country Characteristics}\,\beta_{19}\text{Country}_{it} + \beta_{20}\text{Industry} + \beta_{21}\text{Year} + \varepsilon_{it} \quad (2)$$

$$\log\frac{P(X)}{P(0)}_{it} = \beta_0 + \beta_1 \text{Board Size}_{it} + \beta_2 \text{Board Meet}_{it} + \beta_3 \text{Board Independ}_{it} + \beta_4 \text{LogFE}_{it} + \beta_5 \text{K} - \text{Index}_{it} + \beta_6 \text{Net sales Growth}_{it} + \beta_7 \text{Board Size} * \text{K} - \text{Index}_{it} + \beta_8 \text{Board Meet} * \text{K} - \text{Index}_{it} + \beta_9 \text{Board Independ} * \text{K} - \text{Index}_{it} + \sum_{K=10}^{14} \text{Firm Characteristics} + \sum_{K=14}^{17} \text{Country Characteristics} + \beta_{18} \text{Country}_{it} + \beta_{19} \text{Industry} + \beta_{20} \text{Year} + \varepsilon_{it} \quad (3)$$

$$\log\frac{P(X)}{P(0)}_{it} = \beta_0 + \beta_1 \text{Board Size}_{it} + \beta_2 \text{Board Meet}_{it} + \beta_3 \text{Board Independ}_{it} + \beta_4 \text{LogFE}_{it} + \beta_5 \text{K} - \text{Index}_{it} + \beta_6 \text{Net sales Growth}_{it} + \beta_7 \text{Board Size*Net sales Growth}_{it} + \beta_8 \text{Board Meet*Net Sales Growth}_{it} + \beta_9 \text{Board Independ*Net sales Growth}_{it} + \sum_{K=10}^{14} \text{Firm Characteristics} + \sum_{K=14}^{17} \text{Country Characteristics} + \beta_{18} \text{Country}_{it} + \beta_{19} \text{Industry} + \beta_{20} \text{Year} + \varepsilon_{it} \quad (4)$$

$$\log\frac{P(X)}{P(0)}_{it} = \beta_0 + \beta_1 \text{Board Size}_{it} + \beta_2 \text{Board Meet}_{it} + \beta_3 \text{Board Independ}_{it} + \beta_4 \text{LogFE}_{it} + \beta_5 \text{K} - \text{Index}_{it} + \beta_6 \text{Net sales Growth}_{it} + \beta_7 \text{Board Size} * \text{LogFE}_{it} + \beta_8 \text{Board Meet} * \text{LogFE}_{it} + \beta_9 \text{Board Independ} * \text{LogFE}_{it} + \beta_{11} \text{Board Size} * \text{K} - \text{Index}_{it} + \beta_{12} \text{Board Meet} * \text{K} - \text{Index}_{it} + \beta_{13} \text{Board Independ} * \text{K} - \text{Index}_{it} + \beta_{14} \text{Board Size} * \text{Net Sales Growth}_{it} + \beta_{15} \text{Board Meet} * \text{Net Sales Growth}_{it} + \beta_{16} \text{Board Independ} * \text{Net Sales Growth}_{it} + \sum_{K=16}^{20} \text{Firm Characteristics} + \sum_{K=20}^{23} \text{Country Characteristics} + \beta_{24} \text{Country}_{it} + \beta_{25} \text{Industry} + \beta_{26} \text{Year} + \varepsilon_{it} \quad (5)$$

4.1 Descriptive statistics

Table 3 provides an overview of the descriptive statistics based on the final sample distinguishing between companies disclosing annual reports, sustainability reports, integrated reports and both sustainability and integrated reports. This table shows the means, standard deviations, minimum and maximum of all the continuous and categorial variables. Considering

Table 3.
Descriptive statistics

Variables	Total sample Mean	SD	Min	Max	AR Mean	SD	Min	Max	SR Mean	SD
BOARD SIZE	11.14	3.85	3.00	31.00	9.00	4.45	3.00	31.00	11.23	3.82
BOARD MEET	8.99	3.55	1.00	43.00	8.61	3.23	1.00	19.00	8.90	3.48
BOARD INDEPEND	0.63	0.23	0.00	1.00	0.58	0.28	0.00	1.00	0.62	0.24
LOGFE	−2.44	0.64	−5.05	−0.35	−2.28	0.59	−4.02	−0.88	−2.45	0.63
KZINDEX	0.14	2.06	−15.07	22.41	−0.10	2.48	−15.07	5.59	0.13	2.07
% NET SALES GROWTH	0.05	0.10	−0.50	0.86	0.12	0.17	−0.13	0.86	0.05	0.09
LOGTA	5.52	2.61	2.47	15.60	5.28	2.68	2.47	12.72	5.47	2.59
LOGNETSALES	3.86	0.72	1.33	5.81	3.21	0.77	1.33	5.16	3.86	0.71
ROA	0.07	0.07	−0.35	0.48	0.06	0.07	−0.16	0.33	0.07	0.07
MTB	3.15	3.16	−14.12	28.55	3.84	3.81	0.47	24.11	3.22	3.13
LEVERAGE	1.07	1.39	−2.76	10.81	0.92	1.19	−1.57	6.46	1.06	1.41
GDP	1,803	1,193	58	3,950	1,429	1,227	58	3,950	1,816	1,213
LEGAL RIGHT	6	2	2	8	5	2	2	8	6	2
ENFDISCLOSURE	7	3	0	10	6	3	0	10	7	3
FREQUENCIES										
CODE LAW/COMMON LAW	74%				82%				75%	

(*continued*)

Table 3.

Variables	SR		IR				SR and IR			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
BOARD SIZE	3.00	24.00	11.58	3.62	5.00	24.00	11.63	3.21	7.00	25.00
BOARD MEET	1.00	43.00	9.72	4.38	5.00	38.00	9.65	3.64	1.00	24.00
BOARD INDEPEND	0.00	1.00	0.69	0.20	0.25	1.00	0.73	0.15	0.35	1.00
LOGFE	−4.98	−0.62	−2.52	0.71	−4.40	−0.35	−2.44	0.66	−5.05	−0.90
KZINDEX	−10.80	22.41	0.26	2.10	−11.68	6.07	0.35	1.28	−3.16	4.39
% NET SALES GROWTH	−0.50	0.81	0.00	0.07	−0.27	0.14	0.00	0.05	−0.23	0.15
LOGTA	2.53	15.60	5.94	2.63	3.09	13.65	5.96	2.69	3.36	14.30
LOGNETSALES	1.78	5.81	4.12	0.58	2.63	5.20	4.18	0.55	2.69	5.35
ROA	−0.35	0.48	0.06	0.08	−0.22	0.45	0.06	0.06	−0.08	0.43
MTB	−14.06	28.55	2.66	3.09	−9.50	22.14	2.12	2.55	−14.12	14.36
LEVERAGE	−2.76	10.81	1.30	1.53	−2.07	6.81	1.09	1.05	−2.35	4.85
GDP	58	3,950	1,754	1,049	206	3,950	2,068	958	58	3,950
LEGAL RIGHT	2	8	5	2	2	8	6	2	2	7
ENFDISCLOSURE	0	10	7	3	0	10	8	3	0	10
FREQUENCIES										
CODE LAW/COMMON LAW			74%				51%			

the total sample, the mean value of board size is 11.14 ± 3.85 and the mean value of the number of the board meeting is 8.99 ± 3.55 on average. The percentage of the independent members is 63% ± 23%. The mean value of LogFE is –2.45 ± 0.79, the mean value of K-Index is 0.14 ± 2.13 whilst the mean value of net sales growth is 5% ± 0.14. As for firm's control variables, the mean value of companies' size is 5.52 ± 2.6 for LogTA (3.86 ± 0.73for LogNetSales) 1, ROA 7% ± 0.07, market to book value 3.15 ± 3.16. With reference to the institutional variables, the sample is composed by companies that have on average a value of GDP equal to 1.813, a mean index of legal right equal to 6 and a mean index of enforcement disclosure equal to 7. Finally, the companies of our sample are located for 74% in common law countries.

Companies disclosing both integrated reports are on average characterised by the larger board, the highest number of independent members and meet more frequently. As for the role of control variables, with regard to financial characteristics of companies, the size tends to be similar over the period amongst the three groups whilst the ROA of those issuing an integrated report tends to be higher. Furthermore, integrated reports seem to be disclosed especially in code law countries, with a lower strength of legal rights and higher investor protection through existing disclosures.

5. Results and discussion

5.1 Regression analysis

Table 4 reports the results of regression analysis.

In equation (1), Board size has a positive and significant association when the companies publish the integrated report and both the types of report (β_1 = 0.094 and p = 0.087 for IR, β_1 = 0.127 and p = 0.031 for IR and SR). It indicates that the publication of sustainability reporting and integrated reporting is influenced by having more directors sitting on the board. Therefore, H_1 is supported only for companies that adopt the integrated report and both the integrated report and sustainability report. The findings of previous works about IC disclosure (Tejedo-Romero *et al.*, 2017a, 2017b) and integrated reporting (Busco *et al.*, 2019) confirm this result. A larger board with different skills and competences tends to promote an internal culture towards the disclosure of a set of discretionary information as non-financial one still are. However, the coefficient of board size related to the adoption of integrated reporting is higher than the coefficient of board size regarding the adoption of sustainability reporting, confirming that a larger board can rely on more expertise and experience to understand the complexity of several types of information that should be included in the integrated report, such as the description of the different classes of capital, the business model or the strategic assets. The board meeting activity has no statistical significance when the companies publish only the sustainability reporting and the integrated reporting or both the reports. Therefore, H_2 is not confirmed.

In taking into account board independence, the coefficient registers a positive and significant value for the sustainability report (β_3 = 0.781, p = 0.081), for integrated reporting (β_3 = 1.70, p = 0.021) and integrated reporting and sustainability reporting (β_3 = 3.560, p = 0.000). This implies that the independent director does motivate companies to publish integrated and sustainability reports both as standalone and joint documents and to reveal more useful information to external shareholders and stakeholders. Therefore, H_3 is supported. These results are in line with the previous studies that have found a positive relationship (Cerbioni and Parbonetti, 2007; Liao *et al.*, 2015; Lim *et al.*, 2008). As explained before, independent directors have a fundamental role in monitoring management behaviour, increasing the voluntary disclosure of corporate information.

The variables used as firm's incentives, LogFE and Net Sales Growth are negatively and significantly associated with sustainability report (LogFE: coeff: −0.390, p: 0.023; Net Sales

Table 4.
Regression analysis

Variables	Equation 1 SR	Equation 1 IR	Equation 1 SR and IR	Equation 2 SR	Equation 2 IR	Equation 2 SR and IR	Equation 3 SR	Equation 3 IR	Equation 3 SR and IR
BOARDSIZE	0.068	0.094*	0.127**	−0.172	−0.202	−0.381**	0.072*	0.124	0.184***
BOARD MEET	0.044	0.073	0.074	0.263	0.245*	0.351**	0.053	0.076	0.067
BOARD INDEPEND	0.781*	1.704**	3.560***	2.296	6.355***	5.404**	0.744	1.612	3.727***
LOGFE	−0.39**	−0.600**	−0.622***	−0.54	−1.147	0.305	−0.405*	−0.608	−0.625***
KZINDEX	0.013	−0.061	−0.078	0.026	−0.045	−0.053	−0.108	−0.225	0.035
NETSALESGROWTH	−3.055***	−6.760***	−8.012***	−3.115	−6.666***	−8.014	−2.904***	−6.792	−8.1758***
BOARD SIZE * LOGFE				−0.112**	−0.137*	−0.227*			
BOARD MEET * LOGFE				0.089**	0.068	0.111*			
BOARDINDEPEND *LOGFE				0.626	1.866***	0.677			
BOARD SIZE*KZINDEX							0.011	−0.025	−0.053**
BOARD MEET*KZINDEX							0.017	0.038	0.047**
BOARD INDEPEND*KZINDEX							−0.254	0.145	0.048
BOARD SIZE*NETSALES GROWTH									
BOARD MEET*NETSALES GROWTH									
BOARD INDEPEND*NETSALES GROWTH									
LOGTA	0.03	0.029	0.118	0.026	0.024	0.113	0.03	0.026	0.119
LOGNETSALES	1.702***	2.681***	2.884***	1.703***	2.684***	2.807***	1.698***	2.621***	2.816***
ROA	3.679**	5.789***	4.620*	4.193**	6.284**	5.132**	3.472**	5.634**	4.678*
MTVB	0.000	−0.031	−0.068*	0.000000	−0.033	−0.067*	0.000	−0.038*	−0.071*
LEVERAGE	−0.012	0.002	−0.097	−0.016	−0.002	−0.097	−0.009	0.008	−0.087
GDP	0.000	0.001	−0.002	0.000	0.001	−0.002	0.000	0.001	−0.002
LEGALRIGHT	−5.688	−6.834	−8.034	−7.574	−8.79	−9.938	−7.457	−8.698	−9.999
ENFDISCLOSURE	0.525	0.634	0.497	0.755	0.868	0.731	0.742	0.863	0.742
[CommonLawCodeLaw = 0]	1.128	1.399	9.498	0.859	1.275	9.261	0.508	1.132	9.636
Controlled by country, industry and year									
Pseudo R	0.4509823			0.4613275			0.4618455		
Log^2	2,103.58***			2,078.51***			2,077.24***		

Note: *, **, *** indicates that the correlation is statistically significant at the 10%, 5% and 1% levels respectively

(*continued*)

Variables	Equation 4 SR	Equation 4 IR	Equation 4 SR and IR	Equation 5 SR	Equation 5 IR	Equation 5 SR and IR
BOARDSIZE	0.079	0.107*	0.142**	−0.2159*	−0.189	−0.295*
BOARD MEET	0.084*	0.111**	0.111**	0.303**	0.303**	0.355**
BOARD INDEPEND	1.109**	2.305***	4.083***	3.136*	6.736**	6.533**
LOGFE	−0.416**	−0.627***	−0.653***	−0.414	−1.043	0.054
KZINDEX	0.012	−0.06	−0.067	−0.001	0	−0.002
NETSALESGROWTH	5.333	6.568	−6.307	6.709	8.732	−0.348
BOARD SIZE * LOGFE				−0.138**	−0.153**	−0.217
BOARD MEET * LOGFE				0.084*	0.074	0.099
BOARDINDEPEND *LOGFE				0.807	1.769*	0.894
BOARD SIZE*KZINDEX				0.015	−0.024	−0.037
BOARD MEET*KZINDEX				0.011	0.033	0.040*
BOARD INDEPEND*KZINDEX				−0.379	−0.122	−0.017
BOARD SIZE*NETSALES GROWTH	−0.219	−0.331	0.581	−0.202	−0.434	0.24
BOARD MEET*NETSALES GROWTH	−0.333	0.193	−0.308	−0.359	0.203	−0.223
BOARD INDEPEND*NETSALES GROWTH	−5.49	−18.33**	−8.317	−7.405	−19.845	−13.086
LOGTA	0.035	0.031	0.116	0.031	0.022	0.119
LOGNETSALES	1.695***	2.733***	2.888***	1.708***	2.683***	2.818***
ROA	3.868**	6.262***	4.983**	4.263**	6.683***	5.518**
MTVB	0	−0.032	−0.071*	0	−0.04	−0.072*
LEVERAGE	−0.013	−0.008	−0.093	−0.016	−0.008	−0.093
GDP	0.001	0.001	−0.001	0.001	0.001	−0.002
LEGALRIGHT	−3.652	−4.839	−5.977**	−7.382	−8.715	−9.941
ENFDISCLOSURE	0.27	0.378	0.229	0.728	0.847	0.716
[CommonLawCodeLaw = 0]	1.289	1.674	9.555**	0.108	1.007	
Controlled by country, industry and year						
Pseudo R	0.4582461			0.4774841		
Log^2	2,086.01***			2,038.72***		

Table 4.

Growth: coeff: −3.055, p: 0.000), integrated report (LogFE: coeff: −0.601, p: 0.002; Net Sales Growth: coeff: −6.760, p: 0.003) and both sustainability report and integrated report (LogFE: coeff: −0.623, p: 0.003; Net Sales Growth: coeff: −8.014, p: 0.000). KZINDEX is found to have no significant association. Hence, information asymmetry and growth opportunities result to have a negative effect on these reporting practices. In the view of agency theory, this can be deemed to the fact that they can be perceived as tools able to disclose sensitive information.

In the equation (2), the interaction term Board Size*logFE is negatively and significantly associated with sustainability report (Board Size*logFE: coeff: −0.112, p: 0.023), integrated report (Board Size*logFE: coeff: −0.137, p: 0.028) and both reports (Board Size*logFE: coeff: −0.228, p: 0.002). The interaction term Board Meet*logFE is positively and significantly associated with the adoption of a sustainability report (Board Meet*logFE: coeff: 0.089, p: 0.045) and the adoption of both reports (Board Meet*logFE: coeff: 0.112, p: 0.066). Moreover, the interaction term Board Independ*logFE is positively and significantly associated with the adoption of the integrated report (coeff: 1.866, p: 0.052) only. For this reason, we can confirm partially the $H_{4.}$ Information asymmetry results have a negative moderating effect on the adoption of NFR practices when companies have a large board size. This finding confirms the agency view of those who have suggested that larger boards tend to be inefficient from a communication and consensus reaching viewpoint. This effect turns positive when coming to the frequency of meetings in the case of sustainability and both types of reports, the more board members meet up, the more the analysts' forecast error is reduced in that they tend to receive more articulated and well-discussed information. Finally, the same can be witnessed with reference to the presence of independent directors on the choice to release an integrated report. Analysts' forecast errors reduce when independent directors sit on the board, in that they can guarantee a better alignment between management's and shareholders' and stakeholders' interests.

In equation (3), the interaction term K-Index*BOARD SIZE is negatively associated with the adoption of both sustainability and integrated report (coeff: −0.053, p: 0.033) whilst the interaction term Board Meet*K-Index is positively associated with the adoption of both sustainability and integrated report (coeff: 0.047, p: 0.042). So, we can confirm hypothesis $H_{5,}$ but not with reference to integrated and sustainability standalone reports. This is in line with the previous studies that show the effect of financial constraints on the CSR disclosure (Cheng *et al.*, 2014), but it is in contrast with the study of Garcia-Sanchez *et al.* (2020) about the integrated report. A higher frequency of board meetings is indicative of a major time spent by the board in addressing a large number of company issues (both of financial and non-financial nature).

In equation (4), the interaction term Board Independ*Net Sales Growth is negatively associated with the integrated report. Growth opportunities influence negatively only the association between the publication of the integrated report and the independence of board directors. This association, limited to integrated reporting, can be justified by the fact that integrated reporting can reveal more sensitive information. On the basis of these results, we can confirm H_6.

In equation (5), when we test the effect of all moderating terms, we obtain results similar to the previous models.

Refering to the firm'characteristics, the size measured as logta and lognetsales is significantly and positively associated with AR, SR, IR and SR and IR in all models, especially in terms of sales. The same can be said with reference to ROA. This demonstrates that companies that tend to have a better financial performance are encouraged to provide non-financial information, also on a voluntary basis.

Market to book value is negatively associated with the release of both integrated reports and sustainability reports in all models, this meaning that the release of both types of reports can become even counterproductive. Leverage results to have no effect on these variables. The institutional characteristics and the country, industry and year dummies are not significant in all models, with the only exception of legal rights and common/civil codes country when the association is mediated by growth opportunities. The institutional structure of countries does not tend to affect this choice.

6. Robustness analysis

In the robustness analysis, we propose a different measure of the dependent variable as follows: 0 if the company adopts the annual report, 1 if the company adopts the sustainability report and 2 if the company adopts an integrated report. The results of robustness models (Table 5) confirm the results of the main models because we can confirm partially the moderating effects of information asymmetry, financial constraints and growth opportunity.

We found a significant and negative association between the interaction terms LogFE*Board Size and the voluntary adoption of a sustainability report (coeff: −0.108, *p*: 0.030) and integrated report (coeff: −0.170, *p*: 0.003). Moreover, the interaction terms LogFE*Board Meet is positively and significantly associated with the adoption of a sustainability report (coeff: 0.088, *p*: 0.047) and integrated report (coeff: 0.080, *p*: 0.097). Relating to the interaction terms K-Index*Board Size, K-Index*Board Meet and K-Index*Board Independ, we found no significant association with the disclosure of sustainability and integrated report. Relating to the growth opportunity, only the interaction terms Board Independ*Net sales growth is negatively and significantly associated with the adoption of the integrated report (coeff: −15.441, *p*: 0.018). When we test all interaction terms, the results confirm the same association demonstrated in the previous models, with the exception of the association between the interaction term Board Indipend * K-Index and the adoption of sustainability reporting, that is significant and negative (coeff: −0.414, *p*: 0.088).

7. Conclusions

The aim of this paper has been to investigate if and to what extent board characteristics can be seen as determinants of voluntary adoption of integrated reporting, as compared with the voluntary adoption of sustainability reporting or both of them and if these associations are moderated by financial incentives, such as information asymmetry, financial constraints and growth opportunities. The analysis has been performed in the European setting, and in particular on companies listed on the Eurostoxx600 that adopt integrated or sustainability reporting or both of them for the period 2015–2018 for a total of 2,103 firm-years observations.

By means of multi-nomial regression analysis, results suggest good and distinctive corporate governance practices that the company could follow to implement integrated reporting as compared to sustainability reporting. When considered as standalone reports, differences emerge in relation to the size of the boards, and thus the breadth of competences required to adopt an integrated report. The presence of independent directors on the board tends to influence the adoption of both practices, even though it results to have a major role in the case of integrated reports. When considered in conjunction (companies that adopt both), the effect of these boards' characteristics is confirmed with a higher value. Hence, the largest is the number of reporting devices adopted by a company, the largest are the skills and monitoring needed. In terms of the role of mediating variables, findings show that the

Table 5.
Robustness analysis

Variables	Equation 1 SR	Equation 1 IR	Equation 2 SR	Equation 2 IR	Equation 3 SR	Equation 3 IR	Equation 4 SR	Equation 4 IR	Equation 5 SR	Equation 5 IR
BOARDSIZE	0.063	0.095*	−0.167	−0.2813**	0.065	0.1313**	0.075	0.1060*	−0.215	−0.226
BOARD MEET	0.043	0.069	0.260**	0.2738**	0.053	0.079*	0.083*	0.107**	−0.356	0.354***
BOARD INDEPEND	0.752*	2.402***	2.111	5.721*	0.723	2.348***	1.087**	2.977***	−7.529*	6.137**
LOGFE	−0.389**	−0.594***	−0.527	−0.503	−0.398**	−0.577***	−0.417**	−0.626***	−0.464	−0.688
KZINDEX	−0.005	−0.092	0.011	−0.070	−0.063	−0.113	−0.007	−0.089	0.050	0.025
NETSALESGROWTH	−3.001*	−7.095***	−3.065***	−7.024***	−2.873***	−7.266***	5.607	2.079	6.920	5.396
BOARD SIZE * LOGFE			−0.107**	−0.170**					−0.132**	−0.168***
BOARD MEET * LOGFE			0.087**	0.080*					0.085	0.094*
BOARDINDEPEND *LOGFE			0.563	1.321					0.777	1.257
BOARD SIZE*KZINDEX					0.013	−0.030			0.016	−0.025
BOARD MEET*KZINDEX					−0.004	−0.010			−0.002	−0.007
BOARD INDEPEND*KZINDEX					−0.287	0.198			−0.414*	0.029
BOARD SIZE*NETSALES GROWTH							−0.232	0.029	−0.215	−0.153
BOARD MEET*NETSALES GROWTH							−0.329	0.043	−0.356	0.077
BOARD INDEPEND*NETSALES GROWTH							−5.668	−15.44**	−7.530	−18.04**
LOGTA	0.249	0.389*	0.191	0.325	0.221	0.325	0.264	0.406**	0.175	0.297
LOGNETSALES	1.486***	2.476***	1.545***	2.524***	1.533***	2.524***	1.471***	2.495***	1.582***	2.575***
ROA	3.962**	5.775*	4.349**	6.169***	3.703**	6.169***	4.159**	6.229***	4.391**	6.577**
MTVB	0.000	−0.044*	0.000	−0.044*	0.000	−0.044*	0.000	−0.044*	−0.001	−0.048*
LEVERAGE	−0.012	−0.035	−0.1670	−0.039	−0.010	−0.039	−0.013	−0.045	−0.0155301	−0.048
GDP	0.001	0.001	0.260	0.000	0.001	0.000	0.001	0.001	0.001	0.000
LEGALRIGHT	−10.109	−11.703	2.111	−11.392	−9.908	−11.392	−10.064	−11.680	−9.987	−11.805
ENFDISCLOSURE	1.078	1.117	1.027	1.069	1.047	1.069	1.071	1.106	1.054	1.110
[CommonLawCodeLaw = 0]	1.002	−2.433	0.519	−3.051	0.968	−3.051	1.337	−2.162	1.215	−2.960
Controlled by country, industry and year										
Pseudo R	0.453		0.444		0.444		0.441		0.460	
Log likelihood	2,099***		1,799***		1,798***		1,805***		1,764***	

Note: *, **, *** indicates that the correlation is statistically significant at the 10%, 5% and 1% levels respectively

relationship between board characteristics and the voluntary uptake of sustainability and integrated reports is not a linear one. In particular, information asymmetry can play a fundamental role with reference to the decision to uptake sustainability and integrated reports as standalone documents. Information asymmetry results have a negative moderating effect on the adoption of NFR practices when companies have a large board size as they tend to be inefficient from communication and consensus reaching viewpoint. This effect turns positive when coming to the frequency of meetings in the case of sustainability and both types of reports, the more board members meet up, the more the analysts' forecast error is reduced in that they tend to receive more articulated and well-discussed information. Finally, the same can be witnessed with reference to the presence of independent directors on the choice to release an integrated report. Analysts' forecast errors reduce when independent directors sit on the board, in that they can guarantee a better alignment between management and shareholders' and stakeholders' interests. Financial constraints also have a role, especially in relation to the decision to adopt both. This could be related to the associated costs to release two separate documents.

From a conceptual viewpoint, the presence of these similarities and differences suggests that these two reporting tools can benefit from an understanding that relies on both agency and stakeholder theories, that have to be conceived somehow complementary, especially, when it comes to integrated reporting.

From a company perspective, these findings can allow managers to better contextualise the choices of the board of directors when it comes to the disclosure of a discretionary set of non-financial information. In other words, managers can have further insights on why boards decide to adopt integrated and/or sustainability reporting, and thus operate accordingly. This results to be of particular support considering the recent revisions of the International <IR> Framework (2021), which calls for disclosures about the process followed to prepare and present the integrated report are encouraged that can include related systems, procedures and controls, including key responsibilities and activities, the role of those charged with governance, including relevant committees. Thus, the more the management is aware of the choices and related underpinning logics of the board, the more it can be accountable.

As for policy implications, the results indicate that the board size and board independence have a significant positive impact of the voluntary adoption of integrated reporting. Accordingly, regulators may opt for mandating a minimum number of board members and their independence. In addition, the impact that moderating variables related to investors, such as information asymmetry and financial constraints, have in the decision to adopt NFR tools results to provide evidence of the relevance of providers of financial capital also with respect to sustainability topics. This direction has been recently evidenced also by the proposal of the new European directive on corporate sustainability reporting directive (EU CSRD), which states that "The primary users of sustainability information disclosed in companies' annual reports are investors and non-governmental organisations, social partners and other stakeholders" (EU CSRD, 2021, p. 2).

Notwithstanding the above contributions to research and practice, our study has a number of limitations, which could offer some indications for future research. Firstly, the sample is composed by European and listed companies only, therefore, our findings may not be generalisable to international and small and medium companies. Secondly, sustainability reports are mainly referred to as those included in the GRI database. Thus, reports following Sustainability Accounting Standards Board (SASB) standards are not explicitly considered. Further research could clearly distinguish in the sample, organisations following GRI and/or

SASB standards. Finally, we have not considered all independent variables suggested by the literature on board characteristics, such as the board age and the board skills (Kanagaretnam *et al.*, 2007). These variables could be analysed in future research.

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