



INSTITUTO
UNIVERSITÁRIO
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Does innovation spur integrated reporting?

Ricardo Almeida Nogueira Pinto

Thesis specially presented for the fulfilment of the degree of Doctor in Management
- Specialization in Accounting

Supervisors:

PhD, Isabel Maria Estima Costa Lourenço - Full Professor – ISCTE – Instituto
Universitário de Lisboa

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Resumo

Em 2013 surgiu um novo normativo para os relatórios das empresas: o relato integrado. O Conselho Internacional para o Relato Integrado publicou este normativo com o objetivo de melhorar a qualidade do relato assim como de promover a sua adoção generalizada. A concretização destas metas implica, por exemplo, um entendimento abrangente dos incentivos internos e externos que estão associados à sua adoção.

Esta pesquisa pretende contribuir para a ampliação do conhecimento que resultou de estudos anteriores ao focar-se na análise da associação entre a performance relacionada com a inovação ao nível do país e o compromisso com a inovação ao nível da empresa, na adoção do relato integrado na Europa. Adicionalmente, foi adotado um suporte conceitual ainda não aplicado neste ramo de investigação, designado de sistema de inovação nacional, que foi complementado com a teoria institucional.

A amostra é constituída por 388 observações (empresa-ano) de organizações localizadas na Europa entre 2016 e 2019. Os resultados da regressão logística suportam a existência de uma associação positiva e estatisticamente significativa entre a performance relacionada com a inovação ao nível do país e a publicação do relato integrado. Ao nível da empresa, os dados sugerem um suporte parcial para a influência do compromisso com a inovação, moderado pela performance relacionada com a sustentabilidade, na adoção do relato integrado.

Palavras-chave: Determinantes, incentivos, relato integrado.

Classificação JEL: M42: Contabilidade; Q56: Ambiente e desenvolvimento – Ambiente e comércio - Sustentabilidade – Contas ambientais e contabilidade – Capital ambiental – Crescimento da população.

Abstract

In 2013 a new reporting framework was revealed: integrated reporting. The International Integrated Reporting Council published this framework to improve corporate reporting quality and achieve widespread acceptance. In order to achieve these goals, it is vital, for example, to understand external and internal factors that drive integrated reporting adoption.

This research extends previous findings by focusing on the impact of country-level innovation performance and firm-level innovation commitment on integrated reporting uptake in the European setting. In addition, the adopted conceptual support is based on the institutional theory combined with the framework of the national innovation systems that, to the best of our knowledge, has not yet been applied in this strand of research.

The sample includes 388 firm-year observations of firms located in Europe between 2016-2019. The results of the logistic regression model show evidence of a positive and significant association between country-level innovation performance and integrated reporting uptake. Moreover, at a firm-level, the data partially support the influence of innovation commitment, moderated by sustainability performance, on integrated reporting adoption.

Keywords: Determinants, incentives, drivers, integrated reporting.

JEL classification: M42: Accounting; Q56: Environment and Development - Environment and Trade - Sustainability - Environmental Accounts and Accounting - Environmental Equity - Population Growth.

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List of abbreviations

- CEO – Chief Executive Officer
- CSR – Corporate Social Responsibility
- ESG – Environmental Social Governance
- ESMA – European Securities and Market Authorities
- IR – Integrated Reporting
- IIRC – International Integrated Reporting Council
- NACRA reporting awards (National Corporate Report Awards)
- NGO – Non-governmental organisation.
- R&D – Research and development

1. Introduction

The following paragraphs of this chapter outline the background, research problem, objectives, hypotheses, results, contribution and organisation of this thesis.

Background, objectives and hypotheses

This study has the purpose of assessing how country-level innovation performance and firm-level innovation commitment influence integrated reporting (IR) adoption in Europe. This analysis is grounded, at a country-level, on the national innovation systems framework and institutional theory. At a firm-level, it is supported on the perspectives of the signalling, agency and proprietary costs theories.

Disclosure policies are a crucial element of the overall corporate strategy since they can affect both stakeholders' perceptions and internal decision-making (Carraher & Auken, 2013; Blomme, 2017). The way each firm communicates with its stakeholders the value creation process, the way it relates with the environment, its past and future policies and performance may positively influence how the firm is perceived, but may also entail additional costs and risks (Perego et al., 2016). Historically, there has been an accountability deficit. This fact, along with significant financial reporting scandals and the environmental crisis propelled institutions to create new reporting standards such as integrated reporting (White, 2005).

This trend opened new opportunities for research in the accounting field. For example, one strand of studies has focused on understanding the factors associated with integrated reporting adoption. These research projects gave significant contributions to our present understanding of the context surrounding IR acceptance. Even though previous studies results indicated several IR drivers at a country, industry and firm-levels (Jensen & Berg, 2012; Frías-Aceituno et al., 2013a, 2013b, 2014; García-Sánchez et al., 2013; Sierra-García et al., 2015; Lai et al., 2016; García-Sánchez & Noguera-Gámez, 2018; García-Sánchez et al., 2019; Girella et al., 2019; Fuhrmann, 2020; Kılıç et al., 2021), to the best of our knowledge, the influence of innovation as a possible driver of integrated reporting uptake, concurrently, at a country-level and firm-level was not examined.

Former studies focusing on the impact of innovation on voluntary disclosure are rare and mainly focused on the firm-level. Research focusing on the impact of firm-level environmental innovation on environmental disclosures suggested a positive impact (e.g. Radu & Francoeur, 2017; Gallego-Álvarez, 2018).

Therefore, this research has the purpose of filling this void by studying the incentives of integrated reporting adoption by considering the impact of innovation performance at a country-level and innovation commitment at a firm-level.

This purpose led to the following hypotheses:

- Hypothesis 1: The likelihood of adopting integrated reporting is higher in countries with a higher level of innovation performance.
- Hypothesis 2: Firms with a higher level of innovation commitment will have a higher propensity to publish an integrated report.
- Hypothesis 3: The influence of firm-level innovation commitment on integrated reporting adoption is conditional on the firms' sustainability performance levels.

Research design overview

Regarding the research design, the analysis was based on a sample corresponding to 388 firm-year observations for the years 2016-2019 of listed firms in Europe.

The methodological approach was quantitative. In this regard and in the same vein as previous research, a pooled binary logistic regression model was computed. Since the objective of this study was to focus on integrated reporting adoption, the binary dependent variable is 1 if the firm adopted integrated reporting and 0, otherwise. The research model includes three independent test variables. The first one, related to country-level innovation performance, was measured by the Global Innovation efficiency ratio (Cornell et al., 2019). This index quantifies each country's innovation performance looking at several dimensions that can explain the overall country's performance. It compares the innovation output (e.g. the number of patents) with the level of input (e.g. infrastructures). The second and third interest variables are related to firm-level innovation commitment (measured by the firms' R&D expenses to sales ratio) and

sustainability performance (measured by the Thomson Reuters Asset 4 ESG performance score).

What's more, this model includes several control variables at different levels of analysis to rule out other possible explanations. At a country-level, it includes predictors for the quality of the legal environment, the level of individualism of a country and economic development. At an industry-level the regression controls for the industry concentration level. At a firm-level, it considers the effect of profitability, size, leverage and cash-flow on the likelihood of publishing an integrated report. Finally, it also includes dummy variables to account for country, industry and year fixed effects.

Results

Regarding the results, the binary logistic regression model provided support for the country-level and firm-level hypotheses 1 and 3, although, for the latter, a partial support. The data did not provided support for hypothesis 2.

The evidence for the country-level hypothesis (H1) on the grounds of institutional theory and the national innovation systems framework suggests that firms located in a similar institutional environment will tend to adopt a similar pattern of behaviour to guarantee their continuity, as stated in the institutional theory (DiMaggio & Powell, 1983; Gogodze, 2016; Sharif, 2006; Lundvall, 2007). Therefore, it is argued that firms located in an innovation-conducive setting will have a higher probability of publishing an integrated report.

The data also partially support the firm-level hypothesis (H3) regarding the association between firm-level innovation commitment, moderated by ESG performance and IR uptake. The evidence does not indicate an unconditional effect of firm-level innovation commitment on IR adoption (H2). Nonetheless, it partially supports that the impact of firm-level innovation commitment on IR adoption is conditional on sustainability performance levels. These results reflect a positive or negative balance that may arise from a cost and benefit analysis regarding the disclosure decision (Verrecchia, 1983).

Contribution

The pertinence of research focused on IR adoption incentives has been highlighted by the research community (e.g. Adams, 2015). In this regard, firstly, this study extends previous literature findings by showing evidence of two new determinants that drive IR acceptance, namely country-level innovation performance and firm-level innovation commitment.

Secondly, most of previous studies were based on data referring to years before 2013, thus, before the release of the IR framework by the IIRC. Few studies were based on data posterior to 2012 (Girella et al., 2019, Fuhrmann, 2020 and Kılıç et al., 2021). This study provides data related to the fiscal years between 2016-2019.

Thirdly, the majority of this body of research included firms from different regions (Asia, Africa, North and South America and Europe), providing a valuable global perspective (e.g. Lai et al., 2016; Fuhrmann, 2020). As a consequence, the representativity of European firms in these samples was restricted. This study adds to the literature by bringing evidence of IR adoption incentives focusing on the European setting.

Fourthly, one of the country-level conceptual frameworks adopted was the national innovation systems that, to the best of our knowledge, has not been applied to this strand of research. Moreover, it was provided a combined view of this framework with the institutional theory.

Fifthly, this research provides evidence that countries with different innovation performance levels and, thus, different innovation-inducive settings may impact IR adoption differently. Even though this framework was published in 2013 and a significant amount of research has been published, some researchers question IIRC's objectives and framework (e.g. Flower, 2015). What's more, although IR diffusion is increasing, it is still limited (WBCSD, 2020). In this context, it is essential for IR practice that regulators and professional bodies analyse the results of independent empirical research to assess further developments and foster acceptance. In their effort towards harmonisation and diffusion of a higher level of integrated information, European institutions and professional bodies may gauge the need to tailor the legislation and guidelines in light of these differences.

Sixthly, managers may become more conscious of the trade-off that is implicit in the adoption decision. Firms have to judge the magnitude of the expected costs and compare them with the magnitude of the expected benefits.

Finally, investors support their investment's decisions considering the information that is or is not available for each investment option. Thus, having an overarching perspective regarding the trade-off and contextual factors that may lead different firms to adopt different levels of integrated information will support a better judgement, in the context of the overall investments' decisions, regarding the rationale behind the firms' reporting strategy.

This thesis is ordered in the following chapters and sections. Section 2.1 begins by presenting a brief overview of the setting in which integrated reporting emerged and its prominence. Section 2.2 focuses on the literature review and is subdivided into three parts. The first part (2.2.1) gives an overview of studies focusing on determinants of CSR adoption. The second part (2.2.2) examines studies focusing on the drivers of integrated reporting with a qualitative approach followed by Section 2.2.3 which analyses studies that adopted a quantitative approach. The latter section is further subdivided into two parts. The first part (2.2.3.1) reviews studies that were carried out in a mandatory setting. In the second part (2.2.3.2), the focus is redirected to studies related to a voluntary environment which is the specific objective of this research. The last section of this chapter (2.3) summarises the literature review and describes the objective and relevance of this study.

Section 3.1 of Chapter 3 starts by describing theories commonly used on voluntary disclosure research but also in research focusing on the drivers of integrated reporting. Then, it is described the reasoning that led to the adopted conceptual approach and outline the research hypotheses at a country-level (3.2) and firm-level (3.3).

Section 4.1 of Chapter 4 starts by describing the sample composition and data sources. Then, Section 4.2 outlines the research model and the adopted variables. For each variable, it is provided detail regarding the chosen measurement criteria.

Chapter 5 is divided into two sections. The first section (5.1) shows and evaluates the results of the univariate and bivariate analyses for all the variables. The second section (5.2) depicts and

assesses the results for the test and control variables of the binary logistic regression model in light of the hypotheses, theoretical support and previous research findings.

Chapter 6 aims at synthesising this research mentioning the objectives, research design and relevant findings. Along with this overview, it references research constraints, its significance and future research opportunities.

2. Background and literature review

2.1 Background

In general, corporate reporting is seen as an essential means of communication with its stakeholders (Blomme, 2017) and as having an important role in internal decision-making processes (Carraher & Auker, 2013). Even so, a historical accountability deficit along with significant financial reporting scandals and the environmental crisis prompted the path towards a higher level in reporting standards in which Integrated Reporting (hereafter IR) was part of (White, 2005).

IR is a type of corporate reporting that has gained prominence in academia and within practitioners. Some view it as a tool that surmounts some of the critics that traditional reporting has received to fulfil some of the unmet needs of information of its stakeholders. (IIRC, 2011; ESMA, 2015; Eccles & Krzus, 2015).

Companies usually publish sustainability reports separated from financial reports with minimal connectivity between them. This happens in a setting where firms increasingly view that sustainability issues are crucial to their long-term success and, thus, should be looked at through a business perspective (Eccles & Krzus, 2015). In traditional reporting, often, is difficult for stakeholders to evaluate whether the companies' strategy is sustainable (Eccles & Krzus, 2010). This fact led to the idea of integrating into one document the mainstream financial reporting with sustainability issues and corporate social responsibility reports (King & Roberts, 2013). As Eccles & Krzus (2010: 3) pointed out:

"If attention to environmental, social and governance performance is integrated into basic business processes, then what is the logic for producing separate financial and non-financial reports?"

Nonetheless, Eccles & Krzus (2010) draw attention to the fact that integrated reporting is not the ultimate solution to prevent financial crisis or to all the environmental and social problems, but it can have a positive impact on all of these areas in a context when there is the will to implement sound policies.

Regarding the reports' length, criticisms have existed concerning the excessive dimension of traditional reporting. This lack of conciseness creates hindrances in stakeholders' understanding

of the intertwine between different policies and impacts and, hence, assessing the overall performance (ESMA, 2015; IIRC, 2011).

To unravel these problems, it was founded in 2010 a global partnership of investors, corporations, standard setters, regulators, accounting firms and non-governmental organisations named *International Integrated Reporting Council* (hereafter IIRC). This non-profit organisation has the vision of disseminating integrated thinking worldwide through the creation of a reporting standard: *Integrated Reporting* (IIRC, 2011).

The final version of the framework was available in 2013 and had the primary goal of creating a guideline that helps companies convey to their stakeholders the process of creating value over the short, medium and long-term (IIRC, 2013).

IIRC's mindset was to develop a standard that would promote, simultaneously i) unbiased information; ii) conciseness; and iii) the inclusion of financial and non-financial information. Thus, it would be possible to achieve a holistic assessment of the future performance of the companies in a succinct and balanced way. Integrated reporting also aims to address both internal and external decision-makers information needs (Barth et al., 2017).

This framework is grounded in principles rather than rules since it does not impose specific measurements, indicators, the disclosure of particular issues and report's layout (IIRC, 2013; Eccles & Krzus, 2015). It also strives to achieve comparability, albeit limited, stating some minimum content that the reports ought to contain (IIRC, 2013).

Nevertheless, although principles-based, this standard identifies the required content of the report as well as all the types of resources that, when considered material, should be included (IIRC, 2013).

The central idea behind the integrated reporting theoretical framework is that companies should enlarge their reporting to include all the resources they use (Cheng et al., 2014a) and address all the relevant stakeholders focusing on the providers of capital (Eccles & Krzus, 2015). The IIRC uses the word “capitals” to represent the resources. The following capitals are acknowledged: financial, intellectual, manufactured, human, social, relationship, and natural (IIRC, 2013). This is a broad concept that takes into account both resources owned or not by

the company since their availability, nature and cost can affect the firm's viability (IIRC, 2018b).

This standard also highlights that the information should be connected. This concept is pivotal and means that as a result of previous consideration of the intertwinings (trade-offs and mutual dependencies) between the several units of the firm and its capitals the company thoroughly evaluates how it builds value over the short, medium and long term and will reveal this reasoning in the IR. Thus, this collective awareness of the value creation process leads to integrated thinking and integrated decision-making (IIRC, 2016, 2018b).

In short, the IIRC recommends creating a document that communicates the firms' governance, strategy, performance and prospects, considering its external context to inform its stakeholders of how it creates value over the short and long term in a concise way.

In 2017, experts reviewed 43 Integrated Reports of companies that participated in the integrated reporting Network. Their analysis revealed that the average length in 2017 decreased compared to 2016 (IIRC, 2017b).

There has been a growing interest in the IR framework as well as in communicating sustainability policies in general (Adams, 2016; Rinaldi et al., 2018; De Villiers et al., 2017; Ioannou & Serafeim, 2019). The 2018 Global Director Survey Report identified integrated reporting as one of the primary reporting frameworks (Global Network of Director Institutes, 2018). In addition, EY (2017) survey results show that non-financial information plays a vital role in investors' decisions. In countries such as the U.K., Japan, New Zealand and Australia, there has been encouraging regulatory progress in the direction of integrated reporting (IIRC, 2018a). China, India, Malaysia and the U.S. have given steps in the direction of the development of integrated information (Howitt, 2016; IIRC, 2018a). In the Netherlands, there was a 55% increase in listed companies using integrated reporting in 2017 when compared to 2016 (IIRC, 2017a). IIRC's CEO views this global increase of interest as a consequence of i) the existence of scientific evidence that IR lowers the cost of capital and increases its share price. In line with this opinion, Baboukardos & Rimmel (2016) present evidence supporting the value relevance of IR after having studied 954 South African companies; ii) increase in the examples available in the IIRC's database and iii) a call for IR adoption from prominent investors like the CEO of

Black Rock investment firm (Howitt, 2016). Adams (2017), in search of empirical evidence regarding the impact that integrated reporting has in organisations, interviewed Australian and South African board members and non-executive directors of listed companies. It was contended that the reporting processes of the King Code of Governance Principles required to South African firms (King III) and integrated reporting framework may have had a positive contribution to board supervision in managing complexity and extended the view of how value is created. Until now, Brazil and South Africa are the only countries where the integrated reporting framework compliance is mandatory (Dumay et al., 2016; Eccles, 2019; IIRC, 2021).

In the European Union, the 2014/95/EU non-financial reporting directive specifies which companies and what type of ESG information major European companies must disclose on a comply or explain basis. This can be considered as the first move towards integrated reporting in Europe (Camilleri, 2015; Howitt, 2016). Both regulations incorporate a principles-based approach and have embedded some common principles, namely connectivity, materiality and conciseness (Howitt, 2016). As a consequence of the similarities, some researchers contend that the IR framework could be helpful in meeting the directive regulation (e.g. Dumay et al., 2018). Nonetheless, there are relevant differences between these frameworks. Firstly, even though these regulations address non-financial reporting, the IR framework is primarily directed to the firms' investors while the directive is grounded on a stakeholders perspective (Milne & Gray, 2013; Manes-Rossi et al., 2018). Secondly, in contrast with the IR framework, the EU directive emphasises the need to disclose anti-bribery and corruption information while the IR framework does not (Manes-Rossi et al., 2018). Thirdly, the EU directive recommends that firms disclose issues related to due diligence and policies in a specific part of the report. Adopting a different perspective, the IR framework recommends firms to adopt a more holistic view of the firm and integrate this information in the content element of performance of the IR along with the outcomes (Manes-Rossi et al., 2018).

Although some researchers argue in favour of integrated reporting as aforementioned, this is not a unanimous position. Flower (2015) casts doubt about the integrated reporting purpose, arguing that the integrated reporting framework has discarded sustainability accounting since it adopted the notion of worth for investors instead of worth for society. With a similar view, Thomson (2015) posits that integrated reporting leaves out a significant part of the sustainability

issue. Stubbs & Higgins (2014) suggested, after having studied a small sample of Australian companies, that integrated reporting is just the next phase of sustainability reporting rather than an innovative disclosure process. In their view, the integrated reporting contribution incremental and based on pre-existing processes and structures. Brown & Dillard (2014) contend that although integrated reporting can have a role in enlarging the nature of the reports' content, it does not promote critical thinking about the established processes within the firm.

Regarding the quality of integrated reports, the evidence is still scarce (Pistoni et al., 2018; Vitolla et al., 2019). Lopes & Coelho (2018), having performed a content analysis to the integrated reporting of 224 firms from 26 countries for the years 2011-2015, suggested that the disclosure level is lower than expected. For example, the integrated reporting framework establishes the nature (elements) of each report's content, which encompasses eight elements. In this study, six out of the eight elements were only considered by nearly half of the companies classified as Reference Reporters by the IIRC. In line with these findings, Pistoni et al. (2018) also performed a content analysis to assess the reports' content quality analysing 126 integrated reports from six different regions for the years 2013 and 2014. Their evidence supported that the overall quality of the reports is low due to insufficient content such as i) the business model; ii) capitals; iii) strategic priorities and iv) the value creation process. These results are expected as they mirror the initial stage of implementation of integrated reporting. Also, Dilling & Caykoğlu (2019) analysed the content of 107 companies that published integrated reporting in 2017 and found it to be low. Darus et al. (2019), studied 100 firms in Malaysia in 2014. They suggested the quality of the reports was higher in organisations whose strategies were congruent with their vision and mission statements. In addition, they also found that the companies that implemented policies to address risks revealed, similarly, more integrated reporting elements in their annual reports.

In academia, several calls for more research in integrated reporting have been made in the scientific literature along with an increasing amount of published research (Rinaldi et al., 2018; Dumay et al., 2016; Cheng et al., 2014a). Past studies were mainly concentrated on, i) external reporting; ii) auditing and assurance; iii) accountability and governance; iv) management control and strategy and v) performance measurement (Guthrie et al., 2012; Dumay et al.,

2016). Nonetheless, several researchers stress the need for more research (e.g. Rinaldi et al., 2018; Dumay et al., 2016).

As in the CSR reporting literature (e.g. Artiach et al., 2010; Lourenço & Branco, 2013), some studies have focused on the determinants of IR quality (e.g. Rivera-Arrubla et al., 2017) whereas another strand of research has focused on the determinants of adoption (e.g. García-Sánchez & Noguera-Gámez, 2018; García-Sánchez et al., 2019) both in a mandatory (e.g. Wachira et al., 2020) and voluntary reporting settings (e.g. Jensen & Berg, 2012; Frías-Aceituno et al., 2013a, Frías-Aceituno et al., 2013b; Frías-Aceituno et al., 2014; Garcia-Sánchez et al., 2013; Sierra-Garcia et al., 2015; Lai et al., 2016; García-Sánchez & Noguera-Gámez, 2018; García-Sánchez et al., 2019; Girella et al., 2019; Fuhrmann, 2020).

The review of previous studies presented in the next section will show that past studies yielded contradictory results regarding some of the studied incentives and that there are determinants that have not yet been examined. In this regard, this research aims to investigate, on the grounds of the signalling and agency theories, the impact that firm-level innovation commitment and country-level innovation performance have in explaining integrated reporting adoption.

2.2 Previous related research

It was outlined earlier that the research objectives focus was on Integrated Reporting adoption drivers in a voluntary setting.

In this regard, the first section of this chapter (2.2.1) reviews literature that focuses on the determinants of CSR reporting with the objective of obtaining a broader perspective of this stream of research. Although the analysis is directed towards research with a quantitative approach, in the second section of this chapter (2.2.2), for the same reasons, it is presented an overview of the findings of studies that were centred on the drivers of integrated reporting with a qualitative research design. Subsequently, in section 2.2.3.1, it is provided an analysis of previous studies that focused on “comply or explain” settings that, presently, to the best of our knowledge, are circumscribed to Brazil and South Africa. Then, in section 2.2.3.2, this review

is redirected to quantitative studies in contexts where the adoption is voluntary, which is the focus of this research. The last section (2.3) summarises the conclusions of the literature review. Finally, in the same section, it is included an outline of the research gap as well as the importance of addressing it.

2.2.1 Determinants of CSR reporting adoption

Liu & Anbumozhi (2009), based their study in China collecting data reported for 2006 of Chinese public firms included in the China Securities Regulatory Commission website. Their objective was to assess the incentives associated with the environmental information disclosure level. A multiple regression model was used in this regard. The authors highlighted that companies' environmental sensitivity was the main explanatory factor. In addition, they emphasise that firms disclosed environmental information, mainly as a vehicle to reduce possible governmental concerns. In contrast, there was no evidence supporting the influence of economic performance in CSR disclosures. Lastly, this analysis revealed that creditors and shareholders pressures were negligible. Nonetheless, they underscored that their influence has been growing. Thus, it is suggested that in the future, the number of companies that will publish environmental-related information may increase.

Huang & Kung (2010), computed a multiple regression to analyse if there was an association between CSR information disclosure and stakeholders' expectations with a sample of public firms pertaining to the Taiwan Stock Exchange between 2003 and 2005. They posited that bigger companies or that violated environmental rules would have more government control. As such, with the aim of strengthening their legitimacy, it was posited that these organisations would be propelled to publish CSR information. Debtors and consumers were also viewed as significant drivers of this behaviour. Regarding the impact of the level of diffusion of the ownership structure, the authors contend that the higher the levels of diffusion and the number of personnel the higher the levels of attention the firm will receive regarding their disclosure strategy. Being aware of this close scrutiny, firms will tend to follow the environmental

disclosure path. Finally, accounting firms and environmental groups were also considered as having an important influence.

Amran & Haniffa (2011), through the lens of the institutional theory, interviewed CSR reports preparers of Malaysian firms with the objective of finding the drivers of CSR reporting uptake. The preliminary evidence suggested that all three processes of the institutional theory were applicable, namely coercive, normative and mimicking processes. Nonetheless, subsequently, after having re-examined the data from the interviews, along with the results of regression analysis, the researchers underlined that the main reason for CSR reporting embracing was a public relations strategy with the objective of enhancing their public reputation. The Malaysian government expected a higher level of transparency. Having this in mind, these firms followed an environmental driven strategy to be seen as legitimate and, thus, increase the likelihood of winning governmental business propositions and sustainability reporting awards. Finally, the authors emphasised that the existence of the NACRA reporting awards (National Corporate Report Awards) constituted an important driver since it could improve the firms' public image.

Fortanier et al. (2011) analysed a sample of 2004 of firms classified in the Fortune rank of the top 250 global firms to assess whether CSR standards adoption led to a reduction in country differences in CSR reporting. In addition, they also evaluated if standards strictness led to a higher level of reporting homogeneity. The conclusions of this analysis were based on logistic regression. They found evidence that companies that adopted reporting standards were more likely to achieve a higher level of harmonisation. However, they suggested that the harmonisation level was not associated with a higher degree of norms stringency. They conclude that the existence of standards at a global level does not propel CSR reporting adoption. However, it lessens the impact that the institutions of each country have on the firms' way to communicate CSR.

Zeng et al. (2012) analysed a sample of listed firms between 2006 and 2008 of the manufacturing industry in China to assess the incentives associated with disclosing environmental information. In China, not all firms are obligated to publish CSR information. Firms that attain pollution levels that surpass extant governmental limits as well as companies pertaining to sensitive environmental sectors must publish CSR information. Nonetheless, these rules exist only when firms ask for permission to be listed or aspire to finance their activities in

the stock exchange. However, these firms want to be viewed as legitimate and had already published this type of information when they first entered in the stock market. As a consequence, their stakeholders may be expecting this behaviour on a continuous basis. Hence, the results supported the idea that the propensity to disclose CSR information is higher among these firms pertaining to sensitive environmental industries. Regarding all the other companies, the government recommends that they publish CSR information. What's more, the authors found that in China these recommendations are more effective when the firms are state-owned than private firms. Their evidence corroborated this hypothesis. Also, due to an uncertain regulatory setting and as a way to deal with the unknown impact in their business activities, companies may mimic their peers' behaviour as referred in the institutional theory. This study showed evidence that supports a higher likelihood of companies publishing CSR information when more companies in the industry follow this reporting policy. This research also focused on the impact of reputation on CSR disclosure uptake. As a proxy for brand reputation, the authors considered that firms with a top position in the trademark ranking or a higher position than other famous brands will have a higher chance of publishing CSR information. The reasoning behind this hypothesis lies in an expected higher loss for those organisations with a reputed brand in a context where societies' awareness for these issues is increasing. The study findings supported this expectation.

Kim et al. (2013) studied CSR practice in South Korea through the analysis of public and private information as well as conducting interviews with executives and CSR experts. The results of the interviews were also analysed in conjunction with other documentation so that triangulation could be carried out. The evidence supported the view that social and environmental practice is the result of a combination of pressures. The economic setting along with significant institutional pressures are seen as key incentives. In addition, it is suggested that the influence of the prevailing Confucianist culture that favours a vision where the group needs are above individual needs constitute an important driver. Also, the country faced pressures of some international associations (e.g. the Global Reporting Initiative) that contributed to the diffusion of best reporting practices in the form of standards, thus, emphasising the need to take into account environmental issues. Also, South Korea firms were sensible to other groups influence

as, for example, the FTSE4Good or the Fortune 100 best mindful companies to work for. This setting propelled this country to adopt environmental and social practices.

Shnayder et al. (2016) investigated the drivers of environmental-related information disclosure in the package food business sector. Their conceptual support was the institutional theory and stakeholder management. They reviewed 16 sustainability reports from multinational firms. Additionally, this study included seven semi-structured interviews with mid-level managers. The evidence showed that external incentives were key explanatory factors. What's more, it was suggested that CSR practices were not equal across different stakeholders and institutions. Although both normative and regulatory processes were found to have explanatory value, cultural and cognitive drivers were viewed as the main incentives. The authors suggest that the government could be aware of the significant impact of the latter factors and postpone governmental actions.

Burritt et al. (2016) examined the incentives associated with water-related information disclosure in Japan for 2013 and 2014, adopting stakeholder theory as their conceptual umbrella. The authors performed a content analysis of sustainability and integrated reports of 100 firms listed in the Nikkei 225 and computed a multiple linear regression. The findings revealed that the level of ownership concentration and companies' risk levels associated with water were important incentives for publishing water-related information. These findings contradict initial expectations since Japan does not categorise water as a key environmental risk. Organisations quest to increase notoriety and be perceived as relevant in the public eye and by environmental organisations may explain this practice. In contrast, it was found that cross-listing, as well as profitability, were not relevant drivers.

Halkos & Skouloudis (2016) studied the determinants of climate disclosures of 100 European firms using logistic regression analysis. The data suggested that few groups of Greek companies were including these specific topics in their reporting. In addition, it was underlined that firms belonging to sensitive environmental industries, companies' size and multinational firms were relevant explanatory variables. Regarding the latter, the need to enhance public reputation in the host countries can be viewed as an incentive to change. In contrast, it was suggested that the profitability, industry and type of ownership have no explanatory value.

Roy & Ghosh (2019) studied the determinants of environmental information disclosure in Asia. They departed from a sample of 100 firms located in China, Japan, India, South Korea and Indonesia from 2010 until 2016 with 600 firm-year observations. The conclusions were supported in regression analysis. The study concluded that culture, along with the legal system and civil rights and liberties were the main explanatory factors of environmental disclosure in these countries.

Lee et al. (2018) carried out a survey to 8,779 small and medium firms in Korea obtaining a final sample of 780 firms. These data were used to assess the incentives that explained the adoption of environmental responsibility practices in the logistic sector. Several quantitative methods were used to examine the data, namely structural equation modelling, factor analysis and one-way variance analysis. The authors underlined that perceived social expectation was the key driver of environmental-related practices. With a lesser degree of significance than the previously mentioned driver, the authors highlighted the pressure exerted by stakeholders and the level of internal organisational endorsement. These pressures resulted from key environmental issues pertaining to this industry, namely greenhouse gas pollutants, the necessity to reduce fuel consumption as well as a reduction in energy consumption related to warehouse management. Lastly, there was evidence suggesting that managers knew that they had to be engaged and embrace green practices.

Uyar et al. (2021) examined institutional incentives that may lead to sustainability reporting uptake in the tourism industry worldwide. This analysis encompassed environmental, social and governance issues and included data from 2011 until 2016. In addition, industry-level and firm-level control variables were included in a logistic regression analysis. The evidence suggested that environmental, social and governance motivations had a significant explanatory value. However, environmental and governance-related factors stood out compared with incentives related to countries' social development.

Nguyen et al. (2020) examined the drivers of environmental information disclosure in Vietnam. The authors selected 120 firms listed on the Ho Chi Minh City Stock Exchange. They started their investigation by carrying out a survey and, subsequently, extended their analysis with an exploratory factor analysis followed by regression analysis. The evidence indicated that the most relevant driver was the government influence. This country has strict laws concerning

environmental protection as well as laws enforcing environmental recuperation in the sector of mineral extracting as this industry entails more environmental-related risks. The level of consciousness of the organisations' management team regarding environmental topics was also considered as relevant since these managers will be more conscious of the importance of publishing environmental-related information. Finally, the size of the firms, the industries where these firms operated and pressures exerted by the community were also considered important drivers. However, the authors underscored that higher levels of leverage and profitability decreased the likelihood of publishing CSR information.

Tran & Beddewela (2020) evaluated the impact of the institutional context on sustainability information disclosure in Southeast Asia. Conceptually, the study was based on the neo-institutional theory. The sample was comprised of the 30 largest firms pertaining to the Financial Times Stock Exchange ASEAN index, which comprises 30 most prominent firms in Indonesia, Philippines, Vietnam, Thailand, Singapore, and Malaysia. The analysis was carried out using multiple regression analysis. The evidence revealed that firms in countries with civil law and mandatory regulation exhibited more CSR information in their annual reports. In the same vein, organisations that have adopted GRI standards as their guidelines were more prone to publish CSR information. Finally, firms that pertained to environmental groups adopted the same disclosure practice. In brief, there were legal, normative and cultural propellers. Nonetheless, the authors underline that legal and cultural factors were the main incentives.

In summary, the above studies highlight the prominence of external over internal drivers regarding CSR practices adoption. In particular, stakeholders such as debtors and consumers as well as direct governmental influence through regulation were commonly referred as key drivers. Nonetheless, this influence also occurred in an indirect way. The quest for legitimacy propelled some organisations to follow a "green" path expecting to obtain economic benefits in the future and increase their reputation. Finally, countries' culture, standard setters as well as environmental NGO's were also considered as essential influencers.

2.2.2 Determinants of IR adoption: qualitative research design

The first strand of studies on integrated reporting predominantly focused on how IR was being implemented by the first adopters (e.g. Eccles & Krzus, 2010) rather than specifically on the incentives behind its adoption. Nonetheless, some of their findings can shed some light on this matter. In the following paragraphs, we describe some of these case studies to understand what prompted these firms to be at the forefront of integrated information.

Novo Nordisk, a Danish firm pertaining to the healthcare industry, was an early adopter of sustainability reporting (Hopwood et al., 2010). This stance towards environmental reporting was rooted in the past, when the company was criticised for the consequences that the business was having in the health of the firm's employees. The firm's personnel were having contact with an enzyme as a result of the manufacturing process which was damaging their health. Then, the firm was confronted with extensive negative media coverage leading to a weakening of the firm's reputation. Facing adversity, management saw this as an opportunity to change how the firm dealt with its stakeholders. They started to actively consult them in order to anticipate differences and use that information in their decision process. This mindset prompted the firm to start publishing social and environmental-related information. The will to enhance the communication with its stakeholders along with established processes for producing environmental-related information propelled the firm to publish information that would integrate economic, social and environmental issues. Integrated reporting was, in this case study, mainly, a consequence of external pressures the firm was facing (Hopwood et al., 2010).

Natura, a firm that operates in the cosmetic industry located in Brazil, included environmental issues as part of its strategy. They were also an earlier adopter of integrated reporting. This organisation viewed reporting as a way to improve not only their external communication but, also, as an instrument that would foster reflection and transformation (Eccles & Krzus, 2010).

United Technologies Corporation was probably the first company to adopt integrated reporting in the USA, with its first release in 2009. The firm's activities were concentrated in the construction and aerospace sectors. The company ranked 39 in the 2008 Fortune 500 list. In their first publication, the company underlined that to be profitable they had to look at corporate responsibility as a key element to achieve that goal. Moreover, they believed that sustainability

performance and the way it was conveyed to the market would influence the value of the firm shares (Eccles & Krzus, 2010).

Robertson & Samy (2015) interviewed 10 senior managers of UK FTSE 100 companies to evaluate their perceptions regarding sustainability reporting versus integrated reporting practices on the grounds of diffusion of innovations theory. They performed a content analysis of 22 reports in order to achieve a phenomenological triangulation. They found that senior managers perceived integrated reporting as an enhancement over traditional reporting and thus, endorsed this practice. The interviewees highlighted that changes made in the UK disclosure legislation would contribute to an increased IR acceptance. However, the researchers also pointed out that some of the firms worked in silos. In their view, this lack of communication could hamper integrated thinking and, consequently, the required linkages between financial and non-financial information could not be attained. Finally, the evidence suggested difficulties in measuring the capital concept and a lack of IIRC guidance.

Gunarathne & Senaratne (2017) examined reports published between 2010 and 2014 and interviewed both adopters and other related institutions that could influence IR adoption in Sri Lanka. As a complement, they evaluated released documents related to adopters of IR. It was underscored that early adopters were driven, mainly, by stakeholders' information necessities. Their objective was to strengthen the bonds with them. Moreover, they posited that these companies already were familiarised with the importance of sustainability and had it included in their business model as an important pillar with unconstrained management support. As such, there was compatibility between this novel practice and the firm. The implementation of this strategy led to the creation of an infrastructure for collecting sustainability information. These established processes would reduce the burden of preparing additional information. For organisations that implemented IR, after this initial phase, the adoption was mainly driven by the influence of institutions such as standard setters and business schools through, e.g. seminars, awards or workshops.

Robertson & Samy (2020), with the same quest of finding the factors that explain integrated reporting adoption undertook a new investigation. They interviewed 36 senior executives of 17 UK firms with roles in financial, sustainability, and legal departments to evaluate their perceptions regarding sustainability reporting versus integrated reporting practices. Under the

umbrella of the diffusion of innovations theory, they stressed the importance of sociological incentives over economic-related factors concerning integrated reporting uptake. Both social expectations and the willingness to improve reputation management played major roles in IR adoption. What's more, they found that not all the industry players had the same perspective regarding social and environmental issues. Organisations that pertained to the manufacturing and utilities industries manifested a greater concern with their social and environmental impact on their performance due to the nature of their industries. They also underscored that integrated reporting was deemed by the interviewees as a mean to demonstrate the connection between financial and non-financial information and the organisations' value creation process. They expected that it would help to overcome some of the limitations of traditional sustainability reporting. In contrast, complexity or a mismatch with firms' requirements were found to be hindrances to the adoption.

In sum, both external and internal incentives were mentioned as important drivers of a higher level of integrated information. There were some similarities between these studies. All these firms viewed environmental issues as an integrate part of their business model and vital for their success. As these organisations already had established processes for collecting sustainability information, they were more prone to accept this change. Others saw that IR could improve relations with their stakeholders which were viewed as key for their business success. Reference was also made to the role that integrated reporting could play in the firm's internal change process and to the positive impact that would have on the firm market value. Novo Nordisk case study and Robertson & Samy's (2020) research revealed the impact that the external environment can have in the firms' internal processes, in their reporting policy but also a major impact on their reputation. The nature of the industry was highlighted as a potential incentive due to the impact of the manufacturing and utilities industries in the environment.

Eccles & Krzus (2010) also emphasised that most of these initial adopters believed that leaving Corporate Social Responsibility out of the companies' priorities could increase business risks and, thus, could jeopardise their profitability and continuity. Business schools and standard setters were considered by some as key for firms that adopted IR after the initial phase. Nonetheless, the findings also highlighted potential obstacles. A higher complexity or a gap with firms' requirements could create barriers. Difficulties in communication between

departments were also seen as a problem since it would impede the integrated thinking mindset underpinned in the framework released by the IIRC. Finally, some suggested the need for better guidance regarding the implementation of the capital concept.

2.2.3 Determinants of IR adoption: quantitative research design

This section reviews scientific articles directly related to the research problem written in English and published in the Web of Science and Scopus databases. The selection of articles was restricted to papers that adopted an archival research design.

2.2.3.1 Mandatory setting

The following studies support their findings, mostly with evidence related to companies located in Brazil and South Africa where there has been a “comply or explain” regulation (ACCA, 2014; Wachira et al., 2020; Eccles, 2019; IIRC, 2021).

South Africa was a pioneer in integrated reporting due to a specific political context that led to social demands for information regarding how organisations were contributing to society (Wachira et al., 2020). Initially, King governance codes I and II stated that its adoption was voluntary. However, 2010 onwards, as a consequence of the release of the King III code, public and listed organisations were required to publish integrated reports on a “comply or explain” basis (ACCA, 2014; Wachira et al., 2020).

Since 2016, after the publication of the King IV governance code, the IR framework, as published by the IIRC, was adopted in this country as a guide for IR implementation (ACCA, 2014; Wachira et al., 2020). Likewise, Brazil has taken actions to foster IR adoption. The country’s stock exchange has recommended firms to publish integrated reports on a report or explain basis (Eccles, 2019; IIRC, 2021).

Vaz et al. (2016) developed their research with a sample of 1.449 firms located in 13 countries in 2012. As the sample composition included a significant number of firms pertaining to

countries where the adoption is mandatory along with firms located in a voluntary setting, this study was classified in this section.

Supporting their research on institutional theory, they contributed to the previous literature by suggesting that companies in countries with integrated reporting regulation are more prone to adopt IR. Conversely, being listed in a stock exchange did not impact the level of integration of the information. In a voluntary setting, and in line with Frías-Aceituno et al. (2014), their results supported, that firms in the same country had a similar stance towards integrated reporting. However, no relation was found regarding companies belonging to code-law countries, which is consistent with Jensen & Berg (2012) findings but divergent to Frías-Aceituno et al. (2013a) that found a significant relation between firms established in civil law countries and a higher likelihood of publishing integrated reporting. Evidence was also found concerning the significance of countries where a culture of collectivism prevails in explaining integrated reporting adoption. This is congruent with García-Sánchez et al. (2013) conclusions. The authors' findings also revealed that having high investor protection indices leads to a decrease in the likelihood of implementing integrated reporting. In contrast, Jensen & Berg (2012) research expected a positive association between these variables. Also, evidence regarding countries with a culture where femininity values prevail was statistically non-significant. This contradicts García-Sánchez et al. (2013) results where this variable was considered as having a positive and significant influence. In addition, Vaz et al. (2016) concluded that the evidence was not statistically significant regarding the explanatory variable of industry membership which is in line with Frías-Aceituno et al. (2014) and Lai et al. (2016) but is divergent of Sierra-García et al. (2015) and García-Sánchez et al. (2013) whose results exhibited statistical relevance. In addition, Vaz et al. (2016) pointed out that, against expectations, the determinant of economic development was considered as non-significant, possibly due to the sample being biased towards developed countries.

At a firm-level, their evidence supported that companies' size does not explain the presence of IR which is consistent with Lai et al. (2016) research in a voluntary setting but contradicts the positive relation e.g. in Sierra-García et al. (2015), Frías-Aceituno et al. (2014), García-Sánchez et al. (2013), Frías-Aceituno et al. (2013b) research. The hypotheses of a positive association

between having the sustainability report assured and having published an integrated report was rejected. Sierra-García et al. (2015) obtained similar findings.

Wachira et al. (2020), examined if there was an association between integrated reporting adoption and higher levels of analyst following at the end of 2014. The analysis was based on 388 listed firms in the Johannesburg Securities Exchange located in South Africa and was supported on institutional theory.

The results indicated a positive and significant influence of analyst following. They argued that firms being submitted to higher monitoring levels would be more prone to adopt a reporting framework that would agree with investors' expectations. In addition, they suggested that it could enhance their reputation. Also, they contended that firms pertaining to sensitive environmental industries were more prone to integrate their information as a mean to obtain legitimacy. The explanatory variable related to size was found to be positive and significant Wachira et al. (2020). This result is divergent from Vaz et al. (2016) finding of non-significance. Lastly, firms that had their sustainability reports assured had a higher likelihood of publishing integrated information. This result is consistent with Vaz et al. (2016) conclusions.

In short, although these studies reveal several country-level and firm-level incentives that were significant, country-level drivers appear to be predominant in a mandatory regulatory context.

2.2.3.2 Voluntary adoption setting

This section provides some descriptive statistics regarding previous studies in the first part, followed by a review of published scientific articles with quantitative and archival approaches.

Most of the articles included in this section were based on samples composed of firms located in countries where IR adoption is voluntary. This section also includes a small number of articles that included South Africa in their sample because the representativity of this country in the total sample composition was small.

This strand of research has attracted some attention of the research community, as can be depicted in the following ranking of total citations per article per year (see Table 1). This information was downloaded from the Google Scholar database.

Table 1: Article total number of citations

Authors (year of publication)	Article title	Rank	Total citations
Jensen & Berg (2012)	Determinants of Traditional Sustainability Reporting Versus Integrated Reporting. An Institutional Approach	1	559
Frías-Aceituno et al. (2013b)	The Role of the Board in the Dissemination of Integrated Corporate Social Reporting	2	557
Frías-Aceituno et al. (2014)	Explanatory Factors of Integrated Sustainability and Financial Reporting	3	415
Frías-Aceituno et al. (2013a)	Is integrated reporting determined by a country's legal system?	4	347
García-Sánchez et al. (2013)	The cultural system and integrated reporting	5	343
Sierra-García et al. (2015)	Stakeholder Engagement, Corporate Social Responsibility and Integrated Reporting: An Exploratory Study	6	251
Lai et al. (2016)	Corporate Sustainable Development: is 'Integrated Reporting' a Legitimation Strategy?	7	192
García-Sánchez et al. (2019)	Integrated reporting: The mediating role of the board of directors and investor protection on managerial discretion in munificent environments	8	50
García-Sánchez & Noguera-Gámez (2018)	Institutional Investor Protection Pressures versus Firm Incentives in the Disclosure of Integrated Reporting	9	36
Girella et al. (2019)	Exploring the firm and country determinants of the voluntary adoption of integrated reporting	10	35
Fuhrmann (2020)	A multi-theoretical approach on drivers of integrated reporting-uniting firm-level and country-level associations	11	12
Kılıç et al. (2021)	Does institutional theory explain integrated reporting adoption of Fortune 500 companies?	12	3

Source: Google Scholar. Total number of citations as of 15 of September 2021.

Table 1 shows a significant number of citations reflecting the perceived relevance of this strand of research by the research community. The top 7 articles in the ranking represent approx. 95% of the total citations (Jensen & Berg, 2012; Frías-Aceituno et al., 2013a; Frías-Aceituno et al., 2013b; Frías-Aceituno et al., 2014; García-Sánchez et al., 2013; Sierra-García et al., 2015; Lai et al., 2016) and were published before 2016.

Regarding the journals where these studies were accepted for publication (see Table 2), approx. 58% of the studies were accepted in the journal of “Business Strategy and the Environment” and the journal of “Corporate Social Responsibility and Environmental Management”. Each of the remaining articles were published in different scientific journals.

Table 2: Percentage of publications per scientific journal

Journal	Number of publications per journal	Percentage of total publications
Business Strategy and the Environment	4	33.333%
Corporate Social Responsibility and Environmental Management	3	25.000%
Australian Accounting Review	1	8.333%
International Business Review	1	8.333%
Journal of Cleaner Production	1	8.333%
Journal of Applied Accounting Research	1	8.333%
Meditari Accountancy Research	1	8.333%
	12	100%

Overall, previous studies on determinants of adoption of integrated reporting in a voluntary adoption setting have addressed the effect of country-level, industry-level and firm-level factors in the propensity to adopt integrated reporting (Table 3¹).

The following paragraphs describe in more detail the summary of the findings of the related literature and are organised in an ascendant chronological order of publication date.

Drawing on institutional theory, Jensen & Berg (2012) selected a sample of 309 firms for 2008. They analysed country-level variables that may explain the choice between presenting an integrated reporting and traditional sustainability reporting (TSR). This study focused on the i) political system: the conclusion was that countries with stronger investment protection are more prone to publish IR. No significant differences were found regarding civil versus code law countries and TSR versus integrated reporting; ii) financial system: they found that higher market coordination and higher ownership dispersion were significantly related to publishing integrated reporting; iii) education and labour system: the results supported a significant positive impact of the share of private expenditures for tertiary education as well as countries with a high trade union density; iv) cultural system: it was found the positive impact of a higher level of national corporate responsibility (both at environmental and social perspectives). Also, they suggested that countries that value self-expression more highly than survival necessities and where secular-rational values are prevalent to traditional values were more prone to adopt integrated reporting and v) economic system: the level of economic development (GNP and level of state interventions in economic activities) was also found to have a significant positive impact (Jensen & Berg, 2012).

Frías-Aceituno et al. (2013a) also studied the country's legal system effect on the grounds of institutional theory. The study was based on an unbalanced sample comprised of 750 non-financial international firms from 20 countries representing 2.129 observations from 23 different industries for the years 2008-2010. They found a significant relation between companies established in civil law countries and a higher likelihood of publishing integrated reporting. Their results contrast with Jensen & Berg (2012) that found this variable unrelated to the propensity to embrace integrated reporting. What's more, they confirmed that companies

¹ Table 3 classifies the drivers in categories ¹ for each level of analysis (adapted from Busco et. al., 2019).

where regulations are rigorously enforced are more prone to adopt integrated reporting. Lastly, at a micro-level, the results for the variables of size and profitability infer a positive relation. Nonetheless, no relation was found to growth opportunities.

Frías-Aceituno et al. (2013b) analysed the influence of the characteristics of the Board of Directors to see their impact on the degree of integration of the information. The unbalanced sample included 568 international companies from 15 countries for the years 2008-2010 with 1.575 observations. The researchers found that board gender diversity and board size had a significant positive effect on the level of integration. In contrast, they didn't find statistically significant evidence supporting board independence and activity levels predictors. Firms' size and growth opportunities also had an important explanatory role in integrated reporting adoption with a positive effect. Contrasting with these results, profitability was found to be not statistically significant.

García-Sánchez et al. (2013) studied the impact of cultural factors on IR with the support of the stakeholder theory. The sample was comprised of 3.042 observations of 1.590 companies for the years 2008-2010, representing 20 countries. They concluded that companies located in countries with a collectivist and feminist cultural framework value more sustainability. This leads to a higher probability of integrated reporting uptake. They argue that this association may be due to the fact that countries where feminism prevails may prioritise long-term quality, whereas masculine oriented countries give more emphasis on material success.

Conversely, the level of tolerance to uncertainty, power distance and long versus short term orientation were found to be not statistically significant. When evaluating whether size was a predictor of IR, the results pointed out in the same direction of Frías-Aceituno et al. (2013b) as they suggest that size has a positive effect. Likewise, they analysed the control variable profitability and found that it positively affects the propensity to adopt integrated reporting (García-Sánchez et al., 2013). Nonetheless, the findings of the variable growth opportunities showed that it was not statistically significant and contrasted with Frías-Aceituno et al. (2013b) that demonstrated a positive and significant association. Finally, the results also showed that industry membership was a relevant variable.

Frías-Aceituno et al. (2014) structured their investigation through the lens of the agency theory with a sample of 3.042 observations of 1590 firms for the years 2008-2010 related to 20 countries. They concluded that high levels of industry concentration are significant and have a negative impact on the likelihood of integrating information due to abnormal profit preservation objectives. There was evidence supporting that both the predictors of profitability and firm size positively impacted the probability of integrated reporting adoption in line with Frías-Aceituno et al. (2013b). Companies' growth opportunities were found to be not significant, contrasting with Frías-Aceituno et al. (2013b) that found it to be positively related. Their results also showed that there were significant differences among countries but not between industries. Finally, regarding the level of application of the GRI standards, there was evidence to support that there is a positive relation.

Sierra-García et al. (2015) supported their analyses in a sample of 7.344 observations of corporations located in Africa, Asia, Europe, Latin America, North America and Oceania, for the years 2009-2011. This exploratory study enabled the authors to conclude that size was a relevant variable and was positively associated with integrated reporting adoption. This result is in line with Frías-Aceituno et al. (2013b) research. The researchers also concluded that the region was a significant explanatory variable with a negative influence. Finally, the variables of having the corporate sustainability report verified, year, and the GRI industry supplement, were positively and significantly correlated to having implemented an IR. The variable industry was found to be significant and negative, which contrasts with Frías-Aceituno et al. (2014) findings of econometric irrelevance. Finally, no statistical significance was found between choosing an auditor versus a consultant to assure the CSR report.

Lai et al. (2016), with the support of the legitimacy theory, investigated the predictors of IR adoption with a sample of 104 international firms located in Europe, United States, Asia, South America, Australia and Africa for the years 2009-2011. Their findings suggest that companies are not using IR to lessen the impact of a low ESG disclosure score since there was a positive association between the Bloomberg ESG disclosure rating and integrated reporting adoption. Also, the results provide evidence that size was not a significant explanatory variable. Conversely, previous research, e.g. of Sierra-García et al. (2015) and Frías-Aceituno et al.

(2013b) demonstrated a positive and significant association of this variable. The authors suggest that different sampling criteria may explain this inconsistency. Lai et al. (2016) found that leverage has no explanatory value. Profitability was found to be unrelated to IR disclosure, which contradicts the significant relation found, e.g. by Frías-Aceituno et al. (2014). The results also showed that the relation between the industry variable and IR were not significant in line with Frías-Aceituno et al. (2014). The variable region had no explanatory value, which contradicts the results of a negative influence (Sierra-García et al., 2015).

García-Sánchez & Noguera-Gámez (2018) based their analyses on an unbalanced sample of 995 companies spanning from 2009 until 2013 for 27 countries. Their evidence revealed that firm-level determinants have a significant role in the publication of integrated information and that there is an inverse relation between the level of institutional development and the decision to release an IR. They support their hypotheses with a combination of several conceptual frameworks, namely, the political cost theory, stakeholder–agency theory, signalling theory and the theory of proprietary costs. The level of judicial effectiveness of the legal system and the level of law and order were considered significant with a positive relation with integrated reporting adoption in line with Frías-Aceituno et al. (2013a) results. On the other hand, the variables related to common law versus civil law country and investor protection were found to have no influence. The latter variable results contradict Jensen & Berg (2012) evidence of a positive relation.

García-Sánchez et al. (2019) supported their analyses on a sample of 956 companies from 27 countries from 2006 to 2014. This study underscores that managers show a low incentive to release integrated information due to a higher managerial discretion in munificent environments. Nonetheless, the researchers highlight that when managers' discretion is higher, in these types of settings, there is a moderating effect of a strong board in countries where the level of investor protection is stronger. At a micro-level, size was found to be positive and econometrically significant which is in line with all the previous authors with the exception of Lai et al. (2016) that suggested its irrelevance. Additionally, there was evidence that higher leverage levels may decrease the propensity for IR uptake. This conclusion is divergent from Lai et al. (2016). Also, the variable referring to industry concentration was referred to as

significant and negatively related, which is consistent with previous research (Frías-Aceituno et al., 2014; García-Sánchez & Noguera-Gámez, 2018).

Girella et al. (2019) selected integrated reports of 71 listed firms in 2016 to evaluate the drivers of IR adoption of firms located in Oceania, North and South America, Europe and Asia. The results indicated that both firm and country-level variables were significant.

At a country-level, a more favourable country risk rating was linked to higher levels of integrated information. They reasoned that stakeholders of nations with lower risk would perceive of being in a more favourable setting and, thus, would be more attentive to social and environmental issues. Their second test variable was related to the influence of the perceived corruption levels. They contended that this variable could spur integrated reporting. It was suggested that consumers of countries with a higher perception of corruption would be more sensitive to environmental-related issues. This collective view would then influence governmental institutions to check firms' practices attentively in this regard. Lastly, they suggested that nations where collectivism and feminism were more present, or with a long-term orientation were also more prone to embrace integrated reporting. This is congruent with García-Sánchez et al. (2013) findings.

At a firm-level, more profitable companies attained a higher level of integrated information. This is consistent with the majority of previous research (e.g. García-Sánchez et al., 2013; Frías-Aceituno et al., 2014). The results for the predictor related to growth opportunities depicted a positive effect. This outcome is congruent with the majority of the results of prior literature (e.g. Frías-Aceituno et al., 2013b; García-Sánchez et al., 2013; Frías-Aceituno et al., 2014). The conclusions for the predictor related to size revealed a positive and significant association which is also consistent with most of the results of previous research (e.g. García-Sánchez and Noguera-Gámez, 2018; García-Sánchez et al., 2019). Finally, they also studied the dimension of the board and posited that firms with bigger boards were also relevant in understanding the drivers of IR. This finding concurs with most of the former literature (e.g. Frías-Aceituno et al., 2013b).

Fuhrmann (2020) selected integrated reports of 2000 global firms located in Asia, Europe, Asia, North America, South America, Australia and Africa released between 2012-2016.

They suggested a significant negative influence of cultural drivers at a country-level, namely power distance and masculinity. The first result is divergent with García-Sánchez et al. (2013) evidence of a non-significant relation. Regarding the second one, this conclusion is congruent with García-Sánchez et al. (2013) and Girella et al. (2019) evidence. This study also underscored that lower levels of investor protection could increase the likelihood of IR uptake. In contrast, Jensen & Berg (2012) suggest a positive effect of this driver and García-Sánchez & Noguera-Gámez (2018) found that it had no explanatory value. Finally, the evidence suggested that countries with a higher level of collectivism had a higher propensity to adopt an IR. These findings are in line with previous studies (García-Sánchez et al., 2013; Girella et al., 2019 and Fuhrmann, 2020).

At a firm-level, the study found a positive association between the release of an integrated report and higher levels of growth. In addition, Fuhrmann (2020) posited that firms were more prone to accept integrated reporting when their social performance was higher. In contrast, regarding environmental performance, the evidence was not statistically significant. This conclusion is divergent with the majority of the results of prior literature that indicate a non-significant influence (e.g.; García-Sánchez et al., 2013; Frías-Aceituno et al., 2014; García-Sánchez & Noguera-Gámez, 2018). Only Frías-Aceituno et al. (2013b) came to the same conclusion. In the same vein, the effect that leverage has on higher levels of integrated information has not yet achieved consensus. Whilst Fuhrmann (2020) saw evidence indicating that leverage has a negative and significant relation, Lai et al. (2016) contended a non-significant influence. Lastly, Fuhrmann (2020) saw evidence of a negative impact of industry concentration on the propensity to embrace integrated reporting. Frías-Aceituno et al. (2014) results are consistent with this conclusion. However, García-Sánchez & Noguera-Gámez (2018) obtained divergent results. They contended that firms in industries that were more concentrated had a higher probability of adopting integrated reporting.

Kılıç et al. (2021) concluded that a decrease in institutional quality increased the propensity to adopt an IR in contrast with previous findings (e.g. Jensen & Berg, 2012; García Sánchez et al., 2018). They suggested that a high shareholder power of the 450 firms pertaining to the Fortune 500 index in 2017 composing the sample could explain this difference. What's more, they found significant evidence supporting a higher IR adoption in countries with code law when compared

to countries with common law, positing that this was explained by the influence of non-governmental institutions in line with Frías-Aceituno et al. (2013b) and in contrast, e.g. with Jensen & Berg (2012). Countries' sustainable development was found to have a positive impact. Conversely, board independence and diversity were found to have a negative impact on IR adoption, although their combined impact was found to be positive in some of the models. Finally, the results for the economic development explanatory variable were mixed.

Most of these studies have defined the dependent variable as dichotomous (with a value of 1 if the firm has adopted integrated reporting and 0, otherwise). However, Frías-Aceituno et al. (2013b) considered the existence of three levels. The first level has only financial statements, the second level if besides preparing the financial statements it prepares the CSR report and the third level if it publishes an integrated reporting.

2.3 Synthesis and major conclusions of the literature review

Overall, the majority of previous studies examining the drivers of CSR and IR uptake adopting a quantitative approach included country, industry and firm-level predictors. Nonetheless, country and firm-level incentives of IR acceptance prevailed.

Concerning country-level determinants, there was a prominence of topics related to the institutional-legal (e.g. Jensen & Berg, 2012; Frías-Aceituno, 2013a), economic-financial system (e.g. Jensen & Berg, 2012; Frías-Aceituno, 2013a) as well as the influence of culture (e.g. García-Sánchez et al., 2013). At an industry-level, the focus was on industry membership and industry concentration (e.g. Frías-Aceituno et al., 2014). Finally, at a firm-level, there was an emphasis on predictors related to sustainability (Lai et al., 2016) and firms' performance and size (e.g. Frías-Aceituno et al., 2014).

Even though the published studies confirmed the existence of country, industry and firm-level incentives, there are still important gaps that need to be examined. To the best of our knowledge, previous research has not considered the influence of innovation as a possible predictor of integrated reporting adoption, simultaneously, at a country-level and firm-level. Within the broad spectrum of research on the drivers of voluntary disclosure, previous research on the

influence of innovation is scarce and directed to the firm-level. In this regard, a strand of research studied the impact of environmental innovation on environmental disclosures and found a positive and significant effect (e.g. Radu & Francoeur, 2017; Gallego-Álvarez, 2018).

Accordingly, this study addresses this gap by re-examining the drivers of integrated reporting. It assesses the impact of country-level innovation performance and firm-level innovation commitment on the propensity of publishing an integrated reporting.

The literature review also showed that, frequently, the conceptual support of former research was based on, the stakeholders, signalling, proprietary costs, institutional, legitimacy and agency theories. However, to the best of our knowledge, it has not yet been considered the support of the national innovation systems conceptual framework. This study supports the country-level hypothesis on this framework and combines it with the institutional theory.

Table 3: Findings of previous studies regarding determinants of voluntary adoption of IR

Determinant	Authors (date of publication)	positive (+) negative (-) influence	Dependent variable measurement
COUNTRY-LEVEL:			
Country	Frias-Aceituno et al. (2014)	(+)	0 - financial statement, 1 - CSR report 2, - IR.
Region	Sierra-Garcia et al. (2015)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
	Lai et al. (2016)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Civil law versus common law	Jensen & Berg (2012)	Non-significant	Firms with a high level of sustainability reporting versus firms that have adopted IR.
	Frias-Aceituno et al. (2013a)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez & Noguera-Gámez (2018)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Kılıç et al.(2021)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Investor protection	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
	García-Sánchez & Noguera-Gámez (2018)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
Market coordination	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Ownership concentration	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Share of private exp. to Public exp. for tertiary education	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Trade union density	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Environmental performance	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
	Kılıç et al.(2021)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Social development of a country	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Dominance of secular-rational values	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Dominance of self-expression over survival values	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Level of economic development	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
	Kılıç et al.(2021)	(+)/(-)	1 if the firm discloses an IR and 0 if it doesn't.
Level of state interventions in economic activities	Jensen & Berg (2012)	(+)	Firms with a high level of sustainability reporting versus firms that have adopted IR.
Dominance of collectivism	García-Sánchez et al. (2013)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(+)	1 if the firm discloses an IR and 0 if it doesn't.

Table 3 (cont.)

Determinant	Authors (date of publication)	positive (+) negative (-) influence	Dependent variable measurement
Institutional quality	Kılıç et al.(2021)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
Tolerance to uncertainty	García-Sánchez et al. (2013)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Long-term orientation	García-Sánchez et al. (2013)	Non-significant	
	Girella et al. (2019)	(+)	
	Fuhrmann (2020)	Non-significant	
Power distance	García-Sánchez et al. (2013)	Non-significant	
	Fuhrmann (2020)	(-)	
Dominance of feminism	García-Sánchez et al. (2013)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Indulgence	Fuhrmann (2020)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Strength of law enforcement	Frias-Aceituno et al. (2013a)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez & Noguera-Gámez (2018)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Corruption perception	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Importance of the stock market	Fuhrmann (2020)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Country risk	Girella et al. (2019)	(-)	
INDUSTRY-LEVEL:			
Industry membership	Frias-Aceituno et al. (2013a)	NA	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2013b)	NA	
	Frias-Aceituno et al. (2014)	Non-significant	0 - financial statement, 1 - CSR report 2 - IR.
	García-Sánchez et al. (2013)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Lai et al. (2016)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Sierra-García et al. (2015)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
Environmental sensitive	Kılıç et al.(2021)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Industry concentration	Frias-Aceituno et al. (2014)	(-)	0 - financial statement, 1 - CSR report 2 - IR.
	García-Sánchez & Noguera-Gámez (2018)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
Adoption of the GRI industry supplement	Sierra-García et al. (2015)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
High growth industries (munificent environment)	García-Sánchez et al. (2019)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
FIRM-LEVEL:			
Sustainability:			
ESG performance	Lai et al. (2016)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Assurance of the corporate sustainability report	Sierra-García et al. (2015)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
GRI application	Frias-Aceituno et al. (2014)	(+)	0 - financial statement, 1 - CSR report 2 - IR.

Table 3 (cont.)

Determinant	Authors (date of publication)	Positive (+) negative (-) influence	Dependent variable measurement.
Auditor versus consultant as CSR assurer	Sierra-García et al. (2015)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Social performance	Fuhrmann (2020)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Governance:			
Board diversity	Frias-Aceituno et al. (2013b)	(+)	0 - financial statement; 1 - discloses a CSR report 2 - discloses an IR.
	García-Sánchez & Noguera-Gámez (2018)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Kılıç et al. (2021)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
Board activity (number of Board meetings)	Frias-Aceituno et al. (2013b)	Non-significant	0 - financial statement; 1 - discloses a CSR report 2 - discloses an IR.
Board size	Frias-Aceituno et al. (2013b)	(+)	0 - financial statement; 1 - discloses a CSR report 2 - discloses an IR.
	García-Sánchez & Noguera-Gámez (2018)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Board independence	Frias-Aceituno et al. (2013b)	Non-significant	0 - financial statement; 1 - discloses a CSR report 2 - discloses an IR.
	García-Sánchez et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Kılıç et al. (2021)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
Probability of referring to external consultants	García-Sánchez et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Audit committee expertise	García-Sánchez et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Kılıç et al. (2021)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Audit committee independence	Kılıç et al. (2021)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Experience of the board	García-Sánchez et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Board performance	Fuhrmann (2020)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
Size:			
	Frias-Aceituno et al. (2013a)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2013b)	(+)	0 - financial statement; 1 if it also discloses a CSR report and the value of 2 if it discloses an IR.
	García-Sánchez et al. (2013)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2014)	(+)	0 - financial statement, 1 - CSR report 2 - IR.
	Sierra-García et al. (2015)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Lai et al. (2016)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez & Noguera-Gámez (2018)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.

Table 3 (cont.)

Determinant	Authors (date of publication)	positive (+) negative (-) influence	Dependent variable measurement
Business growth opportunities	Fuhrmann (2020)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Kılıç et al.(2021)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2013a)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2013b)	(+)	0 - financial statement; 1 - discloses a CSR report 2 - discloses an IR.
	García-Sánchez et al. (2013)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2014)	Non-significant	0 - financial statement, 1 - CSR report 2 – I
	García-Sánchez & Noguera-Gámez (2018)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2013a)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Profitability	Frias-Aceituno et al. (2013b)	Non-significant	0 - financial statement; 1 - discloses a CSR report 2 - discloses an IR.
	García-Sánchez et al. (2013)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Frias-Aceituno et al. (2014)	(+)	0 - financial statement, 1 - CSR report 2 - IR.
	Lai et al. (2016)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez & Noguera-Gámez (2018)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
	Kılıç et al.(2021)	(+)	1 if the firm discloses an IR and 0 if it doesn't.
Risk:			
Leverage	Lai et al. (2016)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	García-Sánchez et al. (2019)	(-)	1 if the firm discloses an IR and 0 if it doesn't.
	Girella et al. (2019)	Non-significant	1 if the firm discloses an IR and 0 if it doesn't.
	Fuhrmann (2020)	(-)	1 if the firm discloses an IR and 0 if it doesn't.

3. Theoretical background and hypotheses

This chapter, firstly, outlines theories that are frequently used to explain voluntary disclosure adoption in section 3.1. Secondly, it describes the reasoning for the adopted conceptual frameworks at a country-level and firm-level in sections 3.2 and 3.3, respectively.

3.1 Overview of voluntary disclosure theories

Previous archival studies focusing on the drivers of integrated reporting adoption were grounded on several conceptual frameworks commonly used in the literature that is focused on explaining voluntary disclosure of information, as discussed below.

One of these theories was delineated by Verrecchia (1983). He highlighted the impact of the decision to voluntarily disclose when facing the costs associated with that information and its potential impact on the firms' competitive position. These costs may stem, e.g. from preparing and publicising the information or of a loss in competitiveness. As such, it extended our knowledge regarding why firms may decide not to disclose information voluntarily. Frías-Aceituno et al. (2014) contended that firms located in industries with a higher concentration level have a lower propensity to disclose integrated information since they do not want to experience a decrease in their profitability due to higher proprietary costs.

The stakeholder theory emerged after Freeman's (1984) influential investigation. He stressed the importance of taking into account all stakeholders and not only the investors to survive. This theory views stakeholders as all entities that influence the firms' activity, such as, employees, suppliers, clients, financial institutions and the government. In IR, this conceptual framework is frequently used (Vitolla et al., 2019). Adopting the stakeholder theory as their conceptual guide, García-Sánchez et al. (2013) analysed the impact of culture on IR uptake at a national level. Their evidence suggested that companies located in countries with stronger feminist and collectivist values had a higher likelihood of embracing integrated information.

The institutional theory, as a result of Meyer & Rowan's (1977) seminal research, also gave an important contribution by bringing to light the importance of incentives of a non-rational nature in the context of understanding change. The arguments of this theory are commonly used in studies focusing on the drivers of integrated reporting (Vitolla et al., 2019). They will be described in more detail, subsequently, in this chapter.

The legitimacy theory also appears in this body of research. It was the result of an investigation by Dowling & Pfeffer (1975). Their research emphasised the impact that society's norms and values may have on organisations. It assumes that companies' actions and values associated with these actions have to be compatible with social norms and values to avoid their legitimacy being questioned. The negative consequences of significant differences between the companies' values and the norms and social values may have, for example, an economic, legal or societal nature. Lai et al. (2016) examined if the disclosure strategy of publishing an IR had the purpose of mending legitimacy pressures using size, profitability, industry and leverage as proxies. They posited that the decision to adopt integrated information was not connected with a legitimisation goal.

The agency theory resulted from Jensen & Meckling's (1976) pioneering work. They proposed paths that would foster the alignment of interests between managers and owners. The premises of this philosophy will be explained in more detail, subsequently, in this chapter.

Another applied framework is the signalling theory that resulted from Spence's (1973) innovative work in the labour market and was later applied in the accounting context by Ross (1977). In accounting, signalling with the objective of communicating quality has also been examined e.g. by Toms (2002). His research suggested that environmental disclosures could influence the level of firms' environmental reputation significantly. The premises of this philosophy will be explained in more detail later in this chapter.

In summary, the theories mentioned above shed light on several potential reasons that can explain the decision to disclose or not to disclose in a voluntary setting. Even so, Verrecchia (2001) highlights that there is a lack of a single unified, comprehensive theory explaining information disclosure.

3.2 Country-level conceptual framework and hypothesis

For countries to be at the forefront of the competitive landscape, the need to rely on their national innovation systems has grown (Gogodze, 2016). The national innovation system is a conceptual framework (Edquist, 1997) that views this system as comprised by the countries' organisations (e.g. firms, universities, research institutes) and institutions that have the role of establishing laws and rules (Lundvall, 1992, 2007; Edquist & Johnson, 1997). Technology advance and adoption will be influenced by the decisions of these intertwined institutions (Sharif, 2006).

This conceptual framework has been widely used i) in academia by researchers ii) by policymakers (Balzat & Hanusch, 2004) and iii) by organisations such as the World Bank, the OECD and the International Monetary Fund (Sharif, 2006; Lundvall, 2007).

The national innovation systems framework assumes that each country has a specific innovation system that is, to some extent, different from other countries (Lundvall, 1992; Watkins et al., 2015). This uniqueness stems, partially, from the idea that each element of the system cannot be seen as being independent of each other but rather as interacting in a particular way with the others (Lundvall, 2007). Thus, it can be argued that it is relevant to study the impact of innovation at a country-level on organisational practice.

For a positive cycle of innovation and adoption to occur, the role of each countries' institutions is paramount (Gogodze, 2016; Sharif, 2006; Lundvall, 2007).

If we complement the national innovation systems view of the importance and influence that institutions have on organisational innovation practices with the institutional theory perspective, we can understand how these institutions influence organisational behaviour (Campbell, 2006, 2007). This conceptual framework is frequently used to study the adoption of practices in organisations (e.g. Jensen & Berg, 2012; Matten & Moon, 2008; Oliver, 1991). Firms that are located in a similar institutional setting will tend to adopt similar patterns regarding their practices in a quest to obtain legitimacy, because they want to guarantee resources that are pivotal to their existence (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott, 1995). In addition, institutions play an essential role in

reducing uncertainty, in devising economic, political and social incentives that influence society evolution, its organisational structure and *modus operandi*. Nonetheless, these same institutions may also create constraints (North, 1990).

One important aspect of this perspective is the idea that institutionalised practices, mostly, do not stem from a rational analysis. It considers the influence of other processes that lead to the homogenisation of organisational behaviour under a similar environment. This process is referred to as isomorphism by DiMaggio & Powell (1983). These authors consider three mechanisms that can lead to change and institutionalisation.

The first is related to formal or informal institutional pressures when there is a dependency relation with another institution, e.g. in the form of law or guidelines that can be mandatory or not. The release of the directive 2014/95/EU by the European Union regarding non-financial information in a comply or explain basis may be viewed as a pressure that contributes to firms' awareness of the importance of reporting this type of information and, thus, of publishing an IR (Howitt, 2016). These types of pressures are designated coercive isomorphism by DiMaggio & Powell (1983).

The second process is designated by normative pressures such as professional bodies, universities and consultants' opinions. The IIRC directive structure includes members of large consulting organisations (Flower, 2015). In this regard, it can be argued that the larger auditing and consulting companies' support of integrated reporting and the impact that their opinion has on their clients may have a positive impact in integrated reporting awareness and uptake. In addition, the emergence of IR in business schools' curricula may have a positive influence on integrated reporting adoption to some extent (Jensen & Berg, 2012).

The third process occurs when there is the adoption of other organisations practices (mimetic processes) in the same industry, professional associations or consulting firms as a way to deal with uncertainty. DiMaggio & Powell (1983), underscore that innovation adoption can result from a modelling process. Thus, it can be argued that some of the companies that have already adopted integrated reporting, did so as a result of a modelling process of previous adopters. Even so, DiMaggio & Powell (1983) do not discard Hannan

& Freeman's (1977) view that isomorphism may occur as a consequence of a competitive environment.

In addition, Meyer & Rowan (1977) seminal paper point out the possibility of decoupling, i.e., publicly the firm adheres to the practices but only superficially. In reality, nothing substantively changed.

Oliver (1991) suggested that organisations' responses to external pressures could be the result of their individual interests and were not confined to a passive stance. This view adds to the initial perspective of the institutional theory by considering that these individual interests could also include an economic leitmotiv besides other non-rational reasons. Oliver (1991) considered avoidance, defiance and manipulation as alternative reactions that could occur under specific circumstances.

As already mentioned, institutional theory has been frequently used to explain the influence of the environment in organisational practices. In the following paragraphs, we describe some investigations that adopted institutional theory to study the influence of the environment on firms' behaviour regarding corporate sustainability reporting and integrated reporting.

Adopting institutional theory as the conceptual support, Jones (1999) contended that, at a country-level, social responsibility, in the form of stakeholder management, is likely to occur in social and cultural environments that view social responsibility as important. Also, countries where the economy is more developed and, consequently, have their basic needs fulfilled will be more prone to social issues. At an industry-level, it was proposed that when new sectors emerged or competition was fierce, firms attention to stakeholders increased. At a firm-level, firms that were smaller and closely-held face lower bureaucratic control. As such, those managers with an environmental-social friendly mindset could more easily embed these issues in their firms' strategy. Finally, firms operating in profitable market segments that followed a differentiation strategy would also endorse this perspective.

Delmas & Toffel (2004) underlined the influence of the government in shaping organisations' actions, for example, releasing regulation that supports specific

environmental initiatives. In addition, sectorial competition along with consumers' environmental-related views may also push firms towards a "greener" path. The authors also mention societal regulations as a possible driving force. This pressure may stem from, e.g. environmental litigations. Non-governmental organisations and community groups may trigger organisational isomorphism. Their influence may propel companies to manage in a more environmental-friendly manner. Finally, the researchers highlight that the degree of influence that these drivers have are moderated by several factors. The firms' structure, past environmental performance and competitive position all help to explain these relations.

Jeurissen (2004) research focused on the drivers of corporate citizenship. The author found that self-interest along with ethical values can increase the quality of life. Thus, this perspective considers that a social-driven behaviour is not always incompatible with personal benefits. Firms that prioritise employee's' health may be able to attract more employees. The need to reduce raw materials consumption may lead to a cost reduction. It is suggested that corporate citizenship behaviour is a consequence of the interaction of four factors. Firstly, the adopted marketing strategy. Firms may, e.g. consider sustainability as an element that consumers favour and, thus, be willing to adapt to the characteristics of their products to increase customers satisfaction. Secondly, firms actions may stem from regulatory pressures. Thirdly, stakeholders may pressure the firm to act responsibly. e.g. through public campaigns. Finally, culture and social values. Firms' incompatibility with their clients' values can have a negative impact on firms' performance.

Campbell (2006) developed a conceptual study that depicted companies' factors influencing social issues as an essential pillar of their business. He underlined the significant impact that the institutional environment has and that this institutionalisation process is not immediate. In fact, it entails disagreement, discussion and compromise. Regarding the impact of regulation, the author highlighted that a more restricted regulation could favour a more social-driven behaviour. He also viewed important the pressures and control exerted by stakeholders, for example, through public manifestations as an incentive to this type of behaviour. Regarding the influence of institutions, he

mentioned that non-governmental organisations, institutional investors or industry associations could drive firms' behaviour towards a more socially responsible way. Finally, management's openness to interacting with its stakeholders, such as community groups, personnel and unions could increase firms' awareness of these social issues.

Doh & Guay (2006), adopting a case study research methodology, assessed differences in Europe and the United States institutional environment that could influence CSR practices based on institutional and stakeholder theories. In this regard, the study evaluated firms' strategies, governmental policies and non-governmental organisations' *modus operandi* regarding social issues. The data collected from the interviews revealed that the institutional and political settings are significant determinants of how non-governmental organisations and governments act towards CSR issues. One of the case studies illustrated this point. It focused on the contestation regarding the prices of an anti-viral drug and the reaction of the firms in both regions. They found that companies policies in Europe and United States were similar. However, European governments and non-governmental institutions actively influenced companies behaviour towards change. This stance contrasted with the marginal influence of the same institutions in the United States.

Husted & Allen (2007) studied the influence of the environment of multinational firms located in Mexico to determine factors that may influence the organisations' social stance and policies. In this regard, they computed a regression with data of 473 surveyed firms located in Mexico. The final sample was comprised by 96 responses. The authors found that innovative organisations and munificent settings exerted an important influence over the firms' social approach.

Muthuri & Gilbert (2011) studied CSR incentives in Kenya performing a survey and a web content analysis. According to the authors, Corporate Social Responsibility in Kenya was intertwined with the organisations' objective of being viewed as legitimate. To achieve this goal, firms internalised practices that they perceived as being the best, i.e., it was a consequence of a mimicking process. Kenya's internal regulatory setting was not the main incentive behind CSR adoption. Nonetheless, regulatory pressures of the parent companies did exert a significant influence. Some of these firms had international codes

describing the appropriate behaviour. Finally, it is highlighted that normative pressures, e.g. by non-governmental institutions are key to understand Kenya's CSR landscape.

Marquis et al. (2007), studied community-level institutional drivers of corporate social action. Firstly, they underlined that organisations' isomorphism is driven by both cognitive and cultural aspects. They make reference, for example, to a case study where banks in the USA had a shared view of philanthropy with a focus on housing. Organisations may follow this shared view regarding social issues with the objective of gaining legitimacy. Secondly, regulation as e.g. tax laws and social pressures may promote firms to behave in a socially acceptable manner. For example, governments may persuade firms towards a more socially acceptable behaviour by offering tax benefits. Nonetheless, regulatory or political norms may encourage or detract social actions. Finally, the existence of ties between non-profit organisations and firms may also act as an incentive.

Long & Driscoll (2008), contended that the codes of ethics were means used by Canadian companies to obtain legitimacy. Its institutionalisation was found to be a consequence of isomorphism.

Using the lens of institutional theory, Matten & Moon (2008) suggested that CSR business practices are different across Europe and US companies due to differences in the institutional environment. They posited that in the US explicit motives for CSR prevailed, contrasting with Europe where implicit reasons prevailed. Explicit CSR actions, in the context of this study, refer to organisations' voluntary actions. For example, some American companies included in this analysis gave financial assistance in the aftermath of the 2005 Katrina hurricane. These explicit actions may also stem from external pressures such as the UN Global Compact or the ISO 14000.

Nonetheless, they are always the result of discretionary decisions. Implicit CSR actions are intertwined with organisational culture, norms and values. They are not a direct consequence of firms' decisions but are mainly driven by the institutional setting (Matten & Moon, 2008).

Sotorrió & Sánchez (2008), studied CSR incentives with a sample of 40 North American and European firms for 2003 and 2004. Through a multiple linear regression model, the authors confirmed that the location of the company influences the level of engagement and the adopted approaches regarding social issues. In this regard, the authors created an indicator of sustainability engagement that would reflect the companies' social effort towards the community, customers, personnel and setting. European firms were found to be more engaged with social issues than firms located in North America. The authors suggest that this may be due to the influence, e.g. of non-governmental organisations, consumer associations, media and local governments.

Bebbington et al. (2009) carried out in-depth interviews of six members of the New Zealand Business Council for Sustainable Development intending to assess CSR reporting drivers on the grounds of institutional theory. They contended that companies adopted sustainability reporting because of a mimetic isomorphism process as proposed by institutional theory rather than on rationale grounds.

Chen & Bouvain (2009) found that country-level institutional pressures explained why online CSR reports of firms located in the UK, USA, Germany and Australia adopted the UN Global Compact were different. They asserted that USA, Australia and UK companies had to attend to an ample range of topics due to ownership dispersion and, for this reason, contrasted with German corporations. Differences in supplier-related issues in the UK reports with the other countries were explained by a high ethical consciousness of consumers regarding sourcing.

De Villiers & Alexander (2014) carried out an empirical study to assess if there were differences between the corporate social responsibility reporting of South African and Australian firms operating in the extracting business. A content analysis was performed on firms' websites and annual reports using a checklist to evaluate the differences. The author posited that the corporate social responsibility reporting structure of a sample of South African and Australian companies was partially different because of environmental forces such as local communities and national regulations i.e. the institutional setting. Finally, the author suggested that the adoption of standards led to some similarities in the reporting content.

Jensen & Berg (2012) examined the determinants of integrated reporting from an institutional perspective. They found that the majority of the country-level hypothesised determinants had a significant influence on integrated reporting uptake. They found that, e.g. protection laws, ownership concentrations, economic and environmental development and the level of national corporate responsibility were significant.

Frías-Aceituno et al. (2013a) focused their research on the influence of a country's legal system in the adoption of integrated information. They suggested that higher indices of law and order in civil law countries had a higher likelihood of publishing integrated reports.

In summary, the literature mentioned above points out the significant influence of institutions on firms' disclosure practices on the grounds of institutional theory. This body of research underscores that, coercive pressures (e.g. Jeurissen, 2004; Matten & Moon, 2008; Jensen & Berg, 2012; Frías-Aceituno et al., 2013a; De Villiers & Alexander, 2014), normative pressures (e.g. Delmas & Toffel, 2004; Campbell, 2006; Marquis et al., 2007) and mimicking processes (e.g. Delmas & Toffel, 2004; Bebbington et al., 2009) may explain firms' actions.

The reasoning for choosing institutional theory as the conceptual approach for this research was twofold. Firstly, integrated reporting adoption represents a disclosure decision. The previously mentioned research also includes studies focusing on integrated reporting adoption (e.g. Jensen & Berg, 2012; Frías-Aceituno et al., 2013a), thus, showing evidence of the relevance of this theory in explaining integrated reporting adoption. Secondly, DiMaggio & Powell (1983), emphasise that institutional theory may explain why some organisations implement innovative practices.

As already mentioned, one key premise of the institutional theory is that companies located in a similar institutional environment will tend to adopt a similar pattern of behaviour to guarantee their continuity (DiMaggio & Powell, 1983). For example, financial institutions located in countries with higher levels of innovation performance will tend to expect a higher level of innovative organisational practices when evaluating

credit proposals, thus, exerting coercive pressure, although informal, on their clients. As often firms need loans to survive and thrive, the power of these institutions can be substantial. In addition, in countries with higher levels of innovation performance, firms may endure fierce competition. To deal with this uncertain environment, they may model their peers' organisational practices as a way to improve their competitive position and assure legitimacy (mimetic isomorphism) (DiMaggio & Powell, 1983).

Therefore, it is hypothesised that companies located in an environment that favours innovation will tend to adopt that pattern. It follows that:

Hypothesis 1: The likelihood of adopting integrated reporting is higher in countries with a higher level of innovation performance.

3.3 Firm-level conceptual framework and hypotheses

In the context of information asymmetry between two entities, signalling theory can be helpful explaining behaviour (Spence, 1973). This theory was initially applied in the labour market and subsequently extended to other fields. For example, it was initially applied to accounting as a result of Ross (1973, 1977) ground-breaking work regarding the role of the financial structure as a signal to the market. Its application in research has reached other fields of knowledge such as strategy, entrepreneurship, human resource management (Connelly et al., 2011). It assumes that there is an entity that sends a signal (signaller) that is directed to another entity. This entity will interpret that signal (the receiver). It reasons that there is information that the outsiders don't have, but want, and thus the need to communicate (signalise) the receiver (Connelly et al., 2011).

The use of signals as a means of communicating quality that the receiver cannot observe was initially investigated by Spence's (1973) seminal work. He suggested that, since quality was an unobserved characteristic, job applicants could reduce the information asymmetry with prospect recruiters signalling quality with education.

Hasseldine et al. (2005) also studied the impact of environmental disclosures as a quality signal on companies' reputation. Their results suggested that the quality of the disclosures contributed more than their quantity to companies' reputation.

Zhang & Wiersema (2009) contended that the quality of management cannot be observed and that the quality of the financial reporting can be viewed as a signal of their quality to investors.

Mahoney et al. (2013) found evidence of a signalling effect behind the voluntary adoption of CSR standalone reports. The result is an increased stakeholders' perception of the firms' engagement to CSR as a consequence of a decrease in information asymmetries.

Frías-Aceituno et al. (2014) studied several potential drivers of integrated reporting. They structured their study, among others, with the assumptions of signalling theory as their conceptual guide. They posited that the disclosure of high returns could function as a signal of the firms' investment quality. García-Sánchez & Noguera-Gámez (2018) and Girella et al. (2019) also examined the drivers of IR and adopted the same conceptual approach supporting the hypothesis of an association between higher profits and IR disclosure as a signal of the firms' performance. The results confirmed this hypothesis.

The disclosure of an IR might also be viewed as a signal to investors of management's unobserved quality (Zhang & Wiersema, 2009). Managers may have information about the performance of the investments that investors (outsiders) do not have. In addition, managers want to maximise their bonuses and keep their job. Hence, they may decide to signal investors (receivers of the signal) their performance, since it cannot be fully observed, thus reducing this information gap.

An incomplete or misinterpretation by investors of management's performance could negatively affect their performance appraisal and management's legitimacy could be questioned. This is even more pertinent in a context where there is significant evidence supporting the high uncertainty surrounding R&D investments regarding its capacity to create value (Rosenberg, 1994; Kothari et al., 2002).

This perspective is consistent with the agency theory portrayed by Jensen & Meckling (1976) and Jensen (2005) that states that agents (e.g. management) may support costs that

will enable to satisfy the principal's interest (bonding costs). Gaffikin (2007), highlights that preparing financial reports to the shareholders may be viewed as a bonding cost since the agent will have to allocate time to its preparation and may refrain from opportunistic conducts of the agent. The IR framework intends to enhance the way firms communicate and how it creates value for their stakeholders. It proposes a more concise report and a more holistic view of the firm and its performance. Thus, in light of the agency theory, it can be argued that this improvement in communication will reduce the information gap between managers and the shareholders, benefiting both.

At an empirical level, Busco et al. (2019) contended that firms with a higher level of R&D investments have a higher performance regarding their ability to integrate environmental, social and economic factors in their decision-making. What's more, Gallego-Álvarez (2018) found evidence of a positive and significant association between R&D expenditures and the extent of environmental disclosure.

Therefore, it is hypothesised that:

Hypothesis 2: Firms' with a higher level of innovation commitment will have a higher propensity to publish an integrated report.

Nonetheless, other factors may influence the managers' decisions. Although some question the importance of the IR framework as an environmental communication tool (e.g. Flower, 2015), there are several allusions in the IR framework to sustainability issues. Firstly, it explicitly highlights the positive impact that integrated reporting-related processes may have on sustainability: "The cycle of integrated thinking and reporting, resulting in efficient and productive capital allocation, will act as a force for financial stability and sustainability" (IIRC, 2013: 2). Secondly, the IIRC has considered the need to disclose environmental information in several parts of the IR framework, regarding i) the proposed capitals' definition. It reflects a comprehensive view of the firms' resources that includes the natural capital. Thus, firms are more likely to adopt this view and incorporate them in their decisions and policies; ii) the IR framework recommends the

inclusion of environmental-related issues as part of the firms' value creation description; iii) the recommended report content section of the framework considers sustainability topics in the strategy and business outcomes elements. For example, the firm should disclose how social and environmental opportunities have been integrated into the firms' policies (IIRC, 2013), thus, emphasising the need to integrate non-financial with financial information. Thus, it can be argued that firms more committed to sustainability issues and, thus, with a higher sustainability performance will have a higher propensity to embrace IR (Robertson & Samy, 2015, 2020). Lai et al. (2016) found evidence of a significant and positive impact of sustainability performance on the adoption of IR.

On the other hand, publishing information that may harm the firms' competitiveness (proprietary costs) may detract firms from disclosing an IR (Verrecchia, 1983; Steyn, 2014). Perego et al. (2016) contend that the publication of an IR entails contingencies related to legal risks. Hence, the overall expected benefits associated with improving the communication with the stakeholders may be sufficient for some firms to cover the overall proprietary costs but may not be sufficient for others (Verrecchia, 1983).

Therefore, it is expected that firms committed to innovation, when the attained level of sustainability performance is sufficiently high to surpass the expected costs of disclosure, will have a higher likelihood of adopting an IR. On the other hand, it is also anticipated that firms committed to innovation that attain a level of sustainability performance that does not exceed the costs of disclosure, will have a lower probability of implementing an IR. As a consequence, it is anticipated that the effect that firm-level innovation commitment has on the likelihood of adopting IR will be dependent on the firms' sustainability performance level.

Hence, it is hypothesised that:

Hypothesis 3: The influence of firm-level innovation commitment on IR adoption is conditional on the firms' sustainability performance levels.

4. Research design

This chapter begins by explaining the sampling process and sample composition in section 4.1. Afterwards, section 4.2 explains the quantitative methodological approach, outlines the research model and describes the measurement criteria for all the dependent and independent variables.

4.1 Sample and data

The initial analysis was focused on non-financial public firms of the ten European countries with the highest GDP (PPP) in 2019, namely Germany, France, the UK, Netherlands, Sweden, Poland, Belgium, Romania, Spain and Italy. All the companies of these countries that had positive values regarding R&D expenses and the Thomson Reuters environmental sustainability score as well as financial information available for all the four years of analysis (2016, 2017, 2018 and 2019) were examined.

For these firms, the integrated or annual reports and CSR reports for fiscal years 2016, 2017, 2018 and 2019 available in English in the website of all these firms were collected. A total of 5.542 documents were downloaded. A content analysis was performed on all of these reports using the built-in search engine of the document reader software. Firms that explicitly acknowledged in the report as being an integrated report were selected for the treatment group.

The remaining firms, not selected for the treatment group, were screened for the control group. For each firm in the treatment group, a control firm was selected from the same country, industry (when available) and with a similar size. This analysis also included firms that began to adopt IR after 2016 and, thus, were screened for selection in the control group for the period in which they did not publish an integrated report.

The final sample was comprised by 388 firm-year observations in both groups, composed by 194 observations in the treatment group and 194 observations in the control group.

The financial data for all years were collected from the Thomson Worldscope database and refer to the consolidated financial statements. For other variables, the primary data

sources are Cornell et al. (2019), the World Bank, Hofstede (2015) and will be described in more detail in the next section.

Regarding the sample's distribution for each country (Table 4), the concentration of observations ranges from approx. 6% in Belgium and Italy to approx. 31% in France. Regarding the other countries, the UK has the highest representativity (approx. 16%), followed by the Netherlands and Spain (approx. 12%). Lower in the rank are Sweden and Germany each one representing approx. 8% of the total number of observations.

Table 4: **Sample composition per country**

Country	IR adopters (firm-year obs.)	Non-IR adopters (firm-year obs.)	Total firm-year obs.	Country % o: the total firm year obs.
Belgium	11	11	22	5.670%
France	60	60	120	30.928%
Germany	16	16	32	8.247%
Italy	12	12	24	6.186%
Netherlands	24	24	48	12.371%
Spain	24	24	48	12.371%
Sweden	15	15	30	7.732%
UK	32	32	64	16.495%
Total	194	194	388	100%

Concerning the industries represented in the sample, Table 5 shows that the manufacturing sector is the most representative (approx. 73%). All the other sectors' representativity range from approx. 6% to approx. 13%.

Table 5: **Sample composition per industry**

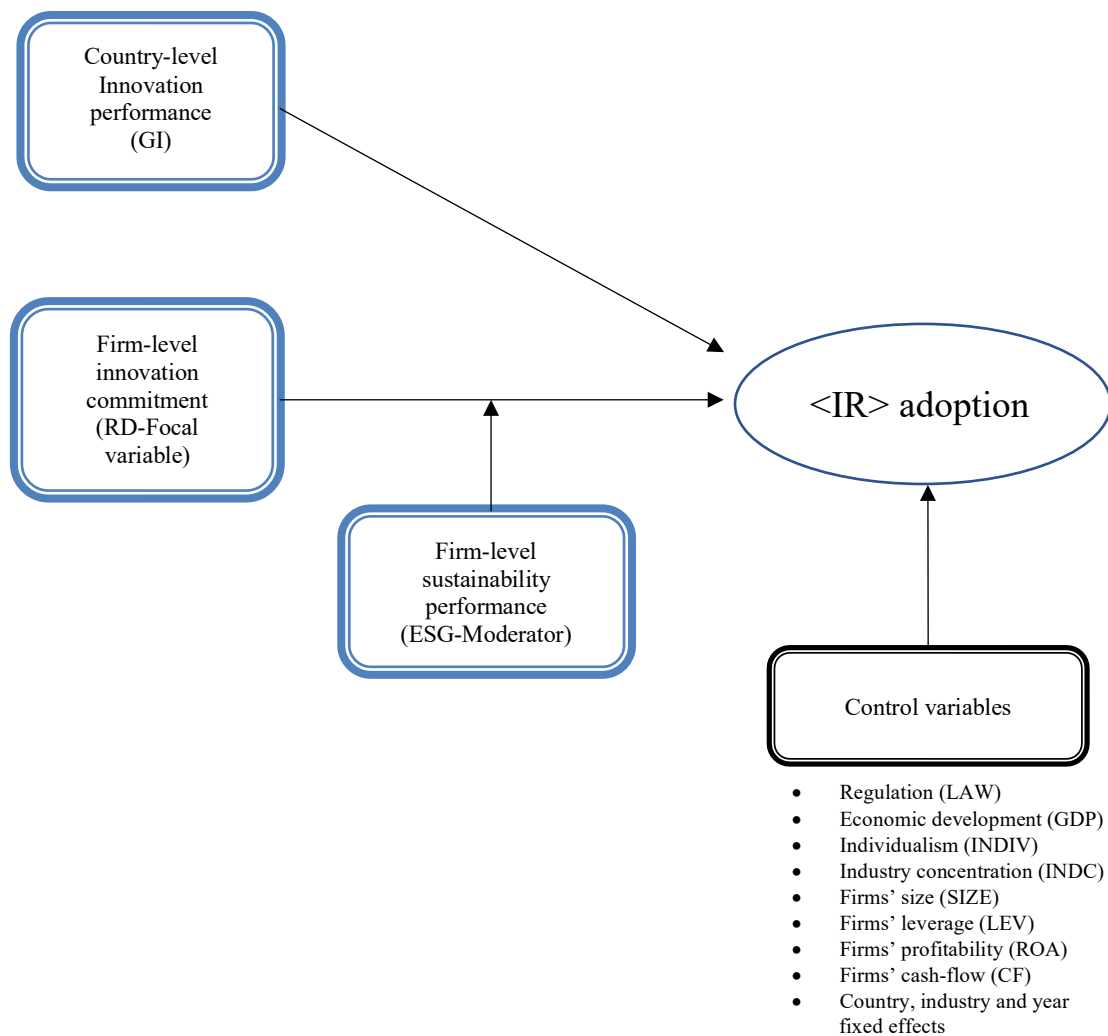
Industry	IR adopters (obs.)	Non-IR adopters (obs.)	Total obs. per country / total obs.	Total obs. per country / total obs. (%)
Mining and construction	13	9	22	5.670%
Manufacturing, wholesale trade	138	145	283	72.938%
Services	13	18	31	7.990%
Communications, transportation, electric, gas and sanitary	30	22	52	13.402%
Total	194	194	388	100%

4.2 Methodology

This section focuses on defining the quantitative approach, research model and the adopted criteria for measuring the variables.

Having in mind that the research hypotheses are centred on the association between innovation performance at a country-level and innovation commitment at a firm-level and the propensity of adopting integrated reporting, it was outlined the following research model, as represented in Figure 1:

Figure 1: **Research model**



After having defined the research model, and since the objective was to study an association between continuous and binary explanatory variables with a binary dependent variable, it was adopted a pooled binary logistic regression model with year, country and industry fixed effects with the following Equation (1).

$$IRi^2 = \alpha + \beta_1 GI + \beta_2 RD + \beta_3 ESG + \beta_4 RD * ESG + \beta_5 LAW + \beta_6 GDP + \beta_7 INDIV + \beta_8 INDC + \beta_9 SIZE + \beta_{10} LEV + \beta_{11} ROA + \beta_{12} CF + \beta_{13} COUNTRY + \beta_{14} IND + \beta_{15} YEAR + \varepsilon_i \quad (1)$$

All the information above is related to 2016, 2017, 2018 and 2019 fiscal years. GI is the global innovation efficiency ratio of the innovation output score divided by the innovation input score and depicts the countries' innovation performance regarding how efficiently the inputs lead to innovation outputs. RD represents the research and development expenses divided by net sales centred on the mean. ESG measures the firms' sustainability performance centred on the mean. RD*ESG is the product term of the interaction between the focal variable RD and the moderator variable ESG. LAW mirrors the perception of trust and quality of each country's rules. A value of one for countries with a score above the median and zero otherwise. GDP is the natural logarithm of the GDP per capita (parity purchasing power). INDIV represents the level of individualism of a country. Captures the level of independence within the members of a society. A higher score translates into a more self-centred society. INDC is the level of concentration of an industry measured by the Herfindahl index. SIZE is the natural logarithm of total assets. LEV represents the firms' total debt to total equity ratio. ROA represents the earnings before interest and taxes (n) divided by the total assets (n-1). CF represents the free cash-flow to total sales ratio. COUNTRY, IND and YEAR are dummy predictors for country, industry and year fixed effects.

The independent variables measurement criteria and data sources included in Equation (1) above are described in Table 6.

In the same vein as some of the previous authors (e.g., Frías-Aceituno et al., 2013a, 2013b; García-Sánchez & Noguera-Gámez, 2018), the dependent variable (IRi) for each

² The conclusions using return on equity as a proxy for profitability and the natural logarithm of sales as a proxy for size are identical.

year of the four years of analysis (2016-2019) is a binary variable with a value of 1 the firm adopts integrated reporting and a value of 0, otherwise. An annual analysis of the firms' reports was performed to assess whether firms explicitly acknowledged in the report as being an integrated report and selected for the treatment group. In addition, as some firms began to adopt IR after 2016, these firms were also screened for the control group for the period in which they did not publish an IR.

Table 6: Description of the explanatory variables included in the logistic regression model

Panel A: Test variables (Independent variables related to innovation)			
Level	Variable name	Variable label	Measurement
Country	GI	Innovation performance	GI is the global innovation efficiency ratio of the output score divided by the input score and depicts the countries' innovation performance regarding how efficiently the resources lead to innovation outputs (Cornell et al., 2019). A higher ratio depicts a higher performance.
Firm	RD	Innovation commitment	R&D expenses to sales ratio centred on the mean (Thomson Reuters Datastream).
Firm	ESG	Environmental Social and Governance performance	Environmental Social Governance Score centred on the mean (Thomson Reuters Asset4).
Firm	RD*ESG	Product term	Product term of the interaction between RD (focal variable) and the moderator variable ESG (Thomson Reuters).
Panel B: Control variables			
Country	LAW	Rule of law	Mirrors the perception of trust and quality of each country's rules. A value of one for countries with a score above the median and zero otherwise (World Bank).
Country	GDP	Economic development	GDP is the natural logarithm of the GDP per capita (parity purchasing power) (World Bank)
Country	INDIV	Individualism	Score representing the level of individualism of a country. Captures the level of independence within the members of a society. A higher score translates into a more self-centred society (Hofstede, 2015).
Industry	INDC	Industry concentration	The level of concentration of an industry is measured by the Herfindahl index. The higher the score, the higher the level of concentration.

Table 6 (cont.): **Description of the explanatory variables included in the logistic regression model**

Panel B: Control variables (cont.)

Firm	SIZE	Size	Natural logarithm of total assets. (Thomson Reuters Datastream).
Firm	LEV	Leverage	Represents the firms' total debt to equity ratio (Thomson Reuters).
Firm	ROA	Return on assets	Represents the earnings before interest and taxes (n) divided by the total assets (n-1) (Thomson Reuters).
Firm	CF	Cash-flow	Represents the free cash-flow to sales ratio (Thomson Reuters).

Since the test independent variables are related to innovation, it is essential to clarify the adopted concept of innovation. It was followed the OECD & Eurostat (2005: 46) view of innovation where it states that:

"(...) an innovation is the implementation of a new or significantly improved product or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations."

The definition mentioned above encompasses a broad view of what innovation is that contrasts with past perspectives where the concept was associated with R&D-based products (Cornell et al., 2016). This broader perspective includes new organisations' methods and business practices (technologies). Gunarathne & Senaratne (2017) argue that integrated reporting can be viewed as a form of managerial technology.

The following paragraphs describe the measurement criteria for each of the explanatory variables at a country, industry and firm-levels, beginning with the test variables and followed by the control variables.

Country-level innovation performance

As referred earlier, the national innovation systems conceptual framework highlights that innovation is not an isolated phenomenon, but the result of the interaction of multiple actors (e.g., financial institutions, firms, universities, government). Hence, to measure the performance of this system, it is required a multi-dimensional metric. Entities such as, e.g., the European Commission, the World Economic Forum, the World Bank, OECD, Cornell et al. (2019) developed several innovation performance indicators. In this study, it was adopted the framework of Cornell et al. (2019). This organisation publishes the global innovation efficiency ratio which represents the countries' innovation performance regarding how efficiently the resources lead to innovation outputs (Cornell et al., 2019). A higher ratio depicts a higher performance. Regarding the indicator produced by the European Commission, as it does not measure the relation between the inputs and outputs, it was not adopted (Edquist et al., 2018).

The indicator published by the World Economic Forum relies, mainly, on surveys. Since “self-reported innovations can be subjective and difficult to calibrate” (Gann & Dogson, 2019: 3; Crespo & Crespo, 2016), this data source was also excluded. The World Bank and OECD also have indicators related to innovation. However, a composite overarching indicator is not available and in the case of the OECD there is no available data for 2016. For these reasons, and due to the possibility of establishing a link between the national innovation systems and the Global Innovation efficiency ratio (Crespo & Crespo, 2016; Gogodze, 2016), we chose the Global Innovation efficiency ratio (hereafter GI) as a proxy for country-level innovation performance. In fact, the level of linkages between companies and other institutions influences this index. This characteristic of the GI is in line with a critical idea of the national innovation systems conceptual framework: the interactions between the system actors have a significant influence on countries' innovation performance. Moreover, it includes indicators that serve as measures for education (learning) which is another central feature of the national innovation systems framework along with measures that concern the influence of the financial sector, which is considered as an element of the system (Lundvall, 1992; Crespo & Crespo, 2016; Gogodze, 2016). Finally, the GI framework considers institutions as having a significant influence on firms' behaviour. This perspective is congruent with the principles that underpin institutional theory.

This indicator was designed in 2007, taking into account a context in which innovation was considered as a key element of the economy and, thus, a key element in the design of growth policies. What's more, knowledge became scattered at a global scale and business operations became more complex (Cornell et al., 2016). In this regard, the objective was to develop a metric that would synthesise several dimensions of innovation beyond the traditional one. Their aim was to empower decision-makers and analysts with a measure that would enable comparisons between countries. Therefore, this index could also be used as an improvement tool of governmental economic policies. The existence of an external auditor may contribute to an increase in the quality and general acceptance of these measures (Cornell et al., 2016).

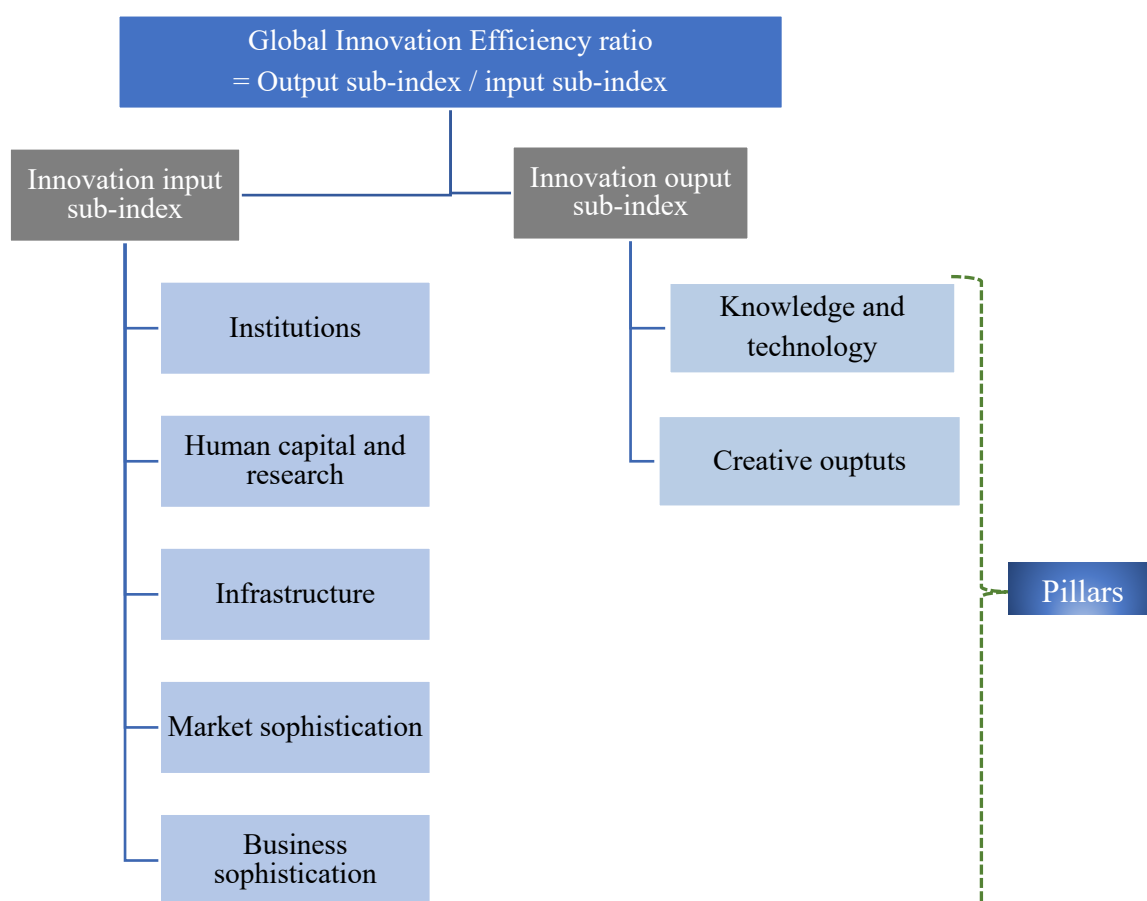
This indicator has been used predominantly on research published in journals focusing on statistics and operational research (e.g., Tziogkidis et al., 2020; Saisse & Lima, 2019), economics and innovation (e.g., Crespo & Crespo, 2016; Gogodze, 2016; Jankowska et al., 2017). In accounting research, to the best of our knowledge, it has not yet been used.

Figure 2 highlights that each country's Global Innovation Efficiency is influenced by an input sub-index and an output sub-index. The input component captures characteristics of the

economy that contribute to innovative activities. The output sub-index reflects the outcomes of innovative activities within the economy (Cornell et al., 2019).

Figure 2 also depicts that each sub-index can be further decomposed into pillars. The value that results from the combination of the pillars for each sub-index explains the importance of each sub-index. The input sub-index is the result of the following pillars i) institutions; ii) human capital and research; iii) infrastructure; iv) market sophistication; v) business sophistication. Regarding the output sub-index, the pillars are i) knowledge and technology outputs and ii) creative outputs. The global innovation efficiency score is the ratio of the output to input indexes and depicts the countries' innovation performance regarding how efficiently the used resources lead to innovation outputs (Cornell et al., 2019).

Figure 2: Framework of the Global Innovation Efficiency ratio



Source: Adapted from Cornell et al. (2016).

Firm-level innovation commitment

Regarding the measurement of innovation at a firm-level, different indicators can be considered and categorised by input, output or composite indicators. Although input indicators indirectly measure innovation and, thus, do not guarantee that the innovation process will be successful, they are commonly used in research (Dziallas & Blind, 2019). This category of proxies captures an essential part of firms' innovativeness (Romijn & Albaladejo, 2002).

R&D investments or expenses, as input indicators, have been frequently used in research as a proxy for innovation (Dziallas & Blind, 2019) and are viewed by some researchers as "the organisation's effort or commitment towards innovation" (Ferreira et al., 2010: 929). Regarding output indicators, the use of patent-based proxies is also common. Even though they have been considered valuable and adopted in many studies, some point out that they also have limitations as previously referred for the input indicators (Flor & Oltra, 2004). For example, the number of claims associated with each patent may vary within countries, hindering comparisons (Cohen & Levin, 1989) and some innovations cannot be protected by patents (Coombs et al., 1996).

In this study, the use of a measure of output such as patents for the sampled companies was not feasible due to time constraints and reliability issues. Therefore, this study measures innovation commitment at a firm-level as RD divided by net sales.

As the sample does not include observations with a value of zero for firm-level innovation commitment (RD– focal variable), the coefficient of ESG (moderator variable) would be meaningless since it would represent the impact of ESG on the dependent variable for a value of RD that does not exist in the sample. Thus, to overcome this problem, the independent variable RD was centred on the mean for interpretations purposes. Therefore, after centring RD on the mean, a value of zero represents firms that have an average innovation commitment.

Moderating variable

The variable related to sustainability performance (ESG) is expected to moderate the effect that innovation commitment has on IR adoption and is measured by the Environmental Social

Governance score (Thomson Reuters Asset4). The fact that this indicator is based on information produced by the companies conveys reliability to the data. The ESG score ranges from a minimum of zero to a maximum of 100. The final score results from a comprehensive set of indicators grouped in the environmental, governance and social pillars. The scores of each pillar influence the final ESG score differently depending on the number of indicators included in each pillar (Thomson Reuters Asset4). The information that Thomson Reuters produces is commonly adopted by researchers (e.g. Ioannou & Serafeim, 2012; Cheng et al., 2014b). This data provider has a specialised team in sustainability and a verification process that includes, e.g. independent audits and automated checks integrated in their data collection procedure (Thomson Reuters, 2019). For the same reason referred for the RD variable in the previous paragraph, as the sample does not include firms with zero ESG scores, this variable was centred on the mean for interpretation purposes. Conceptually, Wood (1991) defines corporate social performance as the consequence of corporate and social responsibility activities.

Control variables

The regression model includes control variables that resulted from the review of previous literature.

At a country-level the model considers predictors related to the legal system, economic development and culture.

LAW reflects the quality of the country legal system. This variable was found by the majority of previous studies to have a positive and significant effect on the adoption of integrated reporting. Firms would adopt a higher level of integrated information as a complement. As a means to enable contracting and foster the relation with their stakeholders due to a decrease in information asymmetry (e.g. Frías-Aceituno et al. 2013a; García-Sánchez & Noguera-Gámez, 2018). Nonetheless, Kılıç et al.(2021) found that this variable had a negative and significant impact on integrated reporting adoption. The authors argue that IR may function as a substitute for a weaker legal environment. It is anticipated a positive influence.

In addition, the GDP independent variable controls for the level of economic development. Jensen & Berg (2012) findings indicated that the level of economic development had a positive and significant impact on the propensity to adopt integrated reporting. They argue that previous

studies found that the level of economic development is associated with the propensity to adopt CSR reporting (Belal, 2000). Nonetheless, Kılıç et al.(2021) studied different models and the results depicted both a positive and a negative influence. As a consequence, a positive result is expected.

Finally, the predictor INDIV is related to the level of individualism of a country. Previous research suggested a negative association of individualism with higher levels of integrated information (García-Sánchez et al., 2013; Girella et al., 2019 and Fuhrmann, 2020). In other words, countries with higher levels of collectivism are expected to propel IR adoption as each individual is more focused on the collective rather than in himself. Hence, it is anticipated a negative association between the level of individualism of a country and IR adoption.

At an industry-level, industry concentration (INDC) was found to have a consistently negative influence on IR adoption (Frías-Aceituno et al., 2014; García-Sánchez & Noguera-Gámez, 2018 and Fuhrmann, 2020). To avoid a reduction in their profits, companies facing a low competitive setting may avoid publishing supplementary information regarding the company performance and strategy (Frías-Aceituno et al., 2014). Thus, it is anticipated a negative impact of this driver.

At a firm-level, the model includes independent variables related to the firms' size, performance (profit and cash-flow) and financial structure.

Size (SIZE) is expected to have a positive influence in the propensity to adopt integrated reporting. The complexity of larger firms entails more intricate information systems, which lowers the costs of producing additional information (Singhvi & Desai, 1971; Buzby, 1975). In addition, these firms do not view the disclosure of additional information as a risk of endangering their competitive position (Singhvi & Desai, 1971; Buzby, 1975). Previous research findings, although mixed, predominantly suggest a positive and significant effect of size in integrated reporting uptake (e.g., Frías-Aceituno et al., 2013a; 2013b; 2014; García-Sánchez et al., 2013).

Since most of previous research also suggested that Profit (ROA) was positively related to IR uptake (e.g. Frías-Aceituno et al., 2013a; Frías-Aceituno et al., 2014; García-Sánchez et al., 2013), it is expected a positive association between this variable. In contrast, Fuhrmann (2020) discovered a significant and negative concerning this predictor. This author suggests that, on the grounds of the proprietary costs theory (Verrecchia, 2001), higher profitability levels may detract firms from disclosing information due to risks of increased competition.

The predictor of Leverage (LEV) was examined by García-Sánchez et al. (2019) and Fuhrmann (2020). Their results supported a negative influence of this determinant. They argue that financial institutions may favour the use of covenants rather than request complementary information. Nonetheless, Lai et al. (2016) and Girella et al. (2019) obtained non-significant results. It is anticipated a negative influence of this driver on the probability of IR adoption.

Finally, it is expected that the higher the cash-flow (CF), the higher the incentive to publish an IR. Cash-flow and profit reflect complementary views of the firms' performance. Most of previous studies suggest that profit has a positive and significant association with IR adoption (e.g. Frías-Aceituno et al., 2013a; Frías-Aceituno et al., 2014; García-Sánchez et al., 2013). Accordingly, it is expected that higher cash-flow levels will lead to a higher likelihood of publishing an IR.

The research model also includes country, industry and year fixed effects.

5. Results

This chapter presents and interprets the results findings. It starts with a univariate and bivariate analyses in Section 5.1. Thereafter, in Section 5.2, the focus is on an analysis of the regression results.

5.1 Univariate and bivariate analyses

Table 7 below depicts descriptive statistics related to all firms (Panel A), the treatment group (Panel B) and the control group (Panel C). Finally, Panel D outlines the results of the comparison tests.

Table 7: Descriptive statistics and bivariate tests

Panel A: All firms (n=388)

	Mean	Median	SD	Min	Max
GI	.760	.730	.071	.653	.930
RD	0.000	-.029	.085	-.050	.965
ESG	0.000	3.575	16.282	-64.255	24.315
GDP	10.795	10.793	.119	10.526	11.023
INDIV	72.814	71.000	10.664	51.000	89.000
INDC	.036	.018	.048	.017	.255
SIZE	16.546	16.579	1.530	11.335	20.053
LEV	.346	.321	1.882	-35.965	2.708
ROA	.082	.075	.056	-.144	.290
CF	.139	.128	.114	-.516	1.022
LAW	.711	-	-	0.000	1.000

Panel B: IR adopters (n=194)

	Mean	Median	SD	Min	Max
GI	.760	.730	.071	.653	.930
RD	-.005	-.026	.057	-.050	.209
ESG	3.227	6.310	15.001	-64.255	24.315
GDP	10.795	10.793	.119	10.526	11.023
INDIV	72.814	71.000	10.678	51.000	89.000
INDC	.038	.018	.048	.017	.255
SIZE	16.799	16.884	1.398	13.041	20.053
LEV	.439	.300	.372	0.000	1.826
ROA	.088	.082	.050	-.018	.290
CF	.158	.139	.115	-.003	1.022
LAW	.711	-	-	0.000	1.000

Table 7 (cont.)

Panel C: IR non-adopters (n=194)

	Mean	Median	SD	Min	Max
GI	.760	.730	.071	.653	.930
RD	.005	-.031	.106	-.050	.965
ESG	-3.227	-.720	16.900	-54.095	23.005
GDP	10.795	10.793	.119	10.526	11.023
INDIV	72.814	71.000	10.678	51.000	89.000
INDC	.035	.018	.048	.017	.255
SIZE	16.292	16.231	1.616	11.335	19.528
LEV	.253	.352	2.635	-35.965	2.708
ROA	.076	.068	.060	-.144	.258
CF	.120	.117	.109	-.516	.507
LAW	.711	-	-	0.000	1.000

Panel D

Comparison tests	Test statistics		
RD	a	-0.626	
ESG	a	-4.108	***
INDC	a	0.732	
SIZE	a	-3.281	***
LEV	a	0.795	
ROA	a	2.136	**
CF	a	2.869	***

(a) Wilcoxon Mann-Whitney non-parametric test due to violation of the normality assumption.

The symbols *, **, *** indicate statistical significance at 10%, 5%, and 1% for two-tail tests. RD represents the research and development expenses divided by net sales centred on the mean. ESG measures the firms' environmental performance centred on the mean centred on the mean. INDC is the level of concentration of an industry measured by the Herfindahl index. SIZE is the natural logarithm of total assets. LEV represents the firms' total debt to total equity ratio. Represents the earnings before interest and taxes (n) divided by the total assets (n-1). CF represents the free cash-flow to net sales ratio.

Panels, A, B and C of Table 7 show that the mean of the country-level innovation performance (GI) is of approx. 0.76 which reflects that the firms in the sample, on average, were able to obtain 0.76 of output for each unit of input. This value is close to the median (0.73).

Panels B and C show that the mean and median are the same in the treatment and control groups for all the country-level variables (GI, INDIV, GDP and LAW). These values are the reflection of a dependent variable that is at a firm-level whereas these variables are at a country-level.

The mean for the predictor related to firm-level innovation commitment (RD) for all firms is zero, as expected, since this variable was centred on the mean. Also, the mean of this predictor is negative in the treatment group (approx. -0.005), thus, lower than in the control group (approx. 0.005) and the difference is not statistically significant. Thus, the mean signs are opposite but the absolute values are the same in both groups. This is expected as the variable was centred on the mean and both groups have the same number of firms. The same comparison with raw data also shows that the mean of the control group (approx. 0.056) is superior to the mean of the treatment group (approx. 0.045). The uncentred mean for all firms is of approx. 0.05.

The environmental performance (ESG) mean is zero for the entire sample, as expected, since the variable was centred on the mean. The treatment group has a higher mean (approx. 3) when compared to the control group (approx. -3). This difference was found to be statistically significant at a 1% level. The means signs are opposite but the absolute values are the same in both groups. This was predictable since this explanatory variable was centred on the mean and the treatment and control groups have the same number of firms. In the same vein, this analysis with raw data also demonstrates that the mean of the treatment group (approx. 73.422) is higher than the mean of the control group (approx. 66.968). The uncentred mean for all firms is of approx. 70.195.

The variable industry concentration (INDC) has a value of 0.38 in the treatment group which is superior to the control group (approx. 0.35). This difference is not statistically significant.

The mean of the variable SIZE is superior in treatment group (approx. 16.8) when compared with the control group (approx. 16.3) and is statistically significant at a 1% level.

The predictor of leverage (LEV) has a mean of approx. 0.439 in the treatment group which is superior to the control group (approx. 0.253). This difference is not statistically significant.

The mean of the variable related to profitability (ROA) is superior in the treatment group (approx. 0.088) when compared to the control group (approx. 0.076). This difference is statistically significant at a 5% level.

CF represents the variable related to cash flow. The mean is inferior in the control group (approx. 0.12) when compared to the treatment group (approx. 0.16). This difference is statistically significant at a 1% level.

This bivariate analysis has the limitation of not presenting the results in a multivariate setting and, thus, is useful as a preliminary exploratory analysis. The binary logistic regression model presented in the next section will extend this analysis by, simultaneously, considering several predictors and, thus, overcome this limitation.

In order to assess the magnitude and direction of the correlation between all the continuous variables, Table 8 shows the Spearman's correlations.

Table 8: Spearman's correlations for the continuous variables

	GI		GDP		INDIV		INDC		SIZE		LEV		ROA		CF		ESG		RD
GI	1.000																		
GDP	0.399 ***	1.000																	
INDIV	0.397 ***	0.224 ***	1.000																
INDC	-0.237 ***	0.042	-0.044	1.000															
SIZE	0.142 ***	0.039	-0.023	0.091 *	1.000														
LEV	-0.011	-0.103 **	0.075	0.188 ***	-0.011	1.000													
ROA	0.172 ***	0.133 ***	0.099 *	-0.160 ***	-0.091 *	-0.185 ***	1.000												
CF	0.114 **	-0.023	0.031	0.203 ***	0.158 ***	0.123 **	0.279 ***	1.000											
ESG	0.007	0.028	-0.058	0.013	0.541 ***	-0.033	0.023	0.118 **	1.000										
RD	0.111 **	0.277 ***	-0.010	-0.348 ***	-0.015	-0.202 ***	0.136 ***	0.021	0.135 ***	1.000									

The symbols *, **, *** indicate statistical significance at 10%, 5%, and 1% for two-tail tests. GI is the global innovation efficiency ratio of the output score divided by the input score and depicts the country's innovation performance regarding how efficiently the inputs lead to innovation outputs. RD represents the research and development expenses divided by net sales centred on the mean. ESG measures the firms' sustainability performance centred on the mean. LAW mirrors the perception of trust and quality of each country's rules. It has a value of one for countries with a score above the median and zero, otherwise. GDP is the natural logarithm of the GDP per capita (parity purchasing power). INDIV represents the level of individualism of a country. A higher score translates into a more self-centred society. INDC is the level of concentration of an industry measured by the Herfindahl index. SIZE is the natural logarithm of total assets. LEV represents the firms' debt to equity ratio. ROA represents the earnings before interest and taxes (n) divided by the total assets (n-1). CF represents the free cash-flow to net sales ratio.

Table 8 shows that the correlations between all the interest variables, GI, RD, ESG are low.

Regarding the level of association of the interest variable related to country-level innovation performance (GI) with other variables, Table 8 depicts low levels. A positive correlation of approx. 0.4 at a 1% significance level with the variable related to individualism (INDIV) and economic development (GDP). Hence, the data suggest that countries' with higher innovation performance are more self-centred and have a higher level of economic development.

The interest variable related to firm-level innovation commitment (RD) has significant correlations with the other independent variables, but they are all moderate to low. The correlation with industry concentration (INDC) is negative of approx. 0.35 (1% significance level) suggesting that higher levels of firm-level innovation commitment is associated with lower levels of industry concentration. Table 8 also depicts a positive correlation of approx. 0.3 between firm-level innovation commitment (RD) with the level of economic development (GDP) at a 1% significance level, indicating that firms' commitment with innovation is higher in countries' with a higher economic development.

Regarding the correlations between the other variables, the highest correlation is between sustainability performance (ESG) and SIZE (positive of approx. 0.54) at a 1% significance level. Thus, this indicator suggests that larger firms have a higher probability of having a superior environmental performance. Finally, the correlation between country-level individualism (INDIV) and economic development (GDP) is positive of approx. 0.22 at a 1% significance level, thus suggesting that economic development is higher in countries where the society is more focused on the individual needs .

Overall, all correlations fall below an absolute value of 0.6 and, thus, under the threshold of 0.8. Moreover, untabulated results indicate that the values of all the variation inflation factors fall below 10. Therefore, the data suggest that the model does not present multicollinearity problems (Gujarati, 1995).

5.2 Binary logistic regression

Table 9 summarises the outputs of the logistic regression model. Model M4 departs from Equation (1), previously stated, and includes all the explanatory variables. Model M1 includes all the predictors of model M4 with the exception of the variables RD (focal variable), ESG (moderator) and the product term of both. Model M2 includes all the predictors of model M4 with the exception of the variables GI, ESG and the product term between RD and ESG. Model M3 drops the variable GI from model M4 and includes all the other variables of this model.

Table 9: **Logistic regression results**

	M1		M2		M3		M4	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
constant	-65.348	***	-74.877	***	-62.082	***	-48.261	***
GI	1.846	***	-		-		2.875	***
RD	-		-1.439		-5.339	***	-5.424	***
ESG	-		-		0.036	***	0.037	***
RD*ESG	-		-		0.502	***	0.507	***
Control variables:								
GDP	4.914	***	5.912	***	5.217	***	3.734	***
INDIV	0.066	***	0.069	***	0.040	***	0.036	***
INDC	-20.094	***	-20.337	***	-22.497	***	-22.537	***
SIZE	0.288	***	0.292	***	0.099	*	0.100	*
LEV	0.158		0.133		0.163	*	0.160	*
LAW	-0.015		-0.042		0.203	***	0.213	***
ROA	5.818	***	5.796	***	6.462	**	6.512	**
CF	2.873	**	3.019	***	2.907	**	2.946	**
Pseudo R sq.	0.0661		0.0669		0.1056		0.1061	
Nr. Of obs.	388		388		388		388	

The symbols *, **, *** indicate statistical significance at 10%, 5%, and 1% for two-tail tests. Pooled logistic regression for fiscal years 2016-2019 with country, industry and year fixed effects. Robust standard errors clustered by firm and year. GI is the global innovation efficiency ratio of the output score divided by the input score and depicts the countries' innovation performance regarding how efficiently the inputs

lead to innovation outputs. RD represents the research and development expenses divided by net sales centred on the mean. ESG measures the firms' sustainability performance centred on the mean. LAW mirrors the perception of trust and quality of each country's rules. A value of one for countries with a score above the median and zero otherwise. GDP is the natural logarithm of the GDP per capita (parity purchasing power). INDIV represents the level of individualism of a country. Captures the level of independence within the members of a society. A higher score translates into a more self-centred society. INDC is the level of concentration of an industry measured by the Herfindahl index. SIZE is the natural logarithm of total assets. LEV represents the firms' debt to equity ratio. ROA represents the earnings before interest and taxes (n) divided by the total assets (n-1). CF represents the free cash-flow to sales ratio.

Country-level innovation: hypothesis 1

The logistic regression results (Table 9) show that the coefficients for country-level innovation performance (GI) in models M1 and M4 are positive and significant at a 1% level (coef. M1 = 1.846; coef. M4 = 2.875). What's more, untabulated results show that there is an average marginal effect of approx. 0.62, also statistically significant at a 1%, level (model M4). These results suggest that higher levels of country-level innovation performance will meaningfully increase the likelihood of adopting integrated reporting, hence, supporting H1.

It was hypothesised earlier that a higher country-level innovation performance increased the likelihood of integrated reporting adoption. After having reviewed the related literature, it was stressed that there was a gap regarding the influence of country-level innovation performance as a possible determinant of integrated reporting adoption. It was also mentioned that preceding studies on the influence of innovation on voluntary disclosure are scant and firm-level focused (e.g. Radu & Francoeur, 2017; Gallego-Álvarez, 2018).

At a conceptual level, the rationale supporting this hypothesis stemmed from a conjoint view of the national innovation systems framework with the institutional theory. Firstly, it was emphasised the importance of analysing the impact of innovation at a country-level

on companies' practices due to the uniqueness of each country as underlined in the national innovation systems framework (Lundvall, 1992; Lundvall, 2007; Watkins et al., 2015). It was also highlighted the major role played by each country's institutions in the innovation cycle (Gogodze, 2016; Sharif, 2006; Lundvall, 2007). The national innovation systems framework emphasises the importance of institutions as catalysts for innovation. Subsequently, this view was complemented with the lens of the institutional theory. It was explained the influence that each country institutional setting has on the adoption of these new practices. For example, it was stated that companies may adopt similar behaviour as a way to promote their continuity (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). The literature review along with this conceptual analysis supported the hypothesis that companies that are located in an environment that favours innovation have a higher propensity to adopt integrated reporting. These results support this reasoning.

Firm-level innovation: hypothesis 2

The output of the logistic regression in Table 9³ shows that the variable RD in model 2 is not statistically significant (coef.= -1.439) and, therefore, does not provide support to hypothesis 2.

This hypothesis assumed that firm-level innovation commitment could positively influence the likelihood of adoption of integrated reporting. The analysis of the related literature confirmed the existence of a gap that needed to be addressed.

Conceptually, it was argued that integrated reporting could serve as a signal of the managers' unobserved quality, since it would help to communicate to investors (the receivers of the signal) their performance. Managers have access to privileged information that investors cannot access. Integrated reporting could contribute for a

³ Centring the firm-level test variables does not change the conclusions. The signs of the coefficients of the variables are the same if the firm-level test variables are not centred. Also, the level of statistical significance of all variables remain within conventional levels. Without centring the test variables levels of significance are, 1% for RD and RD*ESG; 10% for ESG. The control variables significance levels are of 1% for GDP, INDV, INDC and LAW, 5% for ROA and CF and 10% for SIZE and LEV.

decrease of this information gap between the principal and the agent. Therefore, a partial or misinterpretation of management's decisions could constitute a hindrance in the management's performance evaluation and, thus, managements' legitimacy could be questioned. The high uncertainty regarding the ability of R&D investments to create value further reinforced this reasoning (Rosenberg, 1994; Kothari et al., 2002).

It was also contended that this view is congruent with the agency theory portrayed by Jensen & Meckling (1976) and Jensen (2005) that posit that management (agents) may incur in costs that are aligned with the principal's interest (bonding costs). Gaffikin (2007), stresses that preparing financial reports to the shareholders may constitute a bonding cost as the agent will have to allocate time to its preparation and may hinder opportunistic behaviours of the agent.

In short, the hypothesised positive relation between firm-level innovation commitment and IR adoption that was based on a conceptual support circumscribed to the signal and agency theories was not confirmed by the evidence. A possible explanation for this result is that other conceptual frameworks and factors, not contemplated in this hypothesis, could condition the influence of firm-level innovation commitment on IR uptake. These aspects are considered in hypothesis 3 below.

Firm-level innovation: hypothesis 3

Table 9 shows that the interaction terms (ESG*RD) coefficients are positive and significant at a 1% level in models M3 and model M4, thus, supporting that ESG moderates the influence of RD on the dependent variable as predicted on hypothesis 3 (coef. M3=0.502 and coef. M4=0.507).

The moderator variable ESG is positive in models M3 and M4 and statistically significant at a 1% level (coef. M3 = 0.036; coef. M4 = 0.037).

The focal variable (RD) has coefficients that are negative and significant in models M3 and M4 (coef. M3 = -5.339; coef M4 = -5.424) at a 1% significance level. Thus, it is expected that when the sustainability performance variable (ESG) is at the mean, (corresponding to zero since this variable was centred on the mean), the variable RD has, on average, an expected negative impact on the likelihood of adopting IR.

Since both the product term (RD*ESG) and the individual coefficients (RD and ESG) do not depict in a meaningful and complete way the impact that the interest (focal) variable (RD) has on the dependent variable, an average marginal effects analysis was carried out in the next paragraphs.

To understand how the variable RD influences the dependent variable, it was computed the average marginal effect for different levels of sustainability performance (the moderator variable).

Figure 3 depicts the average marginal effects of firm-level innovation commitment on IR adoption (Y axis) for different levels of ESG performance (X axis) ranging from a minimum of -63 to a maximum of 24. When the sustainability performance level is below 8, the innovation commitment influence on the probability of adoption of IR is negative and statistically significant at a 1% and 5% levels (64% of the observations fall within this range). Hence, the expected benefits of an enhanced communication are inferior to the expected costs that arise from a loss of competitiveness and increased litigation risks (Verrecchia, 1983; Steyn, 2014; Perego et al., 2016). This figure also shows that this negative impact is consistently reduced as the moderator (ESG) variable increases. These results confirm hypothesis 3 regarding an impact of innovation commitment on IR adoption dependent of the level of sustainability performance.

The right side of Figure 3 shows that when the sustainability performance (ESG) level is above 13, there is a positive impact of innovation commitment (RD) on the probability of adopting an IR that increases consistently as the moderator variable increases (statistically significant at a 1% level within this range and represented by 25% of the observations).

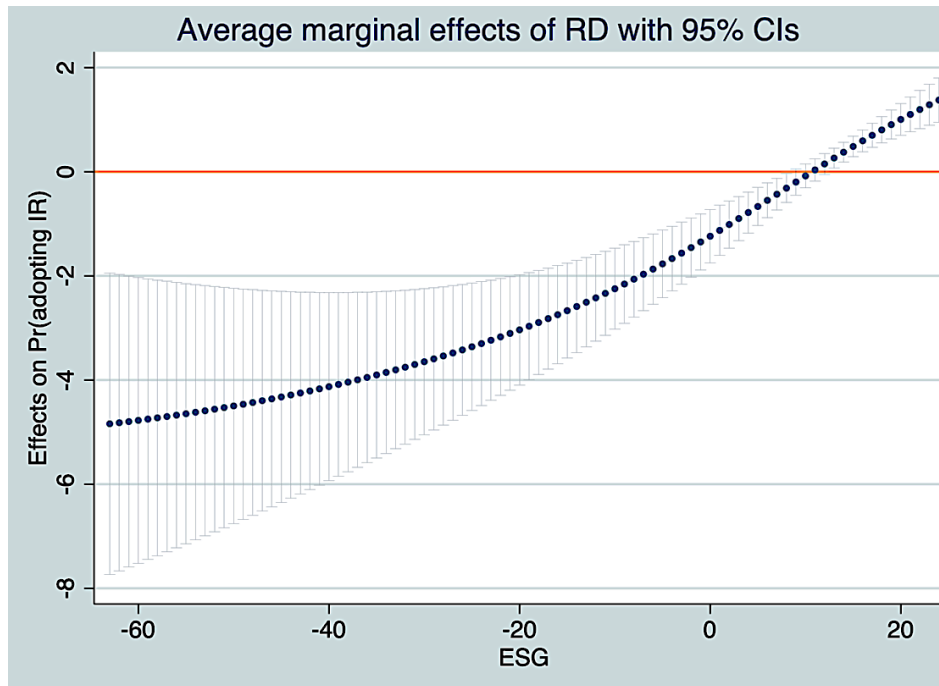
Thus, for some firms the benefits may be superior to the expected costs. In other words, the expected improvement in the way it communicates how it creates value, how it perceives its external environment, its strategy along with its past and future performance exceeds the expected total costs (Verrecchia, 1983; Steyn, 2014; Perego et al., 2016). These results also partially confirm hypothesis 3 concerning an impact of firm-level innovation commitment on IR adoption moderated by sustainability performance.

Overall there is a steady increase in the average marginal effects from a minimum of approx. -4.84 to a maximum of approx. 1.38 in the entire range of observations.

Also, the majority of the significant observations that are below (above) the average sustainability performance (ESG) depict a negative (positive) effect of innovation commitment on the probability of adopting an IR.

However, the 95% confidence interval in Figure 3 also shows that there are 11% of the observations that have average marginal effects with no statistical significance that fall between 8 and 13 of sustainability performance (ESG). As a result, these data present partial support for hypothesis 3 that firm-level innovation commitment impact on IR adoption is moderated by the firms' sustainability performance levels. Thus, the data partially confirm the conceptual support. Firstly, regarding the signal and agency theories reasoning concerning why higher levels of firm-level innovation commitment leads to higher levels of IR adoption. Also, it was argued the existence of a link between the IR framework and sustainability that support an expected positive impact of higher sustainability performance levels on IR adoption. It was highlighted that the IR framework emphasises i) the positive influence that the processes associated with integrated reporting may have on sustainability and ii) the need to disclose environmental issues in different parts of the report (IIRC, 2013). Finally, although there are benefits associated to the disclosure, it could also have a negative impact on the firms' competitiveness (proprietary costs) that could bring additional legal risks for the firm (Steyn, 2014; Perego et al., 2016). In this regard, the model output provides partial support of the existence of a cost-benefit analysis underpinning the disclosure decision (Verrecchia, 1983).

Figure 3: Average Marginal Effects of R&D commitment (RD) on IR adoption for different levels of firm-level ESG performance (ESG)



Control variables

The predictor representing the level of economic development (GDP) was positive (coef. $M4=3.734$) and significant at a 1% level. These results depict a positive association between economic development and IR adoption. It is concordant with the findings Belal (2000) as well as Jensen and Berg (2012). Nonetheless, Kılıç et al. (2021) studied several models that depicted both a negative and positive association between the level of

economic development and IR adoption. Differences in the sample composition and period may explain these differences.

The variable INDIV is positive at a 1% statistically significance level (coef. M4=0.036). This result suggests that countries with a higher level of individualism have a higher propensity to publish an IR. In other words, in countries where individualism prevails each member of the society is more self-centred (Hofstede, 2021). Conversely, García-Sánchez et al. (2013), Girella et al. (2019) and Fuhrmann (2020) indicated a positive association of higher levels of collectivism with IR uptake. The sample composition of these studies included a significant proportion of firms from regions other than Europe (Asia, Africa, Australia, North and South America), which may explain this difference.

The variable related to the level of industry concentration (INDC) is negative and significant at a 1% level on all models depicting that firms of industries with higher levels of concentration have associated a lower probability of publishing an IR (coef. M4 = -22.537). This evidence is concordant with all previous studies (Frías-Aceituno et al., 2014; García-Sánchez & Noguera-Gámez, 2018 and Fuhrmann, 2020). Firms operating in a less competitive environment, to avoid a decrease in their profits, may be less motivated to publish additional information related to the firms' performance and policies (Frías-Aceituno et al., 2014).

The independent variable SIZE results indicate the existence of evidence supporting a positive influence of this explanatory variable on the publication of an IR (coef. M4 = 0.1) at a 10% significance level. Consequently, these results support that larger firms have a higher likelihood of adopting an IR. These findings are in line with the majority of preceding research indicating a positive and significant influence (e.g., Frías-Aceituno et al., 2013a; 2013b; 2014; García-Sánchez et al., 2013; Sierra-García et al., 2015; García-Sánchez & Noguera-Gámez, 2018; García-Sánchez et al., 2019).

These outcomes may be explained by the higher visibility that larger companies have along with a higher shareholder involvement. This setting prompts them to disclose information in a more systematic way than smaller companies where a reduced number of stakeholders may disclose the information informally (Cowen et al., 1987; Karim et

al., 2013). Furthermore, larger companies have a more diverse range of products with a more intricate distribution system. As a consequence, their business requires a more complex information control system which makes possible the release of additional information with lower costs (Singhvi & Desai, 1971; Buzby, 1975). Finally, bigger companies are less prone than smaller companies to view the release of additional information as a threat to their competitive position (Singhvi & Desai, 1971; Buzby, 1975). Nonetheless, some studies contented a non-significant relation (e.g. Lai et al., 2016; Fuhrmann, 2020 and Kılıç et al., 2021). These authors mention that differences in the sampling criteria could explain these differences (Lai et al., 2016). Overall, most of previous studies' results largely support a positive association of this predictor.

The evidence related to the independent variable LEV depicts a positive and significant influence (coef. M4 = 0.16) at a 10% level. This evidence is in line with the legitimacy theory principles. Firms may provide creditors additional information to be perceived as legitimate by the financial institutions (Dowling & Pfeffer, 1975; Lai et al., 2016). Also, firms that favour debt in their financing decisions may need to explain how these resources were used (Busco et al., 2019). In contrast, Lai et al. (2016) and Girella et al. (2019) obtained non-significant results. García-Sánchez et al. (2019) and Fuhrmann (2020) evidence suggest that this relation is negative and statistically significant. The latter author suggests that financial institutions may opt to use covenants to protect their investments (Fuhrmann, 2020).

The coefficient of the predictor measuring the trust and quality of each country's rules (LAW) is positive at a 1% significance level (coef. M4 = 0.213). Thus, the higher the agents confidence regarding the quality of their countries' rules and enforcement, the higher the likelihood of embracing IR. This result is consistent with Frías-Aceituno et al. (2013a) and García-Sánchez & Noguera-Gámez (2018) findings. However, Kılıç et al. (2021) reported a negative and significant influence due to a substitution effect for a weaker legal environment.

The explanatory variable related to profit (ROA) was positive (coef. M4 = 6.512) and significant at a 5% level in line with most of previous studies (e.g. Frías-Aceituno et al., 2013a; Frías-Aceituno et al., 2014; García-Sánchez et al., 2013). This outcome is

consistent with the reasoning that firms may be motivated to disclose higher profits as a signal of their unobserved quality (Spence, 1973; Frías-Aceituno et al., 2014). However, Fuhrmann (2020) found a significant and negative association. This author suggests that this result may be explained by factors associated with the proprietary costs theory.

The coefficient of the independent variable CF suggests a positive influence (coef. M4 = 2.946) in the propensity to publish an IR at a 5% significance level. Accordingly, the results suggest that firms with a higher performance, regarding their ability to generate cash-flow have a higher likelihood of publishing an IR. On the grounds of the signalling theory, it can be argued that firms are motivated to send a signal of their unobserved performance. As higher levels of cash-flow depict a higher performance, this variable will have a positive influence on the likelihood of publishing an IR (Spence, 1973; Frías-Aceituno et al., 2014). Most of previous studies focusing on the association between firms' performance and IR uptake are in line with these results, although focusing on the profit dimension of performance (e.g., Frías-Aceituno et al., 2013a, 2014; García-Sánchez et al., 2013; García-Sánchez & Noguera-Gámez, 2018; Girella et al., 2019).

In summary, the results support hypothesis 1, suggesting that there is evidence of a positive and significant influence of country-level innovation performance on the propensity to publish an IR. The data does not support an unconditional effect of firm-level innovation commitment on IR adoption (H2). Nonetheless, it partially suggests that firm-level innovation commitment influence on IR adoption is moderated by the level of firm-level sustainability performance (H3).

6. Conclusions

Firms' decisions on how to communicate with the stakeholders their strategic options and performance may be beneficial but may also lead to additional costs and risks (Verrecchia, 1983; Perego et al., 2016). Thus, it is essential that the decision to adopt and develop a new reporting framework be also supported, when available, in scientific evidence.

In this regard, this research investigated country-level and firm-level incentives that explain the acceptance of integrated reporting by examining the effect that country-level innovation performance and firm-level innovation commitment have on the propensity to publish an integrated report.

At a country-level, the conceptual support was based on the national innovation systems framework (Lundvall, 1992; Sharif, 2006; Lundvall, 2007; Watkins et al., 2015; Gogodze, 2016) combined with the institutional theory (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Departing from these frameworks, it was argued that each country has unique characteristics regarding their institutional environment and how these institutions interact. It was also mentioned the importance of the institutions in shaping an innovative environment and, thus, their influence on organisational practice. This reasoning supported the hypothesis that organisations situated in countries with settings that foster innovation will have a higher likelihood of implementing integrated reporting (H1).

At a firm-level, it was hypothesised firstly (H2) that firm-level innovation commitment had a positive influence on IR adoption with the support of signalling (Spence, 1973) and agency (Jensen & Meckling, 1976) theories. Secondly, it was hypothesised that the firms' sustainability performance level moderated the firms' innovation commitment influence on the likelihood of IR adoption on the grounds of signalling (Spence, 1973), agency (Jensen & Meckling, 1976) and proprietary costs (Verrecchia, 1983) theories (H3).

The collected final sample included 388 firm-year observations for the years 2016-2019 of firms located in 8 European countries (Belgium, France, Germany, Italy, Netherlands, Spain, Sweden and the United Kingdom). The primary data sources were the firms' websites and the Thomson Reuters database.

The results were based on a binary pooled logistic regression. This econometric technique is frequently applied in this strand of research (e.g. Frías-Aceituno et al., 2013a, 2013b; García-Sánchez & Noguera-Gámez, 2018). The dependent variable is binary and was defined as one if the firm has published an IR or zero, otherwise. Listed firms that explicitly acknowledged in the report that it was an integrated report, and, simultaneously, had information available in the Thomson Reuters Worldscope database for 2016-2019 were selected for the treatment group. The country-level interest variable GI was measured by the global innovation efficiency index (Cornell et al., 2019). The firm-level interest variables RD and ESG were measured by the research expenses to sales ratio and by the Thomson Reuters Assets4 environmental performance score, respectively. RD was considered a focal variable and ESG a moderator variable. The model also included several control variables, related to i) the legal environment (LAW), ii) the level of economic development (GDP), iii) culture (INDIV), iv) the level of each industry concentration (INDC), v) the firms' size (SIZE), vi) the debt structure of the firm (LEV), vii) profitability (ROA) and viii) cash-flow (CF). In addition, a group of dummy variables were included to control for country, industry and year fixed effects.

The results presented evidence that country-level innovation performance has a positive influence on the likelihood of IR uptake. The logistic regression coefficient of the variable GI and the average marginal effect were positive and statistically significant at a 1% level. Thus, the expectations based on the theoretical grounds of the national innovation systems framework and institutional theory were confirmed (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Lundvall, 1992; Sharif, 2006; Lundvall, 2007; Watkins et al., 2015; Gogodze, 2016).

At a firm-level, the data did not support an unconditional effect of firm-level innovation commitment on IR adoption (H2). Nevertheless, it partially supported the existence of a conditional effect. There is an interaction between innovation commitment (RD - focal variable) and sustainability performance (ESG - the moderator variable) as predicted on hypothesis 3. The evidence showed that the impact that innovation commitment (RD) has on the probability of IR uptake depends on the attained level of sustainability performance. Thus, these results partially confirm the signalling (Spence, 1973), agency

(Jensen & Meckling, 1976) and proprietary costs (Verrecchia, 1983) theoretical predictions regarding the trade-off underpinning this reporting decision. Although there may be benefits associated with an improved communication, there may be costs associated to a loss in competitiveness along with increased litigation risks (Perego et al., 2016). Nonetheless, the data also showed that 11% of the observations had average marginal effects with no statistical significance. Hence, the evidence presents partial support for hypothesis 3 that firm-level innovation commitment impact on IR adoption is moderated by the firms' sustainability performance levels.

Regarding the contributions of this study, firstly, this investigation extends former literature findings by analysing two new drivers of IR, namely country-level innovation performance and firm-level innovation commitment.

Secondly, to the best of our knowledge, few investigations were based on data posterior to the IR framework publication in 2013 (Girella et al., 2019 and Fuhrmann, 2020 and Kılıç et al., 2021). This study collected data referring to the period of 2016-2019.

Thirdly, previous studies focused their analysis on different regions, thus, providing a valuable worldwide perspective (e.g. Lai et al., 2016; Fuhrmann, 2020). As a consequence, the proportion of European firms in these samples was low. This study gives a contribution to this line of research by focusing on the study of the drivers of IR adoption in Europe.

Fourthly, one of the conceptual frameworks adopted was grounded on the national innovation systems framework. To the best of our knowledge this framework has not yet been applied to this strand of research.

Fifthly, this investigation provides evidence that countries with different innovation performance levels and, thus, different innovation-inducive settings may impact IR adoption differently. In their path towards harmonisation and diffusion of integrated information, European institutions and professional bodies may gauge the need to adapt the legislation and guidelines in light of these differences.

Sixthly, this study may increase the managers' awareness regarding the trade-off that is implicit in the decision to embrace a higher level of integrated information. Companies have to judge whether the level of the expected costs exceeds the level of the expected benefits.

Lastly, investment's decisions take into consideration the type of information that is available for each investment option. Thus, having an all-encompassing view regarding the trade-off and environmental factors that may lead different firms to adopt different levels of integrated information will help to support a better judgement, in the context of the overall investments decisions, regarding the reasoning that led to the firms' reporting strategy.

This study has associated some limitations that may contribute to future research opportunities.

Although a significant amount of care was taken in the selection of the variables, the proxy for country-level innovation performance could mirror other specific country-level variables, not included in this study, thus, restricting the results interpretation.

The conclusions of this research are restricted to the European setting and, thus, cannot be extrapolated to other regions. Future studies could assess the impact of these drivers on explaining integrated reporting adoption either focusing on a non-European country or on a non-European region (e.g., Asia, Africa, Australia and America) where firms face different regulatory and cultural environments.

Also, these findings were based on a quantitative methodological approach. Future research could shed light on the rationale behind the managers' decision to adopt IR by conducting, e.g. surveys and interviews. Although there are some published studies with this focus, the amount of available evidence is still restricted (e.g. Robertson & Samy, 2015, 2020). The availability of data obtained adopting different methodological approaches would allow a more robust and comprehensive understanding surrounding IR adoption.

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