



## The influence of integrated thinking on corporate performance: the mediating role of publishing an integrated report

### Abstract

This study examines whether integrated thinking influences corporate performance for a sample of European listed firms during the years 2014-2019. In addition to this direct effect, this study also investigates the potential indirect effect of integrated thinking on corporate performance via publishing an integrated report. Using structural equation modeling with lagged effects, the results show that, integrated thinking positively affects the company's non-financial performance and corporate performance. On the other hand, the results do not indicate that integrated thinking is significantly affecting the company's financial performance. Finally, this study found no significant association between publishing an integrated report and the company's financial, non-financial and corporate performance. Therefore, this study found no empirical evidence that integrated thinking is positively related to corporate performance via publishing of an integrated report.

Keywords: integrated thinking, integrated reporting, integrated report, financial performance, non-financial performance, corporate performance

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## 1. Introduction

Corporate scandals, such as Enron, WorldCom and BP, illustrated the limited social and environmental considerations in the decision-making process of firms (Cheng et al., 2015). Stakeholders criticized this unethical behavior and pressured firms to act more responsible for the impact of their decisions on the environment and society (Abeysekera, 2013). These critics resulted in the implementation of corporate programs and initiatives of sustainability in order to achieve specific targets in terms of corporate governance, social and environmental impact (Busco et al., 2013). On 9 December, 2013, the International Integrated Reporting Council, IIRC, released the first internationally recognized <IR> framework. Integrated reporting, <IR>, is the latest attempt to counter alleged criticism of contemporary financial reporting that argues accounting no longer meet the information needs of financial capital providers and other stakeholders (Lev & Gu, 2016). The IIRC defines <IR> as “*a process founded on integrated thinking that results in a periodic integrated report by an organization about value creation over time and related communications regarding aspects of value creation*” (IIRC, 2014). Integral to <IR> is ‘integrated thinking’, which is a multi-capital management approach by balancing a company’s performance across 6 capitals, namely the financial, social and relationship, human, intellectual, manufactured and natural capitals (Al-Htaybat & von Alberti-Alhtaybat, 2018). Integrated thinking helps organizations to articulate the relevance of sustainability issues into their long-term business strategies. The integration of sustainability issues in long-term business strategies is important for firms to successfully face challenges and take advantage of opportunities in the complex and turbulent business environment to reconcile competitiveness and sustainable growth (Al-Htaybat & von Alberti-Alhtaybat, 2018). The objective of the IIRC is a world in which integrated thinking is embedded within mainstream business practices in the public and private sectors, facilitated by <IR> as the corporate reporting norm (IIRC, 2013).

Considering this ambitious objective of the IIRC, many scholars have started paying attention to <IR> (Girella et al., 2019). Most research related to <IR> focused on the benefits that can be derived from publishing an integrated report (Lemma et al., 2019; Churet & Eccles, 2014; Salvi et al., 2020). Empirical studies that examined the benefits related to publishing an integrated report showed mixed results. Some empirical studies found positive benefits related to publishing an integrated report (Salvi et al., 2020; Lemma et al., 2019). Other empirical studies found no significant benefits related to publishing an integrated report (Churet & Eccles, 2014; Nurkumalasari et al., 2019). A possible explanation of these mixed results is the influence of integrated thinking on both corporate performance and the likeliness

of publishing an integrated report. The IIRC (2013) argues that changes and benefits of <IR> are arising from integrated thinking and in the process of producing an integrated report, not from an integrated report itself. Yet, the benefits related to integrated thinking have received little attention in prior literature related to <IR> and remain largely unknown. To the best of the authors' knowledge, to date only Maniora (2017) investigated the direct effect of integrated thinking on corporate performance. Maniora (2017) perceived publishing an integrated report as main driver of integrated thinking and the <IR> process. However, in line with the IIRC (2013), this study argues that integrated thinking is the main driver behind the publication an integrated report and the <IR> process. Nonetheless, the effects related to publishing an integrated report should not be underestimated because an integrated report is crucial for the realization of the benefits associated with integrated thinking (IIRC, 2016). In addition, an integrated report can be used as tool to communicate the integrated thinking embedded in an organization. This study posits that integrated thinking will explain variations in corporate performance and the likeliness of publishing an integrated report. More specifically, the aim of this study is to investigate whether integrated thinking affects corporate performance and to what extent this relationship is mediated through the publication of an integrated report. Therefore, the following research question will be investigated in this study:

*What is the effect of integrated thinking on corporate performance and to what extent is this relationship mediated through publishing an integrated report?*

The scientific contribution of this study to the ongoing research related to <IR> is threefold. First, most studies related to <IR> examined the benefits related to publishing an integrated report. These empirical studies provided mixed results (Lemma et al., 2019; Salvi et al., 2020; Churet & Eccles, 2014; Nurkumalasari et al., 2019). A possible explanation for these mixed findings is the omitted variable integrated thinking. Integrated thinking is the central principle underlying the <IR> process (IIRC, 2013). <IR> is a process founded on integrated thinking that results in a periodic integrated report by an organization about creating value in the short, middle and longer term. An integrated report is argued to be a tool for communicating the integrated thinking embedded in an organization (IIRC, 2013). Therefore, this study examines whether integrated thinking affects corporate performance and the potential indirect effect of integrated thinking on corporate performance via publishing an integrated report. Second, this study responds to the call of de Villiers et al. (2017) for more research on the benefits related to <IR> by examining the effects of <IR> on corporate

performance, which consists of a company's non-financial and financial performance. Previous research on the benefits related to <IR> examined the effect of <IR> on corporate financial performance (Churet & Eccles, 2014; Albetairi & Hamdan, 2018; Wen et al., 2017). Up till now, Maniora (2017) is the only empirical study that investigated the indirect effect of publishing an integrated report on corporate performance via the overall integration level, measured by the amount of integrated thinking and integrated management embedded in an organization. However, according to the IIRC (2013), integrated thinking is the main driver behind publishing an integrated report and the <IR> process. Therefore, in contrast to the paper of Maniora (2017), this study investigates integrated thinking as main driver for publishing an integrated report, sustainable growth and improving corporate performance. Third, this study contributes to the ongoing research related to <IR> by providing empirical evidence that integrated thinking is the driver of <IR> (IIRC, 2013; Deloitte, 2015; Dumay & Dai, 2017; Oliver et al., 2016). Yet, there is little quantitative research performed on the benefits related to integrated thinking. To date, most research on integrated thinking used a qualitative research method to examine the benefits of integrated thinking in Asian and African organizations (Dumay & Dai, 2017; Feng et al., 2017; Oliver et al., 2016). This study complements the empirical evidence of these case studies by examining the effects of integrated thinking on corporate performance for a large European sample.

The findings of this study are also relevant for the IIRC, policy makers and stakeholders because on the policy-making side, the findings of this study could provide useful insights to develop high-quality, mandatory, regulations and standards to ensure that <IR> achieves their goal "*focus on optimizing value creation for itself and others through a multi-capital approach*" (IIRC, 2020, p. 13). Moreover, despite the centrality of integrated thinking to <IR> and the growing number of firms that uses the IIRC framework, there has been limited research done on the concept of integrated thinking. Clarifying what integrated thinking means in practice can improve the understanding of this key <IR> concept and the <IR>'s potential to improve <IR> in practice. At last, this study provides insights for stakeholders to better understand the concept of integrated thinking as driver of sustainable growth and corporate performance in the short, medium and longer term.

The remainder of this study is structured as follows. The next section provides a literature review and develops hypotheses. The third section describes the research method, data sample and the economic model used in this study. The fourth section presents the results of the structural equation modeling analyses. The fifth and sixth section contains a conclusion, discusses the main implications, outlines the contributions and limitations of this study.

## 2. Literature review and hypotheses development

### 2.1 Integrated thinking and corporate performance

The adoption of <IR> has been motivated by the ability of management to respond to the changing needs of stakeholders regarding social responsibility (Haller et al., 2018). After a number of corporate scandals, in the last decennia, the market interest in non-financial performance has grown. Dhaliwal et al. (2011) found empirical evidence that superior corporate non-financial performance leads to a lower cost of capital and new financing opportunities. Other studies showed that managing non-financial performance issues can improve a firms' reputation which in turn has positive economic benefits, such as increased product sales, attracting more talented employees, increasing staff loyalty and higher employees' productivity rates (Lev 2003; Bebbington et al., 2008; Roberts & Dowling, 2002; Waddock & Graves, 1997). Up till now, sustainability reports are the most used reporting strategies for disclosing non-financial information. However, sustainability reports are criticized due to the limited connection between corporate financial and non-financial information, leading to an isolated approach to sustainability (Manoira, 2017). This isolated view prevents internal and external users of sustainability reports to get a comprehensive and reliable view on whether environmental and social issues are really integrated into sustainable business strategies and processes (Jensen & Berg, 2012).

On the contrary, <IR> is perceived as a superior mechanism to integrate environmental and social issues into the firm's core business model and long-term strategy (Manoira, 2017). Integrated thinking is the main principle underlying the ability of <IR> to integrate sustainability issues into the firm's core business model and long-term strategy. Eccles & Serafeim (2011) argues that when a company is able to achieve integrated thinking in its business model, <IR> can function as a driver of organizational change. In addition, in line with stakeholder theory, <IR> has the ability to help organizations to manage, to interact and to engage with complex networks of relations among different stakeholder groups because integrated thinking guides managers to develop a better understanding of key stakeholders' legitimate needs and interests into their day-to-day decision-making processes (IIRC, 2013). Specifically, integrated thinking helps management to balance its stakeholders' positions and decide to what extent it will meet these expectations and requirements. The inclusivity of different groups of stakeholders into the day-to-day decision-making process of managers may drive sustainable value creation, reduce information asymmetry between the company and its stakeholders and positively influence the companies' competitive position (Dal Maso et al., 2017; Lozano & Huisingh, 2011). On the other hand, in the short term, <IR>

could have a negative impact on a company's financial performance because integrated thinking has to be embedded throughout the whole organization and this requires time, money and investments, such as education and training of staff members (Vitolla et al., 2019). Therefore, the benefits of <IR> might only become visible after a certain period of time. On the basis of the main results of previous studies on the benefits related to publishing non-financial information, this study hypothesizes the following direct effect from integrated thinking:

*H1a: Integrated thinking is positively related to financial performance*

Currently, there is an emerging public pressure on companies to engage in the production of public goods and mitigate negative externalities driven by a greater awareness of environmental and social issues, changing set of institutions and expectations about the role of organizations in the society (Knauer & Serafeim, 2014). This pressure can be reflected in consumer choices, employment preferences, increased codified in laws, regulations and business practices, such as mandated disclosure of non-financial information (Eccles & Churet, 2014). These phenomena provide incentives for firms to improve their non-financial performance. On the other hand, short-term oriented investors provide a barrier to the execution of long-term business strategies. Fortunately, <IR> has the ability to help firms to manage this dilemma. According to Eccles & Churet (2014), <IR> involves managing tangible and intangible assets for shareholder value creation while taking into consideration externalities on the environment and society. This requires recognizing social trends that influence business developments, engage with key stakeholders and a deeper understanding of the impact of decisions and activities on all types of capital. For that firms need the right systems and structures in place to incorporate integrated thinking in all aspects of decision-making. Integrated thinking plays a crucial role for managers to find an optimal balance between managing short-term business imperative and ongoing value creation. It helps firms to maintain their competitive advantage in a fast-changing business environment, which depends on its ability to manage new types of risks and opportunities related with environmental, social and corporate governance issues (Eccles & Churet, 2014). Integrated thinking is about creating and preserving value and decision-making based on interconnected, multi-capital information (IIRC, 2013). Then, all six capitals, from which social & relationship and nature are two of the six capitals, will become integral part of the company's long-term strategy and objectives. The increased awareness and integration of the social and environmental dimensions into the day-to-day decision-making processes of managers,

guided by integrated thinking, might drive sustainable value creation and improve the company's non-financial performance. Accordingly, this study hypothesizes the following direct effect of integrated thinking:

*H1b: Integrated thinking is positively related to non-financial performance*

## 2.2 Integrated thinking and integrated reporting

Nowadays, it is widely accepted that traditional financial reports do not provide all essential information for the decision-making process of investors and stakeholders (Girella et al., 2019). The inadequacy of financial information revealed in corporate scandals has led scholars and practitioners to raise doubts about the usefulness of this particular information (Lev & Gu, 2016). This led to the call of investors and stakeholders towards new forms of disclosing and reporting that take into consideration aspects of long-term and sustainable development, inclusive capitalism and transparency (Girella et al., 2019). The publication of sustainability reports did only respond partially to this call. Sustainability reports remain isolated documents that make a distinction between financial and non-financial drivers of corporate value creation (Mervelskemper & Streit). Furthermore, sustainability reports do contain little future-oriented information, such as future risks and opportunities (Jensen & Berg, 2012). In general, as mentioned before, sustainability reports do not contain information about interconnections between financial and non-financial dimensions that are essential to present a comprehensive picture of the firm (Bernardi & Stark, 2018). These shortcomings resulted in the development of a new reporting method, namely an 'integrated report' (IIRC, 2013). An integrated report contains both financial and non-financial information integrated into a single report. An integrated report provides information about future targets, long-term value creation and makes connections between corporate financial and non-financial performance in order to present a holistic view of the firm (Jensen & Berg, 2012). Another benefit of integrated reports regarding traditional financial and stand-alone sustainability reports is that traditional financial and stand-alone sustainability report are retrospective, integrated reports are not only retrospective but also future-oriented (IIRC, 2013).

However, an integrated report is not just a new way of reporting for firms. An integrated report is a product of the process of <IR> (IIRC, 2013). In 2013, the International Integrated Reporting Council introduced the International Integrated Reporting Framework. This framework provides principles and guidelines for firms in order to report the firms' financial, social, intellectual, manufactured, human and natural capitals and how these six capitals are interconnected with the company's long-term strategies (IIRC, 2013). The focus

on these 6 capitals should encourage firms to become more transparent about their activities and increase the number of sustainable decisions (IIRC, 2011).

In addition, <IR> can function as vital driver of changes in senior management. <IR> has the potential to change the focus of senior management from mono-capitalism, profit focus, to multi-capitalism, creating and preserving value based on interconnected multi-capital information (IIRC, 2014). The ability of a firm to execute this multi-capital management approach is driven by the degree of integrated thinking embedded in an organization. Integrated thinking is perceived as the core element and driver of <IR> (IIRC, 2013). It enables organizations to create value for investors, society and the environment in the short, middle and long term (IIRC, 2020). The objective of integrated thinking is to provide guidance to managers in order to understand crucial factors which initiate integrated decision-making and actions that take into consideration the creation of value in the short, middle and long term (Feng et al., 2017). Integrated thinking is argued to be a key factor for the success of integrated reporting practices (Dumay et al., 2018). Figure 1 gives an overview of the process of <IR>. This figure displays the centrality of integrated thinking in the <IR> process. Also, previous literature suggests that publishing an integrated report is the visible aspect of <IR> that reflects the degree of integrated thinking within the internal business processes (Busco et al., 2013; Dumay et al., 2018; Eccles & Churet, 2014). Hence, an integrated report can be used to communicate the integrated thinking embedded in an organization to stakeholders and investors. Accordingly, this study hypothesizes the following direct effect from integrated thinking:

*H2: Integrated thinking is positively related to publishing an integrated report*

**Figure 1. an overview of the process of <IR>**



*Source: UK GBC (2015)*

### 2.3 Integrated report and corporate performance

Besides direct effects of integrated thinking, there may also be indirect effects related to integrated thinking on the companies' financial, non-financial and overall corporate performance via publishing an integrated report. Currently, investors increasingly recognize the importance of strategies designed to limit negative externalities on the environment, society and other forms of capital (Eccles & Krzus, 2010). Investors and stakeholders are increasingly urging firms to become more accountable for the impact of their decisions and activities on the environment and society (Manning et al., 2019). Integrated reports, in which companies account for financial and non-financial performance, are tools to communicate their socially responsible behavior and are potential tools to reduce the asymmetric information between the firm's management and external stakeholders. However, in settings which there is a separation of ownership and control and <IR> practices are voluntary, agency theory suggests that, management might behave opportunistically and disclose inaccurate and unreliable non-financial information (Cho et al., 2013). In particular, senior management of firms, which are under public pressure and their legitimacy is threatened, prefer to selectively publish good integrated reporting practices to reduce the legitimacy risks (Manning et al., 2019). Legitimacy theory suggests that managers can influence public expectations by means of communication strategies (Dowling and Pfeffer, 1975; Lindblom, 1994). Publishing voluntary information may be used as a 'symbol' to communicate changes in corporate behavior, thus repair poor legitimacy (Suchman, 1995). In line with legitimacy theory, Lai et al. (2016) found empirical evidence that the reporting on environmental and social performance might be driven by legitimacy threats such as bad records on economic performance given by rating agencies. Thus, similar to sustainability reports, integrated reports can be used to change the perceptions of external users. Perego et al. (2016) found that a large number of firms publishing an integrated report focus disproportionately on <IR> as a legitimate external communication tool rather than an internal managerial process that is known as integrated thinking. On the other hand, signaling theory suggests that the growing interest in non-financial performance, in turn, raises incentives for senior management to truthfully report their superior non-financial performance to differentiate themselves from its poor performing peers (Braam et al., 2016). Yet, publishing non-financial information is on a voluntary base. Therefore, it is hard for firms to convince investors that the firm really integrates sustainability issues into their long-term strategies and convince stakeholders that the firm is not engaging in cheap talk. The IIRC framework provides investors considerable help when making these distinctions and the IIRC framework is also helpful for senior

management to really integrate sustainability issues into their business strategies (Knauer & Serafeim, 2014). The mission of <IR> is both the development of integrated thinking in a firm and providing guidance to companies to effectively communicate the integrated thinking embedded in the organization by publishing high quality integrated reports (IIRC, 2013). In this context, signaling theory suggests that, integrated reports are useful devices for managers to distinguish themselves from competitors by signaling the high performance on all six capitals in comparison with sustainability reports that only focuses on two of the six capitals, social and natural capital. Besides, integrated reports are also important tools to provide senior management high-quality information, in a comprehensive way, by developing a better understanding about efficiently using and investing in financial, social and environmental resources which leads to positive changes in the company's financial and non-financial performance. Specifically, integrated thinking may initiate internal transformation processes within a company by influencing the integration of sustainability issues into the core business model via publishing an integrated report because publishing an integrated report creates discussions and reasonable reflections which can raise the company's understanding of how to link economic, environmental and social aspects more effectively together in the day-to-day decision-making process (Maniora, 2017). Accordingly, this study hypothesizes the following direct effect from integrated thinking:

*H3a: Integrated thinking is positively related to financial performance via publishing an integrated report*

*H3b: Integrated thinking is positively related to non-financial performance via publishing an integrated report*

### 3. Research method

#### 3.1 Data sources and sample

To test the hypotheses, a panel data set was compiled covering a 6-year period (2014-2019) for European listed companies. The data is retrieved from Refinitiv Eikon, the IIRC website and CorporateRegister.org. The data sample is derived from the ASSET4 Europe database. The initial data sample consisted of 1160 firms from different European countries and industries. However, 447 firms did have missing values from multiple variables and years. Therefore, these firms were excluded from the sample. This study uses a balanced panel data because biases in estimators derived from balanced panel data are smaller than biases in estimators derived from unbalanced panel data (Verbeek & Nijman, 1992). The remaining data sample consists of 713 firms from 20 European countries. These countries are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom. Table 3.1 shows the distribution of the different European countries in which the firms of the data sample are headquartered. The United Kingdom is the most represented country with 32,07% of the data sample. The Czech Republic, Ireland and Portugal are the least represented countries in the data sample. Since 32,05% of the firms are headquartered in the United Kingdom, this may cause biased results. Therefore, in section 4, a robustness check will be performed in order to examine whether the results are influenced by the large distribution of the firms headquartered in the United Kingdom.

A European data sample is used for several reasons. First, a European data sample is used because the European Union has implemented different directives that should accelerate the adoption of <IR> and stimulate European firms to embed integrated thinking within their business processes (Dumay & Dai, 2017). Second, the ASSET4 European database is the largest database available in Refinitiv Eikon to empirically investigate the corporate benefits related to integrated thinking. Third, previous research on the determinants of <IR> found empirical evidence that culture significantly influences the adaption of <IR> (García-Sánchez et al., 2013; Frias-Aceituno et al., 2013). A European sample is used to control for the possible influence of culture on the results of this study. Fourth, prior literature on integrated thinking investigated firms headquartered in Asia and Africa (Dumay & Dai, 2017; Feng et al., 2017; Venter et al., 2017). Yet, there is little known about the benefits of integrated thinking in European firms.

The data sample will be examined for the period 2014-2019. The year 2014 is the first year examined in this study because the Pilot Program of IIRC ended in 2013. Integrated reporting, <IR>, gained importance worldwide after the Pilot Program of the IIRC in 2013. The year 2019 is the last year examined in this study because not all data, from the year 2020, is available for several variables examined in this study.

In addition, table 3.2 shows the industry distribution of the firms in the dataset based on the two-digit SIC codes categorization of industries (Cohen et al., 2008). The firms in the data sample are operating in 53 different industries. However, most of those industries had less than 30 observations. Therefore, similar to Braam et al. (2015), this study reclassifies the sample into six main industry groups. The six industry groups are mining and construction (10-17), manufacturing (20-39), transportation & pub. utilities (40-49), trade (50-59), finance, insurance & real estate (60-67) and services (70-89).

**Table 3.1: List of the European countries in the dataset**

Country	Number of firm observations	Percentage of total
Austria	72	1.69
Belgium	90	2.11
Czech Republic	18	0.42
Denmark	138	3.23
Finland	126	2.95
France	504	11.81
Germany	402	9.42
Greece	72	1.69
Hungary	24	0.56
Ireland	30	0.70
Italy	210	4.92
Netherlands	168	3.94
Norway	102	2.39
Poland	90	2.11
Portugal	24	0.56
Spain	252	5.91
Sweden	240	5.63
Switzerland	222	5.20
Turkey	114	2.67
United Kingdom	1368	32.07
Total	4266	100.00

**Table 3.2: List of the industry distribution in the dataset**

Industry (U.S. SIC codes)	Number of firms	Percentage of total
Mining and construction (10-17)	58	8.13
Manufacturing (20-39)	184	25.81
Transportation & pub. utilities (40-49)	77	10.80
Trade (50-59)	35	4.91
Finance, insurance & real estate (60-67)	164	23.00
Services (70-89)	195	27.35
Total	713	100.00

## 3.2 Variables

### 3.2.1 Dependent variables

The dependent variable in this study is corporate performance. Similar to Maniora (2017), the overall corporate performance reflects the balanced view of a company's performance in all four areas, economic, environmental, social and corporate governance. Yet, it is not possible to retrieve this measurement directly from Asset4. Therefore, this study constructs a similar proxy measurement for corporate performance. Corporate performance is a comprehensive performance measurement that consists of a financial performance part, which is measured the return on assets, and a non-financial performance part, which is measured by the average scores on the social and environmental indicators, ESP. The return on assets, RoA, used as measurement proxy for financial performance, is an accounting-based measurement used by multiple studies on <IR> (Galant & Cadez, 2017; Fasan, 2013; Frias-Aceituno et al., 2013). The RoA will be measured by dividing net income by total assets. All data to measure the return on assets are retrieved from Refinitiv Eikon. The company's non-financial performance is measured by a self-constructed variable which presents the average of the sum of the company's environmental and social performance. The environmental pillar measures how well a firm uses management practices to avoid environmental risks and takes environmental opportunities to create long-term shareholder value. The social pillar measures the company's reputation and the license to operate, which are essential factors for long-term value. In order to retrieve the overall corporate performance, the values of the company's financial performance and non-financial performance have to be standardized. The standardization of variables allows different variable measures to create values that are comparable (Studenmund, 2017). First, in order to standardize different variables, the mean has to be subtracted from the values of the variables. Second, the variable, which mean is

subtracted from the value, has to be divided by their standard deviation. This process has to be done for every observation for the variables ESP and RoA. As a result, the standardized variables have a mean of zero and standard deviation of 1 and are thus on the same scale. (Studenmund, 2017). Finally, the standardized ESP and RoA variables will be added up and divided by two to get an overall score for corporate performance.

### 3.2.2 Independent variables

Integrated thinking, IT, and publishing an integrated report, IR, are the independent variables in this study. IT captures to what extent a company demonstrates integrated thinking using both financial and non-financial information in the strategic decision-making (Maniora, 2017). Consistent with Venter et al. (2017) & De Villiers et al. (2017), this study uses the Refinitiv TR ESG CSR strategy score as proxy measurement for integrated thinking. The TR ESG CSR is “*a score that reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes*” (Thomson Reuters, 2019). This index score is scaled from 0-100. Specifically, the higher the score on this index, the higher the integration of the financial, social and environmental dimensions into the decision-making process.

Publishing an integrated report, IR, is the other independent variable that is used in this study. IR indicates whether a company published an integrated report in that particular year or did not. To assess whether or not an integrated report is published in a particular year, this study uses a dummy variable, consistent with prior literature that investigated the benefits related to <IR> (Girella et al., 2019; Wahl et al., 2018; Frias-Aceituno et al., 2013). The dummy variable takes value 1 for firms that have published an integrated report in that year and takes value 0 when firms did not publish an integrated report in that year. Data about whether or not a firm publishes an integrated report is derived from CorporateRegister.com.

### 3.2.3 Control variables

This study included several firm-level and country-level control variables in the structural equation model analyses. According to Waddock & Graves (1997), there are different firm-specific variables that influence the disclosure of non-financial information. First, firm size, which is measured by the logarithm of total assets. Second, leverage, which is measured by the ratio of debt to total assets of the company at the end of the year (Girella et al., 2019). Third, Debt, which is measured by the market value of the amount of debt at the end of the year. To control sector-specific effects, this study included industry dummies based on the two-digit standard industrial classification codes (Manning et al., 2019). At country level, this study controls for the country's judicial system. Prior literature related to

the determinants of <IR> found empirical evidence that the judicial system influences the likelihood of publishing an integrated report (Jensen & Berg, 2012; García-Sánchez et al., 2013; Frias-Aceituno et al., 2013). According to Porta et al. (1998), countries can be distinguished in two main judicial systems, the civil law countries and the common law countries. The judicial system of a country will be measured by a dummy variable, Law. The Law variable takes value 1 when the firm is headquartered in a common law country. The Law variable takes value 0 when the firm is headquartered in a civil law country. Finally, this study uses country dummies to control for country-specific variations and year dummies to control for omitted variables that are constant among firms however varying over time. Table 3.2 gives an overview of the definitions of the dependent, independent and control variables used in this study.

**Table 3.2: Definitions of the variables**

Variable	Definition	Data
<b>Dependent variables</b>		
RoA	The income before extraordinary items scaled by total assets at the end of the year.	Thomson Reuters ASSET4
ESP	The average of the environmental, social scores measures the overall ES performance.	Thomson Reuters ASSET4
CP	The average of the standardized RoA and ESP scores. The overall corporate performance reflects a balanced view of a company's performance in all four areas, economic, environmental, social and corporate governance.	Thomson Reuters ASSET4
<b>Mediating variable</b>		
IR	IR is a dummy variable that equals 1 if the company published an integrated report according CorporateRegister.com, 0 otherwise.	CorporateRegister.com
<b>Independent variables</b>		
IT	Integrated thinking is measured by the TR ESG CSR strategy score. This is a score that reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes.	Refinitiv TR ESG CSR strategy
<b>Control variables</b>		
Firm size	The natural logarithm of the market value of equity per share at the end of the year.	Thomson Reuters ASSET4
Leverage	The ratio of debt to total assets of the company at the end of the year.	Thomson Reuters ASSET4

<i>Debt</i>	The market value of the amount of debt at the end of the year	Thomson Reuters ASSET4
<i>Law</i>	Dummy variable that equals 1 if the company is resides in countries with a common law judicial system, 0 otherwise.	Porta et al. (2008)
<i>Country controls</i>	A vector of country dummies	
<i>Industry controls</i>	A vector of dummy variables based on classification of the sample in six main industry groups based on the two-digit standard industrial classification	Thomson Reuters ASSET4
<i>Year controls</i>	A vector of year dummies	

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### 3.3 Econometric model

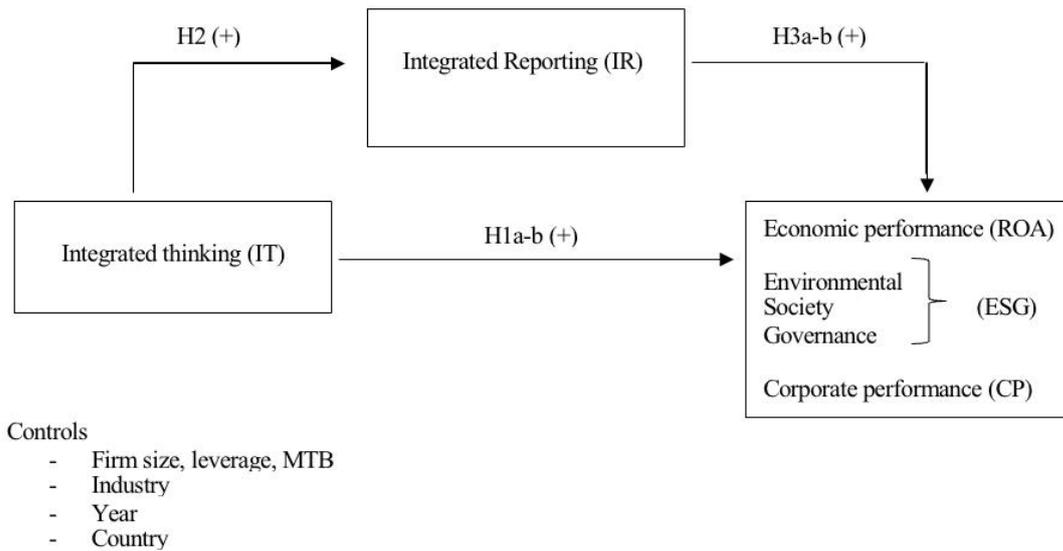
To test the hypotheses, this study performs the following structural equation models with lag effects for IT and IR, where integrated thinking is the independent variable that explains the variations in ROA, ESP, CP and IR while controlling for other variations related to other factors specified in the model. Previous studies on non-financial information found empirical evidence that the disclosure of non-financial information does not have an immediate effect on corporate performance (Lopez et al., 2007; Manning et al., 2019). This study used a 2-year lag effects of integrated thinking and 1-year lag effect of integrated reporting because integrated thinking is argued to be the underlying principle that drives the process of <IR> and publishing an integrated report is argued to be the final product of the <IR> process (IIRC, 2013). Therefore, the following structural equation model with 2-year lag effects of IT and 1-year lag effects will be performed:

$$ROA_{it}, ESP_{it}, CP_{it} = \beta_0 + \beta_1 * IT_{it-2} + \beta_2 * IR_{it-1} + \beta_3 * SIZE_{it} + \beta_4 * DEBT_{it} + \beta_5 * LEVERAGE_{it} + \beta_6 * LAW + \beta_7 * INDUSTRY_{control,i} + \beta_8 * YEAR_{control,t} + \beta_9 * Country_{control,t} + \epsilon_{it}$$

And where integrated thinking affects ROA, ESP and CP via IR:

$$IR_{it-1} = \beta_0 + \beta_1 * IT_{it-2} + \beta_2 * SIZE_{it} + \beta_3 * DEBT_{it} + \beta_4 * LEVERAGE_{it} + \beta_5 * LAW + \beta_6 * YEAR_{control,t} + \beta_7 * INDUSTRY_{control,i} + \beta_8 * YEAR_{control,t} + \beta_9 * Country_{control,t} + \epsilon_{it}$$

**Figure 2. IT is the determinant of IR, ROA, ESP and CP**



## 4. Results

### 4.1 Descriptive statistics

Table 4.1 gives a descriptive overview of the number of observations, means, standard deviations, minimum and maximum values of the dependent, independent and control variables. All variables consist of 4266 observations. The data sample was checked for influential outliers by using the lever, cook's d and dfits test. These tests showed that the CP, RoA, ESP, IR, Size and Debt variable had influential outliers. These variables were winsorized at level of 1% and 99% to remove the influential outliers. The corporate performance, CP, variable has a mean of -0.0003 because the CP variable is a proxy measurement created from the standardized RoA and ESP variable. The RoA variable has a mean of 5.40%. This implicates that, on average, the firms in the data sample have a return on assets of 5.40%. The ESP variable has a mean of 55.211, which indicates that, on average, the firms in the data sample have a combined social and environmental score of 55.211. However, the standard deviation of the ESP variable is 18.938. This large standard deviation suggests that the ESP scores are widespread among the data sample. Further, the IT variable has a mean of 57.955. This implicates that, on average, the firms in the data sample have a high score representing the integrated thinking embedded in their organization. Similar to the ESP variable, the IT variable has a large standard deviation of 27.245, which indicates that the amount of integrated thinking embedded in an organization is widespread among the data sample. The IR variable has a mean of 0.173. This indicates that only 17% of the total sample publishes an integrated report according CorporateRegister.com. In addition, all variables were checked whether they are normally distributed by performing histograms. The control

variable firm size was not normally distributed. Therefore, this variable was turned into a logarithmic variable. The natural logarithm of the total assets has a mean of 16.635. The Debt variable has a mean of 41.25%, which suggest that, on average, the firms in the data sample have a total debt with respect to total assets of 41%. Similar to the ESP and IT variable, this variable contains a large standard deviation, 24.135, which indicates that the amount of debt to assets is widespread among the data sample. Finally, the law variable has a mean of 32.78, which indicates that one third of the firms are headquartered in common law countries.

**Table 4.1 Summary statistics after winsorizing**

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Dependent variables</i>					
CP	4266	-0.0003	0.688	-1.779	1.902
RoA	4266	5.4020	6.750	-16.770	30.700
ESP	4266	55.955	18.938	10.325	98.39
<i>Independent variables</i>					
IT	4266	57.955	27.245	2.540	98.390
IR	4266	0.1730	0.378	0	1
<i>Firm control variables</i>					
Size	4266	16.635	3.517	12.498	27.849
Leverage	4266	0.0055	0.017	-0.001	0.131
Debt	4266	41.725	24.135	0	119.041
<i>Country control variables</i>					
Law	4266	0.3280	0.469	0	1

Notes: IR: integrated report, ESP: environmental and social performance, RoA: return on assets, CP: corporate performance. See Table 3.2 for the definitions.

Table 4.2 presents the Pearson correlation matrix. As rule of thumb, a correlation between 0.7 and 1 is perceived as high correlation. A correlation between the 0.69 and 0.3 is perceived as moderate correlation. A correlation between 0.29 and 0 is perceived as low correlation (Stundenmund, 2017). The correlation matrix shows a high correlation between the CP variable and the ESP variable (0.711). Furthermore, a moderate correlation between CP and RoA (0.692). A reason for the high correlations between CP and RoA and CP and ESP is that the CP variable is created from the standardized values of the ESP and the RoA variable. However, the high correlations between CP and RoA and CP and ESP is not an issue because these variables are used as separate dependent variables in the structural equation models. The next section, section 4.2, tests the assumptions underlying the regression models for autocorrelation, multicollinearity and homoscedasticity.

**Table 4.2 Pairwise correlations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) CP	1.000								
(2) ESP	0.711 (0.000)	1.000							
(3) RoA	0.692 (0.000)	-0.008 (0.587)	1.000						
(4) IT	0.078 (0.000)	0.1672 (0.000)	-0.055 (0.000)	1.000					
(5) Leverage	0.025 (0.048)	-0.038 (0.014)	0.070 (0.000)	-0.086 (0.000)	1.000				
(6) LNassets	-0.109 (0.000)	0.096 (0.000)	-0.248 (0.000)	0.328 (0.000)	0.197 (0.000)	1.000			
(7) DEBT	-0.019 (0.000)	0.213 (0.164)	-0.289 (0.000)	0.144 (0.000)	-0.068 (0.000)	0.314 (0.000)	1.000		
(8) IR	0.295 (0.540)	0.073 (0.000)	-0.028 (0.063)	0.376 (0.000)	0.036 (0.020)	0.237 (0.000)	0.105 (0.000)	1.000	
(9) Law	0.078 (0.000)	-0.028 (0.074)	0.134 (0.000)	0.023 (0.133)	-0.429 (0.000)	-0.178 (0.000)	-0.124 (0.000)	0.029 (0.056)	1.000

Notes: IR: integrated report, ESP: environmental and social performance, RoA: return on assets, CP: corporate performance. See Table 3.2 for the definitions. The p-values \*\*\*, \*\* and \* indicate a significance at a 1%, 5% and 10% level.

## 4.2 Preliminary data analyses

### 4.2.1 Autocorrelation

This study performs panel data analyses which consists of multiple years. Therefore, it is possible that the error terms of different years are correlated. To test for autocorrelation in the panel data, the Wooldridge test is performed. Table 4.3 (see appendix) presents the results of the Wooldridge test. The null hypothesis suggests that there is no first-order autocorrelation. The alternative hypothesis suggests that there is first-order autocorrelation. The F-value is 4.043 and the Prob>F is 0.0447. Therefore, the null hypothesis is rejected. The panel data in this study contains autocorrelation. Standard robust errors are used in the regression analyses to control for autocorrelation.

### 4.2.2 Variance inflation Factor

Table 4.4 (see appendix) shows the VIF table to test the presence of multicollinearity. Multicollinearity can be assumed if two or more independent variables are correlated to each other. The Variance inflation factor measures the amount inflation of the variance of the regression coefficients due to collinearity among other coefficients. The general rule of thumb is that there is severe multicollinearity between variables when the VIF is higher than 5. The results of table 4.3 indicate no severe multicollinearity between the independent variables.

### 4.2.3 Homoscedasticity

Another important assumption for performing regression analyses is homoscedasticity. Homoscedasticity assumes constant variances between the different error terms. In contrast, heteroscedasticity assumes that the variance between the error terms is not constant. Table 4.4 (see appendix) shows the Breusch-Pagan-Godfrey test. The Breusch-Pagan-Godfrey test is used to test for heteroscedasticity. The null hypothesis of the Breusch-Pagan-Godfrey test suggests that there is constant variance between the error terms of the variables. The alternative hypothesis suggests non-constant variance of the error terms between the different variables. The chi-square has a value of 43.04 and the Prob>chi2 is significant (0.000). The null hypothesis will be rejected. Therefore, the error terms of the variables are non-constant. Robust standard errors are used to control for heteroscedasticity (Stundenmund, 2017).

### 4.3 Results

Table 4.6 shows the results of the structural equation models with lagged effects to test H1-H3, which predicted direct and indirect effects of integrated thinking on IR, ROA, ESP and CP. Model 1, 2 and 3 in table 4.6 uses IR and ROA, IR and ESP and IR and CP as dependent variables. Panel A presents the results when using 1-year lagged effects of integrated thinking. Panel B presents the results with 1-year lagged effect of IR and 2-year lagged effects of integrated thinking. Model 1 of Panel B shows a significant positive association between integrated thinking and ESP after controlling for integrated thinking variations related to IR and other factors included in the model ( $\beta = 0.0710$  and the z-value = 2.90). These results provide support for H1b which indicates that integrated thinking positively affects non-financial performance. Model 2 of Panel B indicates that integrated thinking is insignificant positively related to RoA ( $\beta = 0.0022$  and the z-value = 0.29). These results do not provide support for H1a, which assumed a positive association between integrated thinking and financial performance. Model 3 of Panel B shows a positive association between integrated thinking and corporate performance ( $\beta = 0.0021$  and the z-value = 2.44). This indicates that integrated thinking is positively related to corporate performance.

In addition, Model 1, 2 and 3 of Panel B show significant relations between integrated thinking and publishing an integrated report. These results provide support for H2 ( $\beta = 0.0046$  and the z-value = 8.94). However, Model 1, 2 and 3 show statistically insignificant relations between IR and ESP ( $\beta = 1.0011$  and the z-value = 0.51), IR and RoA ( $\beta = -0.1073$  and the z-value = -0.18), IR and CP ( $\beta = 0.0036$  and the z-value = 0.19). The insignificant associations between IR and ESP, RoA and CP in table 4.3 do not provide support for H3a-b, which

predicted that integrated thinking indirectly affects financial, non-financial and corporate performance via publishing an integrated report.

**Table 4.6 Regression results for structural equation model lag effects**

<b>Panel A. Regression models with 1-year lag effects of the independent variables</b>						
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>	
	IR <sub>t</sub>	ESP <sub>t</sub>	IR	RoA <sub>t</sub>	IR <sub>t</sub>	CP <sub>t</sub>
IT <sub>t-1</sub>	0.0045*** (8.85)	0.0710** (2.90)	0.0045*** (8.85)	0.0022 (0.29)	0.0045*** (8.85)	0.0021** (2.44)
IR <sub>t</sub>		0.6796 (0.34)		-0.1287 (-0.22)		0.0036 (0.05)
Debt <sub>t</sub>	0.0001 (0.21)	0.0088 (0.28)	0.0001 (0.21)	-0.0462*** (-3.79)	0.0001 (0.21)	-0.0033 (0.15)
Size <sub>t</sub>	0.0126* (2.13)	0.0050 (0.02)	0.0126** (2.13)	-0.2239*** (-3.85)	0.0126* (2.13)	-0.0163** (-2.03)
Leverage <sub>t</sub>	0.8094 (1.14)	6.0960 (0.11)	0.8094 (1.14)	6.6721*** (-3.79)	0.8094 (1.14)	0.7522 (0.53)
Law <sub>i</sub>	-0.0020 (-0.02)	-5.8708 (-0.92)	-0.0020 (-0.02)	2.3364** (3.03)	-0.0020 (-0.02)	0.0190 (0.10)
Year	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Cons	-0.557** (-2.97)	74.541*** (6.59)	-0.557** (-2.97)	16.734*** (4.62)	-0.557** (-2.97)	1.333*** (4.27)
N	3,555	3,555	3,555	3,555	3,555	3,555

<b>Panel B. Regression models with 1-year lag effects of IR and 2-year lag effects of IT</b>						
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>	
	IR <sub>t-1</sub>	ESP <sub>t</sub>	IR <sub>t-1</sub>	RoA <sub>t</sub>	IR <sub>t-1</sub>	CP <sub>t</sub>
IT <sub>t-2</sub>	0.0046*** (8.94)	0.0602** (2.45)	0.0046*** (8.94)	0.0040 (0.50)	0.0046*** (8.94)	0.0126** (2.23)
IR <sub>t-1</sub>		1.0011 (0.51)		-0.1073 (-0.18)		0.0019 (0.19)
Debt <sub>t</sub>	0.0002 (0.28)	0.0064 (0.21)	0.0002 (0.28)	-0.0466*** (-3.52)	0.0002 (0.28)	-0.0023 (-1.49)
Size <sub>t</sub>	0.0118* (1.97)	-0.022 (-0.09)	0.0118* (1.97)	-0.246*** (-3.96)	0.0118* (1.97)	-0.0183** (-2.26)
Leverage <sub>t</sub>	0.7440 (0.99)	-3.7521 (-0.06)	0.7440 (0.99)	4.114 (0.14)	0.7440 (0.99)	0.4203 (0.26)
Law <sub>i</sub>	-0.0057 (-0.05)	-6.2861 (-1.02)	-0.0057 (-0.05)	1.355 (1.74)	-0.0057 (-0.05)	-0.0635 (-0.37)
Year	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Cons	-0.512* (-2.55)	80.289*** (7.09)	-0.512* (-2.55)	18.201*** (4.61)	-0.512* (-2.55)	1.576*** (4.90)
N	2,844	2,844	2,844	2,844	2,844	2,844

Notes: IR: publishing an integrated report, ESP: environmental and social performance, RoA: return on assets, CP: corporate performance. See Table 3.2 for the definitions. The p-values are shown in the parentheses. \*\*\*, \*\* and \* indicate a significance at a 1%, 5% and 10% level.

### 4.3 Robustness

Table 3.1 shows that the United Kingdom is relatively well represented in the data set with 1368 firm-year observations (32.07%). To check whether the results are influenced by the inclusion of the United Kingdom, table 4.7 shows the results of the repeated structural equation model analysis after eliminating the UK. The findings of these additional analysis are similar to the main results. Model 1 in table 4.7 shows a positive and significant association between integrated thinking and ESP after controlling for integrated thinking variations related to an integrated report and other factors included in the model. The relation remains significant at a level of 10%, however the magnitude has decreased. These results provide additional support for H1b. Model 2 in table 4.7 shows a negative and insignificant association between integrated thinking and RoA. The magnitude of the coefficient has become stronger, however the association remained non-significant. Similar to the main the results of the main analyses, these results do not provide support for H1a. The results of model 3 in table 4.7 indicates a positive and significant association between integrated thinking and corporate performance. The correlation between integrated thinking and corporate performance remains significant at a level of 10%, however the magnitude has decreased. The results of model 3 in table 4.7 provides additional support for H2. Finally, the results in table 4.7 indicates that IR is not significant associated to ESP, ROA and CP. In comparison with the main analysis, the magnitude of the coefficients of IR on ESP and CP did become negative and the coefficient of IR on RoA did become positive. However, similar to the results of Table 4.6, the relation of IR on ESP, RoA and CP remained insignificant. Therefore, these results do not provide support for H3a-b. Overall, the findings of this additional analysis show that the results are robust with regard to the different frequencies of country observations.

**Table 4.7 Regression results for structural equation model with 1-year lag effects of IR and 2-year lag effects of IT without UK**

	Model 1		Model 2		Model 3	
	IR <sub>t-1</sub>	ESP <sub>t</sub>	IR <sub>t-1</sub>	RoA <sub>t</sub>	IR <sub>t-1</sub>	CP <sub>t</sub>
IT <sub>t-2</sub>	0.0037*** (6.50)	0.0646** (2.13)	0.0037*** (6.50)	0.0042 (0.56)	0.0037*** (6.50)	0.0020** (1.97)
IR		-2.1519 (-0.76)		0.5491 (0.88)		-0.0256 (-0.28)
Debt	-0.0001 (-0.05)	0.0082 (0.17)	-0.0001 (-0.05)	-0.0580*** (-3.51)	-0.0001 (-0.05)	-0.0117** (-2.28)
Size	0.0039 (0.56)	-0.1376 (0.41)	0.0039 (0.56)	-0.2606** (-3.11)	0.0039 (0.56)	-0.0099 (-0.99)
Leverage	-0.3240 (-0.41)	50.6053 (0.81)	-0.3240 (-0.41)	-12.4176 (-0.43)	-0.3240 (-0.41)	0.5074 (0.28)
Law	0.1960 (0.57)	0.0677 (0.00)	0.1960 (0.57)	-0.1702 (-0.14)	0.1960 (0.57)	-0.0117 (0.03)
Year	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Cons	-0.180 (-0.83)	69.488*** (5.55)	-0.180 (-0.83)	18.827*** (4.98)	-0.180 (-0.83)	1.362*** (3.62)
N	1,932	1,932	1,932	1,932	1,932	1,932

Notes: IR: integrated report, ESP: environmental and social performance, RoA: return on assets, CP: corporate performance. See Table 3.2 for the definitions. The p-values are shown in the parentheses. \*\*\*, \*\* and \* indicate a significance at a 1%, 5% and 10% level

To check whether the results are robust to non-lagged effects, table 4.8 shows the results of the additional structural equation model analysis with non-lagged effects. Model 1 shows a significant positive association between integrated thinking and ESP after controlling for integrated thinking variations related to IR and other factors included in the model ( $\beta = 0.0752$  and the z-value = 3.12). These results provide additional support for H1b which indicates that integrated thinking positively affects non-financial performance. The results of Model 2 of table 4.8 indicates that integrated thinking is insignificant associated with RoA ( $\beta = 0.0024$  and the z-value = 0.33). These results do not provide support for H1a. Model 3 of table 4.8 shows a positive association between integrated thinking and corporate performance ( $\beta = 0.0022$  and the z-value = 2.63). This indicates that integrated thinking is positively related to corporate performance. In addition, Model 1, 2 and 3 of table 4.8 show significant associations between integrated thinking and publishing an integrated report. These results provide additional support for H2 ( $\beta = 0.0044$  and the z-value = 8.83). Finally, Model 1, 2 and 3 show statistically insignificant relations between IR and ESP ( $\beta = 1.4712$  and the z-value = 1.30), IR and RoA ( $\beta = -0.0754$  and the z-value = 0.73), IR and CP ( $\beta = 0.0752$  and the z-value = 0.89). Therefore, the results of table 4.6 and 4.8 provide support for H1a-b and H2, however not for H3a-b, which predicted that integrated thinking indirectly affects financial, non-financial and corporate performance via publishing an integrated report.

**Table 4.8 Regression results for structural equation**

	Model 1		Model 2		Model 3	
	IR <sub>t</sub>	ESP <sub>t</sub>	IR	ROA <sub>t</sub>	IR <sub>t</sub>	CP <sub>t</sub>
IT <sub>t</sub>	0.0043*** (8.83)	0.0752** (3.12)	0.0044*** (8.83)	0.0024 (0.33)	0.0044*** (8.83)	0.0022** (2.63)
IR <sub>t</sub>		2.0290 (0.24)		-0.0754 (-0.13)		0.0024 (0.04)
Debt <sub>t</sub>	0.0022 (1.50)	0.0030 (0.10)	0.0022 (1.50)	-0.0473*** (-4.15)	0.0021 (1.50)	-0.0034** (-3.07)
Size <sub>t</sub>	0.0133** (2.25)	0.0129 (0.00)	0.0133** (2.25)	-0.2237*** (-3.50)	0.0133** (2.25)	-0.0165** (-2.09)
Leverage <sub>t</sub>	0.7560 (1.09)	-4.2578* (-0.08)	0.7560 (1.09)	3.0569 (0.14)	0.7560 (1.09)	0.3092 (0.24)
Law <sub>i</sub>	0.0036 (0.03)	-5.9304 (-0.91)	0.0035 (0.03)	3.1944*** (4.51)	0.0035 (0.03)	0.0816 (0.43)
Year	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Cons	-0.493** (-2.51)	66.932** (6.15)	-0.493** (-2.51)	14.898*** (5.04)	-0.4933** (-2.51)	0.984*** (3.29)
N	4,186	4,186	4,186	4,186	4,186	4,186

Notes: IR: integrated report, ESP: environmental and social performance, RoA: return on assets, CP: corporate performance. See Table 3.2 for the definitions. The p-values are shown in the parentheses. \*\*\*, \*\* and \* indicate a significance at a 1%, 5% and 10% level.

**Table 4.9 Regression results for structural equation model with 1-year lag effects of IR and 2-year lag effects of IT, whereas CP is a measurement of Tobin's q and ESG**

	Model 1		Model 2		Model 3	
	IR <sub>t-1</sub>	ESG <sub>t</sub>	IR <sub>t-1</sub>	Tobin's q <sub>t</sub>	IR <sub>t-1</sub>	CP <sub>t</sub>
IT <sub>t-2</sub>	0.0046*** (8.94)	0.2280*** (12.79)	0.0046*** (8.94)	0.3621 (0.64)	0.0046*** (8.94)	0.0063*** (8.69)
IR <sub>t-1</sub>		1.2870 (1.52)		-0.0033 (-1.16)		0.1168 (1.19)
Debt <sub>t</sub>	0.0002 (0.28)	0.0183 (0.93)	0.0002 (0.28)	-0.0110** (-2.03)	0.0002 (0.28)	-0.0013 (-1.15)
Size <sub>t</sub>	0.0118* (1.97)	-0.0910 (-0.55)	0.0118* (1.97)	0.0190 (0.76)	0.0118* (1.97)	0.0065 (0.10)
Leverage <sub>t</sub>	0.7440 (0.99)	-68.121*** (-1.97)	0.7440 (0.99)	8.0016 (1.28)	0.7440 (0.99)	-0.6634 (-0.40)
Law <sub>i</sub>	-0.0057 (-0.05)	-0.8976 (-0.23)	-0.0057 (-0.05)	0.5356 (1.26)	-0.0057 (-0.05)	0.0590 (0.43)
Year	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Cons	-0.512** (-2.55)	31.03*** (4.13)	-0.512** (-2.55)	2.716** (2.70)	-0.512** (-2.55)	-0.663** (-2.20)
N	2,844	2,844	2,844	2,844	2,844	2,844

Notes: IR: integrated report, ESG: Environmental, Social and corporate Governance score, Tobin's q: measures whether a firm or an aggregate market is relatively over- or undervalued, CP: corporate performance, constructed by the standardized values of Tobin's q and ESG variables. See Table 3.2 for the remaining definitions. The p-values are shown in the parentheses. \*\*\*, \*\* and \* indicate a significance at a 1%, 5% and 10% level.

To check whether the results are robust to alternative measurements of non-financial performance, financial performance and corporate performance, table 4.9 shows the results of an additional structural modelling analysis, with Tobin's q, a market-oriented measurement, as proxy measurement for financial performance, the ESG score as measurement of non-financial performance and CP presents a constructed score that contains the standardized values of the Tobin's q and ESG variables. The results of table 4.9 provide support for the results in the main structural equation modeling analyses of table 4.6 regarding the sign and insignificance between integrated thinking and financial performance, the positive and significant associations between integrated thinking and corporate performance and integrated thinking and non-financial performance. Furthermore, the results of table 4.9 also indicate an insignificant association between IR and non-financial performance, IR and corporate performance and IR and financial performance. Overall, the results using these alternative measures are consistent with those reported in the main analyses.

## 5. Discussion

This study contributes to prior literature related to <IR> being the first study providing empirical evidence that integrated thinking is positively related to corporate performance. As proposed by KPMG Australia (2014), one of the most mentioned benefit of <IR> is breaking down silos and connecting teams across different departments in an organization in order to achieve improvements in business performance. The findings of this study confirm that the underlying principle of <IR>, integrated thinking, affects corporate performance. In addition, this study is one of the few quantitative empirical studies that investigated the benefits related to integrated thinking. Up till now, prior literature related to <IR> examined the relation between publishing an integrated report and performance (Maniora, 2017, Churet & Eccles, 2014, Salvi et al., 2020; Nurkumalasari et al., 2019). However, these empirical studies found mixed results. A possible explanation for these inconclusive results is the influence of integrated thinking on the likeliness of publishing an integrated report and corporate performance. This study examined whether integrated thinking affects corporate performance and to what extent there is an indirect effect of integrated thinking on corporate performance via publishing an integrated report.

The results confirm the expected positive association between integrated thinking and non-financial performance and integrated thinking and corporate performance. These results provided empirical evidence that a multi-management approach, integrated thinking, which focusses on value creation in the short, middle and long-term leads to higher non-financial

performance and corporate performance. On the contrary, the results of the main and additional structural equation modeling analyses did not indicate that integrated thinking affects financial performance. The study of Lopez et al. (2007) provides an explanation for this insignificant relationship because the adoption of <IR>, for example embedding integrated thinking throughout the whole organization, means additional expenses incurred in research, training and risk prevention. This requires time, effort and investment and cause a short-term decrease in profitability. Furthermore, the results of the structural equation models showed an insignificant association between IR and RoA, IR and ESP and IR and IR and CP. A possible explanation of this insignificant results is given by Eccles et al. (2011). This study argues that there is a significant time lag between implementing <IR>, publishing an integrated report and reaping the benefits of superior non-financial performance. Furthermore, <IR> is a relatively new management practice, yet most companies that adopt <IR> and publish an integrated report do not fully capture the benefits of practicing in the holistic way described by the IIRC. In line with the theory of proprietary cost, companies make additional expenses during the issuance of an integrated report related to the preparation and dissemination of voluntary information through disclosure. These additional expenses negatively impact financial performance and cause especially in the short-term a decrease in profitability, which mitigates the benefits related to <IR>. Furthermore, the results indicate that integrated thinking is positively related to the likeliness of publishing an integrated report, which provides support for arguments of the signaling theory, suggesting that firms with high integrated thinking embedded into an organization voluntarily disclose this information into an integrated report to signal their higher integrated thinking. Overall, the findings of the main and additional structural equation modelling analyses suggest that integrated thinking positively affects non-financial and corporate performance. However, the insignificant association between IR and ESP, RoA and CP provide no empirical support that integrated thinking has an indirect effect on corporate performance via publishing an integrated report.

Finally, this study performed a robustness check whether the results were biased by the inclusion of the United Kingdom, since 32,05% of the firms are headquartered in the United Kingdom. However, Table 4.7 indicates that the findings of the structural modelling analyses are robust with regard to the different frequencies of country observations. Also, other robustness checks are performed in order to assure that the ESP is a reliable measurement for the company's non-financial performance, the RoA, return on assets, is reliable measurement for the company's financial performance and the CP is a reliable

measurement for corporate performance. The results of Table 4.7 shows that the results of the main structural equation modeling analyses are robust with regard to alternative measurements. Overall, the results of this study indicate that integrated thinking positively affects corporate performance. However, there is no empirical evidence that integrated thinking indirectly affects corporate performance via publishing an integrated report.

The findings of this study have to be considered in the light of several limitations. First, the validity of the proxy measurement to measure the integrated thinking embedded in an organization. The research on integrated thinking is growing, however there are doubts about the validity of the measurement of integrated thinking (De Villiers et al., 2017). Previous empirical research on integrated thinking is limited and therefore there are little alternative measurements of integrated thinking. The measurement used in this study, similar to previous quantitative studies that measured integrated thinking, is the CSR strategy score. Up till now, this measurement is perceived as best proxy measurement for integrated thinking (De Villiers et al., 2017). Furthermore, it is questionable whether the return on assets is a reliable proxy for the company's financial performance because this measurement has a short-term perspective and <IR> does not mainly focusses on value creation in the short term. Therefore, future studies should use a measurement of financial performance that incorporates the longer term to receive a more comprehensive picture about the effect of <IR> on firm performance.

Second, related to data availability, the firms in the data sample included were firms from Europe during the years 2014-2019. This panel data study on data from European firms is a study in a unique context with similar cultures and institutional settings that might negatively affect the generalizability of the findings. Therefore, future research should include a broader and an intercontinental firm sample and use a longer time period to increase the generalizability of the findings.

Third, this study investigated the effects of publishing an integrated report on corporate performance. However, the quality of the information disclosed in an integrated report may also affect corporate performance (Barth et al., 2017; Lee & Yeo, 2016; Pistoni et al., 2018). Future research could further examine the interrelatedness of the quality of an integrated report.

## 6. Conclusion

This study examined whether integrated thinking affects corporate performance and to what extent integrated thinking has an indirect effect on corporate performance via publishing an integrated report for a European sample during the period of 2014-2019. This study made a distinction between direct effects and indirect effects of integrated thinking on IR, ESP, RoA, and CP, using structural equation modeling with lagged effects. The results of the structural equation models show that integrated thinking is positively related to the publication of an integrated report, the company's non-financial and corporate performance. However, the results do not indicate that integrated thinking is significantly affecting the company's financial performance. Although the significant association between integrated thinking and the company's non-financial performance, the results do not indicate that publishing an integrated report affects the company's non-financial performance. The latter result provides further support for legitimacy theory, which suggests that companies under high public pressure, in the short term, adjust their reporting behavior, such as publishing an integrated report, rather than improving the underlying non-financial performance. Also, the results do not indicate that publishing an integrated report affects the company's financial and corporate performance. An explanation for this insignificant relationship is the significant time lag between publishing an integrated report and reaping the benefits of superior non-financial performance. Finally, this study performed robustness checks to ensure the results of the main analyses are robust. The findings of the robustness checks indicates that the results of this study are robust with regard to different frequencies of country observations, alternative measurements and a non-lagged effect analysis. This study found additional empirical evidence that integrated thinking has a direct positive effect on corporate performance, however, this study found no empirical evidence that integrated thinking indirectly affects corporate performance via publishing an integrated report due to the insignificant associations between IR and the company's financial performance, IR and the company's non-financial performance and IR and corporate performance.

The findings of this study have several implications for integrated reporting practices and related research to integrated thinking. First, the findings are likely to be helpful for external capital providers and other stakeholders in assessing the integrity of the publication of voluntary disclosed integrated reports and the external effects of integrated thinking. Second, the results, which shows incremental effects of integrated thinking on the company's non-financial performance and corporate performance, but not on the company's financial performance, have implications for future research. These results call for further analyses on

whether and how integrated thinking influences financial performance and which other related factors influences the relationship between integrated thinking and non-financial performance. Overall, more research is needed on both drivers and consequences of integrated thinking to advance our understanding of the conditions that facilitate or inhibit integrated reporting practices and the creation of long-term value.

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## Appendix

**Table 4.3 Wooldridge test for autocorrelation in panel data**

	F (1,710)	Prob > F
	4.043	0.0447

H0: no first-order  
autocorrelation

**Table 4.4 Variance inflation factor**

	VIF	1/VIF
Size	1.30	0.770
Leverage	1.09	0.918
Law	1.10	0.912
IT	1.26	0.793
DEBT	1.14	0.878
IR	1.19	0.840
Mean VIF	1.18	.

**Table 4.5 Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

	chi2	df	Prob > chi2
	43.04	1	0.0000

Ho: Constant variance