Sustainability reporting in the aviation industry: worldwide evidence

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Abstract

Purpose – The purpose of this study is to investigate empirically what affects Global Reporting Initiative (GRI)-based sustainability reporting and its relationship with firm performance in the aviation industry between 2006 and 2015.

Design/methodology/approach – The authors derived data from the GRI Sustainability Disclosure Database and Thomson Reuters EIKON; from the former, they downloaded GRI-based reports, and from the latter, they obtained financial data. The authors performed four-level analysis – report existence, report count, application level of report and firm performance –using various regression models (i.e. logistic regression, Poisson regression, ordered logistic regression and ordinary least squares regression).

Findings – First, the authors based the analysis on the existence of GRI-based sustainability reports, which showed that firm size and leverage are positively associated with sustainability reporting. Contrary to expectations, ownership was negatively associated. Furthermore, free cash flow per share, growth and profitability do not have significant effects on sustainability reporting, in contrast to expectations. Subsequent analysis was based on report count (number of total published reports within the examination period) and application levels of reports. Compared to the preceding analysis, there were no notable surprises. In addition, we found evidence that growth is negatively associated with application levels of reports (partially supported). Thus, report existence, report count and application level results largely confirm each other. Finally, the authors tested the effect of sustainability reporting on firm performance, which did not produce significant results. Thus, in the aviation industry, sustainability reporting does not play a significant role in enhancing firm performance.

Practical implications – First, the findings show that larger and highly leveraged aviation firms can reduce agency and legitimacy costs through sustainability reporting. Surprisingly, the same assumption did not hold for ownership structure as the firms with diffused ownership base tend not to publish sustainability reports. Thus, boards are advised to establish and improve monitoring mechanisms in these types of firms. Second, although the number of aviation companies publishing separate sustainability reports has increased significantly over the years, almost half of the companies are not still producing sustainability reports. Hence, if the aviation industry believes the merits of engaging in sustainability issues and sincerely desires to enhance its sustainability reporting practices, the authors can suggest the following initiatives. Boards might encourage companies to incorporate sustainability issues into company operations by assigning the necessary financial and human resources. The boards might also establish a separate sustainability committee or department, which could focus on sustainability issues and reporting practices. Regulatory bodies could also encourage aviation companies to act in a socially and environmentally responsible manner by proposing legal requirements and providing guidance.

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Social implications – Relevant civil organisations and environmental activists might undertake more active roles to enhance awareness of sustainability issues in the aviation industry.

Originality/value – Most of the prior studies did not focus on standalone GRI-based sustainability reports, and they were conducted on limited samples and not the aviation industry in particular. This study aims to fill these gaps empirically by establishing testable hypotheses and attempting to demonstrate the validity of theoretical relationships in a wide range of data and among aviation companies worldwide. In this sense, this study is unique in what it undertakes. This study also tests whether sustainability reporting impacts firm value in the aviation industry which, to the best of the authors' knowledge, has not been examined in prior studies to this extent.

Keywords CSR, GRI, Aviation industry, Sustainability report, GRI application level

Paper type Research paper

1. Introduction

Growing concerns over environmental degradation, resource depletion, global warming, climate change and human rights violations have stimulated more socially responsible business practices (Sheldon and Park, 2011) and have forced organisations to respond to these concerns (Adams and Frost, 2008). This new approach of conducting business considers society's overall well-being, rather than only economic development. Moreover, stakeholders' accountability demands beyond shareholders' interests have caused companies worldwide to realise the importance of sustainability issues (Dodds and Kuehnel, 2010; Boiral, 2013), leading to issuance of stand-alone sustainability reports that have become important vehicles for presenting information on corporate social and environmental initiatives (Al Farooque and Ahulu, 2017).

In particular, some individual industries have been the subject of sustainability research due to their operations' sensitivity to the environment and human life (i.e. environmental and social aspects of sustainability). Among the most prominent of these industries are the tourism, transportation, mining and energy industries (Jenkins and Yakovleva, 2006; Cowper-Smith and de Grosbois, 2011; Moseñe *et al.*, 2013; de Grosbois, 2016). One of the industries on the spot is the aviation industry due to its disastrous impact on the environment and human health with the use of fossil fuels, hazardous emissions and the employment of large and diverse groups of employees. The growth of the airline industry, in terms of both passenger and cargo transportation in the industry, has deepened these concerns[1] because this demand growth implies more fuel consumption, more hazardous waste and more noise. Due to the international nature of the industry, these negative consequences are not limited to the home countries of the companies but also extend to other nations, eventually leading to global climate change. As de Grosbois (2016) noted in her latest paper, the international nature of the tourism industry, including aviation, has had particularly significant impacts on emerging and less developed economies and has rendered them vulnerable due to weaker legal and regulatory regimes. These concerns in the aviation industry have even caused sectoral organisations (e.g. the International Civil Aviation Organization) to develop standards and recommended practices for energy use and the development of a sustainable environment and to propose future prospects for using alternative energy sources (Cui and Li, 2015). Moreover, other than environmental issues, the aviation industry is at the centre of human life and safety issues because it serves international passengers and employs large and diverse groups of employees (Kemp and Vinke, 2012). Thus, in addition to economic sustainability, environmental sustainability and social sustainability are highly relevant to the industry.

Previously, some studies focussed on the sustainability reporting of the aviation industry. A strand of research examined the stand-alone reports published by companies in

the aviation industry to determine their sustainability reporting practices and disclosures. For instance, Mak and Chan (2006) investigated the environmental reporting practices of companies in the Asia Pacific airline industry. They documented that airlines in more developed countries are more environmentally conscious and devote resources heavily to environmental policies. Mak *et al.* (2007) conducted a qualitative study examining the environmental reports published by airline companies in Europe and the Asia Pacific region for 2001. They found that airline companies have noticed the importance of producing separate environmental reports and have devoted varying degrees of effort and resources to publish such reports. Similarly, Cowper-Smith and de Grosbois (2011) explored the corporate social responsibility (CSR) reports published by the airlines for 2009 through a qualitative content analysis. Their findings revealed that airline companies focus on environmental issues, rather than social or economic dimensions of CSR. Skouloudis *et al.* (2012) performed a qualitative study of 13 airports in North America and Europe by analysing their sustainability reports. They found that sustainability reporting is not yet a common practice among international airports, and there is considerable variation in the reporting practices. Kemp and Vinke (2012) examined the CSR disclosures of the aviation industry of Pakistan and identified that only 13 of 39 companies clearly reported at least one CSR dimension in their annual report and/or on their websites. Furthermore, Wang *et al.* (2015) evaluated the CSR performance of eight Chinese airlines using entropy weighting and grey relation analysis. Another strand of research performed surveys or case studies to understand the factors impacting the CSR practices of companies in the aviation industry. For example, Sheldon and Park (2011) conducted a survey-based study to investigate the CSR perceptions and practices of the US travel industry, including some aviation firms. Kuo *et al.* (2016) also conducted surveys and confirmatory interviews to determine the motivations for and barriers to CSR practices in the airline industry. Dodds and Kuehnel (2010) contacted Canadian mass tour operators to assess the CSR practices of the sector. Chang *et al.* (2015) conducted interviews with experts from the airline industry to investigate the key strategic factors that might impact the CSR strategies of the airline companies. Karaman and Akman (2017) applied a survey-based technique to report on the CSR perceptions of Turkish airlines. Lynes and Andrachuk (2008) adopted an in-depth case study approach on Scandinavian airlines to determine why companies are committed to corporate social and environmental responsibility practices. Kearins and Fryer (2011) similarly used a case study approach to investigate how sustainability theory relates to practice at the Auckland Airport. Moreover, Vourvachis *et al.* (2016) investigated the disclosure reactions to legitimacy threats by examining the CSR disclosures of airline companies in response to major airline accidents. Kılkış and Kılkış (2016) developed a sustainability ranking index to benchmark nine airports across multiple factors. In particular, Lee and Park (2010) examined the performance effects of CSR on seven airline companies with 46 firm-year observations.

What is inferred from the above cited studies is the scarcity of empirical studies to draw generalisable conclusions, the dearth of CSR or sustainability studies, particularly on sustainability reporting, and the lack of longitudinal investigations and cross-country studies. Moreover, most of the prior studies did not focus on standalone Global Reporting Initiative (GRI)-based sustainability reports, and they were conducted on limited samples and not particularly on the aviation industry. Our study aims to fill these gaps empirically by establishing testable hypotheses and attempting to prove the validity of theoretical relationships over a wide range of data and aviation companies worldwide. In this sense, this study is unique in what it accomplishes. This study also tests whether sustainability reporting impacts firm value in the aviation industry, which has not been examined in prior

studies to this extent, to the best of knowledge of the authors, because it is important to assess the impact of sustainability reporting on market value, as a firm's financial health is the ultimate test for the failure or success of any business initiative (Luo and Bhattacharya, 2006).

The remainder of the study is organised as follows. Section 2 summarises the GRI, which is a prominent sustainability reporting framework. Then, Section 3 describes the theoretical framework and develops the hypotheses. Sections 4 and 5 present data and descriptive statistics and empirical analysis, respectively. Section 6 discusses the findings by comparing them with those of prior studies. Finally, Section 7 presents the implications and limitations of the study.

2. Global reporting initiative

Comprehensive communication through appropriate social documents helps companies to maintain and strengthen relationships with their stakeholders (Caporaso *et al.*, 2016). In this sense, an increasing number of companies have started to publish separate CSR or sustainability reports, which include their social and environmental performances and provide a comprehensive picture of the non-financial aspects of their practices (Berthelot *et al.*, 2012). Companies generally use global standards, such as the GRI guidelines, to structure these CSR or sustainability reports (Martínez-Ferrero *et al.*, 2013). The GRI was founded in the USA by the collaboration of the Coalition for Environmentally Responsible Economies and the United Nations Environment Programme, in which the initial focus was on the environmental issues (Laskar and Maji, 2016). The main objective of the GRI is to establish their guidelines as an internationally accepted framework that promotes comparability in sustainability reporting over time and across companies (Isaksson and Steimle, 2009; Einwiller *et al.*, 2016). According to the GRI, sustainability reporting should cover the social, environmental and economic impacts of organisations (Jain and Winner, 2016). In this regard, the GRI has devised a standard set for sustainability reporting, including the social, environmental and economic performance of companies. Over time, the GRI guidelines have become the most widely accepted framework for corporate social voluntary reporting (Nikolaeva and Bicho, 2011). More comprehensive information about the GRI, its frameworks, and sector supplements can be found at the official website of the GRI (GRI, 2018).

3. Theoretical framework and hypotheses

Agency theory, legitimacy theory and stakeholder theory are the most dominant theories for understanding the social and environmental disclosure practices of companies. Agency theory was developed in the information economics literature to model the agency relationship, "in which one party (the principal) delegates work to another (the agent), who carries out that work" (Eisenhardt, 1988, p. 58). Agency theory explains the relationships between principals (shareholders) and agents (managers) under the assumptions of information asymmetry and conflicts of interests between shareholders and managers (Jensen and Meckling, 1976; Eisenhardt, 1989). In this view, firms are considered as the nexus of contracts between principals and agents (Jensen and Meckling, 1976), and information asymmetry exists because managers, as self-interested agents, possess superior information about the current and future financial and non-financial information about company performance, compared to company shareholders (Ho and Taylor, 2013). To diminish information asymmetry between the firm and its external agents, companies use several communication channels (Brammer and Pavelin, 2008). In this respect, companies

produce sustainability reports and adopt GRI as a way of mitigating agency problems, as well as reducing information asymmetries and agency costs.

In contrast to agency theory, legitimacy theory provides a comprehensive view on sustainability reporting as it recognises that companies continually seek to ensure that they operate within the bounds and norms of their respective societies (Guthrie and Parker, 1989; Brown and Deegan, 1998; Reverte, 2009). From the perspective of this theory, an organisation operates in society via a social contract, by which it accepts engaging in socially responsible practices to ensure the approval of corporate objectives, which is fundamental to providing for its long-term success and continuity (Guthrie and Parker, 1989). Conversely, if the organisation does not operate within the bounds of societal expectations, its ability to obtain resources, legitimacy or social support can be affected adversely (Oliver, 1991). Organisations therefore might adopt disclosure strategies as a legitimising tool to show that they consider community expectations in their practices (Deegan *et al.*, 2002; Cho and Patten, 2007). In accordance with legitimacy theory, sustainability reporting could be an appropriate strategy to achieve social acceptance (Ching and Gerab, 2017), to legitimise company operations (Deegan and Blomquist, 2006; Ching and Gerab, 2017), to create a positive image (Kent and Monem, 2008) and to enhance their corporate reputation (Oliveira *et al.*, 2010). In a sense, GRI adoption would help companies to gain legitimacy as responsible corporate citizens by demonstrating their commitment to norms (Nikolaeva and Bicho, 2011; Al Farooque and Ahulu, 2017).

The term "stakeholder" refers to any individual or identifiable group on which the organisations' survival depends, including employees, customers, suppliers, government agencies, certain financial institutions and shareholders (Freeman and Reed, 1983). Stakeholder theory asserts that companies should be managed in compliance with the interests of their stakeholders (Freeman, 1994; Jensen, 2002). By offering a new way to organise thinking, this theory suggests that the needs of shareholders can be only met if the needs of other stakeholders are satisfied to some degree beyond profit maximisation (Jamali, 2008). This principle does not imply that financial performance is unimportant; however, this argument indicates that stakeholder management is very crucial for the survival of companies (Morsing and Schultz, 2006). As stakeholder management is very crucial, companies have strong incentives to convince stakeholders that they consider stakeholder expectations in their business operations (Branco and Rodrigues, 2008; Oliveira *et al.*, 2010). The managerial branch of stakeholder theory posits that companies use corporate disclosure to respond to the informational needs of powerful stakeholder groups (Reverte, 2009). For instance, with respect to the impact of stakeholders on the sustainability reporting practices of companies, Rahman Belal and Owen (2007) found that, while multinational companies are motivated by the influences of investors and parent companies and the demands of supranational organisations, such as the World Bank, domestic companies are particularly driven by buyers. Fernandez-Feijoo *et al.* (2014) also reported that investors and employees are the most influential stakeholder groups impacting the CSR reporting transparency of companies. In this sense, high-quality CSR reporting can be considered a means of responding to different demands and certain interests of corporate stakeholders (Odriozola and Baraibar-Diez, 2017). Within the context of stakeholder theory, it has also been argued and proved that social performance and disclosure have significant associations with each other, indicating that active engagement with social responsible activities leads to higher levels of disclosure (Ullmann, 1985; Roberts, 1992). Otherwise, if there is a gap between the act and the disclosure, two situations appear. Companies with high levels of sustainability disclosure but low levels of actual social performance have considerable value at risk; in contrast, firms with high actual social performance but lagging social disclosure have the

potential to secure unrealised returns on investment through improved communication strategies (Peloza *et al.*, 2012).

3.1 Hypotheses

We established several hypotheses for the potential reasons underlying sustainability reporting and for why sustainability reporting should be related to firm performance.

3.1.1 Firm size. Firm size is one of the most frequently used variables to understand the social and environmental reporting practices of companies. A significant number of studies in the prior research have reported a positive association between firm size and the extent of company disclosures (see, for example, Gao *et al.*, 2005; Alsaeed, 2006; Ho and Taylor, 2007; Hossain and Reaz, 2007; Branco and Rodrigues, 2008; Siregar and Bachtiar, 2010; Abd Rahman *et al.*, 2011; Skouloudis *et al.*, 2014; Nazari *et al.*, 2015; Al Farooque and Ahulu, 2017). Several reasons can be identified that favour this positive association. First, agency theory asserts that larger companies are subject to higher agency costs due to greater information asymmetry between managers and shareholders (Jensen and Meckling, 1976). To reduce agency costs, larger companies would disclose more information than smaller companies. In this sense, separate company reports (i.e. sustainability reports, CSR reports and environmental reports) would provide a platform for larger companies to report additional information about their operations to diminish information asymmetry with their shareholders. Second, larger companies might have a greater tendency to disclose their CSR practices because they are more concerned with legitimacy (Amran and Haniffa, 2011), might have more to lose due to the lack of legitimacy (Kuzey and Uyar, 2017) and might be subject to higher political costs (Shamil *et al.*, 2014). Further, engaging in activities to provide sustainable development and publishing issues related to sustainability depends upon the availability of financial resources within a company (Brammer and Pavelin, 2008). As large companies have more resources than small companies, the disclosure costs of social and environmental issues would be more affordable for them (Ho and Taylor, 2007). In addition, larger companies might have better organisation structures and more developed information systems (Uyar *et al.*, 2013), making it easier for them to publish GRI-based reports. Further, large companies are monitored by the public and are expected to face intensive pressure from groups that advocate for a green environment and better social welfare (Naser *et al.*, 2006). To mitigate such pressures, large companies are more prone to engaging in socially and environmentally responsible activities voluntarily (Siregar and Bachtiar, 2010). Moreover, the managements of smaller companies are more likely to believe than the managements of larger companies that the full disclosure of information could threaten their competitive positions (Hossain and Reaz, 2007). Small companies therefore avoid disclosing voluntary information about their practices due to the fear of losing any competitive advantage.

With regard to the association between firm size and sustainability reporting, Simnett *et al.* (2009), Shamil *et al.* (2014) and Kiliç and Kuzey (2017) documented that firm size significantly and positively impacts the decision of a company to produce stand-alone sustainability reports. Further, Legendre and Coderre (2013), Martínez-Ferrero *et al.* (2013) and Kuzey and Uyar (2017) determined that firm size is a significant and positive determinant of the decision to publish a GRI-based sustainability report. In line with the above discussions and empirical findings, we expect a positive influence of firm size on the decision to publish a GRI-based sustainability report. Therefore, we suggest the following hypothesis:

H1. Firm size has a significant, positive association with issuing GRI-based sustainability reports.

3.1.2 Free cash flow per share. Free cash flow has not been tested at all for its potential effect on sustainability reporting in prior studies, except by Artiach *et al.* (2010) and Kuzey and Uyar (2017). Free cash flow indicates a firm's ability and financial resource availability for other activities, such as sustainability reporting, after meeting requirements for dividends and capital expenditures. From the perspective of stakeholder theory, if a company has scarce resources, it will prioritise the concerns and needs of its financial stakeholders (Artiach *et al.*, 2010). Therefore, companies with small free cash flows will focus on financial demands rather than social expectations (Ullmann, 1985). In contrast, high free cash flow levels will permit companies to respond to financial demands, as well as the social expectations of their stakeholders. According to Aksu and Kosedag (2006), companies with higher free cash flows are subject to higher agency costs, which can result in undervaluation of the equity of firms. In this regard, they predicted a positive link between free cash flow and company disclosures as companies with higher cash flows will have more willingness to be transparent through disclosures to reduce the negative impacts of excessive cash flows on equity value. The relationship between free cash flows and the sustainability reporting tendencies of firms has not been supported by the findings of empirical studies (Artiach *et al.*, 2010; Kuzey and Uyar, 2017). In line with theoretical arguments, we investigate this association in the aviation industry and formulate the following hypothesis:

H2. Free cash flows have a significant, positive association with the issuing of GRI-based sustainability reports.

3.1.3 Profitability (return on assets). Profitable companies might have a greater tendency to legitimise their activities as they are subject to intense public scrutiny due to their high profit margins (Branco and Rodrigues, 2008). Companies therefore might use sustainability reporting as a means of legitimising their activities and corporate profits (Andrikopoulos *et al.*, 2014). Another strong argument that favours the relationship between profitability and sustainability reporting is that companies will devote company resources to meeting social demands if they have acceptable levels of financial performance (Roberts, 1992). Stakeholder theory also posits that if a company has high economic performance, it will face fewer pressing demands from its financial stakeholders (Artiach *et al.*, 2010). Therefore, high profitability levels allow companies to meet the expectations of financial stakeholders, as well as the demands of other stakeholders, by undertaking CSR practices (Siregar and Bachtiar, 2010). In contrast, firms in financial trouble might have little ability to invest in CSR activities (Waddock and Graves, 1997). Moreover, the managements of high-profit companies might tend to disclose higher levels of voluntary information regarding their performance to promote positive impressions of their achievements (Alsaeed, 2006).

While theoretical discussions have proposed a positive association between profitability and company disclosures, empirical results regarding this association have been inconclusive. For example, Neu *et al.* (1998) found that unprofitable companies are more likely to disclose voluntary information than profitable ones. Ho and Taylor (2007) also reported that profitability has a negative influence on the triple bottom-line disclosures of companies. Similarly, Kiliç and Kuzey (2017) indicated that profitability has a negative association with the publishing of a separate sustainability report. Further, Alsaeed (2006), Kent and Monem (2008), Reverte (2009), Andrikopoulos *et al.* (2014), Shamil *et al.* (2014) and Kuzey and Uyar (2017) failed to determine a significant impact of profitability on sustainability disclosures. Conversely, Waddock and Graves (1997), Artiach *et al.* (2010), Lourenço and Branco (2013) and Hussain *et al.* (2016) documented that profitable companies have high corporate sustainability performance. Nazari *et al.* (2015) found similar evidence that profitable companies have more willingness to disclose their sustainability

performance. Legendre and Coderre (2013) and Martínez-Ferrero *et al.* (2013) also found that companies with high profitability are more likely to publish sustainability reports in compliance with GRI guidelines. In line with the theoretical arguments, we expect that profitability has a significant and positive impact on the decisions of companies to publish separate sustainability reports in compliance with the GRI framework. Thus, we suggest the following hypothesis:

H3. Firms with higher profitability are more likely to issue GRI-based sustainability reports.

3.1.4 Leverage. Creditors (i.e. loan providers) offer financing to companies and, in exchange, expect their loans to be repaid promptly (Hill and Jones, 1992). Agency theory suggests that companies with high leverage are more prone to higher agency costs because high leverage ratios can transfer potential wealth from debt holders to shareholders (Jensen and Meckling, 1976; Meek *et al.*, 1995). For instance, company managers might expropriate the wealth of debt holders by making high-risk investment decisions to enhance the wealth of shareholders without considering the benefits of debt holders (Crutchley and Hansen, 1989). In this regard, highly leveraged companies might disclose higher levels of voluntary information to assure creditors and investors regarding their ability to pay their obligations (Ho and Taylor, 2007), to mitigate agency costs (Jensen and Meckling, 1976) and to reduce cost of capital (Jensen and Meckling, 1976). Further, from a stakeholder theory perspective, Roberts (1992) reported that company disclosures might be viewed by companies as a way of meeting certain expectations of debt holders, who are among the most important stakeholder groups of the company. However, Artiach *et al.* (2010) asserted that as debt holders are a powerful stakeholder group, managers are more likely to consider their expectations than those of comparably less powerful stakeholders. Therefore, high-leverage companies will emphasise the claims of debt holders rather than those of less powerful stakeholders, such as community at large, which might negatively influence their tendency to engage in CSR practices and disclosures (Artiach *et al.*, 2010).

Prior empirical findings on the associations between leverage and company disclosures have also been ambiguous. For instance, while Uyar *et al.* (2013), Kansal *et al.* (2014), and Kuzey and Uyar (2017) found a negative association between leverage and company reporting practices, many other studies have found insignificant associations between the two variables (Neu *et al.*, 1998; Alsaeed, 2006; Ho and Taylor, 2007; Brammer and Pavelin, 2008; Kent and Monem, 2008; Liu and Anbumozhi, 2009; Reverte, 2009; Artiach *et al.*, 2010; Siregar and Bachtiar, 2010; Abd Rahman *et al.*, 2011; Martínez-Ferrero *et al.*, 2013; Kılıç and Uyar, 2014; Shamil *et al.*, 2014; Nazari *et al.*, 2015; Hussain *et al.*, 2016; Kiliç and Kuzey, 2017). However, very few studies have found a significant and positive impact of leverage on sustainability reporting (Roberts, 1992; Simnett *et al.*, 2009; Andrikopoulos *et al.*, 2014; Sharif and Rashid, 2014). Although theoretical discussions and empirical findings have been conflicting, we expect that companies with high leverage ratios are more likely to issue GRI-based sustainability reports. Thus, we develop the following hypothesis:

H4. Firms with higher leverage are more likely to issue GRI-based sustainability reports.

3.1.5 Growth. Higher levels of growth options enhance the ability of a company to incorporate sustainability issues into its strategies (Artiach *et al.*, 2010). High-growth companies might provide economic sustainability as a condition of going concerns through social and environmental sustainability (Kuzey and Uyar, 2017). In addition, high-growth firms might have specific knowledge that cannot be disclosed through traditional financial

reports (Debreceny *et al.*, 2002). Therefore, growing companies might reduce information asymmetry by publishing stand-alone reports (i.e. sustainability reports) that comprise additional comprehensive disclosures for investors. Regarding this variable, Debreceny *et al.* (2002) failed to determine a significant impact of growth prospects on internet financial reporting. Kuzey and Uyar (2017) also determined an insignificant link between growth opportunities and sustainability reporting. In contrast, Artiach *et al.* (2010) and Naser at al. (2006) found that companies maintaining growth are more likely to engage in CSR practices and reporting. Similarly, Kend (2015) found significant and positive associations between sales growth and the decision to purchase assurance for stand-alone sustainability reports. In particular, Shamil *et al.* (2014) found that firm growth has a significant, positive association with the publishing of stand-alone sustainability reports. Based on the above discussions and prior findings, we expect that growth would impact company decisions regarding the issuance of GRI-based sustainability reports. Thus, we suggest the following hypothesis:

H5. Growth has a significant, positive association with the issuing of GRI-based sustainability reports.

3.1.6 Ownership structure. The companies with low concentrations of ownership are subject to higher levels of agency costs due to higher levels of information asymmetry and conflicts of interests between shareholders and managers (Fama and Jensen, 1983). Therefore, if the ownership structure is diffused, the company is expected to present more CSR disclosures to mitigate information asymmetries (Reverte, 2009) and to reduce agency costs (Alsaeed, 2006). Further, companies having more dispersed ownership will have more stakeholders, as well as more visibility in the public domain, necessitating transparency thorough CSR reporting (Kiliç *et al.*, 2015). In contrast, a company with shares held by a limited number of family members will have less incentive to disclose voluntary CSR information because these shareholders can obtain information directly from the company (Naser *et al.*, 2006; Reverte, 2009). Moreover, Liu and Anbumozhi (2009) revealed that companies with widely dispersed ownership are more likely to incorporate environmentally responsible practices into their strategies to attract more investors.

Although theoretical arguments have suggested a positive link between company disclosures and ownership diffusion, prior findings have been ambiguous. For instance, while Uyar *et al.* (2013) found a negative association between ownership diffusion and company disclosures, Alsaeed (2006) and Liu and Anbumozhi (2009) determined an insignificant association. Conversely, Akhtaruddin *et al.* (2009) and Kiliç *et al.* (2015) documented that ownership diffusion has a significant and positive impact on company disclosures. Lourenço and Branco (2013) similarly found that leading corporate sustainability performance firms have lower levels of ownership concentration. Along this line of theoretical discussions, we propose the following hypothesis:

H6. Ownership diffusion has a significant, positive association with the issuing of GRI-based sustainability reports.

3.1.7 Firm value. Ethical investing is growing and gaining worldwide attention, reflecting the interest of investors and other stakeholders in socially and environmentally responsible business practices (Lo and Sheu, 2007). This increasing attention could enhance the firm value of the companies that present conciseness about social and environmental matters by engaging in CSR activities and reporting them through stand-alone sustainability reports. Further, Bachoo *et al.* (2013) asserted that high-quality sustainability reporting reduces information asymmetry between company insiders and stakeholders and might decrease

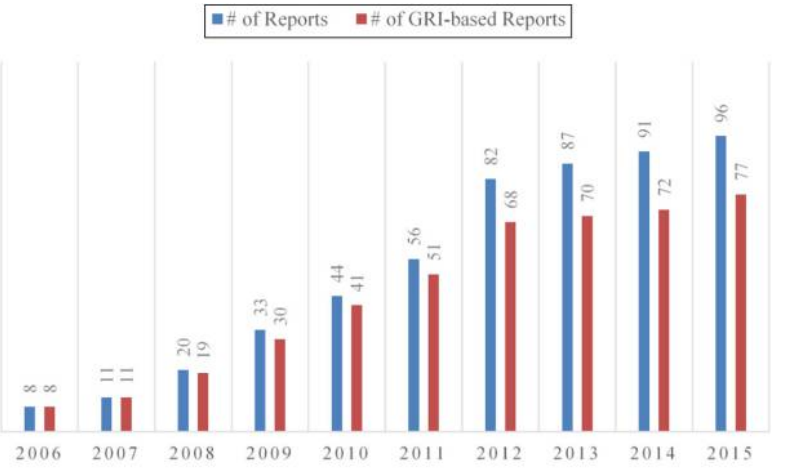
the uncertainty of investors regarding future cash flows. For instance, sustainability reporting could cultivate relationships with stakeholders (Siregar and Bachtiar, 2010), enhance firm reputation (Siregar and Bachtiar, 2010) and enable access socially and environmentally oriented markets (Laskar and Maji, 2016), which in turn would improve future company performance and cash flows. Therefore, the production of a separate sustainability report shows investors that the firm is involved in sustainable development, which might increase firm performance and ultimately positively impact firm value (Berthelot *et al.*, 2012). Moreover, Anam *et al.* (2011) reported that company disclosures including some hidden values might reduce the misevaluation of share prices as a result increasing the firm value.

With regard to the association between firm value and sustainability reporting, Siregar and Bachtiar (2010) found a significant, positive impact of CSR disclosures on future company performance. Uyar and Kılıç (2012a) found that voluntary disclosure significantly impacts firm value. Bachoo *et al.* (2013) revealed that the quality of sustainability reporting has a positive association with the expected future performance of a company. Berthelot *et al.* (2012) similarly provided evidence that the publication of sustainability reports is positively valued by the financial market. Lo and Sheu (2007) and Laskar and Maji (2016) also reported that corporate sustainability performance has a positive and significant impact on the market value of a company. A recent study by Kuzey and Uyar (2017) documented that GRI-based sustainability reporting influences firm value positively. Based on the above discussions and empirical findings, we expect that the issuing of GRI-based sustainability reports plays a significant, positive role in enhancing firm value. Therefore, we develop the following hypothesis:

H7. The issuing of GRI-based sustainability reports has a significant, positive association with firm value.

4. Data and descriptive statistics

To test the hypotheses of the study, we compiled data sets related to aviation companies' GRI-based reporting behaviour and matched these sets with their financial indicators. Aviation is defined as the design, development and operation of heavier-than-air aircraft (Fang, 2012; Merriam-Webster Online, 2018). The main players in the aviation sector include airline companies, airport operators and aeronautics/aerospace corporations. Thus, the sample of our study consists of these three types of aviation firms. The aviation companies' GRI-based reporting behaviour was extracted from the GRI Sustainability Disclosure Database (SDD) and was used as a measure of reporting activity. Lee and Park (2010) declared that measuring CSR activity accurately is a major issue in data collection. The GRI database provides a rich source of data and ready-to-use sustainability reports. The GRI SDD is open to the public and grants access to GRI-based sustainability and other types of reports. The GRI SDD publishes GRI-based reports going back to 1999; however, there were only a handful of reports for the first few years. As a result, we extracted reporting activity for the period of 2006-2015, when reporting in the SDD became popular across the aviation industry. Figure 1 shows the number of all sustainability reports, as well as GRI-based sustainability reports issued by the aviation industry, extracted from the SDD. Throughout the years, reporting activity became more prevalent, and many aviation companies publicised their sustainability activity. While only 8 reports were published in 2006, 96 sustainability reports were disseminated in 2015, showing a substantial increase and the commitment of industry members to sustainability reporting. Moreover, the figure shows the high level of GRI framework adoption in sustainability reporting by the aviation



Source: GRI SDD database

Figure 1.
Sustainability reporting in aviation industry (years: 2006-2015)

industry consistently across the analysis period. In total, 528 sustainability reports were published, including GRI-based and non-GRI-based reports, of which 447 were GRI-based, corresponding to 84.7 per cent. This outcome confirms the acceptance of the GRI framework within the industry and can be regarded as the success of the efforts of the GRI organisation.

In the period of 2006-2015, Europe outperformed other regions in the number of firms that it domiciles with sustainability reporting activity and the number of GRI-based reports (Table I). In the table, the first column presents the number of firms that have issued sustainability reports, and the second column presents the number of reports published by these firms. The last column is based on the second column; for example, the percentage of reports published in Europe (178 reports) is 39.8 per cent of all of the published reports (447 reports). Similarly, Asia follows Europe, having 34 per cent of the GRI-based reports share. North America follows Asia with a 12.1 per cent share of GRI-based reports, which is far less than the preceding two regions. Latin America and the Caribbean and Oceania and Africa follow the other regions, constituting 9.8 and 3.1 per cent of the reports, respectively.

The financial variables of the aviation companies were retrieved from the Thomson Reuters EIKON database, which covers more than 99 per cent of the world's market capitalisation. Table II summarises the data coverage and the number of firms in the

Region	Count of firms	Count of reports	% of reports
Africa	1	5	1.1
Asia	48	152	34.0
Europe	66	178	39.8
Latin America and the Caribbean	15	44	9.8
North America	21	54	12.1
Oceania	6	14	3.1
Total	157	447	100

Table I.
GRI-based reports by region

aviation sector. Aerospace companies constituted more than 47.2 per cent of the all of the aviation companies, followed by airlines with a 32.4 per cent share and airport operators with a 20.4 per cent share.

The sample used in the study included observations from the 284 companies listed in the Thomson Reuters EIKON database covering the period of 2006-2015. We manually matched the Thomson Reuters EIKON data to the GRI SDD data. The matching was highly successful, comprising two-thirds of the companies in the GRI data (corresponding to 105 of 157 companies reported in the GRI SDD data). We assumed that the remaining 179 companies of 284 in the EIKON database had no sustainability reporting activity in the period of interest. All 284 companies, regardless of their GRI reporting status, were considered in the subsequent analysis.

We preprocessed the data before proceeding to any analysis. We checked the data for missing cases. Cases in which a large portion of the data was missing were eliminated from the analysis.

The definitions and sources of all of the data and variables are summarised in Table III.

Table IV summarises the descriptive statistics of the variables used in the study. Min, max, mean and standard deviation (SD) were provided so that readers can check the accuracy of the data and variables. GRI-based reporting was not common in the period of interest, averaging approximately 12 per cent of all observations with a standard deviation of 32.0 per cent. The firm sizes (total assets) ranged from 3,813 to 130,291,834 (as reported by the firm). On average, the firms were 5.1 per cent profitable in terms of their return on assets (ROA), and they grew 11.7 per cent a year. The aviation sector's average Tobin's Q ratio exceeded 1. A few firms' Tobin's Q ratios were even greater than 10, which strongly justified further investment in these companies.

5. Empirical analysis

Correlation analysis was performed to determine the bivariate relationships between the variables. Table V presents the Pearson's correlation coefficients and their significance levels. The measure explaining the linear associations between the variables indicated that there were no highly significant associations between any two variables. There were some significant positive correlations between the GRI variable and natural logarithm of firm size ($r = 0.298$, $p < 0.01$) and between the GRI variable and leverage ($r = 0.201$, $p < 0.01$). There were also some significant negative correlations between the GRI variable and three other variables including profitability ($r = -0.060$, $p < 0.01$), ownership structure ($r = -0.132$, $p < 0.01$), and TOBINQ ($r = -0.101$, $p < 0.01$). The results indicated that multicollinearity was not a problem for the given data set.

In this study, we relate the GRI-based reporting behaviour of a company to its financial indicators by using the natural logarithm of firm size (total assets), free cash flow per share,

Aviation sector	Count of firms	% of firms
Aerospace	134	47.2
Airline	92	32.4
Airport	58	20.4
Total	284	100

Table II. Thomson Reuters EIKON data coverage

Variable	Definition	Source
GRI	Binary variable taking the value of 1 if the company publishes a GRI-based report in a given year and a value of 0 otherwise	GRI SDD database
GR count	Count of GRI-based reports for the period of interest	GRI SDD Database
GRI Application Level	Application level of GRI reporting framework	GRI SDD Database
Firm size (as reported)	Total assets of a firm	Thomson Reuters EIKON
Free cash flow per share	Ratio of free cash flow to the total number of shares outstanding	Thomson Reuters EIKON
Profitability (ROA)	Return on assets	Thomson Reuters EIKON
Leverage	Ratio of total debt to total assets	Author's own calculations
Growth	Ratio of current year's total assets to previous year's total assets minus one	Author's own calculations
Ownership	Proportion of shares of a publicly traded company traded on the stock market	Thomson Reuters EIKON
TOBINQ	Ratio of market capitalisation and total debt to total assets	Author's own calculations

Table III.
List of variables

	Minimum	Maximum	Mean	SD	Obs.
GRI	0	1	0.12	0.320	1,864
GRI count	0	12	1	2.338	225
Firm size	3,813	130,291,834	6,634,359	13,946,591	1,864
Free cash flow per share	−29.562	15	0.534	2.791	1,864
Profitability (ROA)	−0.543	0.382	0.051	0.068	1,864
Leverage	0	0.932	0.253	0.183	1,864
Growth	−0.791	5.787	0.117	0.314	1,864
Ownership	0	1	0.636	0.268	1,864
TOBINQ	0.138	11.729	1.182	0.913	1,864

Table IV.
Descriptive statistics

	1	2	3	4	5	6	7	8
1. GRI	1	0.298**	−0.044	−0.060**	0.201**	−0.040	−0.132**	−0.101**
2. Ln (firm size)		1	0.105**	0.000	0.323**	−0.052*	0.091**	−0.244**
3. Free cash flow per share			1	0.139**	−0.173**	−0.048*	0.137**	−0.010
4. Profitability (ROA)				1	−0.224**	0.110**	−0.006	0.218**
5. Leverage					1	0.066**	−0.036	−0.177**
6. Growth						1	−0.016	0.103**
7. Ownership							1	0.041
8. TOBINQ								1

Table V.
Pearson's correlation coefficients

Notes: **Correlation is significant at the 0.01 level (two-tailed); *correlation is significant at the 0.05 level (two-tailed)

profitability (ROA), leverage, growth and ownership as the specific proxies. The mathematical model can be written in the below form:

$$GRI_t = \beta_0 + \beta_1 Ln\,(Firm\ Size)_t + \beta_2 Free\ Cash\ Flow\ per\ Share_t + \beta_3 ROA_t + \beta_4 Leverage_t + \beta_5 Growth_t + \beta_6 Ownership_t + \varepsilon.$$

The dependent variable in the model, GRI, takes a value of 1 if a company publishes a GRI-based report and a value of 0 otherwise. We applied a natural logarithm transformation to firm size to improve the fitted model. Other independent variables are explained in Table III. All of the aviation companies listed in Thomson Reuters EIKON database were considered in the analysis irrespective of their GRI reporting status. We considered three time periods for the analysis. First, we ran the model on all of the 2006-2015 data; then, we conducted the analysis for the period of 2011-2015; and finally, the analysis was performed on the 2015 data only to determine the most recent relationships between the variables. Our first purpose of dividing the whole sample period into two sub-periods was to investigate whether there are differences across periods because we have seen in descriptive statistics analysis that the report counts changed substantially over the years. In addition, we aimed at differentiating the reporting behaviour of companies based on their business activities. Therefore, we clustered the companies under the sectors airline, airport and aerospace, and ran the analyses.

Table VI summarises the results of the logistic regression analysis. First, all of the logit models were statistically significant and yielded Chi-square statistics with p-values less than 0.001. The Nagelkerke pseudo R^2 values indicated that the models explained between 20 and 43 per cent of the variance in GRI-based reporting. In prior studies, R^2 values are between 3 and 46 per cent (Jennifer Ho and Taylor, 2007), between 16 and 18 per cent (Artiach *et al.*, 2010), between 4.8 and 44 per cent (Kuzey and Uyar, 2017), 4 per cent (Legendre and Coderre, 2013) and 20 per cent (Kolk and Perego, 2010). This demonstrates that the R^2 values in our study are at moderate level and are not weaker than those in prior studies. However, other than the financial variables used in the study, non-financial factors might influence sustainability reporting practices (Keerasuntonpong *et al.*, 2015; Viljoen *et al.*, 2016), such as internal (i.e. board characteristics), media exposure and regulatory factors. Thus, the findings highlight further research avenues regarding the inclusion of other factors, which might improve the explanatory power of the models.

The results suggested that there is a positive and statistically significant relationship between GRI-based reporting and firm size ($\beta 1 = 0.684$, 0.998, 0.915, 0.672, 0.706 and 0.936 with p-value < 0.01 in all models). Similarly, there is a positive and statistically significant association between GRI-based reporting and the leverage of a firm ($\beta 4 = 2.35$, 2.645 and 4.387, with p-value < 0.01 in all three models including all firms in the aviation industry). However, this relationship is not confirmed by three clusters of business types. In contrast, GRI-based reporting is negatively related to the ownership structure of a company in all models with significant p-values < 0.01, except in aerospace companies ($\beta 6 = -2.193$, -1.184, -4.013, -2.263 and -2.322). In addition, free cash flow per share, profitability and growth turned out to have no effect on GRI-based reporting.

In addition, we associate the GRI-based report count of a company with its financial indicators using the same set of independent variables through Poisson regression. Poisson regression is a standard model used for count data (Cameron and Trivedi, 2013) and is appropriate for modelling the GRI-based report count. Some previous similar studies have run Poisson regression because their dependent variables were count data

Table VI.
Logistic regression analysis

	2006-2015				2011-2015	2015
	ALL	Airline	Airport	Aerospace	ALL	ALL
Ln (firm size)	0.684 (0.059) **	0.998 (0.112) **	0.915 (0.164) **	0.672 (0.129) **	0.706 (0.072) **	0.936 (0.183) **
Free cash flow per share	−0.018 (0.023)	0.048 (0.038)	0.087 (0.048)	−0.117 (0.072)	−0.003 (0.031)	−0.045 (0.07)
Profitability (ROA)	−0.085 (1.579)	−1.656 (2.267)	−3.827 (3.516)	−7.279 (4.215)	−0.026 (1.876)	8.173 (4.075)
Leverage	2.35 (0.473) **	1.048 (0.769)	−0.563 (1.092)	−1.903 (2.054)	2.645 (0.596) **	4.387 (1.388) **
Growth	−0.664 (0.376)	−1.04 (0.647)	−0.2 (0.607)	0.366 (0.639)	−0.393 (0.469)	−0.964 (2.226)
Ownership	−2.193 (0.314) **	−1.184 (0.454) **	−4.013 (0.744) **	−0.134 (1.001)	−2.263 (0.391) **	−2.322 (0.886) **
Constant	−11.636 (0.915) **	−16.222 (1.771) **	−12.293 (2.203) **	−13.022 (2.167) **	−11.726 (1.081) **	−16.131 (2.804) **
No. of observations	1,864	563	390	911	1,060	225
−2 log likelihood	1,048.46	462.79	264.74	170.24	698.65	135.56
χ^2	284.46	145.66	80.19	37.059	207.84	65.57
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Pseudo R^2(Nagelkerke)	0.28	0.35	0.32	0.20	0.31	0.43

Note: **Variable is significant at the 0.01 level

(Donnelly and Mulcahy, 2008; Uyar and Kılıç, 2012b). Hence, we formulated the mathematical model as below:

$$GRI\ Report\ Count_t = \beta_0 + \beta_1 Ln\,(Firm\ Size)_t + \beta_2 Free\ Cash\ Flow\ per\ Share_t + \beta_3 ROA_t + \beta_4 Leverage_t + \beta_5 Growth_t + \beta_6 Ownership_t + \varepsilon.$$

Table VII presents the results of the Poisson regression. Poisson regression model was statistically significant (Likelihood Ratio Chi-square: 288.163; p-value < 0.001).

The results suggested that there are positive and statistically significant relationships between GRI report count and firm size ($\beta 1 = 0.629$ with p-value < 0.01) and between GRI report count and leverage ($\beta 4 = 2.112$ with p-value < 0.01). Conversely, GRI report count was negatively associated with the ownership structure of a company ($\beta 6 = -1.31$ with corresponding significant p-values < 0.01). In addition, free cash flow per share, profitability and growth turned out to have no effect on GRI report count.

Another noteworthy examination was carried out to investigate the link between the declaration of application level of GRI-based reports of a company with its financial indicators. GRI application level reflects the extent of GRI reporting framework coverage. GRI application level depends on standard disclosure guidelines. In our period of interest, 2006-2015, GRI guidelines coded as 3, 3.1 and 4 were commonly followed. In the analyses, application levels for GRI 3 and 3.1 guidelines were coded from 1 to 7, where 1 is used for an undeclared application level, 2 is for C level, 3 for C+, 4 for B, 5 for B+, 6 for A and 7 for A+ level. On the other hand, application levels for GRI 4 guidelines were coded at 3 levels: 1 for undeclared reports, 2 for Core and 3 for Comprehensive "in accordance" options. An ordered logistic regression model is appropriate for the analysis as the GRI application level is an ordinal dependent variable (Fullerton, 2009; Legendre and Coderre, 2013; Kuzey and Uyar, 2017). The mathematical model of the relationship is formulated as follows:

$$GRI\ Application\ Level_t = \beta_0 + \beta_1 Ln\,(Firm\ Size)_t + \beta_2 Free\ Cash\ Flow\ per\ Share_t + \beta_3 ROA_t + \beta_4 Leverage_t + \beta_5 Growth_t + \beta_6 Ownership_t + \varepsilon$$

Table VIII presents the results of the ordered logistic regression analysis.

	2015
Intercept	−9.561 (0.768) **
Ln (firm size)	0.629 (0.05) **
Free cash flow per share	−0.02 (0.022)
Profitability (ROA)	1.941 (1.279)
Leverage	2.112 (0.406) **
Growth	−0.37 (0.661)
Ownership	−1.31 (0.268) **
No. of observations	225
Likelihood Ratio Chi-square	288.163
p-value	<0.001

Note: **Variable is significant at the 0.01 level

Table VII.
Poisson regression analysis

The results implied that the relationships between GRI application level and firm size ($\beta 1$ = 0.64, = 0.908 with p-value < 0.01), and between GRI application level and the leverage ($\beta 4$ = 1.352, = 4.93 with p-value < 0.01) are positive and statistically significant at sustainability reports prepared in accordance with both GRI 3 & 3.1, and GRI 4 frameworks. The association between GRI application level and growth, and GRI application level and ownership is not robust across the models. In addition, free cash flow per share and profitability had no effect on GRI application level.

Finally, we tested the hypothesis that firm performance is related to GRI-based reporting behaviour and other financial indicators of a firm. We used Tobin's Q ratio, the ratio of market capitalisation and total debt to total assets, as a proxy for firm performance. The mathematical form of the model is written below:

$$TOBINQ_t = \beta_0 + \beta_1 GRI_{t-1} + \beta_2 Ln\,(Firm\ Size)_t + \beta_3 Free\ Cash\ Flow\ per\ Share_t + \beta_4 ROA_t + \beta_5 Leverage_t + \beta_6 Ownership_t + \varepsilon.$$

In this model, we assumed that a GRI-based report published in a given year influences the firm performance of the succeeding year. Hence, we used the lagged form of the GRI variable. Table IX summarises the results of the regression analysis. The regression models

Application Level	GRI 3 and 3.1	GRI 4
Ln (firm size)	0.64 (0.062) **	0.908 (0.182) **
Free cash flow per share	−0.013 (0.025)	0.032 (0.069)
Profitability (ROA)	−1.518 (1.695)	−0.257 (4.047)
Leverage	1.352 (0.509) **	4.930 (1.344) **
Growth	−0.046 (0.019) *	1.408 (1.144)
Ownership	−2.327 (0.346) **	−1.674 (0.856)
No. of observations	1,502	221

Notes: **Variable is significant at the 0.01 level; *variable is significant at the 0.05 level

Table VIII.
Ordered logistic regression analysis

	2006-2015	2015
GRI (lagged)	0.015 (0.038)	−0.168 (0.102)
Ln (firm size)	−0.047 (0.007) **	−0.031 (0.021)
Free cash flow per share	−0.008 (0.004)	0.004 (0.013)
Profitability (ROA)	3.266 (0.197) **	3.386 (0.555) **
Leverage	0.112 (0.069)	0.117 (0.21)
Ownership	0.238 (0.044) **	0.182 (0.134)
Constant	1.355 (0.091) **	1.275 (0.282) **
No. of observations	1,543	190
F-stat	58.822	7.858
p-value	<0.001	<0.001
Adjusted R^2	0.18	0.18

Note: **Variable is significant at the 0.01 level

Table IX.
Regression analysis for TOBINQ

were statistically significant with the associated F-statistic and their corresponding p-values (less than 0.001).

The results indicated that there is no relationship between TOBINQ and GRI-based reporting. It turned out that firm performance was independent of sustainability reporting activities. Other results presented a positive and statistically significant relationship between TOBINQ and profitability (β_4 = 3.266 and 3.386 with p-value < 0.01 in both models, respectively). In addition, free cash flow per share and leverage turned out to have no effect on TOBINQ (firm performance). The relationships between TOBINQ and firm size and between TOBINQ and ownership were not robust across the models.

6. Discussion

According to the research findings, the firm size increases the likelihood of GRI-based report publishing, as well as the number of published GRI-based reports in the aviation industry. Therefore, we accepted *H1*. This result is consistent with many prior findings, which denoted a positive association between firm size and the decision to publish GRI-based sustainability reports (see, for example, Legendre and Coderre, 2013; Martínez-Ferrero *et al.*, 2013; Kend, 2015). One possible explanation for this positive association between the firm size and GRI-based reporting is provided by legitimacy theory. From the perspective of this theory, larger companies must seek a greater level of legitimacy for their operations as they have higher public visibility than smaller companies (Branco and Rodrigues, 2008). Therefore, larger companies might attach more importance to sustainability reporting as part of their legitimation strategies (Branco and Rodrigues, 2008). Another possible explanation regarding this positive association is that larger companies might tend to disclose higher levels of voluntary information than smaller companies as they have more resources to collect and report data (Naser *et al.*, 2006). This explanation was confirmed by the study of Sheldon and Park (2011), in which the authors revealed that one of the major reasons that companies cited for not undertaking CSR reporting was limited resources.

In line with our expectations, the results of the research revealed that the possibility of GRI-based reporting increases as the leverage and the ratio of total debt to total assets increase. Thus, we accepted *H2*. Our finding was similar to that of Simnett *et al.* (2009), who determined a significant and positive impact of leverage on the decision to produce stand-alone sustainability reports. The companies in the aviation industry rely highly on debt to finance their operations, which might indicate that creditors represent a strong stakeholder group for the companies in this industry. Therefore, the companies in the aviation industry might tend to disclose more information to assure creditors about their ability to pay their obligations. Further, companies with high leverage are more prone to higher levels of agency costs (Alsaeed, 2006) and monitoring costs (Naser *et al.*, 2006). In addition, as highly leveraged companies are seen as risky, they will face difficulties in accessing financial resources from banks or stock markets if they do not disclose detailed information about their operations (Naser *et al.*, 2006). Hence, to reduce agency and monitoring costs, as well as to access additional financial resources, highly leveraged aviation companies might tend to disclose higher levels of information through several communication channels, including GRI-based reports. However, although this relationship was confirmed in models comprising all types of aviation companies, it was not verified in three sub-models established for three aviation sub-sectors (i.e. aerospace, airline and airport). This might be attributable to the following two reasons: shrinking sample sizes after decomposition of the whole sample or varying capital structure decisions of those three types of aviation sub-sectors.

Our findings do not support *H4* because the impact of ownership diffusion on issuing GRI-based sustainability report is found to be significant and negative in the aviation industry. This finding supports the results presented by Wang *et al.* (2013) and Drobetz *et al.* (2014), who determined that as the ownership concentration percentage increases, the level of CSR disclosures increases. Our findings are also in compliance with Uyar *et al.* (2013), who found a negative relationship between ownership diffusion and corporate voluntary disclosures. One possible explanation for this negative association between ownership diffusion and sustainability reporting could be that shareholders of companies with dispersed ownership structures might have little incentive or ability to monitor the managers (Drobetz *et al.*, 2014). Therefore, dispersion of the shareholders weakens the monitoring process within the companies, which can reduce the pressure on management to disclose voluntary CSR information (Naser *et al.*, 2006).

Our findings denoted an insignificant association between free cash flows and the issuing of GRI-based reports. Therefore, we rejected *H6*, which proposed that free cash flow has a significant impact on GRI-based reporting. This result is in congruence with Artiach *et al.* (2010) and Kuzey and Uyar (2017), who failed to determine an insignificant link between free cash flows and sustainability reporting. A possible explanation for this insignificant association might be attributable to agency theory. According to Jensen (1986), excess free cash flow is a reason for conflict between shareholders and managers, increasing agency costs. Thus, managers who hold excess free cash flow might refrain from disclosing more information to avoid this adverse effect. Another reason might be low economic performance, which influences firms' ability to undertake sustainability programmes to meet social demands (Ullmann, 1985; Artiach *et al.*, 2010).

Further, we determined that profitability does not significantly impact the likelihood of GRI-based report publishing. Therefore, this finding rejects *H3*. Our findings corroborate the results presented by Kent and Monem (2008), Reverte (2009), Andrikopoulos *et al.* (2014), Shamil *et al.* (2014) and Kuzey and Uyar (2017). Indeed, in a straightforward manner, profitable companies are expected to produce GRI-based reports because they are under more intense public scrutiny, which causes them to engage in social responsibility activities and disclosures to legitimise their activities (Branco and Rodrigues, 2008). However, the aviation sector has a low level of ROA (5.1 per cent) during the analysis period, and therefore, aviation companies might not feel the pressure of legitimising their existing level of profit, which in turn means that they are not sufficiently motivated to issue sustainability reports.

With regard to *H5*, we found no significant association between growth opportunities and GRI-based reporting. Our findings are in congruence with the prior literature's proposal that there was no significant association between growth opportunities and sustainability reporting (Debreceny *et al.*, 2002; Eng and Mak, 2003; Frias-Aceituno *et al.*, 2014; Kuzey and Uyar, 2017). The general expectation is that companies with high growth opportunities are more likely to publish stand-alone sustainability reports to mitigate information asymmetry and to reduce agency costs (Bushman and Smith, 2001). However, there is an opposing view that high-growth companies are less likely to disclose voluntary information as they are more prone to proprietary costs associated with proprietary information disclosures, placing them at a competitive disadvantage (Debreceny *et al.*, 2002). This issue may cause an insignificant link between growth and sustainability reporting because high-growth companies might be unwilling to disclose additional information through publishing separate sustainability reports to avoid proprietary costs.

Our results showed that GRI-based reporting does not have a significant impact on firm value in the aviation industry, in contrast to *H7*, suggesting a positive link between these two variables. Thus, this finding indicates that investors do not attribute significant positive

value to the publication of GRI-based sustainability reports. This finding is in compliance with Murray *et al.* (2006), who failed to determine a significant impact of social and environmental disclosures on company share returns. This finding also confirms the results reported by Carnevale *et al.* (2012), which revealed insignificant associations between market value and the publishing of a stand-alone sustainability report. This insignificant association could be interpreted as the investors not being able to understand the information included in the sustainability report and hence not attaching any value to this report (Carnevale *et al.*, 2012). For instance, Cowper-Smith and de Grosbois (2011) reported that the CSR reporting practices of different airline companies are inconsistent due to a lack of standardised reporting, making it very difficult to perform meaningful comparisons. Lack of standardisation and harmonisation in sustainability reporting can harm the investors' ability to understand the information published within stand-alone sustainability reports. Therefore, investors might not assign value to the publication of such reports. In contrast, investors might be able to understand the information presented within sustainability reports, but they might believe that it is not relevant to attach a value to these reports (Carnevale *et al.*, 2012). Finally, it is probable that investors respond only to airline firms' socially irresponsible activities (negatively), while they are indifferent to socially responsible activities (Kang *et al.*, 2010).

One of the notable contributions of this paper is to investigate the potential determinants of application level of sustainability reports, as this issue has rarely been examined in prior studies (Legendre and Coderre, 2013; Ruhnke and Gabriel, 2013; Kuzey and Uyar, 2017). This study also responds to those prior studies' call for further research to provide additional evidence on this topic. The findings indicate that larger firms and highly leveraged firms are more likely to publish sustainability reports with high application levels, which is in line with agency theory. This is because higher level reports imply the disclosure of more comprehensive reports that might be more effective in reducing the conflicts between insiders and outsiders. On the contrary, negative association between GRI application level and growth might be attributable to the avoidance of proprietary costs, as discussed in preceding paragraphs (Debreceny *et al.*, 2002). The negative association between GRI application level and ownership structure might be due to the fact that dispersion of the ownership weakens the monitoring of management behaviour (Naser *et al.*, 2006; Drobetz *et al.*, 2014).

Table X summarises the outcomes of the hypothesis testing.

Hypothesis:	Direction of association for report existence (based on logistic regression)	Direction of association for report count (based on Poisson regression)	Direction of association for application level of report (based on ordered regression)
H1: Firm size	Positive	Positive	Positive
H2: Free cash flow per share	Not significant	Not significant	Not significant
H3: Profitability	Not significant	Not significant	Not significant
H4: Leverage	Positive	Positive	Positive
H5: Growth	Not significant	Not significant	Negative (partially supported)
H6: Ownership structure	Negative	Negative	Negative (partially supported)
H7: Firm value	Not significant*		

Note: *To test this hypothesis, we ran a separate ordinary least squares regression

Table X. Acceptance/rejection of hypotheses (based on main models)

7. Conclusions

The purpose of this study was to investigate something that had not been examined before: what affects GRI-based sustainability reporting and its relationship with firm performance in the aviation industry. For this purpose, we derived data from the GRI SDD and the Thomson Reuters EIKON database; from the former, we downloaded GRI-based reports, and from the latter, we downloaded financial data. We performed four-level analysis: report existence, report count, application level of report and firm performance. The results are partially in line with what we expected.

First, we based our analysis on the existence of GRI-based sustainability reports, which yielded that firm size and leverage are positively associated with sustainability reporting. Contrary to expectations, ownership was negatively associated. Furthermore, free cash flow per share and profitability did not have significant effects on sustainability reporting, against our expectations. These findings might imply that larger and highly leveraged aviation companies are more likely to issue sustainability reports, to avoid agency costs and/or to legitimise themselves. These results are expected, in agreement with prior studies. Moreover, aviation firms with diffused ownership not issuing sustainability reports might create information asymmetry between principles and agents; thus, they are advised to disclose sustainability issues to shareholders. Not having the significant effects of free cash flow, profitability and growth rate on sustainability reporting is also against expectations and does not support the argument of holding more resources to help issue sustainability reports.

Second, we explored the factors impacting the GRI-based report count (numbers of total published reports within the examination period) and application levels of GRI-based reports within the period of interest. Compared to the preceding analysis, there were no notable surprises. We found additional evidence that growth is negatively associated with the application levels of reports (partially supported). As a result, report existence, report count and report level results largely confirm each other. Therefore, similar discussions apply to the findings of this analysis on the association between corporate characteristics and GRI report count and between corporate characteristics and GRI report application level.

Finally, we tested the effect of sustainability reporting on firm performance, which did not produce significant results. Thus, in the aviation industry, sustainability reporting does not impact firm performance positively. In other words, stockholders do not care whether the companies issue reports. Stockholders might be overly focussed on financial performance in their decision-making. Alternatively, another plausible explanation is that investors might consider sustainability reporting as an expected routine or unimportant event. Finally, shareholders might consider sustainability reporting to be only a tool for "greenwashing", thereby not viewing it as a true value-generating activity (Dienes *et al.*, 2016). However, there is an opportunity for firms to reap the benefits of sustainability initiatives. To do so, firms are advised to deeply integrate sustainability initiatives into business activities, which helps reputation building and eventually enhances economic performance (Schaltegger *et al.*, 2012; Pérez, 2015). In reputation building, corporations might communicate their sustainability initiatives through various channels, such as corporate reports (i.e. standalone sustainability reports and annual reports), corporate websites, press releases and GRI databases. In communicating with shareholders, linking sustainability initiatives to key business metrics, such as customer satisfaction, corporate governance, employee retention and risk management, might impact perceptions positively and ultimately might serve the purpose of firm value maximisation (Du *et al.*, 2010).

Our study has several implications for companies in the aviation industry, regulatory bodies and other stakeholders. First, our findings show that larger and highly leveraged aviation firms can reduce agency and legitimacy costs through sustainability reporting. Surprisingly, the same assumption did not hold for ownership structure, as firms with a diffused ownership base tend not to publish sustainability reports. Thus, boards are advised to establish and improve monitoring mechanisms in these types of firms. Second, although the number of aviation companies publishing separate sustainability reports has increased significantly over the years, almost half of the companies are not still producing sustainability reports. Hence, if the aviation industry believes the merits of engaging in sustainability issues and sincerely desires to enhance its sustainability reporting practices, we can suggest the following initiatives. Boards of directors might encourage companies to incorporate sustainability issues into company operations by assigning the necessary financial and human resources to engage in sustainability efforts. The boards might also establish a separate sustainability committee or department, which could focus on sustainability issues and reporting practices. Regulatory bodies could also encourage aviation companies to act in a socially and environmentally responsible manner by proposing legal requirements and providing guidance. Our findings indicate that 85 per cent of stand-alone sustainability reports are prepared in compliance with the GRI framework, indicating that this framework has become the most widely accepted framework among the companies in this sector. Therefore, aviation companies might be encouraged to adopt a GRI framework to present their sustainability initiatives. The adoption of a GRI framework might ensure comparability across sustainability reports. The enhanced comparability of sustainability reports would improve an investor's ability to understand the information published within these reports and would contribute to the investor's tendency to assign value to the publication of such reports. Further, our findings indicate that aviation companies are highly reliant on debt to finance their investments, implying that lenders might be a strong stakeholder group in this sector. Therefore, lenders might play a significant role in orienting aviation companies towards considering sustainability issues in their reporting practices by including sustainability criteria in lending policies.

The results provide practical implications for the aviation industry, as well as for various stakeholders. Our study, which focusses on only the aviation industry rather than studying it with other sectors, serves the purpose of alerting the industry executives and managers and relevant stakeholders and organisations. As one of the sectors under the spotlight, it deserves to be the subject of a separate study due to its effects on the environment and society. Second, as documented in the descriptive statistics, we could not find sustainability reports from 179 aviation companies of the 284 companies listed in the Thomson Reuters EIKON database for the period of analysis, indicating that there is a large gap to fill in terms of sustainability reporting in the industry. Third, our study is a contribution to sustainability reporting and aviation industry specifically; however, it also contributes to the corporate governance practices in broader terms because sustainability reporting alleviates information asymmetry between managers and shareholders, leading to less agency conflict. Fourth, the investment community, including investors and analysts, might also use the findings of this study in formulating their portfolios (Inoue and Lee, 2011). Finally, sustainability reporting is currently a voluntary disclosure in many countries worldwide; it might be mandated by jurisdictions in, at least, environmentally sensitive industries, such as the aviation industry. Thus, policymakers and national and supra-national organisations might assume some roles for the improvement of sustainability practices and reporting. Finally, this study is solely based on reporting; thus, it is not measuring the existence or strength of the link between sustainability performance

and reporting. We keep an optimistic view and hope that the aviation industry is reporting what it is doing. Otherwise, the reporting alone remains as just greenwashing (Dienes *et al.*, 2016). In this sense, reporting alone is a not a remedy of current social responsibility concerns of stakeholders.

The study's sample is limited to the aviation industry; thus, the results might not be validated in other industries. Our study might be replicated in other sustainability-sensitive industries, such as hospitality and tourism, energy and chemical industries. Moreover, other than the investigated variables in this study, there might be additional factors that could likely influence sustainability reporting, such as having an ISO 14001 certification (Yusoff *et al.*, 2013), being subject to media exposure (Hahn and Kühnen, 2013), ownership structures, board structures and board diversity (Kiliç *et al.*, 2015) and affiliation with a multinational corporation (Momin and Parker, 2013). Further studies incorporating these variables might improve the explanatory power of the study models. Finally, we have not considered firm-specific mergers and acquisitions and other events (if any), which are out of the scope of this study; thus, the findings should be considered accordingly. We believe that a future study might be designed to assess whether these kinds of conditions might impact the sustainability reporting behaviour of firms.

Note

1. The International Air Transport Association (IATA) expects an increase in passenger demand and cargo transportation by 2018 (IATA, 2017).

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