

An Analysis of Sustainability Reporting Practices of the Global Airline Industry

Eljas Johansson

Department of Management, Faculty of Management and Economics, Gdańsk University of Technology, Gdańsk, Poland

eljas.johansson@pg.edu.pl

Abstract: Sustainability reporting (SR) has become a standard practice for many organisations worldwide. The purpose of this paper is to explore and develop our understanding of the global airline industry's SR practices. Content analysis was employed to map which reporting frameworks the global commercial airline industry has recently used to report their non-financial impacts. Additionally, comparisons were made in the application of SR between geographical regions. The results indicate that two-thirds of the global airline companies had not published sustainability reports online (reporting period 2019). The Global Reporting Initiative (GRI) was the most widely used reporting instrument from the five major non-financial reporting organisations' frameworks. Also, over two-thirds of the reports had used the Sustainable Development Goals (SDGs) as a reference framework or referenced SDGs in other ways. This paper provides one of the broadest overviews of global airline SR practices. It is expected that the results will be of interest to practitioners and scholars in aviation SR.

Keywords: airline industry, CDP, global reporting initiative, reporting framework, sustainability reporting, sustainable development goals

1. Introduction

According to a recent global survey conducted by KPMG (2020), sustainability reporting (hereafter SR) amongst the 250 largest companies by revenue has risen from 35% in 1999 to 96% in 2020. Also, the same survey noted an increase in reporting from 24% to 80% amongst a sample of 5,200 large and mid-cap firms, comprising the top 100 companies by revenue in each of the survey's 52 countries and jurisdictions. Since SR has become mainstream practice across all sectors, it is also relevant and important for airlines, which in 2019 constituted an \$838 billion industry in revenue (IATA, 2020a), transporting about 4.5 billion passengers worldwide while supporting nearly 88 million jobs in global aviation and related tourism (ATAG, 2020). Despite the industry's economic contributions, the societal concerns over flying and its climate impact have grown. Thus, the demand for more meaningful climate-related reporting is likely to increase, making it worthwhile to explore the industry's SR practices.

In order to demonstrate accountability in the area of climate impact, airlines can disclose GHG (greenhouse gas) information about their performance in sustainability reports. The credibility of information in these reports has been associated largely with the use of the external reporting frameworks, notably the Global Reporting Initiative (GRI) (KPMG, 2013), which has become the most prominent SR framework worldwide (e.g. KPMG, 2020), also in the aviation sector (Karaman et al., 2018). Additionally, many companies report their GHG information by participating in CDP's annual climate change survey (CDP, 2022).

The purpose of this paper is to contribute to the still relatively young and underexamined research area of airline SR. This is evident in Zieba and Johansson's (2022) recent systematic review, according to which the first scholarly papers touching upon this topic were published in 2005, and by 2019 only 23 related papers had been published. In recent years, the application of GRI in SR has become one of the central themes in this research, yielding some interesting findings. For example, statistical analyses have demonstrated that the firm size is likely to increase the implementation of GRI (Karaman et al., 2018) and that aviation companies based in countries with a strong governance structure and high social and environmental standards are more likely to engage in such reporting (Kılıç et al., 2019). Additionally, recent quantitative content analyses have contributed to our understanding of the development and scope of environmental, social and economic disclosure in airlines' GRI-based reporting (Yang et al., 2020; Zhang, 2021).

While the increasing application of GRI in the airline industry has undoubtedly provided convenient data for researchers to analyse the determinants and extent of GRI reporting, we know very little about what other frameworks airlines use to report their sustainability and climate-related information. This short study aims to fill this gap by addressing the following research question: *What reporting frameworks are currently used in the global commercial airline industry's sustainability reporting?*

The following section provides an overview of non-financial reporting and the commonly used SR frameworks. Next, the paper explains the research method used to address the research question, followed by a presentation of the results. Finally, concluding remarks, limitations and recommendations for future studies are presented.

2. Review of sustainability reporting and related frameworks

Non-financial reporting originated in the 1970s when its practice evolved from making social disclosures to producing broader social and environmental reports in the 1990s, which after the Millennium became increasingly combined and known as sustainability reports (Fifka, 2013). Regardless of many large corporations worldwide engaged in SR, the practice has remained largely voluntary in most countries (Tyson and Adams, 2020). However, recent evidence indicates intensified policy developments towards mandatory disclosure requirements introduced by (self-)regulatory actors (Van der Lugt et al., 2020). For example, the European Commission has set a directive for non-financial reporting (NFRD), requiring large public-interest entities with over 500 employees to disclose certain non-financial information from 2018 onwards (Hahnkamper-Vandenbulcke, 2021). The Commission also published non-binding guidelines on reporting (European Commission, 2017), later supplemented with guidelines on reporting climate-related information (European Commission, 2019). It is worth noting that NFRD (still) leaves flexibility to companies regarding the aspects disclosed and how the reporting is operationalised (Hahnkamper-Vandenbulcke, 2021).

SR can generally be done in conjunction with annual reports or published as stand-alone reports. A third type of report, an integrated report, has also emerged, incorporating financial and sustainability information into a single document, emphasising the relationship between financial and non-financial performance (Owen, 2013). Also, some believe that in the loosest sense, any report can be identified as a sustainability report if it explains how the company meets its sustainability challenges (Schaltegger et al., 2003). Others are stricter, asserting that sustainability reports must include qualitative and quantitative data about how companies manage their economic, environmental, and social impacts (Daub, 2007).

It is also increasingly recommended that companies report only issues that are significant for them and their stakeholders to maintain their relevance (GRI et al., 2015). Such issues are often referred to using the term 'materiality', which is initially a financial accounting concept (Jones et al., 2015), where an issue is considered material if its omission or misstatement influences the economic decision of users (Dosal, 2013). Addressing materiality in SR is argued to be more challenging for companies because there is less consensus on what constitutes materiality in a non-financial context (Jones et al., 2015).

The lack of clarity of how to operationalise SR is argued to be reflected in the existence of numerous sustainability performance indicators and the varying ways of applying them (Antolín-López et al., 2016). Indeed, various SR frameworks have emerged to guide corporations in SR. Five major non-financial reporting organisations are the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), the International Integrated Reporting Council (IIRC), the Climate Disclosure Standards Board (CDSB), and CDP (formerly Carbon Disclosure Project) (KPMG, 2020). Table 1 outlines the key characteristics of these organisations' reporting instruments, their target audience, where the disclosure is placed, and a brief description of their associated environmental and climate-related information. The frameworks summarised in the table should not be seen as competing ones but rather something complementing each other. In fact, the "group of five" has argued and indicated pursuing alignment in areas of environmental, social and governance (ESG) disclosures (CDP et al., 2019). The consortium has also indicated that their frameworks align against the recommendations set forth by Task Force on Climate-related Financial Disclosures (TCFD) (CDP et al., 2019).

The G20's Financial Board initiated TCFD to develop a set of recommendations, published in a report in 2017, to encourage financial institutions and non-financial companies to disclose information on climate change-related risks and opportunities (Hahnkamper-Vandenbulcke, 2021). The report structured these recommendations around four thematic areas: governance, strategy, risk management, and targets; which are supported by guidance on specific disclosures for all sectors and supplemented disclosures for certain sectors that organisations should include in their mainstream financial filings, providing decision-useful information for investors in understanding material risks (TCFD, 2017). Worth mentioning is that the report identified the transport sector and its associated passenger air transportation industry amongst those that would benefit from the TCFD's supplemental guidance.

Table 1: Commonly referenced sustainability frameworks

	Description	Target audience	Disclosure location	Environmental/Climate-related information
GRI	GRI is an independent, international organisation established in 1997, offering a framework for businesses and organisations for sustainability reporting. In 2016, it transitioned from guidelines to set the first global standards for SR. ^a	Various stakeholder groups ^{b,c}	Sustainability or annual report or other published material including information on sustainability ^c	Comprises topic-specific standards to report climate change when identified as a material topic ^e
SASB	Independent standard-setting organisation, established in 2011, setting industry-specific sustainability disclosure standards and sustainability matters that are financially material. ^a	Investors ^{b,c}	SEC filings ^{b,c}	Information on sustainability topics deemed material, standardised metrics by industry. ^c
IIRC	Formed in 2010 ^b , IIRC is a coalition of various stakeholders, promoting value creation as part of corporate reporting to establish integrated reporting and thinking within the mainstream business practice as the norm in public and private sectors. ^{a,e}	Investors ^{b,c}	Integrated annual report or standalone sustainability report ^{b,c}	General challenges related to climate change, loss of ecosystems, and resource shortages. ^c
CDSB	CDSB is a global consortium consisting of businesses and environmental NGOs, providing a framework for reporting environmental information. Initially, in 2010, the framework focused on risks and opportunities concerning climate change and GHG, but it was later expanded to cover other environmental information and natural capital. ^d	Investors ^d	Mainstream annual financial reporting. ^{d,e}	The framework consists of 7 guiding principles and 12 reporting requirements, which set out the 'how' and 'what' for reporting relevant and material environmental and climate-related information. ^e
CDP	Established in 2000 ^b , CDP is a not-for-profit charity running the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts. ^f CDP facilitates both reporting and ranking. ^b	Investors ^c and other stakeholders ^b	Questionnaire ^b submitted to CDP database ^c	Information on climate change risk procedures and opportunities, energy use and GHG emissions. ^c

^aHahnkamper-Vandenbulcke (2021). ^bDeloitte (2016). ^cTCFD (2017). ^dUN Global Compact and Deloitte (2010). ^eCDP et al. (2019)

Besides the group of five and TCFD recommendations, other often referenced SR frameworks include the United Nations Global Compact (UNGC), the UN Sustainable Development Goals (SDGs), and ISO 26000 (Guidance on Social Responsibility) (e.g. Hahnkamper-Vandenbulcke, 2021).

The UNGC was launched in 2000 to call companies worldwide to align their strategies and operations with its ten principles in human rights, labour, environment, and anti-corruption and support broader UN goals (UN Global Compact and Deloitte, 2010). In 2004, UNGC began to request its signatories to produce Communication on Progress (CoP), which serves as the initiative's primary accountability measure based on commitments from companies to make progress towards the ten principles (Hahnkamper-Vandenbulcke, 2021). The overall format of CoP is flexible, but the signatories should incorporate it into their main stakeholder communication like SR (UN Global Compact, 2013).

As part of the broader UN goals, SDGs were introduced in 2015 as 17 global goals for sustainable development, ranging from ending world poverty to taking action to combat climate change by 2030 (Rosati and Faria, 2019). Organisations can use SDGs as a reference framework to improve their sustainability engagement (Schönherr et al., 2017) and subsequently as a framework to report publicly on how they address the SDGs (Rosati and Faria, 2019). Soon after introducing the SDGs, the GRI, UNGC and WBCSD (2015) published a guide, SDG Compass to

help companies harness the SDGs. Later on, at least GRI (2021; GRI and UNGC, 2018), SASB (2020), and IIRC (Adams, 2017) have all provided additional guidance on SDG reporting.

Another guide supporting companies' SR efforts comes from the International Organization for Standardization (ISO), whose ISO26000, published in 2010, guides organisations on communicating their commitments, performance and other information related to social responsibility (Hahnkamper-Vandenbulcke, 2021). The guidance addresses seven core subjects, one of which covers issues related to the environment (ISO, 2018). Unlike some other ISO standards, ISO26000 provides guidance rather than requirements and thus cannot be considered a certification (Hahnkamper-Vandenbulcke, 2021). The guidance is also compatible to be used in conjunction with UNGC (2010), GRI (Bastian Buck et al., 2014) and IIRC (ISO, 2015).

All in all, the current sustainability and climate reporting landscape can seem like a jungle of acronyms consisting of standards and frameworks with synergies, overlaps and differences. On the one hand, there exists cooperation in the development and support of these instruments, which all aim to accomplish similar goals of promoting sustainability; on the other hand, various standard-setters and reporting organisations can be seen competing for control and dominance in the field of non-financial reporting and potential users (Zinenko et al., 2015). In this respect, GRI has become widely recognised as the leading voluntary guideline for SR (KPMG, 2017, 2020). Since its first guidelines, introduced in 2000, its framework has been updated several times, with the most recent edition, GRI Standards, in 2016 (Sisaye, 2021).

GRI emerged as a framework to standardise, simplify and globalise SR that lacked comparability. Brown et al. (2009) recognise its scope, flexibility (descriptive quantitative measures) and stakeholder base (wide range of industries, organisations and movements) as reasons for its global success. The authors identify that the GRI's original strategy, which enabled it to grow, was based on three revolutionary goals: 1) to form a broad collaborative coalition of various actors of the same political or policy network to discuss and create rules; 2) to build a sense of ownership of the new rules and practices among the collaborators, and; 3) to establish GRI as a steward of the guidelines. This strategy meant that GRI would become an everchanging document produced not by the steering organisation but by the users for other users. Brown et al. (2009) note that while thousands of actors have contributed to the GRI's development, the proportion of NGOs and such kinds of organisations have declined. The authors argue that this was a tactical decision by GRI to ensure the attendance of large global organisations. Other scholars (e.g. Milne and Gray, 2013) have also raised doubts over the credibility of GRI and whether its implementation reflects companies' actual practices.

From the theoretical perspective, SR is often explained in the light of the overlapping legitimacy theory and stakeholder theory, both of which are based on the notion that there exists a social contract between an organisation and those affected by its actions, where the organisation agrees to perform socially desired actions to gain approval of its operations (Deegan and Blomquist, 2006). The main difference of the theories in relation to SR is that legitimacy theory discusses the societal expectations in general, and stakeholder theory recognises different stakeholders holding different opinions about how organisations should operate. There has also been a growing interest in examining SR from the institutional theory perspective (Fusco and Ricci, 2019), according to which organisations are influenced by their institutional environment and, thus, try to demonstrate conformity to regulative, normative and cultural-cognitive patterns (Scott, 2013).

3. Methodology

This study sought to identify and describe various frameworks associated with sustainability and climate-related reporting and measure the frequency of their application in the global passenger airline industry. The target population covers airlines whose primary business is to fly commercial flights. Hence, companies primarily operating on-demand flights (i.e., commercial business aviation and private charter) or cargo-only flights were excluded. It was also decided that the scrutinised data would need to cover the airlines' operational year 2019. This decision was made to evaluate reporting from the recent past before COVID-19 disrupted the industry.

The accessible study population was obtained from the International Air Transport Association's (IATA, 2020b) annual review, comprising 297 airlines. This list was supplemented by airlines (n=42) from the Skytrax ranking organisation's list ([skytraxratings.com/airlines](https://www.skytraxratings.com/airlines), extracted on Oct 10, 2020), as some major airlines, especially low-cost carriers, are not members of IATA. As IATA welcomes different types of airlines as its members, cargo airlines (n=25), wet leasing companies (n=3) and private charters (n=1) were removed from the sample.

Additionally, three companies were removed as they had ceased their operations. Consequently, the initial sample consisted of 307 commercial passenger airlines.

To assess the airlines' participation in SR, the research data under scrutiny consisted of sustainability reports. All types of sustainability reports (i.e. annual report, stand-alone report, integrated report) were considered to serve as appropriate data. Reports were searched and downloaded from the airlines' websites or the GRI database. Next, references to SR frameworks informed by the literature review (i.e. GRI, SASB, IIRC, CDSB, TCFD, UNGC, SDGs, ISO 26000) were searched across the reports using keywords corresponding to their names or acronyms. The identified frameworks were recorded on an Excel spreadsheet whose frequencies were measured using pivot tables. The airlines were also sorted by region, based on IATA's classification (i.e. Africa & Middle East, Asia Pacific, China & North Asia, Europe, the Americas) to measure the geographical distribution of SR.

As the submitted CDP questionnaires reside primarily in the organisation's database, the airlines' participation in the CDP's climate change survey was assessed separately using data from the CDP's website (<https://www.cdp.net/en>). As CDP facilitates both reporting and ranking, the level of GHG disclosure was also recorded based on the CDP scoring system, which gives a letter grade for firms according to their response to the questionnaire. The score is based on a four-level scale: Leadership level (A and A-) means that firms look for specific steps to implement best practices in environmental management; Management level (B and B-) indicates firms implementing strategies, policies and actions that address environmental issues; Awareness level (C and C-) indicates that firms assess environmental impacts and; Disclosure level (D and D-) means that firms only respond to the questionnaire (Al-Qahtani and Elgharbawy, 2020). CDP also assigns a grade F to companies invited to participate in the questionnaire but failed to provide sufficient information. Moreover, companies may be left without a score if their response is not eligible. Companies can also request their score to remain private to them and their requesting stakeholders.

4. Results

As indicated above, the sampling procedure resulted in an initial sample of 307 commercial passenger airlines, used as a base for further analysis. The results of this analysis are presented under two subsections. Section 4.1. details the types of reports found and the extent to which these reports have applied or cited various SR frameworks. Section 4.2 examines the airlines' participation in the CDP questionnaire.

4.1 Sustainability reports and frameworks

After the online search, 98 commercial passenger airlines out of 307 (32%) were identified to be represented in sustainability reports. In turn, 209 airlines (68%) had not published sustainability reports or made them accessible online. Table 2 shows that the Americas outperformed other regions in the number of airlines covered in sustainability reports (51%), followed by Europe (38%), Asia Pacific (36%), China and North Asia (20%). African and Middle East airlines were the least represented (8%).

Table 2: Geographic distribution of airlines represented in sustainability reports

Region	No report		Report		Total
	Frequency	%	Frequency	%	
Africa & Middle East	56	92%	5	8%	61
Asia Pacific	38	64%	21	36%	59
China & North Asia	28	80%	7	20%	35
Europe	61	62%	38	38%	99
The Americas	26	49%	27	51%	53
Total	209	68%	98	32%	307

As the level of the following assessment is essentially associated with airline sustainability reports and not the airlines per se, further adjustments were made to the sample. Three reports were removed because they were published in other languages than English, making it difficult to confirm their content. Two reports were removed because they were published by conglomerates whose disclosures on airline division were partly indistinguishable from other divisions. Finally, 49 airlines reported in joint reports published by their parent companies representing multiple airlines. As a result, the number of reports (n=60) taken to further analysis was fewer than the number of airlines represented in these reports (n=93).

A slight majority of the reports were stand-alone reports (57%), of which ‘sustainability report’ was the most used title (see Table 3). Sustainability information was presented in conjunction with financial statements or integrated reports in 38% of the sample. Three airlines (5%) disclosed information in multiple documents holding various titles.

Table 3: Titles used for airline sustainability reports

Report name	Frequency	%
Sustainability Report*	19	32%
Annual Report	16	27%
Sustainable Development Report*	4	7%
Annual Report and Accounts	3	5%
Corporate Social Responsibility Report*	3	5%
Corporate Responsibility Report*	2	3%
Corporate Sustainability Report*	2	3%
Environmental, Social and Governance Report*	2	3%
Integrated Report	2	3%
Annual and Sustainability Report	1	2%
One Report*	1	2%
Social Responsibility Report*	1	2%
Universal Registration Document	1	2%
Multiple documents	3	5%
Total	60	100%

*) stand-alone reports

All reports were screened for the SR frameworks, whose frequencies and geographical distributions are displayed in Tables 4 and 5. GRI was the most widely referenced instrument (60%) from the major non-financial reporting organisation’s frameworks across all regions. Worth noting is that GRI Standards offers two main options for companies to prepare reports: Core and Comprehensive, of which the Core option necessitates less extensive disclosure (GRI, 2016). Companies may also opt for a ‘GRI-reference’ claim, which can be used if they wish to report only on selected topic-specific impacts but are not looking to provide a complete picture of their material topics and related impacts (GRI, 2016). Only one report claimed compliance with the Comprehensive option; 22 (61%) claimed compliance with the Core option, and; 12 (33%) used the reference claim or cited the framework in other ways. Also, one report claimed compliance with the GRI’s previous generation (G4) reporting guidelines.

Concerning the other three major SR organisation’s frameworks, eight reports claimed alignment with or cited SASB (alignment n=6, 10%; cited n=2, 3%), all of which, except for one, were from the Americas, which is unsurprising, given that the target readers of SASB are U.S. investors. Six reports (10%), in turn, had referenced or claimed alignment with IIRC. Interestingly, no report had indicated following CDSB. Also worth noting is that 20 reports made references to none of the major SR frameworks.

Table 4: Application of the major reporting organisations’ frameworks and their geographical distribution

Region	No. of reports	GRI		SASB		IIRC		CDSB	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Africa & Middle East	5	1	20%	0	0%	0	0%	0	0%
Asia Pacific	14	9	64%	1	7%	2	14%	0	0%
China & North Asia	6	6	100%	0	0%	1	17%	0	0%
Europe	20	11	55%	0	0%	0	0%	0	0%
The Americas	15	9	60%	7	47%	3	20%	0	0%
Total	60	36	60%	8	13%	6	10%	0	0%

Table 5: Application of other frameworks associated with SR

Region	No. of reports	SDG		UNGC		TCFD		ISO 26000	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Africa & Middle East	5	3	60%	0	0%	0	0%	0	0%
Asia Pacific	14	11	79%	6	43%	4	29%	3	21%
China & North Asia	6	6	100%	2	33%	4	67%	2	33%
Europe	20	12	60%	10	50%	3	15%	0	0%
The Americas	15	9	60%	5	33%	4	27%	1	7%
Total	60	41	68%	23	38%	15	25%	6	10%

Concerning the other SR frameworks, a rather big proportion (68%) of the reports had used SDGs as a reference framework to structure their reports or referenced SDGs in other ways to demonstrate their contributions to the 2030 Agenda. On the one hand, this is unsurprising as GRI, SASB and IIRC, whose frameworks were used by the sampled companies, have guided organisations to incorporate SDGs into reporting. On the other hand, the engagement with the SDGs can be demonstrated on quite loose grounds, which may explain their broad application, even higher than the GRI.

Concerning the remaining frameworks, 23 reports claimed to be signatories of UNGC; 15 reports made references to TCFD, and; six reports indicated following ISO26000. Regarding TCFD, it is worth noting that TCFD recommends its related climate disclosures to be included in companies’ mainstream financial filings, which is why its frequency in SR may not represent the whole application level.

4.2 Participation in CDP

The airlines’ participation in the CDP’s 2019 climate change questionnaire was assessed using the CDP database. Again, the initial sample of 307 airlines was refined by removing two conglomerates and 39 airlines because of recognised parent companies. Consequently, the participation in the climate change questionnaire was assessed on 266 companies.

Table 6 presents the geographical frequency distribution of participation in the questionnaire over the different levels of GHG disclosure. At least 21 airline companies out of 266 (approx. 8%) had participated in CDP’s climate change survey, given that they had reached at least the Disclosure level (D or D-). 10.2% of the companies requested to respond to the climate change questionnaire had failed (F) to disclose their data or provide sufficient information to CDP to be assessed. Most notably, most companies had not been requested to participate in the questionnaire (approx. 81.2%). All of the companies in Africa and the Middle East were nonparticipants. In contrast, the participation was the highest amongst companies based in the Americas (approx. 19.6%). The only two companies reaching the Leadership-level score were also from the Americas.

Table 6: Cross-tabulation: Region x level of CDP GHG disclosure

Region		Not found	Not scored	Not available	F	D and D-	C and C-	B and -B-	A and A-
Africa & Middle East (n=61)	freq.	61							
	%	100.0%							
Asia Pacific (n=47)	freq.	34			10			3	
	%	72.3%			21.3%			6.4%	
China & North Asia (n=35)	freq.	28			4			3	
	%	80.0%			11.4%			8.6%	
Europe (n=82)	freq.	66	1	1	7	1	2	4	
	%	80.5%	1.2%	1.2%	8.5%	1.2%	2.4%	4.9%	
The Americas (n=41)	freq.	27			6		4	2	2
	%	65.9%			14.6%		9.8%	4.9%	4.9%
Total (N=266)	freq.	216	1	1	27	1	6	12	2
	%	81.2%	0.4%	0.4%	10.2%	0.4%	2.3%	4.5%	0.8%

5. Concluding remarks

This paper contributed to the strand of research developing our understanding of the airline SR. The intention of this descriptive study was not to infer any meanings in the reports or make any statistical inferences but to measure the application of the widely used SR frameworks in the global passenger airline industry. As such, this paper represents one of the broadest overviews of the global airline SR practices (cf. Kiliç et al., 2019; Yang et al., 2020). Using quantitative content analysis to examine reports found from airlines' websites and the GRI database and the data reported by CDP, this paper revealed the extent to which the globally recognised SR instruments were used by airlines in their 2019 reporting period.

Overall, the results suggest that only one-third of the world's commercial passenger airlines produce sustainability reports. The reporting level in the airline industry may, thus, be even lower than in the aviation sector (incl. aerospace, airline, airport) as a whole (Karaman et al., 2018). In line with previous research, inconsistency characterises the industry's SR (Zieba and Johansson, 2022). The inconsistent levels of SR over regions can likely be explained in the light of institutional theory. While socio-political expectations to practise SR may be low in some regions – possibly explaining the African airline's low engagement in SR and CDP questionnaire – such expectations are likely higher in other regions. For example, SR and participation in CDP were the highest in the Americas, likely due to North America's influence where shareholders highly expect voluntary disclosure (Tschopp, 2005). On that note, the findings may contradict previous research, which often indicates European aviation companies as forerunners of SR (cf. Karaman et al., 2018). Indeed, the rather low coverage (38%) of European airlines in SR is surprising, considering the NFRD has required all large companies (500+ employees) based in the EU to disclose non-financial information since 2018. Although this study does not reveal the size of the sampled companies, the findings may, nevertheless, signal broad noncompliance with NFRD.

The findings demonstrate the airline industry having used GRI, SASB, IIRC and CDP reporting instruments from the five major non-financial reporting organisations. The application of CDSB from this group was not recognised in this study. In turn, GRI was the most widely used reporting instrument. This study also identified the reports having referenced SDG, UNGC, TCFD, and ISO 26000 to varying degrees. Over two-thirds of the reports had used SDGs as a reference framework or referenced SDGs in other ways.

This study has several limitations that future studies can address. The sample was limited to the reporting year 2019 only. Therefore, longitudinal studies could explore the changing reporting trends. Such studies could also verify the regional differences statistically. Causal studies, in turn, could shed light on the determinants of using various reporting instruments, which was outside this study's scope.

Moreover, this study was solely based on measuring the extent of reporting frameworks used; thus, it does not evaluate the difference between genuine reporting and potential greenwashing. On that note, it is important to acknowledge that GRI, for instance, allows certain degrees of flexibility in disclosure and compliance depending on its adopted adherence level. Consequently, future research is encouraged to assess the quality of GRI disclosure. In this regard, academia could also help practitioners develop a scoring mechanism for GRI disclosure, similar to CDP, and evaluate how public scoring would influence SR. Finally, while SR can be seen as an enabler of SDG actions, investments and strategies (Rosati and Faria, 2019), SDG reporting has also been considered unbalanced and often disconnected from business goals (KPMG, 2020). Therefore, assessing the relevance of SDGs in airline SR represents another important future research area.

Acknowledgements

This work was supported by the National Science Centre (Poland) under grant [UMO-2019/35/N/HS4/04367].

References

- Adams, C.A., 2017. The Sustainable Development Goals, integrated thinking and the integrated report [WWW Document]. IIRC ICAS. URL <http://integratedreporting.org/resource/sdgs-integrated-thinking-and-the-integrated-report/> (accessed 8.9.21).
- Al-Qahtani, M., Elgharbawy, A., 2020. The effect of board diversity on disclosure and management of greenhouse gas information: evidence from the United Kingdom. *J. Enterp. Inf. Manag.* 33, 1547–1579.
- Antolín-López, R., Delgado-Ceballos, J., Montiel, I., 2016. Deconstructing corporate sustainability: a comparison of different stakeholder metrics. *J. Clean. Prod.* 136, 5–17. <https://doi.org/10.1016/j.jclepro.2016.01.111>

- ATAG, 2020. Fact & Figures [WWW Document]. URL <https://www.atag.org/facts-figures.html> (accessed 7.4.21).
- Bastian Buck, G., Laura Espinach, G., Staffan Söderberg, I. 26000 P., (PPO), P.O., Organization, I. 26000 P.P., (PPO), 2014. GRI G4 Guidelines and ISO 26000: 2010 How to use the GRI G4 Guidelines and ISO 26000 in conjunction [WWW Document]. URL http://www.iso.org/iso/iso-gri-26000_2014-01-28.pdf (accessed 8.9.21).
- Brown, H.S., de Jong, M., Levy, D.L., 2009. Building institutions based on information disclosure: lessons from GRI' s sustainability reporting. *J. Clean. Prod.* 17, 571–580. <https://doi.org/10.1016/j.jclepro.2008.12.009>
- CDP, 2022. Companies Scores [WWW Document]. URL <https://www.cdp.net/en/companies/companies-scores> (accessed 2.23.22).
- CDP, CDSB, GRI, IIRC, SASB, 2019. Driving Alignment in Climate-related Reporting: Year One of the Better Alignment Project, Startup CEO.
- Daub, C., 2007. Assessing the quality of sustainability reporting: an alternative methodological approach. *J. Clean. Prod.* 15, 75–85. <https://doi.org/10.1016/j.jclepro.2005.08.013>
- Deegan, C., Blomquist, C., 2006. Stakeholder influence on corporate reporting: An exploration of the interaction between WWF-Australia and the Australian minerals industry. *Accounting, Organ. Soc.* 31, 343–372. <https://doi.org/10.1016/j.aos.2005.04.001>
- Deloitte, 2016. Sustainability disclosure Getting ahead of the curve.
- Dosal, C., 2013. Determining materiality: a key for corporate sustainability [WWW Document]. URL <http://www.pgsadvisors.com/2013/07/determining-materiality-a-key-tool-for-corporate-sustainability/> (accessed 4.30.20).
- European Commission, 2019. Guidelines on non-financial reporting: Supplement on reporting climate-related information [WWW Document]. Off. J. Eur. Union. URL [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620(01)&from=EN) (accessed 8.4.21).
- Fifka, M.S., 2013. Corporate Responsibility Reporting and its Determinants in Comparative Perspective - a Review of the Empirical Literature and a Meta-analysis. *Bus. Strateg. Environ.* 22, 1–35. <https://doi.org/10.1002/bse.729>
- Fusco, F., Ricci, P., 2019. What is the stock of the situation? A bibliometric analysis on social and environmental accounting research in public sector. *Int. J. Public Sect. Manag.* 32, 21–41. <https://doi.org/10.1108/IJPSM-05-2017-0134>
- GRI, 2021. Linking the SDGs and GRI Standards [WWW Document]. URL <https://www.globalreporting.org/standards/resource-download-center/sdg-compass-annex-linking-the-sdgs-and-gri-standards/> (accessed 8.9.21).
- GRI, 2016. GRI Standards [WWW Document]. GRI Stand. URL <https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/>
- GRI, UNGC, 2018. Integrating the SDGs into Corporate Reporting: A Practicel Guide.
- GRI, UNGC, WBCSD, 2015. The Guide for Business Action on the SDGs.
- Hahnkamper-Vandenbulcke, N., 2021. Non-financial Reporting Directive - briefing: implementation appraisal.
- IATA, 2020a. Industry Statistics - Fact Sheet November 2020 [WWW Document]. URL https://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf (accessed 7.4.21).
- IATA, 2020b. International Air Transport Association Annual Review 2020 [WWW Document]. 76th Annu. Gen. Meet. URL <https://www.iata.org/en/publications/annual-review/> (accessed 8.27.21).
- ISO, 2018. ISO 26000: Guidance on social responsibility [WWW Document]. Dict. Crit. la RSE. <https://doi.org/10.4000/books.septentrion.6571>
- ISO, 2015. ISO 26000 and the International Integrated Reporting (IR) Framework Briefing Summary [WWW Document]. URL <https://iso26000sgn.org/iso-26000/about-iso26000/ir-and-iso-26000/>
- Jones, P., Comfort, D., Hiller, D., 2015. Materiality in corporate sustainability reporting within UK retailing. *J. Public Aff.* 16, 81–90.
- Karaman, A.S., Kilic, M., Uyar, A., 2018. Sustainability reporting in the aviation industry: worldwide evidence. *Sustain. Accounting, Manag. Policy J.* 9, 362–391. <https://doi.org/10.1108/SAMPJ-12-2017-0150>
- Kılıç, M., Uyar, A., Karaman, A.S., 2019. What impacts sustainability reporting in the global aviation industry? An institutional perspective. *Transp. Policy* 79, 54–65. <https://doi.org/10.1016/j.tranpol.2019.04.017>
- KPMG, 2020. The time has come: The JPMG Survey of Sustainability Reporting 2020. <https://doi.org/10.6004/jnccn.2019.0020>
- KPMG, 2017. The road ahead: The KPMG Survey of Corporate Responsibility Reporting 2017.
- KPMG, 2013. The KPMG Survey Responsibility. <https://doi.org/www.kpmg.com/sustainability>
- Milne, M.J., Gray, R., 2013. W(h)ither Ecology? The Triple Bottom Line, the Global Reporting Initiative, and Corporate Sustainability Reporting. *J. Bus. Ethics* 118, 13–29. <https://doi.org/10.1007/s10551-012-1543-8>
- Owen, G., 2013. Integrated Reporting: A Review of Developments and their Implications for the Accounting Curriculum. *Account. Educ.* 22, 340–356. <https://doi.org/10.1080/09639284.2013.817798>
- Roca, L.C., Searcy, C., 2012. An analysis of indicators disclosed in corporate sustainability reports. *J. Clean. Prod.* 20, 103–118. <https://doi.org/10.1016/j.jclepro.2011.08.002>
- Rosati, F., Faria, L.G.D., 2019. Addressing the SDGs in sustainability reports: The relationship with institutional factors. *J. Clean. Prod.* 215, 1312–1326. <https://doi.org/10.1016/j.jclepro.2018.12.107>
- SASB, 2020. Industry Guide to the Sustainable Development Goals [WWW Document]. URL <https://www.sasb.org/knowledge-hub/industry-guide-to-the-sustainable-development-goals/> (accessed 8.9.21).

- Schaltegger, S., Burrit, R., Petersen, H., 2003. An introduction to corporate environmental management: striving for sustainability. Greenleaf Publishing, Sheffield.
- Schönherr, N., Findler, F., Martinuzzi, A., 2017. Exploring the interface of CSR and the Sustainable Development Goals. *Transnatl. Corp.* 24. <https://doi.org/https://doi.org/10.18356/cfb5b8b6-en>
- Scott, W.R., 2013. *Institutions and organizations*, 4th ed, *Institutions and organizations: Ideas, Interests, and Identities*. SAGE Publications Inc, Thousand Oaks (California). <https://doi.org/7>
- Sisaye, S., 2021. The influence of non-governmental organizations (NGOs) on the development of voluntary sustainability accounting reporting rules. *J. Bus. Socio-economic Dev.* 1, 5–23. <https://doi.org/10.1108/jbsed-02-2021-0017>
- TCFD, 2017. Recommendations of the Task Force on Climate-related Financial Disclosures. Task Force Clim. Fiancial Discl.
- Tschopp, D.J., 2005. Corporate social responsibility: A comparison between the United States and the European Union. *Corp. Soc. Responsib. Environ. Manag.* 12, 55–59. <https://doi.org/10.1002/csr.69>
- Tyson, T., Adams, C.A., 2020. Increasing the scope of assurance research: new lines of inquiry and novel theoretical perspectives. *Sustain. Accounting, Manag. Policy J.* 11, 291–316. <https://doi.org/10.1108/SAMPJ-03-2018-0067>
- UN Global Compact, 2013. UN Global Compact COP Policy.
- UN Global Compact, Deloitte, 2010. UN Global Compact Management Model, UN Global Compact Reports. <https://doi.org/10.5848/ungc.5720.2014.0005>
- UNGC, 2010. An Introduction to Linkages between UN Global Compact Principles and ISO 26000 Core Subjects [WWW Document]. URL https://iso26000.info/wp-content/uploads/2016/03/ISO_26000_UN_Global_Compact_linkage_document_final.pdf (accessed 8.9.21).
- Van der Lugt, C.T., van de Wijs, P.P., Petrovics, D., 2020. Carrots & Sticks 2020 - Sustainability reporting policy: Global trends in disclosure as the ESG agenda goes mainstream.
- Yang, L., Ngai, C.S.B., Lu, W., 2020. Changing trends of corporate social responsibility reporting in the world-leading airlines. *PLoS One* 15, 1–19. <https://doi.org/10.1371/journal.pone.0234258>
- Zhang, X., 2021. Communicating social responsibilities through CSR reports: Comparative study of top European and Asia-Pacific airlines. *PLoS One* 16, 1–14. <https://doi.org/10.1371/journal.pone.0258687>
- Zieba, M., Johansson, E., 2022. Sustainability reporting in the airline industry: current literature and future research avenues Malgorzata. *Transp. Res. Part D Transp. Environ.* 102.
- Zinenko, A., Rovira, M.R., Montiel, I., 2015. The fit of the social responsibility standard ISO 26000 within other CSR instruments: Redundant or complementary? *Sustain. Accounting, Manag. Policy J.* 6, 498–526. <https://doi.org/10.1108/SAMPJ-05-2014-0032>