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INTEGRATED REPORTING AS A MODEL FOR SUSTAINABILITY MANAGEMENT REPORTING: THE CASE OF NORTHEASTERN EUROPEAN AIRPORTS

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Abstract. In their annual and sustainability reports, many companies assert their adherence to the Sustainable Development Goals (SDGs) of the United Nations. The validity of such claims might be questioned if they are not substantiated with financial information and descriptions of value-creation projections. One framework that can show how SDGs are achieved is integrated reporting (<IR>). In contrast to traditional sustainability reports, <IR> encourages the integrated analysis of financial and non-financial information for six capital types within the company's business model, which enables measuring the achievement of sustainability targets. Among many advantages of <IR> related to sustainability is also the analysis of value creation processes in the long term, which generates evidence-based projections of future performance, not merely a reflection on past activities. The aim of this research was to determine if Northeastern European airports apply the <IR> framework to their annual sustainability communications with stakeholders. The major research finding indicates that these airports do not use the <IR> framework in their annual sustainability reporting. However, given the inclusion of <IR> features in their reports and a recent tendency of other airports to adopt <IR>, this finding can be a sign of transition to <IR> for annual sustainability reporting.

Keywords: integrated reporting, sustainable development, value creation, Northeastern European airports.

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Introduction

The aviation industry, particularly airports, faced substantial challenges during the Covid-19 pandemic, necessitating significant adjustments (Forsyth et al., 2020; Serrano & Kazda, 2020). Factors such as travel restrictions, reduced passenger numbers, and operational changes resulted in financial losses, development setbacks, and heightened competition. European airports, experiencing a drastic decline in passenger numbers (70%), aeronautic revenues (67%), and non-aeronautic revenues (51%), with operating profits plummeting by 200% in 2020 compared to 2019, sought measures such as reducing investments, cutting staff expenses, refinancing debts, and securing additional capital, including state assistance (Airport Council International [ACI], 2021; Organization for Economic Cooperation and Development [OECD], 2021; Serrano & Kazda, 2020).

In response, the imperative of sustainable development gained prominence for airports, aligning with the United Nations Sustainable Development Goals (SDGs) (United Nations Development Program [UNDP], 2023). Notably, airports globally, such as JFK International Airport, Sydney Airport, Heathrow Airport, and Aeroporti di Roma, have integrated SDGs into their annual sustainability reports, demonstrating a commitment to concepts like value creation, disclosure, and stakeholder engagement (JFK International Airport Terminal 4 [JFKIAT4], 2022; SYD Sydney Airport, n.d.; Heathrow Airport, n.d.; Aeroporti di Roma, n.d.). Significantly, these reports also exhibit features associated with Integrated Reporting (IR), a framework designed by the International Integrated Reporting Council (Integrated Reporting [IR], 2021; Gerwanski et al., 2021).

The exploration of the integration of IR into airport reporting is motivated by its alignment with the Global Reporting Initiative standards, already embraced by certain airports like JFK International Airport (JFKIAT4, 2022). IR stands out by providing a forward-looking analysis of a company's present and future value-generation capacity, emphasizing sustainability potential through information connectivity, integrated thinking, and consideration of six capital types. The authors of this approach aim to measure the seemingly immeasurable, enabling companies to project evidence-based performance and facilitate transformative change (Carujo et al., 2022; Salterbaxter Mslgroup, n.d.).

The widespread acceptance of <IR> across various sectors, including examples like SAP, Hitachi Transport System, Mitsubishi Logistics Corporation, and ABN-AMRO bank, highlights its utility (SAP, 2022; Hitachi Transport System, 2022; Mitsubishi Logistics, 2022; ABN-AMRO bank, 2022). In France, 58% of CAC40 companies utilized <IR> in

2020, and in Japan, 579 companies embraced this forward-thinking framework (IR, 2023; KPMG, 2020). Consulting firms such as Deloitte and KPMG, along with public authorities, also recognize the value of <IR> (Deloitte, 2023; KPMG, 2022a; Williams & Lodhia, 2021). Globally, airports, including Aerorporti di Roma, Airport Facilities in Japan, Airport Company South Africa, and Munich Airport, have embraced IR, with Munich Airport publishing integrated reports since 2013 (Aeroporti di Roma, 2021, 2022; Airport Facilities Co, 2022; Airport Company South Africa, 2022; Munich Airport, 2023).

Amid the challenges posed by the Covid-19 pandemic, European airports sought public financial support, revealing gaps in their sustainable development strategies. The ethical obligation of airports, combined with the benefits of <IR> and the growing trend among airports to utilize this framework, prompted an examination of whether Northeastern European airports in the European Union (EU) applied <IR> in their annual and sustainability reporting. The aim of this research was to determine if Northeastern European airports apply the <IR> framework to their annual sustainability communications with stakeholders This investigation is essential for boosting investibility of airports and increasing transparency in reporting to the public. The latter is particularly pertinent as these airports received financial support from the public. By identifying <IR> elements, the study seeks to provide insights into how these airports strategically contribute to sustainable development objectives and communicate transparently with the public, fostering accountability for the financial support they have received. To attain this aim, annual and sustainability reports of the selected airports, publicly available on their websites in Northeastern Europe, were subjected to comprehensive analysis using various text analysis methods, including word and concordance frequency analysis.

The geographical focus on Northeastern European airports, including Finland (Helsinki) and the Baltic States (Tallinn, Riga, and Vilnius), was strategically justified. These airports, despite being smaller in size within the context of the EU, play a crucial role in the aviation landscape and urban development of the Northeastern region of Europe. Their relatively modest capacities, in contrast to major international hubs like Heathrow or JFK airports, present a unique opportunity to study the nuances of sustainable development and integrated reporting in a distinct context. The Baltic nations, comprising smaller economies, have often been overlooked in research, providing a compelling reason to explore and understand the specific challenges and opportunities they face. Furthermore, the choice to study these airports aligns with the recognition that sustainable development goals (SDGs) and integrated reporting are universally relevant but may manifest differently in diverse contexts. Analyzing airports in Northeastern Europe provides an opportunity to assess how and if these global frameworks are adapted and implemented in smaller economies within the constraints of limited resources.

1. Literature review

1.1. Why to resort to <IR> for sustainability reporting

Traditionally companies have been using financial statements, annual and sustainability reports to inform stakeholders about the outcomes of corporate performance for the previous period. The increasing complexity of financial reports attributable to expanded operations and new reporting standards (Ishinagi & Shiiba, 2023) might create issues of cohesion and coherence in reporting and loops for covering up misconduct and fraud. Social responsibility and sustainability reports might be disconnected from financial aspects (Sun et al., 2023), in which case the validity of claims might be difficult to verify. However, one report type that coherently connects financial and non-financial information, while informing about the prospects of future, rather than past, performance is <IR> (Grassmann, 2021; Sun et al., 2022; Sun et al., 2023). In theory, it removes financial information gaps (Dumay et al., 2016) via information connectivity and expands the pool of information for a more informative process of decision-making by investors (Grassmann, 2021) who are explained how value is created by a network of capitals (ACCA-NBA, 2013; Cortesi & Vena, 2019) through the prism of integrated rather than silo thinking (Ernst & Young, 2014) and the business model.

Value creation, endorsed by consulting firms like Ernst & Young (2022), Deloitte (Hoffman, 2022), and Boston Consulting Group (Boston Consulting Group [BCG], 2023), and outlined in value chains by KPMG (2022b), spans financial intricacies to global social and environmental considerations. Leveraging this expertise, airports gain a nuanced understanding of interconnected financial, social, and environmental aspects, enabling informed decisions for transparency, accountability, and progress towards sustainability. Amid the growing trend of <IR> in financial, annual, and sustainability reporting, including the transport sector, airports should reassess business models for enhanced value generation. While airports serve multiple objectives like national connectivity, tourism, talent exchange, and GDP boost, they are commercial enterprises with goals such as financial and employment sustainability. This is particularly crucial within the European Union, where airports contribute to common labor markets and play a role in broader supranational objectives. In this context, value creation remains significant for airports.

Value creation incorporates financial and non-financial aspects, which is why the <IR> framework embeds both tangible and intangible assets into its structure to ingrain sustainability (Parfitt, 2022). Non-financial data is no longer considered an addition to financial results; it is perceived as a management instrument, informing stakeholders about social and environmental aspects of performance of a specific company rather than a source of information on general sustainability issues applicable to most companies (Ernst & Young, 2016). Therefore, integrated reports reveal the capacity of a specific company to adapt to new environments, optimize performance, invent solutions, and resist crises.

Value creation rests on the six capitals that are viewed as both inputs and outputs within one network of a business model: financial capital (henceforth – FC); manufacturing capital (henceforth – MC); environmental/natural capital (henceforth – E/NC); social and relationship capital (S&RC); intellectual capital (henceforth IC); and human capital (henceforth – HC) (ACCA-NBA, 2013; IR, 2021; Value Reporting Foundation [VRF], 2021). These six capitals are reviewed within the following areas of application, which facilitates information disclosure, decreases information asymmetries (Cortesi & Vena, 2019), while permitting the flexible use of <IR> components (Cortesi & Vena, 2019) and addition of new information: enterprise overview and external environment; governance; business model; risks and opportunities; strategy and resource allocation; performance; outlook; and basis of preparation and presentation (IR, 2021; VRF, 2021).

The <IR> use has also been consistent with various models of capitalism, including stakeholder and inclusive capitalism, due to the <IR> focus on stakeholders and social issues. Stakeholder capitalism aims to ensure that economic activities satisfy the needs of all stakeholders of an economic ecosystem rather than just its shareholders, which ultimately helps to create sustainable values and lays a path for the attainment of SDGs (Beck & Ferasso, 2023). Inclusive capitalism aims to boost the public trust in capitalism by promoting social inclusion and dialogue with private enterprises (Tweedie, 2022). Both capitalism models resonate with social and relationship capital and stakeholder needs of <IR>. One aspect of inclusive capitalism pertains to limiting possibilities of financial fraud, which according to Liu et al. (2023) is created by corporate culture and a specific group of staff. When implementing <IR>, companies are compelled to increase their level of information disclosure and diversify a group of people creating a report, which lowers chances of covering up fraudulent activities.

Overall, <IR> is not merely a new financial instrument. It is a new instrument of inclusive and stakeholder models of capitalism, which helps to increase corporate accountability for corporate strategic development paths, which provides opportunities for all stakeholders to participate in corporate accountability processes. <IR> provides a structure for reporting on specific long-term drivers of value creation, which is important to investors (Ernst & Young, 2022).

1.2. Why to apply <IR> to airport sustainability reporting

Prior to the COVID-19 pandemic, the aviation sector had been rapidly developing on a global scale (Dimitriou & Sartzetaki, 2022), but upon the introduction of the global lockdown measures, the demand for air travel fell by 90%, creating a profound crisis for airports (Colak et al., 2023) that has not been witnessed before in the airport history (Serrano & Kazda, 2020). Business investments into airports became high-risk ventures (Dimitriou & Sartzetaki, 2022), which is why governments and other authorities took up the role of supporting airports throughout the pandemic time by lowering financial pressure on current expenses and earlier investments (Serrano & Kazda, 2020), and by offering state loans that were expected to eventually return by a positive impact on macroeconomic indicators, such as GDP, employment rates and nation's connectivity (Scheelhaase et al., 2022). In 2020, governments made the following offers to the aviation sector to support its operations: direct equity investments, such as in Latvia, increase in equity and extraordinary loans, such as in Estonia, reimbursements for salaries, such as in Lithuania, stabilization funds, low-interest loans and subsidies, such as in Germany, exemption from repayments on state loans and dividends, loan guarantees, such as in Norway, recapitalization, such as in Denmark and Sweden, capital injections, temporary crisis support, such as in Sweden, etc. (Organisation for Economic Cooperation and Development [OECD], 2021). Thus, governments and other authorities acting on behave of taxpayers have been airport investors, which is why there should be a higher degree of transparency on operations and sustainability in reporting. This is a reason for deploying <IR>.

Since the 1980ies airports have used the privatization of assets (Martimort et al., 2022) as a means for obtaining more investment funds (Graham, 2020). Privatized airport owners include public and private legal persons, and private-public partnerships (Graham, 2020). Privatized airport owners seek various sources of funding from investors (Thomas & Scandurra, 2023), and investors require the understanding of how self-sustainable value is created. Any type of investor is interested in boosting the market value of airports (Martinez et al., 2023) by enhancing, expanding and diversifying airport services. The explanation of how such services create long-term value through the merge of financial and non-financial performance is important for responsible investment. <IR> offers a framework for it.

Airports adopt <IR> for efficient business management, responding to shareholder interests in performance enhancement and value creation (Kaya et al., 2022). In the face of complex airport operations management, addressing diverse stakeholder interests becomes crucial (Dimitriou & Sartzetaki, 2022). <IR> facilitates transparency and traceability, meeting reporting needs for activities, financial status, values, and sustainable impact across socioeconomic development levels. This reporting framework provides systematic information on diverse capitals, enabling cost-benefit analysis and multiple-criteria decision-making, leveraging both financial and non-financial indicators (Dimitriou & Sartzetaki, 2022). Another reason for implementing <IR> relates to environmental issues. Because aviation is among the sectors of economy that negatively impact the quality of life from the environmental perspective, it is important to take steps to make aviation more sustainable (Afonso et al., 2023). The sustainability of aviation, including airports, is created via green efficiency (Hu et al., 2023), which can be expected to surface from airport value-creation processes, displayed in <IR>.

Overall, as value creation is recognized as a fundamental objective of Integrated Reporting <IR> (Roslender & Nielsen, 2021), its application in the airport context serves to illustrate how sustainable values are generated, harnessed, and utilized to enhance the long-term market values of airports. This approach takes into account the economic, social, and environmental needs of long-term stakeholders. According to Deloitte (2022), the essence of <IR> lies in 'meeting stakeholder demands today while driving financial and non-financial information connectivity to unlock future value.' Hence, applying <IR> to airport reporting practices emerges as a potentially effective tool for creating and reporting on sustainable development.

However, it is important to acknowledge that the motivation to adopt <IR> may vary among airports. While value creation may be a fundamental driver for many, there could be instances where certain airports do not prioritize value creation as their primary operational goal. In such cases, the justification for implementing <IR> standards in those specific regions may be questioned. Airports not placing a strong emphasis on value creation may not find the motivation to include <IR> in their reporting standards. Yet, it is crucial to recognize that airports not placing a strong emphasis on value creation might face potential drawbacks. The value of these airports for investors could decrease, as investors often seek ventures with clear strategies for sustainable value generation. Additionally, stakeholders, including the local community and authorities, might lack a comprehensive understanding of how these airports contribute to regional development. Therefore, careful consideration of the diverse objectives and priorities of airports within a region is essential to ensure that the application of <IR> aligns with their overarching goals and contributes to long-term value for both investors and regional stakeholders.

1.3. Examples of airports using <IR>

Some airports have already been using integrated reports as a form of annual reporting on the implementation of business strategy and efficiency of performance. Two features indicate the application of <IR>: title, which includes the concept of *integrated*; and conceptual components of the document (see 2.1).

An airport example annually publishing <IR> is Munich Airport. Since 2013, its report titles have included the phrase *integrated report* (Munich Airport, 2023). For example, the integrated report of 2022 (Munich Airport, 2022), emphasized the engagement with all stakeholders and the deployment of six capitals for value creation over time and expansion of the business model, which since 2023 is expected to include a consulting segment. In value creation, both direct and added values (e.g. the development of environmentally friendly operations) are promoted as inputs and outputs of responsible and sustainable growth within the airport business model and strategy attuned to the changing customer behaviour. Value creation is built on various types of data, including sustainability and financial data embedded into networks created by information connectivity. Another <IR> example is the 2022 integrated report of Airports Company South Africa, which contains the phrase *integrated report* in the title and the conceptual components (Airports Company South Africa, 2022). This report also covers six capitals. Value creation is explained a separate section "How our strategy creates value" (Airports Company South Africa, 2022, p. 39). Value creation is integrated into the airport business model via "Passion – Results – Integrity – Diversity – Excellence" direction (Airports Company South Africa, 2022, p.11). Values are developed, engaging airport stakeholders, one example of which is the procurement, welcoming black-owned businesses (Airports Company South Africa, 2022, p. 24). The connectivity of information is evident through the repeated use of the key concepts of <IR>, supported by financial data.

As for the previous scientific analysis of <IR> of airports, Thomas & Scandurra (2022) identified only 7 out of the 32 surveyed Italian airport operators that published voluntary disclosure reports on their websites in 2022, which could be interpreted as a transition to <IR>. Thus, a small number of airports use the <IR> framework for annual reporting, which might explain the insufficiency of scientific papers on this topic.

2. Methodology

The aim of this research was to determine if Northeastern European airports apply the <IR> framework to their annual sustainability communications with stakeholders. Because a vast majority of data is encoded in unstructured text formats, the analysis of text is used to extract information answering research questions, including those in construction or any other industry (Marzouk & Enaba, 2019). Therefore, the resort to text analysis methods in this research was justified.

The research was conducted in the following stages: selection of airports; selection of reports; identification of <IR> lexical indicators; performance of top frequency analysis; and performance of bigram and concordance analysis of <IR> lexical indicators, as required.

2.1. Selection of airports

The deliberate selection of airports in Finland, Estonia, Latvia, and Lithuania was predicated on their strategic geographic proximity to respective capital cities and their historical status as national hubs. Within the national context, these airports hold prominence as principal aviation facilities, traditionally assuming pivotal roles in shaping nascent trends within the sphere of airport development. This influence manifests notably in their ability to drive technological innovations, cultivate strategic airline partnerships, set benchmarks for service quality, and champion sustainability practices.

While acknowledging the autonomous formulation and pursuit of distinctive business development models by regional and smaller airports, it is imperative to recognize that the imperative to contend with main airports inevitably instigates developmental initiatives that, to a certain extent, align with the trajectories established by these principal aviation facilities. This symbiotic relationship is emblematic of the broader aviation landscape,

wherein regional and smaller airports, in their pursuit of competitiveness, find impetus to synchronize aspects of their development with the overarching trajectories delineated by main airports.

The selected airports provide services to legacy airlines such as Finnair, Lufthansa, AirBaltic, and low-cost operators like Ryanair. Considering these multifaceted factors, the selected airports play a pivotal role in fostering airport-centric regional development, as delineated by Ventura et al. (2020), thereby contributing to urban development within the regional purview of airports. Notably, the selected airports exert influence over the pivotal hub of national urban development – the capital city.

Within the global aviation landscape, airports located in Northeastern Europe can be classified as regional entities, predominantly due to their spatial and quantitative attributes within the European Union framework. Departing from operational contexts typical of major airports, regional airports exhibit distinctive operational specifications (Nommik & Antov, 2017), while playing a crucial role in fostering regional connectivity (Thomas & Jha, 2022). The combined nuances underscore the significance of researching these airports within the scholarly context. The selection criteria for airport reports are provided in Table 1.

2.2. Identification of <IR> keywords

Consistent with PRISMA 2020 Checklist (2023), a protocol was designed to identify <IR> lexical indicators for the analysis of airport reports. The first step focused on the identification of keywords and key phrases of <IR> for extracting <IR> lexical indicators (see Table 2).

Table 1. Criteria for selecting airport reports for analysis (source: created by the author)

Criterion area	Criteria specification	Justification
Report type by title	▪ Integrated reports; ▪ Annual reports; ▪ Annual financial statements; ▪ Sustainability/responsibility reports	▪ Annual regularity of publishing; ▪ Research focus on sustainability
Reports per airport	▪ Inclusion of both financial and non-financial information	▪ Contribution of financial and non-financial performance to value creation (Titko & Shina, 2017); ▪ Inclusion of financial and non-financial information in <IR>
Report format	▪ Created PDF (not scanned)	▪ Implausibility of the analysis of scanned PDF files on the platform *Voyant Tools*
Publication type	▪ Open access	▪ Accessibility by stakeholders; ▪ Public image
Languages	▪ English; ▪ Local language only if English versions of reports did not satisfy other criteria	▪ Expected equivalence of reports in English and local languages; ▪ International status of English
Time period	▪ 2020–2022	▪ Year 2020 as onset of a new era in airport development attributable to the Covid-19 pandemic, which, according to Colak et al. (2023) initiated a deep and prolonged crisis in aviation; ▪ Covid-19 induced need for airport transformation
Reports size per airport	▪ Relative page and word balance across airport reports	▪ Need for a balanced perspective on the region. ▪ Subordinate status of this criteria to other criteria.

Table 2. Concepts analyzed in airport reports (created by the author)

Keywords	Key phrases	Authors	<IR> lexical indicators
▪ Integrated ▪ Disclosure ▪ Capital ▪ Financial ▪ Human ▪ Intellectual ▪ Social ▪ Relationships ▪ Environmental ▪ Manufacturing ▪ Value ▪ Strategy ▪ Stakeholder ▪ Investor ▪ Sustainability ▪ Development ▪ Responsible ▪ Collaboration ▪ Traffic/transport	▪ Integrated report/ing ▪ Disclosure report/ing ▪ FC (e.g. revenues, tax) ▪ HC (e.g. training, health) ▪ IC (e.g. patents, owned technology) ▪ S&RC (e.g. customers, partners) ▪ E/NC (e.g. water, waster) ▪ MC (e.g. premises, infrastructure) ▪ Value creation ▪ Business model ▪ Integrated thinking ▪ Social responsibility	▪ IR (2021) ▪ VRF (2021) ▪ ACCA-NBA (2013) ▪ Deloitte (2023) ▪ Ernst & Young (2014) ▪ KPMG (2021) ▪ ABN-AMRO bank (2022) ▪ Hitachi Transport System (2022) ▪ Thomas & Scandurra (2022)	▪ <IR> ▪ Value creation ▪ Business model ▪ Integrated thinking ▪ Stakeholders ▪ Investors ▪ Disclosure/transparency ▪ <IR> capital types (HC, S&RC, IC, MC, E/NC, FC) ▪ Financial and non-financial information

The keywords were obtained upon the conceptual analysis of some key elements of <IR> in various types of <IR> documents (see Table 2), which ensured the objectivity of selection of <IR> lexical indicators. These documents included the <IR> framework and guides, opinions of consulting firms on integrated reports, a survey of integrated reports, samples of integrated reports and research paper on airport integrated reporting.

2.3. Frequency, bigram and concordance analyses

This study utilized two distinct research methods. The initial approach, categorized as quantitative, centered on the examination of word and phrase frequencies. Word and phrase frequency analysis involves calculating the raw or relative frequency of the occurrence of concepts. Utilizing word frequency aids in identifying research focal points and trends (Han et al., 2017). Consequently, the exploration of concept/word frequency delves into the core conceptual aspects of the written content. Thus, the first research question aimed to determine whether Integrated Reporting (<IR>) concepts were frequently employed in the reports, indicating the implementation of at least some facets of <IR>.

All types of analyses were run on the open-access text analysis platform *Voyant Tools*. Top frequency words in the entire corpus were identified. The top frequency criterion can be set at different levels, but in this report it was set at the threshold of 0.052% of the entire corpus. The 0.002% was tied to the technical restriction of the platform on which the text analysis was conducted. The level of the threshold was motivated by the research aim and the inclusion of the phrase *integrated report* in report titles of integrated reports of companies, for example, those of Munich Airport. The assumption was, if most key concepts of <IR> were found among top frequency words, it might be an indication of <IR> features in the reports (despite the lack of *integrated report* in titles).

Word frequency analysis does not allow to identify phrase frequencies, which is why the entire corpus was subsequently analysed for the presence of <IR> lexical indicators (see Table 2). Their bigrams or concordances (via the link tool or concordance tool, respectively) were created. The assumption was, if <IR> indicators were found in the corpus, this would prove the presence of <IR> features, the implication of which could be some conceptual readiness of airports to transform their annual and sustainability reports to <IR> in the future.

Then, the lexical context of concordances was analysed. Such analysis represents a qualitative method, which allows to delve into the nuances of word use and determine if the keywords were used consistently within the <IR> framework. The qualitative examination of concordances unveils not only the mere presence of <IR> terminology but, more crucially, the appropriateness of its application within specific contexts. This discernment provides a richer and more insightful comprehension of the conceptual alignment of text with <IR> principles.

The groups of words that were excluded from analyses due to their irrelevance to conceptual kernel of reports included function words, such as preposition or conjunctions (due to their purpose of syntax generation), and general lexical items, such as *total* or *consideration* (due to their applicability to any context).

In case of report analysis in local languages (see Table 1), it was to be conducted separately from English reports. Subsequently, all findings were to be combined for generating overall conclusions.

3. Results

3.1. Selection of airports

The airport selection criteria restricted the choice of airports to the following list: Finavia (includes Helsinki Airport) in Finland; Tallinn Airport in Estonia; Riga International Airport (henceforth – RIX) in Latvia; and Lithuanian Airports (includes Vilnius Airport) in Lithuania.

3.2. Selection of reports

Following the report selection criteria (see Table 1), the corpus of Finavia airports contained 3 annual reports (Finavia, 2020a, 2021a, 2022a) and 3 financial statement reports (Finavia, 2020b, 2021b, 2022b); the corpus of Lithuanian Airports consisted of 2 annual reports (Lithuanian Airports, 2020a, 2021a) and 3 sustainability reports (Lithuanian Airports, 2020b, 2021b, 2022); and the corpus of Tallinn Airport included 3 annual reports (Tallinn Airport, 2020, 2021, 2022) (see Figure 1).

All Latvian RIX reports were available in the created pdf format, so in contrast to some English reports (see Table 1 for report selection criteria), they were analysed: annual (RIX, 2020a, 2021a, 2022a) and sustainability reports (RIX, 2020b, 2021b, 2022b) (see Figure 1).

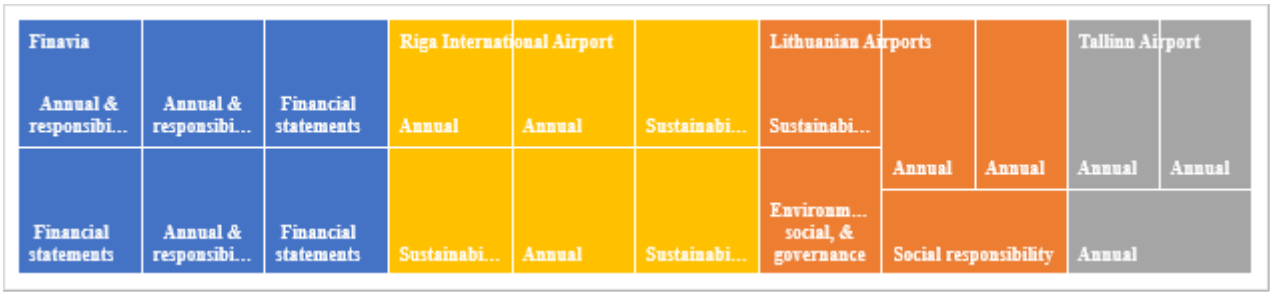

Figure 1. The analysed reports from the period of 2020–2022 (source: created by the author)

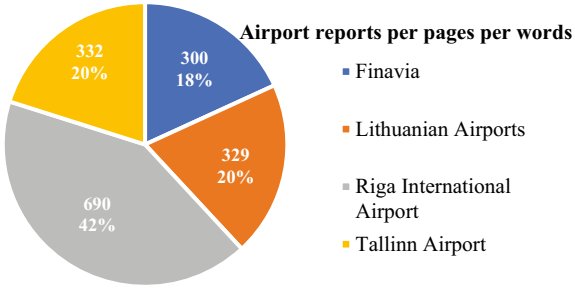

Figure 2. Distribution of pages and words across airport reports (source: created by the author)

In English reports, the number of pages per airport was balanced, ranging between 18% and 20% of the entire corpus (see Figure 2). Considering various degrees of text density per page, the balance of word distribution across the airport reports was proven by descriptive statistics amounting to 20% per reports per airport (see Figure 2). As for RIX, the page percentage constituted 42% and word percentage formed 40% of the Latvian corpus (see Figure 2). The percentage of information obtained from RIX was on average twice the percentage of information gained from other national airports, which is attributed to more extended writing at RIX and the report selection requirements (see Table 1).

In total, 20 reports, containing 1651 pages and 598357 words, were analyzed.

3.3. Frequency and concordance analyses of Finavia, Tallinn Airport and Lithuanian Airports reports

The corpus of Finavia, Tallinn Airport, and Lithuanian Airports reports, called Corpus I in this paper, included 14 documents with a total of 358,557 words. The top frequency analysis (see 2.3) resulted in the selection of 185 most frequently used words (see Figure 3). The frequency algorithm of Voyant Tools deploys weighting and ranking to assign lexical tokens a particular size – the more frequently the word is used, the larger the size of the word in the diagram.

Figure 3. Top lexical frequency analysis of Corpus I (source: created by the author)

This frequency analysis was run on words, focusing on the identification of the concepts related to <IR> lexical indicators (see Table 2). The <IR> concepts in the top frequency list constituted 25% and included the following words: value, capital, general <IR> concepts (development, sustainability, etc.), and concepts pertaining to S&RC (passengers, partners, etc.), HC (employees, training, etc.), FC (depreciation, tax, etc.), E/NC (emissions, waste, etc.), MC (infrastructure, etc). Although *stakeholder* was not identified, the presence of related concepts, such as public, points to the creation of a semantic field related to stakeholder interests (see Figure 3). IC was not identified.

Although HC-, S&RC-, FC-, E/NC-, and MC-related concepts were found in the top frequency list, it was important to determine if they were encoded through the prism of <IR> capital types. Therefore, the phrases denoting capital types were entered in Corpus I. Another <IR> feature explored in Corpus I referred to *integrated thinking*. The phrases encoding capital types and integrated thinking concepts were not identified in Corpus I.

Stakeholders, *transparency/disclosure* and *investors* were not found among top frequency words (see Figure 4). Therefore, they were manually entered in a trend diagram tool to identify their occurrence in the text. Typically, trend diagrams are based on the term-frequency calculations in intervals over time or throughout the corpus. The Voyant Tools has the inbuilt algorithm of dividing each sample of text into 10 equal segments for line trend analysis. Word occurrence was calculated in relative frequencies that represent a normalized measure showing a proportion of work usage in a text in relation to the entire word count, in other words, the percentage of work occurrence in a corpus. In this research, the choice of relative frequencies was attributed to various sizes of documents, which excluded raw frequency analysis. Although the concept of investment appeared among top frequency words, it was used as a financial term rather than the concept denoting a target audience group, which is a requirement of the <IR> framework.

All of the searched concepts showed negligible frequency. *Stakeholders* were identified in all documents except for financial statements of Finavia, in which the concept of shareholders was used instead. In all other reports, both *stakeholders* and *shareholders* surfaced. Thus, airports distinguish these two concepts despite the fact that the concept of shareholders is included in the notion of stakeholders.

To determine if *stakeholders*, *transparency*, and *investors* were used consistent with the <IR> framework, the top frequency bigrams were created in the format of links (see Figure 5). These bigrams display the most frequently used concepts in the closest lexical proximity to the keywords, which form force directed network graphs, which point to clusters and connectivity in created lexical networks. Thus, the words connected to the keywords were not manually entered to be displayed in the diagram; instead, they were selected by a frequency algorithm inbuilt in Voyant Tools. The Voyant Tools, as an open-source digital tool, deploys

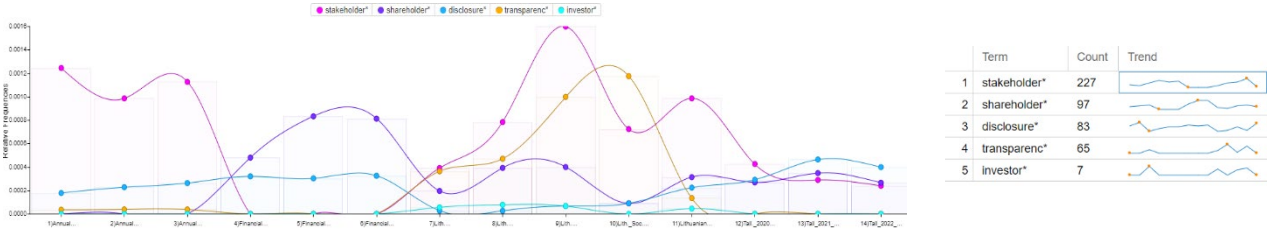

Figure 4. Occurrence of *stakeholders*, *investors*, and *disclosure/transparency* in Corpus I (source: created by the author)

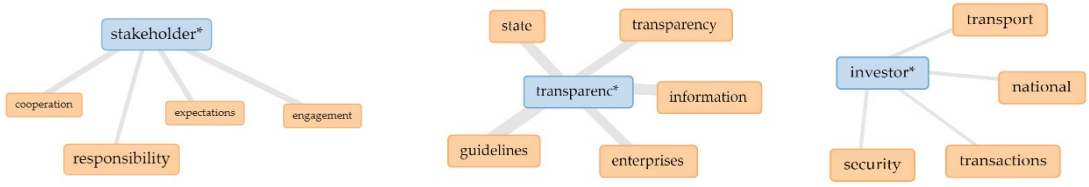

Figure 5. *Stakeholder*, *investor*, and *transparency* bigrams in Corpus I (source: created by the author)

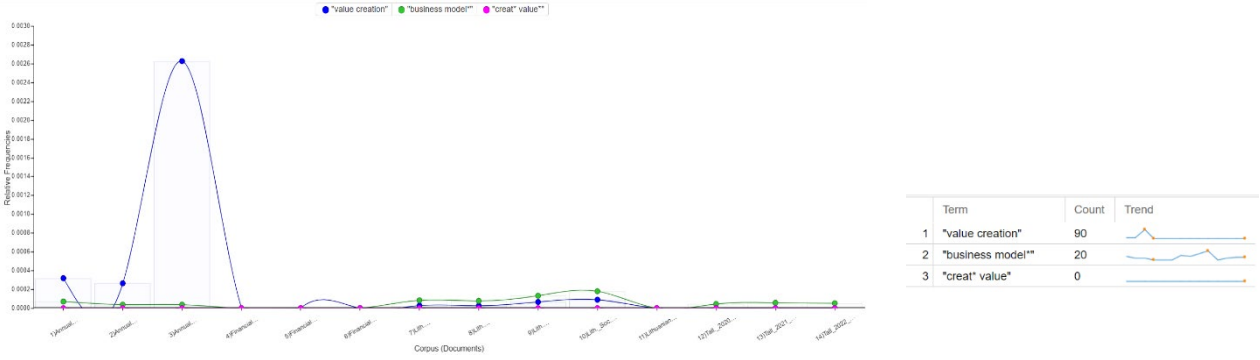

Figure 6. Occurrence of *value creation* and *business model* in Corpus I (source: created by the author)

most simply analytical algorithms. In the case of links, the algorithm consists of the following steps: text segmentation, context window identification, co-occurrence count, link formation, and network visualization.

The use of *stakeholder*, *transparency* and *investors* was found consistent with the <IR> framework, promoting engagement (*cooperation*, *engagement*) and satisfaction of stakeholders' interests (*expectations*), transparency in information reporting (*information*), and value-creation for investors (*transactions*, *security*) (see Figure 5).

The next step was to determine the occurrence of *business model* and *value creation*. A trend diagram was created, which proved hardly any use of the concepts (see Figure 6).

In reports from Finavia, Lithuanian Airports, and Tallinn Airport, a general integration of Integrated Reporting (<IR>) concepts – value, capital, and sustainability – was noted. The reports emphasized specific <IR> elements like human capital, social and relationship capital, financial capital, environmental capital, and manufacturing capital. While these concepts were addressed, the reports lacked explicit use of corresponding phrases, such as 'human capital' or 'financial capital' (see Table 2). For effective airport management reporting, using these specific terms would provide a more precise and standardized representation of how human, financial, and other capitals contribute to overall value creation. This not only aligns with <IR> guidelines but enhances transparency in communicating the airports' comprehensive performance.

3.4. Frequency and concordance analyses of RIX reports

Consistent with section 3.2, RIX reports were analysed separately as Corpus II, which comprised 239,800 words. The analysis procedure was identical to that of English reports, which is why this section contains only descriptive results. The selection of top frequency words (see 2.3) resulted in 125 words. The frequency analysis was run on words to identify concepts related to <IR> lexical indicators (see Table 2). <IR>-related concepts were found among top frequency words (23% of Corpus II) and included the following: value, capital, general <IR> concepts (strategy, sustainability, etc.), and concepts pertinent to HC (employees, training, etc.),

S&RC (passengers, services, etc.), FC (revenues, expenses, etc.), E/NC (noise, water, etc.), MC (runway, infrastructure, etc.). The word *stakeholder* was not identified; however, stakeholder-related concepts, such as Latvia, society, etc., surfaced, which proves the creation of a semantic field inclusive of *stakeholders*.

The coherence between Corpus I and Corpus II was maintained through the consistent application of the same methodological steps. Phrases specifically related to the six capitals were systematically integrated into Corpus II, mirroring the methodology used in Corpus I. In both corpora, challenges were encountered in identifying concepts related to IC along with other capital types. Despite the inclusion of terms such as HC, S&RC, FC, E/NC, and MC alongside the term 'capital,' the absence of specific capital phrases remained notable. The lack of conclusive results regarding capital concepts in both corpora underscores the intricacy of aligning reported concepts with the <IR> framework. This necessitates ongoing investigation and refinement in future analyses.

Other <IR> concepts outside top frequency words included *value creation*, *business model*, *integrated thinking*, *strategic thinking*, and *nexus thinking*. With the exception of the *business model*, which was mentioned only on 3 occasions, which is a negligible amount for the corpus size, other concepts were not identified at all.

Corpus II was also checked for *stakeholders* (as opposed to shareholders), *investors* and *disclosure/transparency*, which were minimally used. In comparison, the concept of *shareholders* occurred 5 times more frequently than *stakeholders*. Although the concept of shareholders is included in the notion of stakeholders, RIX clearly emphasized the interests of airport shareholders. Despite low frequency of occurrence, *stakeholders*, *transparency*, and *investors* were also analysed in bigrams (with the most frequently used co-words) to determine their conceptual connection to the <IR> framework. Little relevance was discovered in relation to <IR>. Therefore, concordance tables for these lexical items were created. Concordance analysis is used when the lexical context surrounding a keyword should be explored (Marzouk & Enaba, 2019) to specify interpretation and meaning of the keyword. The scope of concordances can be set at different levels, for example, 2 to 80 lexical tokens can be selected to the right/left of a keyword. In this research, concordances were limited to 5 tokens in both directions to effectively ascertain the relevance of keywords to <IR> concepts within the broader context. *Stakeholder* concordances showed that the concept emerged in the contexts of identification and consideration of stakeholders and their opinions, and their engagement, which is consistent with the <IR> framework. *Disclosure/transparency* concordances revealed the focus on identification, disclosure and prevention of fraud, implementation of information disclosure/transparency principles in transactions, and ethical conduct, which is also consistent with the <IR> framework. *Investor* concordances also displayed concordances relevant to the <IR> framework in pertinence to presenting information, procedures and measures for attracting investors. Thus, although the use of *stakeholders*, *disclosure/transparency* and *investors* was minimal, it was implemented within the <IR> context.

Overall, the analysis of annual and sustainability reports of Riga International Airport are consistent with earlier findings on other airports and reveals the use of some features of <IR>, such as *value* and *capital*. However, the lack of statistically significant use of <IR> lexical indicators, such as value creation, business model, investors, disclosure/transparency, stakeholders, six capitals and integrated thinking prove the lack of information and structure required for <IR>.

3.5. Combining the outcomes of analyses of the reviewed airport reports

The findings from the analysis of Northeastern European airports' reports indicate a notable absence or minimal incorporation of features associated with <IR> in their annual communications with stakeholders. Despite the identification of sustainability and development as the only <IR> concepts in the top frequency list, the overall weighted average for <IR>-related concepts amounted to 24% across both corpora. This suggests a limited integration of key <IR> elements in the discourse of these airports.

The analysis reveals that specific <IR> lexical indicators, such as human capital, environmental capital, integrated thinking, and intellectual capital, were either not used or were mentioned negligibly. Words associated with general <IR> concepts and various capitals were considered, but their incorporation into a comprehensive <IR> framework was not evident. The identified shortcomings include a lack of depth in discussing human capital and environmental capital components, a predominant association of value with financial aspects rather than value creation, and minimal attention to integrated thinking and intellectual capital. Furthermore, concepts like investors, stakeholders, transparency/disclosure, and business model were scarcely mentioned.

The consistency of these outcomes across reports in both English and Latvian points to similar trends in report writing across the entire Northeastern region of the EU.

Discussion and conclusions

The global landscape, shaped by the Covid-19 pandemic, geopolitical tensions, and military conflicts, significantly influences airports' economic development and consumer behavior patterns (Bulatovic et al., 2023). Consumer expectations, heightened by these factors, drive increased competition in the airport industry, creating a demand for enhanced services and experiences (Bulatovic et al., 2023). Customer satisfaction measurement, crucial in this competitive environment, involves various service quality models like SERVQUAL, SKYTRAX, and Kano models (Bulatovic

et al., 2023; Tseng, 2020). These models converge on the principle that both tangible and non-tangible aspects of corporate performance contribute to customer satisfaction across different levels of perception and expectation, fostering overall business development. For example, the Kano model emphasizes diverse needs, and components within <IR>, such as those of HC, S&RC, and IC, which can be used to illustrate their role as inputs and outputs in satisfying customer needs in a reiterative manner, aligning with sustainability.

However, integrating these diverse factors – tangible and non-tangible, linear and non-linear, financial and non-financial – into a unified model poses a significant challenge. <IR> emerges as a valuable tool for comprehensively assessing these intricate aspects, encapsulating social, financial, and environmental factors within business actions across various hierarchical structures. Leveraging <IR>, airport managers can redefine Key Performance Indicators (KPIs), introducing new KPIs encoding processes and operations, linking them intricately to both tangible and intangible assets and organizational business targets. This interconnected matrix, facilitated by <IR>, can be mapped on the importance-performance analysis, expanding criteria for multi-criteria decision-making, fostering a nuanced model for assessing sustainability and enhancing business development transparency. This strategic approach aligns with Gorshkova et al. (2022), emphasizing <IR>'s pivotal role in guiding multiple-criteria decision-making within the transport industry.

Reporting on social, environmental, and financial performance co-creates a company's success (PWC, 2019), pillars of SDGs included in annual reporting. Sustainability aspects, covered by <IR> (KPMG, 2023), are essential for revealing evidence-based narratives. One focus of the research was to theoretically justify <IR>'s application to airport annual and sustainability reporting. Macro-level and micro-level justifications revealed benefits, enhancing management and sustainability through transparent long-term value creation integrating various forms of capitals.

More specifically, this research focused on evaluating the current integration of <IR> practices within Northeastern European airports' reporting, specifically, on determining if Northeastern European airports use <IR> for reporting on annual and sustainability progress. Sustainability emerged as a high-frequency concept, along with (financial) value, environment, employees, passengers, society, and financial issues. While widespread <IR> adoption was not evident, the inclusion of its components signals a potential transition, emphasizing sustainability aspects. Outcomes indicated a shift in reporting strategies, with sustainability-related components gaining significance. Despite <IR> concepts not prominently featured, the inclusion of its components suggests groundwork for potential transition.

In the future, applying <IR> to airport development should be considered within service quality models (SERVQUAL, SKYTRANX, Kano) and the importance-performance analysis, aligning business inputs and outputs. Northeastern European airports, although not fully embracing <IR>, show potential for transition, driven by sustainability focus, stakeholder demands, and evolving industry trends. The construction of Riga Airport City (RIX, 2023) reflects this shift, diversifying and expanding non-aviation revenues. The focus on sustainability, especially post-Covid-19 public investment, may stimulate the adoption of <IR>, offering a unique merge of financial and non-financial indicators for evidence-based verification of non-financial performance.

National development plans, exemplified by Latvia's strategic vision for 2021–2027, underscore the importance of fostering sustainable development, improving environmental quality, and elevating overall quality of life, including employment standards (Saeima of the Republic of Latvia, 2020). Recognizing airports as integral components of national infrastructure, these plans advocate for sustained and strategic investments in airport development. A case in point is Latvia's Sustainable Development Strategy until 2030, which envisions the transformation of Riga International Airport into a competitive air hub in Europe, enhancing Latvia's transit allure (Saeima of the Republic of Latvia, 2010). Moreover, as an expression of the regional commitment to bolstering transportation connectivity, the ongoing construction of RailBaltic stands as a notable initiative. This transformative project aims to seamlessly link Estonia, Latvia, and Lithuania, creating vital connections between their airports and the broader Central European network through a standardized railway system. This not only facilitates greater integration but also enhances accessibility across the Baltic States, marking a substantial stride toward regional cohesion and progress.

Disclosure statement

The author of the paper does not have any competing financial, professional, or personal interests from other parties.

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