

# How stakeholders respond to airline sustainability signaling – a social media analysis

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## Abstract

**Purpose** – The purpose of this study is to explore stakeholder responses to an airline’s sustainability signaling act. Responding stakeholders, their interpretations and feedback to the signal are studied in light of signaling theory and corporate social responsibility (CSR).

**Design/methodology/approach** – This study was conducted using the social media analytics approach. A total of 7,002 publications in the public domain were collected from the internet’s news services, blogs and major social media websites. These posts were subjected to content, sentiment and reach analyses.

**Findings** – Diverse stakeholder groups, ranging from industry professionals to societal influencers, responded via social media to a CSR-related press release, the main types being general influencers of society and those working in the aviation or tourism industry. The themes of responses ranged from sustainability, technical development and the future of transport to green transition policies. Hence, the press release as a signal was linked to other discussions prevalent in society. Sentiments of the publications were mainly neutral or positive, with very few negative responses from stakeholders. Many responses were supportive, and the critical responses did not contain accusations of greenwashing.

**Practical implications** – Environmental CSR communications are strategically important to companies operating in carbon-intensive industries. The public may view breakthroughs in technology as an efficient way of emissions reductions cascaded with improvements in processes and practices. Utilizing new technology also affects several stakeholders and creates new opportunities for them. Knowledge on the subject may influence the tone of discussion.

**Originality/value** – This study views a press release as sustainability-related signaling and examines stakeholder responses in social media, contributing to CSR and signaling research in the context of the airline industry by observing the signaling process over time along with the behavior of the actors involved.

**Keywords** Aviation, CSR communication, Corporate sustainability, Social media analysis, Signaling theory

**Paper type** Research paper

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## Introduction

The environmental performance of commercial air transport has become a subject of intense discussion and pressure in recent years. The public may have a distorted image of its environmental footprint, placing the industry at risk of being considered environmentally harmful (Chiambaretto *et al.*, 2021). Before the COVID-19 pandemic, phenomena such as flight shame surfaced in society. Although they have not yet begun to affect travel behavior, travelers have become more supportive of market-based and other measures intended to force airlines to implement more environmentally friendly practices (Doran *et al.*, 2022; Gössling *et al.*, 2020).

Therefore, corporate social responsibility (CSR) has become a key element in airline management. It refers to a company's obligation to conduct its business in a manner that considers the system-level effects of its activities (Beal, 2014; Kim *et al.*, 2020; Sheehy, 2015). CSR involves integrating social and environmental concerns into a company's business operations and interactions with society. It plays a significant role in shaping an airline's approach toward sustainability, community engagement, and ethical practices.

Research on agency has examined the problems within principal-agent interactions (Jensen and Meckling, 1976). Such interactions are affected by motivations of individual agents, which have a governing effect on how transition processes evolve. Transition processes can on the one hand, be affected by market, institutional, and regulatory aspects and environments, that can act as drivers for sustainability transitions. On the other hand, their shortcomings may create barriers for the transitions and limit the agency of individual actors (Dodd and Yengin, 2021; Pesch, 2015).

Firms' responses to societal pressure can be investigated through the frameworks of stakeholder management and signaling theories. Options range from passive acceptance to the active and opportunistic manipulation of institutional pressures and expectations (Oliver, 1991). Although regulatory uncertainty plays a role in companies' greenhouse gas-reducing actions, the main stakeholders exerting pressure are the companies' employees, customers, and investors (Cadez *et al.*, 2019; Helmig *et al.*, 2016).

One aspect of proactive stakeholder management is reputation management. Being successful in it can mean superior financial performance over time (Roberts and Dowling, 2002). However, making untenable promises of sustainability can lead to scandals and associated costs (Valentini and Kruckeberg, 2018).

Asymmetric information between parties, such as seller and client or principal and agent, often causes questions of, for example, quality and intent leading to uncertainty. Signaling theory deals with reducing this uncertainty (Connelly *et al.*, 2011; Spence, 1973; Stiglitz, 2000). Companies can utilize signaling in mitigating the effects of uncertainty regarding the level of environmental sustainability and other qualities of their business (Akerlof, 1970; Cuadrado-Ballesteros *et al.*, 2017; Macagnan and Seibert, 2021). Research suggests that "good" corporate citizens issue CSR reports to alleviate information asymmetries that could prevent them from benefitting from their actions (Ching and Gerab, 2017). While many airlines use CSR or sustainability reporting (SR) for this purpose, some also publish it to legitimize their current business practices (Kılıç *et al.*, 2019; Zieba and Johansson, 2022).

Literature on airline CSR communication particularly through digital channels is scarce (Galhoz *et al.*, 2024). Previous studies on press releases have shown that those related to CSR increase companies' coverage in related news articles, and those concerning corporate philanthropy have been rewarded in the market with abnormal cumulative short-term returns (Patten, 2008; Zerbini, 2017). To understand CSR communication, it is also crucial to understand the divergent roles of actors communicating and the environment: therefore, we rely on Connelly *et al.* (2011) who have called for research bridging the domains of signaler, receiver, and signaling environment, to improve understanding of the interactions between different actors present in the signaling process.

In sustainability research, social media has been found to have a mediating role in the construction of bidirectional relationships between actors communicating, such as

stakeholders and companies, thus affecting CSR strategies. While firms use social media as a tool to obtain legitimacy, their followers play a monitoring role. For example, disapproving disparities in CSR information and business strategies can influence a company's disclosure strategy (Arrigo *et al.*, 2022). At the very least, social media also has an indirect influence on tourists' green consumption intentions (Chi, 2021). Moreover, acquiring sustainability certificates changes firms' online sustainability communication with external stakeholders (Lumby and Ngwenyama, 2023).

Advancing sustainability transition touches strongly aviation companies and industry, necessitating them to communicate and signal their sustainability-oriented actions (Chiambaretto *et al.*, 2021). The current dependence on fossil fuels in commercial aviation can be reduced through different pathways, such as continuing their use while sequestering CO<sub>2</sub>, switching to renewable fuels, or using hydrogen-powered aircraft (Timmons and Terwel, 2022). One way of signaling a pro-environmental stance is to announce intentions of transitioning to less environmentally harmful power sources, such as sustainable aviation fuel (SAF). However, there are significant uncertainties about the origins and sizes of future SAF feedstocks. Therefore, commitment to high levels of biokerosene usage may be unachievable, which can make keeping such promises difficult (Koistinen *et al.*, 2019). Nevertheless, being perceived as environmentally friendly is lucrative from a business perspective because it may generate customer satisfaction and loyalty, and a solid CSR reputation significantly affects client-perceived value (Arslanagic-Kalajdzic and Zabkar, 2017; Baumeister *et al.*, 2022).

Finally, we position our study into the intersection of CSR, sustainability-oriented (digital) communications and signaling theory using aviation as a context, and summarize gaps identified in the extant research. In a recent study, Galhoz *et al.* (2024) have studied CSR communications in social media. Also, Hesse and Rünz (2022) examined an airline company's CSR campaign. However, the signaling approach has not been applied in either of these studies. Therefore, they do not add our understanding on companies' sustainability signals and stakeholders' interpretations of such signals. Neureiter and Matthes (2023) have done online experiments with stakeholders on environmental advertisement by airlines, but without regarding the messages as a signaling process. So far, the stakeholders' perceptions to a company's (airline) CSR signaling have been studied in a way that does not cover the signaling process itself, leaving a research gap regarding how stakeholders interpret and respond to such sustainability signal and how the process triggered by a sustainability signal develops into a nuanced discussion among stakeholders.

The purpose of this study is to contribute to the discussion on sustainability disclosures, stakeholder signaling in social media, and aviation emission reductions. This study attempts to answer two research questions to fill the research gap in how a company (airline) can signal and communicate its CSR initiatives through digital channels and how stakeholders respond to them.

RQ1. Which stakeholder groups respond to a company's sustainability signaling in digital media, and how?

RQ2. What are the themes and sentiments in stakeholder responses to a company's sustainability signal in digital media?

To solve research questions of this study, the social media analytics (SMA) approach was used to examine how stakeholders responded when Finnair, an airline, announced its intention to add electrically powered aircraft to its fleet. SMA is an interdisciplinary research field that utilizes a variety of tools and frameworks to track, mine, model, and analyze social media data (Stieglitz *et al.*, 2018). The sustainability signal of our study is a press release triggering responses by stakeholders. Responses studied are different publications posted to the internet by the receiving stakeholders. The SMA approach allows for inclusion of, for instance, also news feeds and public databases (Batinca and Treleaven, 2015). Therefore, also news articles are utilized in acquiring a better overall picture of the case at hand. In total, 7,002 publications

gathered from news websites, blogs, and popular social media platforms were analyzed to study the kinds of posts stakeholders create and what they discuss.

This study is structured as follows: The theory section describes the problems of aviation emissions, CSR communication, and stakeholders' perceptions of them. This is followed by a detailed description of the methodology, results, and discussion sections. Finally, the conclusions are presented, along with a mapping of further research possibilities and the limitations of the study.

## Literature review

### *Context for the study: aviation and airlines pursuing and communicating emission prevention for sustainability*

Aviation's contribution to anthropogenic climate change has been estimated at 3.5%, although significant uncertainty is particularly related to non-CO<sub>2</sub> forcing terms (Lee *et al.*, 2021). Sustained high growth rates will eventually make aviation a major source of carbon emissions (Owen *et al.*, 2010). Therefore, regulators and the industry should strive to stop the growth of emissions and make aviation carbon neutral.

Aviation is included in the Emissions Trading System (ETS) of the European Union and in a global emission trading system known as the Carbon Offsetting and Reduction Scheme for International Aviation (European Commission, 2015). The European Commission's Fit for 55 legislative package includes stricter rules for the ETS (European Commission, 2022). It directs consumption toward low- or zero-carbon fuels and investments in sustainable technologies (Ovaere and Proost, 2022; Skov and Schneider, 2022).

Furthermore, airlines and the strategies they implement play a crucial role in promoting sustainability as middle-level actors in the decision-making hierarchy (Orhan, 2021; Singh *et al.*, 2022). Occasionally, their targets are more ambitious than what regulators and umbrella organizations have committed to. For example, during the data collection for this study, the focal airline company in this study, Finnair from Finland, aimed to achieve carbon neutrality by 2045 (Finnair, 2021a). In accordance with this aim, Finnair aimed to do sustainability-improving actions and communicate them: consequently, Finnair's press release analyzed in this study concerns Heart Aerospace's battery-powered ES-19 commuter aircraft. Entry into service was originally planned in 2026 (Finnair, 2021b, c). In September 2022, the aircraft's design specifications changed significantly. The timetable was also pushed several years into the future by the manufacturer (Heart Aerospace, 2022).

Battery-powered, turbo, or hybrid electric aircraft in general are forecast to be an option, primarily for urban air mobility solutions and small commuter aircraft (Zapozhets *et al.*, 2020). The reason is that during the first half of this century, it will not be possible to utilize them in the most widely used aircraft sizes (Epstein and O'Flarity, 2019).

The general sustainability-oriented sentiments of the societies in which Finnair, our case company, mainly operates, reflect also focal customers' awareness and mindsets on sustainability issues: for example, phenomena such as *flygskam* (flight shame) have emerged (Flaherty and Holmes, 2020; Olkkonen and Quarshie, 2019) in some countries and societies. Several large Nordic companies in different industries are also ranked highly in terms of sustainability (Olkkonen and Quarshie, 2019; Pál and Räsänen, 2023).

### *CSR signaling and stakeholder perceptions in aviation*

In this study, airline CSR communication was investigated in light of signaling theory (Bergh *et al.*, 2014; Spence, 1973). In a signaling process depicted as a timeline, a company sends a signal about its underlying quality (in this case, CSR communication) to a receiver who observes and interprets it. Feedback is then sent to the original signaler (Connelly *et al.*, 2011). Regarding the effects of CSR communication on a company's reputation, a signal passes through two filters governing the effect of CSR reputation on the receiver side. The first filter

consists of whether the context for CSR reporting is positive or negative, while the second filter concerns stakeholders' own psychologically formed CSR perceptions (Hetze, 2016). Figure 1 depicts a synthesized framework used in this study.

Companies tend to apply CSR in a strategic manner (Baron, 2001; Siegel and Vitaliano, 2007). Specifically, SR is used in communication with various stakeholders. The goal is to improve a company's reputation among them and to provide clear messages on environmental and other issues (Kuo *et al.*, 2016). Such signaling extends beyond sustainability disclosures, as previous research on CSR-related social media communication and public reactions has shown (Kwon and Lee, 2021; Saxton *et al.*, 2019). In the case of this study, many stakeholders can be reached, especially through X (called Twitter during the data collection period). In Finland, the service is popular among top-level politicians, journalists, and other influencers (Ruoho and Kuusipalo, 2019).

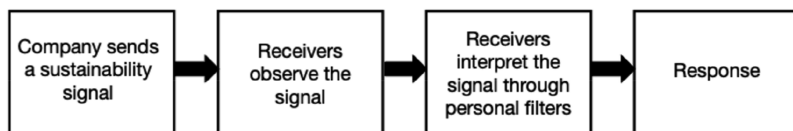
The existing literature typically examines CSR-related customer perceptions through surveys, online experiments, or interviews (Hesse and Rünz, 2022; Neureiter and Matthes, 2023). Regarding receiver feedback, Hesse and Rünz (2022) found that negative perceptions regarding the "Fly Responsibly" de-marketing campaign by the Dutch airline KLM stemmed from perceived opportunistic behavior and a wrong sender-message combination. Nevertheless, KLM, as a full-service provider, was considered by some respondents to be more credible than a low-cost carrier.

Consumers consider vague environmental advertisements by airlines to be greenwashing more keenly than those offering concrete green compensation. This can be traced to their mental image of flying as an environmentally harmful practice. However, topical knowledge about the environment can cause consumers to doubt whether the concrete compensation offered by the airline will be sufficient (Neureiter and Matthes, 2023). These doubts can be alleviated through sustained and concrete communication about CSR activities (Pérez, 2019).

Continuous communication about desired CSR practices as an intra-organizational aspirational discussion molds a company's actions by fostering change inside it. Over time, a possible large gap between ideals and current practices will diminish (Christensen *et al.*, 2013). Specifically, the CSR goals stated in strategic documents form stakeholders' expectations for future actions and may enhance commitment to sustainability aspirations and responsibilities. Therefore, managing the processes through which CSR-related topics are communicated is important, as is differentiating which parts of CSR communication foster change (Penttila, 2020; Schoeneborn and Trittin, 2013).

If sustainability goals are substantial and presented within a timeframe for their achievement, evidence suggests that companies can diminish their environmental footprint. If the goals are ambiguous, there will be no relationship between environmental targets and performance (Dahlmann *et al.*, 2019).

These views fit many airlines' sustainability goals and related communication because processes for implementing less environmentally harmful equipment and procedures can take years or decades. Aviation is in the early stages of escaping the carbon lock-in, a state in which carbon-intensive production methods linger in use due to technological and institutional inertia (Unruh, 2002).



Source(s): Connelly *et al.* (2011), Hetze (2016)

Figure 1. Synthesized framework for the study

However, in accordance with stakeholder management theory, CSR practices and reporting in the airline industry and aviation in general are not always aimed at strategic reputation building, and their focus and intensity vary between companies and regions (Cowper-Smith and de Grosbois, 2011; Karaman *et al.*, 2018; Yang *et al.*, 2020). Other motivations include compliance and risk prevention (Chang *et al.*, 2015; Upadhaya *et al.*, 2018). In Nordic markets, airline CSR is often investigated in terms of SR (Johansson, 2021; Kotonen and Savonen, 2015).

Regarding consumer perceptions of electric aircraft, attitudes toward eco-friendly products, perceived social pressure, and ease of using flights govern how keenly consumers choose an electrically powered airplane over a conventional one. Uncertainties about outcomes may negate both volitional and non-volitional factors in these intentions (Han *et al.*, 2020). Gender and age also have an effect, with younger age groups having stronger green intentions than older age groups (Han *et al.*, 2019a). Signals by operators and manufacturers that reduce perceived risks and enhance knowledge could make customers trust electric aircraft more and develop positive attitudes toward them (Han *et al.*, 2019b).

## Methodology

### Research design

We studied a case in which Finnair conducted sustainability signaling via a press release, related news, and social media communication. Stakeholder responses to the communication were analyzed by monitoring and studying media coverage and discussions on the internet. Using this approach along with the framework presented in Figure 1, we aimed to observe the behavior of different stakeholder actors and environment usually present in signaling that contributes to reputation management (see Carter, 2006; Connelly *et al.*, 2011).

SMA was chosen as the approach for studying the commentary. It provides valuable insight into mass communication by enhancing the understanding of the content on social media platforms and of the actors that influence intercommunication the most, making it popular in the business domain (Stieglitz *et al.*, 2018). This approach makes it possible to study the signaling process as it progresses. Combined with the case study method, it allows for deeper investigation of the communication act itself (O'Connor and Joffe, 2014). To avoid privacy and ethical issues regarding access to private conversations, only posts in the public domain were included in the dataset. Text analysis was used to examine their content.

An analytics tool called *Notified* was used for data acquisition to track user-generated public content on news sites, podcasts, *Facebook*, *YouTube*, *Instagram*, *Twitter*, blogs, and discussion forums in real time. The software began to collect data after the researcher gave it one or more keywords. For this study, the keyword was *Finnair*. Thus, public discussions about the company were collected broadly. Further, the tool's abilities enabled us to expand the SMA approach beyond social media—that is, to news outlets and other such services. Therefore, we were able to examine which media outlets considered the item to be newsworthy and raised it into public discussion on their part. This widened the picture of the signaling environment.

Content analysis can be used as a tool for discovering meanings in a vast number of social media texts. Meanings are not only present in the texts themselves but also in the identity of the participants and contexts in which discussions take place (Krippendorff, 2019). Content analysis has previously been used in conjunction with the SMA approach, for example, in studying aspects of the sharing economy (Geissinger *et al.*, 2019, 2020) and the behavior of gig workers (Bucher *et al.*, 2021). The data were analyzed after collecting and filtering in sequential steps (Silverman, 2014). The first step of coding focused on the type of publication. The aim was to differentiate between news articles, company-disseminated information, and other commentary. Another round of coding was conducted to identify the themes and viewpoints expressed in the publications. The objective was to uncover the kinds of topical aspects present in the responses.

Sentiment analysis was used as another tool for analyzing the dataset. This method, in which automatic tools extract subjective information from text written in natural language, is widely used in services, healthcare, financial services, and politics (Pozzi *et al.*, 2017). Sentiments were analyzed in two stages. The first round of analysis was conducted automatically using Notified, which labeled the sentiments of each post as positive, neutral, or negative. As automatic language processing tools often have challenges with, for example, irony and sarcasm (Pozzi *et al.*, 2017), a second round was performed manually to correct automatically labeled sentiments.

Notified also collected user-related data that were used for analyzing the kinds of actors and actor groups that discussed and disseminated information about the press release. These data include, *inter alia*, usernames of social media accounts and names of the authors, if available. In its CSR reporting, Finnair named customers, investors, research and development partners, media, and the public as stakeholders who could be reached with the kind of news release required by this study (Finnair, 2021d). In Finnair's case, the state of Finland owns 55.9% of its shares. Thus, the government plays a dual role as a stakeholder—as an owner and as a regulator (Finnair, 2021d).

#### *Dataset and data filtering*

Data were collected between March 22, 2021, and April 14, 2021. A dataset of 7,002 entries, comprising articles, blog and forum posts, and social media publications, was obtained.

Finnair published a press release concerning a Letter of Interest (LOI) on the Heart Aerospace ES-19 on March 25, 2021, along with a story on its in-flight magazine covering the same subject (Finnair, 2021b, c). Content related to these publications was filtered for further examination.

Posts regarding the press release in the most widely used languages were extracted by filtering the dataset. This resulted in a subset that featured publications made in English, German, and Finnish. To narrow down the topics to publications dealing with electric aircraft, posts including the words or parts of the words “electric”—“*sähkö*” (electric in Finnish) and “*elektr*”—were filtered. This resulted in 750 entries. Table 1 presents the distribution of publications in the full and filtered sets of data.

The most popular social media platforms used for discussing Finnair-related topics were Twitter and Instagram. Articles formed the second largest number of entries. Most of the messages were published on Twitter, while other social media platforms contained a significantly fewer number of posts. Articles on news and other websites comprised the second-largest source of publications.

To complement the primary data, Finnair's sustainability and annual reporting were used as secondary sources. Reports were used to identify the key stakeholder groups, and the emission reduction targets and steps.

**Table 1.** Collected posts in the filtered dataset according to source and share of total volume

Media	Filtered publications <i>n</i>	%
Articles	93	12
Blogs	46	6
Facebook	42	6
Forums	9	1
Instagram	6	1
Twitter	554	74
Total	750	100

**Source(s):** Authors' own work

## Results

Content analysis was conducted to reveal actions, themes, and viewpoints related to the responses. In the two steps, the frequencies of the concepts were coded. In addition to creating an initial coding protocol, categorization was conducted in an interactive manner to allow for data-driven additions of categories.

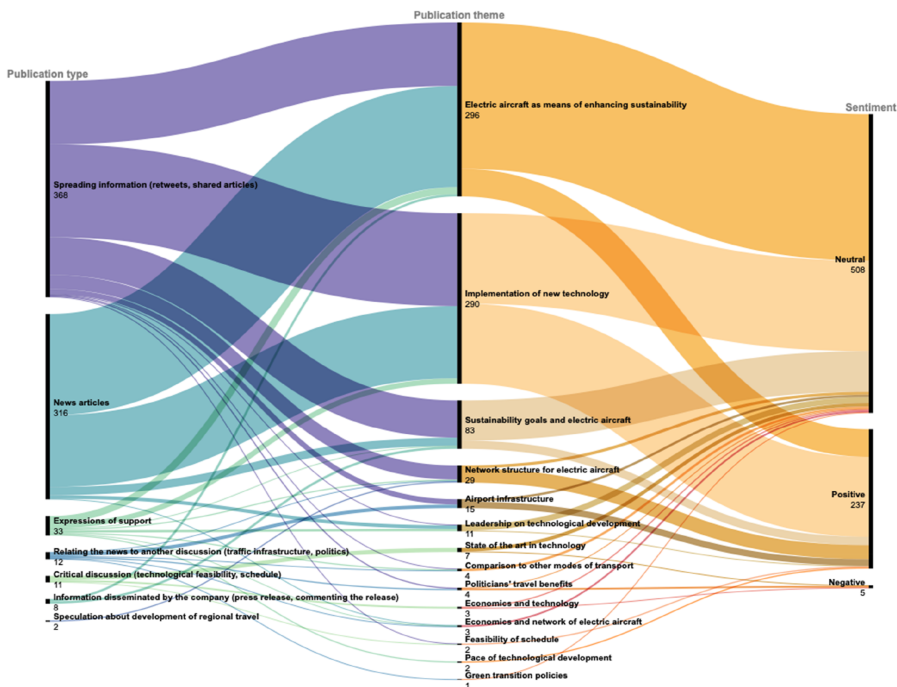
### *Identifying the stakeholders responding to airline CSR communication*

Finnair's press release was distributed in Finland by major news networks and mostly by travel-related services abroad. It was also discussed and shared by some of the company's executive board members and employees. Therefore, the press release seems to have fulfilled the criteria for newsworthiness in media outlets (see [Harcup and O'Neill, 2017](#)).

Regarding stakeholders – domestically in Finland, –various politicians, university professors, aviation personnel, journalists, and other societal influencers took part in the commentary. More globally, in other countries, stakeholders responding to the communication were typically journalists, people connected with travel or tourism, and aviation professionals or enthusiasts.

### *Results of the themes and sentiments of stakeholder publications in the public domain on sustainability-related communication in aviation*

[Figure 2](#) depicts how different types of publications were spread between the themes of the responses and what sentiments were expressed. After the press release and related communications were disseminated, some members of Finnair's executive board shared them on their social media accounts. Domestic and international media outlets reported on this communication, which fueled stakeholder responses.



Source(s): Authors' own work

**Figure 2.** Types, themes, and sentiments of the publications

Publications by the company and its employees highlighted the *sustainability* aspects of the LOI. News outlets also covered the story from other viewpoints, such as the leadership of Nordic countries in *decarbonizing air travel* and *implementing new technology* in general. A similar trend was observed in the largest category of spreading information, which comprised shares of articles and other publications on discussants' social media channels. Here, the technology theme was approximately on par with the share of sustainability-related posts. The sentiments in these categories were mostly *neutral* or *positive*.

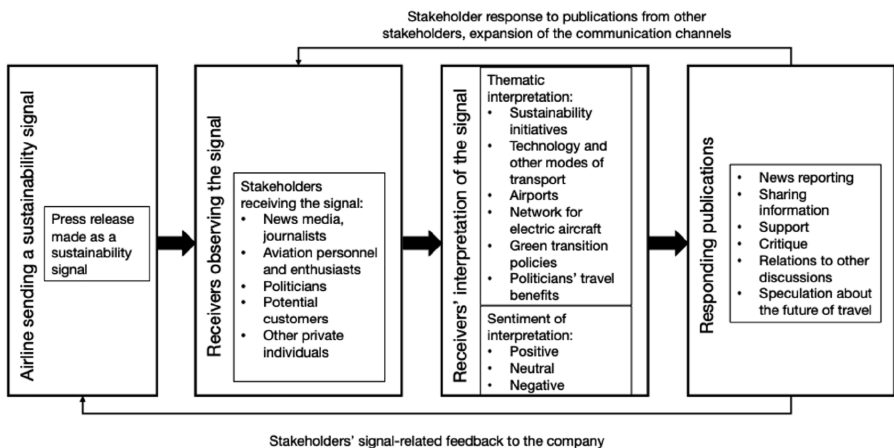
The same themes were largely represented in the expressions of support for the project. *Leadership in implementing new technologies* and the *possibilities of network development* from electric aircraft were also discussed. The latter theme was evident in posts that tied the press release to other ongoing discussions, such as *green transition policies*, *comparisons with other environmentally friendly modes of transport*, and *closure of the historic Malmi airport*. It was also linked to discussions on the *travel benefits* enjoyed by members of parliament. These posts were labeled *negative*, with the rest being *positive* or *neutral*. Speculations were also made on how electric aircraft could revolutionize regional travel.

Some supportive publications admired the *pace of technological development*, while most of the critical comments dealt with the same theme. The state of the art of *current technology* and its ability to make electric flying feasible were questioned, as was the economics of implementing it. The ambitious *schedule for entry into service* was also doubted. Nevertheless, these posts were mostly *neutral*, with no negative sentiment labels.

The tone of the discussion was also studied using reach analysis. Publications with positive sentiment labels achieved approximately 83% of the total reach, neutral posts had 17%, and negative publications gathered less than 1%. Therefore, the general tone of the responses can be seen as positive. The small reach of negative publications can be explained mostly by the Finnish language and the publication platform of the social media accounts of private individuals with few followers.

Figure 3 presents the framework of the observed process of signaling and the subsequent responses to it.

In the process displayed in Figure 3, the company sends a signal concerning its sustainability efforts. Here, the signal was a press release, which was shared on social media by the company's employees and covered in an in-flight magazine. The observing receivers then interpret it and attach a thematic linking and sentiment to the interpretation. Following this,



Source(s): Authors' own work

Figure 3. Model of company sustainability signaling and the following responses

some receiving stakeholders make responding publications that turn into a discussion. Some of these are news articles published by news agencies. As more stakeholders are exposed to the news, the channels of communication expand. The cycle of interpretation and response is repeated. If the original signaler monitors the discussion in some way or takes part in it, it can receive feedback and adjust future actions accordingly.

## Discussion

### *Summary of the key results and discussion*

This study explored the responses of different stakeholders to a CSR-related sustainability signal by a company. Our case displayed how via a sustainability signal – press release – an airline published an LOI on buying an in-development electric aircraft. The responses by stakeholders were studied in light of signaling theory (Bergh *et al.*, 2014; Spence, 1973). The study was conducted using the SMA approach (Stieglitz *et al.*, 2018). Analysis was performed using content, sentiment, and reach analyses.

Regarding our RQ1, we identified the stakeholder groups that respond to a company's CSR signaling and how they do so. Various stakeholder groups ranging from industry professionals to news services and societal influencers responded to the signal. It was spread by news services domestically and internationally, which increased the number of receivers. Prominent politicians, journalists, and other influencers talked about it on their social media channels, suggesting that the company's signal reached several relevant stakeholder groups. Publication types ranged from the company's communications, news articles, and retweets to expressions of support, critical discussion, and linking the press release to other types of discussions.

Regarding our RQ2, we untangled the themes and sentiment responses present in the stakeholders' responses in digital media. The themes in the publications extended beyond sustainability-focused initial communication. Sustainability aspects were the most common themes, followed by the implementation of novel technology for sustainability. Additional themes included airport infrastructure, feasibility of the technology in question and schedule of implementation, comparison with other modes of transport, network development, green transition policies, and the travel benefits of politicians. Neutral and positive posts were most prominent, with negative publications featured mainly in discussions about the technological feasibility of the aircraft in question and politicians' benefits. Explicit greenwashing claims were not found in the data. By contrast, many users expressed support for switching to a radically different aircraft from what the current fleet is composed of.

The results showed that, even during an external shock that caused air travel to halt to a near standstill, the public was interested in CSR-related signaling from a company. This reflects the results of earlier studies, which revealed that followers of companies' social media accounts want to see CSR messages and that human interest is a significant driver of engagement (Manzanaro *et al.*, 2018; Saxton *et al.*, 2019). The LOI and related communication are connected with broader discussions about airline emissions, which have gained traction in recent years. Concerns about emissions have caused many to question the need to travel by air for business or leisure (Flaherty and Holmes, 2020; Gössling *et al.*, 2020). Similar to many signals used by companies in their SR, be it environmental or some other type (López-Santamaría *et al.*, 2021), the focal sustainability signal in this study aimed to express intent, and possibly enhance the public understanding of the company's CSR-related qualities. Figure 3, presented in the Results section, breaks down the process by showing how the signal sent by the company is interpreted and responded to by the receivers. The responders engage in a discussion on social media and provide subsequent feedback to the company. Simultaneously, researchers can monitor the signaling process in the same way as companies themselves do by utilizing the SMA approach (Notified, 2024).

Although this kind of press release could have many interpretations, in the dataset featured in this study, the responses were mostly neutral or positive. In previous studies, similar sustainability-related communication by airlines has been regarded to some extent as

greenwashing. Such views can be harmful to companies, as greenwashing has been noted to have word-of-mouth effects on reputation and negative effects on green purchasing intentions (Zhang *et al.*, 2018). However, in these responses, accusations of such behavior were, perhaps surprisingly, nonexistent.

There may be several reasons for such a non-negative reception. Possibly, the widening acceptance of electric cars has made people more interested in other applications of electric power and increased optimism towards such technology. Seen through the lens of the model presented in Figure 3, the press release passing through the audience's CSR-related mental filters is contextually positive and can be regarded as aspirational communication and as a possibility to curb future emissions. Fleet renewals are part of airlines' core activities, which can make signaling about them more believable.

However, limitations in the knowledge of electric propulsion in aviation may make some stakeholders feel that its availability is sooner than later. As some debaters have suspected, it may take a long time beyond 2026 for technology to be at a sufficient level for commercial aviation (Schäfer *et al.*, 2019). Although previous studies on consumer attitudes toward electric aircraft have addressed the uncertainties of outcomes and perceived risks (Han *et al.*, 2019b, 2020), flight safety risks have not been considered in these discussions. Instead, debates about uncertainties have mainly focused on the capability of storing energy inside batteries.

When data were collected, commercial flying was at a very low level, and pandemic news was dominant, which could have affected how relevant aviation was considered. The idea of a greener future fleet is not as susceptible to greenwashing claims as, for example, CO<sub>2</sub> compensation. In addition, the demographics of Finnish discussants may be a factor in the tone of the discussion. This could result in an epistemic bubble in which relevant comments are invisible because they have been omitted from the social structure, or a bandwagon effect partly prompted by cues presented in social media (Li *et al.*, 2020; Nguyen, 2020; Wang *et al.*, 2023). Additionally, the low level of travel meant that this press release was one of the few newsworthy items to be reported about Finnair during the data collection period.

Regardless of the context in which companies release their initial communication, as the signaling timeline progresses, stakeholders begin to discuss its implications in other frameworks and link them to themes relevant to them, whether or not they are directly related to the original communication's topic. In the current study, the eventual purchase of an electric aircraft fleet would affect Finland's domestic transport policies and the usage of smaller airports, especially in southern Finland. These effects would expand to and engage several additional stakeholder groups. The results of this study suggest that a company may try to manage its reputation through CSR-related communication, but it is not in full control of how its stakeholders respond to it and what kinds of conclusions they draw from the company's actions and aspirations.

#### *Limitations and research avenues*

We are aware that our study has also limitations. One of them is the nature of the SMA approach. Although unobtrusiveness is one of its advantages, more detailed information about stakeholders' views on the subject, and triggers for their inputs to the discussion, could have been obtained by contacting some social media users and interviewing them. In addition, the timing of the data gathering may have been suboptimal due to the low traffic volume. There could have been more discussions before and after the COVID-19 pandemic when topics such as flight shame have been talked about more frequently. Furthermore, as publications from private social media groups and some aviation-specific forums were not featured in the dataset, part of the debate might have been unnoticed. Moreover, as the dataset did not feature discussions on other CSR initiatives, this case study is limited in scope. However, examining these avenues would require different methods and research designs.

A similar study utilizing the SMA methodology on stakeholder responses to airline CSR signaling could be initiated in further research. Incremental methods of reducing emissions could be examined to determine whether consumers accept them as readily as more radical ways of enhancing environmental performance.

## Conclusion

In this study, our aim was to contribute by integrating the signaling theory and CSR research, thus increasing understanding of sustainability signals of companies and consequent stakeholder communications. The study was conducted by examining the responses of multiple stakeholder groups to CSR signaling through the press release (see Zerbinì, 2017). We applied the SMA approach, which makes it possible to monitor the signaling process as it unfolds. This study presents a model of company sustainability signaling process, in which the receivers observe and interpret the signal and respond to it, creating a feedback loop. This approach allows for previously called-for research bridging the gap between the domains of the signaler, the receiver, and the signaling environment (Connelly *et al.*, 2011). Further, we expand the CSR research stream on stakeholder signaling through social media and other channels used for CSR communication (Kwon and Lee, 2021; Lee, 2016), especially regarding environmental themes, by reinforcing the argument that the public is responsive to companies' CSR communication. We also contribute to the nascent literature on airline CSR communication and signaling and stakeholder responses to it, particularly in social media (Galhoz *et al.*, 2024; Hesse and Rünz, 2022; Neureiter and Matthes, 2023).

For practitioners, this study suggests that the stakeholders' response to different sustainability actions varies, perhaps due to techno-optimism or differences in perception or knowledge. Companies operating in carbon intensive industries could attempt to increase coordination in messaging their inherent desire to operate in a more environmentally efficient way in their CSR communication. Following the stakeholder responses using the SMA approach after releasing sustainability-related communications can also help companies engage stakeholders and improve their SR, which has been found to be inconsistent, for example, within the airline industry (Zieba and Johansson, 2022). Studying how company practices transform through aspirational talk could be beneficial (Christensen *et al.*, 2013). Additional benefits to management in general could surface when other stakeholders become aware of new opportunities and start to act on them, adding value to the original action.

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