Original Research Article

The Boeing 737 MAX Crisis: Public Trust, Aviation Safety, and Corporate Accountability?

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ABSTRACT

Imagine boarding a plane, unaware that a hidden software system—one you've never heard of—could override the pilot and send the aircraft into a nosedive. When Boeing introduced MCAS, it was meant to solve a problem. Instead, it created a deadly one. The truth is that this kind of event happened in the series of accidents involving Boeing's 737 MAX, which was found to have MCAS (Maneuvering Characteristics Augmentation System) linked as the main cause of two fatal crashes that killed 346 people. The crashes raised widespread concerns about engineering, regulatory, and corporate responsibilities. Investigations revealed failures not only in technology but also in corporate accountability and basic ethics. However, little research has examined how these failures affected public trust in aviation safety, particularly on social media. Using BlueSky's API, a dataset of 10,455 posts dating back to 2021 was collected and filtered from all of BlueSky's posts using Boeing-related hashtags to ensure relevance. VADER (Valence Aware Dictionary and sEntiment Reasoner) sentiment analysis was applied to measure polarity scores across the dataset, using standard thresholds to classify positive, neutral, and negative sentiment. Revealing that average sentiment remained negative, with a mean composite score of –0.43 across the study period and sharp declines following major Boeing-related incidents. The Boeing 737 MAX crisis demonstrates how failures in corporate responsibility and inaccuracies can weaken public trust in aviation safety. This trust can only be rebuilt through better methods of transparency, enhanced regulation and enforcement, and a deepened commitment to accountability to ensure this trust is maintained by the aviation industry.

Keywords: Aviation Safety; Boeing 737 MAX; Corporate Accountability; Public Trust; Sentiment Analysis; Crisis Communication; Social Media Analytics

INTRODUCTION

Cruz and Diaz (n.d.) conduct a legal review of the two fatal Boeing 737 MAX crashes in 2018 and 2019, analyzing whether they stemmed more from technical failure or corporate negligence (1). The authors document how MCAS, which was designed to correct new engine placements, was implemented without proper pilot training or documentation. Also, how Boeing's incomplete disclosures to their own employees and disregard for safety measures contributed directly to both accidents. They further contend that Boeing's regulatory compliance was a mere gesture, especially with MCAS being kept in concealment not only from FAA regulators but also from its own pilots that flew the plane. The paper sees failure as an example of industrial

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malpractice rather than an honest engineering error. It argues that there exists a deeper systematic oversight failure within Boeing's own upper ranks, the regulatory agencies, and the certification process.

Gates (n.d.) details how Boeing and the FAA fast-tracked the approval of the plane and MCAS, relying heavily on Boeing's own flawed safety analysis (2). He shows internal pressure within the business world to "catch up to Airbus" and cites the FAA's delegation of safety testing back to Boeing, resulting in undisclosed failure modes and insufficient simulation of one single sensor. He emphasizes how MCAS's reliance on one singular sensor (Angle of Attack sensor) had no fail-safes or a reliable pilot alert system—an oversight with catastrophic consequences. These findings are supported by internal emails and FAA documents, showing that both Boeing and the regulators underestimated the impact of MCAS's risk of unintended activation.

In 2021, a study was conducted to examine how public sentiment on Twitter evolved during the Boeing 737 MAX crisis by analyzing over 417,000 tweets (3). They found that emotional reactions spiked after each crash, especially when blame was put solely on Boeing. Showing a clear pattern of how social media amplifies public backlash during corporate failures and mismanagement. Using situation crisis communication theory (4), the authors tracked how Boeing's vague or delayed public statements on their websites and other platforms failed to match public expectations, contributing to mistrust. The paper shows the value of social media analytics in crisis management. By simultaneously monitoring real-time emotional threads of online users, organizations, such as Boeing, could use their time wisely and better tailor their communications to minimize backlash and public scrutiny. The authors argue that public sentiment data is not only reflective but can also be predictive, helping companies identify when transparency or accountability is most urgently needed to manage reputation damage.

Another paper investigates how board-level decisions within the company and cultural shifts over time contributed to the risk-taking behavior Boeing adopted. It finds that Boeing's leadership focused excessively on financial targets and market competition, reducing attention to certification safety (5). The board's focus on such targets, driven by Airbus's growth and increasing public trust, made them vulnerable to short-term pressures that allowed MCAS risks to be minimized. The paper shows that structural oversight mechanisms like board expertise and internal risk culture were not developed sufficiently.

Lastly, the analysis by Mirbabaie et al. also discusses the role of sentiment analysis (3), how it helps businesses, and how it is used to determine public opinion across digital platforms, especially during sensitive situations. By tracking online comments, reviews, and social media posts, organizations can detect negative trends early and respond before issues grow. This is especially useful in public relations and brand monitoring, where timing and tone are critical for maintaining trust with the public. The paper also explains how sentiment analysis programs apply NLP and machine learning to assess whether a text is positive, negative, or neutral. These tools are particularly useful in large-scale brand monitoring because they can process vast amounts of unstructured data that would be too overwhelming to analyze manually. Sentiment analysis not only supports crisis management but also helps shape long-term communication strategies that strengthen a company's reputation.

The Boeing 737 MAX crashes revealed failures in corporate accountability and aviation safety. This study investigates how these events influenced public trust in aviation, as reflected through social media sentiment.

METHODS AND MATERIALS

Data Source Collection

This study investigates the public sentiment regarding the Boeing 737 MAX crisis from a social media perspective, focusing on user generated content from BlueSky (6). To do this, BlueSky's API was used to collect posts and comments and hashtags such as #Boeing, #Boeing737MAX,#MCAS and #aviation safety. These hashtags were selected to ensure content relevance and to capture a broad spectrum of reactions across different time periods. A dataset of 10,455 posts was collected from BlueSky between April 2023 and July 2025 using these hashtags.

Data Cleaning and Filtering

Posts were filtered to remove duplicates and irrelevant content, ensuring that only meaningful and unique entries were included in the analysis. After this cleaning process, the final dataset contained 10,455 posts suitable for sentiment analysis.

Sentiment Analysis Procedure

The center of this analysis uses the application of VADER sentiment, a tool in Python used to measure sentiment. VADER is a lexicon-based sentiment analysis

model known for its performance on social media texts due to its sensitivity to capitalization, emojis, and punctuation (7). Once VADER assigned each entry a sentiment score (positive, negative, or neutral), these scores were aggregated over a defined timeline. This timeline was then compared against major Boeing-related events such as crashes, fleet groundings, congressional hearings, and apology statements on their website, in order to analyze any shifts in sentiment in the public and reactions to specific events. Finally, the results were visualized to identify spikes in negativity or positivity and to explore correlations between Boeing's responses, communications, stock demographics, and public sentiment trends.

VADER's composite score is calculated by combining the intensity of positive, negative, and neutral words in a given text into a single normalized score between -1 and 1. The model uses a valence-based lexicon with every word having a pre-assigned sentiment weight that gets modified by the immediate context, e.g., negations, intensifiers, and punctuation such as exclamation marks. A score closer to 1 indicates very positive sentiment; a score closer to -1 indicates very negative sentiment. Sentiment scores were analyzed from April 2023 to July 2025, using daily median values for short-term fluctuations and a seven-day moving average to observe underlying sentiment trends. Sentiment polarity thresholds were defined according to VADER documentation (7): scores ≥ 0.05 were classified as positive, ≤ -0.05 as negative, and scores between –0.05 and 0.05 as neutral.

Event Segmentation

Significant events in aviation were specified and used to segment the dataset into event-specific windows which included: the Alaska Airlines door incident (early 2024), Boeing's plea deal (mid-2024), congressional hearings (mid to late 2024), and the Spirit AeroSystems acquisition (March 2024). Posts were grouped into ±3-day windows surrounding each event to capture public reactions immediately before and after the events. This type of segmentation allowed for assessing sentiment change related to identifiable crisis events—punctuated by the actions of the corporation.

Statistical Analysis

To evaluate sentiment over time, daily media, mean, and standard deviation were calculated. Event-to-event sentiment was then compared visually with line graphs, moving averages and other relevant methods, which were helpful for identifying spikes or declines in sentiment. A seven-day moving average was used to smooth fluctuations and also to better represent trends. The analysis of data was conducted in Python, and visualizations were completed using relevant packages in Python, including packages such as Pandas.

Platform Selection

Our initial data collection approach involved TikTok, given its vast user base and prevalence of viral aviation-related content following the Boeing 737 MAX incidents. However, TikTok presented several challenges: API access is heavily restricted, scraping public posts often triggers rate limits or requires unauthorized workarounds, and the short-form video format made sentiment analysis complex because much of the sentiment was embedded in non-textual elements such as audio or visuals. These constraints motivated us to seek a platform better suited for transparent, text-based analysis. Bluesky's publicly available, well-documented API (8) enabled us to collect cleaner, text-oriented data. This made preprocessing easier, getting rid of a lot of noise in the dataset but also strengthening the effectiveness of VADER in sentiment analysis, allowing us to generate more reliable and consistent results.

RESULTS

Negative sentiment dominated the dataset, with sharp declines following major incidents and heightened regulatory scrutiny. Short-term sentiment spikes appeared immediately after major incidents, showing rapid shifts in public reaction, as shown in Figure 1 and Table 1. Negative sentiments were significantly higher than positive sentiment across the particular dataset, mostly in response to the Alaska Airlines door incident in early 2024 where there was an initial dip in public sentiment, Boeing's guilty plea deal in mid-2024 (9), and subsequent congressional hearings. While improvements were made and new requirements were set, the need for transparency and safety in aviation continues to increase due to such disastrous failures and the national security threats of the past and present. The series of incidents described in the data served as a powerful demonstration of these threats and a demand for more transparency. In contrast, positive sentiment only increased slightly following milestones such as the acquisition of spirit AeroSystems in March 2024, indicating some lingering skepticism despite Boeing's efforts to reassure the public (Figure 1).

Table 1. Boeing Sentiment Scores by Key Events (BlueSky, Apr 2023–Jul 2025)

Event / Time Period	Mean Sentiment (approx.)	Median Sentiment (approx.)	Description
Alaska Airlines door incident (Early 2024)	–0.25	–0.20	Sharp negative shift tied to accountability concerns
Boeing guilty plea deal (Mid 2024)	–0.22	–0.18	Sharp negative shift tied to accountability concerns
Congressional hearings (Mid–Late 2024)	–0.20	–0.15	Sustained criticism of oversight and leadership
Spirit AeroSystems acquisition (Mar 2024)	+0.05	+0.02	Brief, mild improvement in sentiment
General period between major events	–0.10	–0.05	Persistent negative sentiment dominates discourse
Early 2025 (Regulatory improvements)	–0.05	0.00	Gradual recovery; sentiment never strongly positive

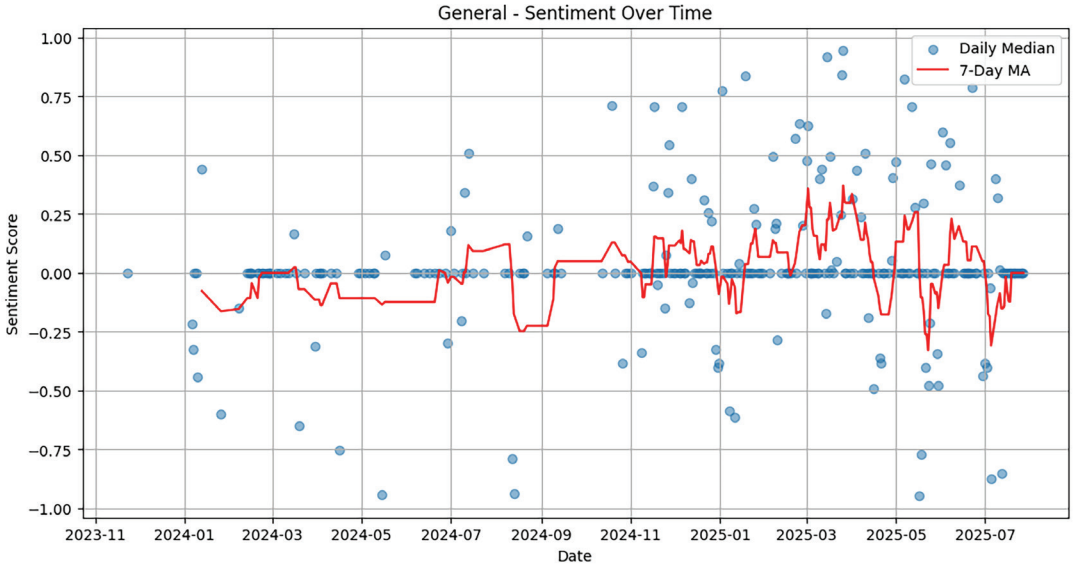

Figure 1. Moving average of Boeing sentiment over time. Data source: BlueSky, April 2023–July 2025.

The crisis periods during which the public became more skeptical and frustrated the most are indicated by the sharp declines in the moving average of sentiments. Brief sentiment recoveries occur during positive corporate announcements or safety assurances. Overall, this long-term trend indicates persistent distrust toward Boeing and the broader aviation industry (Figure 2). This noticeable pattern shows the long-term trend, which stayed negative across the entire period regardless of short-term fluctuations.

DISCUSSION

Across the timeline, neutral sentiment remained present throughout but relatively low compared to negative sentiment, showing that most users' discussions showed heightened affective responses when discussing

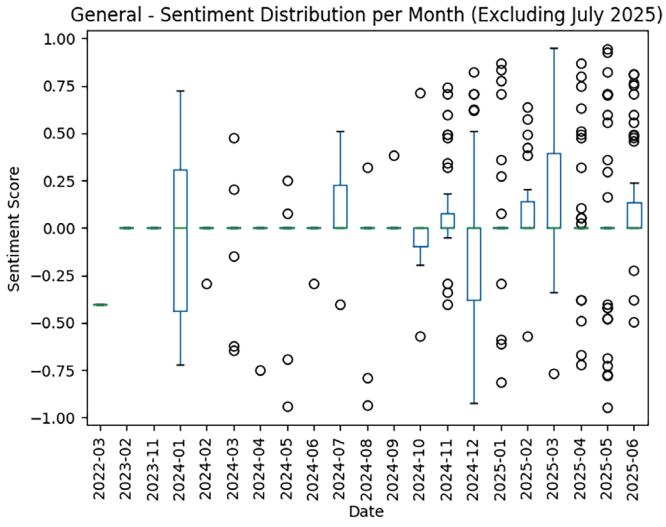

Figure 2. Sentiment distribution by month. Data source: BlueSky, April 2023–July 2025.

the crisis (Figure 3). Bluesky posts that appeared to be categorized as neutral often focused on factual updates, collection of announcements, unspecific statements, or FAA releases on the aircraft knowledge without any concrete indication of emotional disposition. However, these neutral posts were overshadowed by the severe number of increases of criticism, often exemplified during moments like when Alaska Airlines door fell off or when additional whistleblowers came forward. This imbalance shows us how social media scrutiny leaned largely towards distrust and dissatisfaction rather than detachedness, and this perception was fed largely by media coverage that reframed these events as systemic failures rather than isolated incidents.

Over direct safety concerns, users on Bluesky often connected Boeing's crisis to broader themes such as corporate ethics, accountability in large industries, and distrust of profit-driven decision making by Boeing's management. Conversations on this platform clarified that Boeing's reputation is now seen as a symbol of not only an aviation misstep, but of the entire internal culture and their inept leadership. According to Situational Crisis Communication Theory (SCCT), Boeing's delayed responses, really vague statements, and their defensive communication strategy most likely contributed to prolonged negative sentiment (4). Because of these themes, as shown on Table 2, public negativity is persistent and calls for changes that

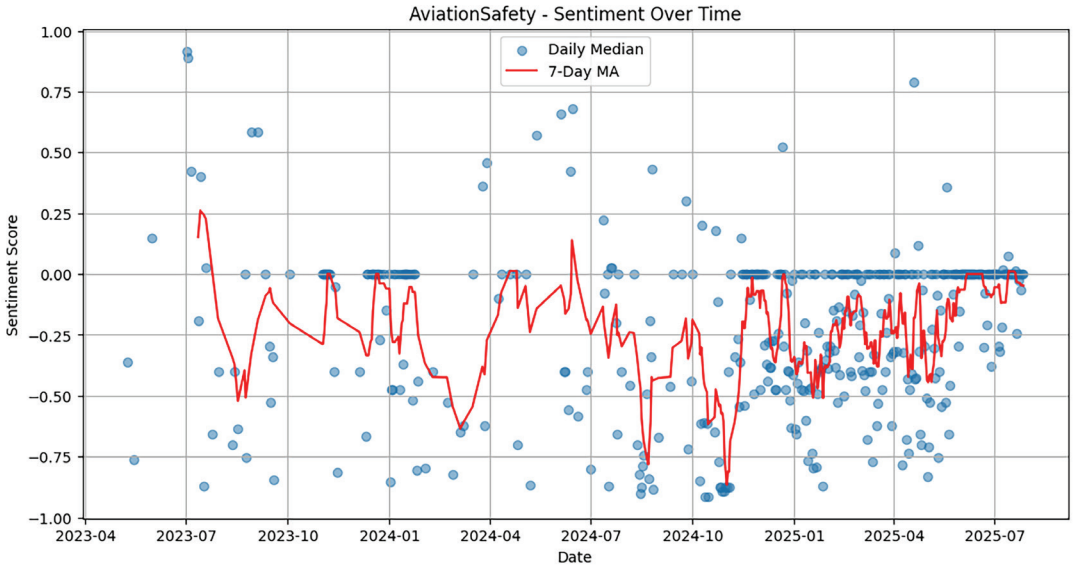

Figure 3. Moving average of Aviation Safety sentiment over time. Data source: BlueSky, April 2023–July 2025.

Table 2. Aviation Safety Sentiment Scores by Key Events (BlueSky, Apr 2023–Jul 2025)

Event / Time Period	Mean Sentiment (approx.)	Median Sentiment (approx.)	Description
Alaska Airlines door incident (Early 2024)	–0.28	–0.22	Strong decline tied to safety fears and system failures
Congressional hearings / whistleblower reports (2024)	–0.24	–0.20	Heightened scrutiny of oversight and industry-wide practices
Regulatory investigations (Late 2024)	–0.18	–0.12	Continued distrust; conversation shifts toward systemic issues
Introduction of new safety regulations (Early 2025)	–0.08	–0.03	Partial sentiment recovery; gradual rebuilding of trust
General period between major events	–0.12	–0.05	Neutral posts present but overshadowed by critical reactions

extend beyond the surface. In reality, trust needs to be reestablished in a long-term way, which is something that the media is currently scrutinizing.

The results show that sentiment was predominantly negative over the study period. Short-term changes in sentiment aligned closely with specific safety events and regulatory developments. Estimated metrics from the dataset indicate a mean sentiment of approximately –0.10, a median between –0.05 and 0.00, and a standard deviation of about 0.30, reflecting moderate variability. These short-term declines potentially suggest that perceived intervals in Boeing's accountability and vague communications intensified public distrust, consistent with SCCT predictions about crises exacerbating when organizations respond defensively. A couple of more prominent negative sentiments came from the Alaska Airlines door incident and Boeing's association with congressional investigations. In Figure 3, the timing of spikes in sentiment concerning media framing and public scrutiny clearly demonstrates how external communication shapes public reactions. Although sentiment improved very slightly following events such as the Spirit AeroSystems acquisition and regulatory updates, the persistent negativity indicating that progressive steps were insufficient to fully restore trust, which in turn shows the long-term impact of accountability failures on public perception. This shows the long-term trajectory of aviation safety sentiment, which gradually improved even though the short-term dips following major incidents. The sentiment rarely reached strong positive values.

Across discussions on BlueSky, negative sentiment was more frequently linked to broader concerns about aviation safety culture, transparency, and institutional accountability. Although changes to standards and organizational revamps were made and concerns were noted within the company, negative discussions persisted. Which implies people continue believing that serious issues can still be identified (Figure 3). Neutral posts, typically consisting of factual updates or regulatory statements, were consistently overshadowed by more critical reactions, reinforcing the view that aviation safety discourse on Bluesky is shaped predominantly by distrust and dissatisfaction.

Although Boeing was present within many of the discussions captured in the dataset, it is important to understand that the company as such does not represent aviation safety as a whole, as there were numerous companies and airlines involved in various different scenarios. An extremely wide network of organizations is involved in aviation safety including regulatory agencies, airlines, manufacturers, and installed maintenance organizations. While Boeing's repeated failures became a huge point for criticism, broader conversations have indicated that concerns extended to systemic oversight and industry-wide practices. Boeing's failures damaged not only the company's credibility but also public confidence in aviation oversight overall, explaining why negative sentiment kept persisting even after corrective actions were put in place. This distinction significantly highlights that while Boeing serves as a symbol of aviation safety challenges, the deliberation reflects wider anxieties about corporate accountability and regulatory factors across the sector (Figure 3).

CONCLUSION

This study found that, following the 737 MAX crisis, the public's perceptions of Boeing mostly remained negative in the short and long term and that broad public beliefs around corporate accountability and safety were undermined post-crisis. For example, intense public negativity was felt after high-profile incidents that involved delayed or vague accountability from Boeing. Merely "positive actions" like acquisitions or regulatory discussions temporarily remedied public perceptions. Ultimately, these observations and assessments note a fairly complex issue—a company recovering from a major crisis is challenging as some actions may prove to only be surface-level. Lastly, a larger emphasis on transparency, consistency, and ethics was expressed as an issue related to corporate conduct that is applicable for companies needing to restore trust post-crisis. Overall, social media attitudes provide valuable insight into the ways in which a company's behaviors affect public perceptions or offer corporations an understanding of strategies for recovering from crises positively.

Future research might extend on these findings through the analysis of sentiment across a variety of social media channels to identify differences in audience reactions, the use of multimodal sentiment analysis—including the investigation of images, video, and emoji, to develop an understanding of more nuanced public perceptions, and analyzing changes in sentiment over a fixed period of time while tracking corporation messages. These methodological improvements will enhance understanding of corporation accountability to the public and provide better guidance to organizations in designing transparent ethical and resilient crisis recovery strategies.

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CONFLICT OF INTEREST

The author declares that there are no conflicts of interest related to this work.

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