Impact of Negative Emotions on X and Organizational Reputation Crisis:

A Case Study of ArriveCan APP

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Abstract

This study examines the reputational crisis created by the ArriveCan app, illustrating how negative platform X emotions configure crisis discourse in terms of emotional discourse, diffusion, and political commentary. Using the Integrated Crisis Mapping (ICM) scheme and Situational Crisis Communication Theory (SCCT), this study explores anger, frustration, anxiety, a sense of urgency, and distrust as prevalent emotional responses. Data were downloaded using a customized Python crawler and interpreted by ATLAS.ti, covering all 452 tweets in terms of emotional category, diffusion path, linguistic characteristics and political orientation. Emotions are shown not only to announce a loss of public trust but as agencies of agenda-setting and collective action as well. This paper argues that emotional expression is not on the margins but central in configuring reputational effects and public blame attribution.

Key words: *Crisis Communication, negative emotions, reputational crisis, public trust, X, ArriveCan*

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Introduction

In 2024, a federal government-funded app called ArriveCan embroiled the federal government and contractors in a sudden scandal. This app was developed during the COVID-19 pandemic to manage health declarations for people entering and leaving the country. Media investigations subsequently found that the contract award process for the project lacked transparency, significantly exceeded the budget, and involved multiple violations during the outsourcing process, leading to widespread public questioning and criticism. After the incident broke out, it quickly spread on social media platform X (formerly Twitter), resulting in a viral crisis diffusion pattern. Public discourse surrounding the hashtag #ArriveCan quickly gained momentum, attracting widespread public attention and discussion. Derivative hashtags with obvious emotional overtones, such as "#ArriveScam," further amplified the negative image of the incident and became an important outlet for people to express their frustration and anger. People disseminated and reposted information spontaneously through diverse emotional expressions in language, propelling the ArriveCan incident to the top of the agenda in a short period of time and deeply engaging in the cognitive construction of responsibility and government legitimacy in the process. This incident clearly demonstrates that in the digital communication environment, the public is no longer a passive recipient of information, but actively participates in the construction and dissemination of crisis meaning through social media platforms (Mirbabaie et al, 2020).

Social media is nowadays a core medium for information dissemination and public participation (Ivanov et al., 2023). Compared with traditional media, social media has higher

interactivity, real-time capabilities, and low barriers to entry. It establishes a two-way communication channel between organizations and the public based on feedback, significantly improving the efficiency and fluidity of information dissemination and public response (Houston et al, 2015). Various organizations, non-profit organizations, and public relations professionals have embraced social media as a strategic means of managing public image and directing public opinion. The channel shows exclusive strengths like high response speed, numerous participants, and extensive influence, particularly in public crises or in cases of tarnished reputation (White & Boatwright, 2020). During crisis, social media enables organizations to share important information and respond immediately to public calls regarding information, regulate the dissemination of negative opinion, and direct the course of conversation. These benefits contribute to social media being a critical tool in enhancing crisis response skills and repairing organizational image (Austin & Jin, 2018; Mishra & Sharma, 2019).

Yet the organizational crisis and reputation management functions of social media remain inherently twofold. While social media presents organizations with new opportunities for communication and dialogue and allows them to respond in a timely manner by expressing views, being open and responsive, and managing public opinion in a short time frame, social media's openness and decentralization also present challenges in terms of the firm's ability to control information (Coombs, 2023). The user-generated content (UGC) represents the organic driving engine of social media rather than managed communication behavior by organizations. Under this engine, the public can freely create and spread content and it is challenging to monitor and intervene in public opinion by organizations (Sung &

Hwang, 2014). Once the public establishes an affective consensus on a website and drives content spreading via tags or affective structuration, organizations have high risks of a situation of losing control, which may aggravate what was originally a local crisis into a society-wide trust crisis (Tian et al., 2022). The study of social media emotion propagation mechanisms and their influence on organizational crisis response efficiency in online spaces thus remains one of the most urgently needed in modern public communication and crisis studies (Coombs, 2007).

In social media driven incidents in public opinion, sentiments have emerged as a non-negligible variable in public opinion. As opposed to the common binary or ternary sentiment categorization, sentiments on online forums are richer and multifaceted and carry particular connotations and close associations with the context of the topic (Wang et al., 2020). The cumulation and amplification of public sentiment threaten an organization's reputation for the short term but affect its long-term credibility in a systemized fashion (Kim, 2016). Previous studies have shown that organizations with damaged reputations on social media platforms often suffer stronger questioning and emotional attacks. Such destructive feedback mechanisms are particularly prevalent in government and public institutions (Peci, 2021). The amplifying effect of digital platforms on negative information means that crises are not merely a matter of information asymmetry, but also a manifestation of trust games. The relationship between public sentiment feedback and crisis response mechanisms in the social media environment is becoming increasingly complex, posing unprecedented challenges for government communication (Al-Omoush et al., 2023).

Although public sentiment has been widely recognized as a key element in crisis communication, existing research mostly treats it as a secondary dimension, with a focus on its role in evaluating crisis response strategies and analyzing stage-specific reactions (Jin & Cameron, 2007). Only a small number of studies have truly regarded emotions as one of the main structures shaping crisis discourse, constructing public opinion, and guiding the process of assigning responsibility (Sellnow & Seeger, 2013; Zhou et al, 2024). Particularly in situations where government departments face reputational crises, public sentiment serves not only as a reflection of trust erosion but also has a dual function of discourse construction and mobilization. However, research on this aspect remains significantly understudied (Ivanov et al., 2023).

To address this research gap, this study introduces the Integrated Crisis Mapping Model (ICM) proposed by Jin et al. (2010) and the Situational Crisis Communication Theory (SCCT) developed by Coombs (2007). The aim of this theoretical framework is to explore the main types of negative public sentiment on social media platforms, their linguistic characteristics, and the path mechanisms through which they interact with government reputation crises. In the ArriveCan crisis, the expression of negative public sentiment contributed to the construction of the crisis agenda and influenced perceptions of the organization's response strategy (Shahrabani & Garyn-Tal, 2024). Therefore, this study attempts to reveal the constructive and communicative functions of emotions in government crises through an in-depth analysis of the structure of public sentiment expression by conventional content analysis methods (Hsieh & Shannon, 2005). This provides a new perspective for understanding the dynamics of political criticism on digital platforms and

offers theoretical references and practical insights for optimizing government digital communication strategies.

1 Literature Review

1.1 Public Opinion and Negative Sentiments in the Context of the COVID-19 Crisis

As a suddenly emerging global health crisis, the COVID-19 pandemic has triggered profound changes in the structure of public opinion and the spread of emotions on social media platforms. Recent academic research has shown that, in the highly uncertain context of the COVID-19 pandemic, there is a high degree of intertwining between the expression of public sentiment, the formation of political attitudes, and the spread of misinformation (Andressa Bonafé-Pontes et al, 2021; Wood et al, 2023). These studies mainly focus on four core issues: the construction of metaphorical frameworks, the heterogeneity of platform communication mechanisms, the collapse of information trust structures, and the functional performance of emotions as a mediating variable in communication (Panzeri et al, 2021; Xue et al, 2024; Theocharis et al, 2023; Khalaf & Shehata, 2023; Shahbazi & Bunker, 2024; Farhoudinia et al, 2024; Huang et al, 2022).

In terms of constructing the discourse framework, publics and medias place pandemic discourse in war metaphors in reporting regarding the pandemic, which consistently builds a strong adversarial and polarized environment (Rana et al., 2024). By framing the virus as an enemy that has to be fought and pandemic as a war that must be won, these metaphors establish an extra narrative of resistance and combat that goes beyond neutral pandemic communication. These metaphors particularly fortify users' perceived urgency regarding risks

and significantly intensify expression of extremely arousing feelings of fear and anger during transmission (Wicke et al, 2020).

Analyzing how platform mechanics influence public attitudes and emotional arousal, Cinelli et al. (2020) undertook a cross-platform comparative analysis of Twitter, YouTube, Reddit, Gab, and Instagram. The results illustrate how while there exist differences in the architectures of algorithms and users of these platforms and in terms of associated demography, the patterns of dissemination of false and misleading information present a surprising similarity in terms of speed and scale. The study reveals that social media platform under crisis conditions manifest infodemic characteristics: highly emotive content can achieve viral dissemination within brief timeframes, constituting an emotional contagion mechanism. These results underscore the amplification role of social media in information ecosystems, positioning platform mechanisms as a structural determinant of affective mobilization during public health crises.

When speaking of the reception and cognitive processing of information, Chou et al (2018) pointed out that information silos and the echo chamber effect were as important as any in spreading false medical information in the times of the pandemic. These messages had a greater probability to be received by those holding a specified pre-existing belief and go unheard by those with differing ideologies. Such selective exposure results in a self-perpetuating information environment. Negative emotions such as fear and distrust get reinforced owing to this. The closed system also stifles the ability of expert or authoritative sources to debunk misinformation.

The function of corrective information in influencing emotions and public perception has also attracted growing scholarly attention. Van der Meer and Jin (2020) illustrated in experimental studies how timely and precise messages from trusted sources like government and media outlets can greatly decrease public misperceptions and enhance willingness to engage in protective behavior. Emotional response was used as a mediator. Diminished negative emotions like anxiety and ambiguity helped restore public confidence in authoritative information and prompted a more balanced risk evaluation. But if corrective messages were coming from close social ties or casual networks, these tended to be less efficient at establishing confidence or realigning attitudes.

Public opinion development is an ongoing and evolving process, framed by social experience, emotional reaction, and communication pathways. Block (1977) observed social positions of individuals play an important part in shaping the opinions, while contextual constraints may dictate the expression of such opinions. Under circumstances of high-pressure situations like the COVID-19 crisis, public opinion goes through three developmental stages of attention to the event in the first instance, perceived risk perception, and subsequent risk evaluation (Wang et al., 2021). Emotional considerations permeate these episodes. They determine public support for policy and tolerance for risk or peril. Malecki et al. (2021) introduced a two-dimensional model to explain how risk attitudes emerge. According to this model, public responses depend on the interaction between subjective emotions, such as anger, and perceived harm. Strong emotional intensity not only affects how information is processed but also shapes how people express opinions and share content on social media platforms.

In the dissemination of public opinion, the social contagion of emotions has become a focal point of research. You et al. (2022) analyzed that in a social media context centered on COVID-19, when negative and neutral emotions dominated, the rate of information reposting and interaction frequency significantly increased. Emotion tags such as “concern” exhibited strong resonance effects. Wei et al. (2022) further pointed out that crisis-specific emotions such as ‘helplessness’ and “anger” have high transmission efficiency on social media and are easily amplified through social network structures to form emotional loops, continuously driving the negative trajectory of public opinion. Berger and Milkman (2012) approached the issue from a psychological perspective, empirically confirmed that high arousal emotions are more likely to gain attention, shares, and interactions on social platforms. This mechanism suggests that emotions are not only the result of users' reactions to information but also shape the public opinion environment during dissemination, serving as an important mediating variable influencing collective cognitive structures.

1.2 Social Contagion Theory and the Spread of Emotions

Social contagion theory suggests that emotions and behaviors of individuals with the ability to spread within a group. Individuals or groups convey their emotional states to others through direct or indirect methods. This transmission process might be conscious imitation or unconscious synchronous reactions (Li et al., 2017). Conventionally, this theory was established in the context of face-to-face communication, emphasizing the importance of nonverbal cue such as facial expressions and body movements in emotion contagion. For example, Barsade (2002) pointed out through his experimental research that emotional

convergence between individuals within a team exists and has a significant impact on group collaboration, conflict management, and performance. Emotions can achieve consistency among groups through imitation and synchronization at the nonconscious level without cognitive processing.

Researchers have gradually discovered the same phenomenon of emotional contagion can occur in online communication without physical contact (Lee & Theokary, 2021). In the social media environment, emotional contagion exhibits clear observability and path dependency even in the absence of face-to-face nonverbal information. The mechanisms of text language, image symbols, interaction frequency, and algorithmic recommendations on digital platforms provide a new medium for the online transmission of emotions. After prolonged exposure to content with specific emotional tendencies, users tend to exhibit consistent emotional characteristics in their posting behavior, demonstrating a pattern of emotional stimulation leading to responsive behavior (Ferrara & Yang, 2015). This phenomenon validates the chain reaction of online emotion transmission, particularly the higher contagiousness of emotions among highly susceptible users.

Another group of studies focuses on the interactive mechanism between emotions and information transmission. Brady et al. (2017) pointed out that moral emotions such as anger and moral indignation play a significant role in the transmission and dissemination of social media content. Large-scale data analysis based on Facebook and Twitter shows that content containing moralizing language has significantly higher retweet rates and interaction frequencies than neutral content, indicating that emotions serve as both passive targets of contagion and catalysts for the widespread dissemination of information. Under such

circumstances, in addition to being expressed through language, emotions can also spread through influencers' high visibility, high influence, and the high connectivity of network structures, achieving a broader social contagion effect (Dubois et al., 2020).

1.3 Government and Social Media Use

The effective use of social media by government agencies is already a well-established phenomenon (Ivanov, 2019). The rapid development of information technology has increasingly made social media a key component of the digital government governance system (Clarke, 2019). Government agencies can leverage social media for more efficient dissemination of policy information and achieve more direct and immediate interaction with the public (Mossberger et al., 2013). Related studies have also shown that the openness and interactivity of social media platforms provide an important lever for governments to promote new strategies (Clarke, 2020) and, to a certain extent, help reshape the public's trust and sense of identity toward the government (Yuan et al., 2023).

The key advantage of social media lies in its interactivity. This feature breaks the traditional one-way structure of government communication with the public and, at the technical level, provides the public with more opportunities to participate, effectively expanding the boundaries of communication between the government and society (Müller, 2022). One reason that people are increasingly choosing social media as their primary channel for communicating with the government is its convenience and accessibility. Another reason is the widespread positive perception and trust in social media infrastructure and function (Homburg & Moody, 2021). Social media provides a platform for rapid

dissemination and multi-channel feedback. Its functions meet the structural requirements of modern governance for openness, transparency, and participation (Ivanov et al., 2023).

From an interactive perspective, how governments organize and formulate their social media communication plans affects willingness to participate on the part of the public. The tone with which governments present themselves in account postings and the bureaucratic language used will primarily influence whether the public will participate in discussion and offer comments. More specifically, content that is extremely interactive in nature and presented in an informal tone and a clear layout will be most likely to spur users to participate. Simultaneously, government websites where citizens can contribute by actively posting, posing questions, or commenting on policies will raise frequency of interaction and participation in general (Bonsón et al., 2015). These results indicate governments must create systems in which they can listen to the public's voice and not use social media as a means of disseminating what messages they present.

1.4 Social Media, Reputation Crises, and Public Sentiment

Social media, especially X, takes a growing paramount position in crisis response and sentiment management and reputation handling (Ilyas & Sharifi, 2025). Instead of one-way communication media as in the traditional media, social media forums facilitate two-way information exchange in a real-time manner, vastly augmenting organizations' capacity in gaining public feedback (Cavaliere et al, 2023). Roshan et al. (2016) posit that the immediateness of the social forums facilitates organizations' ability to dynamically determine public opinion trends, and adjust corresponding external communication content and in-

channel response systems in a timely manner. These functions are essential in managing information direction and emotional oscillations in the early phase of a crisis. Nöhammer et al. (2023) also highlight that the emotion recognition and behavior feedback data provided by social media's monitoring functions make social media a means of information dissemination as well as a crucial information source for making decisions.

The functions of media outlets in influencing public attitude and behavioral intentions have also increasingly come to the forefront. Schultz et al. (2011) identified that with the same crisis response content, variations in information dissemination media had a major impact on public emotional responses and secondary dissemination intentions. The effectiveness of social media such as X in responding to crises and public sentiment is chiefly attributable to its high level of openness, flexibility, and interactivity. These characteristics empower governments and organizations to communicate directly with the public and fulfill their responsibilities. In crisis situations, direct communication from government or organizational leaders can make information more persuasive and significantly alleviate negative emotions such as public anxiety and dissatisfaction (Gruber et al., 2015). However, the impact of social media is not entirely positive. A significant challenge stems from false information and emotional content on social media, as well as the replication, promotion, and dissemination of negative attitudes through such content (Liu et al., 2012; Wigley & Fontenot, 2010).

1.5 Theoretical Framework

The Situational Crisis Communication Theory (SCCT) offers a theoretical basis on how the logical connection between public emotions and response measures can be determined. In assessing crisis communication performance, there are three prime indicators in which organizations are advised to investigate the public's emotional responses, cognitive postures, and behavioral inclinations as reflected in online expressions (Coombs, 2007). Zhao et al. (2020) also tested this theory and illustrated its usefulness in crisis situations. They concluded that favorable interactions like rationale comments and supportive reposts generally connote public approval of an organization's position. Negative interactions like sarcasm and insults imply a communications failure and an erosion of confidence. Emotional expression on social media is not only an open expression of crisis management performance but also a prime variable in restoring organizational credibility and discourse influence (Wang et al., 2021).

However, the spread of emotions on social media platforms is not a linear process. It is prone to unexpected shifts due to the complex interaction between platform and users' emotional structures. The speed and intensity of negative emotions typically far exceed those of positive emotions, and once a negative emotion cluster effect forms, an organization's response often struggles to reverse the direction of public opinion (Zhang et al., 2024). When public sentiment on social media platforms remains unaddressed for an extended period, especially when organizations choose to avoid sensitive topics or use bureaucratic language, aggressive comments and sarcastic reposts will grow exponentially, leading to deeper trust breakdowns and uncontrollable information dissemination (Yang & Jiang, 2015).

To further develop the correlation of emotion types and response mechanisms, Jin et al. (2012) developed the Integrated Crisis Mapping Model (ICM). It endeavors to categorize public sentiment into four elementary categories of *anger*, *fear*, *anxiety*, and *sadness*. The model builds a response model in accordance with the behavioral responses to various types of emotions. It studies the public sentiment of social media content and assists organizations in adopting targeted emotion regulation in crisis communication. When it comes to confronting the dynamic process of speedy changes in emotional types on social media, the ICM furnishes a theoretic perspective in which emotion recognition exceeds labeling and builds a closed-loop feedback process with the implementation of strategy.

Based on these theoretical foundations, this study first explores emotional responses through the lens of ICM to identify the dominant emotional categories in public discourse. It then applies SCCT theory to assess how public reactions and expressions interact with the identified public emotional types. Specifically, this study examines whether an emotionally hostile environment suppresses supportive voices, thereby complicating crisis recovery efforts. Under the combined influence of these theories, the study poses the following research question:

What are the predominant negative emotions expressed by the public regarding the ArriveCan crisis that spread on platform X?

2 Methodology

2.1 Case Study

The contract issues between GC Strategies and the ArriveCan app triggered one of the most significant government reputation crises in Canada in 2024, directly undermining GC Strategies' credibility as a contractor and severely eroding the legitimate authority and trust of the federal government among the public. ArriveCan, launched during the peak of the COVID-19 pandemic, is an essential digital tool that enables travelers to submit mandatory health and vaccination information upon arrival, and serves as a critical component of Canada's border control policy. The Canadian government selected a small IT company named GC Strategies to develop ArriveCan in 2020. At the time of signing the contract, GC Strategies was a small company with limited industry experience, sparking widespread public skepticism about its capabilities and qualifications.

The crisis erupted following the findings of an independent investigation conducted in 2024. An investigation revealed that over one-third of the federal contracts awarded to GC Strategies were not subject to fair competitive procurement procedures (Lzri, 2024). This finding directly undermines the legitimacy of the government procurement system and has sparked public concern about procedural fairness, rational resource allocation, and corruption, particularly the existence of internal transfer of benefits.

The crisis was exacerbated by the official report subsequently released by Canadian Auditor General Karen Hogan. The report pointed out that the total development cost of the ArriveCan app far exceeded the initial budget, with cumulative expenditures exceeding 60

million Canadian dollars, highlighting issues of public fund efficiency and transparency (Major, 2024). Combined factors such as inflated costs, low contract transparency, and unclear contractor qualifications have plunged the government and GC Strategies into a public relations whirlwind.

The incident quickly attracted widespread attention after it was exposed by the media and sparked massive public anger and distrust on social media. Discussions surrounding the hashtag “#ArriveCan” have surged on the X (formerly Twitter), with a large number of critical comments posted by the public. At the same time, a new hashtag with emotional overtones, “#ArriveScam,” quickly grew in popularity and became an outlet for public sentiment regarding the scandal. The use of the term “scam” highlights the public’s negative assessment of government actions and reflects strong protest with a hint of irony against systemic failure.

The sudden outburst of public sentiment dealt a significant blow to GC Strategies' reputation and caused a widespread crisis of trust in the federal government. In terms of public financial transparency, government integrity, and digital governance accountability, the incident significantly undermined the government's credibility and further stimulated public reflection on Canada's government procurement mechanisms and oversight system. For GC Strategies, it is necessary to endure the dual pressure of internal government scrutiny and ongoing public, media, and opposition criticism and questioning in this incident.

2.2 Data Collection Tools

The adjustments made by social media platform X in its usage policies and terms of service directly impacted the applicability of existing open-source data collection tools in this study. A significant number of restrictions have been imposed on X's existing open-source data collection tools in terms of data access permissions and interface calls. Despite trying several tools, none were able to fully meet the specific requirements of this study in terms of data integrity and accessibility. To overcome these limitations, I designed and developed two automated Python programs aimed at maximizing the collection of publicly available data on X within the existing policy framework.

Both programs were designed with the core objective of collecting as much data as possible data within a specified time window, emphasizing automation, stability, and maximization of capture. They use different technical approaches, each optimized for feasibility under the current platform architecture, to ensure execution within the same time frame and geographical scope. In practical application, the two programs were deployed and tested based on operational stability, ease of maintenance, the platform's tolerance for automated behavior, and how closely they matched the actual user experience.

Specifically, the first program is written based on the open API interface provided by platform X. The program works by applying access tokens to provide data collection. However, I believe that programs which are closer to the real-world usage process of people are more realistic in terms of data collection, while is also more helpful in capturing the natural distribution and interaction characteristics of platform content. These features make the collection of data more representative and valuable for reflecting the platform

environment and user behavior patterns. Therefore, after comprehensive evaluation, the first program was discarded due to its lack of consistency in user behavior. The study ultimately decided to use the second program as the main data collection tool for this study, and to build subsequent data preprocessing and analysis processes based on it.

The second programme implements web automation technology by utilizing a browser simulation library in the form of Selenium in order to simulate the actions of real users on the front-end interface of the platform. The programme, by way of this simulation, can automatically carry out a sequence of activities like user login, navigation to a page, content rendering, and data harvesting. The programme emulates the actions of the users in a systematic manner in order to accommodate the interactive offerings of the platform. The programme also regularly harvests publicly available data dynamically loaded on the page by utilizing techniques like element recognition, DOM traversal, and automated scrolling to fetch all pertinent content successfully in real-time.

2.3 Data Source

Thanks to the program I developed, the data collection method simulates real user behavior by systematically searching for the keywords “#ArriveCan” and “#ArriveScam” on social media platform X (formerly Twitter) to collect publicly available data posted by active users. These data include keywords, username, posting times, tweet content, number of likes, retweets, and comments, as well as comment content and times.

The primary purpose of recording keywords, usernames, and posting times is to identify and trace the source of data, enabling clear localization during subsequent reviews

and analyses. Additionally, recording posting times aids in tracking and analyzing changes in topic popularity. When the amount of collected data gradually decreases, data collection should be halted during necessary time periods. Tweet content is the primary data used for research and analysis, serving to assess the types of public sentiment expressed. The primary purpose of recording keywords, usernames, and posting times is to identify and trace the source of data, enabling clear localization during subsequent reviews and analyses. Additionally, recording posting times aids in tracking and analyzing changes in topic popularity. When the amount of collected data gradually decreases, data collection should be halted during necessary time periods. Tweet content is the primary data used for research and analysis, serving to assess the types of public sentiment expressed. Due to the narrowed focus of the study, the number of likes, retweets, and comments on tweets, as well as the content and time of comments, were not utilized in the research. These data points are still retained in the data collection results to assist in tweet identification and provide a foundation for future research.

The main function of collecting the number of likes, retweets, and comments is to help assess the popularity of a tweet. The more likes, retweets, and comments a tweet receives, the more popular it is, and the greater its potential influence. The content and timing of comments are primarily used to assess changes in the influence of individual tweets and the types of emotions conveyed. Similar to tweets, high activity in the comments section indirectly demonstrates the strength of its influence. When the activity level in the comment section gradually decreases, the influence of the tweet also decreases. The value of comments and analysis is similar to that of tweets, primarily used to assess the types of public sentiment

expressed. Beyond this, the content of comments on a single tweet has a strong correlation with the content of the original tweet, which can assist in analyzing the channels through which sentiment spreads during crisis communication.

One of the key advantages of this collection process lies in the significant research benefits offered by X, especially for studying reputation crises, user engagement, and behavioral intent. These benefits stem from features such as user behavior traceability, real-time data availability, and an effective tag aggregation mechanism (Triantafillidou & Yannas, 2020). The public's immediate reactions and emotional expressions on X provide time-sensitive first-hand material for research, which is particularly crucial for analyzing the evolution of public attitudes.

Another advantage stems from the higher frequency of keyword usage. The keyword "#ArriveCan" is a frequently used hashtag on X, covering a large number of user comments related to the ArriveCan app since the outbreak of the COVID-19 pandemic. These contents originate from a wide range of sources, encompassing various user identities such as the general public, government health agencies, and political figures. Consequently, it provides a multi-dimensional perspective for understanding the acceptance levels and trust changes toward government digital governance projects among different groups. Nevertheless, with the outbreak of the ArriveCan corruption scandal in March 2024, the hashtag "#ArriveCan" and related topics gave rise to a new emotional hashtag, "ArriveScam." The emergence of this new hashtag marks the outbreak and concentrated expression of negative emotions in public discourse. The content under this hashtag is mainly created and shared spontaneously by ordinary users, reflecting strong skepticism and dissatisfaction with this public incident.

It is worth noting that technical restrictions on platform accessibility during data collection in the study presented new challenges. Due to access restrictions on the X platform within Canada, virtual private network (VPN) technology was used to locate IP addresses in Japan to ensure the continuity and integrity of data collection. It effectively bypassed regional restrictions, enabling the smooth retrieval of target data and improving overall search efficiency. The IP address is located in Japan mainly due to technical factors related to the server location. The main purpose of this step is to break geographical restrictions, so the country location of Japan is not considered as a factor in the study. Specifically, any IP address outside of Canada can be used in the study. However, due to platform restrictions on X, this study does not rule out the possibility of potential differences in the amount and content of information collected due to changes in IP addresses.

The ArriveCan crisis outbreak occurred in March 2024, but discussion of the issue had already appeared in some news reports as early as February of the same year. Accordingly, the data collection timeframe for this study was set from February 2024 to August 2024 to encompass the entire communication cycle before and after the crisis. Due to platform access restrictions, however, some months have insufficient sample sizes and time gaps. However, relevant empirical data for the period from February to August 2024 was successfully collected using the keyword "#ArriveCan," without any time gaps.

The hashtag "#ArriveScam," is an emotional label following the scandal, began to gain widespread use starting in March 2024, and its activity fluctuated over the following months increasing public sentiment and media exposure. As the crisis gradually loses public attention on X, the activity of this hashtag gradually subsided after July the same year.

Therefore, the data collection period for “#ArriveScam” was ultimately determined to be from March 2024 to July 2024. Also, due to platform access restrictions, data from June 2024 was not fully retained at the technical level. After three failed attempts using data collection tools and the keyword “#ArriveScam,” data for that month could not be obtained, resulting in missing data for that month. Thus, the data collection range for “#ArriveScam” covered only the four months from March to May 2024 and July 2024.

Under the two keywords mentioned above, a total of 631 original tweets were collected for the study. These data constitute the core sample of this study and provide a fundamental basis for subsequent text analysis and sentiment recognition.

2.4 Data Filtering

The preliminary collection of 631 original tweets was subjected to three rounds of manual filtering to ensure the linguistic consistency, thematic relevance, and analytical applicability of the final sample. The first two rounds of filtering were completed before the formal data coding process began. The purpose of this was to clean up invalid, noisy, or ambiguous information in order to improve the quality of the corpus. In the first round of filtering, I went through the original data piece by piece and manually checked it in order to remove data that couldn't be used for this study. Specifically, we excluded the following three types of data: 1) non-English content; 2) posts that only contained tags; and 3) posts that weren't clear or weren't related to the research topic or cases. In the first instance, non-English content that was excluded mainly refers to text written in languages such as French and Arabic in tweets. As this study is conducted in an English language environment, non-

English corpora can lead to misunderstandings in semantic recognition and context interpretation. Considering that this study did not adopt a multilingual parallel processing mechanism, the retention of non-English content would interfere with the linguistic purity of the research sample. Therefore, to ensure a consistent linguistic environment, all non-English tweets were excluded during the initial screening.

The second category of deleted content consists of posts containing only tags which did not convey any emotion and opinions. The main feature of these tweets is that their content consists entirely of tags, lacking any natural language expression or contextual information. For example, some of the collected content includes only the tag "#ArriveScam" without any additional explanation or text. Semantics of tags are highly dependent on specific contexts and textual environments. Using a single tag, especially one that cannot convey emotion, will result in the posted content lacking the ability to independently convey feelings and opinions. For the sake of analytical validity and accuracy, they were excluded from the research sample.

The third category of content that has been removed involves tweets that are unclear or unrelated to the research topic and case studies. The tweets that expressed unclear ideas mainly manifested as semantic ambiguity, illogicality, and confusing sentence structure. For example, two of the deleted tweets with high interaction content were "Spot the difference." And "Canadians are thankful for each and every one of you." Although the level of interaction was high, the lack of contextual interconnectivity meant that these two posts did not directly convey opinions or emotions related to the ArriveCan event. These situations made it difficult to identify the opinions or emotions expressed in the posts, resulting in a

lack of interpretability in the natural language processing and sentiment analysis, and therefore they were considered invalid samples.

In contrast, the proportion of content unrelated to the research topic was higher. These are tweets that were collected by the data collection tool but did not actually mention the keywords “#ArriveCan” or “#ArriveScam” at the semantic level. Most of this content consists of commercial advertisements, public service announcements, or holiday promotions, which are unrelated to the risk communication and public sentiment themes that are the focus of this study. For example, one of the excluded tweets was a Mother's Day promotion. The source text is “Mother's Day brings back such fond memories of times we spent with Mom on this special day. Especially when we were older and her grandkids were there to make it special, Mom looked forward to seeing us all. I can't tell you how much I miss her today.#HappyMothersDay”. This tweet was collected by the data collection tool, but it is not directly related to the ArriveCan incident. This phenomenon is mainly due to the recommendation mechanism of platforms such as X. The mechanism pushes content that matches people’s interest or is related to the advertising strategy of the platform in the search results. So that some tweets that are not actually related to the search keywords still appear in the user interface. Since the data collection tool used in this study automatically extracts results based on simulated user searches, it is inevitable that content unrelated to the research topic will be collected without an ad filtering mechanism in place. After this round of filtering, a total of 549 tweets were retained as the basic corpus for further processing and analysis[1].

[1] Examples of deleted tweets are listed in appendix 1: Examples of Deleted Text and Reason

To further improve the linguistic consistency of the data and the completeness of the screening, we conducted a second round of manual filtering before coding. The operation process of this round of filtering was similar with the first round, focusing on identifying and removing content that may have been missed in the initial screening. After this round of filtering, 521 tweets were retained.

The third round of filtering was conducted simultaneously with the data coding process, where the data was filtered and stored in ATLAS. Most of the tweets deleted in this round of filtering were posted by political practitioners through their personal accounts, or by official accounts of political parties, government departments, and related institutions. Although these tweets may mention or imply ArriveCan crisis or use related hashtags such as "#ArriveCan," their semantic content primarily serves to disseminate official positions, promote policies, or guide the public. Their content does not address ArriveCan's reputation crisis or present discussion points related to emotional contagion or public skepticism.

For example, a representative piece of content that was excluded in this round of filtering was a highly interactive tweet posted by a member of the Federal Liberal Party, primarily promoting the support and opportunities that the Liberal government is providing to young Canadians in the 2024 federal budget. Although the tweet mentioned governance and policy measures and was related to the government budget, it did not address the key issues surrounding the ArriveCan program.

Another group of content that was extensively removed came from the official ArriveCan account. These tweets were like advertisements, mostly used to introduce the software's features, operating procedures, or encourage users to download and use the app.

They were informational in nature and lacked subjective evaluation or emotional tendencies. Although this type of official information is directly related to the ArriveCan application in a literal sense, it does not contain any expressions of the public's or the publisher's own positions, nor does it involve political controversies or public sentiment.

The third round of screening effectively eliminated information that was formally related but substantively irrelevant through in-depth identification at the content level. This stage no longer relies on superficial labels or formal characteristics, but instead focuses on whether the tweets express views directly related to the ArriveCan reputation crisis and related emotional dissemination in terms of semantics. After the third round of screening, ATLAS's statistical functions showed that a total of 452 tweets were retained.

2.5 Data Coding and Analysis

The data coding and analysis for this study were primarily conducted using the software ATLAS.ti. The main reason for using ATLAS.ti is its user-friendly features for qualitative research, which assist in creating coding categories for content analysis and help researchers store and organize the data they collect. Beyond the software’s technical advantage, conventional content analysis was introduced as the primary analytical strategy to ensure methodological rigor.

Conventional content analysis methods were first proposed by Hsieh and Shannon (2005), emphasizing the extraction of representative discourse patterns through an immersive understanding of text. This method is suitable for processing large-scale, unstructured text data. Pluta (2022) successfully applied this method in their study on the dissemination of

health information on Instagram, conducting content analysis on over 800 posts, which provides important reference for the application of this method in the context of social media.

In practice, tweets were read and compared repeatedly to extract representative emotional expressions and information purpose variables. The ICM model and NRC emotion dictionary were consulted during the construction of the coding framework in order to enhance the accuracy and vocabulary coverage of emotion recognition. Based on conventional content analysis, a coding manual consisting of four main categories was established. The final confirmed coding categories are Emotional Expressions, Information Sharing, Emotion vs. Opinion, and Political Criticism, with a total of 15 sub-codes retained. This integrated coding system provides a solid foundation and clear operational guidelines for subsequent data classification, emotion distribution analysis, and political attitude research.

2.6 Coding Definitions and Explanations[2]

The 15 subcodes in four categories cover the types of emotions conveyed in posts and the purpose of the posts. The subcodes in the Emotional Expressions category include the six main emotions that were identified.

2.6.1 Frustration

Frustration can be defined as a feeling of annoyance or irritation, especially caused by the inability to change a situation or achieve a goal (Oxford University Press, n.d.). This definition emphasizes the situational characteristics of frustration, namely the negative experience arising when an individual's pursuit of a goal or desire encounters obstacles or

[2] Coding schedule is listed in appendix 2: Coding Manual

failure. Jeronimus and Laceulle (2017) further define frustration from a psychological dynamic perspective as the irritable pain that arises when an individual's desires conflict with an unyielding and unchangeable reality. Such distress is neither purely anger nor pure sadness, but rather a mixed negative emotional experience that lies between the two.

The composition and influence mechanism of frustration are relatively complex, and its manifestation in different contexts is regulated by individuals' subjective judgments of the controllability of the situation. When individuals perceive a situation as controllable, frustration often triggers approach behavior, manifested as increased anger, and may even lead to aggressive or retaliatory behavior (Yazdi et al, 2024). When a situation is appraised as uncontrollable by an individual, frustration will be increasingly likely to be transformed into sadness, helplessness or withdrawal (Jeronimus & Laceulle, 2017). Thus, frustration and anger do have some similarity but, in their motives, strength, and expression differ radically. While frustration takes an intrapsychic form with cognitive disorientation and tension for affect regulation, anger will also lean toward external expression and object-directed responses.

Anxiety and sadness belong to the most frequent negative emotion categories in the Integrated Crisis Mapping (ICM) model and are strongly linked with frustration in the emotional response process. Jeronimus and Laceulle (2017) also observed frustration to usually occur with these two emotions and interacts with them. Within the ICM model framework, Jin et al. (2012) argue that anxiety is a response arising from an individual facing an imminent, specific, and threatening dangerous situation, typically leading to public avoidance behavior or triggering blame toward responsible parties, such as organizations or

governments. Sadness originates from an individual's emotional withdrawal after suffering a loss in reality, whether material or emotional, which threatens their basic survival goals.

Based on the analysis of the constituent elements of frustration by Jeronimus and Laceulle (2017) and the emotional classification framework in the ICM model proposed by Jin et al. (2012), this study operationally defines frustration as a mixed emotional state that integrates anxiety, sadness, and mild anger. This emotion stems from a direct conflict between an individual's ideals, interests, or values and the unchangeable reality they face. Its expression is usually restrained, mainly manifested as low-intensity emotional restlessness, persistent distress, and dissatisfaction, but does not reach the level of emotional outbursts or extreme anger.

As an additional criterion, this study also considered the presence of emotional language expressed in the tweets. In texts categorized as Frustration, the tweets did not use language that was significantly hostile or highly aggressive, nor did they contain obvious accusatory or derogatory words, further supporting the validity of classifying such texts as Frustration rather than Anger. This definition method, which combines linguistic features, emotion theory, and contextual understanding, provides a theoretical basis and methodological support for subsequent emotion recognition and classification.

2.6.2 Anger

Anger is a strong and highly aroused emotional state typically arising from an individual's intense reaction to perceived injustice or offense in a real-world situation. According to Jin et al. (2012) in the ICM Model, anger originates from an individual's

cognitive assessment that “I” or “belonging to me” has been offended or threatened. In a crisis context, the public often becomes angry because they believe that organizations or relevant authorities are directly responsible for the crisis or have failed to prevent the situation from worsening by demonstrating negligence, evasion, or even manipulation of information during the response process. At this point, factors related to self-involvement, such as the public's cherished self-esteem, moral values, sense of security, and trust mechanisms, are damaged, triggering emotional reactions directed at external responsible parties.

When anger is activated, individuals or groups not only experience intense dissatisfaction and hostility but may also exhibit aggressive behavioral tendencies. When anger fully erupts, the public often engages in symbolic or actual aggressive behaviors aimed at punishing, pressuring, or resisting an organization (Jin et al., 2012). These behaviors are not only manifested as external expressions of emotion but may also transform into specific actions such as online verbal attacks, protests, reporting, or boycotts. Therefore, at the operational level of sentiment analysis, the identification of anger requires not only attention to the presence of the emotion itself but also an examination of whether it is accompanied by increased language intensity, attitude orientation, and behavioral intent.

In this study, tweets labeled as Anger meet two key criteria: the text must clearly express anger emotion, such as criticism, complaints, and sarcasm directed at the government.; and the text must be aggressive or emotionally intense. These characteristics manifest in various forms within tweets, primarily including: the use of uppercase letters to emphasize tone; the employment of rhetorical devices such as sarcasm or irony to convey

dissatisfaction; the explicit expression of accusations, condemnation, or even personal attacks; or the use of insulting language and emotionally charged vocabulary. For example, some tweets contain words with moral connotations and strong negative connotations, such as “scammer,” “corruption,” and “crime.” These words usually indicate that the poster has significant hostility toward the government, policies, or institutions, and are therefore labeled as “anger.” Similarly, vulgar abbreviations such as “WTF” also reflect intense expressions of emotional outbursts and dissatisfaction, and such words are considered typical markers of anger in this study.

To improve the accuracy and systematic nature of anger emotion recognition, this study used the National Research Council Canada (NRC) Emotion Lexicon as a technical support tool. It is widely used in emotion analysis research in social media contexts and includes a large number of words and phrases commonly used to express anger (Mohammad & Kiritchenko, 2015). During the coding process, I utilized vocabulary categorized as “anger” in the NRC Emotion Lexicon to identify and validate the text of tweets. The lexicon focuses on expressions with clear emotional tendencies and high semantic intensity (Mohammad & Turney, 2013). For example, when the text uses vocabulary from the NRC Emotion Lexicon or corresponding variants, the text is marked as angry. Commonly used words include “waste,” and the NRC Emotion Dictionary includes its adjective form “wasteful.” Therefore, text containing the word “waste” and exhibiting aggressive language is labeled as angry. However, due to the limitations of the NRC Emotion Lexicon, its words only assisted in identifying a small portion of the tweets.

2.6.3 Concern

The emotional state induced by anxiety is more than just frustration; it also includes concern, a unique form of emotion with a social orientation. Concern is defined as “anxiety” and “worry” (Oxford University Press, n.d) This short but accurate definition captures the essential features of concern, namely a prospective reaction to potential threats and risks. The brevity of this definition masks the fact that what qualifies concern as an emotion lies in its ongoing focus on potential future events that may affect one’s loved ones, property, or valued possessions.

Unlike most self-focused negative emotions like frustration and anger, the basis of concern is quite other-directed or social. Zickfeld et al. (2017) noted concern as an emotional state with a focus on others. When individuals realize that others are in distress or facing potential threats, they will experience corresponding emotional resonance and psychological alertness. This emotion reflects an individual's perception of the external world and also demonstrates the activation mechanisms of their moral emotions and sense of social responsibility.

The generation of concern stems from the relevance of an event to an individual's current concerns. When an event resonates with an individual's value judgment system, emotions are generated (De Leersnyder et al., 2018). Therefore, concern is not merely a passive reaction, but an active emotional state driven by cognition to perceive risks, essentially involving the anticipation and psychological regulation of future developments that may affect the interests of individuals or groups. In other words, concern reflects a future-oriented, uncertainty-driven anxiety experience.

In this study, to ensure the operationality and consistency of emotion classification, concern is defined as an anxious emotion triggered by worries about potential future risks, problems, or uncertain outcomes. The emotional object of concern is not limited to the self but also includes concerns for others or society. This emotion is often accompanied by sustained attention to macro-level issues such as the nation, public policy, or social order, and exhibits a certain moral involvement and critical thinking orientation. Therefore, tweets labeled as concern exhibit worry or anxiety about the future prospects of individuals, others, society, or the nation in the text, and reflect the cognitive assessment and value involvement underlying this anxiety. For example, tweets expressing concerns about Canada's future governance capabilities, public resource management, social fairness, or intergenerational justice can be considered valid examples of concern.

2.6.4 Urgency

Urgency is an emotion-driven psychological and behavioral tendency that refers to an individual's impulsive need to act quickly under the influence of emotions. Sandel-Fernandez (2024) defines it as a tendency to respond to emotional states with impulsive behavior, emphasizing its significant impact on the speed and direction of behavioral decisions in high-pressure situations. This definition suggests that urgency is more than a reaction to external stimuli- it is an action-oriented emotional regulation mechanism.

In crisis communication and reputation management research, ICM model points out that when faced with crisis events triggered by organizations or governments, the public often exhibit more than just emotional reactions such as anger and sadness; they are also

accompanied by strong demands for action, especially urgent demands for solutions to the problem (Jin et al., 2012). Such reactions go beyond emotional venting and manifest as a path of emotional transformation toward a desire to make a difference. In concrete terms, when the public believes that the issues they care about are being ignored or inadequately addressed, they exert pressure on the responsible parties through public expression, appeals, questioning, and even mobilization, pushing them to take timely and effective measures.

In the Situational Theory of Publics (STP) and the follow-up theory Situational Theory of Problem Solving (STOPS), urgency is closely linked to situational motivation, manifesting as individuals' or groups' perception of the immediacy or time-sensitivity of a particular issue or situation (Kim & Krishna, 2014; Aldoory et al., 2010). Common variables that can be used to drive situational motivation include problem recognition, curiosity, and concern; a strong desire to understand the essence of the problem and find solutions; and tension arising from cognitive uncertainty and the gap between expectations and reality (Kim & Krishna, 2014). When driving variables are enhanced, public is more likely to develop action motivation to do something, which is the situational urgency observed in this study (Kruger-Ross & Waters, 2013).

Based on the above theoretical background, this study operationally defines urgency as an emotion expressed toward change. The actual manifestation of this is mostly the public making clear and direct calls for action to the government or relevant organizations or demanding that they pay attention to the current crisis and take swift measures to address it. In the process of analyzing tweets, content marked as urgency must meet two essential characteristics: the text must clearly express a demand for some form of action, intervention,

or reform; and this demand is usually directed at the government or policymakers and often takes the form of appeals, requests, demands, or questions. For example, using expressions such as “I eagerly await the exposure and conviction of ArriveCan's illegal activities” in a tweet would be considered a typical sign of urgency.

2.6.5 Distrust

Distrust refers to an individual's lack of trust in someone or something, specifically manifested as suspicion and denial of their honesty, motives, or reliability (Oxford University Press, n.d.). This definition highlights distrust as a cognitive-emotional response, the essence of which is vigilance and rejection of uncertainty about the outcomes of others' behavior. Distrust is a more structured and persistent trait that can have a long-term impact on individuals' understanding and evaluation of others' behavior.

In the field of organizational relations and social psychology, distrust is a negative expectation of others' behavior (Tomlinson and Lewicki, 2006). Individuals may interpret others' behavior as malicious or potentially harmful when they make negative judgments about their motives, intentions, or actions. This emotional state usually stems from dishonest behavior such as breaking promises, lack of transparency, and concealing mistakes, and is accompanied by high sensitivity to future risks. The formation of distrust is often event-driven, but once established, it can solidify into a cognitive filter or interpretive framework that continues to influence individuals' understanding of subsequent interactions and behavioral choices. Tomlinson and Lewicki (2006) further pointed out that the psychological and behavioral responses triggered by distrust tend to be defensive in nature, with individuals

tending to adopt self-protective strategies to avoid further harm. Specific manifestations of such psychological states may include refusal to cooperate, avoidance of communication, emotional isolation, and even, at the group level, information lockdown, the spread of hostile sentiments, and escalating conflicts. Based on the above two definitions, this study defines distrust as the negative trust judgment expressed by the public in tweets toward a certain subject through emotions such as suspicion, questioning, blame, refusal to communicate, or negative inferences. This type of emotions is not necessarily presented through direct negative evaluations, and often appear in more implicit rhetorical devices, such as irony, rhetorical questions, counterquestions, or exaggeration, to convey emotional attitudes.

In specific tweet analysis, content marked as distrust must contain explicit expressions of distrust, which may be conveyed through questions that question the legitimacy of a certain behavior, policy, or organization. For example, a tweet labeled as distrust uses a question such as “Should I trust the Canadian government?” to express doubts about the government's efforts to investigate the flow of funds. Although this expression retains the question structure in form, its semantic function is to deeply doubt the transparency and review mechanisms of government fund usage, reflecting an implicit accusation of abuse of power.

2.6.6 Information Sharing

Among the filtered and cleaned tweet data, there is a category of posts with specific dissemination functions, which are mainly characterized by reposting or sharing external information resources as their main purpose. The content of such tweets typically includes

links to news reports, summaries of policy updates, official statements issued by governments or political parties, professional commentary videos, podcast audio content, or updates on the progress of public events. While some tweets may exhibit subtle emotional overtones, stance indicators, or hints of opinion, their overall semantic focus remains on factual reporting and information dissemination. In other words, these types of tweets emphasize content and resources rather than the venting of emotions or the reinforcement of positions.

Based on the above criteria, this study addresses information sharing as tweets that primarily convey event information, news content, or policy information in terms of text structure, semantic focus, and communication purpose. Under this coding category, some tweets do not constitute emotional participants at all, as their tone remains neutral, the information is clearly oriented, and there is no emotional assertion. Therefore, these tweets are excluded from the other three coding categories and are coded only as information sharing.

2.6.7 Emotion vs. Opinion

Emotion vs. Opinion is an auxiliary coding category used in this study to distinguish the functional attributes of tweets. This category contains only two sub-codes: Emotion and Opinion. The primary purpose of this classification is not to explore the relationship between emotions and opinions, but rather to clearly identify differences in the textual functions of tweets, specifically distinguishing whether their primary function is to express emotions or convey opinions. Establishing this classification dimension helps clarify the expressive intent

of the text during the multiple coding process, improving the accuracy of subsequent emotion analysis and stance identification.

In terms of operational definitions, tweets labeled as emotions contain clear and recognizable expressions of emotional state that has a certain degree of intensity, directionality, or emotional category characteristics. Tweets marked as Opinion must contain a clear statement of value judgment or stance on an event, person, policy, or organization. Opinion does not require emotional intensity but demonstrate a certain degree of assertiveness and clarity of stance.

It is important to clarify that Emotion and Opinion are not mutually exclusive. The two can coexist in the same tweet, especially in emotional statements, where opinions are often expressed in an emotionally charged manner. Therefore, some of the tweets in the study are labeled as both Emotion and Opinion, which is an overlapping coding allowed by the coding system. This reflects the normal coexistence of emotion and opinion in social media language and shows how the coding process carefully captures the multiple functions of complex texts.

2.6.8 Political Criticism

Political Criticism is another key category in this study's coding system, designed to identify the political stance expressed by the author of a tweet and their attitude toward the actions of the government or political parties. The establishment of this category goes beyond the focus on emotions, placing greater emphasis on the specific objects and political significance of emotions, especially in the context of ArriveCan's reputation crisis, where public criticism is concentrated, and potential political tendencies are analyzed.

This category includes a total of seven sub-codes: Attack on the Conservative Party; Attack on the Liberal Party; Attack on the NDP; Attack on Trudeau; Government Criticism; Liberal Support; and Support Conservative. These seven sub-codes cover expressions of criticism and support ranging from the political party level to individual political leaders, constituting a relatively complete political evaluation dimension. Through this structural classification, the study is able to refine the public's emotional orientation toward different political parties or political entities, thereby depicting the distribution pattern of political criticism and position expression.

In the specific codification, the first four sub-codes identify offensive remarks targeting specific political parties or politicians. These tweets typically criticize, mock, question, or even condemn the Conservative Party, the Liberal Party, the New Democratic Party, or individual political leaders such as Prime Minister Justin Trudeau. For example, a typical "Attack on Trudeau" tweet accuses Justin Trudeau of regulatory negligence or questions his financial management abilities.

Conversely, the sub-codes "Liberal Support" and "Support Conservative" describe emotional orientations in tweets in which there is expression of support, defense, or identification with a particular political group.

"Government Criticism" as a relatively broad subcode is applicable to content that expresses dissatisfaction, disappointment, or distrust toward the government without specifically targeting a particular political party or individual. For example, criticism of fiscal waste, unequal distribution of public resources, and regulatory loopholes are often classified under this category.

3 Findings

3.1 Frustration

Frustration was the most predominant emotion category with 296 occurrences. Regardless of its relatively moderate intensity level, frustration occurs with a high level of consistency and representativeness in terms of expressing doubt on the government's actions, policy efficacy, and fiscal transparency. These tweets have a distinct emotional tone. Usual expressive features include exclamatory sentences, exaggerated statements, negative structures, and the use of critical vocabulary. Words like “problem,” “waste,” “corruption,” and “absurd” occur quite regularly in the corpus and create a climate of emotional discontent. The difference from high-arousal emotions like anger is that frustration-related postings lean toward reasoning and self-mastery in expression. The emotional tone of the language is generally non-aggressive, marked by a smooth rhythm, with posts focusing on accumulated grievances and calm criticism.

To improve visibility and interaction, some tweets also carry tags expressing emotion or an occurrence, like “#GCStrategies” or “#TrudeauCorruption.” Such tags possess a twofold functionality. While serving as topic aggregators to concentrate information in public opinion, they also carry implicit critical sentiment to allow users to have an opinion even in messages lacking direct critique. Unlike emotional coding, which is characterized by explosive emotions, frustration-related tags are more like emotional clues. Although the tone of the language is relatively restrained, their cumulative effect is equally significant and often used to initiate discussions on public issues.

From a semantic perspective, these tweets mainly focus on issues such as the implementation of government policies, the lack of transparency in fiscal spending, the efficiency of resource allocation, and the absence of political accountability. Numerous tweets expressed skepticism, disappointment, and indirect criticism toward specific political figures, especially the former Prime Minister Justin Trudeau. When expressing frustration, the public often pointed to institutional loopholes in the government's management system through specific facts, events, or questions. In the coding process of this study, tweets labeled as “Frustration” highly overlap with the “Political Criticism” category, with a large number of tweets also being labeled under the subcategories “Attack on the Liberal Party,” “Attack on Trudeau,” and “Government Criticism.” This high overlap indicates that the Liberal Party government and its core figures are the primary targets of frustration in the contextual construction of these sentiments.

It is interesting to note that tweets coded as frustration exhibit a binary narrative logic in their narrative structure. This logic clearly distinguishes the public from the government and casts them in the roles of victims and perpetrators. This structured opposition is structured through language, such as the frequent use of subject shifts between “we” and “they,” constructing a narrative framework in which ‘we’ (taxpayers, citizens) are deprived and “they” (the government, politicians) are inactive. Common examples of such statements include “the taxes we pay are being wasted” and “we are facing a problematic government,” which link systemic failure to individual interests, prompting readers to empathize emotionally and strengthen collective identity. This linguistic strategy is not only a tool for emotional venting but also a mechanism for emotional mobilization.

3.2 Anger

Anger is a highly correlated emotion category with frustration and can be considered as an intensification of frustration. As an emotion, anger reflects the transformation of public sentiment from suppressed feelings of powerlessness to explosive anger and hostility. Although the total number of tweets coded as anger was only 171, significantly lower than those coded as frustration, the influence of anger was not inferior in terms of linguistic expressiveness, dissemination intensity, and emotional mobilization capacity. In certain contexts, expressions of anger were even more intense and sharply targeted.

Tweets coded as Anger exhibit a series of significant and recognizable linguistic features, that not only reinforce the effectiveness of conveying anger, but also enhance the visibility and contagiousness of information in social media dissemination mechanisms. Unlike tweets coded as frustration, which tend to express confusion, doubt, or helplessness, tweets coded as anger are more extroverted and aggressive, often using exaggerated, direct, and emotional expressions to construct a scene of intense emotional output through text and semantic strategies.

The first major linguistic feature is the use of capital letters (e.g. CAPITALIZATION). In this study, capitalized language forms appear extensively in Anger-related tweets and exhibit two typical patterns. The first is the use of a particular word or phrase capitalized with or without special signs like “#” or “!”, which serves to make the tone of the information highlighted. The effect of this usage is to identify the information as particularly important and demanding or requiring attention immediately. An example of this usage is the usage of “#BREAKING” as a prefix or as a tag at the beginning of the tweet. This phrase serves as a

substantial visual anchor in the rapid browser situation of the X platform and compels the users to take a moment and read the tweet. The usage also serves to create an emotive sense of urgency and gravity with the use of tones and sets an emotional context. The usage serves as a device to highlight information and to introduce the construction of emotions, symbolically conveying the urgency inherent in anger.

The second usage of capital letters is less subtle and consists in writing either the entire sentence or even the entire tweet in uppercase. This expression also creates a sense of urgency and contributes to the visual effect and aggressive tone of the tweet. An example of a representative tweet utilizes the use of capitals to introduce the phrase “TAXPAYER MONEY WASTED,” which emphasizes a high level of displeasure and outrage because of the spending of government funds. The visual effect of writing in capitals has a symbolic impact of shouting or rebuking and thus can introduce emotional tension without taking a long time to develop an argument and immediately resonate with readers.

The other key expressive characteristic is the use of rhetorical devices like metaphors, irony, and analogies to express anger indirectly. These expressions normally eschew direct aggressive terms and adopt humor, references to culture, or contextual displacement in order to pursue vehement critique in seemingly lighthearted language. Between March and April 2024, some tweets employed terms or hashtags with very ironically flavored meanings like “April Fools,” to indicate a sense of being duped and let down regarding the ArriveCan affair. Such an expression signifies that the event was expected to be treated gravely and yet the reality was as ridiculous as an April Fool's prank and hence amplifies the extreme disillusionment with the dereliction of duty by the government. Such a rhetorical expression

of anger remains strongly culturally contingent and thus normally invokes an “emotional insularity” effect in its dissemination by spreading very swiftly within groups attuned to a particular cultural background. Satirical language will be much more likely to inspire discussion and sharing in contrast to direct accusations and offers users a “humorized anger” expression avenue and thus lengthens the tenure of anger and social interaction.

In terms of hashtag usage, anger-related tweets are more aggressive and politically charged than frustration-related ones. The extended hashtags used are more direct and bolder, with clear targets for blame and extremely clear emotional positions. Common hashtags include “#TrudeauBrokeCanada,” “#TrudeauBurningCanada,” and “#TrudeauMustResign.” These hashtag labels reflect strong condemnation and attempt to shape a non-compromising public stance and collective demands. They not only focus on specific political figures, especially Justin Trudeau, but also construct a strong causal chain of responsibility, directly attributing the moral and political responsibility for the ArriveCan scandal to the leader and his party.

For expressing purpose and emotional transmission, Anger-related emotions are clearly distinct from Frustration. The former is more mobilizing and inflammatory, not only expressing anger but also actively guiding others to identify with and participate in emotional transmission, emphasizing collective mobilization logic such as “we have been betrayed” and “we must take action.” Unlike the sense of powerlessness reflected in frustration, anger focuses more on betrayal and a sense of entitlement, demonstrating the outward direction of emotions and their potential to drive behavior. These posts no longer simply view the government as an indifferent perpetrator, but explicitly point to specific individuals

responsible, reinforcing their unforgivable role, thereby forming a strong adversarial dichotomy in the discourse structure. Texts labeled as “Anger” share similar characteristics with those labeled as “Political Criticism” in terms of overlap with the “Political Criticism” category, but a higher proportion of posts are simultaneously labeled with sub-codes such as “Attack on the Liberal Party,” “Attack on Trudeau,” and “Government Criticism.”

3.3 Concern

Compared to frustration and anger, concern accounted for a significantly smaller portion of the data in this study, with only 89 entries. However, tweets coded as “concern” carry considerable significance. Their presence demonstrates that, even though intense emotions like anger and frustration dominated the public discourse during the ArriveCan crisis, there were a voice that expressed their emotions in a more moderate, and anxious way. These tweets exhibit unique pragmatic characteristics in terms of discourse strategy, subject structure, and emotional expression, adding diverse emotional layers to the overall discourse ecology. Overall, Concern-type tweets are less likely to express emotional outbursts or sharp criticism. Their discourse style is often more cautious and restrained, focusing more on risk assessment, problem observation, and judgments about long-term trends.

The linguistic style of tweets expressing concern has three features. The most striking one is the usage of descriptive sentences rather than overtly emotional, along with a tendency to engage with descriptive structures or hypothetical assumptions. These phrases like “may be the tip of the iceberg” or “while. the rest of.”, which create contrastive structures or postulate hypothetical situations. This kind of linguistic device fails to moderate aggressive

tones but also adds a high level of information density and warning power to the tweets and offers readers a higher level of reading space.

The second salient linguistic characteristic is a focus on evidence-based reasoning and rationale. Tweets with a concern-oriented style make constant use of social indicators, trend data, or authoritative facts to form the argumentative basis of the argumentation, eschewing subjective inference. A common example is a tweet listing numbers on recent hikes in house prices and living expenses to lead the reader to doubt the sustainability of current fiscal policies. Such information-centric expression blends affective expression with factual realities to keep the tweet objective while imparting a sense of concern, hence enhancing public acknowledgement and approval.

The third key linguistic feature is the de-polarization of subject structure. Tweets labeled as Concern often avoid using positional pronouns such as we, you, and they, and instead use neutral third-person pronouns such as Canadians, citizens, or the rest of us. This expression weakens the confrontational nature of the language and avoids political polarization, while also better reflecting the characteristics of Concern-type emotions, which focus on the welfare of the group and the future of society.

In terms of information transmission and pragmatic purpose, this type of tweet emphasizes the anxiety about the future caused by uncertainty. Unlike frustration and anger, which are more inclined toward outbursts and blame, concern-type tweets often focus on the aftermath of events and structural risks. For example, some tweets raise concerns about whether long-term fiscal dependence may lead to intergenerational inequality, expressing worries about the sustainability of the system. This structure conveys anxiety through a

macro-narrative approach, enhancing the role of concern in triggering rational resonance and cautious policy discussions.

It is worth noting that although Concern-type tweets express emotions in a relatively restrained manner, a significant number of them overlap with the Political Criticism coding category in this study's coding system. Specifically, many these tweets were also labeled as Government Criticism. However, unlike Frustration and Anger, the Political Criticism subcategories overlapping with Concern showed significantly lower frequencies of Attack on Liberal Party and Attack on Trudeau, while neutral-oriented Government Criticism dominated. This phenomenon indicates that “Concern” focuses more on systemic issues and macro-level governance rather than individual accusations targeting specific political parties or political figures.

3.4 Urgency

Among all identified emotions, Urgency is ranked third with 138 tagged tweets, indicating its significant presence in the ArriveCan crisis sentiment. Although this number is lower than frustration and anger, it shows strong communication mobilization attributes and action-driven tendencies, occupying a unique position in the emotion distribution structure. Given its high correlation with desire for change, urgency exhibits more pronounced directive and guiding language characteristics compared to other emotion tags, and its expression strategies form a text style that is significantly different from other emotion categories.

First, the core linguistic features of urgency tweets are reflected in the concentrated use of special vocabulary, which can be divided into two categories. The first consists of high-

frequency emergency signal words, such as “just released,” “watch now,” and “act fast.” These expressions are often used to prompt readers to take immediate action or seek information right away, thereby installing a sense of urgency in the discourse. These expressions often employ imperative sentences or sentence structures that omit the subject, directly positioning the reader as the recipient of instructions, thereby enhancing the persuasive power and dissemination efficiency of the message. The second category consists of adverbial expressions with a sense of urgency, such as “now,” “immediately,” “just,” and “every time.” These expressions commonly follow event-chain stories. For instance, in the pattern “We have just issued. and this can be but a tip of the iceberg”, the temporal adverbs tell us not only that the event has newly happened but also suggest that things may get worse from there and so propel one to keep reading and look for updates.

While anger-coded tweets often use full sentences or paragraphs in upper case to establish emotional tension, upper case in urgency-coded tweets serves a more attention-grabbing and signaling purpose rather than one of emotional venting. This varied visual rhetorical practice suggests that the central intent of urgency to prompt behavioral response rather than emotional confrontation.

The last characteristic of the linguistic form of urgency is its global clarity, forthrightness, and evident purpose. Unlike emotion-coded categories like concern, which prefer a neutral and restrained tone, the information form of urgency tweets simplifies to the extent of leaving out nearly all rhetorical flourishes in favor of brief causal sentences and evocative expressions. For instance, numerous tweets state categorically, “The government must carry out a full probe” or “We need open disclosure about how public monies have been

spent.” These assertions do not only indicate the course of action but highlight also its sense of urgency. Through the minimization of sentence complexity and information vagueness, urgency-type tweets accomplish the double task of speedy information transmission and prompt public comprehension.

From the perspective of information dissemination and pragmatic purposes, the core of urgency-type posts lies in creating a sense of urgency that cannot be delayed, thereby prompting readers to respond immediately. This strategy not only calls for action from government decision-makers but also creates a fear of missing out through frequent updates and emotional appeals. The content of the tweets often revolves around potential consequences such as greater losses if immediate action is not taken. By constantly emphasizing time pressure in the discourse, readers develop a sense of urgency regarding the issue, ultimately forming a mechanism that helps to accelerate the spread of public opinion.

A particularly interesting finding in this research is that although Urgency-type tweets exhibited relatively low emotional depth and do not feature emotional outbursts as a primary characteristic, they demonstrated extremely strong behavioral mobilization capabilities. This characteristic gives them high dissemination potential on social media platforms, particularly in political crisis-related topics where they can swiftly generate collective attention and drive policy response demands. Therefore, during the public opinion development process of the ArriveCan crisis, urgency-type posts not only exist as a dimension of emotional expression but also serve as representative mobilization texts with pronounced “call-to-action” characteristics.

In the overlap analysis with the Political Criticism coding category, tweets coded as Urgency exhibited structural characteristics similar to those of the Concern category. Both categories showed little tendency toward extreme emotional opposition, instead focusing their criticism on systemic issues. Therefore, in both categories of tweets, the sub-code "Government Criticism" appears more frequently than labels targeting specific political parties or individuals, reflecting a stronger neutral critical orientation. Unlike the concern category, where "Government Criticism" dominates, this sub-code does not play a significant role in the urgency category.

More specifically, in tweets coded under Urgency, the distribution of the three sub-codes- Attack on the Liberal Party, Attack on Trudeau, and Government Criticisms-was more balanced. This relatively balanced distribution indicates that although these tweets call for government action, their sentiment and stance distribution is more diverse and does not clearly lean toward either institutional criticism or individual blame. The sentiment of urgency does not belong exclusively to a specific political stance or critical direction, nor is it a direct attribution of responsibility. The emotional driver is more focused on the immediate need for a solution to the problem.

Our analysis suggests that this balanced distribution may be related to the time-sensitive pressure emphasized in Urgency-related tweets. In many tweets, the targets of criticism are not fixed on the Liberal Party or a specific politician, but rather directed at the slow response of the entire governance structure, deficiencies in crisis management mechanisms, or the lack of information transparency. Therefore, even though the tweets use

emotional language in their specific expressions, their directionality is not entirely focused on a single target, but rather exhibits a more dispersed pattern of criticism.

3.5 Distrust

Among all identified emotion categories, distrust was the least frequently, with only 38 tweets classified under it. However, the content of these tweets was highly distinctive, encompassing other emotion types while displaying unique expression patterns and pragmatic strategies, highlighting the complexity and multidimensionality of distrust as a structural emotion. The distrust-related tweets exhibit a high degree of specificity, primarily manifesting in two distinct stylistic expressions. The first type is revelatory language, which frequently employs terms such as “SCANDAL”, “cover-up”, “leak”, and claims he never knew, aiming to create a sense of exposing the government's concealment of the truth. This language constructs a metaphor of the public being deprived of its right to know, thereby evoking readers’ dissatisfaction with the lack of truth. The second type is the widespread use of double-voiced structures. In these tweets, passive voice constructions, which are often used to describe actions or states, such as claims and reported, are intertwined with active voice statements, creating ambiguity and polysemy in tone. The tweets avoid direct accusations while reinforcing the impression of hidden motives behind the events, prompting readers to harbor doubts within the semantic ambiguity and thereby activating feelings of distrust.

Secondly, such tweets blend two functions: disclosing details and making implicit accusations. This is achieved using specific facts like numbers, timelines, and professional

titles to lend credibility and validate inferences of distrust in the government. For instance, a tweet stated “$54 million,” which seems like a neutral statement without drawing inferences. By stacking up specific facts, however, it creates the impression of a statement of fact and hence magnifies readers' distrust. Such a language device not only lends the text surface-level rationality but also forms an important channel for the tweet to exert cognitive power while being logically challenging to deny and profoundly emotion-penetrating.

From an informational dissemination purpose, tweets labeled as distrust do not necessarily openly accuse a political body of malfeasance but counterattack by creating a plausible sounding but unsettling backdrop by evoking theme concepts such as hiding, secrecy, procedural misuses, and misappropriations of resources. The tweets flag insinuating phrases such as “Something doesn't add up,” and propel the citizenry into speculating about the validity and detail of governmental sources without providing hard facts, therefore eroding public trust in the government.

In the analysis of overlap with the Political Criticism coding category, distrust-related tweets exhibit a unique structural distribution. The frequency of Government Criticism in distrust-related tweets shows a clear dominant trend, almost completely dominating all texts coded as distrust. Only a very small number of tweets with sufficiently strong partisan connotations were simultaneously labeled as “Attack on the Liberal Party” or “Attack on Trudeau.” This suggests that distrust is more focused on systemic breaches of trust rather than attacks on individuals or political parties, reflecting a structural skepticism toward the overall power system.

3.6 Information sharing

Information sharing is the most distinctive category in this study, with 159 tweets classified accordingly. The core function of these tweets is to provide the public with factual information about the ArriveCan scandal that is either ongoing or has been exposed. Tweets coded as Information sharing primarily involve details of audit reports, mainstream media investigative reports, summaries of public statements, or the sharing of comments, interviews, podcast links, and event analyses from experts, commentators, and public affairs professionals. A representative example of link sharing was posted by Larry Brock on May 14, 2024, saying, “Tomorrow, Erin O'Gorman (President of the Canadian Border Service Agency) will be back to testify on#ArriveSCAM. She didn't have the easiest time during questioning in February (see below). Expect the same on Tuesday.”

Since the purpose of these tweets is to provide factual information, tweets coded as “information sharing” exhibit linguistic characteristics that are significantly different from those of emotional expression tweets. Overall, their linguistic characteristics are closer to a news-like style of expression. Most information sharing tweets use structurally complete sentences and clearly convey specific facts. These tweets often use third-person subjects paired with relatively objective sentence structures. For example, the sentence posted by Kingston Now on April 18, 2024, “RCMP searches office linked to#ArriveCan contractor Kristian Firth.” does not include an attitude judgment toward the event but neutrally states the current status of an ongoing event.

The second feature is that these tweets often incorporate a large number of words and phrases with “information dissemination” attributes, presenting an authoritative expression

structure. Commonly used phrases in the tweets include news headline-style phrase, accompanied by clear data, specific time points, policy names, and government agency names. For example, The Epoch Times Canada used clear government agency names in its tweet posted on February 22, 2024, said “Commons Committee Passes Vote to Summon #GCStrategies to Testify on #ArriveCan.”

One of the most common types of words is time adverbs, as seen in Garnett Genuis' tweet posted on April 17, 2024, which begins with the capitalized phrase “HAPPENING TODAY”. The primary function of temporal adverbs is to establish a timeline and enhance the timeliness of the information. This highly structured information configuration aims to emphasize the authority and practicality of the information, enabling the audience to quickly understand the progress and background of the situation.

Another feature has weaker linguistic attributes and is more like a behavioral feature. Tweets in this category often cite specific accounts, such as news publishers, commentators, politicians, or government agencies' Twitter accounts, mostly in the form of @commentator or @government agency, to link the content of the tweet to its source. The purpose is to increase the interactivity and trustworthiness of the tweet. Many tweets are not limited to text descriptions but also include podcast links, interview summaries, or program promotional images. The accounts referenced or @-mentioned are often those of seasoned professionals or scholars in the fields of politics, public affairs, or public opinion dissemination. Their involvement enhances the credibility of the information and expands the social reach of the dissemination. For example, a representative tweet shared the discussion among three experts

on the “Northern Perspective” podcast regarding the ArriveCan scandal, along with a viewing link to allow the public to gain a more comprehensive understanding of the incident.

Although Information Sharing-type tweets emphasize objectivity and neutrality, these tweets do not necessarily lack emotional information. As a matter of fact, some tweets express implicit positions or attitudes through hashtags, with the most typical example being the use of the hashtag “#ArriveScam.” While such hashtags are not part of the main text, they serve as semantic auxiliaries that indirectly convey irony and criticism of the ArriveCan project. Some tweets even directly replace “ArriveCan” with “ArriveScam” in the main text, utilizing hashtag language to express a negative stance. Stephanie Kusie employed this approach in a tweet posted on May 22, 2024. The original tweet reads: “ArriveSCAM updateToday at#OGGO, common sense Conservatives will move a motion to summon Minh Doan. Doan is accused of destroying emails and documents related to#ArriveSCAM, lying before Committee, and threatening officials.” Unusually so, apart from the emotional tag “ArriveScam,” the body of the tweet retains the news style in the information sharing category. While this strategy avoids direct emotional venting, it successfully evokes emotional resonance among readers through symbolic metaphor, thereby achieving indirect attitude guidance.

From the perspective of communication functions, tweets categorized under the information sharing encoding category possess several unique functional values. Primarily, they help establish transparency and credibility, serving to inform the public and protect their right to know. Through rational and restrained language and clear factual content, these tweets avoid overly inflammatory language, thereby enhancing the overall legitimacy and

acceptability of the information. On the other hand, these tweets help the public gain a more comprehensive understanding of the issue itself, while also making it easier for readers to repost or participate in discussions after reading. The concise and clear manner of information expression improves the traceability and dissemination efficiency of public opinion. Furthermore, information dissemination tweets also serve as evidence and factual basis for emotional expression tweets. Whether it be anger, frustration, concern, or distrust, the persuasiveness of such emotional expressions often requires solid information support, and information sharing provides this very foundation.

If the information-sharing tweets are generally neutral and restrained in their expression, they still have a profound impact on shaping public perception. Research findings reveal that while these tweets rarely directly express criticism of the government, political parties, or political figures, they still construct an unfavorable impression of the Liberal Party and the federal government through the information they select. Specifically, the information disseminated in these tweets often focuses on issues such as the budgetary mismanagement of the ArriveCan project, the lack of transparency in procurement processes, and contract disputes involving GC Strategies, thereby indirectly fueling the accumulation of public distrust, frustration, and anger. This seemingly neutral yet subtly directive mode of expression grants “information sharing” type tweets unique mobilization potential and discursive power within the broader discourse landscape.

3.7 Emotion & Opinion

In the sample of tweets analyzed in this research, a total of 277 tweets were classified as containing emotion, opinion, or both. This number accounts for a significant proportion of the overall data and reveals that the public's participation in public discourse regarding the ArriveCan scandal, a highly politicized event, was not monolithic but characterized by high levels of subjectivity and narrative engagement. Unlike traditional news sharing or information dissemination, these tweets predominantly reflect individual attitude inputs and stance statements, forming a highly emotionally charged and politically judgmental opinion landscape on social media platforms.

Looking at the specific data distribution, a total of 215 tweets were explicitly labeled as conveying emotions, while 247 tweets were labeled as expressing opinions. The two categories are similar in number, reflecting that users have both clear emotional reactions to this social issue and a tendency to express corresponding cognitive judgments. However, it is more noteworthy that these two types of labels are not independent and mutually exclusive. In fact, a large number of tweets were simultaneously labeled as both emotional and opinion-based, exhibiting a high frequency of co-occurrence. This overlapping coding phenomenon suggests that in users' responses to political events, emotional expression and opinion expression often intertwine, meaning that the public often expresses emotions when stating their opinions, and emotions themselves may serve as the premise and driving force for the formation of opinions.

In the digital public opinion environment, emotions and opinions are not clearly separated in the tweets, but rather highly integrated and mutually reinforcing. In discussions

on the ArriveCan topic, users often do not first calmly assess the facts and then express their opinions rationally, but rather quickly express their positions after being emotionally aroused. This affective pattern of expression leaves opinion expression greatly dependent on emotional responses, even for issues like government trustworthiness, fiscal disclosure, and power abuse. One may say emotions not only offer an expression channel for opinions but also facilitate opinion dissemination and persuasion by being infectious and bearing emotional energy.

From a stylistic perspective, opinionated and emotional tweets were found to be stronger and more categorical in terms of expressive strength and pragmatic resources. Compared to tweets that were labeled to be emotional declarations only, these dual-tagged texts made increased usage of exclamatory sentences and parallel forms of organization with increased usage and with a frequent usage of emotional tags and emphatic adverbs. Such texts were found to have stronger stance stands and critical forms of narration of reasoning. For example, many tweets not only ranted about anger over the financial expenditures of ArriveCan but furthermore explicitly penned as stating that Trudeau should be held accountable or the Canadian government should look into the relevant contracts immediately, with evidence of indigenous intertwinement between emotional output and policy demands.

In contrast, tweets labeled solely as emotional expressions, while also containing emotional tones such as complaints, dissatisfaction, and sarcasm, primarily remain at the level of emotional venting, lacking specific policy agendas or recommendations, and featuring more loosely structured language.

An analysis of the cross-labeling of Emotion and Opinion reveals that the essence of public opinion on social media is often a composite expression of emotionality and cognition. Tweets with dual labels demonstrate stronger influence in terms of content, form, and dissemination potential, serving as critical nodes that connect public emotions with political cognition, stimulate public discussion, and facilitate the formation of collective judgments.

3.8 Political Criticism

In the political criticism-related tweets analyzed in this study, a total of 300 tweets with clear political intent were identified. These tweets exhibit highly politicized language characteristics across multiple dimensions, including content expression, stance orientation, and emotional inclination, making them an important component of political criticism discourse in the ArriveCan crisis context. Among these, “Attack on the Liberal Party” (135 posts), “Attack on Trudeau” (105 posts), and “Government Criticism” (116 posts) are the three most popular subcategories. These not only dominate in terms of quantity but also exhibit significant differentiation in emotional expression and linguistic style.

Tweets labeled as “Attack on the Liberal Party” and “Attack on Trudeau” were significantly higher than other categories in terms of language use and emotional intensity. Such tweets often convey strong dissatisfaction with the ruling party by expressing intense feelings of frustration and anger. This is manifested in the frequent use of derogatory, insulting, and mocking language, as well as sentence structures that often employ exclamatory sentences, capitalized words, emphatic adverbs, and emotional tags to reinforce the tone. For example, Michael Barrett tweeted on March 15, 2024, writing “GC Strategies

made millions off Canadian taxpayers from ArriveScam and refuse to give up their Trudeau government contacts. 16 months of hiding information. And more lies this week. Sign to expose Trudeau's $60 million#ArriveScam". These tweets not only overtly address the Liberal Party or Justin Trudeau as a target, but also emphasize the distinction between the subject and the object, like "us" and "them," in order to create an emotional boundary between the government and the public. Such an aggressive language strategy makes these political critique tweets infectious and contagious, creating a central area of emotional connection in the public opinion domain.

Unlike tweets coded as "Government Criticism," these also carry critical intent but with very different types of emotion. These tweets also commonly co-occur with emotion codes like "concern," "urgency," and "distrust," and the language used by them tends to be relatively subdued and non-aggressive. The most defining feature of these tweets is that they criticize the government system or the implementation of policy rather than targeting political parties and leaders in direct attacks. Such tweets also use a neutral tone, third-person actors, and logical inferential frames while speaking with a tone of suspicion regarding issues like loopholes in institutions, fiscal transparency, and accountability. This suggests that "Government Criticism" primarily reflects institutional and structural reflection rather than partisan-driven emotional attacks, carrying a stronger function of policy caution and future orientation in public discourse.

Beyond these three main types of criticism, there are four less common political intent codes, including "Attack on Conservative Party" and "Attack on NDP," which represent opposition or negative attitudes, and "Liberal Support" and "Support Conservative," which

represent political stance support. Among these, critical comments targeting the Conservative Party and the New Democratic Party are relatively rare. Although my research does not include empirical data directly analyzing this issue, I offer a hypothetical explanation because during the ArriveCan crisis, neither party was the main ruling party, so they did not become the main targets of public sentiment.

Criticism of the New Democratic Party (NDP) mostly stems from its close cooperation with the Liberal Party in Parliament. Some tweets extend dissatisfaction with the Liberal Party to the NDP, arguing that the latter has failed to play its role in checking the Liberal Party's governance. Although this kind of blame isn't as harsh as attacks on the Liberal Party, it still shows some distrust. Criticism of the Conservative Party, however, primarily stems from opposition to its political stance rather than its substantive responsibility in this incident. A very small number of tweets criticize the Conservative Party for failing to effectively oversee the government during its time in opposition. In terms of emotional expression, such criticism tends to be more subdued, less sarcastic, and lacks the sustained linguistic aggressiveness of mainstream criticism directed at the Liberal Party. The emotional intensity of these critiques is also significantly lower than that of mainstream criticism targeting the Liberal Party.

Apart from critical expressions, the public opinion also identified supportive comments toward the Liberal Party and the Conservative Party, coded as Liberal Support and Support Conservative. In comparison, tweets supporting the Liberal Party were the least common, with only 8 tweets labeled as Liberal Support, indicating that the Liberal Party's public support was somewhat suppressed in social media discourse against the backdrop of the

ArriveCan scandal. Such supportive tweets largely adopt a strategy of avoiding the ArriveCan controversy itself, instead emphasizing the Liberal Party's other achievements or criticizing and mocking the Conservative Party to build positive identification with the Liberal Party. Only three tweets attempted to defend ArriveCan itself. Two of these tweets affirmed the convenience of the ArriveCan system based on users' personal travel experiences, while the third pointed out that the project had been formally approved by Parliament and that its original framework was partially inherited from the E-Arrive program introduced during the Conservative Party's tenure, aiming to shift responsibility and alleviate public pressure on the Liberal Party. In terms of language style, these tweets overall exhibit restrained emotional expression, with only one instance of intense emotional language.

In stark contrast, tweets supporting the Conservative Party (Support Conservative) were relatively active. These tweets not only clearly expressed support for the Conservative Party's political stance but also viewed it as a key force in exposing the ArriveCan scandal and pushing for accountability investigations. Some tweets argued that the Conservative Party must intervene in the investigation or that only the Conservative Party can restore government transparency, reflecting expectations and trust in its governing capabilities. For example, Boo tweeted on April 12, 2024, saying “Thank You To Pierre & Team For Bringing This#ArriveScamTo An Investigation .... Could You Imagine If Nobody Started Asking Questions.... We Need#CPCMajorityWe Need#Pierre4PMTo Happen .... We Need#TeamPierreForTheWin#TrudeauMustGo” While this language is strongly partisan in content, it generally employs moderate emotional expression and often frames its arguments

within the framework of institutional reforms and power oversight, thereby avoiding explicit confrontation with supporters of the opposition party.

3.9 Disappointment

During the coding and identification process, some tweets conveyed a sense of disappointment. Although this type of content did not use direct expressions such as “I am disappointed” in form, its language style generally included rhetorical devices such as contrast, irony, and suppressed tone, indirectly presenting an emotional experience of unmet expectations. This manner of emotional expression is often more restrained but effectively resonates with the audience. Its core objective is not emotional venting but rather reinforcing dissatisfaction toward an event or object through subtle linguistic cues.

However, at the operational level of emotion classification, disappointment as an emotional form has a relatively high degree of universality and generality. In other words, most critical tweets contain elements of disappointment to varying degrees. Therefore, although disappointment appears frequently in the content, its lack of clear boundaries of expression and structural linguistic markers makes it difficult to independently construct it as an operationally robust and standardized emotional category during the coding process. Furthermore, disappointment is often embedded within other more recognizable emotional types, such as anger and frustration, and is expressed within the semantic framework of these categories. Therefore, after comprehensively considering expression methods, recognition stability, and classification efficiency, the research results will not treat “disappointment” as

an independent emotion coding label, but rather as an auxiliary emotion dimension embedded in the coding logic of other major negative emotions.

4 Discussion

Through coding analysis of a large number of tweets on the X platform related to the ArriveCan incident, the study identified five representative types of negative emotions: Frustration, Anger, Urgency, Concern, and Distrust. By uncovering the predominant negative emotions and their linguistic characteristics in the ArriveCan crisis, this result directly answers the research question and enriches existing crisis emotion research in the ICM and SCCT frameworks. It also provides concrete empirical evidence for the study of emotion construction in social media contexts.

Frustration was the most common emotional category in this coding, mainly reflecting public doubts about policies, fiscal distribution, and governance effectiveness. Its linguistic style was largely rational, restrained, and cognitively demanding, characterized by low aggressiveness but high cognitive intensity (Argaman, 2010; Munin et al., 2025). This finding challenges the assumptions of SCCT: low-intensity emotions did not automatically dissipate as theoretically predicted but, through their high frequency and wide coverage, became the most prominent form of expression in the social media sphere, revealing SCCT's limitations in accounting for cumulative effects (Ma & Zhan, 2016). Under the ICM model, frustration is not discerned as a fundamental category, but it resembles strongly with sorrow, which is classified as a low-arousal, low-aggression, and weakly communicable emotion (Jin et al., 2010). But this research observes that not only can frustration predominate emotional

displays, but co-occur with political intent labels like “Government Criticism,” and observe dual dissemination functions motivated by opinion frameworks and by emotions. This can tell us that low-arousal emotions, with institutional blame, can proliferate and turn into highly communicable forms (Kušen & Strembeck, 2019).

Anger was the second most common negative sentiment in this research, with highly aggressive and confrontational wording. Under the SCCT model, it is common to arise when the public actively assigns blame to the government and believes that the crisis is within its control (Coombs, 2007). The results bear this out and go on to uncover that anger within the social media arena spanned by face-to-face blame. Data indicate that tweets dealing with anger predominantly focused on Prime Minister Trudeau and the Liberal Party, demonstrating ways in which leaders can become symbolic centers of blame during reputation disasters. At the same time, the study supports the ICM view of anger as a high-arousal emotion with strong potential for dissemination and mobilization (Jin et al., 2012), while also demonstrating that anger often combines with a “collective victim” frame (e.g., “taxpayers’ money is being wasted”), creating a more complex pathway between hostility and mobilization.

Urgency-related tweets hold significant advantages in dissemination and mobilization on social media, often characterized by action-oriented commands such as “investigate immediately,” forming a hybrid style between emotional expression and rational mobilization. Although their emotional intensity is relatively low, they quickly capture attention and enhance participation (Bukar et al., 2020). At the theoretical level, while the ICM model does not define urgency as an independent emotional category, its features

overlap substantially with anxiety and immediacy-related emotions, particularly in terms of high arousal (Jin et al., 2012). This finding confirms and extends a core assumption of SCCT, namely that perceived speed of communication directly shapes public trust (Coombs, 2007). Urgency not only corrects delays in information but also builds collective expectations for response, compelling organizations to regain control of the crisis rhythm.

Concern-related tweets emphasized logical clarity and rigorous reasoning, often analyzing potential impacts, predicting policy outcomes, or questioning the use of public resources. They frequently employed neutral or collective terms such as “Canadians” and “taxpayers” to create a moderate and negotiable context for discussion (Dyer & Kolic, 2020). At the theoretical level, this study supplements the ICM framework. Although concern was not designated as a core category (Jin et al., 2012), evidence suggests it can be understood as a composite emotion situated between anxiety and sadness, combining low transmissibility with high rational intensity. The findings also support SCCT by confirming that responsibility attribution shapes public evaluation of organizational responses (Coombs, 2007). Concern-related tweets typically reflected low hostility and high expectations, indicating a baseline of trust and a willingness to allow time for formal responses.

Distrust-related tweets operated through detail, metaphor, and logical nesting, producing cognitive penetration with relatively low emotional intensity but high informational density. This study advances theory on two fronts. First, it supplements SCCT by demonstrating that distrust emerges when responsibility is unclear, responses are delayed, or communication is ambiguous, thereby exposing limits in SCCT’s treatment of conditions for reputational recovery (Coombs, 2007). Second, it expands ICM by addressing its neglect

of low-arousal, cognitively driven emotions. While ICM primarily stresses the mobilizing function of high-arousal emotions in crisis contexts (Jin et al., 2012), findings here indicate that distrust functions as a cognition-induced emotion, whose transmission relies on logical persuasion and perceptions of institutional breakdown. In doing so, the study offers a more comprehensive account of how diverse emotions shape crisis communication.

5 Research Limitations

Although the study maximized the sample size within the constraints of platform permissions and technical conditions, the data sources still have certain structural limitations. Due to platform X's restrictions on data scraping and the huge volume of user posts every day, the sample used in the study is limited in terms of breadth and representativeness. For the sake of protecting user privacy, the data collection did not include key information such as users' geographical location, social class, ethnic background, and political stance. This creates blind spots in the study's ability to explain the social structural differences underlying emotional expressions and may overlook the unique emotional experiences and expression patterns exhibited by certain marginalized groups in crisis discussions.

The homogeneity of the corpus language also affects the universality of the study. To ensure the consistency of emotion recognition standards and the language compatibility of analysis tools, only English tweets were selected as the analysis object. All non-English content, including French, the other official language of Canada, and some common minority languages, were excluded from the analysis. While this approach enhances the consistency of

semantic analysis and classification accuracy, it also limits the ability to capture public sentiment expression in Canada's bilingual and multicultural context.

In addition, the discontinuity of data collection time also limited the study's ability to characterize the evolution of emotions. Although the data collection period covered the main transmission cycle of the ArriveCan incident, part of the tweet data for June 2024 were missing. This time gap in the time series analysis resulted in the loss of potential public opinion peaks or turning points, affecting the completeness of the event dynamics modeling and potentially underestimating or overlooking short-term outbreaks of certain key emotions.

Conclusion

This study focuses on the public opinion fermentation process of the ArriveCan contract crisis in Canada on social media platform X, clearly revealing the decisive role of emotional expression and political criticism discourse in the construction of digital trust crises. Through the coding and analysis of 452 tweets, the study identified five dominant negative emotions in public sentiment during this crisis: frustration, anger, distrust, concern, and urgency.

At the theoretical level, the core contribution of this study lies in the integration and deepening of emotion transmission mechanisms and expression models. By combining the Integrated Crisis Map Model (ICM) with the Situational Crisis Communication Theory (SCCT), the study reveals how different emotion types trigger distinct public behavioral orientations in crisis communication. The results affirm SCCT’s central proposition that responsibility attribution and the perceived speed of communication directly affect public

trust (Coombs, 2007), while also extending ICM by addressing its omission of low-arousal, cognition-driven emotions such as distrust and concern (Jin et al., 2012). Beyond these theoretical refinements, the study advances risk communication research by showing that, in the age of social media, emotions function as core mechanisms shaping opinion formation and trust restoration, rather than as secondary variables of expression.

In practical terms, the research findings provide important insights for optimizing crisis communication strategies, managing social media risks, and establishing public opinion monitoring mechanisms. Specifically, in crisis management, it is not only necessary to identify factual issues but also to identify emotional types, understand emotional functions, and use these as foundational variables for risk control and communication design. This recognition highlights the layered complexity of crisis communication in the digital era and calls on organizations to embed emotional dynamics and public psychology into systematic approaches to risk governance.

To further expand the depth and breadth of crisis communication research, future analyses should encompass a richer variety of linguistic backgrounds and social media platform data. Further exploration of French and languages commonly used in immigrant communities, combined with data from social media platforms such as Facebook, Reddit, and YouTube, will help to obtain a richer picture of expression scenarios and user profiles. More comprehensive data will also help future research into government communication and response mechanisms during crisis events. A systematic analysis of variables such as response timing, tone, frequency, and information transparency would help evaluate the actual effectiveness of government discourse in regulating emotions and restoring trust.

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Appendix 1: Examples of Deleted Text and Reason

Publisher	Post date	Tweets	Reason for Deletion
E Moon 🐆☼✡	2024-03-16	مجید جوهری احتمالا در جریان جلسات تحقیق کلاه برداری ۶۰ میلیون دولتی#ArriveScamدلاری ترودو یه گوشه اون رو به شاه رضا پهلوی میچسبونه ومیگه ایشون باید پاسخگو باشند	Non-English content
Don’t-Ban-Me Reeeeeee	2024-04-19	#arrivecan	Only includes meaningless tags
e@CaptainScarl3t,True,Bienvenue	2024-05-26	réal !#yul,88,16,77,"	Unclear tweets
Pappa PeeWee	2024-07-26	Spot the difference	Unclear and unrelated tweets
Iqra Khalid	2024-03-09	Thank you so much to the Malton Women’s Council for having me	Unrelated tweets

		at their 13th Annual Women's Day celebration. It was great to see so much support in the room and not just celebrate, but also talk about the important issues that women face everyday. Happy International Women's Day!	

Appendix 2: Coding Manual

Category	Definition	Sub-Codes	Operational Definition	Indicators
Emotional Expressions	Tweets containing explicit or implicit emotional states directed toward events, policies, or actors in the crisis context.	Frustration	A restrained negative emotional state integrating anxiety, sadness, and mild anger, triggered by the conflict between personal ideals/values	Expressions of dissatisfaction, restlessness, helplessness without overt hostility. Avoids strong accusatory language.

			and unchangeable reality.	
		Anger	A strong, hostile emotional state in reaction to perceived injustice, negligence, or corruption.	Aggressive language, accusations, insults, sarcasm, or explicit hostility; often intensified through uppercase, vulgar terms (e.g., “WTF,”).
		Concern	Anxiety-driven, future-oriented emotional state directed at risks or threats to individuals, society, or governance.	Expressions of worry about future outcomes, social responsibility, fairness, intergenerational justice.
		Urgency	Action-oriented emotion manifesting as public calls for immediate response, reform, or accountability.	Tweets explicitly demanding action, solutions, or government intervention (appeals, requests, direct questioning and so on).
		Distrust	Negative trust judgments expressed	Explicit or implicit questioning of legitimacy,

			as suspicion, denial of reliability, or accusations of dishonesty.	transparency, or accountability; often through irony, rhetorical questions.
Information Sharing	Tweets primarily focused on disseminating information without significant emotional expression or stance.	None	Neutral reposts or summaries of news articles, policy updates, official statements, or media reports.	Exclusion Rule: If clear emotional or opinionated content is present, do not classify under this cagetory.
Emotion vs. Opinion	Auxiliary coding to distinguish expressive functions of tweets.	Emotion	Tweets explicitly expressing identifiable emotional states with clear intensity or category.	Overlap Rule: A tweet may be coded as both Emotion and Opinion if emotional expressions are tied to explicit stance.
		Opinion	Tweets clearly presenting a stance, judgment, or evaluation without	

			requiring emotional intensity.	
Political Criticism	Tweets with explicit evaluative statements (criticism or support) directed toward political parties, leaders, or the government.	Attack on Conservative Party	Attacks: Criticism, mockery, accusations of corruption, negligence, or incompetence	
		Attack on Liberal Party		
		Attack on NDP		
		Attack on Trudeau		
		Government Criticism	Broader dissatisfaction	
		Liberal Support	Support: Positive endorsement, defense, or alignment with party/leader.	
		Support Conservative		