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ZHAO WAN TING

Graduate School of Informatics, Nagoya University, Japan

zhao.wanting.v6@s.mail.nagoya-u.ac.jp

https://orcid.org/0009-0005-0556-3165

YAMAMOTO TATSUHIRO

Graduate School of Informatics, Nagoya University, Japan

tyama@i.nagoya-u.ac.jp

https://orcid.org/0009-0001-7243-0144

The Role of Internet Public Opinion in Shaping Local Elections: A Case Study of the 2021 Nagoya City Mayoral Election

Abstract: Internet public opinion builds on the concept of public opinion and refers to the multiple small public spheres represented online. This article analyzes internet public opinion on X (formerly Twitter) during Japan's 2021 Nagoya mayoral election. This local election has been in the spotlight due to a signature fraud scandal involving the incumbent, despite his eventual victory. Therefore, we selected this unique case study to analyze content and user interactions. To achieve this, we employed morphological analysis, word co-occurrence network analysis, and social network analysis on the collected tweets. The results reveal that, compared to policy pledges, political scandals garnered considerable attention from local citizens and high-profile celebrities. This dynamic influenced public discourse, leading to a bias on X favoring the newcomer over the incumbent. Additionally, this analysis underscored the considerable impact of mass media as critical sources.

Keywords: political communication; social media; local elections; internet public opinion; political scandal; content analysis; network analysis

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

Introduction

Political communication research focuses much more on social media than in the past. The fact that anyone can easily reach out to social media to make their voice heard is unimaginable in the age of traditional media. Thus, scholars have high hopes for this new era of political communication symbolized by social media. When we entered this new era, it became clear that social media could fulfill some of our expectations, such as online political discussions and campaigns (McGregor, 2020). However, it also brought concerns like political polarization, selective exposure, and echo chambers. Related studies of internet public opinion in the electoral arena have primarily addressed the issue of political homophily and heterophily (Colleoni et al., 2014; Guo et al., 2020) and the prediction of election outcome (Diaz et al., 2016; Pekar et al., 2022; Vepsäläinen et al., 2017). Besides, the importance of examining content and interaction has been evidenced (e.g. Guo et al., 2020). X shows strong homophily within social networks but lower homophily and a more public sphere in information diffusion (Colleoni et al., 2014).

With over 200 million daily users worldwide, X is one of the largest social media and has become a preferred platform for researchers due to its popularity and data accessibility. Even in Japan, which is characterized by the dominance of traditional media, almost 50% of people use X, which has the second largest audience in the world. Young people constitute a large proportion of X users, and around 20% or more of older people also use X (Ministry of Internal Affairs and Communications, 2023), showing the potential for gauging public opinion. However, the literature about the role of social media in local elections remains relatively scarce in Japan, with most studies centered around the Osaka mayoral and gubernatorial elections. Scholars have focused on the iconic populist Toru Hashimoto, Osaka's former prefectural Governor/city mayor (Ushiro, 2017; Matsutani, 2018; Zenkyo, 2021). We then particularize and consider the case of Nagoya, the third largest city by population (2024), examining the role of internet public opinion in elections.

Table 1. 2021 Nagoya mayoral election result

Candidates	Party	Votes
Takashi Kawamura	Independent (endorsed by Genzei Nippon)	398,656
Toshiaki Yokoi	Independent (endorsed by the Liberal Democratic Party, Komeito, Constitutional Democratic Party of Japan, Democratic Party for the People)	350,711
Toshimitsu Ota	Independent	13,804
Seiichi Oshikoshi	Independent	8,162

Source: (ASAHI, 2021, April 26).

The 2021 Nagoya mayoral election was officially announced on April 11, 2021, with the election day held on April 25, 2021. As shown in Table 1, four candidates ran for

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

office, but only two – Takashi Kawamura and Toshiaki Yokoi – were virtually seen as strong contenders. This election attracted more public attention than previous ones due to the third-term incumbent, Kawamura. In 2009, Kawamura transitioned from national parliament to Nagoya mayor, promising a revolution for the common people, including key policies like resident tax reduction, a hallmark of populist traits. He also founded a regional party "Genzei Nippon (減税日本)", advocating for tax cuts. But, before the 2021 election, a scandal emerged involving forged signatures in the recall campaign against Hideaki Omura, the Governor of Aichi, where Nagoya is the capital. The move to dismiss Omura was started by a group including Kawamura and Katsuya Takasu, a high-profile cosmetic surgeon, in opposition to the governor's response over the Aichi Triennale 2019 art festival. The event featured some controversial artworks, including a statue of a girl symbolizing so-called comfort women, mainly Koreans, who served as prostitutes for Japanese troops before and during World War II (Jiji Press, 2021, para. 3). In February 2020, the Aichi prefectural election administration commission announced that more than 80% of signatures were invalid. Then the fact that Kawamura supported this campaign caused considerable controversy and debate. Regardless of this scandal, he defeated Yokoi, a former Nagoya city assembly member endorsed by both the ruling coalition and the main opposition parties (ASAHI, 2021). Such an antagonistic dynamic between a mayor and political parties is rare in Japan, which may also reinforce Kawamura's image as an anti-elite politician. Nevertheless, the winning margin in this election has narrowed significantly, from 38.7% in 2017 to 7.8% in 2021. This sharp decline reveals the impact of the fraud signature incident, which also unfolded on the Internet.

Internet public opinion and local politics

Public opinion can be understood as an aggregate of the individual views, attitudes, and beliefs about a particular topic expressed by a significant proportion of a community (Lippmann, 1922). Opinion polls are among the most well-known tools for measuring it. However, recent studies have raised concerns about their methodological problems and argue that public opinion should be understood as collective, not just aggregated; dynamic, not static; and reactive, not unidirectional (Perrin & McFarland, 2011). It is the advent of internet has given us the opportunity to confront different "small public spheres" that exist on online platforms (Endo, 2010).

While political discourse on social media can be democratic, as it symbolizes egalitarianism, which ordinary people can easily engage, at the same time, it can be polarized, especially with a right-wing bias that has been proven in many studies (González-Bailón et al., 2022). Many social media platforms, like Facebook and X, have different connective affordances that may be appropriate for certain types of political engagement (Kalsnes et al., 2017). In addition to their architectural features,

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

awareness of how to present oneself also influences how one interacts online. Storsul (2014) explained that when contexts collapse, and media forms integrate, a new situation develops with new conventions – including reluctance about being too political and controversial. Another observation closely related to polarization is the over-representation of hostile and aggressive emotions (Duncombe, 2019; Thelwall et al., 2011). Schäfer (2017) found that the hate speech content of anti-Japanese functioned as a connective frame-bridging empty signifier, connecting the nationalistic discourse of Internet right-wingers with Abe's political views. However, it is confirmed that negative, exaggerated, and sensationalized messages performed better with the audience, receiving more likes, shares, and comments (Klinger et al., 2023). This phenomenon is usually understood as a lack of political deliberation. However, Duncombe (2019) argues that social media, X particularly, has the capacity to challenge the conventional acceptance of what politics is and who can participate, both expanding and hardening entrenched political perspectives. Other studies lie in predicting election results from social media posts (Choy et al., 2011; DiGrazia et al., 2013). The tweets' sentiment corresponds closely to voters' political preferences (Tumasjan et al., 2011). As for the distance between offline and online activism, Wada (2019) argues that the spread of calls for civic action on X does not necessarily reflect the reality.

Since the rise of Toru Hashimoto, local politics in the Japanese context has been studied under the theory of populism. Populism is often defined as an ideology that considers society to be ultimately separated into two homogeneous and antagonistic groups, "the pure people" versus "the corrupt elite", and which argues that politics should be an expression of the general will of the people (Mudde, 2004, p. 543). The hypothesis, supported by European studies on populism that specific marginalized or disadvantaged groups back populism does not hold up as an adequate explanation in Japan (Ito, 2016). The study of the Nagoya case has been positioned as a comparative object with Osaka. Support for Kawamura and Genzei Nippon is similar to the voting for Hashimoto and his party, the Osaka Restoration Association, called "Osaka Ishin-no-kai (大阪維新の会)", which is more influenced by a populist attitude than by political values or a sense of insecurity (Matsutani, 2018, p. 78).

Furthermore, after the 2011 scandals involving Genzei Nippon, voters prioritized the populist leader over civic participation, holding city councilors, not Kawamura, accountable (Matsutani, 2022). Mori (2012) found that in the mayoral and gubernatorial elections, there was some deviation from party support among the supporters of Kawamura and Omura but that the degree of it was more convergent in the municipal council elections, indicating that the established parties' avoidance of making the resident tax cut and Chukyo Metropolis Proposal an issue in the triple elections and the strategy did not entirely work in the municipal council election a month later. Kita (2017) found that an anti-welfare attitude and self-awareness of being reform-oriented contributed to the support for Kawamura. Ushiro (2017) points out that the core of Kawamura's populism is rooted in neoliberalism and strongly emphasizes grassroots

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Data: 15/11/2026 16:03:32

democracy. This is particularly evident in its advocacy of direct democracy and local committees run by volunteers (Ushiro, 2017). From a historical perspective, Kawamura's government is connected with public expectations of breaking the political stalemate of Nagoya's all-ruling-party system (Kita, 2013).

Considering the rapid change in the media environment, this article approaches the Nagoya mayoral election from a different social media angle, with findings that will contribute to our understanding of online political discussion and the interaction between ordinary users and institutional users. Therefore, we aim to explore three interrelated research questions:

RQ1:What topics are social media users talking about in this election?

RQ2: How would internet public opinion react to this political scandal?

RQ3:What kind of users are influential in the social network analysis?

Data and methods

Using the X API, we collected 81,811 tweets containing the keyword "Nagoya mayoral election (名古屋市長選)" from January 1 to April 30, 2021. This collection consists of 63,890 retweets (78.1%), 16,770 original tweets (20.5%), and 1,151 replies (1.4%). To understand what X users discussed about the election, morphological analysis and word co-occurrence network analysis were performed on the text data using the quanteda package in R and Gephi. Then, we employed social network analysis to visualize user interactions, enabling us to identify the most influential individuals. Specifically, we focused on three centrality indexes, weighted degree, hub, and betweenness centrality, to evaluate important users and their connections. The weighted degree is the number of edges that a node possesses (Landherr et al., 2010). Hub score is a metric from the Hyperlink-Induced Topic Search (HITS) algorithms designed to rank web pages (Kleinberg, 1999). According to Chien et al. (2014), the higher the number of outgoing edges, the higher the Hub score of that particular node. A node's Hub score is computed by summing up all the Authority scores of the outgoing edges' nodes. Betweenness centrality measures the times a node acts as a bridge along the shortest path of two other nodes (Landherr et al., 2010).

Analysis

Content analysis

First, we examine the political discourse in line with the first two research questions. In Figure 1, the main content is divided into five clusters based on modularity (Blondel et al., 2008). Cluster A (percentage of the cluster: 21.3%) represents the

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

horse race, which portrayed a one-on-one battle between Kawamura and Yokoi. Many related words are shown, "VS", and the names of the major political parties and their "jointly" "support" for Yokoi. Mention of media sources, for instance, "opinion polls" and "survey predictions" by "*Yomiuri Shimbun*" (the top sales Japanese newspaper) also appeared.

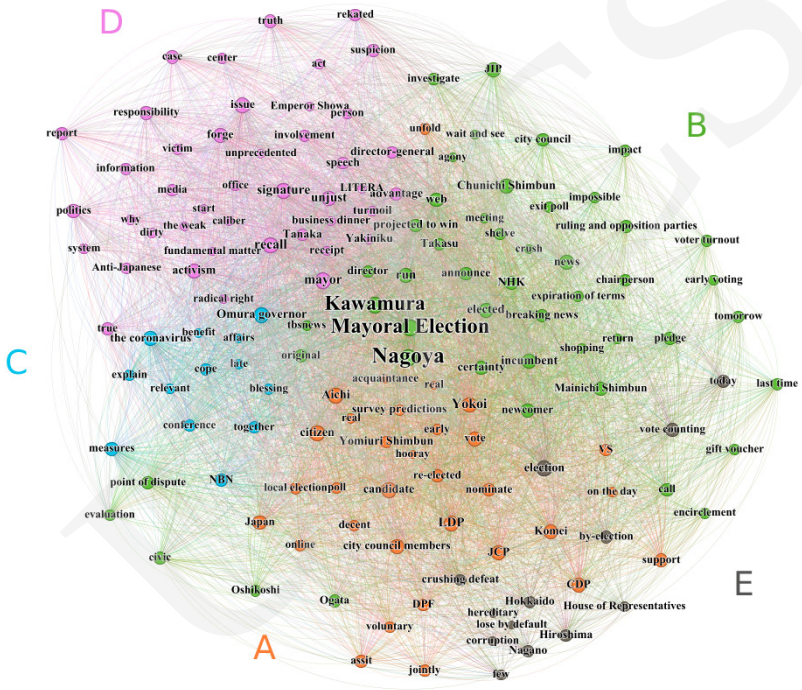


Figure 1. Co-occurrence network analysis of tweets about the 2021 Nagoya Mayoral Election
Source: Authors' own study.

Cluster B (32.7%) is pertinent to the incumbent's position. In addition to the recall incident, there were discussions about voter support for Kawamura, his policy (e.g. COVID-19 economic measures like "shopping", "return", "pledge"), his stance in the election, and debates about the results of ballot counting ("exit poll", "projected to win"). Before Kawamura published his pledge, Yokoi had also announced a commitment to distribute a "gift voucher" to all Nagoya citizens as part of the COVID-19 support. This competition of pledges also caused a dispute among netizens and was ridiculed as a pork-barrel election. In cluster B, we can still witness the presence of mass media as a major news resource, such as "*Chunichi Shimbun*" (the dominant local newspaper in Nagoya), "web", and "*Mainichi Shimbun*" (major newspaper) as well as some major television stations such as "NHK" and "TBS news". "Investigation", "JIP" (Japan Innovation Party, the national extension of the Osaka Restoration Association),

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

and "wait and see" also stand out. In light of Kawamura's flagging situation, it is evident that the JIP has decided to avoid active involvement with him. The *Chunichi Shimbun* news (2021.3.27, tweet, authors' translation) reported this adjustment of the JIP:

> JIP Struggles, Tarnished Reputation Lingers: Nagoya Mayoral Election Observed from the Sidelines: Chunichi Shimbun Web. The Aichi JIP, a prefectural organization of the JIP, has decided not to endorse Mayor Takashi Kawamura, who is seeking a fourth term in the Nagoya mayoral election. #Nagoya #Recall signature forgery #JIP

Cluster C (8.7%) shows the relationship between Governor Omura and Kawamura, which includes the interview with Omura after Kawamura's re-election and the posts criticizing Kawamura for the forged signature incident. Some posts suggest that Kawamura may have neglected the COVID-19 response or the provision of a special cash handout due to his involvement in the recall campaign. A mixture of policy, politics and scandal was emerging as emotional appeals amongst readers and voters:

> Takashi Kawamura, who stirred up a recall campaign against Governor Omura while neglecting COVID-19 response, later claimed "I am also a victim" when the fraudulent signatures were revealed. If such a person is re-elected, nothing but misfortune awaits the citizens of Nagoya. He must be voted out of office.
>
> Source: @pp****1945, 2021.3.6, tweet, authors' translation
>
> *Note*: Asterisk is used to protect the identity of the user.

Similarly, cluster D (28.7%) also around the theme of the forged signature recall incident, but there are two distinct issues from Cluster C. The right side of Figure 1 shows the word cluster around the news website "LITERA", representing the critical posts that reported the news of "receipts" for "Yakiniku" "business dinners" with "mayor" Kawamura, disclosed by "Tanaka", the "director-general" of the recall campaign. On the left side of Figure 1, there are many assaultive words such as "anti-Japanese", "media", "information", "the weak", and "dirty", indicating that some netizens accused mass media of leading public opinion, which is a typical rhetoric of right-wing nationalistic discourse (Schäfer et al., 2017). Taken together, the tweets criticizing Kawamura and those attacking the mass media make up the majority of Cluster D. Clusters C and D show the reactions of netizens to the recall incident. Cluster E is the information about nationwide elections, which covers other elections in "Hokkaido", "Hiroshima", and "Nagano". Alongside tweets encouraging voting, many retweets doubt that mass media failed to provide full election context (such as "corruption", "hereditary", "elections", and "lose by default" due to absence) and overlooked the importance of the Nagoya mayoral election.

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Data: 15/11/2026 16:03:32

Table 2. Top 20 words from word co-occurrence network analysis

Words	Frequency	Words	Degree	Words	Weighted degree
Nagoya	102,137	Nagoya	149	Nagoya	581,690
Mayoral election	88,003	Mayoral election	149	Mayoral election	521,213
Kawamura	70,291	Kawamura	147	Kawamura	492,831
Yokoi	17,330	Mayor	143	Yokoi	134,880
Recall	17,200	Recall	141	Recall	129,576
Mayor	17,052	Citizen	139	Mayor	123,471
Run (for mayor)	16,866	Aichi	138	Signature	105,047
LDP	13,198	Election	137	Fraud	101,975
Fraud	12,784	Signature	133	Run (for mayor)	98,893
Signature	12,542	Candidates	133	LDP	93,853
Elected	11,730	LDP	132	Elected	80,422
Election	10,529	Campaign	130	Web	67,222
Citizen	9,993	Yokoi	129	Aichi	64,727
Candidates	9,796	Omura Governor	129	Omura Governor	64,066
News	9,465	Issue	122	Certainty	62,348
Certainty	9,025	Incumbent	121	Citizen	60,338
Aichi	9,004	News	120	Incumbent	59,525
Omura Governor	8,761	The coronavirus	120	Election	56,139
Incumbent	7,554	Run (for mayor)	119	Campaign	52,834
Campaign	7,452	Fraud	118	Projected to win	51,340

Note: The difference between degree and weighted degree is that the latter calculates the weight of each edge.

Source: Authors' own study.

Table 2 shows the frequency, degree, and weighted degree of the top 20 words from the analysis above."Kawamura" was mentioned 70,291 times, whereas his opponent, "Yokoi", only appeared 17,330 times because of the gap in their visibility. Apart from that, political scandals also played an important role. After the essential elements, such as "Nagoya", "Mayoral election", and the names of major candidates, words related to the incident showed high measures. For example, "Recall", "Fraud", "Signature", "Aichi", "Omura Governor", "Issue", and "Campaign" all appeared in the rankings across the three measures. More importantly, their weighted rank increased relative to their frequency and degree, indicating that scandal-related words may appear less frequently than election-related terms but are strongly linked to key actors in tweets. Consequently, policy pledges have not been able to attract sufficient public attention. "The coronavirus" is the only policy-related term in Table 2, consistent with the findings in Figure 1 on economic policy responses to the pandemic. Public debate in the digital sphere clearly prefers emotional content, such as candidates' political scandals, over policy discussions.

Overall, among all the topics, the fraud signature case was the central theme and impacted this election. Other topics, such as policy pledges, did not demonstrate high popularity. As for news sources, it is confirmed that mass media still retains their prominent role online, mediating the relationship between politicians and the electorate.

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

Social network analysis

As regards the third research question, Figure 2 visualizes the retweets and replies network, and Table 1 lists the top 20 nodes to indicate major centrality indexes. Mass media with high centrality, such as *Chunichi Shimbun* (@chunichi_denhen), *Mainichi Shimbun* (@mainichi), and NHK News (@nhk_news) are shown on the left in Figure 2. Other highly centralized users are often celebrities and influencers, including TV personalities (@Kitsch_Matsuo), psychiatrists (@rkayama), researchers (@aiko33151709), political sociologists (@sangituyama), journalists (@tsuda), bloggers (@kikko_no_blog), news site (@litera_web), authors (@product1954).

In Figure 2, there are six prominent clusters; Cluster A (19.3%) is composed of many pro-Kawamura users identified from the content of their tweets. On the left side of this cluster there is an important actor's account, Katsuya Takasu (@katsuyatakasu), who initiated the recall campaign against Governor Omura with Kawamura, as we mentioned before. His name frequently appears in connection with the incumbent's position, the alleged fraud investigation, and election developments in Figure 1, underscoring his role in the election. Other media outlets, including the conservative newspaper *Sankei News* (@Sankei_news), the major Japanese television network TBS News (@tbs_news), and the popular online media outlet Share News Japan (@sharenewsjapan1) also emerged. In cluster B (15.6%), many users criticized the incumbent over the recall case. Interestingly, the presence of diverse actors in this cluster suggests the widespread attention this scandal has received. The news site LITERA (@litera_web) that we mentioned also showed high centrality in this cluster. Cluster C (12.8%) is similarly formed by users who had been keeping a close eye on the progress of the scandal. For example, a tweet recommending Yokoi as a mayoral candidate from a well-known figure can be observed.

> Toshiaki Yokoi, a city assembly member who has been the spearhead in pursuing the recall fraud issue in the Nagoya mayoral election, has announced his departure from the LDP and his candidacy for mayor (see his blog at the link below). "Now, we are facing a situation where the very foundations of democracy are being shaken. I will investigate the truth, urge the government to revise the system, and restore faith in democracy".
>
> Source: @rkayama, 2021.3.16, tweet, authors' translation.

The difference from Cluster B was the presence of accounts affiliated with the Japanese Communist Party (JCP). In particular, the Aichi Prefectural Committee of the JCP (@jcpaichi) and the Aichi Federation of Medical Worker's Unions (@irouren), which supports the JCP, are located on the periphery of cluster C. Compared with the JCP, other political parties and their alliances were scarce. Clusters D (6.2%), E (5.5%), and F (5.4%) map the spread of election news by mass media and online media. In cluster D, mass media such as NHK News (@nhk_news), *Mainichi Shimbun*

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

(@mainichi), *Yomiuri Shimbun* Online (@Yomiuri_Online), and the online media Yahoo! News (@YahooNewsTopics) are prioritized as key sources of election information. At the center of cluster E is the disaster alert account (@UN_NERV), which disseminates election results in this analysis. In cluster F, the most central entity is the *Chunichi Shimbun*. To the right, *Asahi Shimbun*, Tokai Television's "News One", and individual users are positioned.

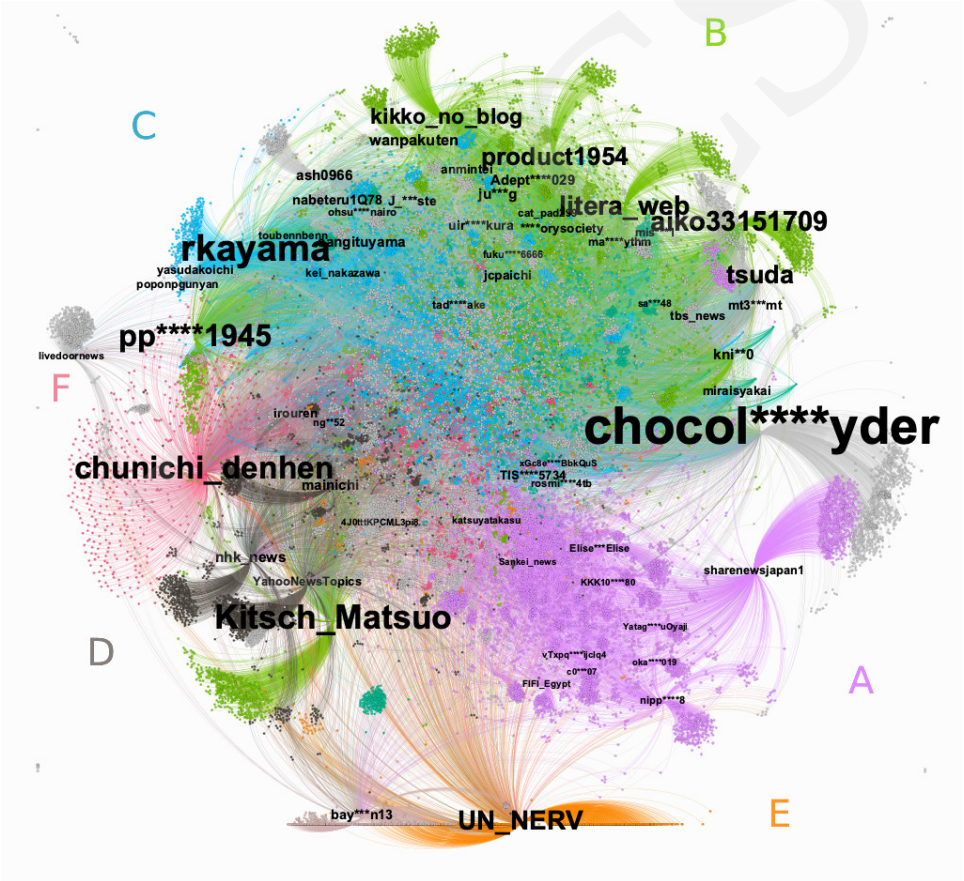


Figure 2. Social Network Analysis of Tweets about the 2021 Nagoya Mayoral Election

Note: Labels are shown when their weighted degree is 250 and above. The size of the node corresponds to its weighted degree, and the size of the label represents its hub.

Source: Authors' own study.

The following draws upon the top 20 nodes for centrality measures (Table 3). Yokoi supporters and critics of the incumbent show higher centrality than Kawamura supporters, constituting the majority. Moreover, because of the recall case, the pro-Yokoi or incumbent criticism side included a very broad range of actors.

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Data: 15/11/2026 16:03:32

Table 3. Top 20 users ranked by centrality measures in social network analysis

Node	Weighted degree	Node	Hub	Node	Betweenness centrality
UN_NERV	2,184	chocol****yder	0.526	rkayama	0.007
chunichi_denhen	2,172	rkayama	0.346	rosmi****4tb	0.006
chocol****yder	1,944	Kitsch_Matsuo	0.291	Qo***33	0.006
rkayama	1,750	pp****1945	0.254	katsuyatakasu	0.005
bay***n13	1,533	chunichi_denhen	0.237	YahooNewsTopics	0.005
Kitsch_Matsuo	1,387	litera_web	0.222	chunichi_denhen	0.005
tsuda	1,291	tsuda	0.222	nhk_news	0.004
pp****1945	1,262	product1954	0.191	nango****jitsu8	0.004
sharenewsjapan1	1,196	aiko33151709	0.180	Elise***Elise	0.004
aiko33151709	1,121	UN_NERV	0.167	yokoitshi	0.004
litera_web	1,080	kikko_no_blog	0.133	UN_NERV	0.003
product1954	989	ju***g	0.100	xGc8e****BbkQuS	0.003
nhk_news	897	ash0966	0.088	sizi***99x	0.003
YahooNewsTopics	839	nabeteru1Q78	0.085	pp****1945	0.003
kikko_no_blog	832	mainichi	0.083	litera_web	0.003
Elise***Elise	742	wanpakuten	0.082	jasumin_jp	0.003
nipp****8	719	uir****kura	0.082	chocol****yder	0.003
sangituyama	711	J_***ste	0.081	Sankei_news	0.003
mainichi	633	sangituyama	0.081	7***ty	0.003
ash0966	601	Adept****029	0.077	bay***n13	0.003

Note: The use of an asterisk is intended to avoid the identification of personal users. Green means pro-Yokoi or criticizing incumbent accounts, and red means pro-Kawamura accounts.

Source: Authors' own study.

In respect to media users, the disaster warning channel, regional newspaper, several national media outlets, and online media were prominently featured. This finding is consistent with the results of the previous study, which also showed the presence of most mass media. Among them, the centrality of the disaster bulletin account and the *Chunichi Shimbun* were particularly high, ranking in the top 10 in three centrality measures. For its role as a local newspaper, the *Chunichi Shimbun* explicitly covers every phase of this election, highlighting its central importance even compared with other mass media. As for the disaster alert account, it only sent one early breaking news update about Kawamura's re-election, which originally came from NHK; nonetheless, the tweet was retweeted 2,182 times.

> [NHK News 21:54] Nagoya mayoral election: Takashi Kawamura is certain to be elected for a fourth term.
>
> Source: @UN_NERV, 2021.4.25, tweet, authors' translation.

As a result, in terms of weighted degree, the disaster alert account ranked highest, even surpassing the local newspaper, *Chunichi Shimbun*. Considering the na-

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

ture of this account, it is likely that users were retweeted due to incidental exposure rather than an intentional desire to engage with political information. Meanwhile, Yokoi's account (@yokoitshi) ranked 10th on the betweenness centrality, giving the impression that his campaign team outperformed the incumbent's campaign team online. Specifically, Yokoi's account was retweeted by several celebrities, such as the well-known psychiatrists (@rkayama), who supported him, as well as members and affiliated organizations of JCP. Therefore, even though Yokoi is affiliated with LDP, users associated with JCP were more active in shaping public opinion on X.

Based on the analysis, it became evident that public discourse about the 2021 Nagoya mayoral election was distinctly divided in its support for the candidates. Many users who supported Yokoi or were critical of the incumbent expressed particular interest in the political scandal. This analysis also highlighted the influence of both regional newspapers and online media as key sources. Examples from the case study include *Chunichi Shimbun*, a disaster alert account, and Yahoo! News, both of which were active in the discussion of public opinion on X. However, there are still unresolved issues regarding incidental online exposure and the credibility of news sources in the digital media landscape.

Results and conclusions

This study investigates internet public opinion of the 2021 Nagoya mayoral election from three perspectives: political topics, reactions to political scandal, and influential users. While this analysis is limited to the X text data type and the regional cases, our research provides valuable insights into the relationships between internet public opinion and local elections, especially in the situation where a populist politician faces headwinds with unlawful suspicions.

Answering RQ1, there is no doubt that the forged signature recall was the central topic, which had significantly impacted internet public opinion, whereas we estimate major candidates did not provoke full-fledge digital competitions of policy. The only policy content observed was the countermeasures to COVID-19. These results indicate that emotions tended to dominate public opinion on X, witnessing alternative practices of online deliberative democracy. Much of the sentiment centered on criticism of the incumbent, driven by the political scandal. It is possible that this criticism content could influence voting behavior. Nevertheless, whether voters' emotions affected their participation cannot be explained by the recovery in turnout alone. It is reasonable to conclude that the fierce competition may have contributed to the increased voter turnout. However, it is challenging in this election to assert that the electoral competition was truly balanced, given the prevailing headwinds against Kawamura.

Regarding RQ2, our analysis indicates that public opinion on X was distinctly divided in its support for Kawamura and Yokoi and even prompted political participa-

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

tion and deliberation from many famous personalities and opinion leaders. As a result, they generally held a position of reprimanding the incumbent for his involvement in the fraud scandal. These all add up to a considerable amount of negative opinion towards Kawamura, which, unlike some studies claimed that the negative emotions did not reflect the election result (Tumasjan et al., 2011). The difference between online and offline could point to a mismatch between the demographics of X users and the electorate; that is, Kawamura's supporters are those who are less exposed to social media. According to the limited literature, however, Kawamura received more support from the younger generation, which normally has a lower voter turnout in Japan (Kita, 2017; Matsutani, 2018). While it is difficult to draw a firm conclusion from the demographics, Yokoi's low name recognition might be why he could not win over Kawamura's critics. The ruling and major opposition parties, except for the JCP, were less active in online, reflecting a notable discrepancy between online and offline political mobilization. This suggests a digital engagement gap between ruling and opposition parties in local elections, which could be a promising area of study in political communication.

Corresponding to RQ3, the social network findings on X show that traditional media is still the primary source of political information in Japan. Prior research, such as McGregor (2020) suggests that the goal of candidates' social media campaigns is to bypass or even influence the press, but this study does not demonstrate the effectiveness of this approach. Traditional media maintains its influence in the online public sphere, mirroring the existing social structure and the privilege of the sender. These dynamics are transported beyond the "boundaries" of social media services to be intertwined with so-called mass media logic or news logic (Kalsnes et al., 2017). Although most of the users may not be local citizens, their debates could still influence voters in Nagoya through the Internet. We also identified that online media played a crucial role in rapidly disseminating election news, especially serving as the secondary channel for transmitting mass media reports. However, the challenges associated with the reliability of online media sources cannot be overlooked. For example, it is widely known that Yahoo! News, one of Japan's largest portal sites, mainly selects its news from the content provided by various mass media outlets. This emphasizes the necessity for a rigorous examination of information distribution in a complex environment, particularly in the context of the relationship between politics and the media.

This study had several limitations that might require further investigation. First, this study focused solely on textual content, excluding images and videos, thus, neglecting the impact of visual elements on social media. In the future, it is necessary to expand the scope of analysis to include visual content. Second, our research was conducted on a special case – the local election in Japan. This limits the extent to which these findings can be generalized to other elections and regions beyond Japan. The third limitation is that this study has concentrated on users at the top end of the

Pobrane z czasopisma Mediatizations Studies **http://mediatization.umcs.pl**
Data: 15/11/2026 16:03:32

centrality spectrum but has yet to analyze their behavioral patterns at the lower end. Future research should develop a methodology capable of identifying a wider range of user characteristics. While this study confirmed that X public opinion tends to be biased towards emotive incidents and trending issues, it is imperative to further explore the various emotional tones in posts, such as joy, anger, sadness, and other sentiments. Finally, although this study does not explicitly establish the causal links between internet public opinion and voting behavior, its contribution lies in retrospectively capturing and explaining the drift of public opinion.

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