Characterizing State-Sponsored Information Campaigns through Network Discovery

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To my grandparents Herman and Irene Lindeman, who gave me the gifts of reading and wonder.

Abstract

The modern information environment, defined by its physical, informational, and cognitive dimensions, is increasingly dominated by dynamic and unpredictable aspects of the internet. The internet enables the free flow of information, yet can be strategically manipulated by different types of actors deploying complex information campaigns through social networks and news mediums to persuade and change the way that people think. The vast influence and stealthy nature of these campaigns, especially those orchestrated by China, are critically understudied due to proprietary data restrictions, resource constraints, and the anonymity of digital interactions, leaving a significant research void in identifying and analyzing state-sponsored inauthentic behaviors on social media platforms.

Today's internet plays a crucial role in the information environment, where information can be disseminated widely through viral tweets, controlled via state censor protocols, or suppressed through government internet censorship. State actors are leveraging social networks for information campaigns, making it imperative to understand who is disseminating what to whom. However, existing research on state-sponsored campaigns, particularly related to China's activities, faces challenges due to attribution challenges, resource constraints, and the anonymous nature of many public forums, resulting in a gap in identifying state-sponsored inauthentic behavior on social media.

To address this research gap, this thesis leverages computational, network science , and natural language processing methods with political and sociological groundings to identify and characterize state actor campaigns within the information environment. At the singular campaign level, I use the network structure of a campaign to identify key actors and their functions across different types of information campaigns. I then employ information theory methods and algorithmic analysis to study covert elements for information campaigns, using a benchmark dataset to ground this section that is by its nature difficult to attribute to any actor. The use of narratives within the information environment is as critical to understand as the types of network impacts they are meant to create on a targeted audience. I analyze how China's dialogue towards regional countries, friends and foes have shifted, specifically before and after Russia's invasion into Ukraine, examining the aggregated effects of campaign narratives. Furthermore, I expand the research by utilizing a social cybersecurity framework to map out how China uses information maneuvers to shape the information environment. Lastly, I aggregate my findings by expanding a decision-making game designed for analysts who are studying how different types of actors manipulate the social media domain. I integrate key measurements in the synthetic creation of a PRC information campaign and validate generated data. These contributions enhance the understanding of state-sponsored information campaigns provide valuable tools to researchers in the field.

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Chapter 1

Introduction and Background

1.1 Thesis Research Motivation, Goals and Scope

Within the United States, this year represents an election year. Since 2016, the general public has become more acutely aware of state actor interference in the public forum, yet information operations against the US public continue abetted and with few consequences. Russia has been effective in finding key vulnerabilities within US discourse in order to further its strategic goals, primarily those of winning the war in Ukraine and diminishing NATO. Russia most recently amplified conspiracy theories around FEMA assistance in the wake of Hurricane Helene [298], manipulated videos alleging sexual assault against Harris' running mate Tim Walz [337], and a fake video of ballots being destroyed. China likewise has perhaps taken a page out of Russia's playbook on finding cultural dividing points in US dialogue, but has adopted a more precise targeting strategy in lieu of Russia's buckshot approach. China has shifted its influence operations to target down-ballot candidates, seeking to influence local political figures that may not be as heavily scrutinized. Within the cyber domain, Chinese hackers targeted the phones of former President Donald Trump and his running mate J.D. Vance, and staff of vice president Kamala Harris [137]. The impact of these state-sponsored attacks on US public forums remains to be seen. However, these attacks undoubtedly accelerate animosity via disinformation and hateful rhetoric between Americans, likely one of the intended effects. How state-actors use the information environment deserves more in-depth study, as the role of foreign public diplomacy gains traction within democratic countries and state actors increasingly seek to manipulate public opinion.

The digital era has undoubtedly transformed traditional communication barriers, enabling instant global connectivity and an unprecedented exchange of ideas. Online users are enabled to find communities of support and identity on a wide range of topics, from healthcare and well-being to politics and identity. This connectivity, coupled with the anonymity enabled by many internet platforms, provides an environment where many users feel they can freely express themselves without judgment. The increased connectivity to find people and content who share values often leads to echo chamber formation. These are environments where users predominantly interact with others who share similar beliefs, reinforced by social media algorithms that personalize content based on user preferences.

It is in this space where people are primed to process and forward information in "safe-space" places that this thesis aims to understand. While these online spaces offer endless opportuni-

ties for community building and identity reinforcement, they also introduce complex challenges, especially in the realm of information operations. Information operations exploit this social connectivity to manipulate public opinion within targeted audiences. They are intensified by the rise of content-optimized platforms like TikTok and an overall decrease in social platform moderation via Twitter/X and Meta. Information and belief manipulation has profound impacts on critical societal events, including elections, public health crises, and international conflicts. Information operations may target any audience to further a specific goal, using online tactics to sway public behaviors and beliefs toward desired outcomes.

The speed of online information propagation is unprecedented, resulting in blurred lines between real conversations, legitimate news content, state-driven propaganda, and targeted disinformation. State actors increasingly exploit and manipulate social media domains to promote their interests through computational propaganda. The attribution of these campaigns poses challenges and frequently is not feasible with the data available to researchers. To muddy the waters further regarding understanding *who* is doing *what*, the information environment is a complex ecosystem consisting of an "aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information"[245].

Social media research on state-actor activity continues to grow in tandem with the growing awareness of information campaigns. However, the research community frequently stops analyzing inauthentic activity at the end of a single campaign. This thesis argues for a computational framework that can be applied to the information environment to identify and characterize state-sponsored information campaigns at both the campaign and narrative levels, empirically building off how a state actor wages information operations to further a desired end-state. We specifically analyze the People's Republic of China (PRC) in terms of how they promote narratives and propaganda, how those narratives target specific audiences, and, ultimately, how China's narratives and stories seek to change public opinion to further China's core interests. We investigate how China crafts and disseminates narratives to influence international perceptions and policies. By dissecting the components of these campaigns, this thesis will shed light on the subtleties of narrative construction and propagation by state actors, offering insights into the mechanisms of global influence and control. This thesis aims to bridge significant gaps in the current understanding of state actors and the range of tactics they use via digital platforms to shape their international influence. We hope that our findings will inform policy decisions, contribute to the academic body of knowledge in digital communications and social cybersecurity, and offer strategic methods for countering state-sponsored propaganda efforts.

1.2 Literature Review

1.2.1 Information Operations on Social Media

Social media platforms such as Twitter have become experimentation beakers for state actors against their own populations and external audiences, with evidence of organized campaigns found in over 80 countries in a 2021 survey [39]. These inauthentic information campaigns are engineered to imitate human behavior to persuade, manipulate, coerce, or crowd out targeted online audiences through information tactics such as distorting online discussion, bridging together, and exciting users towards a viewpoint or topic [26]. Oxford University researchers coined the term

"computational propaganda" to describe how inauthentic methods, such as automated bots and human curation, can algorithmize and shape public opinion [345].

Inauthentic activity frequently uses bot accounts controlled by automated scripts, troll farms that use professionalized groups coordinating activity, and puppet accounts that use fictitious personas. These, among others, have been well-documented methods for disseminating information and disinformation by imitating human social media interactions [103, 135, 204, 300]. Bots have been shown to effectively change public opinion and shift narratives on social media, creating a clear incentive for bad actors to manipulate the information domain [23, 28]. This fact is aided mainly due to the cost efficiency of bots versus paid troll users, paired with social media users' poor ability to determine if another account is authentic or a bot [96].

Bots are useful as an amplification device in spreading and disseminating information campaigns throughout a social network more efficiently than humans [345]. Social media users are easily influenced by information cascades or social contagion, in which users may adapt their behavior based on how they perceive others to behave or think in a certain way [24]. Within the Twitter/X domain, tweets are easily manipulated via retweeting content, which bot automation efficiently exploits [8]. While Twitter/X periodically takes down bot networks, especially those associated with state-sponsored activity, bots constantly adapt to circumvent bot detection measures [191].

The role of fake news or intentional false information additionally plays a large part in computational propaganda, made worse due to its propensity to propagate at a significantly faster rate than legitimate news [333]. State actors benefit from "first movers advantage" in solidifying belief systems due to the stickiness and lasting endurance of beliefs once established [272].

1.2.2 China's approach to information operations

Much of what is known about China's information campaigns is derived from social platforms releasing data on inauthentic activity network takedowns, observational studies, and qualitative research based on original Chinese government documents. China's information campaigns have typically promoted pro-China rhetoric and attacked perceived state enemies [264, 330]. Twitter suspended hundreds of thousands of accounts between 2019 and 2020, where subsequent analysis revealed these accounts were promoting PRC stances towards discussion around the Hong Kong protests and COVID-19 [212, 330].

Further analysis of China's sock puppet accounts reveal the use of both newly created and dormant accounts that displayed poorly developed account bios with very few followers, where batches of accounts are created on the same day with similar naming conventions [212]. Additionally, China has traditionally avoided using memes that often take on a life of their own and potentially undermine centralized messaging control [27]. Extensive computational journalism by media outlets like the New York Times, ProPublica, and the Australian Strategic Policy Institute has coordinated with Twitter in analyzing these networks. Key findings include evidence of the Chinese government outsourcing Twitter campaigns to private companies, using a layered ecosystem of state-sponsored accounts and influencers/foreign voices, and the prolific use of fake accounts for amplification [217, 222, 287].

Past research, specifically on China's MFA and Diplomatic Twitter accounts, determined that information diffusion occurred primarily from key state-sponsored outlets as a function of China's centralized censorship policies. However, this research did not explore other elements of infor-

mation diffusion within the network beyond state-sponsored Twitter accounts [135]. Additionally, this research was conducted when there were only 14 state-sponsored accounts compared to the present count of over 300. More recent research from Oxford University found that China's Twitter accounts are heavily amplified by a small number of super-spreading accounts that were later suspended. However, this research did not account for bot accounts or the type of content being spread [291].

1.2.3 China's Core Interests

Before we elaborate on China's use of influence operations to further its strategic goals, we must first understand what China's goals are. China's core interests are understood as the"non-negotiable" aspects of its policy. General consensus has pointed to a 2009 article by then-State Councilor Dai Bingguo during the China-US Strategic and Economic Dialogue, describing these core interests as: 1) safeguarding Chinese Communist Party and national security, 2) National Security, Sovereignty, and Territorial Integrity, and 3) Economic and Social Development [277]. China's inclusion of Tibet and Taiwan independence movements under the second tier of sovereignty and territorial integrity has been well-established over the last 15 years, demonstrating China's view that these areas are internal issues to China. Fravel (2011) argues that Taiwan is seen not so much as a disputed territory as it is a breakaway territory with separatist tendencies that must be brought to heel [109].

A recent RAND study highlights a 2010 statement at the ASEAN Regional Forum as potentially a shift under Xi Jinping towards more assertiveness around China's core interests [293]. In addition to the core interests noted above, this paper adds the addition of military modernization, regional and global influence, soft and cultural power, technological advancement, and security and stability to critical elements within its grand strategy. This study argues that this framework is crucial towards the "China Dream" where China rises to become a global superpower. Zeng et al. (2015) argue that the nebulous framing of "core concepts" enables ambiguity around knowing which issues are non-negotiable to China, potentially serving strategic obfuscation. The authors discuss the strategic implications around China's growing assertiveness in protecting its core interests, and the potential international repercussions that could be had from this more aggressive strategy [357].

1.2.4 China's bureaucracy for propaganda

China's underlying framework for information warfare draws significantly from its long history of developing and disseminating propaganda. Authoritarian countries have been shown to enable centralized power to inform and manage information campaigns more efficiently, and China may be the best example of this [38]. We use Jason Stanley's definition of *propaganda* to describe the informational context of these campaigns, where it "fundamentally involves political, economic, aesthetic, or rational ideals, mobilized for a political purpose, used to either prop up or erode some ideal [309]."

China's ruling party, the Chinese Communist Party (CCP), maintains its organizational capacity for propaganda through a structured hierarchy of various departments, the main offices of which are the Central Propaganda Department (CPD) and the United Front, managed under the Central Committee of the CCP, in addition to the Ministry of Foreign Affairs (MFA) under the

State Council Information Office (SCIO) [86]. The CPD controls all media outreach and oversight of all propaganda systems, including oversight of China's largest media companies, such as China Global Television Network (CGTN) and Xinhua News. The United Front was developed for soft power influence, specifically charged with increasing the CCP's support among domestic ethnic groups, political, social, and economic elites, social media influencers, and the Chinese international diaspora [86, 88]. The MFA serves as the general bureaucracy that liaisons with foreign governments and heavily participates in *public diplomacy*, which entails one country engaging and communicating with the population(s) of other countries in order to strategically communicate narratives and extend its soft power influence [126]. It is in large part through this organizational structure, disciplinary measures, and strict censorship and surveillance that the CCP maintains power so thoroughly in China [63].

China's propaganda machine operates in tandem with a robust system of legislation and technological components to censor its domestic information sphere. Perhaps most symbolic of China's iron-clad control of domestic discourse is the "Great Firewall" or the Golden Shield Project, completed in 2008 and designed to censor mainland China's access to foreign websites which are perceived to host negatively influential content to include politically sensitive information, pornographic material, and online gambling content [58]. The Great Firewall uses IP and domain name blocking techniques, keyword censorship, VPN detection, and increased penalties for VPN manufacturers to control the flow of information into China [58]. Most notably, for this thesis, the Chinese public cannot access the most popular websites worldwide, including social media platforms such as Facebook, Twitter, and Youtube, and news sites such as the New York Times, the Washington Post, and Fox News.

1.2.5 Understanding China's Influence Doctrine

China's doctrine for its influence operations is rooted in the concept of "peacetime-wartime integration" or the blurring of information operations across a conflict continuum that covers peacetime, war and everything in between [205]. Chinese military strategists Liang and Xiangsui (1999) define this blurring as unrestricted warfare or war of the future in which there are no strict lines between peacetime and wartime or the battlefield from society [185]. China's influence operations stem partly from its Three Warfares doctrine spans the conflict spectrum of unrestricted warfare and is exceptionally well suited for the information domain. We include this doctrine to support our inductive reasoning regarding China's messaging on social media due to China's apparent stance that taking Taiwan by force is not off the table [349].

Three Warfares covers the concepts of psychological warfare, public opinion warfare, and legal warfare; crucial in expanding the definition of war beyond physical conflict zones and necessary for setting the winning conditions for war within peacetime [161]. Psychological warfare seeks to influence a target population or individual's beliefs or perceptions by disseminating information or propaganda to disrupt, support, or weaken a belief. Public Opinion Warfare seeks to shape external and internal opinions to further a goal. Lastly, Legal Warfare shapes and creates a legal context to legitimize actions [161]. China's social media messaging or discourse power is a component of its public opinion warfare strategy in shaping its messaging towards an international audience.

1.2.6 An Evolving Relationship

The growing global influence of China has significantly impacted the geopolitical landscape of the international community. A balance of military tension and cooperation characterizes China's relationships with neighboring countries in Asia. Among China's geopolitical goals in the region, Taiwan occupies a central position due to China's reunification goals. China maintains a view of sovereignty over Taiwan, despite Taiwan's complete autonomy and independently elected government. This policy also provides context for why China considers reunification with Taiwan, whether peaceful or otherwise, an "internal issue" [252]. China's stance on any foreign governments legitimizing Taiwan as an autonomous country has become increasingly hostile, characterized by threats of countermeasures and an escalation in show of force, such as China's drills around Taiwan following U.S. House Speaker Nancy Pelosi's visit to Taiwan in 2022 [346]. Taiwan has become China's litmus test for strong geopolitical ties with other countries, and a point of contention with rivals. China's state-sponsored media plays a crucial role in shaping its foreign policy narrative, particularly regarding its neighboring countries. Analyzing China's state-sponsored news articles is critical to gaining insights into China's foreign policy, its strategic priorities, and the potential implications for the international community. In this thesis, we will analyze China's state-sponsored propaganda news articles to shed light on how China portrays its neighboring countries, focusing on its discourse toward Taiwan and how it has shifted over time.

1.2.7 Let's talk about TikTok

While the focus of this thesis aims to provide a characterization of China's information operations on social media, we did not analyze TikTok data, in part because of the lack of a research API through which to sample data. However, the significant rise of TikTok, especially among users under the age of 30, warrants discussion. TikTok is a content-centric application developed by the Chinese company ByteDance, and has rapidly acquired a global user base exceeding 1.5 billion active accounts since its launch in 2016. The platform has been especially successful with a younger user base, where 41% of users between the ages of 16 and 24 [310].

TikTok has been increasingly scrutinized in part due to the addictive nature of its content targeting minors. The app has been found to encourage addiction-seeking behavior in brain activity by activating reward centers [315], decrease attention spans in children [151], and provide easy access to poorly moderated hate speech and extremist propaganda [338]. The algorithmic content curation on TikTok integrates user engagement metrics such as video pause times and interaction with specific hashtags for content personalization [308]. This level of personalization facilitates the spread of misinformation and computational propaganda, aided by TikTok's novel use of sound memes and an addictive recommendation system [48].

TikTok's content management during geopolitical crises, such as the Russia-Ukraine war, illustrates the role in which social media platforms may facilitate information warfare on behalf of state actors. TikTok's purging and content censorship towards Russian users immediately after Russia's invasion of Ukraine had unprecedented scope for a social media company, resulting in about 95% of content being blocked for Russian TikTok users, all done without any announcements about what policy it was adhering to. Following Russia's invasion of Ukraine, TikTok catered to Russia's "fake news" legislature banning any content critical of Russia's war and created a Russia-internal version of TikTok, blocking external user content from Russian users, in addition to purging anti-

war hashtags and content in Russia[254]. A Tracking Exposed report found that TikTok's content culling occurred at the platform's data transport layer, enabling a giant pro-Russian echo chamber where state-sponsored narratives and disinformation flourished unchallenged [283]. As the war in Ukraine continues, TikTok remains the only non-Russian-owned global social media platform in Russia, likely due to its policy deference towards reinforcing Russia's strict censorship policies. TikTok created a state actor labeling policy for state-sponsored content following Russia's invasion, likely in response to increased scrutiny over its censorship policies [324].

TikTok's lack of transparency contributes to growing concerns about its influence on users, particularly vulnerable users such as minors and young adults where roughly 40% of young adults get their news content from TikTok [183]. There is no research API to enable meaningful independent research on TikTok's effects [303]. The platform points to its transparency centers as valid alternatives to data availability for independent research, where the platform reassures the public that it follows its own content moderation guidelines [190]. Internal audio leaks revealed that US user data has been accessed from China from 2021 to 2022. TikTok has since changed its server locations to US-based locations, although researchers note that this would not necessarily prevent the company from accessing overseas data stores with current backdoor accesses [17]. A 2024 Network Contagion Research Institute study found that pro-CCP content was amplified over anti-CCP content despite having lower engagement, pointing to algorithmic bias to influence users. Additionally, heavy TikTok users had more favorable views of China's human rights record and were more likely to see China as a desirable travel destination, suggesting TikTok's ability to influence user perceptions [160] positively.

Critics of TikTok point to national security concerns when accusing the platform of being a form of Chinese "sharp power", seeking to manipulate and penetrate target country populations as a cognitive warfare strategy [279]. In early 2024, a piece of bipartisan legislation mandated the effective ban of the app within the US. Congress members from both parties were bombarded by phone calls from TikTok users, young and old, who were pushed by the platform to call. The app leveraged user geolocation to target a user's respective congressional members in an attempt to sway the congressional vote. This campaign likely backfired as the bill passed and was signed into law by the President [49]. China's response has been largely to accuse the United States of "double standards" in protecting free speech and to accuse the United States of bullying [326]. Regardless of whether TikTok deliberately aims to manipulate public opinion in favor of China's core interests, its impact on social media users has been undeniably harmful. As a foreign-owned entity, TikTok operates an opaque content delivery platform that has extensive access to a vast user base, raising significant concerns about the influence and intentions behind its operations.

1.2.8 Social Cyber Security's Role

The emerging field of social cybersecurity plays a critical role in understanding and analyzing information operations that attempt to shape people's engagement with ideas and beliefs, using both social and computational frameworks [52]. The types of information communication that are of interest to researchers, such as propaganda, misinformation, and disinformation, do not exist in isolation from the tangible world, but rather exist within the complex interactions of informational, physical, and cognitive elements in the information environment. As a result, social cybersecurity provides an interdisciplinary approach to account for these dynamic complexities.

One notable framework in this field is the BEND framework, developed by Beskow and Carley

	Community Maneuvers		Narrative Maneuvers	
	Social network manipulation		Knowledge network manipulation	
	Affects who is talking/listening to whom		Affects what is being discussed	
Constructive	**Back**	Actions that increase the importance of the opinion leader	**Engage**	Discussion that brings up a related but relevant topic
	Build	Actions that create a group or the appearance of a group	**Explain**	Discussion that provides details on or elaborates upon the topics
	Bridge	Actions that build a connection between two or more groups	**Excite**	Discussion that brings either joy, happiness, or enthusiasm to a group
	Boost	Actions that grow the size of the group or make it appear that it has grown	**Enhance**	Discussion about why the topic is not important
Destructive	**Negate**	Actions that limit the opinion leaders' effectiveness such as by reducing the number who can or do follow, reply, or attend to the leader	**Dismiss**	Discussion about why the topic is not important
	Neutralize	Actions that lead to a group being dismantled, or to appear to be disbanded and thus irrelevant	**Distort**	Discussion that alters the main message of the topic
	Narrow	Actions that lead to the group becoming sequestered from other groups	**Dismay**	Discussion about a topic that will bring either worry, sadness, or anger to a group
	Neglect	Actions that reduce the size of the group or make it appear as such	**Distract**	Discussion about a different or irrelevant topic

Figure 1.1: BEND Information Maneuvers. Image sourced from [216]

(2020) at Carnegie Mellon University, builds upon Ben Nimmo's "4D" Approach used to describe Russian information warfare against Ukraine in 2014 [233]. The BEND framework expands upon the four tactics of dismiss, distort, distract, and dismay, and accounts for additional ways in which actors may try to influence a target audience (see Figure 1.1 for the 16 BEND maneuvers). This framework allows for the mapping of community and network maneuvers, as well as the narratives that actors use to alter informational content towards a target audience, using bot probability scores, psycholinguistic cues, and semantic stance with a social network [27, 31, 52]. The BEND framework forms the theoretical basis within this thesis for understanding the concept of *information warfare*, which Denning (1999) defined as the "operations that target or exploit information media in order to win some objective over an adversary [83]."

In the context of global competition between China and the United States, China has been using influence operations against the United States with the objective of weakening the US and exacerbating existing social and political divisions. This is often referred to as China's "divide and disintegrate" strategy [115]. In 2021, China started propagating narratives through its state-affiliated news sources that the United States is in irreversible decline economically and socio-culturally, with the ultimate goal of ending US global hegemony or even causing the collapse of the United States [30]. This belief was articulated by CCP Central Committee member Yang Jiechi in the 2021 Anchorage Summit when he dismissively told US diplomats that the United States does not have the qualification to speak to China from a position of strength [150].

China's efforts to achieve information dominance over the United States are largely carried out through social media manipulation, which can be effectively analyzed using the BEND model. The CCP employs the doctrine of "Mind Superiority," which involves using psychological warfare

to shape or control the enemy's cognitive thinking and decision-making, as part of its "cognitive domain operations" strategy [115]. This concept aligns with the US and NATO concept of "information dominance" and can be seen as the desired end state of a successful influence operation. By influencing what is discussed in the US and how it is discussed, China aims to undermine US government policies and credibility, ultimately seeking to "divide and disintegrate" the United States through its influence operations. Social cybersecurity plays a vital role in understanding and countering these efforts by analyzing the complex maneuvers and narratives employed by state actors in the digital realm [52].

1.3 Data

This thesis incorporates data across different types of information campaigns. It extends methods beyond social media data to capture a more holistic characterization of how China wages state-sponsored campaigns toward international audiences. This data incorporates rich social network connections through the Twitter API, kinetic flight data from China's air incursions towards Taiwan, scraped media datasets from China's Ministry of Foreign Affairs, Global Times and People's Daily state-affiliated newspapers, and synthetic social network data in our final chapter.

Table 1.1: Summary of datasets used in this thesis.

Data	Type	Size	Ch. 2	Ch. 3	Ch. 4	Ch. 5
Elections in the Asia-Pacific	Twitter	16M texts	✓	✓		✓
State Actor Timelines	Twitter	180K tweets	✓	✓	✓	✓
Democracy Summit 2021	Twitter	7.2K tweets	✓			✓
Democracy Summit 2023	Twitter	90,412 tweets	✓			✓
Covert Operations	Twitter	1M tweets	✓			✓
Taiwan	Twitter	2M tweets	✓	✓		✓
Taiwan Kinetic	Flight	3 years		✓		
Scraped Data	News	1.2M		✓		

1.3.1 Democracy Summit 2021

The United States hosted a two-day "Summit on Democracy" event in mid-December 2021 to address democracy-related challenges worldwide, inviting over one hundred countries to participate. In response, Chinese state-sponsored Twitter accounts began a hashtag campaign around this event with anti-US sentiment and messaging for its internal event called "Dialogue on Democracy" on December 2, 2021. China's hashtag campaign around the Summit on Democracy represents a time-constrained influence campaign with extensive state-sponsored support. We collected tweets using the hashtags #WhoDefinesDemocracy and #WhatisDemocracy, resulting in the collection of 7,798 tweets from September 1 - December 31, 2021.

1.3.2 Democracy Summit 2023

The United States hosted the second annual "Summit on Democracy" event in 2023 to address democracy-related challenges worldwide, inviting over one hundred countries to participate. We used the Twitter V2 API to collect tweets under the hashtag #DemocracySummit during March 11 - April 20, 2023. This dataset includes 90,412 tweets from 63,990 accounts. China's sphere-of-influence network within this dataset resulted in only 209 original tweets with 4,512 retweets.

1.3.3 Covert Operations

The limited observable data that researchers have makes attribution extremely difficult. Social media platforms maintain access to technical indicators that provide more certainty around attributing state-sponsored information campaigns. We include suspected campaigns in addition to verified campaigns to provide ground truth in our analysis of emerging covert information tactics. We use a benchmark Twitter dataset released in 2021 related to an inauthentic network around Xinjiang human rights abuses. Additionally, we analyze two covert networks that were present in other datasets studied for this thesis, related to the 2023 Democracy Summit and Nancy Pelosi's visit to Taiwan. We collected Twitter data following the mainland protests that erupted across China following the Urumqi fire that killed a family during China's Covid lockdown policy. Unfortunately, this last analysis fell outside the current scope of the thesis, but will hopefully be a future publication [100].

- **Pelosi Visit:** We collected 1,758,453 tweets from the Twitter V2 Streaming API between April 1, 2022, and April 1, 2023, using the hashtag search #Taiwan. Within this dataset, we discovered a sub-community of accounts exhibiting repetitive behavior, acting as repeater bots, sharing the same messages multiple times without necessarily maintaining any account connections. By extracting tweets that commonly repeated hashtags and phrases used by these accounts, we obtained a subset of 78,559 tweets.
- **Democracy Summit 2023:** We discovered a sub- community of accounts sharing fake news articles about the United States using the hashtag #USA. We performed a two-hop query of agents who used this hashtag, resulting in a small campaign with 571 accounts and 1,237 tweets.
- **Twitter Network Takedowns:** We have over 5,000 accounts from 2019-2021 that Twitter attributed to the PRC from Twitter's Moderation Research Consortium [54]. This 20K tweet dataset includes anonymized account information and the tweets that these accounts participated in. The accounts were still embedded within the tweet text. Through data extraction, we were able to re-map accounts to content to analyze who this network was targeting

1.3.4 Taiwan

We collected tweets using the hashtag #Taiwan, resulting in the collection of over three million tweets from January 1, 2021 - October 31, 2022. We chose these dates to capture China's Twitter dialogue before Russia invaded Ukraine, in addition to the months following US House Speaker Nancy Pelosi's visit to Taiwan in August. After filtering our data to tweets and retweets relevant to Chinese-flagged accounts, our dataset consisted of 114,719 tweets. We also use a time-series

aggregation of incident reports published by Taiwan's Republic of China Ministry of National Defense on China's People's Liberation Army (PLA) air activities within the Taiwanese Air Defense Identification Zone (ADIZ). These reports provide the number and type of PLA aircraft in the ADIZ when they cross the median strait boundary, along with location and time information [43, 45].

Ukraine

We used the X V2 API to collect pro-Putin hashtags in the immediate weeks after Russia's invasion into Ukraine: #abolishNATO, #IstandwithRussia and #NewWorldOrder. We collected 140,498 tweets from January 1, 2022 to March 3, 2027.

1.3.5 Scraped Datasets

This dataset was exported from the FOCUSdata project at the National Security Studies Department at New Jersey City University (NJCU), a collaborative project with the Rutgers University Center for Critical Intelligence Studies under a grant from the U.S. Office of the Director of National Intelligence (ODNI).

- Ministry of Foreign Affairs: 2,607 English-language speeches and communique from China's Ministry of Foreign Affairs from November 15, 2000, to December 31, 2022 [106].
- Global Times: 677,532 English-language articles from the state-affiliated Global Times outlet. This dataset spans from April 9, 2009, to December 31, 2022 [104].
- People's Daily: 544,940 English-language articles from the state-affiliated newspaper outlet People's Daily. This dataset spans from May 12, 2007, to December 31, 2022 [105].

1.4 Tools

1.4.1 Ora-Pro Software

Ora is a dynamic meta-network and visualization tool with interoperability to import other network extraction technologies to visualize and measure information diffusion, belief change, stance detection, and understand how networks change over time [10, 53]. Ora maintains an import function for Twitter data and maps Twitter's rich metadata fields to a meta-network structure. Critical data fields include the language metadata tag, sender of a tweet, whether a tweet is a retweet and thus not the original tweet, temporal data and self-reported geotags. We use Ora to rapidly calculate network metrics such as centrality measurements, community detection and clustering and exploratory data analysis.

1.4.2 Netmapper

Netmapper is a part of Ora's interoperable pipeline for network analysis and extracts networks from unstructured text data in over 40 languages. The context-level attributes provided by Netmapper include psycho-linguistic signals and emotions [320], semantic networks [305], and social identity theory [129]. Netmapper generates cognitive/emotional cyber-mediated usable emotional sensors

(CUES) from social media that provide indicators or features of an author's cognitive and emotional state given a document [33, 172]. These linguistic cues enable us to analyze sentiment and emotionality from pronouns, emojis, and negative or positive language, in addition to conducting more complex social cybersecurity actor and document modeling using the BEND Framework.

1.4.3 Bothunter

Bothunter is a bot detection algorithm developed by Carnegie Mellon University's Center for Computational Analysis of Social and Organizational Systems (CASOS) Center[1] that generates a prediction that an account is a bot that demonstrates automated activity and is likely controlled by software. Bothunter is a tier-based random forest classifier trained on past bot campaigns and maintains an accuracy above 90% [25]. To increase certainty around our bot classification for each Twitter account, we use the recommended bot probability score of .7, at which the bot classification label is most stable from flipping from one class to the other for outlying bot activity [230].

1.4.4 Momus

Momus is a CASOS research tool designed to compare synthetic social media data to population-level statistics from over 262 million tweets. Momus analyzes three key components of linguistic features by inputting the NetMapper output of psycho-linguistic features from a given dataset. Momus compares a sample dataset to the larger statistical benchmark by calculating the Cohen's Delta change of the sample to the desired population statistic, providing a magnitude of change that would need to be achieved to reach the population statistics.

1.4.5 BERT-Topic

We use the open-source Python library BERTopic to convert the unstructured text of tweets into document clusters for evaluating semantic text similarity [121]. We use this topic modeling algorithm to provide a high-level overview of China's strategic messaging. This library converts text into sentence embeddings using a pre-trained language model. After converting our tweets into sentence embeddings, the library uses methods such as UMAP and HDBSCAN algorithms to reduce data dimensionality and cluster similar documents. Finally, it creates topic clusters using a variant of the Term Frequency-Inverse Document Frequent (TF-IDF) algorithm.

1.4.6 OpenAI GPT 3.5 Turbo

This thesis was written at a time when the world of large-language models feels like the wild west, where practitioners are enabled to use the state-of-the-art tools "fast and loose", so to speak. As such, we heavily leveraged OpenAI's GPT-3.5 large language model for simple tasks such as data labeling, in addition to more complex tasks such as synthetic social media data generation. We discuss tradeoffs and limitations in using this technology in each chapter where it is utilized. GPT 3.5 is a language model developed by OpenAI, designed to generate human-like text based on a given set of instructions or input prompts. GPT models have been been trained on a diverse range

[1] https://www.cmu.edu/casos-center/

of internet text, enabling it to perform a wide-range of language-based tasks but also introducing the noisy variance of un-moderated human language.

1.5 Overview of Thesis Chapters

This thesis aims to identify, characterize, and compare different types of state-sponsored information campaigns, understand the perceived target audience and motives, and further research on how to study state-actor manipulation of the information environment. It was created with a linear, simple sequence in mind.

In Chapter 1, we set the context and background for our follow-on research by making the case that state-sponsored information campaigns require more in-depth study due to the vulnerability internet netizens maintain. Within democratic countries, the threat is increased when social media domains and their access are free and open, enabling bad actors with malintent clear pathways to targeted audiences to promote a strategic agenda. In Chapter 2, we outline the basic components of PRC state-sponsored campaigns, showing how a type of campaign changes over time. Additionally, we compare China and Russia's coordinated narratives over two key events: the Ukraine War and the Pelosi visit to Taiwan. These differences show China's evolving messaging strategies and how it works with a key partner toward different geopolitical events. In Chapter 3, we explore covert elements of campaigns from Chapter 2 to determine the role a covert element plays in an information campaign.

We examine the larger framework of narratives and how they are used in the next two chapters. In Chapter 4, we map China's narratives in Chinese media outlets and Ministry of Foreign Affairs press releases through topic modeling and AI-enabled document labeling to determine how China's narratives have changed amidst its closest ally, Russia's invasion of Ukraine. We examine the geopolitical balancing game that China maintains and how it is leveraging this chaos to reaffirm its own geopolitical importance. In Chapter 5, we dive into a specific set of narratives around Taiwan and examine how China used offline military kinetic activity to reinforce social media narratives outlining its sovereignty demands. Lastly, in Chapter 6, we aggregate our findings across this thesis to design a training scenario for synthetic generation in which an analyst must navigate different types of actors and their narratives amid a changing event landscape to simulate a real-life event to provide an accurate view of the information environment.

Chapter 2

China's Overt Influence Campaigns

"In the eyes of the Westerners, our diplomacy is on the offensive and aggressive, but the truth is, it is them who are on the offensive and aggressive."

–Lu Shaye, China's envoy to France, on Wolf-Warrior Diplomacy [322]

2.1 Introduction

Social media is a critical domain for connecting and promoting ideas and discussion at the international level. China is a relative newcomer to using media with an international audience, passing domestic legislature as recently as 2007 to increase the country's discourse power by creating a Chinese-controlled media platform Xinhua. Xinhua and other similar state media platforms, such as the Chinese Global Television Network (CGTN), can shape narratives about China at the global level [88]. While China's iron-clad censorship policies, such as the Great Firewall to filter and block content internally, are well-known [76] [170], how China shapes international dialogue is less known. Increasingly, Chinese Communist Party (CCP) officials are using Western social media platforms to defend Chinese national interests as part of its continued discourse efforts to shape international opinion. The use of these official accounts is not by themselves unique from any other country's use of social media. However, these accounts are increasingly scrutinized for spreading disinformation and conspiracy theories such as the origins of COVID-19, human rights abuse in Xinjiang, and bot amplification around the 2022 Beijing Olympics [101], [290],[34]. As China continues using social media platforms for messaging international audiences, understanding its overt social media activity may help researchers identify inauthentic activity patterns that are not easily attributable.

2.1.1 Public Diplomacy and Soft Power

Social Media platforms are one part of China's increased *public diplomacy* efforts; the ability for state actors to communicate directly to citizens of other countries to inform and influence[238]. Joseph Nye also coined the term *soft power* as an alternative method to military *hard power* 2-when influence is "getting others to want the outcomes that you 'want' without using payments or threats, typically defined by agenda-setting and attraction [239]. China's use of public diplo-

macy strengthens its soft power strategy as a part of China's national power, on par with military, economic, and political power structures [85].

Ingrid D'Hooghe (2015) broadens the definition of public diplomacy beyond traditional diplomatic engagements to include cultural programs, social media engagement, and education initiatives to promote China's geopolitical goals. However, D'Hooghe identifies China's authoritarian political system as a barrier to building trust with democratic countries [85]. D'Hooghe emphasizes the need for China's public diplomacy to be dynamic and well-coordinated among a diverse range of actors to manage an evolving information environment effectively.

China's Confucius Institutes (CI) exemplify China's constraints in soft power strategies. These programs enjoyed initial success in locating with colleges and universities worldwide as a PRC-underwritten language program designed to export the Chinese language and cultural aspects. A 2017 report by the National Association of Scholars recommended all CI programs be shut down, barring significant oversight reform, citing that the institutes used censorship to influence soft power aims of promoting China's core interests around political history and territorial claims and enforced PRC political ideology including speech codes on US soil. In addition, universities receiving scholarships faced financial incentives to suppress any criticism of the Chinese government [263]. The number of CI programs in the US decreased from more than 100 to less than five by 2023, due to increased scrutiny from the public combined with the threat of loss of funding from the US government. The decline of CI in the US and other Western countries demonstrates China's soft power limitations in democratic societies that may require more transparency and oversight for foreign-entity-controlled academic programs with access to young Americans [203].

Lastly, Manor and Golan (2020) describe the waning importance of soft power as the world shifts from cooperation to competition in which three countries, China, India, and the United States, represent the center of gravity. Manor and Golan stress that countries will form pragmatic alliances based on shared strategic interests over necessarily shared values [195].

2.1.2 Rise and Fall of the Wolf Warrior

During the COVID-19 pandemic, news headlines began following rhetoric from PRC Diplomats and Spokespeople, epitomized by "Wolf Warrior" Diplomacy (WWD), encompassing volatile conspiracy theories and hostile counter-arguments directly against perceived adversaries to defend China's policies. A key example is the 2020 press release by then Ministry Spokesperson Lijian Zhao alleging that COVID-19 may have originated from a US Army lab in Maryland, in response to the US announcing it would reexamine whether the virus escaped from a Chinese research lab [290]. The term was inspired by a nationalistic Chinese film in which China perseveres over foreign aggressors and represents a fundamental shift to assertive engagement characterized by combative and unapologetically aggressive diplomatic tones, particularly against foreign adversaries. This shift away from China's previous diplomatic strategy of "keeping a low profile" in the 1980s under Deng Xiaoping, which emphasized humility and cooperation [352]. Sullivan (2023) suggests a synergy between bottom-up mainland populist sentiment and PRC strategies to distract its citizens from domestic issues [317].

Several factors have contributed to the adoption of Wolf Warrior Diplomacy. Hall (2015) suggests this shift can be seen as China's adaptation of "diplomacy of anger," where emotional displays such as overt anger are used strategically to respond to perceived international slights [124, 125]. Additionally, Loh (2024) ties the rise of assertive diplomacy to organizational and ideological

shifts within China, including Xi Jinping's centralization of power and a surge in nationalism [189]. Xiaolin (2024) additionally adds a personal motive to Wolf Warrior diplomats since China's diplomatic norm remained more orthodox[1]. At the height of the Wolf-Warrior era, although China's diplomats to Germany chose more measured and neutral language, the German perception of their diplomacy was overshadowed by the more conspicuous and confrontational actions of "wolf-warrior" diplomats [327].

The impact of Wolf Warrior Diplomacy has been significant, influencing China's international relations and its image worldwide, but it has likely run its course. Initially, this approach may have rallied domestic support and strengthened the perception of China as a strong, assertive global player. However, studies like those of Mattingly and Sundquist (2023) indicate that such aggressive tactics likely exacerbate international tension versus more traditional forms of diplomacy that focus on cooperation, particularly with Western nations [199]. The adversarial nature of WWD has, at times, led to diplomatic isolation and increased scrutiny of China's motives and actions on the global stage. Brazys, Dukalskis, and Müller (2023) found that after a key 2021 PRC politburo meeting on softening diplomatic rhetoric, China's diplomats softened their political messages, in particular towards Organization for Economic Cooperation and Development (OECD) countries who were prime targets for WWD rhetoric. However, China's key messages did not change[42]. Together, these findings underlined by the disappearance of many top Wolf-Warrior diplomats from the limelight [224, 257] indicate China is reverting to a more subtle tone while still aggressively pursuing its underlying goals.

2.1.3 What about ....

whataboutism, which is much more than just a retort to shut down an argument gone astray on social media. This tactic, which seeks to deflect criticism by highlighting the accuser's inconsistencies or past misdeeds, has been notably utilized in China's diplomatic repertoire, particularly during its era of assertive Wolf-Warrior diplomacy. Whataboutism aims for multiple effects: shift attention, undermine public support within a targeted country, and long-term dissuade other parties from joining with the targeted country by the threat of retaliatory scrutiny [68]. Chow and Levin (2024) detail how effectively whataboutism can erode international alliances, thereby isolating targeted countries and weakening collective actions against a given state using this tactic [68]. Brandt (2022) observes how China and Russia have both used the same themes using whataboutism specifically against the United States, including concern over the death of George Floyd and overall gun violence, US tech censorship to ultimately counter any negative criticism of their policies [41].

Despite its strategic deployment and ability to catch headlines with outrageous claims, the efficacy of whataboutism is not guaranteed and varies significantly with the context of its use. Its success largely depends on the relevance and gravity of the issues it raises [68]. Events that are more recent and severe resonate more with international audiences, potentially turning the critical gaze back onto the accuser. Xia (2023) demonstrates this through an analysis of China's response to Canadian critiques of its treatment of the Uyghurs, where China deflected by spotlighting Canada's historical treatment of Indigenous children. This move attempted to redirect both international criticism and domestic attention in China but reduced the deflection issue of mistreatment of Indigenous children to a sound byte and propaganda deflection technique[348]. Additionally, Tseng (2024) reveals that China's use of whataboutism may be tailored to the diplomatic landscape of each country, as seen in the restraint shown by Chinese diplomats in Germany, suggesting

a precise use of this tactic rather than uniform exploitation [327]. The impact of whataboutism on public opinion and public diplomacy is dependent on the context and relevancy of the argument in addition to the targeted audience. As awareness of this tactic grows and countries better coordinate against this logical fallacy, its effectiveness may diminish within international diplomacy.

2.1.4 China's Digitalized Public Diplomacy

Manor and Huang (2022) describe a more realistic view of the digitalization of public diplomacy, in which countries transitioned from public engagement to the control and management of strategic information flows in online environments [196]. More importantly, Manor stresses that public diplomacy encompasses both soft power represented through engagement and relationship building, versus the more insidious methods of persuasion such as the propagation of conspiracy theories, manipulation, and psychological warfare [196]. We adopt this nuanced definition that digitalized public diplomacy may cover a range of information to disinformation, ultimately to change beliefs and shape opinions.

China's public diplomacy efforts via social media are designed to influence international perceptions and policy agendas, aligning closely with President Xi Jinping's overarching agenda to promote China's narratives. China's diplomatic and government accounts on platforms such as Twitter/X and Facebook have skyrocketed in the last ten years to facilitate its public diplomacy capacity, from almost no presence in 2009 [291] to more than 300 accounts by 2023 [146]. China's use of "Wolf-Warrior" diplomacy frequently defined this embrace of social media by its use of aggressive and, at times, hostile messaging techniques that challenged Western democracies and promoted pro-China narratives [136].

Yuan (2020) links this change in international posturing to Organski's (1958) power transition theory in which there is increased potential for conflict when a rising power challenges an existing dominant power [255, 354]. China's wolf-warrior diplomacy enabled China to counter Western narratives with its own while projecting from a position of confidence, likely born out of negative international perceptions towards China during the COVID-19 pandemic. The origin of China's "undiplomatic diplomacy" may have organic roots because any discussion questioning China's political system and governance is shut down. This type of diplomacy occurred at the beginning of the COVID-19 pandemic when countries questioned China's response and communication strategies around the pandemic [159]. While this type of rhetoric panders to nationalist tendencies to project from a place of strength, this type of rhetoric has consequences and may be challenging to manage, especially if it is personality-driven. Top "Wolf-Warrior" diplomats Zhao Lijian and Qin Gong quietly disappeared from the public view in 2023 [224, 257]. China's online diplomatic messaging likewise has toned its aggressive stance, likely inline with a perceived decrease in critical narratives pointed toward China during COVID19 [159]. We can understand "Wolf-Warrior" diplomacy to be China's immune response to fight back against critical narratives instead of engaging with them.

Overall, China's public opinion has declined broadly under Xi Jinping's presidency, with the strongest declines in the United States, Australia, Japan, South Korea, and Europe [302]. However, Brazil, Mexico, Argentina, Nigeria, Kenya, and South Africa, last surveyed in 2019, had favorable views of China, likely linked to their economic ties related to the Belt Road Initiative. Additionally, Singapore, Malaysia, and Israel had relatively more positive views. This survey linked many key issues responsible for the decline of China's handling and transparency of the COVID-19

pandemic, ongoing human rights violations, its increased military posturing in the South China Sea, perceived unfair trade practices, and the growing perception that China is a dominant global power that will usurp the United States as the leading global superpower [302].

2.1.5 Tactics for inauthentic activity to boost messaging

Inauthentic activity is often comprised of the following: bots, which are accounts controlled by automation; troll farms that use professionalized groups coordinating activity; and puppet accounts that use fictitious personas. These, among others, have been well-documented methods for disseminating information and disinformation by imitating human social media interactions [103, 140, 204, 300]. Bots effectively change public opinion and shift narratives on social media, creating a clear incentive for bad actors to manipulate the information domain [28].

Additionally, bots are effective as an amplification device in spreading and disseminating information campaigns throughout a social network more efficiently than humans [345]. Within the Twitter/X domain, tweets are easily manipulated via the retweeting function, a method easily exploited by bot automation [37]. While Twitter periodically takes down bot networks, especially those associated with state-sponsored activity, bots constantly adapt to circumvent bot detection measures [191]. In short, the modern state actor with few ethical qualms maintains a Swiss army knife of options to shape the discourse of ideas and public opinion through information maneuvers, and tactics waged in the information domain. These tactics might include using any of the inauthentic account types, as mentioned earlier, to shape both narratives and the online communities where those narratives are propagated [26, 31].

2.1.6 To Label or to Not Label

Twitter enacted a labeling policy in 2020 to improve transparency on accounts that it deemed were state-sponsored and state-affiliated media accounts, using editorial independence as one key criterion [55]. This policy, though a step in the right direction, maintained inconsistent labeling to accounts. Our previous paper found that only about 25% of Chinese state-actor accounts were labeled properly [146]. The debate over these labels escalated when Elon Musk bought Twitter in 2022. Twitter labeled the National Public Radio (NPR) account as a state-affiliated media company, which sparked widespread debate on a social media company's ability to determine labels. NPR stated that its decision to discontinue using Twitter was because, by Twitter's definition, NPR received the same label as Chinese or Russia-affiliated media outlets that do not have any editorial independence [107, 163, 276]. This incident underscores the complexities around social media platform moderation, in addition to the potential weaponization of labeling accounts in bad faith. Musk's actions ultimately led to the platform dropping its labeling policy, raising questions about social media platforms' role over the content on their sites.

We contribute to the literature of online influence campaigns by analyzing China's official public diplomacy efforts to understand how inauthentic accounts are being used to amplify state messaging. We map overt campaigns to network structures and analyze how bot accounts are used to inauthentically boost narratives. Through comprehensive network analysis, we analyze the tactics used in the ecosystem boosting PRC accounts, provide new findings on the social network fingerprints for both amplified and amplifier accounts, and shed light on intended targeted audiences, contributing to a deeper understanding of the complex dynamics within overt influence

campaigns. This chapter provides an empirical foundation and theoretical understanding for how the PRC wages overt information campaigns using bot and influencer accounts. Additionally, we use the BEND social cybersecurity framework to understand how China wages information tactics within a campaign. Our key research questions for this chapter are as follows:

- Can we characterize PRC information campaigns on social media using network measurements?
- How does China use information maneuvers within its campaigns?

2.2 Data

Labeled Chinese Accounts

We use an aggregated dataset of over 350 Twitter user handles resultant from past work [144]. Twitter previously used three labels for state-sponsored accounts; China Government Official, China Government Organization, or China State-Affiliated Media. We first added accounts that were already labeled by Twitter, but added any new Diplomatic or Government accounts we found. X (formerly Twitter) stopped labeling *any* state-sponsored activity in 2023[276].

For this thesis, we define Chinese state-sponsored accounts to include any official government accounts and any Chinese media outlets. The latter is due to how the "state exercises control over editorial content through financial resources, direct or indirect political pressures, and/or control over production and distribution"[55]. We label and describe state-sponsored accounts by an individual's name, title, or media name. This labeling process includes accounts representing the Chinese government and other state-sponsored participants within this dataset. All other accounts are anonymized when described for privacy purposes.

Summit on Democracy 2021

We used the X (Formerly Twitter) V1 API to collect the hashtags #WhoDefinesDemocracy and #WhatisDemocracy, resulting in the collection of 7,798 tweets from September 1 - December 31, 2021. The United States hosted an inaugural two-day "Summit on Democracy" event in mid-December 2021 to address democracy-related challenges worldwide, inviting over one hundred countries to participate. In response, Chinese state-sponsored Twitter accounts began a hashtag campaign around this event with anti-US sentiment in addition to messaging for its internal event called "Dialogue on Democracy" on December 2, 2021. China's hashtag campaign around the Summit on Democracy represents a time-constrained influence campaign with extensive state-sponsored support.

Summit on Democracy 2023

We used the X V2 API to collect tweets using the hashtags #DemocracySummit, resulting in the collection of 90,412 tweets from September 1 - December 31, 2021. Our filtered dataset containing only tweets by Chinese accounts and their sphere of influence resulted in 25,512 tweets. The second Democracy Summit hosted by the United States was held on March 28-29, 2023 and overall featured less Chinese state-sponsored activity, but contained a covert element that we assess as PRC-related.

Pelosi's Visit to Taiwan

We collected over 3,000,000 tweets via the X V2 API using the hashtag #Taiwan, over from January 1, 2021 - October 31, 2022. After filtering our data to tweets and retweets relevant to Chinese-flagged and Russian-flagged accounts, our dataset consisted of 25,512 tweets. On August 2, 2022, the United States House Speaker Nancy Pelosi visited Taiwan during a trip to the region. She was the highest-ranking US official to visit the island in 25 years [346]. Pelosi's visit potentially disrupted the US's historical platform of "strategic ambiguity" with such a high-level visit to a country that is not officially recognized. In response, China began a robust messaging campaign warning of consequences to the United States, strongly objecting to any foreign visits or other legitimizing actions towards Taiwan [78]. This dataset also contained a covert element of spammy accounts that we assess as PRC-related. We study this dataset in the next chapter on China's covert information campaigns.

Russian Invasion into Ukraine

We collected 140,498 tweets using the pro-Russian hashtags #abolishNATO, #IstandwithRussia, and #newworldorder from January 17, 2022 to March 7, 2022. This account contained 33 Chinese accounts and provides insight into how China and Russia aligned messaging initially after Russia's invasion into Ukraine.

2.3 Methods

This chapter uses network measures to examine how individual information campaigns are structured and how information diffuses through social media network structures. We analyzed four datasets to examine how the PRC wages public diplomacy and utilizes an amplifier network to boost its social media narratives. The analytic workflow (see Figure 2.1) for this chapter provides both user and network trends within an information campaign by a) labeling Twitter accounts for different groups; bots, state-sponsored accounts, influencer/soft power and all other accounts, b) conducting network analysis to understand network diffusion, agent properties and c) dynamically analyzing the networks to determine how key actors shift or persist, specifically between the Democracy Summits of 2021 versus 2023. Our Twitter/X datasets were converted into meta-networks (network of networks) via the software ORA, in which social media relationships are defined between Twitter users, hashtags, URLS and locations, defined by tweet engagement such as retweeting or liking a tweet and the URLs that are embedded within a given tweet.

- Size: Number of actors within a network
- Density: Metric for denoting how connected a network is, represented by the fraction of edges between agents over all possible connections ratio [336].
- E/I Index: The External/Internal index is a community structure measure representing a node's isolation from an external community conversation with the rest of the network. This measure is calculated by the formula $E - I/E + I$ where E represents external links, and I represents internal links [175].
- In-Degree Centrality: Within a directed network, this represents the number of nodes adjacent *to* a given node [336].

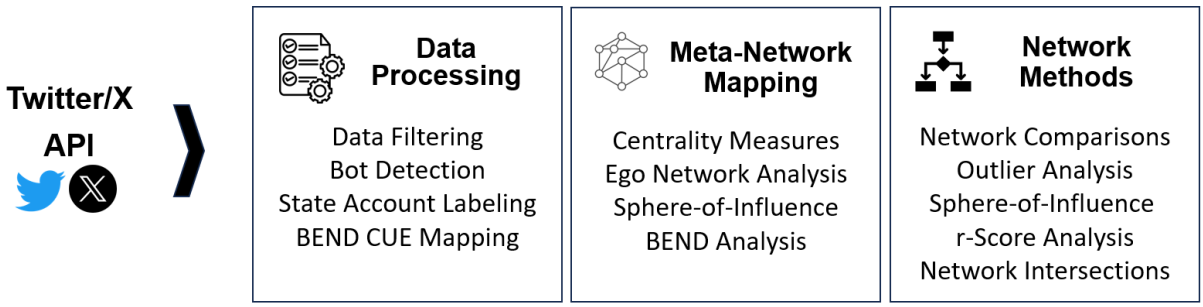


Figure 2.1: Pipeline for mapping network information maneuvers

- Out-Degree Centrality: With a directed network, this represents the number of nodes adjacent *from* a given node [336].

In previous work [144], our initial findings analyzing a small overt campaign around the Democracy Summit indicate a few key factors to expand and investigate. First, *overt campaigns* may be defined as simple centralized information campaigns in which key personnel propagate tweets and amplifiers retweet. For Twitter data, a user with high In-Degree Centrality is generally characterized by a high retweet, reply, and quote frequency. In contrast, users with high Out-Degree Centrality will have tweets, replies, or quotes that other users frequently share.

2.3.1 Finding Key Actors

Finding Key Superspreaders A user with high Out-Degree Centrality will have tweets, replies, or quotes that other users frequently share. Within our labeled state-sponsored accounts, ten accounts were responsible for 50% of all original tweets. This group can be captured by the following in which the out-degree centrality of node v in the network is given by:

$$C_{\text{out}}(v) = \frac{\text{outdeg}(v)}{|V| - 1}$$

where $\text{outdeg}(v)$ is the number of outgoing edges from node v and $|V|$ is the total number of nodes in the network. To identify nodes whose out-degree centrality is two standard deviations above the mean, denoted as $(\mu + \sigma)$, we can use the following equation:

$$N = \{v \mid C_{\text{out}}(v) > (\mu + 2\sigma)\}$$

where v is a node in V, and $C_{\text{out}}(v)$ is the out-degree centrality of node v.

Finding Key Amplifiers A user with high In-Degree Centrality is generally characterized by a high retweet, reply, and quote frequency. Similar to our outliers for out-degree centrality, all six top amplifier accounts were probable bot accounts. We can find these accounts by the following:

Let $G = (V, E)$ be a directed graph, where V is the set of nodes and E is the set of edges. The in-degree centrality of node v in the network is given by:

$$C_{\text{in}}(v) = \frac{\text{indeg}(v)}{|V| - 1}$$

where $\text{indeg}(v)$ is the number of incoming edges to node v and $|V|$ is the total number of nodes in the network. Our information campaign's main information propagators are those nodes whose in-degree centrality is one standard deviation above the mean, denoted as $(\mu + \sigma)$, we can use the following equation:

$$N = \{v \mid C_{\text{in}}(v) > (\mu + 2\sigma)\}$$

where v is a node in V, and $C_{\text{in}}(v)$ is the in-degree centrality of node v.

Finding Key Facilitators We define key facilitators as agents belonging to both in-degree and out-degree centrality outlier sets as defined above. To identify nodes whose in-degree centrality and out-degree centrality are one standard deviation above the mean, denoted as $(\mu + \sigma)$, we can use the following equation:

$$N = \{v \mid C_{\text{in}}(v) > (\mu + 2\sigma) \text{ and } C_{\text{out}}(v) > (\mu + 2\sigma)\}$$

where v is a node in V, $C_{\text{in}}(v)$ is the in-degree centrality of node v, and $C_{\text{out}}(v)$ is the out-degree centrality of node v. The set S contains all the nodes whose out-degree centrality is two standard deviations above the mean.

2.3.2 Network Discovery

Localized Campaigns A given information campaign may represent international reach but may also contain smaller campaigns with a more targeted intended audience. We extracted sub-networks that may represent localized campaigns conducted through China's Consulate offices based on research regarding China's past information operations [145, 162]. By using our known labeled agents from the labeling process, we can find similar unlabeled agents by looking at outliers within our closeness centrality network, which determines the closeness of a node to other nodes within a network. We examine the nodes at least one standard deviation above the mean and explore these accounts manually to determine if they represent other non-Chinese state-actor accounts. We also use the tweet language metadata tags to add tweets if the targeted audience uses a specific language. We extract the sub-meta network of all known state actors and follow-on tweets labeled for a given language.

We examined China's localized campaign strategies to target different populations, primarily through China's diplomatic offices. These campaigns frequently coordinated with local government, news outlets, and community members. While the impact of these campaigns was not measured, we found evidence of China using similar tactics in different countries to disseminate Chinese consulate messages with similar verbiage and rhetoric to local populations. This finding indicates a global strategy with localized sub-components for diffusing messaging at the international and local levels.

Comparison Network Measures We extensively use centrality measures such as in-degree and out-degree within a Twitter metanetwork graph, where nodes represent user accounts and

edges signify agent interactions such as a retweet, like, or mention. We standardize these raw centrality metrics into z-scores to adjust for variations in network size and campaign agent activity levels:

$$Z = \frac{(X - \mu)}{\sigma}$$

where X represents the raw centrality score, μ is the mean, and σ is the standard deviation of centrality scores across the network. Standardization allows for effective comparison of centrality measures across diverse Twitter networks, enhances the ability to detect anomalies to identify nodes with atypical behaviors such as bots or influential actors, and increases sensitivity to subtle differences in data.

2.3.3 Measuring Influence and Narrative Competition

The software ORA-PRO used for most of the network construction and analysis in this thesis provides a Twitter Report, which primarily uses centrality metrics such as betweenness and in-degree across individual input networks to generate top nodes (tweets, agents, hashtags) for key actor functions such as Superspreaders and Superfriends. This report excels in its intuitive translation of how key actors within a network are influential based on a given position within a network, e.g., high betweenness actors facilitate information transfer between different communities within a given network and act as bridging agents.

We created a new influence algorithm to rank accounts on a single score based on user parameters based on our definitions of *reach*, *account engagement*, and *network position*. Our definition of influence relies on the key concepts below of how an agent behaves within a given community, based on its popularity, interactions with other accounts, and ultimately its role within the network. We elaborate more on the definitions, model parameters, and validation process within Appendix 7.4. Ultimately, however, we decided not to use this influence score due to underlying validation issues. We conducted a variance inflation factor (VIF) test to analyze potential multicollinearity issues among predictor variables for a given influence score. We found several concerningly high factors, well over 5, to include our engagement and reach parameters. Due to the high Spearman's correlation overlap of 70% for the top 1% of accounts, we decided to use the more trustworthy "Superspreader" metric within ORA's Twitter report output, which uses node-level measures to rank the top users that generate content that is shared often and hence spreads information effectively.

- Reach: What is an account's ability to reach across a network to propagate influence? We use the number of followers, tweets, and retweets and create a composite measure balancing the audience size and direct engagement activity with a given audience.
- Engagement: How frequently do other accounts engage with a specific account (excluding retweets, which are weighted more heavily in the reach parameter)? Adjusted for the volume of interactions, using a penalty factor that diminishes the effect of mere activity volume, thereby emphasizing quality and engagement depth.
- Network Position: Centrality measurements for a network provide information. We specifically focus on in-degree centrality to capture how often an account is retweeted or amplified, suggesting its influence across the network.

To understand the level of competition in the narrative space, we initially attempted to use hashtags as a proxy for tweet sentiment among top Superspreaders within a dataset. However, state actors had varying use of hashtags that had clear political stances. The same hashtags are frequently used by opposing narrative communities, e.g., #Taiwan or #Ukraine. We added a Stance Detection component from the ORA, which uses a general label propagation algorithm that uses Kumar's (2021) weak supervision to propagate stance values for agents and tweets based on the initial pro/con stance assignment for Agents and Hashtags [177]. For our label propagation, we used the Agent x Agent - All Communication network and Agent x Agent - Retweeted-by networks in addition to the Agent x Tweet- Sender networks.

Lastly, we explored analyzing retweet cascade chains within the datasets and how concepts of tweet virality could be connected to influencers. Information cascades are how information diffuses across a social network, where a cascade traces how a piece of information spreads from one account to another [178]. Within a retweet cascade, a user may post an original tweet that is retweeted either by followers or an unrelated account, which may also be retweeted. We analyzed retweet chain cascades within a test dataset to understand further propagation of tweets by Chinese state actors but ultimately dropped retweet cascade analysis due to the relatively small size of our datasets and the methodology being out of scope for our research questions.

2.4 Results

We conduct a high-level comparison of China's media and government accounts across our four datasets (Figure 2.1). While we annotate in this table whether there was a covert component, our analysis for these unattributed campaigns and their characteristics will be further discussed in the next chapter. We dive deep into the Chinese 2021 campaign countering the US-hosted Democracy Summit, followed by an update on how the 2023 campaign changed. Additionally, we analyze two strategic campaigns: Russia's Invasion of Ukraine and Nancy Pelosi's Visit to Taiwan. We show the asymmetric difference in coordination between Russia and China via a Chinese-interest strategic event such as Pelosi's visit to Taiwan, versus a Russian interest via its ongoing war in Ukraine.

Table 2.1: Chinese Actors across campaigns

Dataset	Chinese Accounts	Tweets/Retweets	% Bots	Covert?
Democracy Summit 2021	137	1,211/21,315	.56	No
Democracy Summit 2023	57	209/4,512	.58	Yes
Pelosi Visit	219	5200/270,601	.55	Yes
Ukraine Invasion	33	77/32,977	.52	No

2.4.1 2021 Democracy Summit

This dataset provided the foundational campaign for understanding China's public diplomacy tactics for a basic information operation, establishing a counter-narrative and a counter-ideology in protest of the United States holding a summit regarding the topic of democracy and, most importantly, not inviting China or other actors that show up in the dataset. Initial analysis revealed that

this campaign was made primarily of retweets, with approximately 85% of all tweets distributed as retweets that forward an original tweet.

Campaign Overview

Our research for the terms #whodefinesdemocracy and #whatisdemocracy points to 2020 15-part Twitter post by a Chinese influencer on "Chinese-style Democracy" and its superiority over western democracy. Prior to November 1, 2021, there were approximately 10 instances of the hashtags, all unrelated to the Democracy Summit. Chinese Diplomat to Lebanon Cao Yi posted five times in October prior to the beginning of the campaign. This migration of viral terms and sentiment from Chinese media to Western and international platforms has been widely documented [301]. The majority or 90% of the campaign occurred within the first two weeks of December before the Democracy Summit. We analyzed the tweet-level language metadata tags, finding 21 different languages represented in this dataset (see Table 2.2). The multilingual tweets indicate language diffusion targeting different populations. However, approximately 83% of our tweets are in English, indicating a clear intent to communicate to western and English-speaking audiences.

Table 2.2: Top Languages and Twitter Actor Ratios in dataset

Language	# Tweets	% Chinese State Accounts	% Tweets by Bots
English	6,520	8.2	56.6
Undetermined	324	13.5	57.1
Chinese	219	2.7	47.5
Spanish	195	18.9	51.7
Arabic	140	21.4	29.3
French	126	17.5	52.4
Russian	94	15.9	42.6

We compared hashtag distributions between types of actors to determine if bots use certain hashtags more than other accounts. There is an extremely high correlation in hashtags used between the three different groups, indicating that bots, state accounts, and all other accounts are promoting the same messaging (see Figure 2.2). The hashtag distributions indicate that Bots and Other accounts use top hashtags at a slightly higher rate than state accounts. This is a byproduct of the retweeting function for this network, where retweets are more likely to have hashtags and original tweets with no hashtags are less likely to be retweeted. By analyzing the top twenty hashtags, we found a perfect correlation in hashtags between Chinese Accounts and "Other" accounts and a .9 correlation between Chinese and Bot accounts. All three groups had the same seven hashtags that are the most widely used with the highest in-degree centrality, indicating this network contains homophilous users that promote similar content.

To better categorize this campaign's themes, we analyzed the top 100 tweets using a two person team to analyze and encode tweets. When included with subsequent retweets, these tweets accounted for nearly 4,865 tweets or approximately 62% of all tweets. By examining the first 20 tweets, we determined three categories of tweets: Pro-China, Anti-US, and general tweets on Democracy. We then re-coded all 100 tweets independently, resulting in an initial Cohen's kappa of .87 for a raw agreement on 94% of tweets, indicating a strong agreement between the graders. We then discussed and jointly labeled the tweets without agreement.

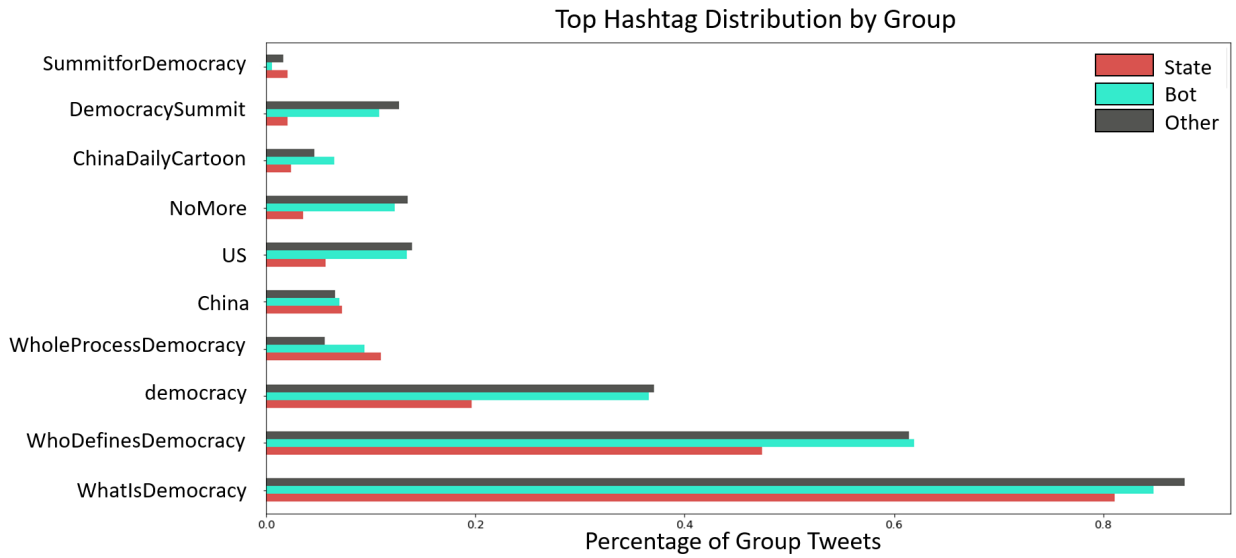


Figure 2.2: Comparison of top Hashtags shared by each group. Bots and Other accounts have higher rates of using top hashtags due to the retweet nature of the network. State accounts create more original tweets, which have slightly less use of top hashtags.

China released an official statement through its Ministry of Foreign Affairs page on the US Summit for Democracy and highlighted three main points listed verbatim below [213].

1. "The US is not a 'beacon of democracy', and the American-style democracy has deviated from the essence of democracy.
2. "A country's path to democracy should be chosen independently by its own people, rather than imposed from outside."
3. "Stoking division and confrontation in the name of democracy is to backpedal in history, and will bring nothing but turmoil and disaster to the world."

These official statements validate our three topic categories. Except for the United States, China does not name any other countries in this campaign, with the exception of hashtags associated with past US conflict zones such as Afghanistan, Iraq, and Syria. China is primarily positioning itself as a foil and prime opposing power to the United States, even within a constrained information campaign. Tweets within this campaign use well-controlled messaging to support critical points the Chinese government seeks to underline.

State-Sponsored Activity and Bot Amplification

An overview of the types of actors and their contributions to the campaign indicates that this campaign was driven primarily by state accounts (see Table 2.3). There are 137 state-sponsored accounts within this network, accounting for only 3% of user accounts but over half of all original tweets. Conversely, bot automation accounted for a smaller subset of original tweets but the majority of retweets. The state accounts also had a high rate of being verified through Twitter. However, we discovered that only 17 accounts were labeled as a China Government Official or Organization, 18 accounts were labeled as state-affiliated media, and the remaining 102 accounts had no Twitter

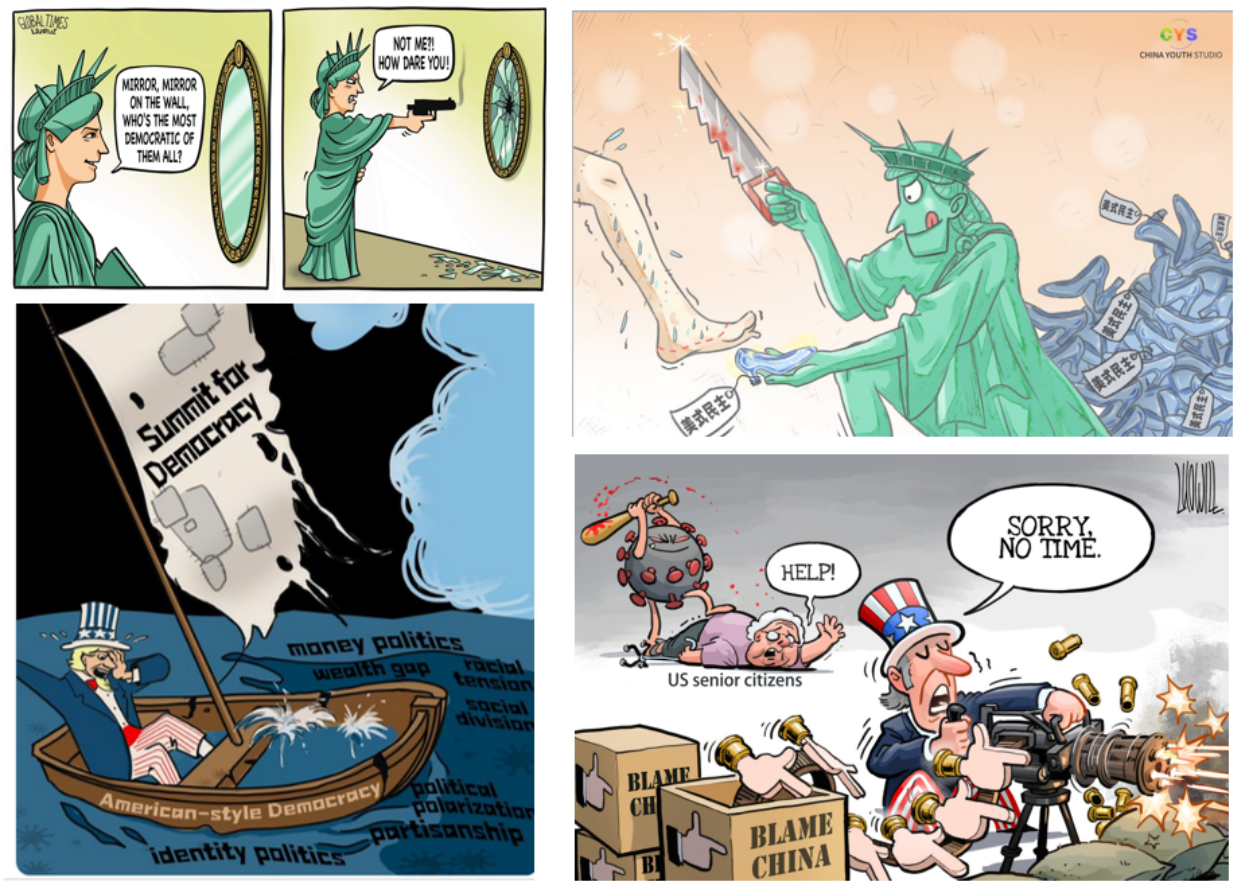


Figure 2.3: Example Cartoons in anti-US tweets. The Anti-US tweet category contained many cartoons and video links, utilizing multi-modal sources of content.

Table 2.3: Twitter Actor description for tweets and retweets. China's state-sponsored accounts account for the majority of original tweets, while Bots are the primary amplification actor for original tweets.

Actor	# Accounts	% Verified Accounts	% Original Tweets	% Retweets
Chinese State-Sponsored	137	64.0	64.7	3.9
Bots Activity	2,037	0	13.6	67.0
Other	1,380	1.3	34.6	34.6

label. These unlabeled accounts contained profiles indicating they were either Chinese Embassy, Ambassador, or other official government position accounts.

Of the 17 government accounts, the Chinese Ambassadors to Cuba, France, Pakistan, India, Canada, the United Kingdom, the United States, and Italy, and international organizations such as the EU, UN, and ASEAN all have labels. Twitter labels the most active and verified accounts, such as China Spokespeople Lijian Zhao, Hua Chunying, and the Ministry of Foreign Affairs accounts. Twitter did not label any diplomatic accounts in African or South American countries, indicating that Twitter's initial labeling methodology focuses on a western audience. For this reason, this paper uses the term "state-sponsored" to cover all state accounts within this dataset, including state-affiliated media sites and both labeled and unlabeled government accounts.

Network Overview A visual inspection of our network shows state-sponsored accounts at the center of Twitter user hubs (see Figure 2.4). This network visualization supports the activity break-down in Table 2.3 pertaining to bot automation accounting for the bulk of retweet activity and indicates that the state-sponsored accounts are the main influential actors within this network. The bot accounts are primarily used to retweet original tweets by state actors as amplifiers.

Bots and State-Sponsored accounts maintain distinct network properties within this campaign. When we separate total degree centrality into in-degree and out-degree centrality, the state-sponsored accounts generally have higher out-degree centrality paired with a lower in-degree centrality. Our dataset is shaped by outliers both for bot accounts and state-sponsored accounts that create long tails within our distributions, such as the top bot account, which has the highest in-degree centrality of all accounts within the dataset. Our bot retweet distribution has a long tail, with 2,268 retweets or one-third of all retweets from Twitter accounts that only retweeted once. This distribution stretches until we hit the outlier accounts for the top two accounts with 70 and 107 retweets. Similar to the bot accounts, a small amount of State-Sponsored accounts make up the bulk of original tweets. Of the 711 original Chinese state-sponsored tweets, approximately 50% are from just ten accounts. Additionally, the top ten "Superspreaders" labeled in Figure 2.4, or accounts with high out-degree centrality, have 5,473 retweets or account for over 70% of all tweets in this network, indicating clear centralized messaging from a small number of accounts.

Difference in Degree Distributions If we examine the distributions for in-degree and out-degree centrality between our Bot, State-Sponsored Accounts, and Other accounts in Figure 2.5, the differences are apparent regarding who is promoting messages and who is receiving and re-amplifying those messages. For out-degree centrality, the state-sponsored accounts have a wider interquartile range than bots and other accounts, with extreme outliers skewing within the fourth quartile. The outlying Twitter account within the "Other" category is a Chinese Youth organization that we will call "Youth Group", which we have now seen a few times both as the creator of one

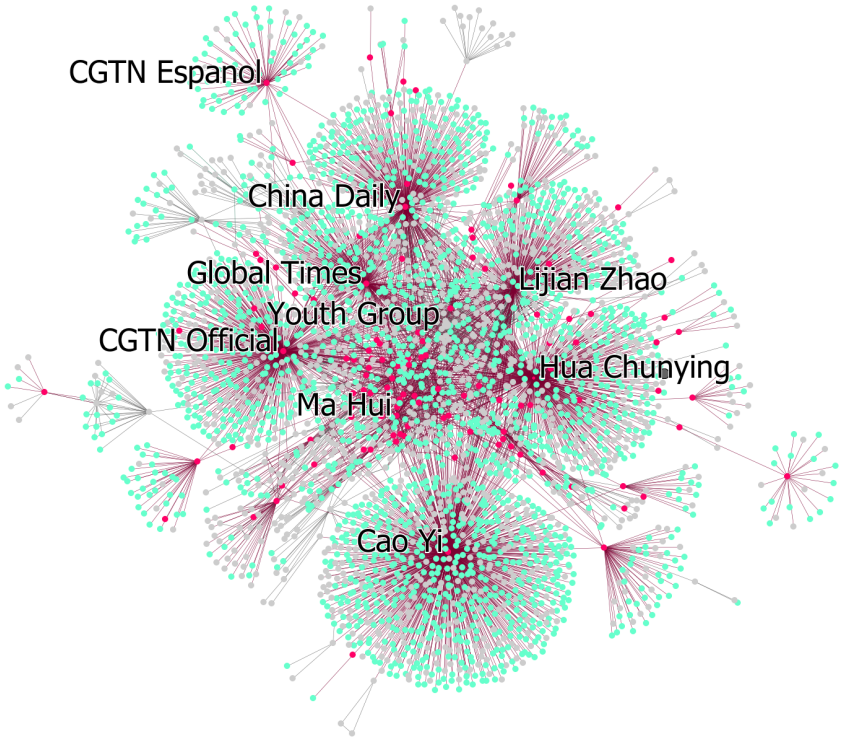


Figure 2.4: Agent x Agent Communication Network of the Twitter users, with the top "Superspreaders" labeled. Red nodes are Chinese state-sponsored accounts, green nodes are bots, and gray nodes are all other nodes. All Superspreaders were state-sponsored accounts except for our "Youth Group" account.

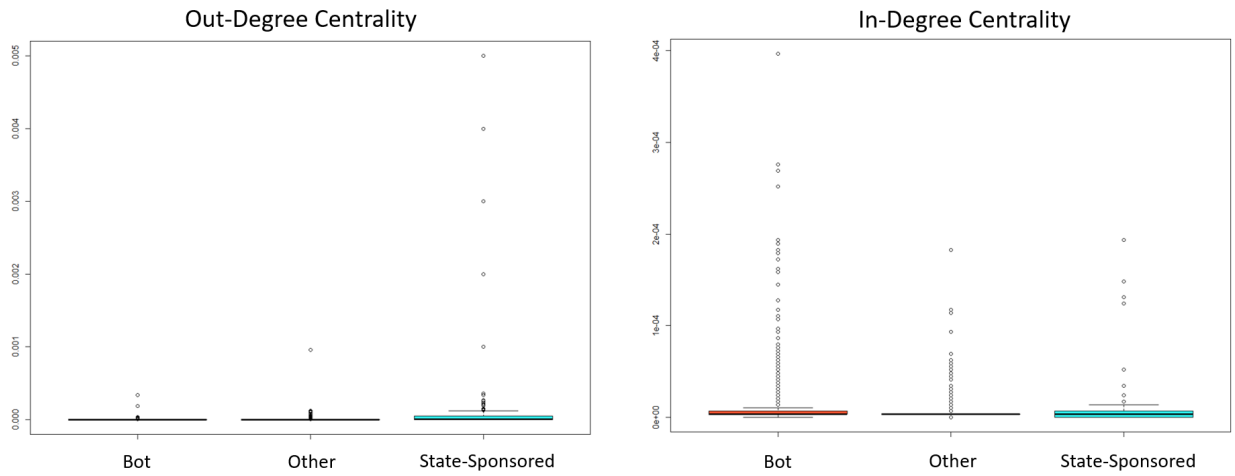


Figure 2.5: In-Degree and Out-Degree distributions for State-Sponsored, Bot and Other accounts using the Agent x Agent Communication Network of the Twitter users.

of the most widely retweeted messages and a Superspreader in Figure 2.4. This account behaves like a state-sponsored account due to its high out-degree centrality and amplification by both bot and other accounts. We see this same trend to a lesser degree regarding in-degree centrality, where bots have many more accounts above the interquartile range than the other two types of accounts, with a significant skew within the last quartile.

Difference in Echo Chamber qualities We conducted a non-parametric Kruskal-Wallis test to determine if the E/I index scores for Bots, State-Sponsored accounts, and all other accounts are from the same distribution or if there is, on average, a difference in scores. We obtained a p-value $<$2.2e-16, indicating a statistically significant conclusion that the average E/I index scores differ across the three groups. By analyzing the plot in Figure 2.6, we can determine that State-Actor accounts have a lower mean value for E/I index scores, indicating that, on average, these accounts participate in communities that are prone to inner dialogue with other group members. Additionally, we can conclude that this information campaign skews towards an echo chamber environment because all groups result in a negative mean E/I value.

Ego Network Properties Due to the high number of outliers within our network, we examine the ego networks for the three different actor types to determine if one group has more ties or shares more alter nodes. We conducted an ego network comparison by creating three ego networks for each actor type using the top ten accounts for each category with the highest number of tweets, representing outliers for both our in-degree centrality and out-degree centrality metrics. Our results in Table 2.4 highlight how the top state-actor accounts had more significant variance in mean connected alter nodes and links, whereas bots had the lowest variance.

By examining the mean ego network where only nodes and links in at least 50% of a group's ego networks are examined, state accounts had the lowest shared nodes, links, and density. Bots shared the most nodes and links, indicating more shared alter nodes. When we examine shared agent nodes within our mean ego networks, we find that our bot ego network has nine State Accounts and one other account "Youth Group". This finding indicates that top bots all primarily amplify the same state-sponsored accounts. For state-sponsored accounts, we see three bot accounts and three state accounts. These Chinese accounts are also part of our Superspreader group

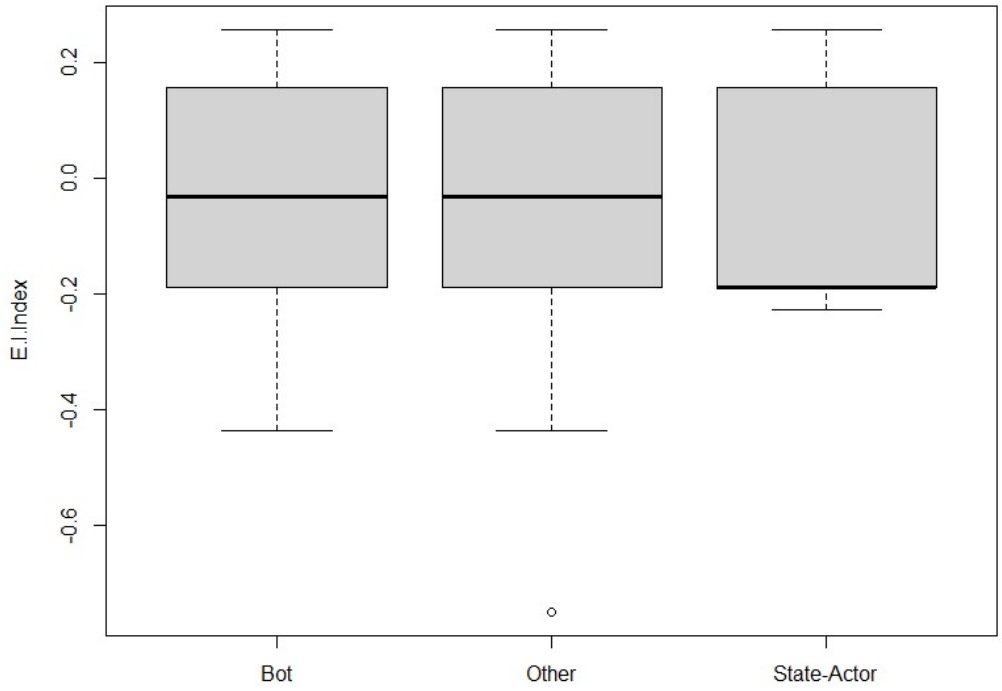


Figure 2.6: Inter-quartile distribution of E/I Index scores across groups

and indicate that even in the top ten State Accounts, the lower-activity accounts amplify the higher-activity accounts. Lastly, our "Other" mean ego network only contained two state-actor accounts, potentially indicating less coordinated activity between the top actors in this group and the campaign itself.

Table 2.4: Ego Network Comparison between Actor Types. Within our mean ego networks, Bots shared the most Chinese state-sponsored alter nodes, indicating the top bot accounts are amplifying the same state-sponsored accounts.

	Ego Network Statistics[1]			Mean Ego Network[2]		
Actor	Nodes	Links	Density	Nodes	Links	Density
State Accounts	594 (713.8)	5,106 (7,065)	.02 (.02)	14	61	.19
Bots	155.5 (43.8)	857 (217.5)	.04 (.01)	45	303	.23
Other	107.4 (134.3)	582.4 (815.4)	.09 (.04)	18	65	.50

[a]Mean (Standard Deviation)
[b]Mean Ego Network contains the nodes and links that occur in at least half of the individual ego networks.

Dynamic Network Analysis We analyzed how key actors within the network shift throughout the campaign. Across the periods, top out-degree centrality accounts are dominated by state-sponsored accounts, indicating that state-sponsored accounts controlled the messaging throughout the campaign. There was considerable consistency in the state-sponsored accounts that maintained a high volume of tweets at least one median above the average for the network across all three peri-

ods, including Cao Yi, Hua Chunying, and the media account Global Times. The one account that is not state-sponsored is "Youth Group", which was active for the first two periods. Additionally, multilingual media accounts such as CGTN Arabic and CGTN Español were active in the second and third periods. This second period also had high out-degree centralities for the consulate accounts to Kenya, Uganda, Cuba, and the United States. Diplomatic accounts were not prominent in the third period except for the Cuban Ambassador, mainly dominated by Chinese media outlets and Spokesperson accounts.

Although top accounts for in-degree centrality are primarily bot accounts, two state-sponsored accounts were in the top in-degree category one standard deviation above the mean; Diplomat Cao Yi and the spokesperson account to the United Nations. Cao Yi's account is also the only state-sponsored account with high in-degree and out-degree centrality measures. This account was the first to begin tweeting before the campaign, indicating that it played a crucial role in maintaining momentum for the campaign's duration.

Who are the "Others" in this network?

The labeling process leaves approximately 40% of accounts as "Other", indicating they are neither a state-sponsored account nor have a bot probability past the .7 threshold (see Table 2.3). This section seeks to characterize this third group within the network responsible for roughly 35% of original tweets and retweets. Due to only 125 accounts in this category contributing to original tweets, we explored this subset to understand the nature of these accounts. We manually annotated the accounts and discovered the tweets fell into approximately three different categories; Pro-China with 132 tweets from 68 accounts, Anti-China with 30 tweets from 20 accounts, and 47 unrelated tweets from 37 accounts. Most of the Anti-China tweets appeared to be from US-based accounts exhibiting right-wing, anti-Chinese rhetoric. The "unrelated" category contained tweets not related to China's campaign. For example, many tweets regarding Myanmar and Nagaland in India were not associated with the Summit on Democracy.

Pro-China accounts were state-sponsored accounts that we did not have in our secondary dataset (mislabeled "Other"), Chinese associations, influencers, and regular Twitter users. The top accounts in the Pro-China group included the aforementioned "Youth Group" and one more student group "Youth Group 2" with 23 and 12 tweets, respectively. There were eight additional accounts that Twitter labeled either a China government organization or Chinese state-affiliated media, two Russian government organization accounts, and one Cuban government account. For individual accounts that could be typically classified as "influencer" accounts, there were 20 accounts by Chinese individuals that typically retweeted many state-sponsored tweets, in addition to about 14 accounts by Twitter users in Ethiopia. This finding may indicate that apart from potential Chinese diaspora Twitter users, a small contingent of users from other countries (particularly in Africa) are also participating.

Localized Information Campaigns

Using the closeness centrality measurement that determines the closeness of a node to other nodes within a network, we examined the nodes that are at least one standard deviation above the mean. This section discloses the non-Chinese state-sponsored activity we found in Table 2.5 along with the interactions between these countries and their Chinese Diplomatic Representatives. Addi-

Table 2.5: Other Countries and local Chinese Activity. China's largest engagement was with Cuban accounts.

Country	No. Accounts	No. Tweets	No. Tweets by Chinese Accounts	No. Retweets for Chinese Tweets
Cuba	11	11	28	129
Uganda	7	8	17	44
Russia	4	2	38	56

tionally, we examine language-specific campaigns with no geographic boundary or government representation.

Uganda: Promoting a Local Symposium on Democracy Uganda represents an interesting example of China taking strategic advantage of another country's weakened ties with the United States to strengthen its ties. It is important to note that the United States did not invite Uganda to the Summit on Democracy. This fact and the adverse reaction from Uganda's Ministry of Foreign Affairs were widely reported in Uganda news outlets [219]. We found tweets advertising a December 10th Democracy Symposium organized by Uganda's Kampala International University and the Uganda Council on Foreign Relations under the theme "Dissecting Western Democracy in Africa," with China providing a keynote speech.

Leading up to Uganda's local symposium on democracy, we see limited amplification of a Chinese state tweet on December 8th, which advertised an article by the Chinese Ambassador to Uganda Zhang Lizhong, stressing the similarities between Uganda and China and the potential for partnerships. This article did not mention the United States by name but mentioned that a "certain country is putting together the so-called Democracy Summit as self-styled leader of democracy" [361]. Of note, the Russian Ambassador to Uganda also retweeted this tweet. We see coordination via retweets and mentions between official Uganda accounts, the Ugandan Kampala University, and Chinese Diplomats to Uganda to promote a joint symposium on democracy while also using anti-US rhetoric (see Figure 2.7).

Cuba: Integrating with local Cuban voices China's Diplomats to Cuba coordinated with Cuban Officials in addition to the organization Cuban Institute of Friendship to prop up a Cuba-facing localized campaign (see Figure 2.8). We found tweets advertising an article the Chinese Ambassador to Cuba wrote within a local Cuban newspaper on China's relationship to Cuba on the subject of democracy. This article mirrored much of the verbiage as the Ambassador to Uganda's article such as the line "...but certain countries call themselves 'democratic leaders' and convene the so-called 'Summit for Democracy' to categorize the countries of the world and label them as 'democratic' and 'undemocratic'."

China's Cuban messaging centers around China's Ambassador to Cuba Ma Hui. The ambassador's tweets and amplification account for approximately 63% of tweets. Within this subnetwork, China's consulate staff use a network of Cuban journalists and local news outlets to promote its messaging. Most other tweets in this network originate from and are amplified by the Cuban Institute of Friendship for the People Asia Pacific Department. China's Global Times news network operates as a bridging agent, providing messaging that both the Ambassador and the Cuban Institute retweet and amplify to the Cuban audience.

Russia: Limited Activity There was limited participation in this dataset from Russia, with only four Russian state-sponsored accounts. There was cooperation to amplify an RT (formerly

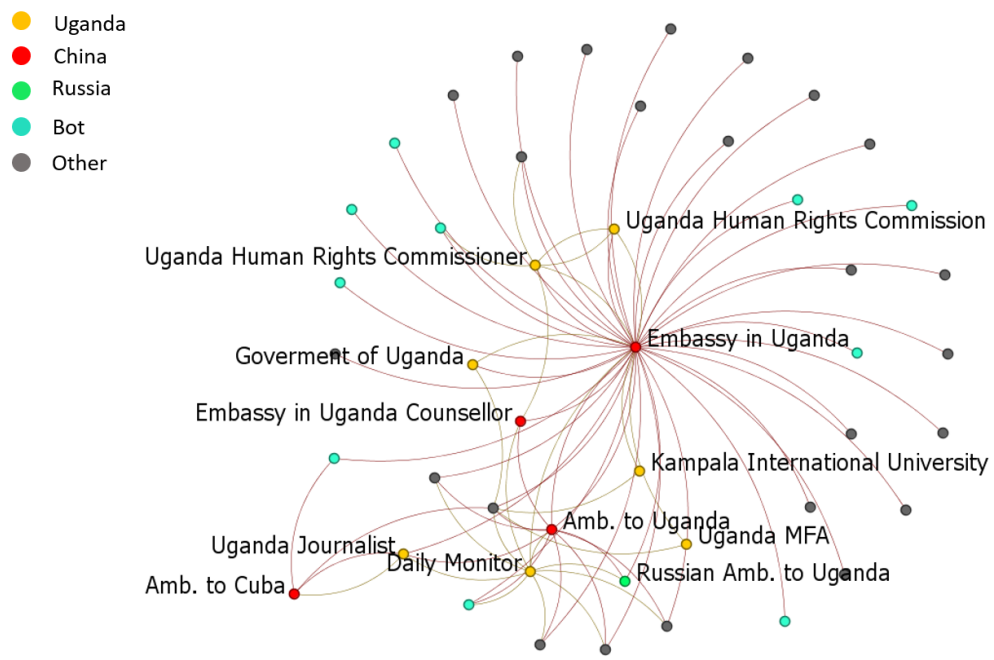


Figure 2.7: Agent x Agent Communication Network of the Twitter users in Uganda's localized campaign. This network represents the coordinating partners to amplify messaging against the US Summit on Democracy and boost Uganda's Symposium on Democracy

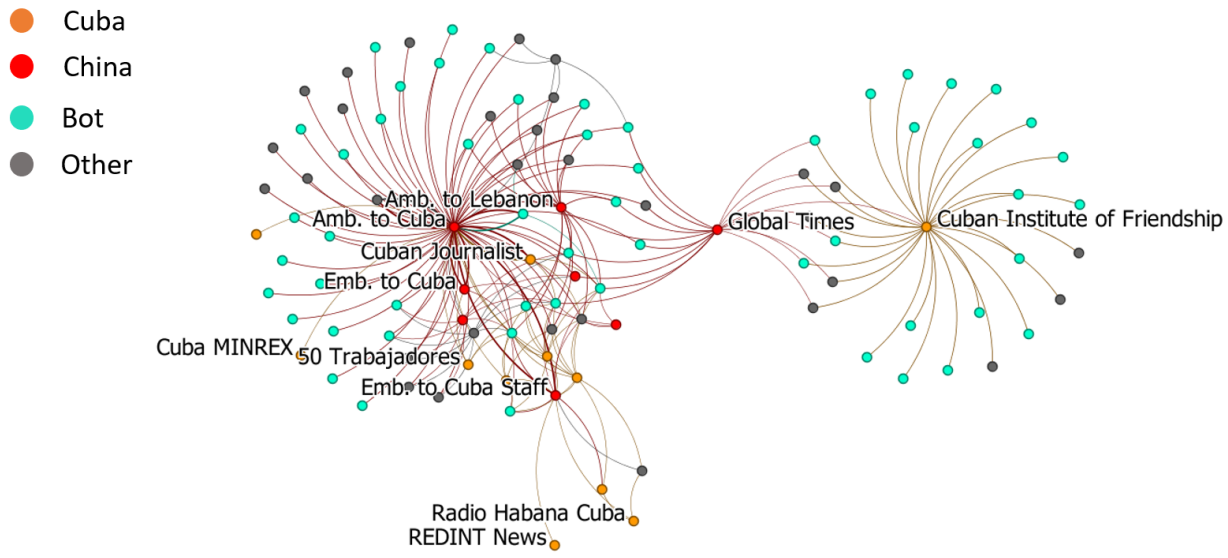


Figure 2.8: Agent x Agent Communication Network of the Twitter users in Cuba's localized campaign. China's Ambassador to Cuba and the Cuban Institute of Freedom were at the centers of gravity, bridged by China's Global Times outlet.

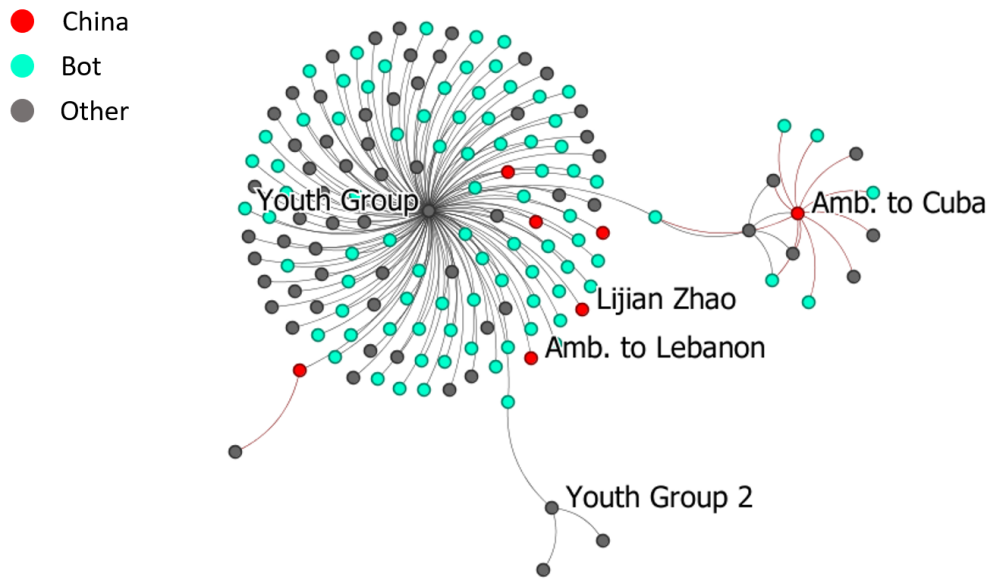


Figure 2.9: Agent x Agent Communication Network of Twitter Users associated with Chinese language tweets. For this campaign, China primarily used one non-state-sponsored account "Youth Group" to create original tweets that are then amplified by bots, state accounts and other accounts.

Russia Today) story on Julian Assange between a Russian Journalist and Chinese state accounts retweeting the story. These tweets used the hashtags #FreeAssangeNOW and #WhatisDemocracy within Russian-language tweets. However, we found no evidence of widespread coordination between Russian and Chinese accounts about a specific localized event. We primarily found all users in this network, including the Russian accounts retweeting CGTN Russia tweets. Russian state accounts appear to be consumers and propagators of Chinese state-affiliated media outlets designed for the Russian audience.

Chinese Language Tweets dominated by non-state-account We examined whether there was different messaging specific to Chinese language speakers, potentially targeting the mainland Chinese diaspora. Our analysis of Chinese-language tweets reveals that approximately 80% are amplifying one specific nonstate-sponsored account that we refer to as "Youth Group" (see Figure 2.9). Our prior sections revealed that this account appears like a state account from a network perspective, due to the amplification of original tweets by both bots and state accounts. This account also uses cartoons that appear to be original content, not taken from other sites like CGTN or Global Times. Another youth group which we call "Youth Group 2" also creates original content with the use of meme-like graphics and state-sponsored video embedded links, but does not have the same scale of amplification as Youth Group. Lastly, the Ambassador to Cuba Ma Hui is also on this network, with Chinese-language tweets amplifying the Cuban Ministry of Foreign Affairs negative statements towards the Summit on Democracy. However, his tweets are not amplified by other state accounts and thus are not likely a key component for messaging to a Chinese audience.

Overall Themes We see some patterns develop in localized campaigns. Chinese ambassadors mirrored official messaging for localized messages to countries. Many Ambassadors used local news outlets, such as Ambassadors to Cuba, Uganda, and Saudi Arabia, to better reach local audiences. Twitter is then used to propagate lengthier Op-Ed pieces by China's Ambassadors. Ad-

ditionally, including local influencers through interviews, symposiums, and discussions highlights China's inclusiveness towards these countries while still promoting Anti-US rhetoric. Chinese-language tweets are an outlier in localized messaging, where one nonstate-sponsored account generates most tweets that are amplified. State accounts also amplify this account, potentially indicating some control or endorsement over the messaging.

2.4.2 2023 Democracy Summit

The United States held its second inaugural Summit on Democracy on July 23, 2023. We initially extracted only the PRC government accounts and all Twitter activity related to these accounts; a sphere of influence extraction. We noticed that a small network of what we call "Soft Power" or influencer accounts associated primarily to pro-Beijing organizations that provided a key facilitation role in addition to overlap with Russian government accounts. Figure 2.12 shows a side-by-side comparison of the 2021 and 2023 campaigns. The 2021 network was dominated by Chinese messaging. We see the following changes by 2023:

1. Decrease in overall PRC messaging, less centralized messaging
2. Academic and Organizational content, less propaganda cartoons
3. No discernible hashtag campaign
4. Increase in Soft Power influencer engagements and outreach
5. Significant decrease in Chinese messaging
6. Overall limited engagement between Russian and Chinese messaging
7. Addition of a covert element of bot accounts

China's efforts around the 2023 Summit are similar to the 2021 campaign; to propagate messaging that the United States hosted Summit on Democracy is a farce due to its hypocritical stance and inconsistent policies. China significantly decreased efforts across its diplomatic and media staff for countering the US Summit on Democracy between 2021 and 2023. Figure 2.10 shows top tweets within this campaign from both a "Soft Power" organization such as the *Friends of Socialist China* and more typical accounts such as the state-sponsored *SpokespersonCHN* account

Hashtag Use China has refrained from using catchy hashtags for its counter-messages, instead opting for descriptive hashtags. China's top five hashtags used were #democracy, #US, #China, #breaking, and #MediaUnlocked. The last hashtag is an enduring hashtag campaign instigated by *China Daily* to combat what it perceives as Western disinformation, prompted by the BBC's news coverage of human rights issues in Xinjiang [359]. This pattern was similar to Russia's top hashtags within its sphere-of-influence network around the 2023 Democracy Summit, which centered around Russian Ministry of Foreign Affairs press releases: #SummitForDemocracy, #democracy, #Patrushev, #Zakharova, and #US. We discuss the covert network of bots for the Democracy Summit 2023 dataset within Chapter 3.3.5. Of note, we did not find any "catchy" hashtags in that dataset either, which primarily relied on algorithmic engagement between bot accounts to promote fake news articles about the Democracy Summit and the United States.

Role of Influencers China utilized more informal networks of organizations to create digital counter-summits in response. We use the label "Soft Power" influencers to define public-facing entities or organizations that maintain large followings and thus have the potential for large impact. We found a small network of international journalists and activists involved with *Friends of*

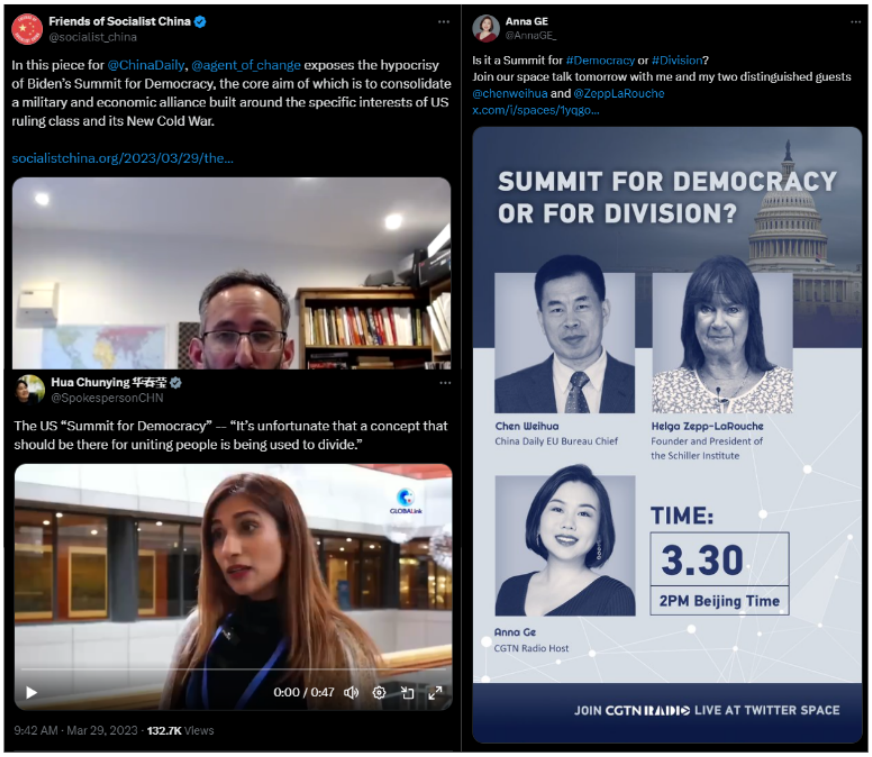


Figure 2.10: 2023 Democracy Summit top tweets within PRC Sphere of Influence network. This campaign heavily leveraged video content featuring academics and members of the "Soft Power" organization *Friends of Socialist China*, which sponsored a counter summit event.

Socialist China (FSC), self-described as " a platform based on supporting the People's Republic of China and promoting understanding of Chinese socialism" [244]. Within this subnetwork of the 2023 Democracy Summit data, FSC organized a counter-summit for Democracy on April 2. The FSC website indicates that it maintains a board of advisors, many of whom are linked to the Chinese government. Additionally, the organization's website posts content directly from PRC government websites such as the Ministry of Foreign Affairs.

Superspreaders The PRC 2021 Democracy Summit metanetwork contained a total of 11,558 nodes(agents, hashtags, tweets and URLs), with 137 Chinese government/media accounts. These accounts generated 1,211 original tweets that were then amplified in 21,315 retweets. In comparison, the Russian metanetwork contained an overall 1,152 nodes with 27 Russian accounts, creating 72 original tweets that were amplified in 2,472 retweets. In the 2023 campaign, we found 57 Chinese accounts with 209 original tweets amplified to 4,512 retweets. This network had a bot ratio similar to the previous campaign. However, we also found evidence of a likely covert campaign sponsored by the PRC that was distinct and isolated from official accounts, which we cover in Chapter 2.6.

Figure 2.11 shows the decrease in high out-degree centrality Chinese state accounts between the 2021 and 2023 Democracy Summit, demonstrating a decline in Chinese state accounts that were heavily amplified. Additionally, Bots did not play as much of a role in amplification for the later campaign. However, "Soft Power" accounts had a large role in both being amplified (out-degree centrality) as well as amplifying (in-degree centrality). Likewise, accounts labeled as "Other" in addition to Soft Power accounts were key in propagating narratives in the 2023 campaign, representing more of a grass-roots appearing campaign versus the centralized messaging from the first 2021 campaign. The top "Soft Power" accounts that were most active in this network were affiliated with FSC and helped amplify the digital counter summit panel that the group hosted with participation and amplification from Chinese state accounts.

A few superspreaders from the first campaign have disappeared, primarily Zhao Lijian or *zlj517*, the notorious frontrunner for China's past use of "Wolf-Warrior" diplomacy [258]. China's key superspreader accounts such as Foreign Ministry Spokesperson Hua Chunying (*SpokespersonCHN*), Global Times News, CGTN, Chinal Daily, and XHNews remain top propagators of information within both summit campaigns. Within the 2023 dataset, 8 out of the top 20 accounts (one standard deviation over the mean for in-degree centrality) were either direct "Soft Power" accounts or journalists and activists involved in promoting the *Friends of Socialist China* digital counter summit.

Russia-China Campaign Overlap We analyzed both China and Russia's sphere of influence networks and their intersections to determine the amount of overlap in tweets and actors. We found 33 Russian accounts in 2023, which created 75 tweets that were amplified in 2,641 retweets. The actors within this Russian sub-network were 65% bots versus the 58% for the Chinese network. Russia's activity is similar to the 2021 dataset, in which we found Russian accounts with 77 original tweets amplified in 1,156 retweets. The 2023 Russian network remained a similar size to the preceding campaign, containing 33 Russian accounts that created 75 original tweets amplified in 2,641 tweets.

We created intersection networks between the Russian and Chinese sphere of influence networks for 2021 and 2023. Overall, we found fewer common actors, tweets, and shared bots amplifying both networks 2.12. In 2021, there were 266 agents, 22 hashtags, 130 tweets, and 9 URLs within both sphere of influence networks. By 2023, the intersection between networks had de-

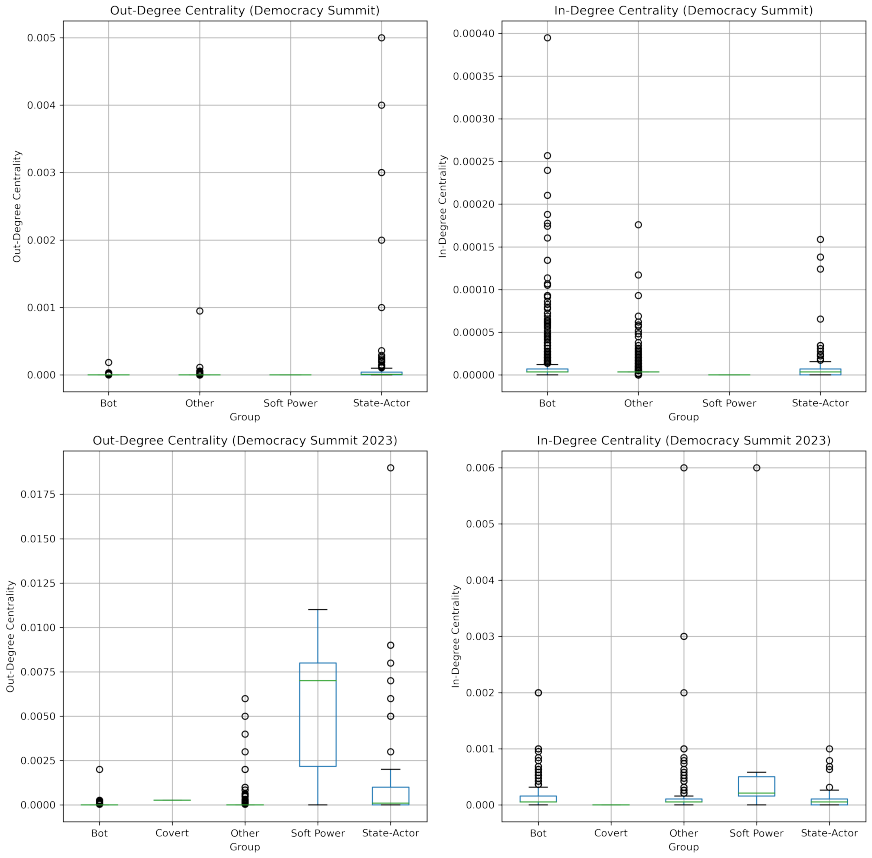


Figure 2.11: Centrality Measures for Actor Groups across the 2021 and 2023 Democracy Summits

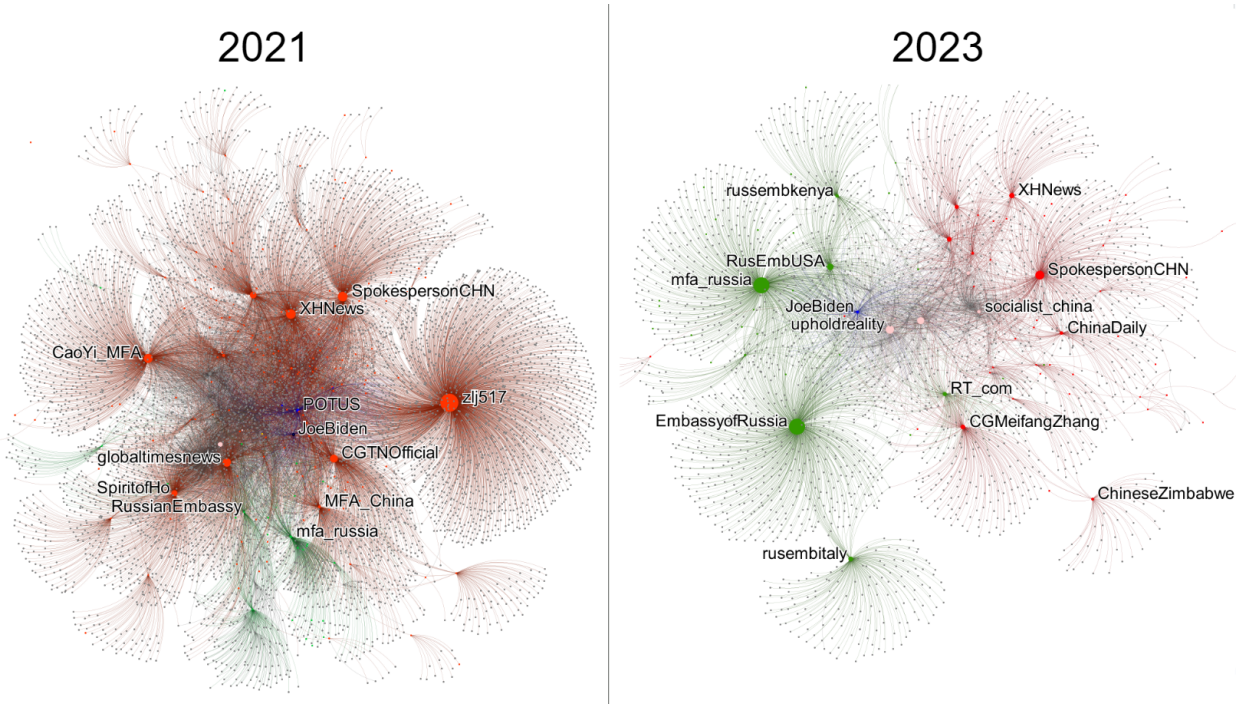


Figure 2.12: Comparison of 2021 and 2023 Democracy Summit networks: Agent x Agent Communication 1-Step Sphere of Influence Network for Russian (Green), Chinese government and media accounts (Red) and Soft Power Influencer (Pink) groups, sized by Out-Degree Centrality, a centrality measure used for message amplification.

creased to 94 agents, 3 hashtags, 1 tweet and 3 URL links in common. These findings indicate that while certain influencers and Soft Power accounts are connected to both PRC and Russian campaigns, overall, China and Russia did not coordinate messaging or amplify state-sponsored media for 2023.

Democracy Summit Social Security Maneuvers We see a similar BEND distribution for the average likelihood of a BEND maneuver given an authored document (see Figure 2.13). The *Enhance* and *Engage* maneuvers were highest, followed by *Neglect* and *Back*. There was a decrease in *Dismiss*, *Distract* and *Dismay* maneuvers. Due to the smaller amount of messaging and reliance on more video content, it is likely that the campaign is perceived as less negative.

2.4.3 Taiwan and Ukraine Information Campaigns

We include these campaigns primarily for their strategic placement for Russia and China respectively. Former House Speaker Nancy Pelosi's visit to Taiwan in August 2022 crossed a red line for China's outward foreign policy, specifically its claims around Taiwan and sensitivity towards any actions it deems legitimizing for the small island. We cover the covert element of this campaign within Chapter 2.6 and the link between online narratives (around this campaign) and kinetic activity within Chapter 4.5.

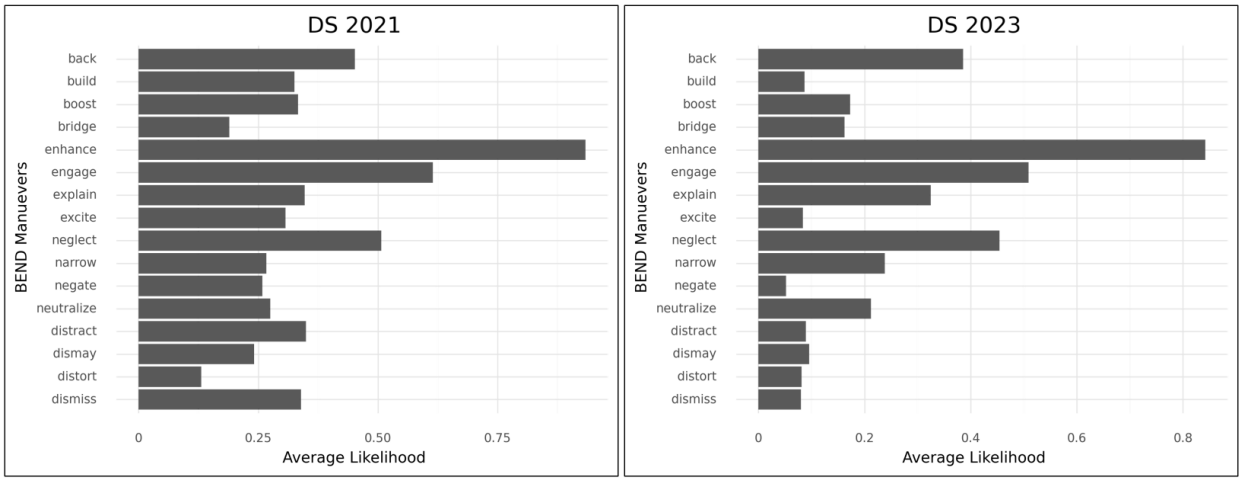


Figure 2.13: BEND Maneuvers for Chinese, Bot, and Other Actors across the 2021 and 2023 Democracy Summit

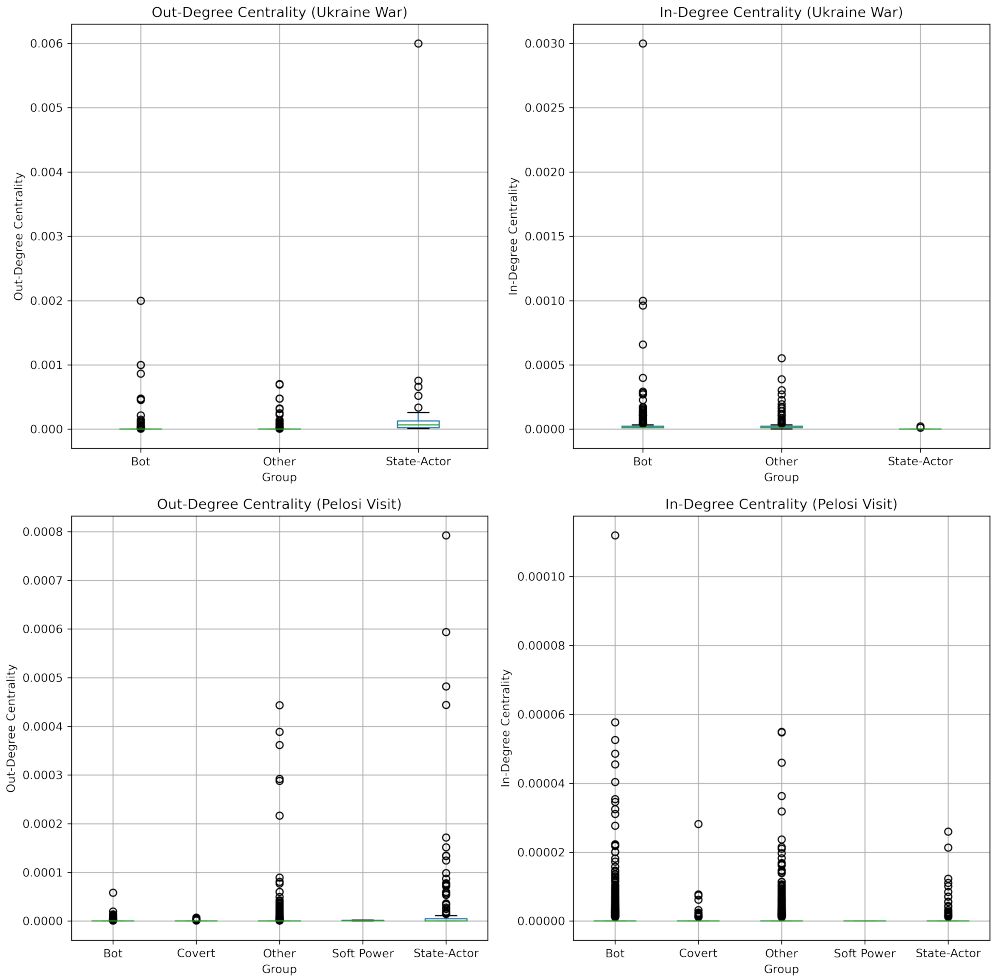


Figure 2.14: Centrality Measures for Actor Groups across Russia's invasion into Ukraine (Top) and Nancy Pelosi's visit to Taiwan (Bottom)

2.4.4 Russia's Invasion into Ukraine

On February 24, 2022, Russia invaded the Donbas region of Ukraine. This conflict is still ongoing as of the publication of this thesis. We analyze social media leading up to weeks prior to and after Russia's invasion into Ukraine to understand China's messaging around the event, and any potential collaboration between Russia and China. China's Sphere-of-Influence network was very small within this dataset, consisting of 33 accounts that created 77 tweets with a resulting 33,000 retweets. While this is a very small subset of both China and Russia's discourse initially after the invasion, it provides key insights into how the countries shared the same narratives.

Whataboutism during the invasion Figure 2.15 shows China's top tweets in the week after the Russia's invasion, which highlighted past US and NATO military conflict instead of actively covering the emerging invasion. Wolf Warrior Diplomat Lijian Zhao tweeted "Never forget who's the real threat to the world" on February 23, one day after the invasion. Russian media accounts then retweeted and amplified this tweet. This narrative demonstrates both China and Russia's use of *whataboutism* in influence operations, in which a narrative deflects attention towards another actor's aggression to legitimize itself or deligitmize critics [36]. Nweke (2022) discusses how these shallow deflections of whataboutism were ineffective in swaying international opinion due to the perceived lack of justification for Russia's unilateral invasion [237]. China's coverage of Ukraine maintained a few key characteristics. Its tweets refer to the conflict as the "Ukraine" crisis and "Russian military operations", carefully segmenting Russia's involvement from the conflict and instead focusing on the following:

- The United States is the world's biggest threat [65] [66]
- NATO is a threat and destabilizes the region with Cold-War bloc actions [363] [70] [12]
- China disapproves of the use of sanctions to solve problems outside of the UN's legal framework [11]
- Ukraine is propagating disinformation [51]
- Reiterating China's support to Russia [57]

The last narrative on the China-Russia relationship was not heavily amplified in this dataset, with only one tweet amplified 60 times. Of note, there were no Chinese state-sponsored or affiliated account messages on Russia's claims of Nazism in Ukraine.

Centrality Measures Figure 2.14 demonstrates very few Superspreaders with extremely high out-degree centrality and almost no engagement from government accounts to self-amplify the narratives. For this campaign, primarily media outlets such as CGTN and Global Times were the primary directly amplified accounts. This points to potentially some disinterest by the Chinese government regarding this information campaign and no efforts by the Chinese accounts to amplify Russian messaging. The amplification in this instance was one-way for this dataset in which Russian accounts amplify China's messaging about the event. Of note, the one Chinese accounts with the highest page-rank centrality, spread iteratively and more organically was a CGTN journalist account who does not claim state-media affiliation. He was also the only state account to use the hashtag #abolishnato and had high amplification by virtue of a more aggressive stance in his messaging than other state accounts.

BEND Manuevers used in Ukraine Figure 2.16 shows agent BEND distributions based on document authorship per actor. The BEND maneuvers for the Chinese and Russian sphere-of-influence networks are very similar, with both networks heavily using *enhance* and *neglect* maneu-

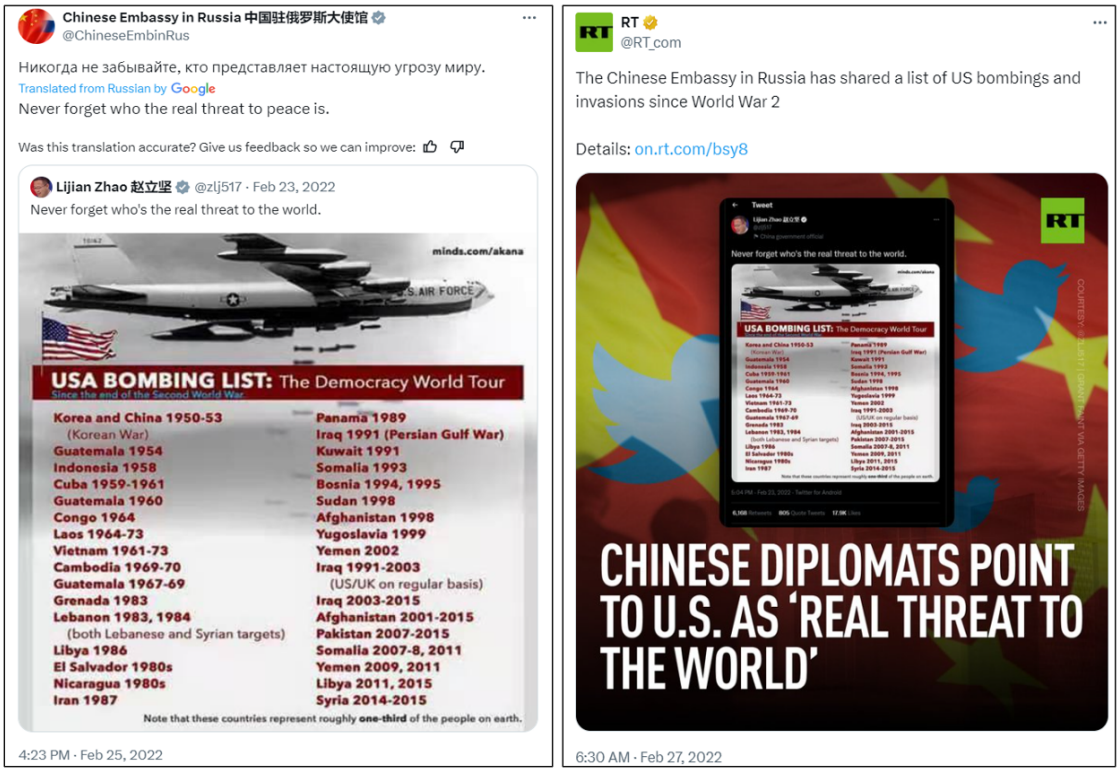


Figure 2.15: China's most propagated tweet and Russian amplification the day after Russia's invasion into Ukraine. This narrative shows heavy use of *whataboutism* influence techniques to dismiss Russia's actions and instead criticize past US conflict. This example shows China's Ambassador to Russia targeting a Russian audience. The original tweet by Lijian Zhao was then amplified by Russian media two days later as a counter-narrative to coverage on the war in Ukraine.

vers. The Russian network appears to use more negative maneuvers such as *neutralize* and *distract*, indicating Russia focused on both community and narrative attacks towards perceived adversaries, i.e. the West, US and NATO after its invasion into Ukraine.

China's top *Enhance* captured whataboutism with both NATO and the US over the past year [363] . From a BEND standpoint, these types of tweets seek to change the topic and agenda-set what the discussion should be about. In this case, China seeks to shift the conversation to topics about the United States and its past conflicts. By shifting the frame of the narratives, China seeks to downplay Russia's ongoing war in Ukraine.

China targeted Ukraine in its top propagated *Neglect* maneuvers with a tweet such as the following: "Kyiv has refused to open the humanitarian corridors proposed by Russia, TASS has reported, citing Russian Deputy Prime Minister Iryna Vereshchuk [12]." This tweet quotes Russian media in framing Ukraine's decision as a block on a humanitarian effort solution. Specifically, Russia's humanitarian corridor would evacuate Ukrainian citizens to Belarus and Russia. Another top *Neglect* maneuver tweet quotes US Political Scientist John Mearsheimer: "Words by John Mearsheimer in 2015. Remember #MonroeDoctrine & #Cuba missile crisis? Russia will never allow #Ukraine to be part of #NATO [57]." This framing seeks to project the US doctrine governing the western hemisphere as an equivalent to the buffer zone that Russia seeks to enact against NATO.

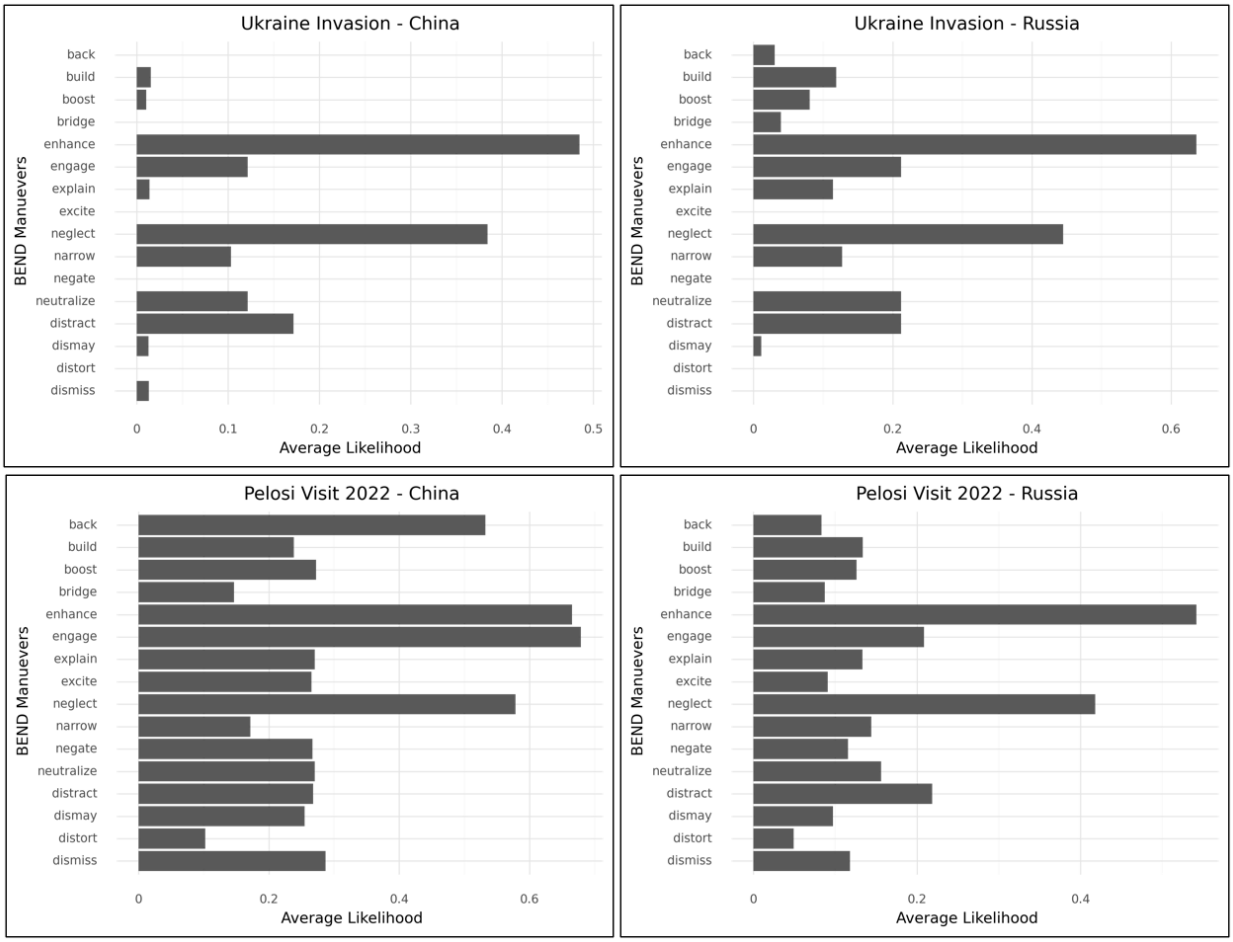


Figure 2.16: BEND Maneuvers for Chinese, Bot, and Other Actors across the Ukraine and Taiwan datasets.

2.4.5 Pelosi's Visit to Taiwan

China's online reaction to former House Speaker Nancy Pelosi's visit to Taiwan in 2022 was dramatic to say the least. Chapter 4.5 discusses this campaign in more detail, highlighting the statistical relationship that the volume of messaging has related to China's kinetic military activity across the Taiwan Strait. This chapter finds key themes in messaging, particularly around China's military countermeasures, foreign interference via the United States, the One China Principle, Taiwan denigration, and ad hominem attacks against Nancy Pelosi.

Over a two-week period before and after the visit, we see 224 Chinese accounts and 24 Russian accounts launch an active information campaign decrying the visit. The PRC accounts generated over 5,000 tweets within this span, which were then amplified into over 270,000 retweets. This campaign maintained an "all hands on deck" approach with the sheer number of accounts participating, signaling a strategic importance to the event. We see Russian mirroring of China's strategic messaging in Figure 2.17, using hashtags such as #ThereisOnlyOneChina and #WeStandWithChina. China's main narrative during this campaign was that China has many more military resources than Taiwan and could take the island by force if it wanted.

Centrality Measures Figure 2.14 (bottom) plots show amplifiers and amplified degree centrality distributions for the China's activity around the Pelosi visit. We can see from the left figure that state-actors were a significant amount of the amplified accounts, with a lesser degree Other accounts. The covert element of this chapter which we will discuss in the next chapter had comparably almost no amplification. China's top five Superspreader accounts were CGMeifang Zhang, Globaltimes, ChinaDaily, SPokespersonCHN (Hua Chunying), and libijian2 (Li Bijian). The amplified accounts were dominated by bot amplification followed by Other accounts. Other state-actor accounts had a sizeable amount of activity in boosting state actor superspreader accounts. Of note, CG Meifang Zhang was a top superspreader in Russia's subsequent sphere-of-influence network, along with Russian state-actor accounts George Galloway, SputnikMundo, SputnikInt, and sputnik_brasil.

BEND Maneuvers used in the Pelosi Visit Phillips et al. (2023) found that China used targeted strategies to neutralize specific threats and dismiss broader criticisms, reflecting China's strategic use of social media to influence international opinion and advance its diplomatic goals [265]. Within the Pelosi campaign, Chinese actors were defined by using *enhance*, *engage*, *back*, and *neglect maneuvers*. China's narrative maneuvers used in this campaign aimed to shape the discussion and conversation around the Pelosi visit to promote China's concerns.

Top *Enhance* maneuvers in this campaign focused on promoting softer aspects on China's reuinification desires, such as the intersection between Taiwanese and Chinese culture. The top engage tweet by Spokesperson Hua Chunying discussed the shanxi noodle and shandong dumpling restaurants in Taipei, noting that Taiwanese palates don't lie about the truth that Taiwan is a part of China [69]. China leveraged a viewpoint that they thought would hold more weight with a US audience in using the top *Back* maneuver tweet propagated. This particular tweet quoted the former US Ambassador to China Max Baucus, who said that the Pelosi visit was reckless [29].

The top left tweet in Figure 2.17 shows the top propagated *Engage* maneuver, designed to discuss the military drills launched during and after Nancy Pelosi's visit. These tweets had the dual purpose of intimidating Taiwan and reinforcing to the international audience that China will use military force to protect its interests. This was also the maneuver that we see Russia also mirroring, focusing on China's superior military capabilities and the futility of any type of Taiwan



Figure 2.17: Top tweets from Chinese and Russian news and government outlets around Pelosi's visit to Taiwan, used in *Engage* BEND maneuvers. Russia mirrored China's messaging on military capabilities, reaffirming its partnership with China.

resistance.

Lastly, China's use of *Neglect* maneuvers aimed to isolate Taiwan from any perceived allies. Top tweets in this category sought to warn potential allies that their efforts will be in vain [206] or reaffirming the UN's support of the one-China Principle via a quote from the Secretary-General [0]. These types of tweets seem to minimize any perceived allies that Taiwan may have, especially in quoting the United Nations, which China will defer to when it is convenient. We will discuss the times when it isn't convenient for China to accept the United Nations feedback in Chapter 4 when we discuss the 2016 UN Tribunal outcome with the Philippines in 4.3.6.

2.4.6 Comparison of All Campaigns: Network Overlap and Influence in the Narrative Space

In this section, we made a high-level comparison of China's media and government accounts across the four complete datasets before further data filtering to better understand where China's government accounts fall in the larger scheme of an information environment. Figure 2.18 shows the overlap or intersection between the Chinese and Russian sphere-of-influence networks. We can see modest overlap, particularly with agents and tweets, in the Democracy Summits. We see a significant intersection in agents for the Pelosi/Taiwan campaign, with seven Chinese state-actor

accounts and three Russian state-actor accounts. Out of the 942 intersecting agents, 76% of these agents are predicted bot accounts, indicating the heavy use of bots to amplify common narratives between the two countries. The intersection for the Ukraine conflict was much smaller, likely due to our small data sample. Out of 79 common agents, there was 1 Russian and 1 Chinese state account with 62% amplifier bot accounts. The overlap of these networks varies across campaigns, reflecting strategic alignments and as well as divergences in state-actor behaviors and bot deployments.

To evaluate China's digital influence during major geopolitical events, we analyzed the full API data queries encompassing entire narrative communities and not only the Chinese sphere-of-influence accounts ecosystem that we extensively analyzed throughout this chapter. This comprehensive approach provides insights into how China's information strategies measure up against other key actors within the same datasets. Our analysis reveals interesting trends in China's influence operations. Over time, we observe a strategic shift from broad, high-volume tactics to more streamlined and targeted approaches. However, these efforts often fail to achieve the influence peaks seen in other accounts with opposing narratives (Taiwan and the US). The role of bots and covert accounts in these operations highlights a continued reliance on amplification over meaningful engagement, suggesting an emphasis on controlling the narrative landscape rather than fostering genuine interaction.

2021 Democracy Summit During the 2021 Democracy Summit, Chinese government accounts were the primary amplified accounts, with a peak in-degree centrality value of 0.005 in addition to the highest mean value, suggesting that their content was heavily retweeted or shared (see Table 2.7). We found a few Chinese student groups that were proxy organizations likely closely linked to the Chinese government that were amplified by the same bot networks as the state-sponsored accounts. This was an example of a non-state account that behaved as a part of the more formal messaging platform. These original cartoons were disseminated the same way as those propagated by CGTN and Global Times. Alternatively, bots were the booster method for this campaign, with a higher in-degree centrality peaking at 0.000174, indicating a significant role as amplifiers of content that actively disseminate information.

Chinese state actor's pivotal role was reflected in their high Superspreader with a peak value of .993, although with a lower mean value of .04 reinforcing what we know about the few influential accounts that we have studied (see Table 2.8). Despite many participating accounts, the influence was concentrated in a few, leading to a high skewness of 28.72 among "Other" accounts. This indicates that while many accounts participated, only a few wielded substantial influence. Bots were primarily used as amplifiers with a narrow influence Superspreader range (0.000 - 0.374) and almost negligible engagement rates, emphasizing their role in disseminating information.

This chapter has already extensively analyzed the hashtag narratives used in 2021, such as #WhatIsDemocracy and #whodefinesdemocracy. Figure 2.19 demonstrates the substantial overlap in pro-Chinese hashtags between the Chinese government and bot accounts. Within the largest narrative ecosystem for the top influencers of each account type, we see minimal hashtag usage from US accounts and domination of maximum influence scores by Chinese accounts, indicating a measurable effect this campaign had on the information sphere in potentially flooding out more pro-US rhetoric. However, stance detection using label propagation through both labeled accounts and hashtags associated with the US or China shows that, overall, this dataset for clear label delineations skewed much more toward US-leaning stances for the overall dataset with a ratio of 1 to 4 accounts 2.9. These stance findings better show that although anti-US sentiment may be pervasive,

this stance was not the majority of the discourse within the narrative space.

2023 Democracy Summit

By the 2023 Summit, the dynamics shifted, with soft power influencer accounts emerging as key players in disseminating and amplifying content within China's sphere-of-influence network (see Table 2.7). These accounts were primarily associated with the Chinese state-sponsored collaborative event hosted with the soft power group *Friends of Socialist China*. State accounts were a key amplified subset but were not amplified as much within this campaign. Bots also played a secondary role in amplifying soft power accounts. The actors associated with the *Friends of Socialist China* organization probably worked to boost their event, which was a collaborative effort. These accounts did not seem to boost the Chinese state actors' other messaging efforts.

Within the larger dataset for the 2023 Democracy Summit, the Chinese, Bot, and Soft Power accounts are all dwarfed in comparison to the highest superspreader scores within the "Other" unlabeled accounts dataset (Table 2.8). Both bots and covert accounts have increased superspreader score skewness (12.59 and 10.65, respectively) with the lowest superspreader mean values, indicating a potentially more impactful use of some bots in penetrating deeper into narrative communities but overall minimal effectiveness.

A first glance at the hashtag usage for the top superspreaders shows that the state actors did not use hashtags, specifically China and Russia (Table 2.8). Bots used #SummitforDemocracy and #Taiwan, similar to "Other" accounts for likely more organic discourse. Covert accounts were the only account type to use #USA in addition to #freedom, both hashtags that are not intuitively anti-US (this hashtag use will be covered in more depth in the next chapter). Analysis using hashtag and account propagation for stance detection indicates that this full dataset based on seed nodes has only 20%

Russia's Invasion into Ukraine dataset For this smaller campaign, Bots remained the primary amplifier type, with the highest out-degree centrality mean and max values, confirming their significant role in actively disseminating content related to the conflict (Table 2.6). State actors, meanwhile, were the primary amplified accounts within this campaign. Interestingly, bots were the second most amplified account type. This is the only dataset we examined where this is true, as they primarily have operated as an amplifying account. China participated in this campaign but maintained a more reserved posture, potentially signaling support to Russia and caution over its messaging priorities. With just 33 accounts, they exhibit a conservative influence range and engagement strategy, indicative of a diplomatic approach aimed at disseminating narratives that underscore non-interference and redirect criticism away from Russia. The low centrality metrics suggest that China is cautious, possibly maintaining a balance and avoiding seeming overly biased towards Russia.

Within the full dataset not restricted to China's Sphere-of-Influence network, Bots were the predominant Superspreader for content disseminated and represented maximum values across all actor types (see Table **??**). The use of bots dominates this campaign, with 26,027 accounts. The massive skewness of 55.95 reveals that while most bots do not share heavily shared content, there are highly active outliers, suggesting targeted campaigns to spread specific narratives or propaganda. This tactic of volume over quality highlights a strategy designed to flood the zone, potentially diluting counter-narratives. Similar to the Bot category, all Other accounts maintained some of the highest influence scores in the dataset and contained anti-Ukrainian sentiment within the narrative space.

State Actors did not use the most popular hashtags within this dataset (Figure 2.21). China used

more neutral hashtags such as #Ukraine, #Russia, and #NATO. Russia likewise used more neutral terms like #RussianUkrainianWar and terms after Russian diplomatic figures such as #lavrov and #zakharova (Figure 2.21). In contrast, the US and Ukrainian accounts used more political hashtags such as #SlavaUkraini and #UnitedwithUkraine. Bots heavily amplified pro-Ukrainian hashtags, such as #standwithUkraine, and anti-Ukrainian hashtags, like #abolishNATO and #istandwithRussia. Within the overall narrative space (Table 2.9), anti-Ukrainian accounts numbered over 40,039, and pro-Ukrainian accounts of around 1,888. Overall, this narrative space was dominated by non-state actors, both bots and likely organic discussion about the Russian invasion that skewed significantly towards pro-Russian rhetoric.

Taiwan Visit Within China's Sphere-of-Influence network, the Pelosi visit to Taiwan highlighted an extraordinary surge in both in-degree and out-degree centrality for Chinese state actors, indicating that this was a significant event that required a tremendous amount of participation from the Chinese accounts, with 224 state accounts present. State actors were the primary amplified accounts by "Other" accounts. Bots maintained a smaller role in amplification within this campaign (2.6). One explanation for this is that this event represented a very nationalist stance in promoting China's sovereignty over Taiwan and setting a red line for this event. Thus, artificial amplification was not necessary.

China's response to Pelosi's visit was characterized by an aggressive information campaign that was perhaps less influential than first examined (see Table 2.8). Chinese accounts had a high participation rate (224 accounts) with more than 70,000 interactions, yet had Superspreader maximum values far below Taiwan, indicating that although Chinese accounts were propagating a large volume of messaging, these accounts were not in key positions within the information network to become "viral". China's use of covert accounts adds to the complexity of the information campaign, although these accounts maintained extremely low Superspreader values and near-zero amplification via in-degree centrality. Russia supported China's position through 24 accounts, emphasizing the One China principle and critiquing US actions. Russian digital efforts aligned closely with China's, both in narrative and strategic support, as reflected by their closeness centrality of 0.512, which suggests these accounts were well-integrated into the narrative network, helping to bridge and amplify the core messages.

The Taiwanese Government's response, limited to only four accounts, demonstrated a significant Superspreader impact on the network with the highest maximum values, with a Superspreader range of 0.140 - 1.000. The accounts achieved a closeness centrality of 0.877, positioning them at the core of narrative networks.

Within the larger dataset, the most popular hashtags across all groups were neutral hashtags such as #taiwan, #US, and #Pelosi, with the exception being the covert hashtags that used the #敦促蔡英文及其政首投降(Traditional Chinese translation: "Urging Tsai Ing-Wen and her military and political leaders to surrender")(2.22). Additionally, we see Taiwanese accounts signaling support to Ukraine via #standwithukraine. Stance detection across the dataset indicates this particular window of data skewed heavily towards pro-Taiwanese, pro-US interests with 133,000 accounts versus the 33,815 accounts for pro-Chinese accounts (Table 2.9). There was a large intersection of pro-Hong Kong hashtags via #milkteaalliance, signaling a widespread coalition against China's different annexation efforts.

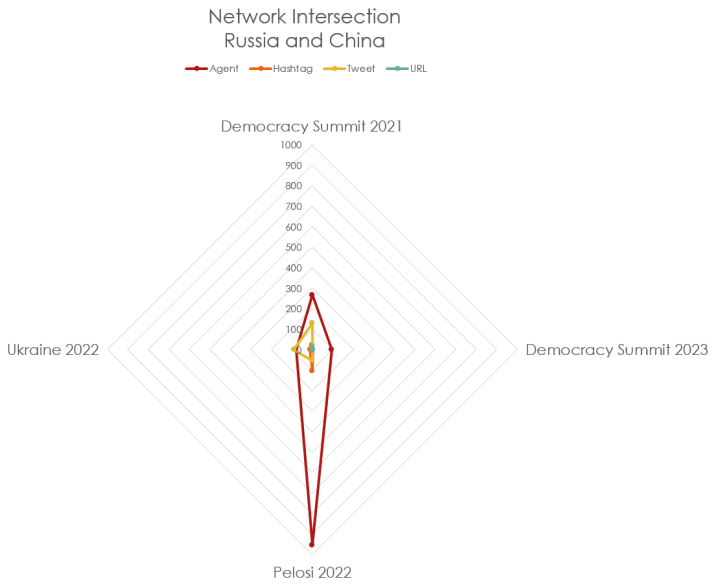


Figure 2.18: Network Intersection of Chinese and Russian Sphere-of-Influence networks across all datasets.

Table 2.6: Out-Degree Centrality Statistics for Account Actor Types in China's Sphere-of-Influence Networks

Actors	Count	Mean	Std Dev	Min	25%	50%	Max
Democracy Summit 2021							
Bot	2037	0.000019	0.000028	0.0	0.000003	0.000007	0.000174
Other	1379	0.000010	0.000011	0.0	0.000003	0.000005	0.000048
State-Actor	137	0.000010	0.000024	0.0	0.000000	0.000003	0.000138
Democracy Summit 2023							
Bot	2404	0.000029	0.000042	0.0	0.000015	0.000015	0.000655
Covert	625	0.000030	0.000033	0.0	0.000015	0.000029	0.000335
Other	932	0.000030	0.000080	0.0	0.000015	0.000015	0.002000
Soft Power	6	0.000387	0.000792	0.0	0.000044	0.000058	0.002000
State-Actor	57	0.000029	0.000057	0.0	0.000000	0.000015	0.000291
Pelosi Visit							
Bot	9609	0.0000003	0.0000021	0.0	0.0	0.0	0.000112
Covert	11266	0.00000001	0.0000003	0.0	0.0	0.0	0.000028
Other	11832	0.00000017	0.0000013	0.0	0.0	0.0	0.000055
Soft Power	2	0.000000	0.000000	0.0	0.0	0.0	0.000000
State-Actor	221	0.0000008	0.0000028	0.0	0.0	0.0	0.000026
Ukraine							
Bot	363	0.000048	0.000180	0.000011	0.000011	0.000011	0.003000
Other	298	0.000029	0.000053	0.000000	0.000011	0.000011	0.000552
State-Actor	33	0.000001	0.000004	0.000000	0.000000	0.000000	0.000022

Table 2.7: In-Degree Centrality Statistics for Account Actor Types in China's Sphere-of-Influence Networks

Actors	Count	Mean	Std Dev	Min	25%	50%	Max
Democracy Summit 2021							
Bot	2037	0.00000018	0.000004	0.000000	0.000000	0.000000	0.000188
Other	1379	0.00000145	0.000026	0.000000	0.000000	0.000000	0.000950
State-Actor	137	0.000163	0.000670	0.000000	0.000000	0.000007	0.005000
Democracy Summit 2023							
Bot	2404	0.000001	0.000015	0.000000	0.000000	0.000000	0.000437
Covert	625	0.000085	0.001307	0.000000	0.000000	0.000000	0.032000
Other	932	0.000015	0.000111	0.000000	0.000000	0.000000	0.002000
Soft Power	6	0.002815	0.002579	0.000000	0.001166	0.002000	0.006000
State-Actor	57	0.000385	0.000850	0.000000	0.000000	0.000029	0.005000
Pelosi Visit							
Bot	9609	0.00000004	0.00000074	0.000000	0.000000	0.000000	0.000058
Covert	11266	0.00000001	0.00000024	0.000000	0.000000	0.000000	0.000007
Other	11832	0.00000037	0.00000798	0.000000	0.000000	0.000000	0.000444
Soft Power	2	0.00000104	0.00000146	0.000000	0.00000052	0.000001	0.000002
State-Actor	221	0.00001938	0.00008239	0.000000	0.000000	0.000000	0.000793
Ukraine							
Bot	363	0.000027	0.000148	0.000000	0.000000	0.000000	0.002000
Other	298	0.000020	0.000082	0.000000	0.000000	0.000000	0.000703
State-Actor	33	0.000307	0.001038	0.000011	0.000022	0.000065	0.006000

Table 2.8: Table with Twitter Account Influence and Network Metrics for full datasets unfiltered. This table shows the context of China's state-sponsored accounts within the larger narrative competitive space

Dataset	Account Type	Accounts	Avg Followers	Total Interactions	Engagement Rate	Reach	In-Degree	Betweenness	Eigenvector	Closeness	Superspreader Range (Mean ± SD)	Skewness
DS21	Bot	55 669	1874	7496	0.000	0.000	0.003	0.000	0.002	0.000	0.000 - 0.374 (0.00 ± 0.01)	22.85
DS21	China	170	312 955	13 451	0.032	0.032	0.005	0.011	0.001	0.203	0.000 - 0.993 (0.04 ± 0.10)	5.97
DS21	Other	37 010	104 359	166 118	0.000	0.000	0.002	0.000	0.002	0.026	0.000 - 1.000 (0.00 ± 0.01)	28.72
DS21	Russia	32	227 490	805	0.000	0.001	0.002	0.001	0.000	0.097	0.000 - 0.066 (0.01 ± 0.02)	1.42
DS21	Soft Power	4	425 472	1145	0.000	0.001	0.039	0.089	0.001	0.308	0.002 - 0.184 (0.09 ± 0.09)	0.02
DS21	United States	8	14 887 270	29 893	0.000	0.002	0.010	0.094	0.231	0.683	0.002 - 0.463 (0.15 ± 0.15)	1.29
DS23	Bot	38 382	1479	5513	0.000	0.000	0.003	0.001	0.000	0.000	0.000 - 0.157 (0.00 ± 0.00)	12.59
DS23	China	57	726 811	1635	0.002	0.002	0.003	0.040	0.000	0.031	0.000 - 0.103 (0.02 ± 0.02)	2.03
DS23	Covert	628	687	3683	0.001	0.000	0.003	0.020	0.000	0.000	0.002 - 0.215 (0.01 ± 0.01)	10.65
DS23	Other	24 867	120 463	79 699	0.000	0.000	0.002	0.003	0.000	0.005	0.000 - 1.000 (0.00 ± 0.01)	39.11
DS23	Russia	34	248 933	2032	0.000	0.005	0.002	0.030	0.000	0.015	0.000 - 0.140 (0.02 ± 0.03)	2.44
DS23	Soft Power	14	146 701	7527	0.046	0.037	0.033	0.070	0.000	0.115	0.000 - 0.216 (0.08 ± 0.07)	0.60
DS23	United States	5	16 909 290	7976	0.054	0.052	0.120	0.090	0.094	0.382	0.017 - 0.240 (0.13 ± 0.09)	0.30
Ukraine	Bot	26 027	1880	26 995	0.000	0.000	0.002	0.001	0.000	0.015	0.000 - 1.000 (0.00 ± 0.01)	55.95
Ukraine	China	33	1 301 961	939	0.005	0.005	0.000	0.000	0.000	0.532	0.000 - 0.148 (0.01 ± 0.03)	4.95
Ukraine	NATO	18	135 795	629	0.001	0.001	0.001	0.001	0.005	0.166	0.000 - 0.027 (0.00 ± 0.01)	2.30
Ukraine	Other	41 643	149 666	125 175	0.001	0.001	0.001	0.001	0.000	0.077	0.000 - 0.729 (0.00 ± 0.01)	27.51
Ukraine	Russia	35	352 938	2920	0.003	0.002	0.001	0.003	0.008	0.466	0.000 - 0.080 (0.01 ± 0.02)	2.32
Ukraine	Soft Power	5	191 297	102	0.001	0.002	0.002	0.003	0.002	0.453	0.011 - 0.034 (0.02 ± 0.01)	0.35
Ukraine	Ukraine Gov	10	756 644	695	0.002	0.002	0.002	0.005	0.014	0.449	0.000 - 0.044 (0.01 ± 0.01)	1.65
Ukraine	United States	6	11 170 550	913	0.005	0.004	0.004	0.002	0.030	0.840	0.012 - 0.045 (0.02 ± 0.01)	0.63
Taiwan	Bot	180 963	1303	140 722	0.000	0.000	0.001	0.000	0.000	0.006	0.000 - 0.244 (0.00 ± 0.01)	12.04
Taiwan	China	224	243 653	71 081	0.003	0.004	0.004	0.006	0.000	0.466	0.000 - 0.286 (0.06 ± 0.06)	0.16
Taiwan	Covert	786	20	77	0.000	0.000	0.000	0.000	0.000	0.003	0.000 - 0.126 (0.00 ± 0.01)	16.18
Taiwan	Other	120 495	12 303	662 975	0.002	0.000	0.000	0.000	0.000	0.036	0.000 - 0.628 (0.01 ± 0.02)	4.92
Taiwan	Russia	24	403 574	5409	0.003	0.003	0.002	0.003	0.000	0.512	0.000 - 0.148 (0.07 ± 0.06)	−0.30
Taiwan	Soft Power	5	372 141	224	0.000	0.000	0.001	0.000	0.000	0.877	0.113 - 0.113 (0.11 ± 0.00)	0.04
Taiwan	Taiwan Gov	4	737 061	129 690	0.307	0.400	0.115	0.393	0.437	0.877	0.140 - 1.000 (0.51 ± 0.37)	0.32
Taiwan	United States	5	17 025 000	9564	0.003	0.001	0.003	0.016	0.014	0.877	0.114 - 0.124 (0.12 ± 0.01)	0.61

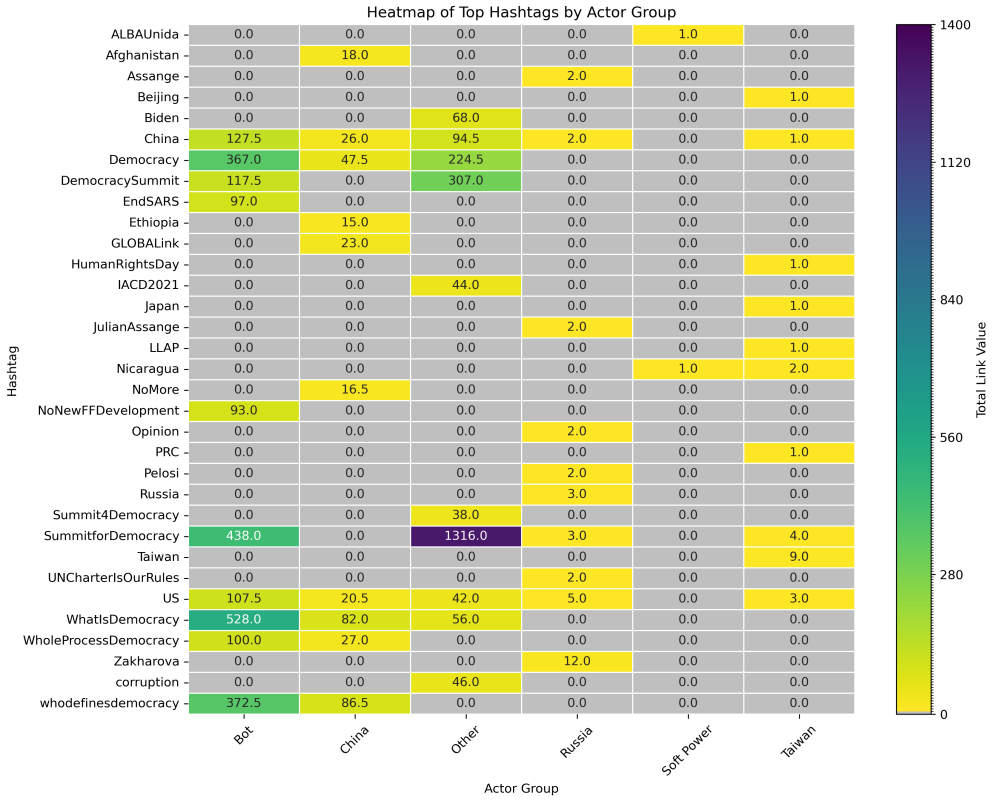


Figure 2.19: Democracy Summit 2021: Top Hashtags for 95% Superspreader Score Percentile of Actor Group Agents

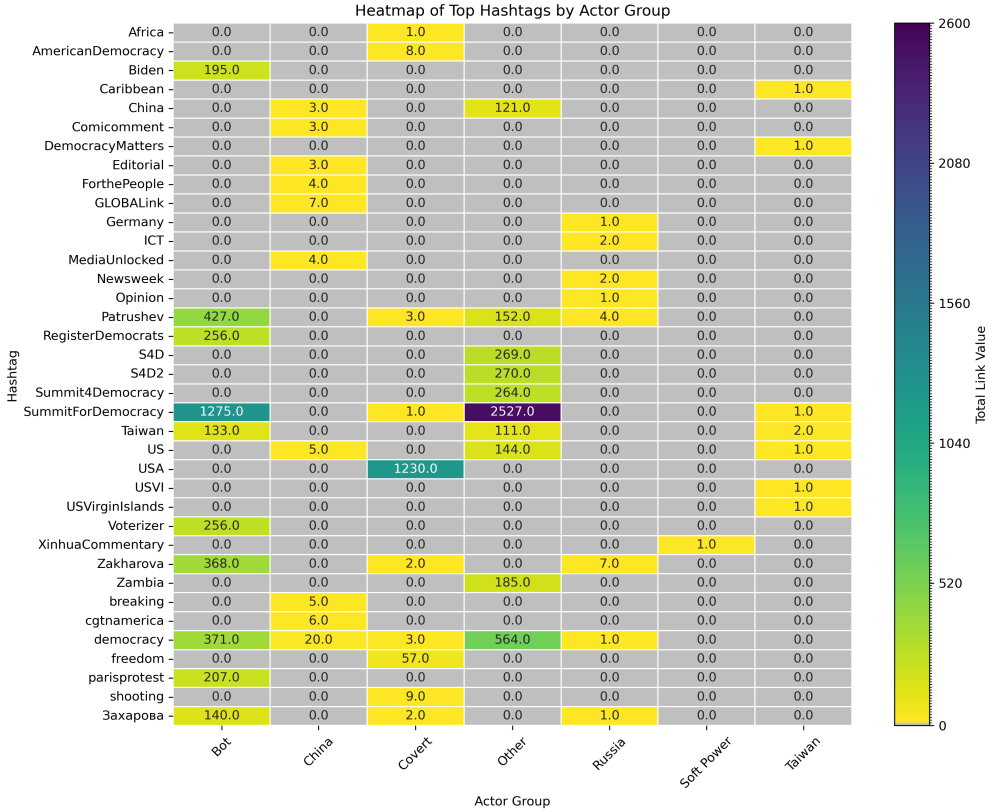


Figure 2.20: Democracy Summit 2023: Top Hashtags for 95% Superspreader Score Percentile of Actor Group Agents

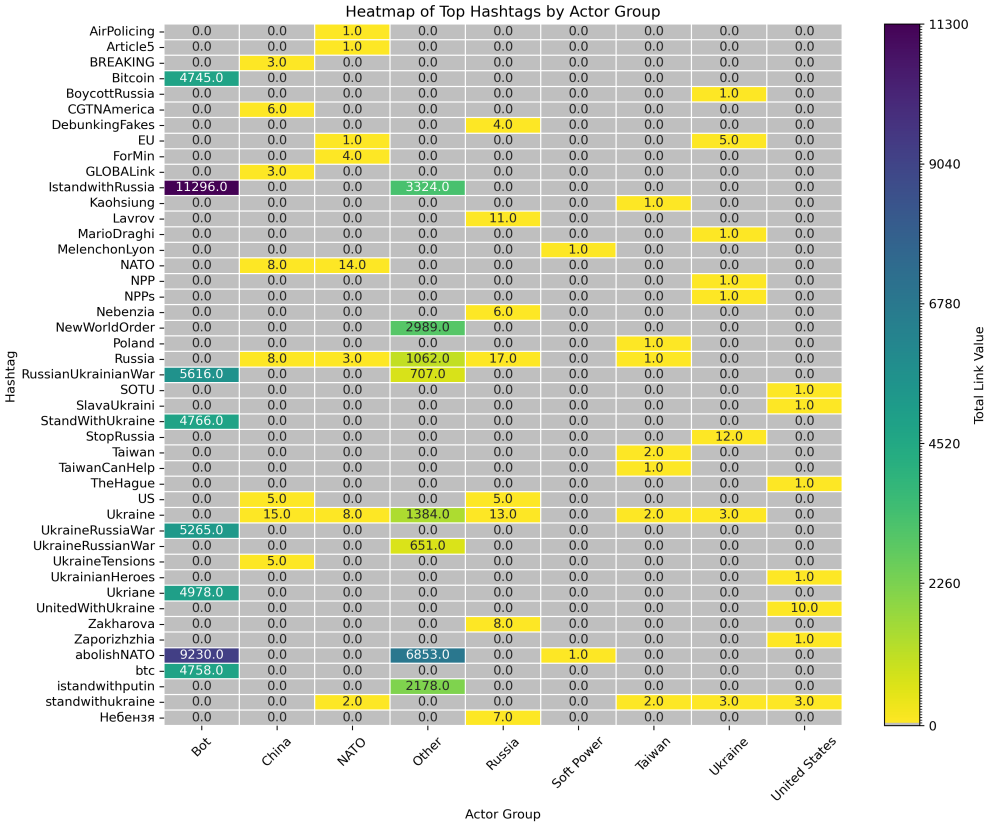


Figure 2.21: Ukraine: Top Hashtags for 95% Superspreader Score Percentile of Actor Group Agents

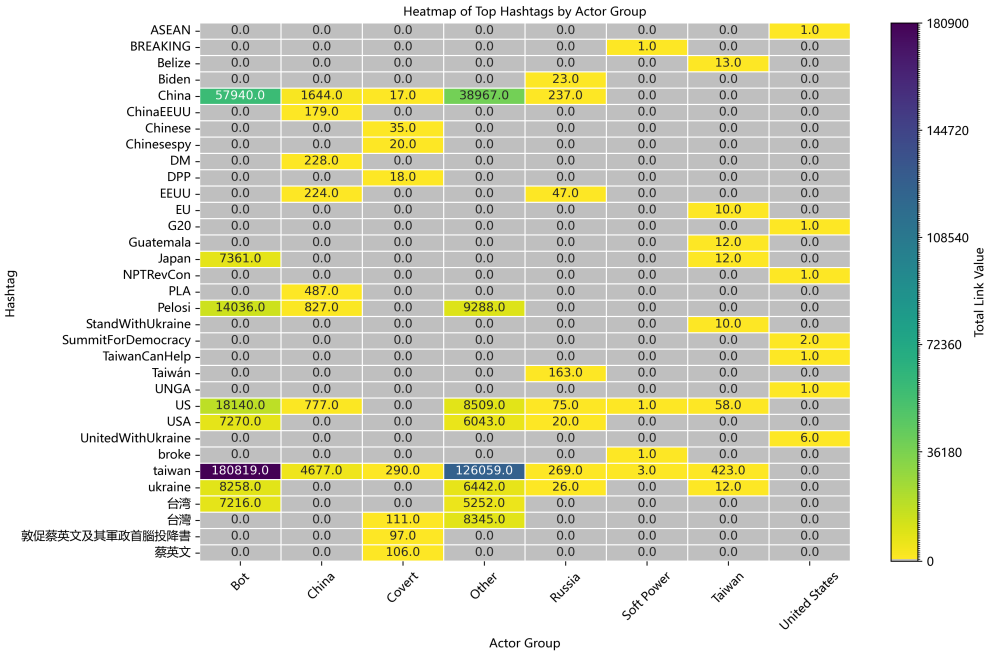


Figure 2.22: Taiwan: Top Hashtags for 95% Superspreader Score Percentile of Actor Group Agents

Table 2.9: Stance Detection on Full Datasets. Label propagation for stance based on both labeled accounts and specific hashtags

Agent Summary			Hashtag Summary		
Category	**Nodes**	**Mean**	**Category**	**Nodes**	**Mean**
			DS21		
Pro: US Accounts	37,011	0.990	Pro: #SummitforDemocracy	1,265	0.825
Con: Chinese	10,073	0.894	Con: #whatisdemocracy, #whodefinesdemocracy	433	0.652
Not Assigned	45,813	N/A	Not Assigned	2,275	N/A
			DS23		
Pro: US Accounts	8,649	0.996	Pro: #SummitforDemocracy	365	0.913
Con: Top Chinese/Russian accounts	4,708	0.975	Con: #Patruschev, #Zakharova	53	0.788
Not Assigned	50,633	N/A	Not Assigned	1,564	N/A
			Ukraine		
Pro: All Ukrainian, US, NATO	1,888	0.906	Pro: #StandwithUkraine, #Ukraineunderattack	981	0.857
Con: All Russian, Chinese	40,039	0.825	Con: #abolishNATO, #istandwithRussia	6,616	0.586
Not Assigned	25,852	N/A	Not Assigned	8,498	N/A
			Taiwan		
Pro: US, Taiwan	133,093	0.984	Pro: #milkteaalliance, #TaiwanisaCountry	11,680	0.755
Con: Chinese, Russian	33,815	0.861	Con: #onechinaprinciple, #onechina	3,116	0.625
Not Assigned	157,041	N/A	Not Assigned	45,729	N/A

2.5 Discussion

Our findings highlight China's complex strategies that it uses on social media platforms, using different types of accounts and their engagement to promote global and at times, more tailored narratives aimed at shaping public opinion. Applying the BEND framework highlighted that China's maneuvers revealed diverse maneuvers used to manipulate public perception and debate. Techniques such as *enhance*, *engage*, and *neglect* were prominently used to steer conversations in ways that favor Chinese geopolitical interests. In campaigns where we studied Russia and China's overlap in network structure and messaging, BEND maneuvers frequently mirrored each other, demonstrating the same types of narrative sentiment and community targeting. The nuanced use of these maneuvers across different campaigns illustrates the strategic depth of China's information operations, aimed not just at promoting pro-China rhetoric but also at weakening the credibility of Western democratic values and institutions.

The study of localized campaigns and the engagement with "soft power" influencers such as the Friends of Socialist China highlights China's strategy to embed its narratives within local contexts and connect via public diplomacy at the peer-to-peer level. This method broadens a target audience aperture by enlisting individual actors or organizations that provide a grassroots perspective and alliance. China's use of influencers to target Chinese-speaking audiences speaks to its understanding of what influences the Chinese diaspora, not necessarily Chinese-affiliated accounts. This nuanced use of local narratives and soft power is a testament to China's increasingly sophisticated approach to propaganda, which blends overt and covert tactics to influence international opinion and project its power on the global stage.

We demonstrate different strategies aimed at influencing the public opinion of a diverse range of targeted audiences, depending on the type of information campaign. The initial 2021 Democracy Summit campaign showed a locally targeted approach towards countering US influence through academic and journalistic outlets that worked with China's resident embassies and more global counter-US narratives about its foreign policy record in conflict zones. The following 2023 Democracy Summit primarily focused on a more simplified counter-US narrative but contained a covert yet ineffective element of accounts. China's participation in the anti-Ukrainian campaign demonstrates a dual effort in signaling support to Russia to the larger international community and to Russia while also abstaining officially from the more biased messaging of supporting Russia's invasion of Ukraine. Lastly, China's narratives against the Pelosi visit were aimed primarily at the Taiwanese and the US as a messaging campaign to deter the visit from happening by increasing the aggressive rhetoric prior to the visit.

Ultimately, however, many of China's messaging priorities fail to become dominant narratives within the information environment. First, the reliance on a centralized network of superspreaders results in messaging that, while consistent, may lack the organic engagement necessary for credibility in the digital space. The heavy use of bots further exacerbates this issue, as artificial amplification fails to engage meaningful dialogue. Additionally, the echo chamber effect, where information circulates predominantly within networks that are already sympathetic or neutral to China's viewpoints, limits the reach and impact of the campaigns. Moreover, China's approach often avoids engaging with counter-narratives, which is essential in social media's dynamic and debate-rich environment. The Wolf-Warrior rhetoric that China experimented with failed to gain traction or credibility in diplomacy with Western nations. Despite its comprehensive digital strategies, China's approach, marked by heavy bot use and a lack of public diplomacy messaging that

promotes engagement, has not achieved significant influence specifically towards western audiences. However, it is important to note that this chapter does not focus on the Global South, where China's messaging strategies may align more effectively with local narratives. Engagement in African countries where China's Belt Road Initiative is influential, may suggest that these regions are more receptive to China's narratives, possibly due to differing geopolitical interests and media environments. This aspect warrants further exploration to fully understand the reach and impact of China's digital diplomacy across different global contexts.

Lastly, this chapter points to the challenges of transparency and attribution in digital campaigns. Nassetta & Gross (2020) found that state-funded labels helped mitigate the shift in perception of misinformation and conspiracy theory content [225]. These labels are a valuable component for social media users to better understand who is funding the content they are consuming.

2.6 Limitations and Future Work

We conducted this thesis with limited Twitter datasets that provide a snapshot of China's information activity between 2021 and 2023. We acknowledge that generalizing these results would require much more data across many different social media platforms, but we hope our findings provide a foundational step for the analysis of different types of actors within state-sponsored information campaigns. Additionally, Twitter's Research API was severely deprecated during this thesis. Hence, other datasets that we would like to have collected were unavailable. Network analysis discovery remained a critical method for understanding social structures and dynamics, but it has limitations. This method may not capture all relevant factors or interactions, and other qualitative or quantitative methods may be needed to complement the network analysis and provide a comprehensive understanding of China's influence campaigns. Additionally, these measurements rely on assumptions and simplifications of social network structures, and their validity and reliability may vary depending on the context and data that is analyzed. We apply mixed methods for our research questions in this thesis to fill in these methods gaps with our network approach. Integrating transformer embedding models to understand the context of narratives would be an invaluable addition.

Further studies could also explore the impact of these information campaigns on public opinion and policy, using mixed-method approaches that combine quantitative network analysis with qualitative content analysis and field studies. Additionally, developing more sophisticated methods for assessing the impact of misinformation campaigns on international relations and domestic politics would significantly advance the field of digital public diplomacy and social cybersecurity. Likewise, the diversity of social media platform research will be critical, including platforms predominant in non-Western countries, to develop a more holistic understanding of China's digital diplomacy strategies. We extensively covered the technical challenges and the necessity for further analyzing stream meme content such as TikTok, which skirts moderation rules and targets young people. Following Tiktok's temporary self-imposed ban in the United States in January 2025 [311], young people flocked to RedNote, another Chinese social media platform because their trust in the US government was lower than their trust in Chinese media platforms.

Traditional social media platforms such as Meta and X remain valuable platforms to study social media discussion and disinformation dissemination, especially with little to no moderation as is the case for X. Youtube likewise remains a necessary platform for understanding video content

dissemination and how content can travel from one social media platform to another depending on the intent of a given campaign, e.g., is the goal to get people on platforms from Meta and X to watch a propaganda video on YouTube? Understanding the target audience for a specific campaign is critical to choosing the right platform to study. For state actors like China and Russia, geographic components should likewise be considered. In the next chapter, we will discuss the origins of the covert network targeting Nancy Pelosi's visit to Taiwan, having originated via viral campaigns in mainland China. How state actors likely incubate grassroots movements and project campaigns outward to a larger audience is becoming more difficult to track and more effective. The US Department of Justice likewise linked a Russian shell company to six conservative influencers, who primarily created podcasts and livestreams [316]. State actors will continue to blur the lines of discourse in democracies, making it more difficult to determine what genuine discourse is and what narratives are being pushed by external pressures.

Chapter 3

Covert Influence Campaigns

"The first rule of unrestricted warfare is that there are no rules, with nothing forbidden."

–Qiao Liang and Wang Xiangsui in *Unrestricted Warfare*

3.1 Introduction

In the digital age, social media has become a pivotal area for state actors to wield influence across borders to citizens of other countries, bypassing traditional channels of engagement. This chapter examines China's integration of covert influence campaigns within its social media public diplomacy strategy, which seeks to manipulate public perception on key issues and advance China's core interests. As state actors like China increasingly use social media to wage covert influence campaigns and propagate unsavory information like disinformation, it is becoming increasingly important to study the impact of inauthentic influence networks in order to mitigate the shaping effects they seek to wage on an unassuming audience [88, 229].

3.1.1 Declining Moderation and Increasing Bot Activity

As social media platforms have grown in influence, their policies on moderating state-sponsored content have drawn sharp scrutiny and criticism. The retreat from stringent moderation policies, as seen with the platform formerly known as Twitter's decision to cease labeling government-affiliated accounts [276], underscores a broader trend of diminishing oversight. An increase in bot-driven interactions parallels this reduction in moderation, further complicating the digital landscape and making it more susceptible to manipulation by state actors [174, 192, 215, 262].. Poor or absent labeling practices are related to uninformed interactions with state-sponsored content, particularly among users unfamiliar with the origins or biases of these sources [215]. Furthermore, the reduction in platform moderation has coincided with a surge in bot activity, which complicates the landscape of digital discourse [262].

Analyzing covert state-sponsored information campaigns poses unique challenges due to the deliberate obfuscation of their origins and the evolution of their tactics to evade detection. The difficulty lies not only in attributing these campaigns to specific state actors but also in identifying and mitigating evolving tactics designed to evade detection [282]. Current techniques to

identify inauthentic state-sponsored actors rely on bot detection techniques [102, 227] or coordination identification techniques [296]. However, inauthentic campaigns continue to evolve and adapt as detection research progresses. Furthermore, conventional methods may not fully capture the nuanced strategies employed by state actors attempting to blend in with genuine social media users.

While Facebook, YouTube, and formerly Twitter collaborated to find and mitigate foreign influence campaigns, X under Elon Musk has largely stopped information sharing to tackle information campaigns [207]. Meta found that 90% of cross-platform accounts linked to Spamouflage were still active on X [207]. Collaborative efforts between the US government and social media platforms have likewise chilled due to a 2023 court ruling after a court ruling barring increased communications between the White House and tech companies over censorship concerns [355].

3.1.2 China's Covert Influence Tactics, Techniques, and Procedures

The digital domain offers state actors anonymity, allowing them to conduct covert operations while maintaining plausible deniability [313]. This aspect of digital geopolitics has been explored in the context of covert Chinese networks, which have been shown to utilize low-effort spammy bots for isolated information campaigns that are easily detectable [148]. China's largest known covert influence operation, Spamouflage, has been active since 2017 and has reported activity on over 40 digital platforms. Chinese influence campaigns such as Spamouflage represent the growing urgency to combat covert information warfare, especially as many such campaigns target democratic audiences to sow discord and manipulate public opinion. These campaigns are frequently cross-platform driven and increasingly integrate emerging technologies such as generative AI to craft and propagate disinformation, speed up manual processes, and bridge cultural divides to adopt persuasive digital personas.

China's use of Russian influence techniques: Targeting societal divisions China's notorious Spamouflage network has been primarily linked to promoting Chinese interests and targeting critics but is reported to be pivoting to target US domestic issues [235, 321, 335]. China is also increasingly using hate speech and racial tropes to target Americans. Spamouflage targeted a down-ballot candidate, US Congressman Barry Moore, with derogatory anti-Semitic tropes (Moore is not Jewish) and conspiracy theories, primarily due to his proposed new sanctions on Chinese government officials [208]. Spamouflage used anti-Semitic hate speech on X to attack Israel. Another Chinese covert network, DRAGONBRIDGE, adopted American personas to persuade a local town in Texas to abandon rare-earth mining [142].

Chinese influence networks are trying new techniques in preparation for the 2024 Presidential election. Chinese influence networks on X leveraged the July 2024 assassination attempt against former US President Donald Trump to create content intended to incite existing political divisions among American citizens [84]. This network was also associated with Spamouflage, creating narratives spreading disinformation that Trump had been assassinated and potential culprits. The network then targeted Vice President Kamala Harris with content questioning the US electoral process and creating ironic content mocking claims of US foreign interference. In 2024, covered social media networks primarily used narratives around racial discrimination, gun violence, police brutality, US support for Israel, and gender identity issues for their divisive content [84].

Microsoft's Threat Analysis team reported a new development of PRC covert elements using fake social media accounts to poll American citizens on what are top divisive issues. These ac-

counts post about US domestic issues such as climate change, US immigration and border policies, drug use, and racial tensions with memes, infographics, and original videos, with verbiage such as "What are your thoughts?" to prod targeted user engagement and collect users via "follow trains" where accounts will promise to follow if followed on social media. Beyond data collecting, this network also spurred conspiracy theories around the first assassination attempt of President Donald Trump, alleging Democratic involvement. Microsoft found that these efforts were primarily focused on sowing doubt and confusion for left and right-leaning Americans [337].

Outsourcing Fake News Generation China is increasingly outsourcing its influence operations to private firms and expanding the platforms it uses to broaden its audience. A Meta report from 2023 took down a small network of fake Facebook accounts, groups, and Instagram accounts, primarily targeting Taiwan, Sub-Saharan Africa, Japan, Central Asia, and the Uygur community. This network used a UK-registered media company to recruit regional content creators [236]. Mandiant dubbed a campaign outsourced by the Chinese public relations firm Shanghai Haixun Technology Co "HaiEnergy" and an ecosystem of fake social media accounts and 72 inauthentic news sites that presented as local independent news outlets, amplifying content aligned with CHina's geopolitical interests [294]. HaiEnergy leveraged legitimate news distribution platforms like TimesNewsWire to "launder" their fake news content. HaiEnergy's social media accounts also promoted two 2022 protests in Washington DC in 2022. These protests were primarily centered on the US government's ban on Chinese goods from Xinjiang. The protests had roughly a dozen protesters each, most of whom were paid to attend and did not know that the protest was Chinese-sponsored [59].

3.1.3 Generative AI: The great equalizer

Researchers have speculated on the potential uses for generative AI capabilities that bad actors will leverage. OpenAI's recent 2024 report validates these concerns with findings on Chinese, Russian, Iranian, and Israeli covert networks' use of generative AI technology [210, 231]. Chinese networks linked to the infamous Spamouflage campaign used OpenAI models for debugging code, analyzing social media, researching current events, and generating social media content, ultimately increasing the efficiency of their operations. The PRC network also used the models to generate message content and assist in targeting and researching behavioral patterns of targeted audiences, in addition to technical indicators for network actors, such as social media analytics. The content generated from OpenAI was then linked to X, Medium, and Blogspot [231]. The key findings regarding this generated content, aimed primarily at critics of China, are that it did not result in audience engagement, pointing to a long-term problem for influence networks, specifically Chinese networks.

This chapter investigates the shifting tactics of covert state-sponsored information campaigns, focusing on China's dynamic approach to managing unattributed social media accounts. By comparing data from 2021 to 2023, we explore how these tactics have adapted in response to changes in social media moderation and detection technologies. We evaluate the presence of detection evasion techniques and compare the frequencies of deployment of DETs. Our analysis uses a combination of tweet and agent-based metrics to uncover different types of evasion deployed by these campaigns, offering insight into the complex dynamics of modern information warfare. This chapter aims to extend the research around China's covert networks by delving into the algorithmic approaches used to conceal these networks. Through comprehensive network analysis, we

study the tactics used by bot communities, explore the cross-platform dissemination of information, and shed light on their targeted audiences, thereby contributing to a deeper understanding of the complex dynamics within both overt and covert influence campaigns.

One last addition to this section integrates new information following the defense of this thesis on innovative methods of disinformation that may indicate bad actors are exploiting new platforms where belief is formed to influence opinions. In early 2025, the American Sunlight Project published a report on how a pro-Russian network, Pravda, generated large volumes of propaganda and disinformation on websites across the globe to increase the chance this content would be scraped to train large language models, a tactic called "LLM grooming" in which content creators exploit generative AI models to bias the content towards specific narratives [270, 325]. This finding reveals a confluence attack using search engine optimization and inherent vulnerabilities for training LLMs via web-scraping large amounts of freely available data on the internet. Emerging attacks like Pravda's LLM grooming hint at covert actors moving to more upstream sources of data generation, such as LLMs, to promote narratives, leveraging new vulnerabilities in rapidly expanding LLM integration.

3.2 Methods

We compare three datasets to trace the evolution of PRC social media strategies, particularly focusing on the use of Detection Evasion Techniques. We use a 2021 Twitter network takedown dataset to provide a benchmark for China's unattributed networks. With this foundational base, we analyze two other covert campaigns found within our overt campaigns in the preceding chapter.

Benchmark: Twitter Covert Network Takedown-2021

Twitter in the past released internal network takedowns of state-linked information operations to the broader academic community as a matter of public interest. This dataset represents a "network of accounts that amplified Chinese Communist Party narratives related to the treatment of the Uyghur population in Xinjiang", with a total of approximately 16,000 tweets from 1,978 users [34, 79]. Twitter anonymized and reduced the dataset, providing the data in a CSV format. We transform the available attributes into a V1 Twitter JSON to compare the network features to other datasets this chapter analyzes. Due to the lack of key elements for Bothunter detection, including a lack of account profile information on the accounts prior to anonymization, we did not conduct bot detection on the available features. Given Twitter's detection and subsequent suspension of the network, we assumed the population had a high rate of bots.

This data was partially anonymized but contained many errors, such as mentioned or retweeted accounts not annotated or missing account ID fields, in addition to accounts being inconsistently labeled by their anonymized account numbers. An example of this might be a record with a tweet containing a retweet, where the retweeted account does not have a Twitter ID. This inconsistency in account labeling resulted in significant disambiguation issues for entities that did not have standardized ID names. To address this data issue, we used any account names that were available in the actual text of the tweet. We extracted Retweet accounts denoted by 'RT@handle" in addition to extracting all other mentioned accounts in the text denoted by '@." We then synchronized the provided account numbers to the accounts listed in the tweet. We used any available screen names

from the text; otherwise, we defaulted to the ID or created a placeholder ID for accounts that were present in the text but not accounts for the provided account IDs. We created a Python dictionary for all screen names that we encountered to match Agent IDs and used this look-up table for any records that were missing a screen name or user ID.

Pelosi's Visit to Taiwan

We collected 1,758,453 tweets from the Twitter V2 Streaming API between April 1, 2022, and April 1, 2023. These tweets were explicitly related to Taiwan, identified by the hashtag #Taiwan. Within this dataset, we discovered a sub- community of accounts exhibiting repetitive behavior, acting as repeater bots, sharing the same messages multiple times. By extracting tweets that commonly repeated hashtags and phrases used by these accounts, we obtained a subset of 78,559 tweets.

We analyze a covert element of spammy accounts that we assess as PRC-related. In August 2022, following the visit of Nancy Pelosi to Taiwan, a wave of mysterious spammy accounts with little engagement emerged on Twitter, utilizing hashtags related to Taiwan. These accounts used Chinese hashtags and directed users to propaganda videos on China's military capabilities hosted on external platforms like YouTube and Tumblr. A tweet from this network read, "#蔡英文#taiwan #敦促蔡英文及其政首投降岸人民都希望家一," which translates to "#蔡英文#taiwan #Urging Tsai Ing-wen and his [sic] military and political leaders to surrender, people on both sides of the straits hope for national reunification" [1]. This campaign aligns with China's long-standing policy of "One China," where Taiwan is regarded as an inseparable part of China and follows China's unprecedented military drills around and against Taiwan following the Pelosi visit [2].

2023 Dataset Our analysis for 2023 uses data queried from the Twitter V2 API, focusing on the hashtag #DemocracySummit during March 11 - April 20, 2023. This more recent dataset, which includes 90,412 tweets from 63,990 accounts, provided a broader perspective on the tactics currently employed by unattributed networks operating on behalf of China. We specifically analyzed a subnetwork that used the hashtag #USA and performed a two-hop query of agents who used this hashtag, resulting in a small campaign with 571 accounts and 1,237 tweets. Based on previous research on how Chinese diplomatic accounts used the hashtag #WhoDefinesDemocracy to counter the Democracy Summit in 2021, we analyzed this data set for a similar hashtag [146].

Secondary Dataset and Bot Detection To further enrich our analysis, we incorporated a secondary data set containing Twitter handles from more than 350 government- and state-sponsored Chinese media outlets [146]. Additionally, we use a tier-based random forest model Bothunter to distinguish inauthentic actors within this data set, specifically accounts that pass a bot threshold of .70 [25, 230]. We were unable to use bot detection on the benchmark dataset due to the data set missing certain key values used for bot prediction to include the account screen names. Lastly, we used ORA network analysis software to generate network mappings and open-source Python tools to statistically analyze the data. In this study, we omit the use of account screen names, adhering to strict ethical guidelines that prioritize privacy and responsible use of digital data.

[1] https://www.bbc.com/news/world-asia-china-38285354

[2] https://www.theguardian.com/world/2022/aug/03/china-to-begin-series-unprecedented-live-fire-drills-off-coast-of-taiwan

Identifying Detection Evasion Techniques

Our study uses methods to analyze the evolution of detection evasion techniques (DET) in different social media campaigns. We focus on two primary analytical dimensions: Tweet or Message Similarity and Account Network Measures.

- Tweet or Message Similarity: This approach addresses the tactics of REPEATER BOTS networks, which disseminate identical or slightly modified messages to evade detection. We assess the similarity of messages using a combination of text analysis techniques, identifying common patterns and artifacts within the tweets.
- Account Network Measures: We examine the structure and dynamics of account interactions, particularly through retweets, to understand how networks of accounts are engineered to maximize dissemination while avoiding detection.

Coordinated Tweet Groups For the benchmark data, we used a combination of regular expressions and tokenization comparison to all artifacts except for the *Chinese Phrase* artifact, which we had to find manually due to the obfuscation with other Chinese language words. In determining whether a tweet was part of a specific repeated sequence, we alphabetically sorted the messages, tokenized the tweet text, and performed a rolling comparison of tweets within a 48-hour period to denote if a tweet had the same text as the tweet before it. We limited tweets that were repeated at least three times and only compared the first three tokens since this bypassed any artifacts that were added to the text.

For the 2023 datset, we grouped a given original tweet and all subsequent retweets, regardless of time constraints. Tweet IDs were used instead of the text of the tweet due to some accounts retweeting the exact same message at a later date that was then amplified by a sequence of bot accounts.

K-Means Clustering We utilize K-means clustering to partition the data set into distinct groups based on latent patterns within our networks. The assignment of cluster labels to each sender enabled the identification of coherent user segments, characterized by similar behaviors, network positions, and content preferences. We calculated the average tweeting per hour and the total tweets per sender, which served as a proxy for user activity patterns. For both campaigns, we used NLP and basic regular expression parsing methods to group tweets either as a repeated tweet for the 2021 dataset or all tweets and their respective retweets for the 2022 dataset. Additionally, we quantified network characteristics through metrics such as the number of unique groups a sender interacts with and the average number of tweets per tweet group, providing insight into the sender's engagement diversity and intensity. We assessed the social network structure by deriving In-Degree and Out-Degree centrality measures, indicative of a sender's popularity and outreach, respectively. The "Number of Followers" metric further enriched our understanding of the influence and reach of an agent within the network.

Entropy Analysis For the benchmark dataset, we calculate an entropy score to measure the diversity of artifact usage in tweets, offering insight into the sophistication of evasion strategies using artifacts to differentiate tweets. We define an artifact within a tweet as a unique string element (e.g., word, number, symbol) that differentiates it from others. The entropy score, $E(a_k)$, measures

the diversity of artifact usage by an actor a_k, indicating their adaptability and sophistication in evasion tactics:

$$E(a_k) = -\sum_{T_k \in \mathcal{T}} p(T_k) \log_2(p(T_k))$$

where $p(T_k)$ is the proportion of tweets by actor a_k that contain a specific type of artifact T_k, illustrating the variety of artifacts used to evade detection.

$$p(T_k) = \frac{1}{|M(a_k)|} \sum_{m_i \in M(a_k)} A_{T_k}(m_i)$$

This measure uses aspects of information theory to capture the degree of spread in the use of artifact types by an actor, with higher scores indicating a greater spread or variety in tactics.

Account Similarity: Analyzing Naming Patterns and Network Roles In our analysis of account similarity, we grouped accounts based on the similarity of their naming conventions, using regular expressions to find user accounts with the same letter and digit ration. This approach enables cluster analysis of bot accounts or coordinated campaigns based on naming patterns that could indicate automated account creation processes. We also used in-degree and out-degree centrality measures to distinguish between content creators and amplifiers within the network. Specifically:

- In-degree centrality was used to identify key content creators, reflecting accounts that receive a high volume of retweets, mentions, or replies, thus acting as primary sources of information or disinformation.
- Out-degree centrality helped pinpoint the amplifiers, accounts that actively spread the content through retweets, mentions, and replies, thereby amplifying the reach of the content creators' messages.

To gauge the connectedness among the amplifier accounts, we employed the Jaccard similarity measure:

$$J(i, j) = \frac{|N_i \cap N_j|}{|N_i \cup N_j|}$$

where N_i and N_j represent the sets of neighbors for accounts i and j, respectively. This metric indicates the overlap in the audiences or networks that different accounts engage with, indicating potential coordinated activity among amplifiers.

3.3 Results

3.3.1 2021: Xinjiang Repeater Network

Our investigation into the Xinjiang benchmark dataset revealed significant findings about the strategies employed by covert networks. The dataset, comprising 16,009 tweets from 1,978 agents between January and April 2021, offered new scholarship into the tactics used to refute allegations

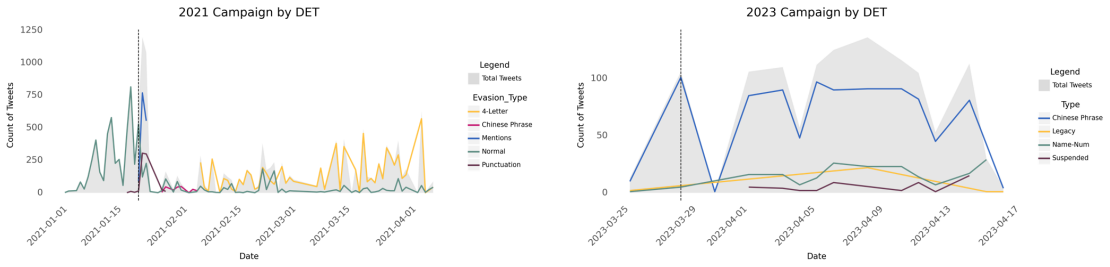


Figure 3.1: (Left) Timeline for the 2021 covert campaign. The dotted line on January 19, 2021 indicates when US Mike Pompeo made a press release against China's treatment of ethnic Uyghurs in the Xinjiang autonomous region. After which, we see a peak in tweet messaging and different types of DETs. The 4-letter method endured until the end of the campaign. (Right) 2023 Democracy Summit Campaign by account type: The dotted line indicates the occurrence of Democracy Summit, at the peak of network message traffic.

of human rights abuses in the Xinjiang Uyghur Autonomous Region. We primarily found narratives and themes that a) refuted claims of human rights abuse against Uyghurs, b) spread positive messaging about China's Xinjiang Autonomous Region, and c) targeted Uyghur activists, groups, and key US politicians such as Mike Pompeo.

Table 3.1: *Detection Evasion Types*: Tweets from covert networks contain character artifacts to differentiate from other similar tweets.

Type	Count	Example
4-Letter	7,168	#Xinjiang Situation: Report finds 'forced labor' accusation false url EHTK
Mentions	1,412	Xinjiang's counter-terrorism measures protect human rights #Xinjiang @fuck_next
Punctuation	670	#Xinjiang Online Vocational education and training is key measure to protect human rights)(
Chinese Phrases	210	#Xinjiang Xinjiang official refutes allegations, welcomes visits [URL] 偿伫褛

Key Account Identification After recovering and merging account names from retweets and mentions, we identified 49 PRC-affiliated accounts and 65 accounts associated with Uyghur activists. The primary narratives promoted by these accounts refuted human rights abuse claims, spread positive messages about Xinjiang, and targeted figures such as Mike Pompeo and Uyghur activist groups. Additionally, we found 9 US Government accounts and 11 accounts associated with western media outlets, almost all of which were affiliated with the BBC outlet.

Detection Evasion Techniques using Artifacts Our analysis revealed various detection evasion techniques (DETs) used by the network to obfuscate its activities. Table 3.1 categorizes these evasion tactics, highlighting their prevalence and nature. We found that the network changed tactics from January to April 2021, likely in response to Twitter network detection. We found four methods that the network used over time: a) random capitalized 4-letter blocks, b) random Chinese

Table 3.2: Top Article Headlines Shared through URLs

Account	Count	Headline
China Daily	1060	Xinjiang's counter-terrorism measures protect human rights
China Daily	470	Short videos depict peaceful and happy lives in south Xinjiang
China.org.cn	436	Vocational education and training is key measure to protect human rights
China SCIO (X)	282	#Urumqi's battle against COVID-19 epidemic.
China.org.cn	216	Real life stories from Xinjiang best refutation of US allegations

words and characters, c) random punctuation characters, and d) engagement around a single account to build a network structure. The purpose of these artifacts is likely to differentiate messages and evade detection algorithms for repeatable, bot-like behavior.

- **4-Letter Block** This method was used from February 4 to April 5, 2021 and represented the largest evasion method, with 7,168 tweets. The character block was a random, unique combination of four capitalized letters of the Latin alphabet. The block was primarily at the end of the text, but it was also found in the middle and for Arabic tweets on the left-hand side of the tweet text.
- **Chinese Phrases** This artifact was used in tweets from January 25 to February 3, with 210 tweets. Tweets include a 5-character block of simplified Chinese text. Many of the text blocks are words or phrases, such as 糙反。 (rough) or (Min Zhen stands in front of the oyster) in Figure 3.1. However, we found many instances of random characters without translation, indicating either a random arrangement or the use of more obscure characters that have not been integrated into the machine translation capabilities of Google Translate.
- **Punctuation** Punctuation artifacts are either at the end of a tweet or buried towards the middle. For this category, there were 670 tweets between January 18-26. An example of this may be where three accounts all tweet the same message as below, where only the email pointer and punctuation artifact differ.
- **Mentions** This network was different than the other methods in using engagement internally to emulate network structure, using the Twitter mention and Retweet function to engage internally. All accounts were related to a single account within a two-hop radius.

Temporal Analysis Figure 3.1 demonstrates the temporal nature of how the repeater bots used the artifacts. The dotted line in this figure is on January 19, 2021, when then US Secretary of State Mike Pompeo conducted an interview with Fox News and published a press release condemning China's treatment of ethnic Uyghurs within the Xinjiang Uyghur Autonomous Region in China [247]. The temporal analysis indicated a significant spike in tweet volume following then US Secretary of State Mike Pompeo's public condemnation of China's treatment of the Uyghur population on January 19, 2021. After the Pompeo press release, we see the beginning of tweets made with detection evasion methods, specifically, the added punctuation, 4-letter blocks, Chinese characters, and the use of mentioning other accounts to emulate engagement. We used a nonparametric Mann-Whitney U test to determine whether there was a difference in tweet counts on weekends versus weekdays, as cited in previous studies [92]. Our findings with a p-value of .475 indicated that there was no difference in the distribution of tweets between weekdays and weekends, indicating that bots probably contributed to most of the content of tweets.

Table 3.3: Influence of Evasion Tactics on Twitter Activity for 2021 Xinjiang Repeater Network

Var.	coef	std err	P$>\|$z$\|$	CI (95%)
Int.	2.890	0.054	0.000	
4-Let.	0.796	0.095	0.000	
Chinese	−0.395	0.266	0.137	
Mentions	−3.322	0.077	0.000	
Punct.	−1.388	0.114	0.000	

Logistic Regression Analysis We conducted a logistic regression analysis to understand how various evasion tactics affect the likelihood that a given agent will continue tweeting in the future after a specific evasion tactic ends. We quantified the impact of these tactics on the probability of an account's continued tweet engagement, utilizing a dummy variable to capture whether an agent persists in tweeting for each type of evasion detection type. The results, presented in Table 3.3 show varying effectiveness between different tactics. Our findings reveal that our *Mentions* network had the highest probability of not tweeting again, indicating that it was easily detectable. The *punctuation* category also indicated that the chances that these accounts continued to tweet were approximately 0.25 times those of accounts that did not use punctuation anomalies, suggesting a decreased probability of continued activity, possibly due to effective detection and action by Twitter. This subnetwork tweeted remained isolated, tweeted for three days, and then disappeared from our data set. Lastly, the odds of *4-Letter* accounts continuing to tweet were approximately 2.22 times higher than those of accounts that did not use this tactic, keeping other variables constant. These findings suggest that Twitter was not as effective in detecting *4-letter* evasion tactics, allowing these accounts a higher likelihood of remaining active. This finding is also supported by the temporal trend of this particular tactic which persists until the end of the data set.

Analyzing the Meta-Network: A Tale of Two Distinct Components

Our comprehensive analysis of the Agent x Agent - All Communications network, encompassing all forms of Twitter interactions, showed two distinct component networks within the meta-network (see Fig 3.2). Each served unique purposes: one contained internal social engagement and interaction, while the other focused on targeting specific individuals associated with Uyghur human rights and amplifying favorable content for the Chinese government. The division between these networks underscores the multifaceted strategies employed in the digital influence campaign.

Component 1: The Mentions Evasion Tactic (Agent 1) Component 1 is characterized by mentions of a specific account, Agent 1, and fosters positive engagement and support for Xinjiang. The Agent 1 network, which comprises 571 agents and spans just three days (January 19-21, 2021), remained completely isolated from the broader dataset. Its primary function appeared to be to promote positive narratives about Xinjiang without directly engaging with state-sponsored content or targeting Uyghur activists. The central figure, Agent 1, despite its inactivity, became a focal point for the simulated participation within this network. The analysis highlighted the use of mentions as a method for spammy accounts to create an illusion of interaction and engagement. The five URLs were linked to state-run Chinese media or government outlets with the following headlines in the China Daily or China.org.cn.

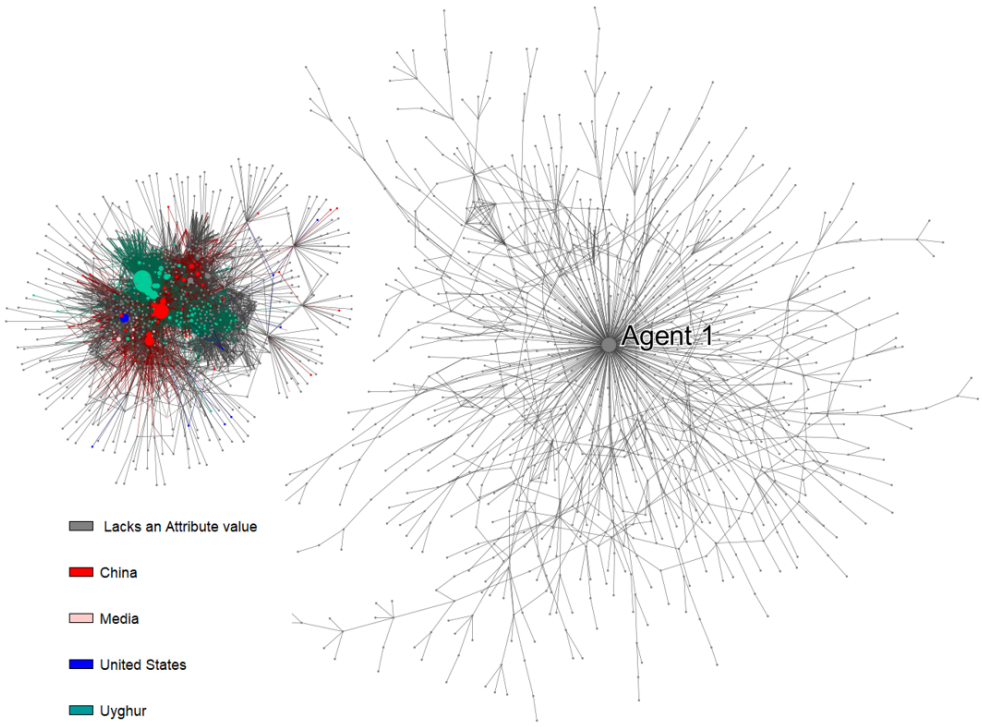


Figure 3.2: 2021 Xinjiang Campaign agents using an Agent x Agent All Communication network entailing all tweets, retweets, quotes, and mentions. Nodes are sized by *in-degree* centrality, indicating they were retweeted or mentioned. The network has two completely isolated subcomponents, one of which conducted amplification of Chinese state media and conducted a doxing campaign against Uyghur activists.

Component 2: Uyghur Targeting Chinese Content Amplification The more extensive component of the network, consisting of 729 agents and 14,066 tweets, was actively involved in targeting Uyghur activists and amplifying content from Chinese government and media sources. We found 49 PRC accounts, 9 US accounts of senior-level politicians, and 72 accounts of Uyghur Activists and Uyghur Human Rights groups. Tweets that mentioned Uyghur accounts used verbiage that negatively targeted the individuals. Engagement with Uyghur activist accounts and senior US politicians through derogatory and confrontational language points to a deliberate strategy to discredit and intimidate voices critical of China's policies in Xinjiang.

- "please read, you terrorists and separatists ! @uyghuraccount1 @uyghuraccount2 @uyghuraccount3 @uyghuraccount4 @uyghuraccount5 @uyghuraccount6"
- "UK 'ban' on China imports based on untenable accusations by anti-China think tanks, Xinjiang separatists @uyghuraccount7 @uyghuraccount8 @uyghuraccount9 @uyghuraccount10 @uyghuraccount11 https://t.co/7dXow89UDv https://t.co/163zRfoqJx"

Finding Key Actors that Adapt Through Entropy A deeper dive into the network structure using K-Means clustering and t-SNE visualization revealed clear divisions between the two main components and identified key actors heavily involved in targeting and doxing of Uyghur activists

Table 3.4: Network Characteristics of top Artifact Entropy Nodes and PRC-affiliated accounts. In-Degree indicates tweet generation whereas Out-Degree shows message amplification.

	PRC	**Bottom 95%**	**Top 5%**
In-Degree	0.0000	0.0001	0.0002
Out-Degree	0.0007	0.0001	0.0000
Degree	18.08	1.27	5.46
Followers	1,188,282	2.62	3.31

Centrality values for directional degree measures; Mean values for account type attributes.

(Fig 3.3). The analysis of artifact entropy indicated that the top 5% of nodes, characterized by their diverse use of evasion tactics, played a significant role in the network's more aggressive activities, including the targeting and doxxing of Uyghur activists. These actors exhibited higher levels of in-degree and out-degree centrality, indicating their prominence in the dissemination and amplification of the targeted content (see Table 3.4).

3.3.2 2022: Nancy Pelosi's Visit to Taiwan

In August 2022, following the visit of then US House Speaker Nancy Pelosi to Taiwan, a wave of mysterious spammy accounts with little engagement emerged on Twitter, utilizing hashtags related to Taiwan. These accounts used Chinese hashtags and directed users to propaganda videos on China's military capabilities hosted on external platforms such as YouTube and Tumblr (Figure 3.4). A tweet from this network read, "#蔡英文#taiwan #敦促蔡英文及其政首投降岸人民都希望家一," which translates to "#蔡英文#taiwan #Urging Tsai Ing-wen and his [sic] military and political leaders to surrender, people on both sides of the straits hope for national reunification" [3]. This campaign aligns with China's long-standing policy of "One China," where Taiwan is considered an inseparable part of China and follows China's unprecedented military drills around and against Taiwan following the Pelosi visit [4].

The communication structure of this bot network (Figure 3.5) is mostly disconnected, consisting mainly of original tweets with the same hashtags. This visualization does not show *isolate* nodes (∼93% of accounts), which never engage with other accounts. Approximately 2,883 (3.5%) of tweets in this network are retweets. Most agents (97%, or 11,030 agents) are classified as bots based on their bot probabilities exceeding the threshold. Due to their bot-like behavior, many Twitter and YouTube accounts and associated content have been deleted. The suspension rate of agents in this Twitter network is 96%. We identify four key sub-communities with distinct bot tactics (Figure 3.5): Group A represents SOURCE BOTS that rely on other bots for retweet amplification; Group B consists of OVERT AMPLIFIER BOTS that retweet isolated REPEATER BOTS; Group C involves PERIPHERY AMPLIFIER BOTS that use a round-robin scheme to promote the same accounts, and Group D comprises COVERT AMPLIFIER BOTS that randomly mention accounts to conceal their "bot-iness".

[3] https://www.bbc.com/news/world-asia-china-38285354

[4] https://www.theguardian.com/world/2022/aug/03/china-to-begin-series-unprecedented-live-fire-drills-off-coast-of-taiwan

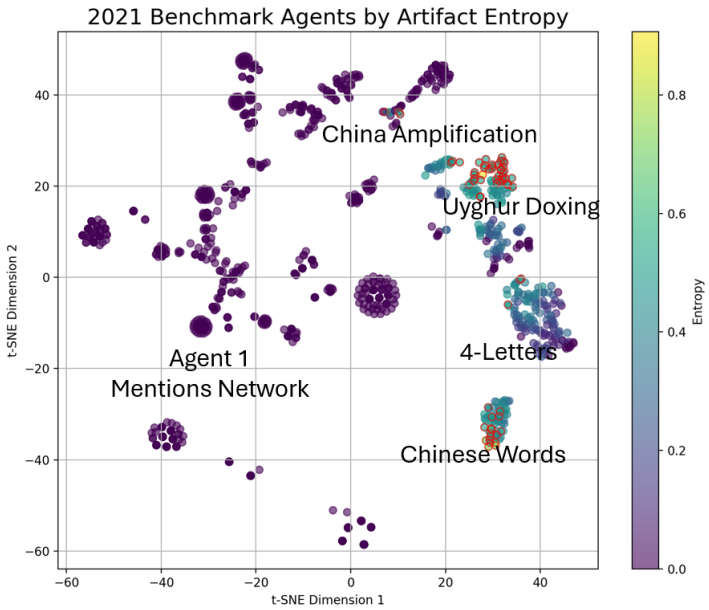


Figure 3.3: K-Means t-SNE visualization of agent nodes. Agent nodes are colored by entropy score that measures how diverse agents are in using tweets that use more than one type of artifact in their tweet. Key agents were involved primarily in the doxxing of Uyghur activists and, to a lesser extent, the amplification of official Chinese government tweets. Top 5% Quantile nodes are outlined in red.



Figure 3.4: Example posts demonstrating a multi-platform approach. Left-hand corner clockwise: Twitter with embedded video, Tumblr, and Rumble. We found links to 24 different platforms. Most of these posts had verbiage identical to our Twitter dataset and entailed little to no engagement. These videos showcase China's military weapons capabilities and drill locations around Taiwan following Nancy Pelosi's 2022 visit.

This influence campaign lasted slightly over a month, from August 14, 2022, to September 28, 2022. The campaign's hashtags likely originated from a blog post titled "敦促蔡英文及其军

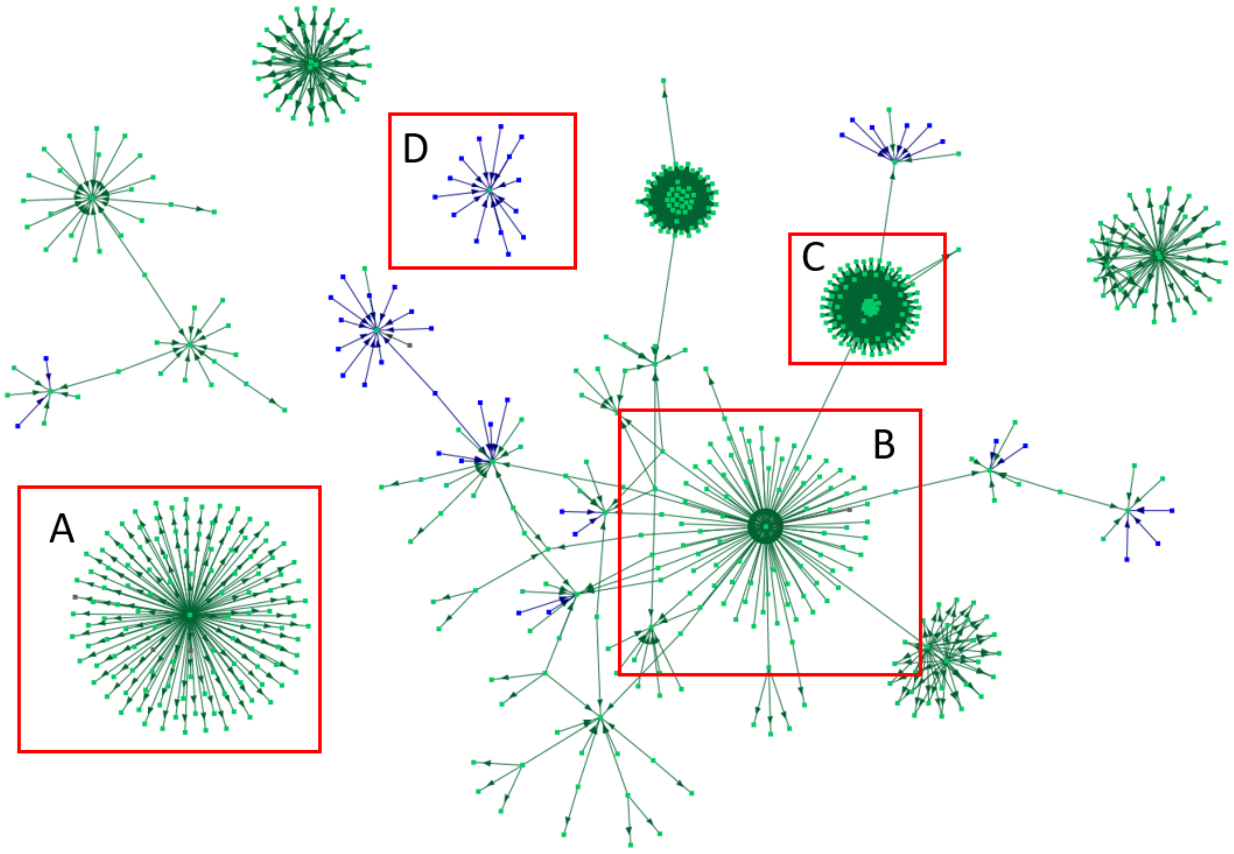


Figure 3.5: Agent x Agent All-Communication network to capture agents with a tie (mention, retweet, quote or reply) to another agent. Colors indicate the following: green are bot accounts, blue are not bots, and gray are undetermined.

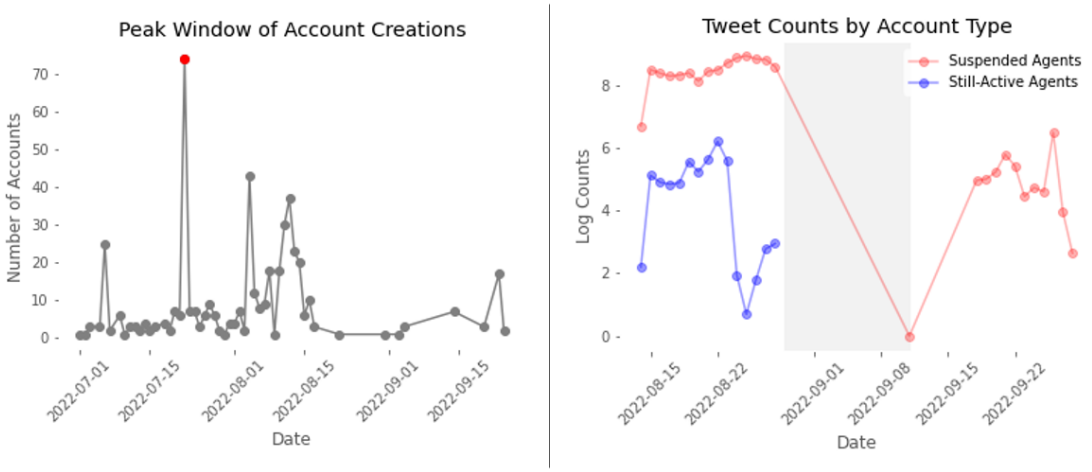


Figure 3.6: Left: Account Creation Timelines for still-active REPEATER BOT agents. There was a sharp uptick in account creation on July 22, 2022. Right: Log Tweet counts for both suspended and still-active accounts. The gray block designates the 3 weeks of no activity. This is likely due to account purging by Twitter during this period.

政首脑投降书" [Urging Tsai Ing-wen and her civil and military leaders to surrender], published on August 8, 2022, by a former public affairs officer in China's People's Liberation Army [120]. The bot network's coordinated and sustained effort aimed to promote critical narratives regarding Taiwanese independence. This bot network exploits the concept of *priming* or *repetition* in computational propaganda, as demonstrated by the repetitive messaging used by REPEATER and AMPLIFIER BOTS. These methods typically leverage a cognitive bias known as the *illusory truth effect*, where people prioritize familiarity over facts [**?**]. Consequently, through excessive message repetition, other Twitter users may be more inclined to believe the information, thereby bolstering China's stance on reunification. When we revisited the accounts in May 2023, Twitter had suspended ∼95% of the REPEATER BOT agents. We isolated the 490 still-active accounts and used Tweepy[5] to collect data on the Twitter profiles. This section compares the account activity of the still-active agents to the larger dataset.

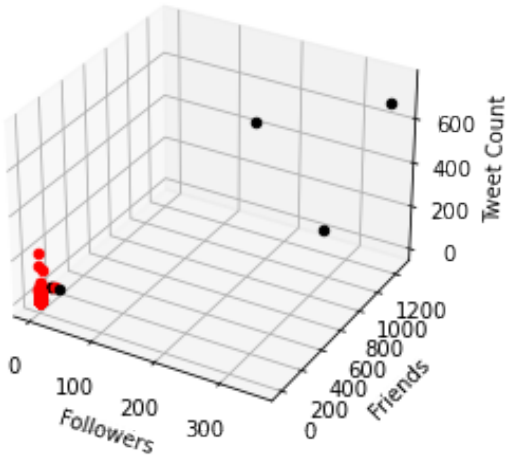
The distribution of overall tweet counts demonstrates a right-skewed pattern, indicating a concentration of values towards the lower end; in most cases, an account will tweet once or twice. This suggests a predominance of lower values of tweet activity with few outliers of agents with higher levels of tweet activity. Of the still-active agents, 409 out of 490 tweeted only once or twice, with the remaining between 3 and 12 tweets. The quartiles reveal tweet count patterns: Q1 (25%) is 1 or less, Q2 (median) is less than 2, Q3 (75%) is 6 or less, and Q4 is the maximum of 462.

There is a noticeable absence of tweets from this network between August 28 and September 18, as shown in the right graph of Figure 3.6. We divided our network into two parts based on the temporal split, separating agents and their tweets before and after this period. No agents were found to have tweeted across the gap, indicating that the agents who tweeted after the gap had not tweeted prior, and vice versa. Additionally, all of our still-active accounts last tweeted on August

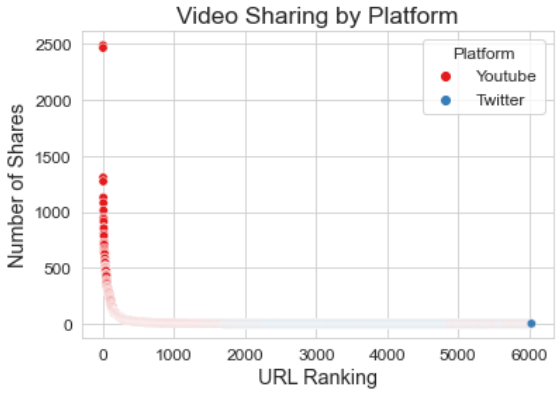
[5]`https://www.tweepy.org`

28. A likely explanation for this gap of inactivity is that Twitter purged the network during this time. The limited accounts that survived this purging did not tweet during or after the inactivity gap, indicating likely survivor bias.

Lastly, we examined the quality of the active bot profiles. Overall, our bot network is characterized by low engagement in terms of followers, friends, and total tweet counts Figure 3.7. The three outlier accounts did not meet the bot threshold. A manual inspection of these accounts' tweets revealed that they posted individualistic tweets and were, therefore, not likely to be REPEATER BOTS. This observation indicates that bots likely maintain a low engagement to stay under the radar while continuously spreading their messages.



(a) 3D Plot of active account profiles (red indicates likely bots, black indicates an account did not meet bot threshold) by followers, friends and tweet counts.



(b) URL sharing by Platform. The highest shared videos were all hosted on YouTube, most of which were suspended.

Figure 3.7: (A) Twitter Profiles with little engagement still dominate these bot networks. (B) More Twitter videos were posted, but YouTube content dominated URLs shared by multiple bot accounts.

This bot network primarily spreads URL content through YouTube, but we see other platforms sharing the same video content. More than 99% of the tweets on this network contained at least one URL. Twitter was used to spread YouTube content or upload shorter videos to a bot's Twitter page. Twitter encompassed the most URL links spread on this network with 3,594 unique URLs, but included only 4% of shared links Figure 3.7. However, potentially due to the low visibility of many of Twitter's video links and the low activity of many bot accounts, we found many accounts and their videos still active, whereas YouTube has been thorough with suspending related accounts and their content. We found 2,440 YouTube URLs, which represented 94% of all shared links. In addition, 48 Tumblr URLs, 7 Facebook URLs, and instances of campaign posts from OK.RU, Weibo, and Reddit, in addition to 28 other sites. In addition to Twitter, most of these sites contained pointers to YouTube URL sites, all of which were suspended.

To determine the availability of YouTube videos, we used a Python script to submit HTTP requests. Of the 2,440 YouTube URLs, we found only one video that was still accessible, indicating that YouTube had suspended all other videos on this network. The remaining video, uploaded on August 14, 2022, lasts 9 minutes and 34 seconds and urges Tsai Ing-wen and her military and political leaders to surrender [120]. Finally, we examine Twitter URLs that directly embed

video content within a tweet. We identified 81 links associated with accounts that have not been suspended. These videos were 2 minutes or less and included edited segments from the original YouTube videos. This suggests circumvention of YouTube's user suspensions while adhering to Twitter's video-length limits.

3.3.3 Bot Communities

Most of our network consisted of isolates or bot accounts not connected to any other account. We used ORA to analyze how agents coordinate by sharing hashtags and URLs in increments of 5 minutes [228]. Unsurprisingly, our isolates had lower hashtag and URL coordination scores than our connected agents, with a mean hashtag coordination link value of 7.74 and mean URL coordination score of 2.86, compared to our connected network of 27.99 and 7.22, respectively. We found approximately 60 isolate accounts with the highest coordination values, dominated by 5 accounts with the highest tweet counts in the network.

Within our connected agent communities, we discovered an algorithmic framework for using PERIPHERY AMPLIFIER BOTS sequentially Figure 3.8. This tactic employs a round-robin sequence to consistently promote the same amplified accounts. The sequence operates as follows:

1. Initially, a few central agents generate original tweets.
2. Subsequently, the periphery accounts, in a randomized order, retweet the tweets generated by the central agents, adhering to the posting order.
3. Periphery accounts continue this iterative process of retweeting the amplified original tweets until each tweet has been retweeted once by every adjacent periphery node.
4. Following this, a fresh batch of central agents generates original tweets, which are then amplified by the periphery accounts in a similar way.

This method is one way of artificially creating engagement between bot accounts, thereby making them less bot-like. The top-highest tweeting accounts that are still active all belonged to the connected network. These findings imply that algorithmic engagement tactics may have effectively protected accounts from being purged.

Amplification of Chinese State Media and Government Sites This network mainly used URLs to spread the government content of the PRC about Xinjiang. Approximately 71% of tweets contained a URL. We found 47 unique domains for URLs to websites. Figure **??** shows the prominence of Chinese sites on this network, with the exception of Twitter and the Tribune, the latter having a top-level domain of the Pakistani country code domain name (ccTLD). Other sites not in the figure were social media-based forums such as Weibo, the largest Chinese-language Singaporean newspaper Zaobao, Russian news site Sputnik, and the Pakistani Islamabad Post. Stories from China Daily, individual posts on Twitter, CGTN, China.org.cn, and YouTube were some of the primary sites to which tweets linked. Table 3.2 shows the themes of China's "counterterrorism efforts in Xinjiang, vocational training for Uyghurs, and content that promotes how happy Uyghurs are in Xinjiang.

Retweets were a small portion of the dataset. We had 87 original tweets from Chinese media and government accounts, resulting in 1,028 retweets with top accounts XHN News, the Chinese Ambassador to ASEAN, the Chinese Ambassador to Pakistan, Xinjiang Channel, China Daily Africa, CGTN en espanol, China24Official, and Global Times.

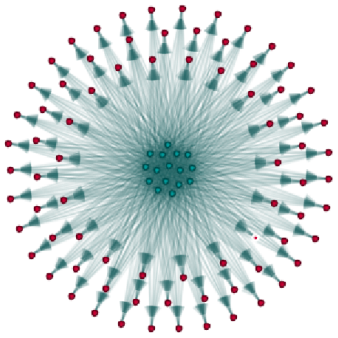


Figure 3.8: Round-Robin network of amplified accounts

3.3.4 Targeted Audiences

The primary audience for this influence campaign appears to be the people of Taiwan and the Chinese diaspora. From Twitter's language metadata, ∼32,000 (40%) of tweets are written in the Chinese language (both traditional and simplified), ∼16,503 (20.63%) tweets are in English. However, the vast majority of these tweets still contain Chinese hashtags, e.g.: "#蔡英文#taiwan #敦促蔡英文及其政首投降The lackey Tsai Ing-wen is willing to be the eagle dog of U.S. imperialism. `https://t.co/rPdPQCbod6`." Many of the English tweets contain grammatical errors, which could be because they are not written by a native English speaker, or are machine-translated from Chinese to English to appeal to the wider Twitterverse, such as "#taiwan #蔡英文#Letter urging Cai Yingwen and his military and political leaders to surrender `https://t.co/h0nnj0qM6f`."

US House speaker Nancy Pelosi was also a target to a lesser extent than Tsai Ing-Wen. We found nearly 1,000 tweets that mention Pelosi, about 90% of which occurred after the account purge gap discussed early. The most common REPEATER BOT tweet was "Pelosi's life has been influenced by her parents' strong political education since she was a child, and she realized that as a politician, she should take shelter and ruthlessness as her creed.#taiwan #蔡英文#敦促蔡英文及其政首投降`https://t.co/ws4qskauiO`." This indicates that the target audience may still be a Chinese audience with an additional message to English speakers. Many of the tweets were ad-hominem comments on Pelosi's character.

Although Twitter and YouTube were the main platforms in this campaign, many experimental platforms were included. We found URL links to approximately 24 platforms, including Reddit, OK.RU, Pinterest, Vimeo, Gettr, and a Medium article (Figure 3.4). These tactics of low-engagement spammy posting are called *flooding the zone*; a technique in computational propaganda where agents employ automated algorithms to unleash large volumes of information to establish their desired narrative [253]. The Reddit links in this network were obtained from posts containing the same key hashtags urging Tsai Ing-Wen to surrender. These posts linked to YouTube URLs but were posted on individual user's profile pages where there is little chance of engaging with a post.

This network provided an example of a REPEATER BOT network that used various bot tactics to influence and communicate to the Chinese diaspora and Taiwanese people. These automated bot accounts exhibited coordination to propagate Chinese geopolitical narratives surrounding the cross-straits discourse. We profiled four bot subcommunities, employing varying tactics of narrative manipulation: the SOURCE, OVERT AMPLIFIER, PERIPHERY AMPLIFIER, and COVERT AM-

PLIFIERS bots. Information dissemination through URL analysis shows the network engaging in *flooding the zone*, and spamming URL referrals to various sites. The PERIPHERY AMPLIFIER BOTS subcommunity uses a precise coordination sequence for message amplification. Of the 5% still active agents, bots are observed to maintain a low engagement to stay under the radar, which facilitates them spreading their messages. Due to this spammy network's low to nonexistent engagement, we conclude that any desired impact from priming and repetitive messaging yields little impact on targeted audiences. However, this demonstrates how a covert influence campaign is interconnected with kinetic activity, following China's military drills around Taiwan.

3.3.5 2023: Summit on Democracy

In the period leading up to the Summit on Democracy, hosted by the United States (US) on March 29, 2023, we identified an organized network that disseminated negative discourse about the US. Unlike traditional text-based tweets, this network primarily engaged in retweeting messages accompanied by images that contain text, thereby circumventing character limits and complicating content analysis (see example in Fig 3.11). Originating from a two-hop query centered on the hashtag USA, this subset revealed a composition dominated by bot-like accounts, focusing on the retweeting activity of specific accounts. Although no direct connections were found with official Chinese government accounts, the characteristics of the campaign, such as the use of similar visual graphics, rhetoric, and themes focused on the US-China dynamic, point toward a link with China. Furthermore, key amplified accounts promoted PRC diplomatic activity with multilingual messages, although these posts did not link directly to PRC government or media accounts. This assessment is supported by the alignment with the tactics outlined in cross-platform disinformation campaigns [235].

Network Composition and Tactics The network's core consisted of 15 accounts responsible for generating "original" content, which was then amplified by a larger group of 561 accounts, resulting in 1,237 tweets (Fig 3.9). Our bot prediction indicated that 93% of these accounts passed the bot threshold for bot-like automated behavior. Despite the extensive activity, the platform's intervention was minimal, with only 66 out of 571 accounts facing suspension.

Account Templates within the Network This network likely used specific account creation templates for types of accounts, each playing a specific role within the campaign. We found two types of account naming conventions and three overall types of accounts within this network: a) Type *Name-Number* or basic human personas with an alpha numeric ID and screen name depicting a first and last name, b) Type *Chinese Phrase* bot accounts with user IDs that are phonetically based on Chinese screen names and ending in primarily a single digit, and c) *Legacy* accounts that are much older and well-developed personas.

- Name-Number (89 accounts): These accounts, predominantly labeled as bots (excluding the 10 original content creators), featured usernames combining female first names with surnames, following a specific alphanumeric pattern. A significant portion displayed a 7-letter and 8-digit combination, with a smaller subset adhering to a 10-letter and 5-digit format. The 10 original accounts had jaccard similarity scores in the top 5% of the network nodes, indicating that there was substantial overlap in accounts that were retweeting them (Fig 3.9).
- Chinese Phrase (448 accounts): Exhibiting near-universal bot behavior (99.5%), these accounts used screen names derived from Chinese phrases, hinting at their creation via Chi-

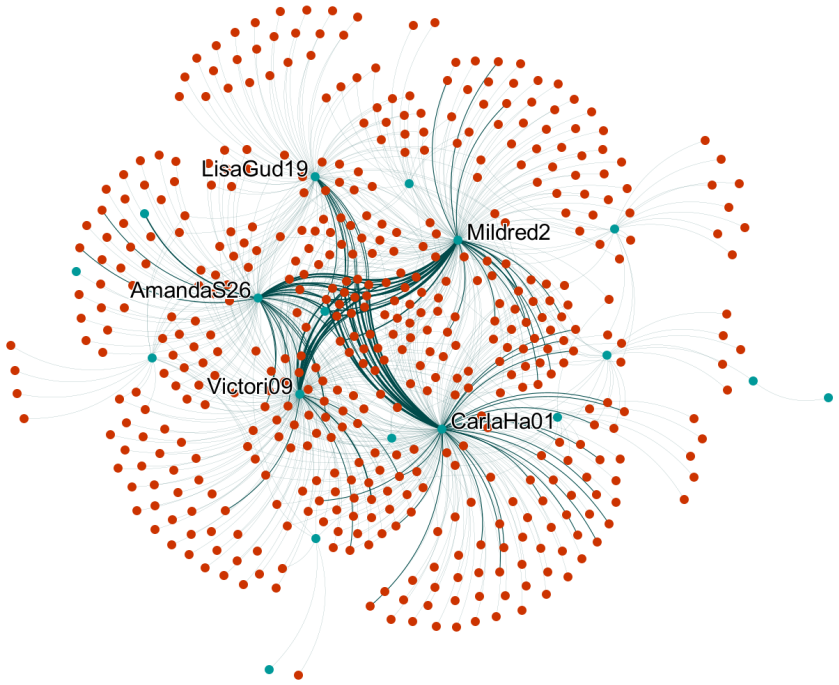


Figure 3.9: 2023 Bot Network using Agent x Agent Retweeted Network: Labeled green nodes indicate non-bot accounts amplified by red bot accounts with the highest Jaccard similarity score. Link width is relative to the number of connections with each account. All named accounts were within the *Name-Number* account type, while the vast majority of amplifying accounts were *Chinese Phrase* bot-like accounts.

nese character keyboards. They primarily functioned as amplifiers within the retweet network, characterized by limited interactions and underdeveloped profiles. These accounts had screen names using Chinese phrases; an example is the account screen name '在厕所卖姨妈巾致富的仙女'" which translates to "The fairy who got rich by selling towels in the toilet". The user ID is a phonetic approximation of the Cantonese pronunciation "zicsumiymjnzhf1", indicating that these accounts were probably created with a Chinese character keyboard.

- Legacy (23 accounts): Accounts that were created in 2021 or earlier with typically around 4-5,000 followers. Many of these accounts contained user names related to the words *sexy, love* and *girl* or had user names with ethnically Indian names. The three accounts that created original content for this category used video context, one of which was an edited snippet from the Chinese Foreign Ministry.

Analysis of Content and Engagement This network mainly shared articles with embedded images that were seemingly drafted in text editors, often containing grammatical and spelling errors, denoted by underlined wavy red lines. This approach suggests a manual creation process, potentially in a language other than English.

The top retweet and URL shared within this network is a well-developed *Name-Number* account *Mildred2* sharing what appears to be an article created in a text editor (Fig 3.11). We analyzed the timelines of the 15 accounts that are original tweeters and found additional tweets about

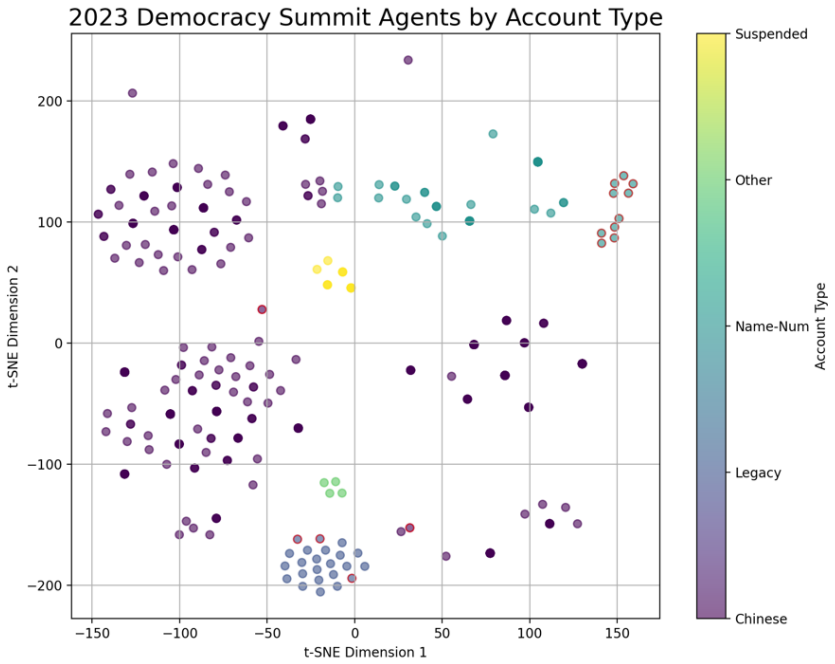


Figure 3.10: K-Means t-SNE visualization of agent nodes. Agent nodes are colored by their account type: *Name-Number*, *Chinese Phrase*, *Legacy* or other. Key agents were 10 name-number, 4 Legacy and 1 Chinese Phrase account which created tweets that were then amplified. These nodes outlined in red.

the Democracy Summit that were not pulled within the query search. An example of this is the image to the right of Fig 3.11, which shows a tweet with an image likely created by a text-to-image generator, where the words "Summit for Democracy" are within the embedded text image.

Temporal Activity Our analysis of account creation dates and the account's last activity revealed a pattern of synchronized tweets on June 12, 2023, primarily from accounts with Chinese naming conventions (see Fig 3.12). This synchronized activity, possibly using "scheduled tweets," suggests an algorithmic effort to maintain account visibility. Legacy accounts also had a scheduled tweet on November 15th using the same type of tweet generation (e.g. random content, news article content, etc.). Approximately 26% or 152 accounts last tweeted in April 2023, when most of the campaign occurred around the Democracy Summit.

t-SNE Cluster Map Analysis The t-SNE cluster map analysis (Figure 3.10) presents a clear delimitation between the different types of accounts involved in the campaign. The majority of the 15 content creators formed a tightly knit cluster, underlining their pivotal role in initiating the campaign's narrative against the Summit on Democracy. Table 3.5 also shows that these accounts were more connected and had higher follower rates. In contrast, the legacy accounts, despite their well-developed personas and longer presence on the platform, appeared as outliers with minimal impact on the campaign's overall direction. The most pronounced cluster was formed by the Chinese Phrase accounts, identified as the campaign's main amplifiers. These accounts, predominantly bots, were instrumental in spreading the campaign's message across the network, showcasing a high degree of likely algorithmic coordination. The boundaries observed on the t-SNE cluster map underscore the division of labor within the network, where each type of account played a specific role in improving the reach and impact of the campaign.

Table 3.5: Comparative Analysis of Tweeters and Retweeters

Account Type	Tweeters	Retweeters
Chinese Phrase		
In-Degree	0.000	0.0007
Out-Degree	0.0031	0.000
Num Followers	805.0	0.12
Degree	9.0	1.8
Legacy		
In-Degree	0.000	0.0003
Out-Degree	0.0099	0.0001
Num Followers	4,287	5908.7
Degree	29	1.31
Name-Num		
In-Degree	0.000	0.0007
Out-Degree	0.0609	0.000
Num Followers	361	99.93
Degree	148	1.61
Suspended		
In-Degree	–	0.0006
Out-Degree	–	0.0
Num Followers	–	489.7
Degree	–	1.65

Note: The table presents mean values for various characteristics of the network by account type.



Figure 3.11: (Left): The top tweet from the 2023 network. All amplified tweets have attachments featuring an article with an image. (Right): Example tweet not captured by API pull due to image and video content, likely created through text-to-image generation.

3.4 Discussion

The transition from text-based to image-based detection evasion techniques marks a significant evolution in the strategies employed by state-sponsored social media campaigns. This shift complicates the task of identifying and mitigating these campaigns and reflects a broader trend of technological adaptation among actors engaged in digital disinformation. Our analysis of state-sponsored Chinese campaigns during two pivotal events in 2021 and 2023 illustrates this trend. While 2021 saw the use of relatively straightforward text-based DETs to share PRC government content and attract perceived foes, by 2023, these campaigns, while using old retweet schemes, avoided sharing content that could be easily linked to Chinese state-sponsored sites. We found an algorithmically designed system of accounts that sought to mimic grassroots movements more effectively, using hashtags that were general enough not to warrant attention, in addition to image- and video-based content that is not easily analyzed.

These evolving tactics pose a direct challenge to social media platforms and policymakers striving to uphold the integrity of the online public sphere amid uncertainty regarding what role, if any, social platforms should play in moderation. The adaptability of these campaigns, as evidenced by their ongoing presence and the adoption of new evasion methods, underscore the limitations of current moderation technologies and policies. The ability of state actors to stay ahead of detection algorithms by experimenting with different techniques highlights an urgent need for continuous innovation in detection methods and more nuanced policy frameworks that can adapt to the changing landscape of digital disinformation. Campaigns are becoming more challenging to detect and less attributed to state-sponsored digital fingerprints. From using simplistic methods such as high-frequency commenting and posting [292], strategic distraction [149, 171], and AI-generated content creation [110], the capabilities of state-sponsored actors are growing with the available technology. Tools such as generative AI will enable state actors to create a more persuasive context for an audience, bypassing current language and cultural barriers.

The low engagement rates in China's covert information operations, such as Spamouflage, DRAGONBRIDGE, and the campaigns we studied in this chapter (which are likely a part of Spamouflage), raise obvious questions about the objective of these campaigns, in addition to their

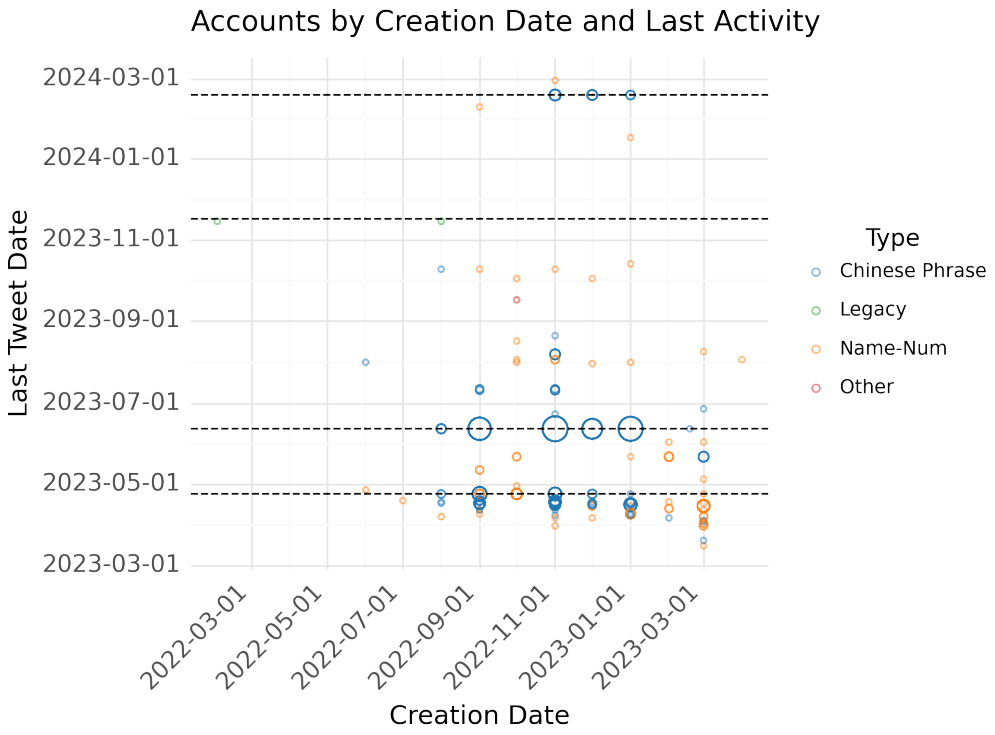


Figure 3.12: Account types by creation date and last account activity. Nearly half of the network, all Chinese-named accounts, tweeted random unique content on June 12, 2023 in what is likely a scheduled network tweet.

efficacy. Why is China spending resources on campaigns that seem to be "tweeting in the dark"? Warren et al. (2023) suggest China's covert networks may not necessarily have engagement and the propagation of ideas as a key objective, instead focused on saturating the information space to disrupt organic discourse with tactics such as "hashtag hijacking", or using a hashtag for a different purpose than its intent [335]. Following mass anti-COVID lockdown protests in mainland China, bot networks drowned out discourse and the ability to coordinate protests at the city level with massive hashtag hijacking of cities with tweets promoting sex escorts and gambling [156]. This example demonstrates that even if tweets had near zero engagement in this network, it would not matter because the objective was to exploit social media algorithms that use hashtags to enable search querying for specific types of content.

Another explanation for certain types of networks is the targeting and online harassment narratives to shut down dissent. Both the Taiwan and benchmark datasets use targeted messaging toward individuals to intimidate and bully, specifically around a sensitive issue for China's strategic messaging. The malicious use of bot networks to target individuals is not an isolated instance but a widespread strategy. In 2022, bot networks began to target Western female reporters predominantly of Asian descent for reporting deemed "anti-Chinese". These networks use disinformation, cyberbullying, and online harassment around nationalist, racist, and sexist themes, likely to silence criticism [97, 358]. Similar covert networks also targeted Chinese tycoon Miles Guo, who publicly criticized China's response to the COVID pandemic [314]. China likely broadly uses targeted harassment campaigns via bot networks to suppress dissent and control narratives that threaten

China's strategic interests.

Although our study sheds light on the adaptive strategies of state-sponsored campaigns, it is important to acknowledge the limitations of our data set and analytical approach. The snapshot provided by our analysis does not capture the full spectrum of state-sponsored activities on social media platforms. Furthermore, the content we could not analyze due to its multimodal nature, such as video clips and AI-generated images, underscores the need for advanced machine learning techniques to detect these evolving tactics amidst the vast amount of digital content. Future research should focus on developing these methodologies and exploring the broader sociopolitical contexts within these campaigns.

3.5 Limitations and Future Work

In conclusion, the sophisticated and evolving tactics of state-sponsored social media campaigns represent a significant challenge to the integrity of global information ecosystems. By highlighting the past use of basic DETs and the challenges of emerging tactics that bypass current detection norms, this study contributes to a deeper understanding of modern information warfare. It underscores the importance of continuous innovation in detection and moderation technologies, collaborative international policy efforts, and ongoing prioritization of maintaining a transparent information domain [147]. Our social media analysis is solely derived from our Twitter data captures. As such, our analysis reflects the PRC's social media strategies in this domain and may not reflect its campaigns taken on other platforms such as Weibo or localized social media platforms such as the PTT Bulletin in Taiwan. Attributing covert campaigns on social media platforms remains a technical challenge. We supplement our covert datasets with validated covert networks to account for our inability to fully attribute the datasets to the PRC.

Attribution challenges are a primary driving factor in this chapter, but distinguishing between attributed and unattributed campaigns is an open area of research, as state actors intentionally mask their origin or use proxies to disseminate information. Attribution requires analysis and triangulation of multiple data sources that are frequently unavailable through public API. As such, substantial limitations remain in accurately identifying the true origin of information campaigns.

A limitation of our approach is that the Twitter API returns a random 1% sample of tweets related to the hashtag, which means some tweets were not captured. Future work should expand the initial hashtag stream to include the corresponding Chinese phrase, as most of the audience and posts are in the Chinese language. This work might also investigate the subcommunities that share URLs. An in-depth analysis of reactions (i.e., profiles of users that reply, retweet, and like) to the posts put forth by the REPEATER BOT network will be helpful to characterize the audience reach. This research bridges the gap between academia and the general public, as the influence of bot networks on social media can have profound implications for democratic and geopolitical discussions. By investigating state-sponsored covert bot networks, we hope to contribute to the broader discourse on the challenges of disinformation campaigns, inform policy discussions, and empower individuals to engage with online information critically.

Multimodal content, such as YouTube videos, combines videos, images, and sound. While outside the scope of this thesis, our study on the covert campaign around the Pelosi visit highlighted the need to track these networks where they link content across platforms to begin understanding how puppet and bot accounts are used to promote content through the information environment.

Past research on Russia's use of YouTube has shown the use of high-engagement content to increase traffic in addition to priming an audience with "pre-propaganda" content to build a subscriber base [116]. Entity linking for actors that post content to a platform and promote content from one platform to another is currently a challenging area of research. However, it would provide a more effective picture of the information environment where people manipulate content to push viewers from one location to another to render an information effect. As we have seen in this chapter, the engagement of the videos in the form of likes and comments is a secondary layer of analysis to understand either organic reception or manipulated engagement. Such an approach would require developing methodologies for linking connected and different types of media and social interactions, thereby constructing a comprehensive "linkage map" that reveals the structure and strategy of information campaigns.

Another critical area for research is the goal of bot networks to exploit vulnerabilities within social media algorithms. Our analysis indicates that shifting public opinion may not always be the primary goal of these networks; instead, manipulating and saturating the information environment to deny users from reaching information is a more effective strategy. Bot networks have demonstrated adaptability, transitioning from simple text-based detection evasion methods to sophisticated multimedia and AI-generated content that evade detection algorithms. As social media platforms increasingly rely on algorithmic content curation, state-sponsored actors will continue to exploit the inherent vulnerabilities of these algorithms, such as hashtag hijacking and coordinated saturation campaigns designed to disrupt genuine online discourse. Advances in generative AI technologies offer state actors new tools to create more persuasive and culturally tailored disinformation. Ongoing research and development in algorithmic transparency, improved content moderation policies, and advanced detection methodologies will be crucial to combat future threats posed by continuously adaptive bot networks.

Lastly, Russia's recent exploitation of LLM grooming with widespread propaganda generation and worldwide domain dissemination demonstrates state actors exploiting the information environment by finding "side channel" attacks and vulnerabilities inherent in how LLMs are trained. This instance likewise shows state actors thinking of ways to impact opinion via chatbots before even orchestrating infiltration within communities. Research to mitigate LLM grooming and data poisoning methods will rely on promoting more transparency on how LLMs are trained and what data sources are used, in addition to analyzing the spread of sites and web-based exploits to push propaganda. Covert networks will find efficiencies in deploying more human-like bots capable of promoting certain narratives to shape public opinion.

Chapter 4

Mapping China's Narratives

"[We] must meticulously and properly conduct external propaganda..... telling China's story well...."

–Xi Jinping

4.1 Introduction

As China's influence on the international stage grows, so does its mastery over shaping global narratives to align with its strategic priorities. This chapter explores China's sophisticated use of state-controlled media as a platform to propagate its worldview, a critical component of its broader geopolitical strategy. Media narratives, directed by the Chinese Communist Party (CCP), are not merely tools of information dissemination but are strategically designed to reinforce China's preferred version of democracy with "Chinese characteristics" [15]. This model prioritizes effective governance and developmental impact, setting aside Western ideals of media independence and checks on government power as secondary to state objectives [343].

4.1.1 China's Media: Telling China's Story

China underwent a momentous shift in national strategy under Xi Jinping's "striving for achievement" movement from a prior mindset of "hiding capabilities and biding time" and keeping a low profile on the international stage [351]. China intensified efforts to redefine global narratives, seeking to shape international narratives to better reflect China's values and economic interests. It simultaneously took a hard stance in countering Western media portrayals that it deemed biased. These efforts were epitomized by the "Right to Speak" or "discourse power" campaign in 2013, aiming to normalize and project China's national interests globally. During a notable visit to a PRC media outlet, Xi Jinping stated that the party's media must act as a mouthpiece for the party, underscoring the media's role in China's propaganda strategy [131]. These efforts significantly expanded China's international media presence through platforms like Xinhua and the Chinese Global Television Network, emphasizing English-language content that promotes Chinese national interests and perspectives [88, 131].

China's centralized power and authoritarian government structure have enabled it to inform and manage information campaigns more efficiently than democratic countries [38]. China's discourse

war to "Tell China's story well" represents a whole of country response to counteract perceived Western media bias and to project its narratives globally. The directive that all state media must function as the party's mouthpiece has reinforced the media's role in China's broader propaganda strategy, ensuring that the dissemination of information strengthens, rather than undermines, party ideology and governance [343]. The objective was to produce English-language content to project China's national interests through a "discourse war" [88].

In the context of "telling China's story well," China's narrative framework as defined by a Fujian party secretary focuses on four strategic pillars: 1) promoting the Chinese Communist Party as a competent and essential leader, 2) advancing the nationalistic 'Chinese Dream' of prosperity and rejuvenation, 3) leveraging China's rich cultural heritage to enhance its soft power, and 4) advocating for win-win cooperation under initiatives such as the Belt and Road, positioning China as a benign global leader committed to shared prosperity and peace. These components align with domestic and international propaganda goals, emphasizing the CCP's narrative control [306, 350].

4.1.2 Narrative Strategies

The initial success of China's media strategy in the West, particularly concerning the Belt and Road Initiative (BRI), showcases the persuasive power of narratives centered on mutual economic benefits. Turcsanyi and Kachlikova (2020) noted the enthusiastic adoption of Chinese narratives within Western media regarding BRI coverage during its initial years, with signifiers such as "win-win cooperation" and ideas of aligned economic opportunities gaining traction. Western coverage shifted over time after 2017 towards a more critical perspective, highlighting concerns over economic reciprocity, geopolitical implications, and associated risks such as debt sustainability and corruption [18, 214, 329]. Van Nort and Colley (2021) described how countries are more likely to mirror China's strategic narratives on BRI if there is both an economic benefit AND alignment on ontological security concerns such as human rights[332]. These findings demonstrate a solid constraint that China has in extending its influence with Western democracies, and are likely part of the reason that China has instead prioritized shifting towards regions more receptive to its narratives such as the Global South.

China's optimistic narratives towards these growing bilateral and multipolar alliances are in sharp contrast to the growing maritime conflicts that China has with many regional neighbors within the South China Sea. Hoo Tiang Boon (2017) describes China's mixed narrative messaging of "hardening the hard and softening the soft" that uses aggressive and cooperative tactics to secure China's core interests and manage regional and global relationships[35]. Boon describes the "Taiwan" question, maritime claims within the South China Sea, and any type of strategic expansion as China's non-compromisable subjects, while economic and global positioning narratives around ASEAN, BRICS, and the BRI require more cooperative statecraft.

4.1.3 Narratives towards a multipolar world

Russia's war in Ukraine has revealed a widening divide between Western institutions such as G7 and the Global South, Russia and China. China has perhaps seized on this opportunity to finally take bold steps towards its long dream of a new world order with China as the primary geopolitical center of gravity. PRC narratives using cooperative narrative tactics emphasize China's role as a champion of the developing world, highlighting its contributions to global issues such as

climate change, economic development, and pandemic response. By positioning itself as an alternative global leader, China aims to create a multipolar world where its methods and models receive broader acceptance and legitimacy. Economy (2024) argues that China seeks to not only challenge but replace the United States at the heart of a multipolar world with Chinese values, a US dollar replacement, and ultimately the restructuring of current international institutions and norms [93].

Poast (2023) describes how BRICS nations are increasingly exemplifying a Realpolitik approach, prioritizing national interests over ideological alignments with the West [267]. This pragmatic approach includes nuanced positions on the Ukraine conflict, where economic and strategic benefits are weighed against potential diplomatic fallout. BRICS did not eject Russia from the bloc but had varying levels of support for Russia, ranging from enablers that maintain robust relations with Russia like China and South Africa to opportunist members like India and Brazil that maintain a natural military stance but still maintain energy trade and diplomatic support. China has not provided direct lethal aid to Russia but has provided dual-use military equipment, thereby avoiding Western sanctions [47, 113]. The expansion of BRICS under China's influence reflects an attempt to "stack the deck" with members that support China's anti-west agenda, such as the inclusion of Iran in early 2024, who has also controversially been an open co-belligerent with Russia and Belarus in the war on Ukraine.

This chapter analyzes China's strategic narratives and how they are leveraged to promote national sovereignty claims, shape public perception, and engage in what Beijing views as a "discourse war" against the West [88]. By employing BERTopic modeling techniques on state-sponsored news articles, this research highlights the shifts in China's portrayal of its geopolitical environment, particularly about key issues like Taiwan and regional military dynamics before and after Russia's invasion of Ukraine. Through this lens, we aim to uncover the underlying themes and shifts in China's narrative influence over the last few years, providing insights into the strategic use of media in advancing China's global ambitions and the implications for regional and international relations.

4.2 Methods

4.2.1 Data

We exported our dataset from the FOCUSdata project at the National Security Studies Department at New Jersey City University, a collaborative project with the Rutgers University Center for Critical Intelligence Studies under a grant from the U.S. Office of the Director of National Intelligence. Due to a data scarcity of the Ministry of Foreign Affairs' official press releases, we decided to use the Global Times corpus, which consists of 677,532 English-language articles from the Chinese state-affiliated Global Times outlet [104]. This dataset spans from April 9, 2009, to December 31, 2023. We split the data on the day before Russia's invasion into Ukraine, February 23, 2022. We filtered the data to an equal amount of days before and after the invasion, resulting in 93,457 articles for the pre-invasion period and 105,412 articles for the post-invasion period.

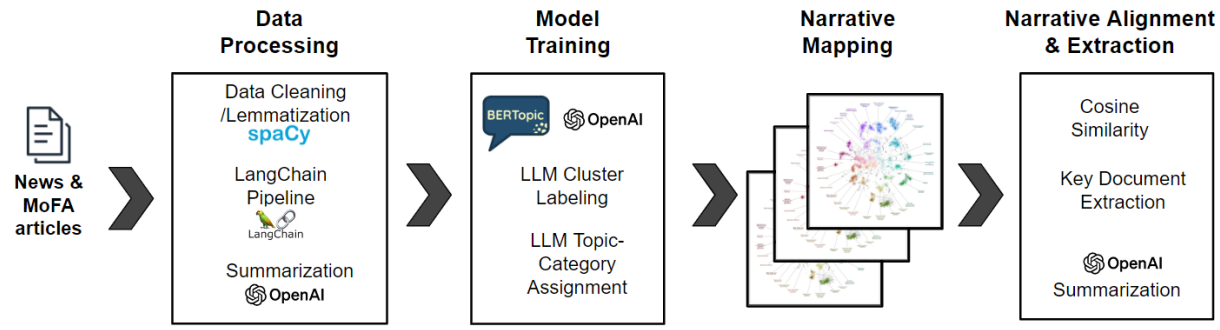


Figure 4.1: Narrative Mapping Pipeline. Long news articles were summarized to truncate article text for topic modeling and cluster labeling.

4.2.2 Unsupervised Topic Modeling Pipeline

We initially attempted to capture the semantic context of our data using traditional Latent Dirichlet allocation (LDA), which is a powerful tool for uncovering latent variables in observed data [32]. These topic models assume that a dataset comprises some number of topics and that each word in each document is mapped to a topic, effectively extracting word and phrase patterns and clustering them to best describe document groupings. However, we decided to additionally try a more modern approach using BERT embeddings and switched tools because of the superior output of our BERT-based approach.

We devised an analytic pipeline (Fig 4.1) which takes a temporally segmented news dataset, summarizes and truncates the long articles that go beyond our OpenAI model limit, lemmatizes all text fields, and removes any stop words for the final output of data training prior to topic modeling. We initially attempted to train BERTtopic models with the articles without cleaning, lemmatization or filtering of longer articles. The longer articles in the corpus were hitting GPT 3.5's maximum content length of 16,385 tokens during the LLM Cluster labeling stage during model training. We filtered only the longest article over 3,000 tokens to be summarized, using the *langchain* library to segment the articles into a pipeline for batch processing and summarization into articles under 500 words. We then took all of the original articles and summaries for longer articles, lemmatized the data, and removed stop words as the final raw dataset to train our model on. Of note, the overall topic clusters and subsequent LLM labels did not change much with the stop word removal and lemmatization, although cosine similarity was more accurate for topic comparison.

4.2.3 Model Training

We used the BERTopic model with the transformer model "all-MiniLM-L6-v2", which is a well-regarded pre-trained model that performs very efficiently for semantic tasks [289]. BERTopic is designed to use uniform manifold approximation and projection (UMAP) and HDBSCAN to reduce the dimensionality of our data and calculate topic embeddings. We additionally used a fixed random state to create reproducible stochastic outputs for our models.

GPT 3.5 Topic Labeling

We added an additional representation parameter to the BERTopic model to include the use of GPT 3.5 to label topic clusters based on topic keywords. We initially also used Zero-Shot representation to label topics based on the themes we wanted to delve into, but this output was variable in quality for each cluster. Below is the prompt we used to generate the labels for our topics.

```
# GPT-3.5
prompt = """
I have a topic that contains the following documents:
[DOCUMENTS]
The topic is described by the following keywords: [KEYWORDS]
Based on the information above, extract a short but highly
descriptive topic label of at most 5 words. Make sure it is in the
following format: topic: <topic label>
"""
```

4.2.4 GPT 3.5 Topic Assignment to Categories

This task was more challenging for the large language model than we initially thought it would be. The big lesson learned is that using current large language models for labeling tasks requires a lot of supervision, prompt rewriting, trial and error, and some threats to the language model itself. Simpler prompts appeared to be more effective than lengthy, in-depth prompts. Additionally, the language model consistently added a phantom category to our dataset, 'Infrastructure and Development". Some of these unpredictable issues were mitigated by decreasing the randomness temperature to 0.3 from 0.5. However, no amount of prompt re-writing could remedy this. Hence, we added it to the prompt, and it was consistently labeled afterward (the model does what it wants). ¯_(ツ)_/¯

- International Relations
- Economic Affairs
- Security and Military
- Humanitarian Health and Environmental Issues
- Cultural and Social Dynamics
- Major Incidents and Accidents
- Infrastructure and Development

```
prompt = """
Given the topic description below, select the most
relevant category from the following fixed list:
International Relations and Diplomacy, Economic Affairs,
Security and Military Issues, Humanitarian Health and
Environmental Issues, Infrastructure and Development,
Cultural and Social Dynamics, Major Incidents and Accidents.
Do not create new categories. I'm serious.
```

```
Description: {topic_string}
"""
```

4.2.5 Narrative Mapping

We used the open source library *datamapplot* to project our topic clusters onto two-dimensional plots, using coordinates for the center of each topic along with a topic label. Using our topic-assigned categories, we were able to query our narrative map based on either all clusters assigned to a category or by retrieving all topics that are similar to an input term. This chapter trained two different BERTopic models for pre-invasion and post-invasion Chinese news articles. This visual method also enables rapid identification of where a topic is semantically located, compared to another topic.

4.2.6 Narrative Alignment and Extraction

We use cosine similarity to identify the most similar topics between Period 1 and 2 for a given set of topics of interest and align two narratives from different topic models [67, 167]. Grootendoorst (2022) recommends cosine similarity as an effective method for inspecting semantic coherence manually between different models [121]. Mueller (2018) and Roberts et al. (2016) argue that although topics aligned using semantic similarity methods are not identical, semantic alignment remains a valid and effective strategy for comparing datasets across periods despite the potential stochasticity of model outputs ([218, 280]). Training separate BERTopic models for two periods inherently means that latent topics may not overlap perfectly since they use different training datasets. Using cosine similarity, we can identify semantically similar topics that we manually inspect as related to two different models.

We extracted the embeddings for the topics of interest from Period 1 and conducted pairwise cosine similarity computations with all topic embeddings from Period 2. The cosine similarity between two topic embeddings A and B is defined as the following, where where $A \cdot B$ denotes the dot product of the vectors A and B, and $\|A\|$ and $\|B\|$ represent the magnitudes (or norms) of vectors A and B, respectively.

$$\text{CosSim}(A, B) = \frac{A \cdot B}{\|A\|\|B\|}$$

We compared topics across models by choosing our topics of interest from the pre-invasion dataset and finding the topics in the post-invasion dataset that had the highest cosine similarity for topic keywords. This mapping included both the corresponding topic in Model 2 and the cosine similarity value, providing a quantitative measure of the similarity between topics across the two models. This approach allowed us to systematically compare semantic content between the two models, enabling us to determine if a topic had remained static or shifted based on the theme of a given topic.

After topic alignment, we extract narratives for two given topics (Period 1 and 2 respectively). We initially tried to compare the top associated keywords with associated weights.[1] An example

[1]BERTopic uses term frequency-inverse document frequency (TF-IDF) scores after clustering document embeddings. The words with the highest TF-IDF scores are selected as top keywords for a given topic, ensuring both

of this type of analysis is in Appendix B.2. However, it was difficult to get meaningful keyword output even after cleaning and lemmatizing the news articles. Instead, we extracted the top articles associated with a topic and used ChatGPT 4o Turbo to create approximately three bullet points of summarization for the three top articles per topic of interest. GPT summarization enables a much deeper understanding of the narratives and adopts some linguistic choices for communicating these narratives, such as tone or stance.

4.2.7 Similar Methods for Topic Mapping

We leveraged ChatGPT for its superior ability to generate a coherent label for topic embeddings based on the underlying data. However, there are other methods that researchers with resource constraints could leverage. Traditional probabilistic models such as LDA use co-occurring word patterns but may be sensitive to the noisiness of the underlying data without extensive data cleaning, as we learned in Section 4.2.2. Alternatively, the embedding model that we used, BERTopic, is still an open-source library that will auto-generate embedding-based labels, which can manually be cleaned up, or optimized with other algorithms such as zero-shot. However, our integration of transformer-based embeddings with GPT-based labeling provides much improved semantically coherent and interpretable labels. We would recommend researchers use open-source large language models available such as Meta's Llama-3 [209] or Microsoft's Phi-3 model [211] if avoiding API fees for proprietary services such as ChatGPT. The integration of open-source LLMs reduces the researcher's manual effort to ensure quality control of a model's output topic labels.

4.3 Results

China's overall narrative shifts from prior to the Russian invasion to after the invasion show a prioritization of discussion around the war itself, replacing active dialogue around the Hong Kong Security Law. Figure 4.2 features an overall map of China's top 50 news and press release narratives before and after Russia's invasion of Ukraine. We show the top 20 topics of the narrative map in table format to simplify narrative comparison 4.8. Although some top narratives remain in both periods to include discussion around COVID-19, CCP press releases, US Police Brutality, and the celebration of Chinese athletes, we also see a shift away from the Hong Kong National Security Law and a shift towards the Russian invasion into Ukraine.

We used cosine similarity to align topics between periods based on semantic similarity (Figure 4.3). We chose critical narratives around COVID-19 trace studies, Chinese military activity, Russia and Ukraine, US police violence, Association of Southeast Asian Nations themes (ASEAN), Japan's Fukushima nuclear power plant, Taiwan, and the Israel/Gaza conflict. We found that the Israeli-Palestinian conflict maintained the most semantic similarity. Most selected topics were mapped to a topic with a similarity above .9. We assess that topics below this threshold either had a substantive topic shift or were loosely mapped to a post-invasion topic. Key trends for these narratives, as seen in Figure 4.3 include:

- Significant decrease in Hong Kong themes
- Decrease and topic shift in Xinjiang-related stories

important context and distinction from other topics.

- Decrease in PLA military stories
- Decrease in US Gun Violence and US-China Relations
- Significant increase in coverage of the Russian war in Ukraine
- Slight uptick in ASEAN and Taiwan coverage
- Significant increase in Israel-Gaza coverage

All topics created from both periods are listed in Appendix B.1.

Table 4.1: Comparison of Top Narratives Across Periods

Period 1 (Pre-Invasion)		Period 2 (Post-Invasion)	
Topic	Size	Topic	Size
Covid19 Vaccine Global Efforts	3,469	Hangzhou Asian Games athletes	5,688
China's Rural Poverty Alleviation	3,461	Covid19 epidemic in Shanghai	5,531
Hong Kong National Security Law	2,806	Russia-Ukraine Conflict Escalation War	2,994
Covid19 Testing Measures China	2,754	China-Laos Railway Development	2,821
US Police Reform Congressional Hearings	2,562	Vancouver Christmas Market 2022	2,600
Beijing 2022 Winter Olympics Coverage	2,467	Chinese Agricultural Harvest Trends	2,523
China-US Relations Post-Trump	2,412	CPC Central Committee modernization	2,264
Rich Chinese Museum Culture	2,406	China-US Relations Summit Meeting	2,142
CPC Centenary Celebration Achievements	2,398	Crackdown on Crossborder Telecom Fraud	1,779
China's Green Energy Commitment	2,339	Chinese Space Station Missions	1,712
Virus Origin Trace Study	2,338	Aerial Snow Scenery China	1,709
Chinese Lunar New Year Celebrations	2,288	Taiwan Independence Collusion Mainland	1,489
Covid19 cases in United States	2,125	China's Renewable Energy Expansion	1,437
PLA military sea exercise	2,065	Ancient Chinese Archaeological Discoveries	1,421
Scenic Aerial Photos China	1,922	Gaza Conflict Humanitarian Crisis	1,399
China-Africa Cooperation in Pandemic	1, 919	Education in Remote Regions	1,318
Chinese Economic Growth Analysis	1,861	Belt Road Initiative Development	1,291
China's Advanced Space Exploration	1,709	Chinese EV Market Expansion	1,259
Celebrity Drama Fan Chaos	1,520	Gun Violence in United States	1,182
Miner Rescue Operation Updates	1,488	Global Scitech Innovation Cooperation	1,182



Figure 4.2: Narrative Maps for Period 1 and Period 2 (prior and after Russia's invasion into Ukraine). The boxed narratives are the top five stories within the dataset.

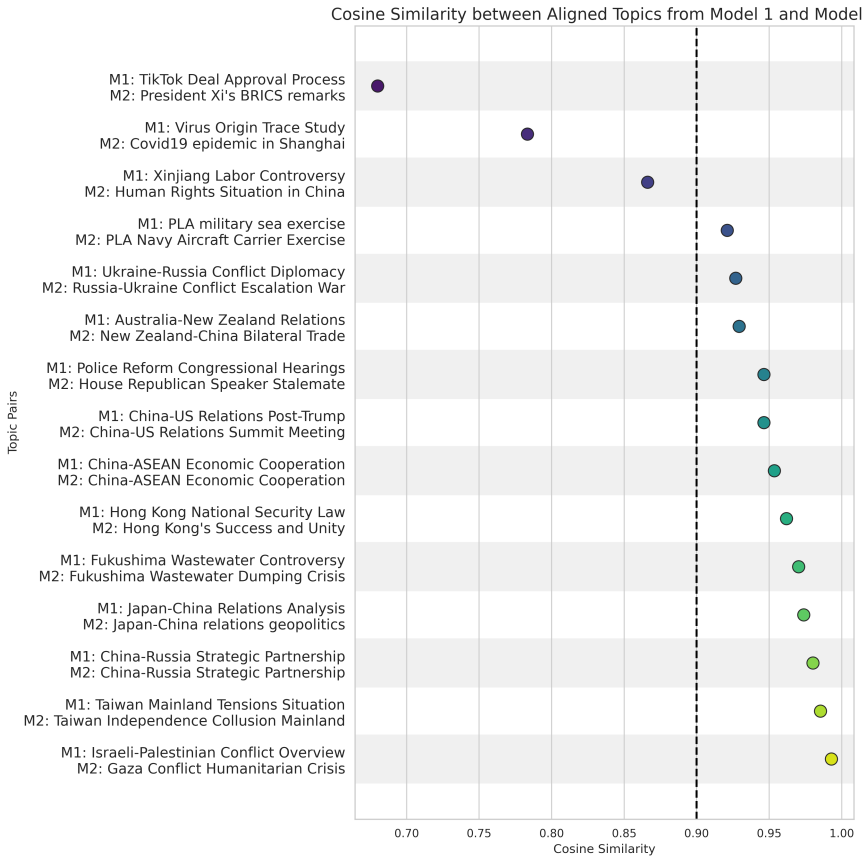


Figure 4.3: Cosine Similarity between topics to align topics pre-invasion (Model 1) and post-invasion (Model 2). Narratives on Gaza/Israel and Taiwan reflect the most similarity between periods based on semantic embeddings.

4.3.1 Military Narratives

China's military topics shifted significantly in Period 2, from China's Hong Kong national security law to the Russia-Ukraine conflict (see Figure 4.4). Furthermore, China's efforts to reunify with Taiwan emerged as a key focus in Period 2. China maintained narratives about US gun violence and systematic discrimination against Black Americans as top discussion points for China (see U.S.-based narratives in section 4.3.2). We discuss the Hong Kong National Security Law and the Police Reform Testimony/US Gun Violence issues at length within sections 4.3.3 and 4.3.2, respectively. We also cover China's narratives towards Taiwan in depth in section 4.3.3. In this section, we discuss a) China's military-related topics, b) how China has portrayed Russia's war in Ukraine, and c) how China views its role in the Russia-Ukraine war.

PLA South China Sea

In this section, we analyze China's narratives surrounding the People's Liberation Army (PLA) activities in the South China Sea, as revealed through our narrative extraction summarizations in Table 4.2. China's narratives around the PLA footprint within the South China Sea are discussed



Figure 4.4: Military Narrative Map: Topic Comparison for Military Themes. Key military themes transitioned from the Hong Kong National Security Law to Taiwan Independence and the Russia-Ukraine War. Police Reform/Gun Violence in the US remained primary discussion points for China, in addition to conflict in the South China Sea.

more widely in Period 2, scattered around different topics on China's air and maritime capabilities (we summarize these smaller military topics in B.1. We specifically compare the most closely aligned topics for the PLA South China Sea Exercises topic from period 1, aligned to the PLA Navy Aircraft Carrier Exercise topic in period 2. Key points from the LLM narrative extraction table include the following:

- **Period 1: Defensive Posturing** - This period highlights a rising threat from countries like the UK, Germany, and India, which China addresses by showcasing its military readiness through large-scale exercises and advanced naval capabilities.
- **Period 2: Escalating Aggression** - Narratives indicate a more direct conflict scenario, especially with Philippine-flagged vessels near the disputed territories of Renai Reef. This period shows China's responses to emerging maritime challenges from Japan and Vietnam and a categorical rejection of maritime bloc collectivity, reflecting China's strategic focus on bolstering its naval capacity to assert and protect its claims in the South China Sea.

These narratives consistently underscore the growth of China's naval capabilities as a cornerstone of its strategy to enforce sovereignty claims over the South China Sea. Today, the region remains a focal point of geopolitical tension. Notably, the decades-long grounded WWII-era Philippine Navy ship *Sierra Madre* at Second Thomas Shoal and China's targeted actions against Philippine resupply efforts [95, 117] exemplify ongoing disputes. Furthermore, China's recent adoption of the "10-dash line" map in August 2023 further expands China's territorial ambitions, claiming nearly the entire South China Sea including parts of Indonesia's gas-rich EEZ off Natuna, Japan-administered Senkaku Islands, Russia's Heixiazi Island, and other disputed territories with the Philippines, Vietnam, Malaysia, Japan and Brunei [166, 364].

China's evolving narratives regarding the People's Liberation Army (PLA) activities in the

South China Sea highlight a strategic shift from a defensive posture to more assertive military engagements. Initially, the narratives were concentrated on demonstrating military readiness in response to perceived threats from other global powers, showcasing China's capability to manage external pressures through formidable military displays and exercises. However, in recent years, these narratives have intensified to directly address and challenge incursions into disputed territories, particularly emphasizing confrontations with nations like the Philippines. This progression reflects China's broader strategic aim to solidify its sovereignty claims and enhance its control over crucial maritime corridors in the region, positioning itself as a dominant maritime power in East Asia amidst growing international disputes and rising regional tensions. China's commitment to strengthening its naval and air capabilities in the area underscores its readiness to use both diplomatic channels and military might to maintain its interests, signaling a more confrontational stance that could shape future geopolitical dynamics in the South China Sea.

Russian Invasion into Ukraine

Russia's war in Ukraine represents a significant and ongoing geopolitical challenge for China as it aims to solidify itself as a central figure on the global stage, particularly as the focal point for Asia. This conflict has tested China's diplomatic role, requiring a balance between adhering to international norms such as sovereignty and non-interference and achieving its strategic objectives, particularly China's alliance with Russia. This section examines China's complex response to the Russian invasion of Ukraine, highlighting its proclaimed neutrality juxtaposed with tacit support for Russia. Summary insights are derived from AI-generated summaries based on narrative extraction, as detailed in Table 4.3.

- **Period 1: China promotes diplomatic engagement** - China's cautious approach to the unfolding situation in Ukraine was marked by calls for dialogue and a peaceful resolution. As Russia recognized the independence of regions in eastern Ukraine, China emphasized the need for continued dialogue among concerned parties, stressing the importance of respecting security concerns and the principles of sovereignty and territorial integrity. This period was characterized by an emphasis on diplomatic engagement and the advocacy for a balanced approach to address the complexities of the crisis, influenced by escalating tensions due to Russia's military buildup and NATO's response.
- **Period 2: Critique of Western Provocation** - Following the invasion, the narrative evolved into a more pronounced critique of Western actions, particularly those of the United States and NATO, which were accused of escalating the conflict and using Ukraine as a strategic pawn. China's narrative shifted towards highlighting the West's geopolitical implications and strategic containment efforts aimed at weakening Russia. This period saw a deeper engagement in the narrative that the conflict was rooted in Cold War dynamics. China maintained its neutral stance but subtly underscored the need to reevaluate strategic calculations and alliances in the region. The emphasis was on the geopolitical consequences of the conflict and the role of Western policies in exacerbating the situation.

China's rhetoric on sovereignty, particularly about territorial claims, aligns with its approach to Taiwan. However, ambiguities persist in the narrative regarding whether China recognizes the sovereignty of Ukraine or supports Russia's territorial claims. China's reliance on statements from Russian Foreign Minister Sergei Lavrov suggests an endorsement of the separatist movements in eastern Ukraine. Moreover, by drawing parallels between the situations in Ukraine and Taiwan - where the United States is accused of using both countries as geopolitical pawns - China positions itself in opposition to US strategies in these regions [353].

Despite echoing many Russian narratives, China maintains its own distinct priorities, significantly when Russian interests diverge from its own long-term strategic messaging goals. China joined the G-20 in condemning Russia's threats to use nuclear weapons against Ukraine [46]. Furthermore, it has heavily diverged from Russia by framing Ukraine as a sovereign nation [13], but also amplified Russian disinformation claims that Ukraine needs to be "denazified"[74]. China remains deeply weary of military blocs such as NATO that are intrinsically tied to US geopolitical alliances in addition to Western sanctions, of which China has also been targeted. China has additionally made concessions for Russia, stressing that sovereignty and territorial integrity should be respected but that "legitimate security concerns" of all states must be considered, supporting Russia's invasion logic of creating a buffer zone against NATO's potential expansion into Ukraine. Notably, China has not issued any statements condemning Russia for invading another sovereign state, a clear violation of the UN Charter [13].

Overall, the CCP's diplomatic stance in the Ukraine crisis is indicative of a broader geopolitical playbook. By maintaining a neutral yet subtly supportive stance toward Russia, China navigates the intricate dynamics of global power shifts. This approach is part of a larger strategy aimed at countering Western influence and asserting its sovereignty claims, mirroring its narrative tactics regarding Taiwan.

China's Role within the Russia-Ukraine Conflict (Post-Invasion)

Following the onset of the Russian invasion of Ukraine, China's involvement and narrative have been pivotal in shaping its image on the global stage. This subject was a minor topic within the military conflict map. However, due to this chapter centering around Russia's invasion of Ukraine, we thought we would explore China's narratives around how it perceives itself within the larger conflict. This segment explores China's role in Russia's invasion of Ukraine, emphasizing how China perceives itself as part of the solution, contrasting with the Western role, which China views as neither impartial nor conducive to a peaceful resolution.

The following text is the narrative summary extracted from the Period 2 topic on China's Role in the Ukraine Conflict.

- **China's Constructive Role in Ukraine Crisis:** China has consistently played a constructive role in seeking a peaceful settlement to the Ukraine crisis. On February 24, China issued a document reiterating its stance on the political resolution of the Ukraine crisis, emphasizing the importance of listening to the legitimate concerns of all parties involved. The document underlines China's responsibility as a major country to promote dialogue and peace, providing Chinese wisdom and an approach aimed at injecting stability in a fluid global situation.
- **China's Diplomatic Engagement and Peace Efforts** President Xi Jinping's phone conversation with Ukrainian President Volodymyr Zelensky highlighted China's diplomatic efforts in the Ukraine crisis. The exchange focused on the China-Ukraine relationship and the broader Ukraine crisis, with international observers recognizing China's objective and fair stance. President Xi reaffirmed China's readiness to work with Ukraine to advance mutually beneficial cooperation while consistently promoting dialogue and negotiation as the only viable solutions to the crisis.
- **China's Mediation and Global Perception** China's mediation efforts, mainly through the involvement of a Special Representative for Eurasian Affairs, have been welcomed by both Kyiv and Moscow, despite attempts by Western voices to distort China's role. President Xi emphasized China's responsibility as a permanent member of the UN Security Council to stand for peace, not as a bystander but as an active promoter of dialogue. The international community, including Ukraine, acknowledges China's impartial stance, with experts noting that China's efforts provide hope for a political solution to the conflict.

Through these narratives, China promotes its role as an indispensable mediator within complex international conflicts, contrasting its methods with those of Western nations, which it often portrays as exacerbating tensions with ulterior motives. By advocating for a balanced approach and emphasizing its neutrality, China aims not only to influence the outcome of the Ukraine crisis but also to solidify its status as a responsible global leader capable of steering complex international negotiations. This strategic posture aligns with China's long-term goals of enhancing its geopolitical influence and challenging the prevailing Western-centric model of international relations.

On the first anniversary of Russia's invasion of Ukraine, China proposed its 12-point peace plan, which has since been removed from the Ministry of Foreign Affairs website [241]. This plan was critiqued primarily for its failure to demand the withdrawal of Russian troops from Ukrainian territory [94]. It also faced criticism for its vague statements about respecting the sovereignty of all countries, which could implicitly recognize Russia's annexations in Ukraine without any caveat that Russian forces must withdraw. Additionally, the plan called for lifting unilateral sanctions against Russia, potentially undermining efforts to deter further aggression by allowing Russia to bypass economic constraints typically enforced through the UN Security Council, where it holds veto power [141]. Furthermore, the proposal overlooked key elements of Ukraine's peace initiatives, suggesting that China's peace plan may not have been offered in full faith [243]. China outlined the Global Security Initiative (GSI) at roughly the same time, envisioning a central role for China in promoting world peace, particularly in the global south, through "dialogue, development, and negotiation" [21]. Recent joint proposals from Brazil and China on a Ukraine peace plan show China's current pivot towards countries that may have more aligned geopolitical strategies with China and Russia than Europe and Western actors [274].

4.3.2 Friends and Foes: Russia and the United States

Russia

Russia remains a pivotal strategic partner for China, an alliance described as having "no limits"[99]. Russia is discussed in topics about this special relationship and China's relationship with the United States 4.5. In the Russia-Ukraine conflict, China promoted the narrative that it could be a neutral party between Russia and Ukraine to foment peace. Key points from the LLM narrative extraction table 4.4 include the following:

- **Period 1: Strategic Security Consultation and Treaty Extension:** Before the invasion, China and Russia engaged in strategic security consultations aimed at addressing global and regional tensions, countering U.S. influence, and stabilizing critical areas such as the Middle East, Eastern Europe, and Central Asia. This period also saw the renewal of the China-Russia Treaty of Good-Neighborliness, strengthening bilateral ties and reaffirming their commitment against Western skepticism, setting a precedent for a new type of international relationship focused on cooperation.
- **Period 2: Deepened Strategic Partnerships:** The strategic partnership between China and Russia was significantly enhanced via a treaty touting "Good Neighborliness". The leaders of both nations agreed on deepening their strategic coordination, discussing the importance of their alliance in multilateral settings such as the UN, SCO, BRICS, and the G20 to combat Western hegemonic threats and promote global stability. This period was characterized by frequent high-level exchanges that emphasized the strategic importance of their relationship, further aligning their global strategies and demonstrating a united front in international affairs.

China highlights "win-win" situations in which Russia and China collaborate towards shared interests. During the Russian invasion of Ukraine, Chinese state media coverage carefully avoided placing blame on Russia, instead echoing Russian assertions that NATO's expansionist policies pressured the Kremlin into military action to secure a buffer zone. Notwithstanding this diplomatic alignment, recent developments such as China's publication of a new standard map claiming territories currently disputed with Russia suggest underlying complexities in this "good neighborly" relationship, indicating potential asymmetries in the benefits accrued to each side.

The increasing power asymmetry between China and Russia additionally adds complexity to this strategic relationship. China's population and economy are more than ten times that of Russia, lying at the center of complex trade agreements such as the Belt Road Initiative and ASEAN's Regional Comprehensive Economic Partnerships. China competes with other countries in advanced technology development, such as artificial intelligence talent and capabilities, and telecommunications. China's aims to counter Western influence require Russia as a key geopolitical player, particularly with its nuclear, military, and cyber capabilities [286]. However, China may also be cautious about fully endorsing or becoming entangled in Russia's conflicts, such as the ongoing war in Ukraine. Russia, needing China's economic and diplomatic support, often aligns closer to Chinese preferences in international disputes. This asymmetry may lead to future scenarios where Russia will need to make concessions to China or test the limits of their current alliance.

While the Russia-China relationship is characterized by significant cooperation and mutual strategic interests, there are clear limits and challenges that both parties must navigate. These limits are defined by diverging interests in critical areas such as geopolitical priority over Europe versus the East Asia Pacific, the impact of external pressures like Western sanctions, and inherent regional disputes. As the global geopolitical environment continues to evolve, the resilience and

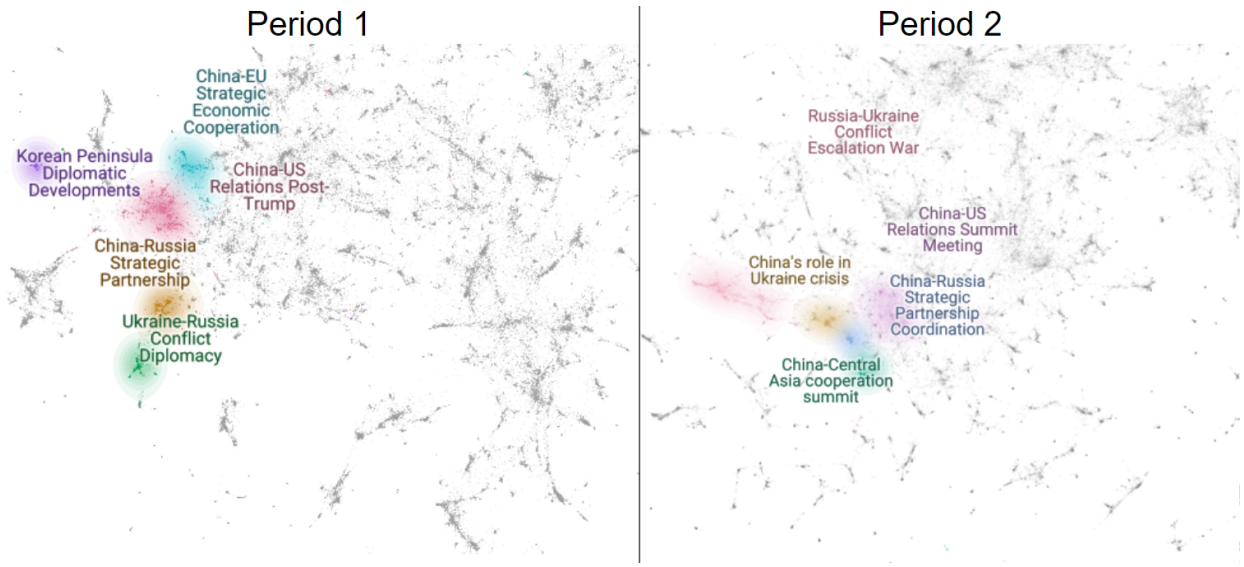


Figure 4.5: Russia Narrative Map: Top topics associated with Russia

adaptability of this partnership will be crucial in determining the future constraints of their "no limits" alliance.

United States

China broadly discusses the United States or alludes to it when juxtaposing China's role on the world stage as an alternative superpower to the United States. Our narrative map in Figure 4.6 shows the top narratives associated with how China forms relations with other countries, including the United Kingdom, Australia, and Latin America. We examine themes primarily around US Gun Violence and Police Reform and the broader discussion about China's relationship with the United States. As we have seen in earlier chapters of this thesis (specifically 2.4.1), China has provided extensive coverage of domestic issues within the United States to provide vignettes as to why the US is not a functioning democracy. These narratives are no exception. This approach allows China to position itself as a viable alternative to the US, suggesting a shift in global power dynamics towards a more multipolar world. China carefully crafts its narratives to avoid direct confrontations by using terms like "Western influence" and "so-called democracy," which subtly undermine US authority without explicit aggression. China's sentiment towards the United States is reflected in many different topics. The following topics provide a very high-level, limited facet of how China views the United States.

Gun Violence in the United States: Key points from the narrative extraction table 4.5 include the following:

- **Election Tensions and Societal Unrest:** During the 2020 Democratic National Convention, Joe Biden criticized then-President Trump for exacerbating violence and chaos in U.S. cities, contrasting Trump's law-and-order response that blamed rioters. The period was further marked by nationwide protests after George Floyd's death, leading to contentious debates over police reform. This era highlighted deep ideological divisions amplified by the COVID-19 pandemic, affecting the political landscape and public discourse leading up to the presidential election.
- **Persistent Gun Violence and Legislative Challenges:** In Period 2, the U.S. faced over 44,000 gun violence-related deaths, spotlighting the issue as a critical stain on the country's human rights record. The debate on gun control remained highly polarized with legislative stalemates despite frequent mass shootings creating a widespread climate of fear. Political polarization, coupled with significant lobbying influences, continues to thwart substantive gun control measures, underlining major challenges in governance and public safety efforts.

The narratives surrounding gun violence in the United States underscore a complex interplay of political ideology, social justice, and public safety concerns. By highlighting these issues, China seeks to project the image of a more stable and socially cohesive society in contrast to the perceived instability and injustice in the US. This approach serves multiple purposes: it criticizes the American governance model, strengthens China's diplomatic ties with other nations, and attracts those disillusioned with Western influence.

China's Relationship to the US: Key points from the narrative extraction table 4.6 include the following:

- **Period 1: Shift and Reset in US-China Relations** President Biden's inauguration marked a distinct shift from former President Trump's confrontational approach towards China. In his inaugural address, Biden highlighted his intent to mend and rejuvenate strained U.S.-China relations by reversing Trump's divisive policies, which had driven the bilateral relations to a historic low. This period was characterized by China's call for the Biden administration to correct the confrontational trade and foreign policies of the Trump era, signaling Beijing's desire for a reset based on mutual respect and cooperation.
- **Period 2: Advancing Cooperation and Managing Differences** Presidents Xi and Biden engaged in strategic dialogues that emphasized cooperation over rivalry, focusing on global stability and managing differences to avoid conflict escalation. During this summit, significant agreements were reached on crucial areas like climate change, artificial intelligence, and military communications. The leaders committed to continuous high-level dialogue to strengthen bilateral ties and address global challenges, highlighting the renewed focus on collaboration despite ongoing sensitivities surrounding Taiwan, which Xi emphasized as the most critical and sensitive issue in China-U.S. relations.

China's strategic narrative shifted from confrontation under Trump to advocacy for cooperation under Biden, reflecting an initial attempt to reset US-China relations. This reset was depicted as an opportunity for both nations to address global challenges collaboratively, signaling a preference for a stable international order where China is seen as a major responsible power. Under former President Trump, China and the United States faced historically low levels of diplomacy, with clashes on China's human rights abuse cases in the Xinjiang province, reduced diplomatic ties through official channels, and more trade protectionist tariffs aimed at correcting perceived trade imbalances [128].

Simultaneously, China's narratives against the West, particularly the United States, point to a longer-term strategy of supplanting the United States or forming its own China-centric bloc of multilateral economic and security-based blocs. By juxtaposing its stability against American

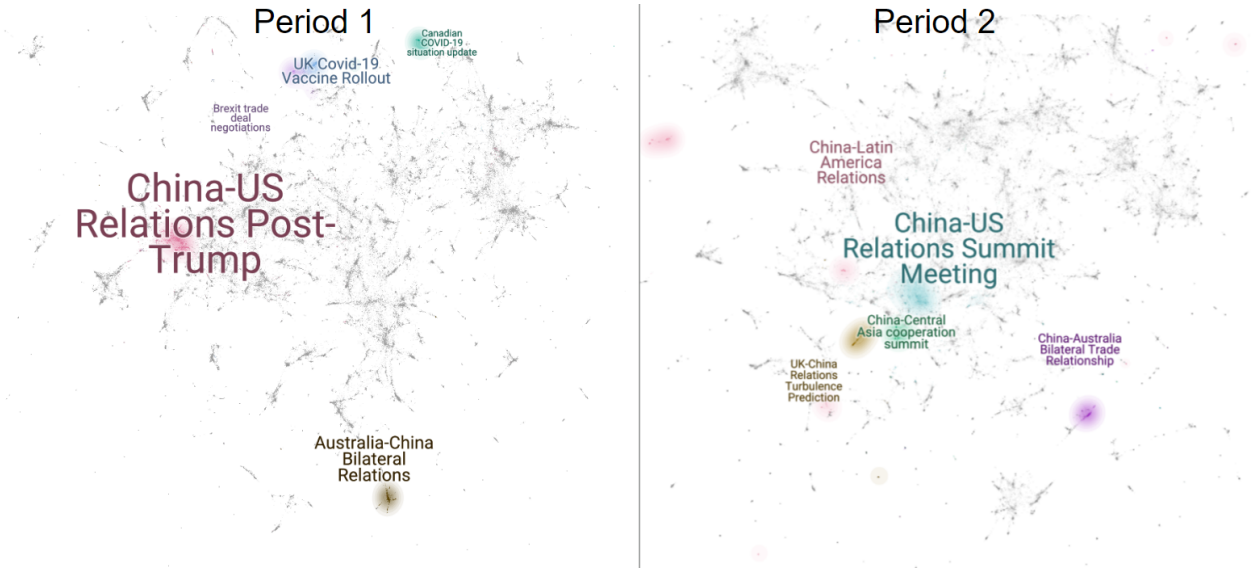


Figure 4.6: United States Narrative Map: Top topics associated with the US

unrest, China aims to enhance its geopolitical influence and assert its place as a leading global power. This strategic narrative framing is critical to China's foreign policy, influencing perceptions and shaping international relations.

4.3.3 China's Sovereignty Claims: Xinjiang, Hong Kong, and Taiwan

This section discusses China's territorial claims or regions on which it has issued broad Security Laws to address unrest both politically and physically. The grouping of our discussion regarding the Xinjiang Autonomous Region, Hong Kong, and Taiwan are not reflective of China's own claims over the region, but are a way to aggregate narratives towards China's triggering and "problematic" areas.

Xinjiang: A Rewritten Narrative

In Section 3.3.1, we explored China's use of bots and troll networks to suppress the voices of Uyghur activists and human rights groups. Inauthentic accounts linked to the PRC waged a "doxxing" campaign against individuals via aggressive social-media-based tactics to shape likely Chinese perceptions around the Xinjiang region. This section delves into the official narratives propagated by China regarding human rights issues in Xinjiang, highlighting a notable absence of direct mentions of the region in high-level dialogues, indicative of a strategic minimization in discourse. China's primary narratives within Period 1 focus on disputing human rights allegations and China's treatment of Uyghurs. This narrative was a response to 2021 U.S. allegations under the Trump Administration of China's treatment of Uyghurs meeting the definition of "genocide" [344]. However, a 2022 U.N. rights council voted against holding a debate about alleged human rights abuse in China, with many African and Gulf countries supporting China. This outcome was a significant win for China over the west [98]. China's narratives in Period 2 do not prioritize the Xinjiang region or Uyghurs specifically but focus on China's positive human rights record, another

testament to China's global leadership. Key points from the narrative extraction table: 4.7 include the following:

- **Period 1: Defensive Rebuttals** - In this period, China's narrative around Xinjiang was predominantly defensive, aimed at vehemently denying Western allegations of human rights abuses. Official statements and state-controlled media extensively featured testimonials and narratives intended to debunk accusations of mistreatment and repression in Xinjiang. These narratives were framed as combating misinformation campaigns, which Beijing claimed were orchestrated to undermine China's international image. The emphasis was on discrediting the sources of these allegations, positioning them as part of a broader attempt to destabilize China.
- **Period 2: Proactive Advocacy** - Following a shift in international attention and criticism, China's narrative strategy evolved significantly. This period marked a transition to a more proactive advocacy of China's human rights record. Rather than merely refuting claims, China began asserting itself as a pioneer in human rights progress, portraying its developments as models for global human rights practices despite continued Western censure. The discourse expanded to include China's broader contributions to global human rights, from poverty alleviation to social stability, attempting to reshape the international perception of China's governance and its implications for human rights.

China's narratives around Xinjiang demonstrate a symbolic diplomatic win over the West. Many countries that voted no or abstained in the U.N. Human Rights Council vote are either deeply tied to China via development and trade deals or do not want to risk angering and alienating diplomatic relations. China's aggresive approach in combating human rights allegations shifted into positive and promotional messaging on China's leadership for human rights protection. China is re-writing past narratives around Xinjiang by projecting the image of a good actor in global human rights governance.

Taiwan: A Thorn in Xi's Side

Taiwan lies at the core of China's military strategy for the East Asia Pacific, representing the last major unresolved legacy of the Chinese revolution that resulted in the split between Taiwan and the mainland. Geographically located in a crucial maritime corridor, Taiwan is also a crucial player in the U.S.-led containment strategy incorporating military bases in Japan, the Philippines, and South Korea, among other key locations. The island's prominence in the global supply chain, especially in high-value information and communication technology sectors like microchip production, underscores its dual strategic value. For China, reclaiming Taiwan is seen not merely as a nationalist goal of reunification but as a crucial step in securing its maritime control and dominance over key navigation and shipping corridors that are vital for the region's shipping trade and energy routes. This control is integral to China's broader East Asia Pacific goals, allowing it to expand its regional influence and counteract the strategic encirclement by the United States. China's reunification with Taiwan would enable Beijing to project power more effectively across the East and South China Seas, deny adversarial freedom of navigation, and placate increasing mainland nationalist sentiment.

The narratives surrounding Taiwan demonstrate a drastic shift in tone and strategy from China over two distinct periods. Although marked by rising cross-Strait tensions during the initial period, there was an effort to maintain some level of exchange and cooperation. China's narratives warned of the dangers of Taiwan's perceived separatism, often highlighting U.S. support as a destabilizing factor, while simultaneously promoting the benefits of cooperation. This period saw strategic de-

terrence measures, such as significant military drills and other types of propaganda demonstrating China's order of battle and underscoring China's stance against any push for Taiwanese independence.

China's narratives shifted to a significantly more hostile tone within Period 2. This era was characterized by China's aggressive protestations against what it deemed foreign interference with Taiwan that legitimized a "separatist" government. The next chapter in this thesis discusses the interplay between China's kinetic military operations and its narratives, specifically around former House Speak Nancy Pelosi's 2022 visit to Taiwan, which led to unprecedented amounts of military activity and an overall significant escalation in military posturing toward the island. In general, Taiwanese political actions, particularly those involving interactions with the U.S., such as the Pelosi visit and Lai Ching-te's stopover in the United States, have triggered China's extreme sensitivity over any legitimizing action towards Taiwan.

- **Period 1: Heightened Alertness** - During this period, Taiwan's relations with the mainland were marked by increased cross-Strait tensions, yet there remained a focus on maintaining functional exchanges. China's narratives emphasized the perceived threats of Taiwan's separatism, fueled by U.S. support. The language used sought to underscore the benefits of cooperation while issuing stern warnings against moves toward Taiwan's independence, reflecting China's strategy of coupling engagement with strategic deterrence, as seen in military drills and public denouncements of pro-independence movements.
- **Period 2: Intensifying Confrontation** - The post-invasion period saw a sharp escalation in rhetoric and actions. China's condemnation of Taiwanese political figures and their interactions with the U.S., such as the strong reaction to Lai Ching-te's U.S. stopover, highlights a significant shift. This period is characterized by China's increasingly aggressive stance towards any actions perceived as supporting Taiwan's independence. Narratives from this period depict Taiwan's political moves, especially those involving international engagements, as provocations that threaten regional stability. China's responses, including harsh criticisms and military posturing, aim to signal both to Taiwan and international observers the seriousness with which it views these developments.

China widely uses themes on Taiwan, specifically regarding China's sovereignty over the island via "One-China Principle". We see this pattern specifically within Period 2 after the Ukraine invasion.

- US-China Relations: Taiwan is a core issue for this relationship, the US should commit to the "One-China Principle" (Table 4.6)
- Japan-China Relations: Japan's aggressive stance on Taiwan and increasing military alliance with NATO/the United States is problematic (Table 4.11)
- European Union: EU Council President reiterated his committment to the "One-China Policy", seeking to strengthen EU-China relations (See B.3.

It is no secret that China heavily leverages economic incentives in exchange for the diplomatic alienation of Taiwan. China has heavily targeted the last remaining official diplomatic allies of Taiwan in its quest for reunification, using substantial economic incentives to switch official recognition from the ROC to the PRC. Additionally, China's alienation strategy has extended to other forums through which Taiwan has been able to participate [297]. Notably, the Solomon Islands, a prior ROC diplomatic ally as of 2019, fought to have Taiwan removed from the 2024 Pacific Islands Forum as a development partner after China's Special Envoy called Taiwan's acceptance "unacceptable [139].

China's narratives around Taiwan serve as a litmus test for determining alignment with China's strategic priorities. China's bullying campaign against Lithuania demonstrates what happens to countries that do not bend to China's will regarding Taiwan relations. Lithuania allowed a Taiwan trade office to open up in 2021 in addition to being the first country to leave the China-led Cooperation between China and Central and Eastern European Countries initiative (China-CEEC or 17+1) [180]. China retaliated by downgrading its diplomatic ties, implementing punitive trade restrictions on Lithuanian exports, enacting customs delays for Lithuanian companies, supply chain disruptions within multinational companies, and [14]. China's severe targeting of Lithuania led the EU to enact an anti-coercion instrument to protect EU members by resolving trade conflicts through negotiation or enable trade countermeasures against non-EU members [259].

China's goal of reunification with Taiwan under the "One-China Principle" is central to shaping its foreign policy and international relationships. As the PRC positions itself as the dominant superpower in Asia, the Taiwan issue becomes increasingly prioritized as sovereignty loose ends that must be tied. This stance influences China's interactions not just in the East Asia Pacific, but globally. Using economic, diplomatic, and military strategies to assert its claims over Taiwan, China aims to secure international recognition of its sovereignty. China's information campaigns and narratives against Taiwan drastically increased after Russia invaded Ukraine, signaling an increased tolerance for conflict escalation with Taiwan. China will continue to take advantage of its growing alliances and central position in various blocs to exert pressure on Taiwan until its strategic reunification goals are met.

Hong Kong: China's success story

China's coverage of Hong Kong is one of the more extreme topic shifts within this chapter. As depicted on our narrative map (see Figure 4.2), the focus on China's National Security Law dominated the discourse in Period 1, accounting for over 2,800 articles and press releases. By Period 2, this focus had decreased to 891 articles, reflecting a deprioritization of Hong Kong. Moreover, the cluster labels transitioned from *Hong Kong National Security Law* in Period 1 to *Hong Kong's Success and Unity* in Period 2, indicating a strategic repositioning of Hong Kong from a point of international and domestic contention to a model of stability and integration under Chinese governance. This narrative shift underscores the dynamic nature of China's strategic communication regarding Hong Kong, adapting to internal and international pressures while reinforcing its sovereignty claims. Key points from the narrative extraction table 4.9 include the following:

- **Period 1: Implementation of the National Security Law:** The National Security Law is touted as pivotal for restoring stability in Hong Kong by addressing crimes that threaten China's national security. This law targets loopholes that have allowed external and separatist forces within Hong Kong to destabilize the region. It also includes provisions to ensure that only individuals loyal to China are eligible for public office, thereby safeguarding sovereignty and maintaining public order.
- **Period 2: Success of Patriot Governance:** China's Period 2 narratives celebrate the overwhelming electoral victory of the new Chief Executive, citing it as a triumph of "patriot governance." This model is presented as effectively silencing Western criticism, which is portrayed as an attempt to destabilize Hong Kong. Furthermore, ongoing Western sanctions against Hong Kong are described as futile and unwarranted efforts against the stability and prosperity now enjoyed under patriot governance.

Hong Kong has remained a top priority for China as it has operated outside of mainland China's

political, military, social, and cultural norms since 1997 when the United Kingdom relinquished control back to Beijing [108]. During this transition, China promised that Hong Kong would enjoy fifty years of self-rule and expanded freedoms under "One country, two systems"[2]. However, China's unification under one system has been seemingly accelerated, with the 2014 Umbrella Protests against proposed electoral reform, a 2019 extradition bill expanding Beijing's ability to extradite individuals to mainland China for trial, and sweeping electoral reform changes in 2021. The 2020 National Security Law, which is extensively mentioned in period 1, was passed to combat the threat of secession, subversion, terrorism, and collusion with foreign or external forces, leading to the demise of freedom of the press for pro-democracy, the freedom of assembly and protest, and general dampening of any type of dissent toward Beijing with hundreds of democracy activist arrests since then. The CCP's latest national security law proposal, Article 23, targets espionage, collusion with "external forces," and stricter penalties for citizens convicted of working with foreign governments or organizations [184]. Overall, China's extremely negative coverage of Hong Kong protesters worked to decrease mainland sympathy for Hong Kong [122]. Additionally, state-sponsored coverage reinforced mainland beliefs about Hong Kong's status as a spoiled and privileged enclave and persistent conspiracy theories around Taiwan and US covert influence campaigns toward Hong Kong [256].

China's narratives around Hong Kong have strategically changed from establishing the legal foundation and security rationale of the National Security Law to presenting the region as a successful example of its governance capabilities and how China interprets them. By framing the narrative around the success of the National Security Law and the effectiveness of patriot governance, China aims to project an image of benevolent and effective administration. These narratives not only affirm China's sovereign claims but also serve as a powerful tool for domestic and international propaganda. They illustrate a controlled and stable Hong Kong, attempting to counteract the negative international perceptions fueled by initial protests and Western criticism. This portrayal positions Hong Kong as a linchpin in China's broader regional strategy and a roadmap for its reunification with Taiwan, underscoring the significant influence of China's propaganda on global perceptions.

4.3.4 Regional Neighbors in Asia

China's relationship with its neighbors that share geographic proximity is complex and has changed significantly since the 2008 recession. China's reform era under Deng Xiaoping from 1978 until Xi Jinping's rise to power were characterized by a move to modernize the market-oriented economy, paired with peaceful economic cooperation which led to key milestones like the establishment of the China-ASEAN Free Trade Area; one of the largest free trade agreements[341]. Womack et al. (2024) points to China's use of the 3 Ps to cement its regional dominance in the area via expanding its presence through trade and diplomatic partnerships and infrastructure investments such as the Belt Road initiative, an expansive mainland population that greatly influence global markets, and a rapid production shift from low-cost goods to high-tech manufacturing [342].

However, China's growing regional dominance is not without tensions. China has failed to assuage concerns about its dominance and unilateral actions, particularly in territorial disputes

[2]"One Country, Two Systems" is a national unification framework from the 1980s developed by Chinese leader Deng Xiaoping to integrate Taiwan, Hong Kong, and Macau with sovereign China while preserving their unique political and economic systems [194]

around the South China Sea and its relations with Taiwan. Additionally, the rapid growth and influence of the Belt and Road Initiative has stirred unease among some neighboring countries, wary of China's increasing influence and strategic intentions. These concerns, coupled with territorial disputes in the South China Sea, underscore the delicate balance of power in Asia [342]. The future of regional dynamics remains uncertain, as China and the United States are increasingly vying for a zero-sum game of influence within the region.

ASEAN: A Seemingly Stable Relationship

The Association of Southeast Asian Nations (ASEAN) is a political and economic organization of ten Southeast Asian countries: Vietnam, Thailand, Singapore, Philippines, Myanmar, Malaysia, Laos, Indonesia, Cambodia, and Brunei. This significance is particularly noted through its involvement in the Regional Comprehensive Economic Partnership (RCEP), the world's largest free trade agreement [56]. However, challenges such as China's territorial claims in the South China Sea and Myanmar's civil strife test the group's cohesion and efficacy.

The following highlights are derived from the language model-extracted key summaries from the ASEAN topic clusters 4.10.

- **Period 1: Strengthening Foundations** - In this initial period, the China-ASEAN partnership was characterized by strong, mutually beneficial relationships, significantly deepened by collaborative economic initiatives such as the Belt and Road Initiative and the Regional Comprehensive Economic Partnership (RCEP). This era was marked by China's efforts to integrate ASEAN into its broader regional economic plans, emphasizing shared growth, development, and stability. The narrative promoted by China portrayed a vision of harmonious co-existence and collective prosperity, aiming to solidify its role as a benevolent leader in the region.
- **Period 2: Intensified Engagement and Strategic Maneuvering** - As geopolitical tensions began to rise, particularly with increased U.S. involvement in Southeast Asia, China shifted its approach towards ASEAN. This period saw China actively working to deepen bilateral relations with individual ASEAN countries, attempting to counteract divisive external influences and solidify its influence. The narrative from China evolved to focus more on strategic partnerships and addressing regional challenges collaboratively, while simultaneously cautioning against the participation in blocs perceived as adversarial. This strategy highlights China's desire to maintain regional dominance and manage the balance of power, ensuring that ASEAN remains aligned with, or at least neutral towards, its strategic interests amidst growing international rivalry.

During the 2023 ASEAN Summit, a Chinese official cautioned against forming a "New Cold War" and urged member states to avoid taking sides or participating in bloc confrontations [340]. Interestingly, China's formal communications around this speech omitted any Cold War rhetoric, instead highlighting proposals for collaborative efforts to establish a Code of Conduct in the South China Sea to ensure regional stability [250].

China's dialogue with ASEAN often promotes a narrative of win-win partnerships marked by mutual respect. However, its simultaneous warnings against other members joining counter-dispute blocs reveal underlying tensions, particularly concerning the South China Sea disputes with several ASEAN members. The resolution of future disputes, especially regarding the proposed Code of Conduct, in which China is a primary stakeholder, remains uncertain.

Japan: Increasing hostility with historical undertones

China's narrative approach towards Japan underscores an increasing hostility weighed down by historical grievances. In analyzing the bilateral dynamics, China views Japan's alignment with external powers, particularly the United States, as a significant threat to regional security. This perception is sharpened in narratives from the second period, which portray Japan as adopting an increasingly militaristic stance and aligning closely with U.S. strategies, particularly through the Quad summit and positions on Taiwan. These narratives are meant to deter Japan from policies that could be perceived as aggressive or destabilizing by Beijing.

The continued emphasis on issues such as Taiwan and the memory of World War II indicates that China is increasing its hostile rhetoric with Japan in line with escalating tensions and Japan's alignment with the U.S. The CCP heavily commemorates events like the Nanjing Massacre, utilizing these historical narratives within its media to sustain a collective memory of Japanese wartime aggression, adding to mainland suspicions of potential Japanese rearmament [50]. This strategic use of history serves as a reminder of past conflicts and a tool to manipulate Japanese policy and public opinion towards China [90].

The following highlights are derived from the language model-extracted key summaries from the dataset concerning the Japan-China and Fukushima topic clusters.

- **Japan-China Relations:**(see Table 4.11)
  - **Period 1: Cautionary Diplomacy** - During this period, Japan's alignment with the United States was viewed by China as a potential threat to Asia-Pacific security. Key issues such as Taiwan, alongside China's internal concerns like Hong Kong and Xinjiang, were prominent in bilateral discussions. This phase reflects a period where Japan's foreign policy decisions, particularly its proximity to U.S. geopolitical strategies, were closely scrutinized by China, emphasizing a narrative that cautioned Japan against too close an alignment with external powers that might destabilize regional dynamics.
  - **Period 2: Escalating Tensions** - Japan is depicted as increasing its militaristic posture and risk of aligning with United States' strategies aimed at containing China, particularly during events like the QUAD summit and with regards to Taiwan. These narratives underscore China's view of Japan as a destabilizing force in the region, potentially leading to escalated military and diplomatic tensions. The rhetoric suggests that Japan's actions could lead to broader regional instability, echoing historical concerns of Japan returning to its militaristic past.
- **Fukushima:** There was very little if any sentiment shift for narratives between the two periods. Table 4.12 shows summarized narratives regarding Fukushima. China focused on similar themes within both periods: Narratives focused on environmental harm to the Japanese fishing industry, general concern from South Korea, Japanese citizens, and Chinese, and an overall loss of regional credibility for Japan.

The relationship between China and Japan is complex and characterized by both a deep historical animosity and intertwined economic dependencies. Economic interdependence adds another layer of complexity, as China is Japan's largest trading partner and Japan is China's second largest after the United States [181, 242]. The trade balance between these two nations underscores significant mutual interdependence and economic cooperation, bringing a pragmatic aspect to necessary interactions, where both nations must navigate the challenges of maintaining robust economic ties while managing political, historical, military and populist nationalist tensions. This balancing act between economic cooperation and geopolitical rivalry highlights Sino-Japanese relations' frequently contradictory nature.

The emphasis on issues like Fukushima and Japan's policy shifts concerning Taiwan and military alignments is a clear indication of China's intent to shape public and international perception. China's coverage of Fukushima taps into legitimate fears that people in South Korea, China, Japan and the rest of the world have regarding the potential for nuclear contamination to be released into key waterways. China's narratives regarding this event were about fishermen in various countries and their livelihoods, tapping into an aspect of public diplomacy that seeks to connect to the public within other countries. China will continue to dynamically shape the narrative landscape around Japan, likely more often than not using the stick over the carrot in terms of geopolitical posturing. Their economic interdependence links these two countries, regardless of ongoing military and political tension.

4.3.5 South Korea: Failing to Balance Regional Ties

China's narratives towards South Korea show a gradual hardening of stance between both periods, warning South Korea against aligning closer to Japan and the United States. The shifts in China's diplomatic narratives regarding South Korea from Period 1 to Period 2 indicate broader geopolitical movements within East Asia, driven by increasing tensions and realignments between the United States and China 4.13. In Period 1, China's approach to South Korea was positive, emphasizing cooperation and seeking to downplay differences over sensitive issues like Taiwan, aiming to prevent the appearance of a growing bloc between the US and regional neighbors against China.

However, in Period 2, there is a tangible hardening in China's rhetoric towards South Korea, tied to Beijing's perception that Seoul is aligning towards the United States and Japan. The narratives from this period often frame South Korea's actions as aligning with adversarial strategies, particularly in the context of US-led security initiatives in the region. This includes the deployment of the THAAD missile defense system, which China perceives as a direct threat to its own security interests.

The following highlights are derived from the language model-extracted key summaries from the dataset concerning the China-South Korea topic cluster 4.13:

- **Period 1: Subtle Balancing Act** - In this period, South Korea's diplomatic efforts are characterized by a nuanced approach towards China, despite participating in joint statements with the US that include Taiwan, a sensitive issue for China. Chinese narratives during this time suggest a recognition of South Korea's less confrontational stance compared to Japan, with a focus on fostering cooperation and stabilizing regional geopolitics amid external pressures.
- **Period 2: Growing Confrontations** - By contrast, in Period 2, South Korea is portrayed as increasingly aligning with Japan and the United States, a shift that is perceived by China as leading to potential economic and security consequences. The narrative emphasizes South Korea's susceptibility to US influence, particularly strategies that may propel it into unnecessary conflicts, echoing the situation in Ukraine.

China's narrative shift between the two periods indicates changing perceptions about South Korea's foreign policy alignments, hinting at China's strategic adjustments. As South Korea strengthens ties with the US and Japan, China warns of economic consequences for South Korea, such as trade and technology restrictions, to deter Seoul away from perceived adversarial actions. This pivot emphasizes China's readiness to deploy economic coercion, as evidenced in 2017 when South Korea adopted the THAAD missile defense system from the US in response to North Ko-

rean provocations. Subsequently, China's retaliatory measures, including sanctions on tourism and firms, inflicted substantial economic losses on South Korea.

In response to these challenges, and in light of ongoing security threats from North Korea, South Korea has taken significant steps to diversify its economic dependencies on China. This strategic diversification aims to reduce reliance on China, underscored by the 2023 shift when the United States became South Korea's top export partner. Furthermore, South Korea has set goals to stabilize supply chains and reduce dependence on Chinese imports and exports to less than 50% by 2030, a move designed to insulate its economy against potential future economic pressures from China[304]. In essence, South Korea has taken China at its word and made plans to mitigate China's proposed deterrence strategy of economic consequences.

Recent developments highlight the delicate balance South Korea must navigate between economic and security interests. The resumption of trilateral meetings between Japan, South Korea, and China on May 27, 2024, heralded by Chinese Premier Li Qiang as a "restart and a new beginning," appears to be China's attempt to counterbalance the strengthening military and strategic cooperation between South Korea, Japan, and the United States [299]. This initiative was promptly followed by a trilateral ministerial meeting in Singapore involving the defense ministers from the US, Japan, and South Korea, emphasizing their commitment to bolster security cooperation and address challenges such as North Korea's nuclear program[249].

These events underscore the intricate interplay between economic agreements and security concerns, illustrating the significant challenges South Korea faces in managing its regional relationships. The evolving narratives reflect South Korea's ongoing effort to balance these dynamics, which are critical for regional stability and strategic planning. This situation highlights the complexities of East Asian geopolitics, where economic interdependencies are intricately linked with rising security tensions.

4.3.6 Philippines

The South China Sea is a critical maritime and shipping corridor that has long been a focal point of geopolitical contention, particularly between China and the Philippines. The Philippines lies at the center of China's low-intensity "gray-zone" operations just short of open conflict around disputed islands in the South China Sea. The international tribunal's 2016 ruling under the United Nations Convention on the Law of the Sea (UNCLOS) found no legal basis for China's claims within the South China Sea [134]. However, China dismissed the ruling as biased and illegitimate, affirming its position against third-party arbitration and advocating for bilateral negotiations as the only mechanism for dispute resolution over sovereignty claims[318].

The Philippines emerges as a significant focal point within China's narratives in the post-invasion period, particularly concerning South China Sea disputes. Our analysis identifies a distinct topic cluster highlighting China's maritime conflicts with the Philippines, especially around the controversial Second Thomas Shoal. The discussions also cover the broader activities of the People's Liberation Army Navy (PLAN) in the South China Sea. China perceives the Philippines as challenging its patience and goodwill and infringing upon Chinese sovereignty, particularly at Ren'ai Jiao (Second Thomas Shoal). China intends to take the necessary actions at Renai Reef to safeguard its territorial integrity. It accuses the Philippines of provoking conflicts by failing to dismantle a grounded warship at the shoal, symbolizing Manila's defiance. Furthermore, China alleges that the Philippines, with the backing of Western influences, engages in disinformation

campaigns aimed at undermining China's position and destabilizing the regional order. These narratives are strategically disseminated through state media, diplomatic channels, and official communications, framing China as a victim of unwarranted aggression, which it contends forces it to take necessary actions to defend its sovereignty.

Language model-extracted key summaries from the dataset concerning the Philippines-China maritime dispute include:

- **Philippines' Provocative Actions in the South China Sea:** The Philippines' recent actions in the South China Sea are deemed extremely dangerous by China, which has accused the Philippines of repeatedly stirring trouble and infringing on China's sovereignty, particularly around the Ren'ai Jiao. Despite China's goodwill and restraint, the Philippines has ignored its commitment to remove a grounded warship from the area, instead attempting to reinforce it, which China views as a grave violation of international law and a serious threat to regional stability.
- **Philippines' Propaganda Campaign in the South China Sea:** Recent investigations reveal that the Philippines, with the support of Western media, has been actively spreading disinformation to defame China and exacerbate tensions in the South China Sea. This propaganda campaign involves fabricating incidents and spreading false narratives, which are intended to manipulate international opinion against China. The Philippines' actions, supported by external forces, are seen as a deliberate attempt to create conflict and disrupt peace in the region.
- **China's Preparedness for the Renai Reef Situation:** China has expressed its readiness to handle any situation at Renai Reef, following recent provocations by the Philippines. The Chinese Coast Guard has driven away Philippine vessels attempting to intrude on Chinese waters, and China has reiterated its demand that the Philippines tow away a grounded military vessel from the reef. China remains committed to resolving the dispute through dialogue but warns that it will take necessary measures to protect its sovereignty if provocations continue.

China's conflict flashpoints over disputed areas with the Philippines and other countries such as Vietnam are becoming more contentious, marked by China's increasingly aggressive behavior such as the use of water cannons, military supply interdictions, and vessel ramming [157]. The situation is further complicated by the long-standing mutual defense treaty that the Philippines and the United States maintain. The Philippines' growing strategic alignment with the United States, Japan, and Australia, nicknamed "the Squad," is in part due to China's maritime coercion, conducting the first quadrilateral exercise within the Philippine EEZ in 2024 [197, 220]. Japan and Australia also remain observer nations in the annual bilateral exercise between the Philippines and the United States, *Balikatan*, which focuses on threats posed by China to both Taiwan and the South China Sea. The "Squad" and other "minilateral" groups may become more widespread as the limits of ASEAN's ability to build consensus and mediate disputes become more apparent [152].

China's response to the growing Philippine regional alliances, particularly with the United States and "Squad" members, has been very negative, with China questioning the Philippines' commitment to ASEAN. During the 2024 Shangri-La Dialogue, the Philippines reiterated that the U.S. presence was crucial to regional peace. A senior PRC military officer accused the Philippines of relying more on "Squad" nations than ASEAN partners and that only ASEAN countries and others in the region should work to settle disputes, adding that China opposes any external interference and will not "allow wolves in the house, " further elaborating that "China has always believed that all countries, regardless of their size, wealth, or strength, are on equal footing. China has not bullied and will never bully smaller countries. But China has its bottom line, and it will not allow

certain countries to take advantage of their smaller size to play the victim role and act wildly"[9]. This internal logic that China always operates as a fair and objective actor provides context for China's persistent arguments for settling all issues bilaterally without any external mediation or collective action.

China's narratives around the South China Sea disputes with the Philippines exemplify a sophisticated blend of victimization, sovereignty defense, and opposition to external interference, aimed at both domestic and international audiences. These narratives serve multiple strategic purposes: justifying China's actions, maintaining domestic support, complicating ASEAN unity, and attempting to dilute U.S. influence in regional security matters. As China continues to push for bilateral over multilateral or third-party resolutions, its narrative strategies and maritime actions will remain central to understanding and predicting regional security dynamics and stability in the South China Sea.

4.3.7 China's Economic Center of Gravity

BRICS (Period 2)

China has expanded the role and influence of BRICS, an informal group established in 2006 by Brazil, Russia, India, China, and later South Africa to challenge and shift power from North America and Western Europe. It has been expanded to include Iran, Egypt, Ethiopia, and the UAE, representing a geopolitical rival to the G7 [19]. China has emphasized the importance of strengthening economic ties within BRICS nations, boosting trade relations, and supporting investment in infrastructure through initiatives like China's Belt and Road Initiative (BRI) [3], and advocating for the development of a BRICS payment system to reduce dependency on Western financial systems.

Acemoglu (2023) argues that the current trajectory of BRICS alignment under Chinese influence may exacerbate existing global tensions and internal disparities within the member countries while failing to provide a platform for genuinely independent and beneficial cooperation among the world's emerging economies [6]. Acemoglu adds that the broader implication of expanding the group to more authoritarian countries is the potential to stifle democratization efforts in these countries, contributing to a broader "democracy crisis" among emerging economies.

[3]The Belt and Road Initiative or New Silk Road is a massive PRC investment and development initiative with over 149 countries participating

- **BRICS Summit as a Platform for Strategic Cooperation:** Strategic Importance: At the 15th BRICS Summit in Johannesburg, President Xi Jinping emphasized BRICS as a critical mechanism for cooperation among emerging markets and developing countries, positioning it as a key driver for global economic growth and stability. The summit reinforced BRICS' commitment to reforming global governance structures to better reflect the interests of developing nations.
- **Expansion and Influence of BRICS:** Growing Global Influence: The summit highlighted the growing global influence of BRICS, with numerous countries expressing interest in joining the bloc. This expansion reflects BRICS' increasing relevance in international affairs, particularly as a counterbalance to Western-dominated institutions. The inclusion of African leaders underscores BRICS' role in promoting South-South cooperation and addressing the unique challenges faced by developing countries.
- **China's Role in Strengthening BRICS Cooperation:** China played a pivotal role in the summit by proposing and supporting initiatives that enhance BRICS cooperation, such as the BRICS Partnership on New Industrial Revolution and green development projects. These initiatives demonstrate China's strategic intent to use BRICS as a platform to advance its vision of a multipolar world order, where emerging economies have a stronger voice in global affairs.

Belt Road Initiative (BRI)

The Belt and Road Initiative (BRI), a Chinese-led bilateral initiative, represents a bold, expansive global infrastructure development strategy that seeks to enhance regional connectivity and embrace a brighter economic future through the development of trade and investment links between Asia, Europe, and Africa. The BRI encompasses the creation of a vast network of railways, energy pipelines, highways, and streamlined border crossings, both westward—through the mountainous former Soviet republics—and southward, to Pakistan, India, and the rest of Southeast Asia [200]. This initiative not only aims to deepen economic connections but also to reinvigorate China's own economic standing, creating new markets for Chinese goods and technology and fostering infrastructural development in a multitude of partner countries.

China's BRI narratives remain very high-level and frequently highlight BRI as a tool for promoting international cooperation and economic development, challenging the growing global tendencies toward unilateralism and protectionism. This narrative is strategically designed to position China as a global leader advocating for collaborative development, directly opposing notions of Cold War-era confrontations and bloc politics. China's narratives promote building a more interconnected world economy while asserting itself as a pivotal economic hub.

Language model-extracted key summaries from the dataset concerning on BRI within Period 2 include:

Reaffirmation of Multilateralism and Cooperation: The speech emphasizes the importance of unity and cooperation among participating countries, stressing the Belt and Road Initiative (BRI) as a platform for shared growth and development. It counters the resurgence of Cold War mentalities and bloc confrontations by promoting a vision of a global community with a shared future. This emphasis is strategic, aiming to position China as a leader in global cooperation against a backdrop of increasing geopolitical tensions.

Commitment to High-Quality Development: President Xi Jinping's declaration of moving towards high-quality Belt and Road cooperation reflects China's strategic shift to address international concerns about the quality of BRI projects. This involves a focus on sustainability, green development, and the integration of digital technologies. The introduction of initiatives like the Digital Silk Road and Green Silk Road underscores a move towards modernization that is not only infrastructural but also ecological and technological.

Expansion of Economic and Digital Connectivity: The forum highlights significant commitments to enhancing global connectivity through substantial financial investments and policy initiatives. These include expanding market access, deepening reforms in key economic sectors, and setting up new financing windows to support BRI projects. Such initiatives are designed to strengthen economic ties, enhance digital cooperation, and boost global confidence in China's role as an economic partner, thereby fostering a more interconnected and mutually beneficial global economy.

Despite these optimistic portrayals, the BRI has attracted criticism for potentially fostering local corruption [143], biasing infrastructure projects towards Chinese markets [226], and introducing complex challenges in debt management. Studies comparing Chinese loan agreements with traditional financing methods highlight differences such as stringent confidentiality clauses, mandatory accounts in Chinese banks, and a lack of debt restructuring processes with cross-default clauses. The study points to how China systematically links loan cancellation and payment acceleration to the PRC's diplomatic relationship with the debtor [114]. These factors contribute to a perception of opacity and raise concerns over debt sustainability. Critically, the bilateral nature of BRI loans has led to scenarios in which nations, unable to fulfill debt obligations, surrender sovereign rights over strategic assets and territory [5, 22, 138]. Such outcomes underscore the need for greater scrutiny and transparency in China's lending practices. BRI institutions loans' strictly Chinese bilateral nature has not been subject to the same scrutiny regarding debt sustainability and lending transparency as other multilateral platforms such as the Paris Club [138].

While the BRI aims to project China as a primary bilateral lender in international infrastructure development, the initiative's implementation reveals a complex interplay of strategic diplomacy and economic leverage. This multifaceted approach has implications not only for the economic futures of participating countries but also for their political sovereignty and autonomy. The BRI is an expansive vehicle for China's broader ambitions, providing funding options for countries that may have fewer options while operating under opaque terms and with future leverage over strategic and sovereign assets, expanding China's footprint outward.

4.3.8 Odds and Ends Narratives

We discuss a few "odds and ends" narratives about COVID19 and the Chinese Surveillance balloon primarily for their importance in enabling conspiracy theories to propagate. Over the last three years, China has maintained a multitude of different narratives regarding the COVID-19 pandemic. Narratives linked to the origin of the virus are inherently tied to many different types of conspiracy theories, some grassroots and some manufactured by figures of authority.

Covid Tracing and Misinformation (Period 1)

China's narratives regarding COVID-19 tracing efforts reflect a strongly defensive posture, particularly against the United States. This stance underscores the complexities of conducting COVID origin tracing within a highly politicized environment. These narratives seek to shield against external accusations but also shape international discourse on the subject. This method is reflective of China's broader geopolitical ambitions to protect its sovereignty and enhance its global standing, particularly in issues of significant international concern like the COVID-19 pandemic.

In response to US efforts to investigate the origins of COVID-19, China propagated conspiracy theories linking the virus to US government biological research labs, notably at Fort Detrick, Maryland. Some narratives even associate these activities with historical events, such as Japan's notorious Unit 731 operations during World War II, using China's preferred historical transgressor [290]. China's use of conspiracy theories has been used to deflect criticism and ramp up unified nationalistic sentiments, especially when used against a critical adversary such as the United States [62].

Moreover, China was one of the first major actors to leverage the power of conspiracy theories during the pandemic, suggesting that US military personnel participating in the 2019 Military World Games might have introduced the virus to China, countering the "Wuhan virus" rhetoric from US leaders during the Trump administration [221]. Zhiying et al. stress that authoritarian countries leverage conspiracy theories to primarily shift blame and responsibility, attack adversaries, and galvanize followers[273]. This utilization of conspiracy theories serves multiple strategic functions: it deflects criticism, consolidates nationalistic sentiments, and counters narratives from adversarial nations.

Language model-extracted key summaries from the dataset concerning on Covid Tracing within Period 1 include:

- **Misinformation Campaign on China's Virus Origin:** The COVID-19 origin tracing has been marred by a misinformation campaign targeting China, fueled by speculative theories rather than facts. Intelligence agencies, known for disinformation, and political figures have pushed the lab leak theory, leading to an intelligence investigation criticized for being politically driven. The campaign followed a pattern of media hype, political amplification, and widespread social media dissemination, politicizing the pandemic and undermining scientific inquiry.
- **WHO-China Joint Study Warns of Missing Key Study Window:** Scientists involved in the WHO-China joint study on COVID-19 origins warn that political interference is closing the critical window for scientific investigation. Despite initial findings supporting naturally-occurring origins, the U.S.-led push for the lab leak theory has delayed essential follow-up studies. The scientific community emphasizes the need to depoliticize the investigation to avoid missing the opportunity for crucial research.
- **Failed COVID-19 Origin Trace and Intelligence Report:** The intelligence report on COVID-19 origins has been criticized as inconclusive, lacking new evidence, and driven by political motives rather than scientific inquiry. Scientists argue that tracing the virus's origins requires expertise and collaboration, free from political interference. The report's failure to draw definitive conclusions has only intensified conspiracy theories, with experts calling for a focus on scientific research instead.

Overall, China's narratives on COVID-19 origin tracing demonstrate a defensive strategy, particularly against U.S. accusations, portraying itself as a victim of politicized and unscientific investigation efforts. Simultaneously, China propagated conspiracy theories linking the virus to U.S. government labs, using these narratives to deflect blame and strengthen mainland national-

istic sentiments. China's accusations of US-led misinformation campaigns orchestrated by U.S. intelligence agencies seek to delegitimize U.S. global standing and the requests for a tracing investigation. Ultimately, China's approach seeks to shift responsibility and garner domestic support by framing itself as resisting Western aggression.

Chinese Balloon Incident (Period 2)

In February 2023, a Chinese surveillance balloon made headlines when it transited for seven days across the United States before being shot down by an F-22 fighter jet, causing a massive international incident between China and the United States [187]. China primarily opposed what they called the downing of a civilian airship, an overreaction, and more evidence of anti-Chinese sentiment. Interestingly, China initially claimed that this story was a US conspiracy theory denoted by a blurry picture of a balloon with no obvious links to China [168, 362]. China would later on adopt narratives as we see below, chastising the United States and "projecting an image of responsibility and rationality, of being the adult in the room"[173].

The US reaction may have, in part, been driven by heightened partisan reactions to the discovery of the balloon [261]. NORAD would later admit this was not even the first Chinese balloon to transit over the US, merely that the organization did not include this type of object in their treat profile [223]. It is worth noting that the US shot down multiple objects in the weeks following the balloon shoot-down, with objects not necessarily connected to the PRC [344]. This may indicate a period of heightened US responses during a politically turbulent period.

The following were the key summaries LLM-extracted from Chinese-US balloon topic cluster:

- **China-U.S. Relations and Balloon Incident:** The recent balloon incident has further strained China-U.S. relations, with Chinese authorities expressing strong dissatisfaction and opposition to the U.S. shooting down a Chinese civilian airship. The Chinese government has urged the U.S. to stop escalating tensions and to avoid actions that would worsen the situation. Despite the incident, there is still hope for dialogue and communication between the two nations, especially with potential high-level meetings in Europe, as long as both sides can create a positive environment for such discussions.
- **China Protests U.S. Overreaction to Balloon Incident:** China strongly protested the U.S. decision to shoot down a non-threatening Chinese civilian airship, describing the action as an overreaction and a violation of international norms. The Chinese government reiterated that the airship was conducting meteorological research and had accidentally entered U.S. airspace. Despite these explanations, the U.S. has maintained a narrative of a "spy balloon," contributing to increased tensions between the two nations and setting a worrying precedent for handling similar incidents in the future.
- **Spy Balloon Controversy and U.S.-China Relation:** The so-called spy balloon controversy has been heavily politicized in the U.S., with some officials using it to push anti-China sentiment and strain bilateral relations further. Despite numerous countries, including the U.S., using high-altitude balloons for scientific and other purposes, the incident has been sensationalized to paint China as a threat. This narrative overlooks the historical and global context of balloon usage, leading to unnecessary escalation in U.S.-China tensions, which could have significant repercussions for international stability.

4.4 Discussion

China's narrative priorities shifted drastically following Russia's invasion of Ukraine. We primarily see more "hardening the hard" aggressive tactics and less "softening the soft" cooperative narrative

tactics, hearkening back to Boon's framework for China's mixed messaging strategy [35]. This finding makes sense if we remember that part of China's uncompromising perspectives is tied to its ideas about Chinese territorial sovereignty, combined with the complex relationships and disputed territory China's regional neighbors maintain with China and amongst themselves. Zhang (2006) proposes a theory of signaling, suggesting that China's assertive actions in the South China Sea are influenced by the perceived level of resistance from the United States[360]. However, China has escalated its sovereignty posturing towards many regional neighbors following Russia's invasion of Ukraine, despite an uptick in the US containment strategy around China.

It is clear that past western dominated alliances and power brokers are being challenged with the growing power of competitors such as BRICS and the rising Global South, and that China is leading this charge. China's pivot to the Global South is likely due the limits of its influence with Western countries and functional democracies in recent years due to Xinjiang human rights tensions and the designed opacity of China's trade and loan agreements. China's aspirations for a greatly expanded BRICS entail a rival to the economic power and might of G7 in an increasingly multipolar world. China's narratives make clear that it will always oppose bloc formations that would enable more parity for other countries against China's immense regional power, especially when such coalitions appear to counteract its interests. This strategy is particularly evident in its reactions within ASEAN and military narratives, where China positions itself against the formation of blocs that could facilitate united fronts against its actions in regions like the South China Sea and in which China will always have the upper hand in bilateral negotiation. This opposition is linked to a broader strategic aim to prevent any dilution of its influence in regional affairs and to maintain its position as the central force in East Asia.

Furthermore, China's approach to international disputes, particularly highlighted in the context of the Ukraine-Russia conflict, demonstrates an inconsistency with legal pathways. China advocates for UN-mandated solutions which are unlikely to be effective given Russia's position in the Security Council, showcasing a pragmatic approach to international law that serves its strategic interests. This pragmatism extends to its stance on arbitration by international bodies, particularly in disputes involving sovereign borders, where China prefers bilateral negotiations that it can more directly influence. However, China also disregards other UN decisions such as the arbitration with the Philippines, in which it deemed the outcome illegitimate.

Lastly, China's narratives around Taiwan serve as a litmus test for its relationships with other countries. Its portrayal of Taiwan not just as a territorial issue but as a principal component of its national identity and sovereignty is a critical element of its foreign policy. This is used to gauge the alignment or opposition of other nations, particularly major powers like the United States, and to signal its red lines in international diplomacy. China's tools of economic coercion have been used punitively against smaller nations that dared defy Beijing such as Lithuania, resulting in the European Union creating defensive laws against similar economic incursions. This incident is anecdotal evidence of how China treats countries that defy it, flying in the face of statements it has made about never using its economic power against a smaller country in a bilateral agreement. China's method of increasingly using the stick over the carrot to persuade countries to bend to China's will has led to a greater decoupling of regional neighbors and perceived adversarial countries from China's economy through tariffs and other protectionist economic tools in key areas such as electric vehicle production [188]. China likewise has pushed for this decoupling from the United States and the West, with de-dollarization efforts via BRICS, a SWIFT replacement, and reducing its reliance on Western countries. This decoupling of economies removes a deterrence as-

pect between China and the West, potentially making a forceful annexation of Taiwan much more dangerous [82].

4.5 Limitations and Future Work

The narrative analysis presented faces several inherent challenges and limitations. The complexity and dynamism of narratives mean that distilling long periods into two comparative snapshots might oversimplify or overlook nuanced shifts and interactions between evolving storylines. Our reliance on a generative large language model for data processing and aggregation imposes another layer of limitation, dependent on the accuracy and comprehensiveness of the model's output, which can affect the depth and breadth of our analytical conclusions.

Moreover, the broad scope of our analysis, covering numerous countries and thematic narratives, introduces potential gaps in domain-specific knowledge and interpretative depth. The qualitative nature of our analysis, necessary for understanding the subtleties of narrative construction and impact, means that some key points and counter-narratives may be underexplored or misinterpreted. These limitations underscore the need for ongoing refinement of narrative analysis methodologies and the importance of integrating diverse data sources and expert insights to enrich understanding and ensure a more holistic view of China's strategic communications and their implications for international relations.

An important area for future research would be investigating whether state-sponsored media outlets align closely with diplomatic government communications or diverge strategically in their narratives. This type of analysis could be a standard for comparing editorial independence for countries and understanding how countries may use the state media apparatus for different messaging roles. For instance, examining whether low-level state accounts primarily amplify or support prominent narratives disseminated by official media or whether state-sponsored media focuses selectively on critical events. In contrast, less prominent channels that address lower-priority issues could show a systematic messaging hierarchy. Additionally, a temporal analysis could discover that certain types of narratives have less decay over time due to increased messaging prioritization. Future research on narrative alignment between official government and media channels would improve our understanding of a state actor's strategic communication infrastructure, potentially uncovering nuanced operational hierarchies and strategic distributions of narrative labor across official and unofficial state actor channels.

Table 4.2: PLA Maritime: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
PLA's Military Parade and Exercises: The Chinese People's Liberation Army (PLA) showcased its advanced military capabilities during a maritime parade in the South China Sea, featuring the aircraft carriers Liaoning and Shandong, as well as amphibious assault ships. The exercises aimed to explore new operational methods and enhance combat readiness, reflecting China's commitment to modernizing its military.	**Escalating Tensions in the South China Sea:** The shadow of conflict grows in the South China Sea as Philippine vessels approach Chinese Coast Guard ships in a dangerous manner, leading to multiple confrontations. This highlights the rising tensions and potential for violent clashes between China and the Philippines over disputed territories, particularly around the Renai Reef.
Y20 Aircraft in South China Sea Drills: The PLA conducted transport missions and amphibious landing drills in the South China Sea using the Y20 large transport aircraft. These exercises demonstrate the PLA's growing capability to reinforce its presence and respond rapidly to emerging threats in the region, signaling China's determination to safeguard its territorial interests.	**China's Response to Maritime Challenges:** Amid these disputes, China reaffirms its commitment to resolving maritime disagreements through dialogue and consultation, rejecting maritime bloc confrontation. Chinese officials emphasize peaceful resolutions with ASEAN countries, while external provocations from nations like Japan and Vietnam exacerbate tensions, leading to a complex and unstable situation in the region.
Large-Scale Military Exercises Amid Rising Tensions: In response to military threats from countries like the UK, Germany, and India, China announced large-scale military exercises in the South China Sea, featuring live-fire drills and missile tests. These exercises, including potential tests of the DF-21D and DF-26 missiles, underscore China's readiness to defend its core interests and deter external provocations in the region.	**Military Developments and Strategic Vigilance:** In response to growing security challenges and external military provocations, China's People's Liberation Army Navy (PLAN) has made significant advancements in military capabilities, including the commissioning of new warships and the development of carrier-based aircraft. These developments are part of China's broader strategy to safeguard national sovereignty and maintain security in increasingly contested maritime regions like the South China Sea.

Table 4.3: Russia's War in Ukraine: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
China's Cautious Approach to Ukraine Crisis: China has handled the complex Ukraine crisis with caution and adherence to principles, emphasizing dialogue and consultation for a reasonable solution. As Russia recognized the independence of regions in eastern Ukraine, China called for continued dialogue among the concerned parties, highlighting the importance of respecting security concerns and resolving the issue peacefully.	**Timeline of the Russia-Ukraine Conflict:** The Russia-Ukraine conflict continued on March 24, 2022, with negotiations ongoing but hampered by shifting positions from the Ukrainian side, according to Russian Foreign Minister Sergei Lavrov. Tensions escalated as Russia expelled diplomats in response to Washington's actions, and military activities persisted, including Russian advances and Ukrainian counterattacks. Significant events included the rejection of NATO membership for Ukraine by President Zelensky and ongoing peace talks, though progress remained limited.
Escalating Tensions and China's Concern: The Ukraine crisis has seen escalating tensions due to Russia's military buildup and NATO's response. China has expressed concern over the situation, urging all parties to address their security concerns through dialogue and negotiation rather than military confrontation, recognizing the complicated factors driving the crisis, including NATO's expansion and military actions that have pressured Russia.	**Geopolitical Implications and Strategic Containment:** The Russia-Ukraine conflict represents a significant geopolitical event with roots in Cold War dynamics and long-standing Russian-Ukrainian tensions. Russia's involvement, partly driven by concerns over NATO expansion and Western influence, reflects broader strategic objectives to weaken Russia and disrupt European energy projects like Nord Stream 2. The conflict is viewed as part of a larger strategy to contain Russia by exploiting regional tensions and using Ukraine as a strategic pawn.
China's Neutral Stance and Advocacy for Peace: China's position remains neutral, focusing on upholding sovereignty and territorial integrity principles while advocating for peaceful resolution through dialogue. China's strategic ties with Russia and its neutral stance in the Ukraine crisis have been underscored, with Chinese experts noting the crisis's complexity and the need for direct talks to prevent further escalation and global instability.	**Western Influence and Military Dynamics:** Western involvement, particularly from the U.S. and NATO, has played a crucial role in escalating the conflict, with military aid and strategic partnerships fueling tensions. Historical efforts by the U.S. to expand NATO eastward and support Ukraine have contributed to the current crisis, with Russia reacting strongly to perceived threats to its geopolitical space. The conflict underscores the challenges of balancing relations with both Russia and the West, highlighting the consequences of strategic miscalculations.

Table 4.4: Russia-China Strategic Relationship: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
China and Russia's Strategic Security Consultation: China and Russia held a new round of strategic security consultations in Moscow, focusing on addressing global disorder and regional tensions. Both nations see these frequent interactions as essential for countering the decline of U.S. influence and stabilizing regions like the Middle East, Eastern Europe, and Central Asia.	**China and Russia's Strategic Partnership and Global Stability:** China reaffirms its support for Russia's core interests and emphasizes the importance of their strategic partnership in maintaining global stability. Chinese President Xi Jinping and Russian Prime Minister Mikhail Mishustin discussed enhancing coordination in multilateral arenas such as the UN, SCO, BRICS, and G20. This partnership is seen as crucial in withstanding threats of hegemony and unilateralism, contributing to world peace and security.
Extension of the China-Russia Treaty: Presidents Xi Jinping and Vladimir Putin announced the extension of the China-Russia Treaty of Good-Neighborliness, signaling strengthened bilateral ties ahead of the centennial of the Communist Party of China. This extension is seen as a response to Western doubts about the alignment of China-Russia relations and a reaffirmation of their commitment to a new type of international relationship.	**Xi-Putin Agreement on Deepening Strategic Coordination:** Xi Jinping and Vladimir Putin agreed to deepen their comprehensive strategic partnership, focusing on regional and international issues of mutual interest. They highlighted the principles of good-neighborliness, friendship, and win-win cooperation as the foundation for advancing their bilateral ties. The meeting resulted in significant agreements, including the signing of a joint statement to guide their cooperation and further align their global strategies.
Impact of China-Russia Cooperation on Global Affairs: The deepening of China-Russia relations, particularly through high-level interactions and joint strategic initiatives, underscores their role in countering Western influence and maintaining global stability. This cooperation is seen as a stabilizing factor in international relations, with both countries committed to working together to address global challenges and protect their shared interests.	**High-Level Exchanges and Strategic Importance of China-Russia Relations:** Frequent high-level exchanges between China and Russia signal the strategic importance of their relationship. These interactions demonstrate a commitment to maintaining a sound and steady development of bilateral ties, with an emphasis on legislative cooperation, multilateral coordination, and addressing global challenges. The meetings underscore the enduring partnership between the two countries, rooted in mutual support and shared goals in the international arena.

Table 4.5: US Gun Violence: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Biden vs. Trump on Violence: During the 2020 Democratic National Convention, Joe Biden criticized President Trump for fostering chaos and failing to stop violence in U.S. cities. Trump and his supporters countered by blaming rioters and emphasizing a law-and-order message ahead of the election.	**Gun Violence as a Human Rights Issue:** Gun violence is a severe social issue in the United States, with over 44,000 deaths reported in 2022 and a rising number of mass shootings. The widespread ownership of firearms, driven by social insecurity and self-defense needs, exacerbates the problem, making gun violence an indelible stain on the country's human rights record.
George Floyd's Death and Police Reform: George Floyd's brother, Philonise Floyd, testified before Congress, urging lawmakers to enact police reform to prevent future deaths like his brother's. The issue became highly partisan, with Democrats pushing for sweeping changes and Republicans focusing on supporting law enforcement while condemning rioters.	**Political Polarization and Gun Control Challenges:** The debate over gun control is highly polarized, with Democrats and Republicans deeply divided on the issue. This polarization, combined with powerful interest groups and the constitutional right to bear arms, has led to a legislative stalemate, making meaningful gun control measures difficult to achieve despite the ongoing violence.
2020 Presidential Election Amid Pandemic: The U.S. entered the 100-day countdown to the 2020 presidential election amidst the COVID-19 pandemic and nationwide protests against racial injustice. Biden criticized Trump's handling of the pandemic and social unrest, while Trump attacked Biden's competence and policies. The race was marked by significant ideological divisions and uncertainty due to the ongoing crises.	**Impact of Gun Violence on Society:** The frequent mass shootings have created a climate of fear and trauma across the United States, affecting public spaces and daily life. Despite growing public outcry and political promises, efforts to address gun violence remain insufficient, and the problem continues to be a significant challenge for governance and public safety in the country.

Table 4.6: US-China Relationship: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Biden's Shift from Trump's Toxic Rhetoric: President Biden, in his inaugural speech, marked a clear departure from Trump's confrontational rhetoric towards China, signaling a willingness to address domestic challenges and repair strained U.S.-China relations. This shift highlights Biden's approach to re-engage with the world and reject Trump's divisive policies, which had brought U.S.-China relations to a historic low.	**Xi and Biden Engage in Strategic Dialogue to Stabilize Relations:** Chinese President Xi Jinping and U.S. President Joe Biden held a candid and in-depth discussion on November 15-16, focusing on strategic issues critical to China-U.S. relations and global stability. They emphasized the importance of cooperation over rivalry and managing differences effectively to avoid conflict.
Trump's Troubling Legacy on China Policy: Trump's administration left a significant mark on U.S.-China relations, characterized by an aggressive stance that included trade wars and sanctions. This legacy has complicated the path forward for Biden, as he inherits a deeply strained bilateral relationship that will require careful navigation and potential policy reversals.	**Summit Yields Agreements on Key Areas of Cooperation:** During the historic summit, Xi and Biden reached significant agreements on areas such as climate change, artificial intelligence, and military communication. Both leaders committed to maintaining high-level dialogue and cooperation to address global challenges and strengthen bilateral ties.
China's Call for Biden to Correct Trump-Era Policies: China has urged the Biden administration to abandon the confrontational policies of the Trump era and adopt a more positive and constructive approach to bilateral relations. Beijing's appeal reflects its desire for a reset in U.S.-China relations, emphasizing the importance of mutual respect and cooperation to ensure stability and progress.	**Taiwan Remains a Core Issue in China-U.S. Relations:** President Xi reiterated that the Taiwan issue is the most sensitive in China-U.S. relations, urging the U.S. to adhere to its commitments and avoid actions that could escalate tensions. The summit is seen as a new starting point for stabilizing and improving the relationship between the two nations.

Table 4.7: Xinjiang: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Chinese Officials Refute Western Media Reports on Xinjiang: Chinese Foreign Ministry spokesperson Wang Wenbin and Xinjiang officials strongly refute Western media reports that accuse China of human rights violations in Xinjiang. They argue that these reports are based on misinformation and are part of a broader effort to undermine China's image internationally.	**China's Commitment to Advancing Human Rights:** China is determined to advance the international human rights cause, emphasizing the benefits for people worldwide. President Xi Jinping reiterated China's commitment during a meeting with UN High Commissioner for Human Rights Michelle Bachelet, highlighting China's achievements in human rights and its role in global human rights governance.
Xinjiang Residents and Officials Debunk Rumors: During press conferences, Xinjiang residents and officials used personal experiences to debunk rumors about forced labor, forced sterilization, and the demolition of mosques in the region. They emphasized that the region has seen significant socioeconomic development and that the claims made by anti-China forces are baseless.	**Promoting Human Rights Through China's Path:** China advocates for a country-specific approach to human rights, emphasizing that each nation should follow a path suited to its own national conditions. China's approach to human rights focuses on development, ensuring subsistence and security for its people, and contributing to global human rights progress.
Criticism of Adrian Zenz's Reports: Chinese experts criticize Adrian Zenz's reports on forced labor in Xinjiang's cotton industry, arguing that his conclusions are based on selective evidence and misinterpretations. They assert that modern agricultural practices in Xinjiang have led to increased mechanization, and that allegations of forced labor are unfounded and part of a Western agenda to harm China's international standing.	**Chinese Scholars' Confidence in Human Rights Achievements:** Chinese scholars have shared China's human rights progress on international platforms, emphasizing the country's success in poverty alleviation, education, and healthcare. They argue that China's human rights path has provided a valuable model for other countries, despite Western criticisms and attempts to politicize human rights issues.

Table 4.8: Taiwan: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Cross-Strait Tensions and Exchanges: Amid rising tensions between Taiwan and mainland China, the Straits Forum in Xiamen focused on maintaining cross-Strait exchanges. Chinese officials emphasized the benefits of cooperation while warning against Taiwan separatism, which they argue is exacerbated by U.S. support.	**China Condemns Lai Ching-te's Stopover:** China strongly condemned the stopover of Lai Ching-te, a DPP candidate for Taiwan's 2024 election, in the United States. Chinese officials accused Lai of being a dangerous troublemaker and emphasized that his stopover violated the one-China principle, potentially leading to increased tensions in the Taiwan Strait.
DPP and Ukraine Comparison: Chinese mainland officials criticized the Democratic Progressive Party (DPP) in Taiwan for drawing comparisons between Taiwan's situation and Ukraine's. They argued that such comparisons are misleading and are used to internationalize Taiwan's status, which they maintain is a purely internal Chinese matter.	**DPP Candidate Lai and Rising Tensions:** Lai Ching-te's stopover in New York and San Francisco as part of his trip to Paraguay has sparked new tensions between Taiwan and mainland China. Political and civil groups in Taiwan have protested against what they see as secessionist acts by the DPP, warning that these actions could lead to further conflict and harm Taiwan.
Military Drills and Strategic Deterrence: The Chinese People's Liberation Army (PLA) conducted significant military drills near Taiwan, seen as a strategic deterrent and a warning against Taiwan independence. Chinese experts and officials underscored the seriousness of these actions, linking them to broader U.S.-Taiwan relations and the ongoing geopolitical tensions.	**Pelosi's Visit to Taiwan and China's Response:** The Chinese Communist Party's Taiwan Work Office issued a statement condemning U.S. House Speaker Nancy Pelosi's visit to Taiwan. The statement emphasized that the visit severely violated the one-China principle and was seen as an egregious act of collusion between the United States and Taiwan, sending a dangerous signal to Taiwan independence forces.

Table 4.9: Hong Kong: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
National Security Law and Stability in Hong Kong: The National Security Law in Hong Kong is emphasized as a crucial tool for restoring stability, effectively punishing crimes that endanger national security, and addressing deep-rooted issues in the region. Officials assert that the law respects Hong Kong's legal system and human rights, while also providing the necessary legal basis to safeguard national security.	**Patriot Governance in Hong Kong:** The successful election of John Lee as the Chief Executive of Hong Kong with over 99% of the vote marks the continuation of "patriot governance" in the region. Western criticisms of Hong Kong's new electoral system are dismissed as attempts to destabilize the region, with officials emphasizing the system's focus on selecting capable and patriotic leaders.
Central Government's Determination to Implement Security Legislation: The central government is determined to fix loopholes in Hong Kong's legislative system and counter external forces and local separatism. The National Security Law is seen as essential for safeguarding China's core interests and is strongly supported by pro-establishment groups in Hong Kong. There is also a push for Article 23 legislation to further enhance national security.	**Hong Kong's Progress and Integration:** Over the past 25 years since returning to Chinese sovereignty, Hong Kong has maintained stability and prosperity through the support of the mainland. The implementation of the National Security Law and improvements to the electoral system are highlighted as key measures that have enabled Hong Kong to overcome challenges and continue its development.
Patriots Governing Hong Kong: The principle of "patriots governing Hong Kong" is stressed as essential for effective governance and long-term stability. Efforts are being made to improve Hong Kong's electoral system to ensure that only those who are loyal to China and support the constitutional order can hold public office, thereby protecting national sovereignty and the well-being of Hong Kong residents.	**Western Sanctions and Hong Kong's Stability:** In response to Western sanctions targeting Hong Kong officials, Chinese experts argue that such actions are rooted in a desire to destabilize the region. Despite these pressures, Hong Kong's society has restored stability and continues to integrate with the overall development of China, with a focus on safeguarding national security and maintaining its role as an international financial center.

Table 4.10: ASEAN: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
China-ASEAN Partnership: China and ASEAN have agreed to elevate their relationship to a comprehensive strategic partnership, with President Xi Jinping emphasizing mutual respect, win-win cooperation, and efforts to address regional challenges together. This partnership aims to enhance trade, investment, and cooperation in areas such as health, digital economy, and sustainable development, with China pledging significant financial and vaccine support. The collaboration is set to deepen through initiatives like the Belt and Road, RCEP, and joint efforts in public health and green economy, marking a milestone in China-ASEAN relations.	**China's Commitment to ASEAN:** China has maintained a strong commitment to supporting ASEAN's centrality in the evolving regional architecture, emphasizing mutual respect, non-interference, and the strengthening of ASEAN-led mechanisms like the East Asia Summit and the ASEAN Regional Forum. China has pledged to support ASEAN's efforts in regional economic integration through initiatives like the Belt and Road and RCEP, aiming to build a peaceful, secure, and prosperous region. This partnership underscores China's long-term strategy of fostering stable and inclusive development in Southeast Asia.
China-ASEAN Community: Marking the 30th anniversary of China-ASEAN dialogue relations, both sides have committed to building a close community with a shared future, focusing on upgrading bilateral ties, promoting economic recovery, and enhancing cooperation in areas like disaster relief and public health. China has been a proactive partner in ASEAN's initiatives, including pandemic response and infrastructure development, while emphasizing the importance of ASEAN's centrality in regional cooperation.	**Wang Yi's Southeast Asia Tour:** Chinese Foreign Minister Wang Yi's recent tour of Southeast Asia reflects China's ongoing efforts to bolster strategic communication and deepen bilateral relations with ASEAN countries. Amid increasing regional tensions and external pressures, Wang's visit underscores China's commitment to enhancing cooperation on critical issues like economic recovery, regional stability, and the Belt and Road Initiative. The tour is seen as a clear message of China's intent to work closely with ASEAN members to counteract divisive forces and strengthen regional solidarity and connectivity.
China-ASEAN Achievements: Over the past 30 years, China-ASEAN relations have flourished, setting an example of vibrant bilateral cooperation, particularly through initiatives like the Belt and Road, Regional Comprehensive Economic Partnership (RCEP), and the China-ASEAN Free Trade Area. The partnership has expanded into new areas like digital governance, green economy, and poverty reduction, while continuing to address traditional issues such as maritime security and economic integration, reflecting a deep, mutually beneficial relationship.	**China-ASEAN Relations and RCEP:** The 30-year relationship between China and ASEAN has led to substantial mutual benefits, positively impacting over 2 billion people through enhanced economic and political cooperation. The implementation of the Regional Comprehensive Economic Partnership (RCEP) is a major milestone, promoting deeper economic integration, trade facilitation, and cooperation in new areas such as digital and green economies. This partnership has solidified China and ASEAN's comprehensive strategic relationship, ensuring that both sides are better positioned to address global challenges and pursue sustainable development goals.

Table 4.11: Japan: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
China-Japan Relations and LDP Leadership Election: The leadership race within Japan's ruling Liberal Democratic Party (LDP) is becoming increasingly focused on China-bashing, particularly with candidates like Fumio Kishida and Taro Kono adopting tough stances on China, including issues surrounding Taiwan. Analysts warn that such hawkish rhetoric might win elections but could poison the overall relationship between Japan and China, making it difficult for future leaders to mend ties. Taiwan's situation is seen as a critical issue that will test the political wisdom of Japanese leaders.	**Japan at a Historic Crossroad:** Japan stands at a critical juncture in its relationship with China, as the 50th anniversary of diplomatic normalization between the two countries is marked by a series of commemorative events. However, the relationship is strained by historical sentiments, geopolitical changes, and strategic doubts, with China urging Japan to objectively and rationally view its development and to make cautious choices to avoid repeating past mistakes.
Post-Abe Policy Fluctuations: Following Prime Minister Shinzo Abe's resignation due to health issues, Japan's political landscape faces potential fluctuations, particularly in its policies toward China. While Abe's long tenure brought some stability to China-Japan relations, his departure raises uncertainty about the continuity of these policies. Analysts predict that the next leader's stance on China will be crucial for maintaining bilateral relations, especially given the economic interdependence between the two nations.	**Senior Diplomat Warns Japan on Taiwan Issue:** Chinese senior diplomats have issued strong warnings to Japan over its stance on Taiwan, particularly in the context of the QUAD summit and comparisons to the Ukraine crisis. China has stressed the importance of respecting its sovereignty and security interests and has criticized Japan's moves to internationalize the Taiwan issue, cautioning against actions that could destabilize the Asia-Pacific region.
China's Warning to Japan: Chinese Foreign Minister Wang Yi issued a strong reminder to Japan to avoid aligning too closely with external powers like the United States in ways that could harm China-Japan relations. During a 90-minute phone call with his Japanese counterpart, Wang Yi emphasized that Japan should view China's development objectively and avoid interfering in China's internal affairs, such as issues related to Xinjiang and Hong Kong. The message was clear: Japan's actions in alignment with U.S. policies could have serious repercussions for regional stability and bilateral ties.	**Japan's Dangerous Path on Taiwan and NATO:** Japan's recent actions, including provocative statements on Taiwan and plans to attend a NATO summit, have raised concerns about its increasing militarism and alignment with U.S. strategies to contain China. Experts warn that Japan's aggressive stance on Taiwan could lead to severe consequences, escalating confrontation, and damaging regional stability, with implications for both China-Japan relations and broader Asia-Pacific security.

Table 4.12: Japan's Fukushima Nuclear Plant: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Japan's Decision to Dump Contaminated Water: Japan has decided to discharge contaminated radioactive wastewater from Fukushima into the sea despite strong domestic and international opposition. This decision, formalized by Japanese Prime Minister Yoshihide Suga, involves releasing water treated with the Advanced Liquid Processing System (ALPS) into the Pacific Ocean. The move has sparked significant concern due to the potential environmental impact and the potential harm to Japan's fish industry, which could face catastrophic consequences.	**Japan's Irresponsible Decision:** In a move widely condemned as irresponsible and selfish, Japanese Prime Minister Yoshihide Suga announced the government's plan to discharge radioactive wastewater from the Fukushima Daiichi Nuclear Power Plant into the Pacific Ocean. This decision, made despite overwhelming domestic and international opposition, has drawn sharp criticism for its disregard of the global community's concerns, particularly given the catastrophic meltdown at Fukushima in 2011, which led to the accumulation of millions of tons of contaminated water.
Strong Opposition and Concerns: The decision has faced backlash from Japan's fishery industry, environmental groups, and neighboring countries like China and South Korea. The Japanese fish industry, already struggling to recover from the Fukushima disaster, fears the release will undo years of efforts to restore its reputation. Environmental groups and neighboring countries have raised concerns about the potential health risks and the long-term effects on the marine environment and food safety.	**Strong Opposition and Environmental Concerns:** The Japanese government, despite opposition from its fishing industry and the public, has pushed forward with the plan, which is expected to have long-term effects on the marine ecosystem. Critics argue that the release could undo years of work to restore the reputation of Japanese fish products and have catastrophic impacts on the future of Japan's fishing industry. Neighboring countries, including China and South Korea, have expressed grave concerns, calling for Japan to handle the disposal with greater caution.
Japan's Credibility and Regional Impact: Japan's decision has also been criticized for its potential to damage its international credibility, especially in Asia. Critics argue that the Japanese government and TEPCO, given their past mishandling of the Fukushima disaster, are not trustworthy in ensuring the safe disposal of radioactive waste. Countries in the Asia-Pacific region, particularly China and South Korea, have expressed grave concerns, urging Japan to handle the issue with greater caution and to consult more thoroughly with affected nations before proceeding.	**Global Condemnation and Diplomatic Fallout:** The decision has drawn significant international backlash, with calls for Japan to halt the release and explore safer alternatives. The plan has been labeled as irresponsible and selfish, with critics pointing out Japan's poor track record on environmental issues. There is growing concern that Japan's actions could cause irreversible damage to the global marine environment, leading to calls for international legal action and closer scrutiny by global organizations like the International Atomic Energy Agency (IAEA).

Table 4.13: South Korea: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Hype around Taiwan Question and South Korea's Position: Chinese experts refute the hype and wishful thinking around Taiwan's inclusion in joint statements from US-South Korea meetings, contrasting it with stronger US-Japan statements. They emphasize that South Korea, unlike Japan, seeks to maintain an independent diplomatic stance rather than leaning strongly against China, understanding Taiwan as a red line in China's foreign policy.	**South Korea's Strategic Balancing Act with China and Japan:** South Korea is cautious about aligning too closely with Japan and the US, fearing economic and diplomatic repercussions from China, but its increasing alignment signals a shift towards a quasi-alliance that could limit its diplomatic flexibility. The future of South Korea-China-Japan trilateral cooperation remains uncertain, with South Korea's recent actions indicating a shift away from balanced diplomacy towards a more confrontational stance. This shift could have significant implications for regional peace and stability, as well as for South Korea's own economic and security interests.
Envoy Visit to South Korea and Japan: Deputy Secretary of State and special envoy Stephen Biegun visited South Korea and Japan to discuss bilateral and global issues, particularly concerning the DPRK. This visit came amid heightened tensions on the Korean Peninsula, with stalled denuclearization talks and escalated actions by DPRK, including demolishing an inter-Korean liaison office and cutting communication lines.	**Yoon Administration's Foreign Policy and Regional Security:** The Yoon administration is seen as heavily influenced by US-designed strategies, which some experts believe could draw South Korea into unnecessary conflicts, similar to the situation in Ukraine. The administration's strong stance on issues like THAAD deployment and its approach to China-South Korea relations have raised concerns about a rapid deterioration in bilateral ties.
Chinese FM Meeting with South Korean President: Chinese State Councilor and Foreign Minister Wang Yi met with South Korean President Moon Jae-in in Seoul, wrapping up a four-nation visit. They agreed to strengthen ties and boost cooperation, with South Korea emphasizing the importance of its relationship with China. The visit is seen as a strategic move by China to stabilize regional geopolitics amid rising tensions and external pressures.	**South Korea's Diplomatic Challenges and Future Prospects:** The Yoon administration's rhetoric and actions, such as emphasizing South Korea's role in the US-Japan alliance and downplaying China's importance, have drawn criticism both domestically and internationally. There is a growing concern that South Korea's foreign policy under Yoon may sacrifice long-term regional stability for short-term gains in its alliance with the US and Japan.

Chapter 5

Narratives and Offline Behavior

"China's national power has increased significantly, reducing the benefits of compromise and enabling China to drive a much harder bargain"

–M. Taylor Fravel, Political Scientist at MIT

5.1 Introduction

China's escalating military activities in the South China Sea and its focus on asserting territorial claims over Taiwan have raised significant concerns internationally. The evolving tactics— including live-fire drills, maritime encirclement, missile launches, and persistent military flights into Taiwan's air defense identification zone—underscore China's 'gray zone' approach—strategies short of open warfare—to achieve reunification with Taiwan [3, 80]. This approach aligns with the broader notion of influence operations, where coordinated efforts leverage diplomatic, military, economic, and informational capabilities to shape foreign attitudes, behaviors, and decisions [179]. These influence operations often extend to the information environment, including social media platforms where international audiences are easily accessible.

China's gray zone endeavors, particularly its territorial claims through the nine-dash line, present distinct challenges [112]. Unlike its conflicts with neighboring countries, China's Taiwan dispute originates from the 1949 Chinese Civil War, leading to conflicting claims as a legitimate China. This historical context, reinforced by China's emphasis on sovereignty, shapes its pursuit of reunification, which China views as an "internal issue"[349]. Although most countries lack formal diplomatic ties with Taiwan, informal trade, security, and technology cooperation connections persist [247]. Taiwan's status is further complicated by the US's policy of strategic ambiguity, maintaining a non-diplomatic relationship with Taiwan and non-committal support if China invades Taiwan [164].

While most countries do not formally recognize Taiwan through diplomatic ties, many countries, including the United States, maintain unofficial ties in trade, security, and development relations and science and technology cooperation [248]. The United States officially supports a One-China policy in which it opposes any unilateral changes to the status quo, opposes Taiwan's independence, and expects any cross-Strait differences to be resolved by peaceful means [248]. In reality, the US continues to draw from historical agreements such as the 1979 Taiwan Rela-

tions Act, which forms the basis of its "strategic ambiguity" policy, maintaining a non-diplomatic relationship with Taiwan and non-committal support in the event of China invading Taiwan [164].

Recent studies, including a RAND analysis, highlight China's comprehensive gray zone tactics throughout the East Asia Pacific, primarily targeting Taiwan [186]. On the one hand, military maneuvers, such as incursions into the Taiwan Air Defense Identification Zone (ADIZ), underlie the projection of China's force and aggressive territorial assertions. However, China's extensive use of social media platforms through both overt state channels and covert information operations offers information on its messaging strategies, promoting Chinese narratives and interests in its "discourse war" [87].

China's influence doctrine is seamlessly integrated into the broadly coordinated strategy aimed at attempting to force Taipei to bend to Beijing's will regarding reunification. Three Warfares covers the concepts of psychological warfare, public opinion warfare, and legal warfare; crucial in expanding the definition of war beyond physical conflict zones and necessary for setting the winning conditions for war within peacetime [185]. Psychological warfare seeks to influence a target population or individual's beliefs or perceptions by disseminating information or propaganda to disrupt, support, or weaken a belief. Public Opinion Warfare seeks to shape external and internal opinions to further a goal. Lastly, Legal Warfare shapes and creates a legal context to legitimize actions [161]. We define China's ADIZ flight incursions and the subsequent messaging on those flights as a form of psychological warfare against the government and people of Taiwan. China's social media messaging or discourse power is a component of its public opinion warfare strategy in shaping the dialogue towards Taiwan.

The growing scholarship on political communication emphasizes that, on the international stage, both realms of Chinese state activity should be seen in connection with one another. Empirical evidence indicates that online state propaganda is strongly linked to offline conditions, such as economic partnerships and ideological compatibilities [111, 312]. But in acute contexts of international conflict, how do online messages relate to offline actions? The surge in China's messaging, specifically around Taiwan, presents an opportunity to study how these narratives align with military actions in the gray zone.

This chapter introduces a novel computational social science approach to analyze China's social media discourse following destabilizing events. House Speaker Nancy Pelosi's visit to Taiwan marked a change in the historical US stance on strategic ambiguity, prompting China's assertive messaging around the event [346]. This discourse cascade, coupled with the escalating tensions between China and Taiwan [198], compounded by global events such as the Russian invasion of Ukraine [288], requires a closer examination of the link between social media narratives and real-world actions. This study seeks to dissect China's high-level narratives toward Taiwan, investigating their correlation with offline kinetic activities and employing computational analysis for quantitative insights and qualitative exploration. This chapter builds off the last chapter, extending beyond *how* the PRC messages to further explore *what* the PRC messages. Specifically, we explore what themes emerge in the PRC's narratives. Our data allows us to start understanding how these narratives have shifted over time in rhetoric oriented towards China's neighboring countries in the East Asia Pacific, e.g. South Korea, Japan, the Philippines, and Taiwan.

The Asia Pacific is currently undergoing a turbulent period of shifting security alliances and expanding spheres of influence toward China or the United States. Russia's invasion into Ukraine may seem far removed from the region, but it has had a rippling effect on security posturing. Japan is continuing to strengthen its relationship with NATO in the Indopacific [16] in addition to

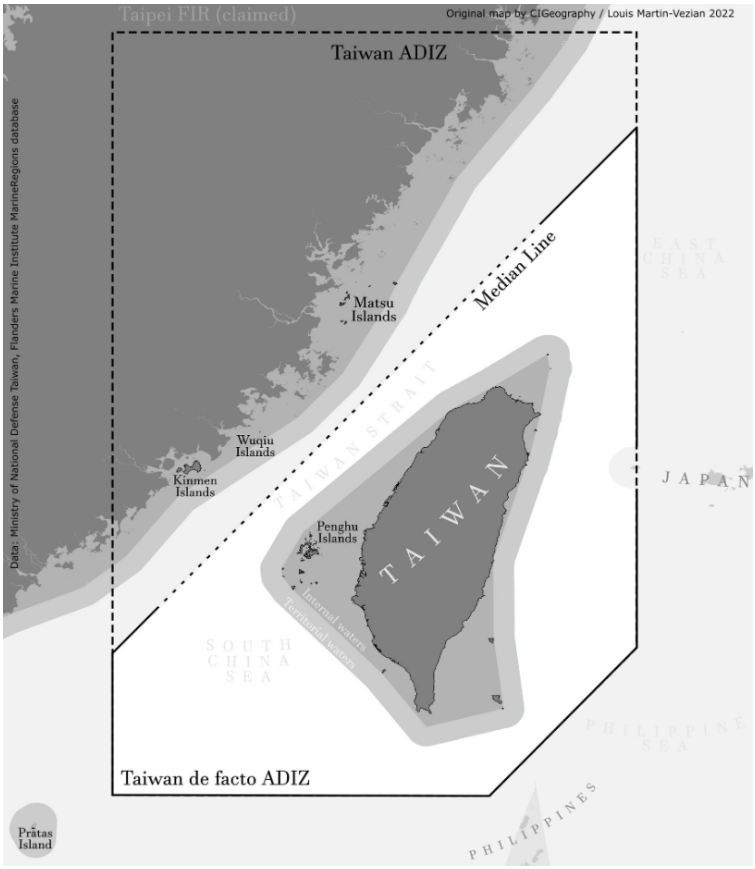


Figure 5.1: The Taiwan Strait median line between China and Taiwan within Taiwan's Air Defense Identification Zone (ADIZ) represents an informal Cold War-era agreement. China has increased its ADIZ median line violations coinciding with its increased military posturing. Credit: STR/AFP via Getty Images[3]

strengthening security cooperation and economic trade with South Korea [193]. There is a research gap in exploring regional narratives and how they shift over time. We ask the following questions in this chapter:

- The nexus between China's social media narratives and its kinetic grey zone activity against Taiwan.
- The nature and content of China's messaging through these narratives.

5.2 Methods: Triangulation Strategy

Data Data collection entailed over three million tweets from January 1, 2021, to October 31, 2022, using the Twitter V2 API using the hashtag #Taiwan. This period covers China's Twitter discourse before the Ukraine conflict and the aftermath of Nancy Pelosi's visit to Taiwan. After filtering the data to tweets and retweets relevant to Chinese-flagged accounts, the dataset consisted of 115,841 tweets. The accounts of interest dataset encompass 350+ official Chinese-government-affiliated Twitter handles, including government officials, organizations, and media accounts. Twit-

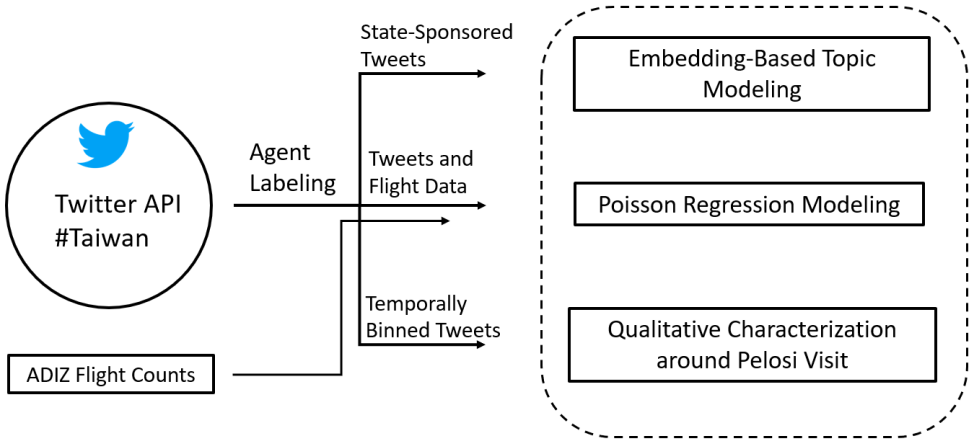


Figure 5.2: Data processing and mixed methods pipeline for empirical and qualitative methods used to corroborate findings

ter previously maintained a nonstandardized labeling policy for state-sponsored and state-affiliated accounts, although previous research found that only 15% of Chinese state-sponsored accounts were labeled [146]. As of April 2023, Twitter does not label state-sponsored or state-affiliated accounts [55].

The last data set aggregates incident reports published by the Ministry of National Defense of Taiwan's Republic of China on China's People's Liberation Army (PLA) air activities within the Taiwanese ADIZ. These reports provide the number and type of PLA aircraft in ADIZ and location and time information [44] and were first featured by the New York Times to analyze China's increase in ADIZ flights since 2020 [45].

The analytical workflow for this section follows a concurrent triangulation strategy in which the we use quantitative and qualitative methods to corroborate the findings [319]. The workflow (5.2) involves data processing, agent labeling, bot identification, quantitative and qualitative analysis, and characterization of China's message during specific events.

Agent Labeling We use the tier-based machine learning tool, Bothunter, which classifies Twitter agents as bots using metadata and other account features to provide a probability value between [0, 1], predicting whether a Twitter user is an automated bot [25]. The bot threshold was based on the recommended bot probability score of.7 as a cut-off point to increase confidence in bot classification for each Twitter account [230]. This threshold is the level at which the bot classification label is most stable from changing from one class to another for outlying bot activity. We used a secondary data set that contains more than 350 state-sponsored / state-affiliated accounts of interest in China to further label agent nodes [144].

Embedding-Based Topic Modeling We used the BERTopic python library to cluster unstructured tweet text for semantic text similarity [121]. This topic modeling algorithm was used to provide a high-level overview of China's strategic messaging. This method involved converting tweets into sentence embeddings using a pre-trained language model. Additionally, we used used UMAP and HDBSCAN algorithms to reduce the dimensionality of the data and cluster similar documents. Lastly, we generated topic clusters using a variant of the Term Frequency-Inverse Document Frequent (TF-IDF) algorithm.

We filtered the Twitter data to only original tweets from state-sponsored accounts, which was a total of 12,809 tweets. We cleaned the raw text of the tweets by removing the special characters and URLs embedded in the text and then used the efficient sentence-transformer model all-MiniLM-L6-v2 to create document embeddings [271]. After fitting the model with a total topic cluster of 96, we removed stop words and noisy tweet artifacts, such as ampersands, to update the topic models. Lastly, topic reduction resulted in the final 30 topics.

Regression Modeling We used a two-stage Poisson regression model to quantify the temporal associations between ADIZ violations and online activity. The predictors for each model included concurrent numbers of ADIZ violations and lagged values of ADIZ violations, as well as tweets from these types of actors. We controlled for linear time trends and the total daily tweets recorded in the dataset. The Twitter data was filtered to Chinese-affiliated account tweets and any corresponding retweets, resulting in 115,841 tweets. This data was transformed into a time series sequence in which each day contains an aggregated number of tweets and retweets by state accounts and bots.

Narrative Characterization around the Pelosi Visits China's reaction to Nancy Pelosi's visit to Taiwan prompted a surge in Twitter discourse. This section's analysis covered the period leading up to her visit, the week of her visit coinciding with Chinese military drills, and the aftermath. Given the exceptional nature of the heightened Twitter activity and ADIZ flights during this event, it is an outlier that could escalate regional tensions. We employed qualitative coding to comprehend China's social media strategy during this event.

The Twitter data was segmented into three timeframes: a) pre-Pelosi visit, b) during her visit, and c) post-visit. Chinese government messaging regarding Pelosi's visit commenced as early as April 7, 2022. This date marked the start of the pre-visit period. The data peaked from August 2 to 8, 2022, amassing 21,406 tweets in one day and comprising nearly 60% of the dataset. This week aligned with a significant ADIZ surge, ranging from 8 to 45 daily flights within a 15-day span. To capture the zenith of Twitter chatter and ADIZ activities, we limited the analysis to Pelosi's visit period (August 2 through August 8, 2022), which peaked on August 5, 2022, roughly three days after Pelosi's visit. Subsequently, the data extended from August 9 to October 31, 2022.

We analyzed the top-most propagated or popular stories for each time slice to understand China's top messaging priorities. We examined the top 30 most amplified tweets in each period, constituting at least 25% of the tweets within each timeframe. An initial coding ontology was established by reviewing the first period. We then coded all thirty tweets for each period. If we encountered a new code for a different period, we re-coded any periods that had been previously completed to ensure tweet categorization standards were the same across all three periods. We consider the most amplified tweets a reliable gauge of messaging priorities during the Pelosi visit and during subsequent military drills.

5.3 PRC Narratives and offline kinetic activity toward Taiwan

Agent Analysis

We found 34,902 different agents or Twitter user accounts within our Twitter dataset. Of these accounts, 218 were Chinese state-sponsored, with a subset of 122 accounts as Twitter Verified accounts. Bot accounts represented 18,191 accounts or approximately 52% of all accounts. Ad-

ditionally, our dataset comprises retweets with approximately 81% of our 115,841 tweets. Due to the nature of our filtering, all original tweets are by state-sponsored accounts. These accounts additionally are responsible for a fraction of the retweets, or approximately 2.5% of our retweets. The bot accounts are the prime amplification tool for these tweets, accounting for over two-thirds of all retweets in this network at 67.7%. Our Chinese state-sponsored accounts are the most active in terms of tweet count on average. The significant standard deviation indicates the large skew in tweet activity between the top outlying accounts and the average accounts (see Table 5.1). Lastly, 97% of all tweets were in English. This language choice indicates that the intended audience for tweets with the #Taiwan hashtag is a predominantly English-speaking western audience.

Table 5.1: Overview of Twitter actors and descriptive statistics for their tweet counts. Chinese state-sponsored accounts are on average significantly more active than other types of accounts in our dataset. Bots have a higher average and significantly higher standard deviation that accounts for many "Superspreader" bots.

Actor	Mean	SD	Range
State-Sponsored	31.34	90.17	[0, 807]
Bots	3.88	14.23	[0, 740]
Others	2.27	6.89	[1, 598]

5.3.1 High-Level Narrative through Embedding-Based Topic Modeling

After topic reduction and data conditioning to improve the topic cluster quality, we characterized topic clusters by analyzing the topics with the highest contributing documents as key themes within each cluster. The intertopic map in Figure 5.3 recalculates our document embeddings and reduces the dimensionality of our data for a 2-dimensional space. We increased the quality of our clusters by training our BERTopic model, viewing our topics to determine coherence, and then updating our trained model's topics to remove stop words. Overall, we found five main clusters (see Table 5.2) characterizing China's high-level narratives across our Twitter corpus; China's military capabilities and equipment, tweets indicating a response to the Pelosi visit, themes around Taiwan's independence and potential reunification with China, foreign interference, and China's legal and legitimate claims over Taiwan.

Military Capabilities

Contributing topics included Chinese military organizations PLA or the People's Liberation Army and the Eastern Theater Command, which oversees military operations in the Taiwan Strait [155]. This cluster contained messages on ongoing and upcoming military drills conducted by the Eastern Theater Command around Taiwan leading up to and during the Pelosi visit. In addition, this group included topics with specific aircraft denoted, such as jets and warplanes. It should be noted that the PLA uses J-10, J-11, and J-16 fighter jet aircraft in its ADIZ incursions [101].

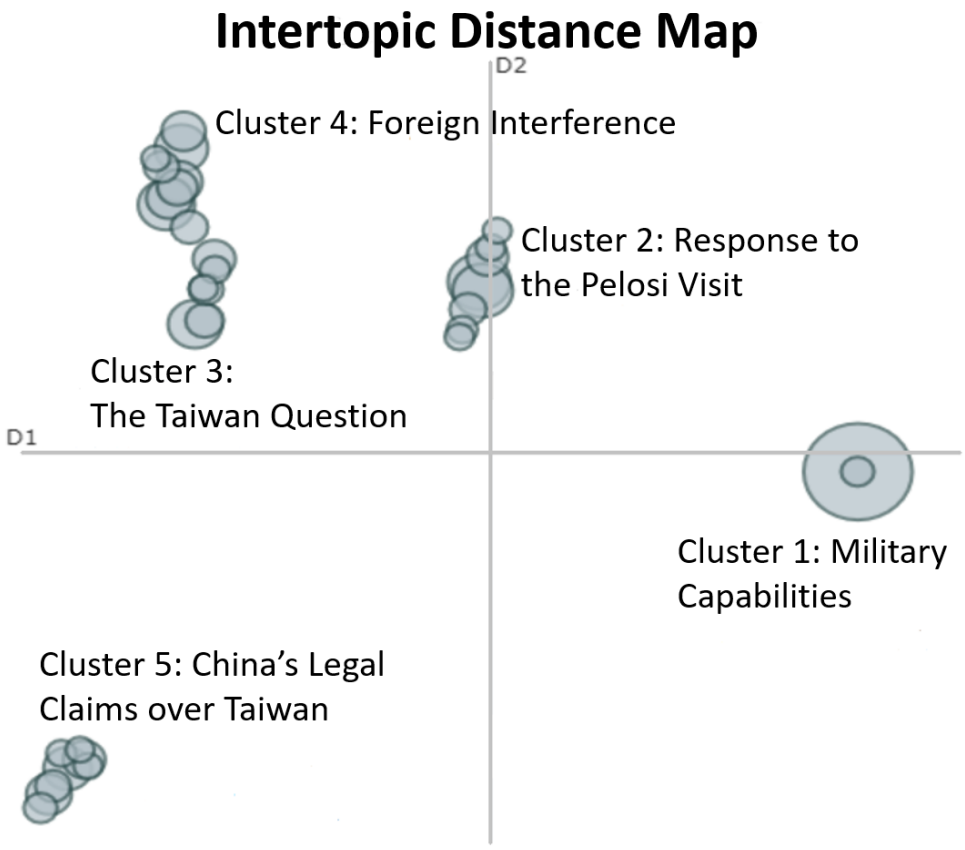


Figure 5.3: Topic clusters from Chinese state-sponsored Twitter accounts. Our topic map shows more similar topics closer together onto a 2-D space, where the size of the topic circle is proportional to the number of contribution tweet documents. The cluster themes are based on the general sentiment of the largest contributing topics for each cluster.

Pelosi Response

This cluster incorporated much of the dialogue about how China will respond to the Pelosi visit. Contributing topics include China's sovereignty over Taiwan, countermeasures, and potential responses China would make over the visit. These tweets also generally name Nancy Pelosi specifically, in addition to topics that might be similar to other clusters. Countermeasures beyond a military response include potential economic countermeasures. One topic grouping included tweets on China hitting Taiwan with import suspensions of citrus fruits and two types of fish on August 3, 2022, directly following Nancy Pelosi's visit.

The Taiwan Question

China describes the goal and ensuing challenges of a reunification with Taiwan as the Taiwan Question or the Taiwan Issue [240]. Contributing topics entail promoting dialogue on China's goal of reunification with Taiwan, its claims of territorial integrity, a new white paper China published on its foreign policy stance towards Taiwan, and criticism against Taiwan's independence move-

Table 5.2: Topic clusters with key topics and the number of contributing tweet documents underlying each cluster.

Cluster	Topic	Size
1: Military Capabilities	PLA; Jets; drills; Warplanes; Eastern Theater	539
2: Pelosi Response	Pelosi; sovereignty; countermeasures; response	587
3: The Taiwan Question	reunification; Taiwan; independence; secession; Ukraine; territorial integrity; white paper	439
4: Foreign Interference	Taiwan Strait; Japan; Biden Administration; sovereignty; playing card	529
5: Legal Claims	One-China Principle; sole legal; arms sales; Lithuania; UN; General Assembly	461

ment. Taiwan's Democratic Progressive Party (DPP) is perceived as promoting anti-China foreign policy in addition to Taiwan's independence movement.

Additionally, this cluster contains messaging on China's newest update to official foreign policy on Taiwan since 2000, published eight days after the Pelosi visit by [349]. The published white paper still supports a One-China Principle reliant on a "One Country, Two Systems" policy in which Taiwan would still be allowed to operate under pseudo-autonomy and subordinate to the PRC. However, it expands the potential for an extended military occupation of the island following reunification, either through peaceful or other means. The white paper explicitly names the DPP and the United States as obstacles to reunification. The United States is framed as the primary source of external interference for reunification, exploiting Taiwan to contain and hinder China's progress. China defines this as external interference since it considers the Taiwan question a matter of internal affairs for China. The DPP is described as secessionist and separatist, both crimes under the National Security Law adopted in 2015 [323].

Lastly, this cluster included tweets on China clarifying how Ukraine is dissimilar to Taiwan. We see the most amplified tweet on Ukraine with 307 retweets made by the Consul General of China in Belfast on our peak day of the Pelosi Visit August 5, 2022: *The #US is nothing less than the world's largest government-sanctioned arms dealer. With the enabling of the #Ukraine conflict and the undermining of #Taiwan-China just two of the latest examples! How can the creator of war be the purveyor of peace? How indeed! #SIPRI.*

China also warned Taiwan against using Ukraine as an argument before Russia's invasion. Foreign Ministry Spokesperson Hua Chunying tweeted on February 23, 2022 with 204 retweets, one day before the invasion: *It is unwise of the #Taiwan authorities to try to exploit the #Ukraine issue to its benefit. Taiwan is not Ukraine. It is an inalienable part of # China's territory, and this is an indisputable historical and legal fact.*

Foreign Interference

This cluster is near Cluster Three due to more text similarity compared to other clusters regarding themes of territorial integrity. Key topics included critical dialogue on the Biden Administration and Japanese lawmakers' visit to Taiwan in late August 2022 and the rejection of Japan's exclusive economic zone claims and historical aggression to the region from World War II. This cluster

included a topic on "playing cards." The underlying tweet documents show this phrase is used as such taken from a tweet by the Consul General of China to Karachi: *The #USA attempts to obstruct # China's complete #reunification and the #rejuvenation of the #Chinese nation by playing the #Taiwan card is doomed to fail, Chinese experts have said.*

Japan, second to the United States, receives the most negative sentiment. The top tweet contributing to Japan's topic grouping involves a statement condemning a joint US, Australian, and Japanese military exercise on August 7, 2022: *PLA's military drills around Taiwan island were supposed to end on Sunday at noon but were extended. It's a contempt toward joint warning of the US, Japan &Australia. To Chinese, regarding Taiwan question, these 3 countries are paper tiger, paper dog and paper cat in that order.*

Additionally, China frequently paints Japan as a historical aggressor in our data, drawing back on World War II era agreements to justify why Taiwan belongs to China:

- August 4, 2022 tweet with 397 Retweets: *The Cairo Declaration of 1943 and the Potsdam Proclamation of 1945 were very clear about China's rights over Taiwan. "All the territories Japan has stolen from the Chinese, including Taiwan and Penghu Islands, shall be restored to China".*
- August 8, 2022 tweet with 48 Retweets: *On Monday, China's Embassy in Tokyo issued a statement, warning Japan not to repeat its historical mistakes on the Taiwan question and again act as a trouble-maker, harm neighboring countries for its own interests & getting itself stuck in a geopolitical quagmire. https://t.co/gGHtu0oddB*
- August 13, 2022 tweet with 62 Retweets: *#Taiwan is part of #China - this is an indisputable fact. There is only one China in the world and #Taiwan has belonged to China since ancient times. In 1895, #Japan forced the #Qing government to cede Taiwan after Japan's war of aggression against China.*

Within the Three Warfares context, China's high-level narratives focus on its military capabilities, which support its psychological warfare approach toward Taiwan. These narratives are perhaps the most straightforward in encompassing China's troops, equipment, and military capabilities as a deterrent for any Taiwan independence movements or political maneuvers towards geopolitical actors that China sees as a threat, such as the United States and Japan. We see the Pelosi visit catalyzing a focused messaging effort by China to preserve its nationalist interests. China's social media narratives also aim to sway international opinion regarding Taiwan with a multi-pronged approach. These narratives rely on legal warfare to claim legitimacy regarding its One-China Principle and criticize countries such as the US and Japan for giving Taiwan legitimacy. China's most recent white paper on Taiwan serves as the latest legal warfare stepping stone for justifying future foreign policy and provides a roadmap for China's planned reunification with Taiwan.

5.3.2 Analysis of China's Twitter use and kinetic activity towards Taiwan

China's ADIZ violations are perhaps some of China's more volatile military operations and psychological warfare towards Taiwan. A key research question for this project entailed methods to determine if ADIZ violations predict China's Twitter activity and vice-versa; does China's Twitter activity predict ADIZ violations to provide a type of indicator for kinetic activity? We used a two-stage hierarchical Poisson regression model featuring a lagged 24-hour variable for features such

as State-Sponsored tweets, bot tweets and ADIZ violations in addition to interaction terms for the month of Nancy Pelosi's visit to both determine the potential directionality of any relationships in addition to controlling for our large Twitter skew in the month of August.

Do ADIZ violations predict state-sponsored Twitter activity?

We found a significant effect of ADIZ violations on State-Sponsored Twitter activity, but only during the month of Pelosi's visit 5.3. In Model 1, we do not distinguish in the dataset between August 2022 and other months. In Model 2, we include an additional predictor (the month of Pelosi's visit) as well as interaction effects with this month for all other variables in Model 1. Note that a likelihood ratio test suggests that Model 2 is preferred ($p < .001$).

Without making the distinction between months, the general effect of concurrent ADIZ violations is positive; the more violations there are on that day, the more state-sponsored tweets there will be (b = 0.0258, SE = 0.0019, $p < .001$). This controls for state-sponsored tweets the previous day, and for ADIZ violations the day before.

However, when accounting for the specific month of Pelosi's visit, we see that this effect is no longer significant (b = -0.0005, SE = 0.0065, $p > .05$). Moreover, on any day that is not the month of Pelosi's visit, the relationship with ADIZ violations the day before is negative (b = -0.0205, SE = 0.0079, $p < .01$). However, specifically in August 2022, the relationship becomes positive (b = 0.0313, SE = 0.0084, $p < .001$).

These findings suggest that there is a significant relationship between state-sponsored Twitter activity and ADIZ violations, but they exhibited distinct patterns during the Pelosi visit. When Pelosi visited, ADIZ violations would take place and would be succeeded by Twitter activity the following day. This result could indicate that China's Twitter use towards Taiwan only corresponds with ADIZ activity if a special military operation is taking place, in which Twitter amplification is beneficial.

Table 5.3: Do ADIZ Violations predicted State-Sponsored Twitter Activity? A two-stage hierarchical Poisson regression model indicates that a relationship exists only when supporting China's information campaign against the Pelosi visit.

Coefficient	Model 1	Model 2
Intercept	0.3638 (0.0609)***	0.5932 (0.0756)***
Day	0.0258 (0.0019)***	-0.0009 (0.0003)**
All Tweet Count	0.0037 (0.0002)***	0.0039 (0.0002)***
ADIZ Violations	0.02588 (0.0019)***	-0.0005 (0.0065)
State-Sponsored Tweets (Lag)	0.0042 (0.0003)***	0.0237 (0.0061)***
ADIZ Violations (Lag)	0.0033 (0.0025)	-0.0205 (0.0079)**
Pelosi Month	-	33.9960 (0.0756)***
Pelosi x Day	-	-0.0896 (0.0041)***
Pelosi x All Tweet Count	-	-0.0039 (0.0002)***
Pelosi x ADIZ Violations	-	0.0072 (0.0068)
Pelosi x State-Sponsored Tweets (Lag)	-	-0.0229 (0.0061)***
Pelosi x ADIZ Violations (Lag)	-	0.0313 (0.0084)***

Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Do ADIZ violations predict bot activity?

We repeat our methods but switch our outcome variable in Table 5.4 to demonstrate that ADIZ violations predict bot activity, but only for the month of Pelosi's visit. As before, in Model 3, we do not distinguish in the dataset between August 2022 and other months. In Model 4, we include an additional predictor (Pelosi Month) as well as interaction effects with this month for all other variables in Model 3. Note that a likelihood ratio test suggests that Model 4 is preferred ($p < .001$). Without making the distinction between months, note that the general effect of concurrent ADIZ violations is positive; the more violations there are on that day, the more bot tweets there will be (b = 0.0195, SE = 0.0004, $p < .001$). This controls for bot tweets the previous day, and for ADIZ violations the day before.

Once again, when accounting for the specific month of Pelosi's visit, we see that this effect is no longer significant (b = -0.0013, SE = 0.0015, $p > .05$). Moreover, on any day that is NOT the month of Pelosi's visit, the relationship with ADIZ violations the day before is negative (b = -0.0106, SE = 0.0017, $p < .001$). However, specifically in August 2022, the relationship becomes positive (b = 0.0130, SE = 0.0018, $p < .001$). These findings suggest that there is a significant relationship between bot activity on Twitter and ADIZ violations, but they exhibited distinct patterns during the Pelosi visit. When Pelosi visited, ADIZ violations would take place and would be succeeded by bot activity the next day.

Table 5.4: Do ADIZ violations predict bot activity? A two-stage hierarchical Poisson regression model indicates that ADIZ violations are likely to be followed by bot activity the next day, but only during the window of the Pelosi visit.

Coefficient	Model 3	Model 4
Intercept	3.2445 (0.0140)***	3.3781 (0.0179)***
Day	0.0045 (0.0000)***	-0.0004 (0.0001)***
All Tweet Count	0.0001 (0.0000)***	0.0041 (0.0000)***
ADIZ Violations	0.0195 (0.0004)***	-0.0013 (0.0015)
Bot Tweets (Lag)	0.0001 (0.0000)***	0.0012 (0.0001)***
ADIZ Violations (Lag)	-0.0004 (0.0005)	-0.0106 (0.0017)***
Pelosi Month	-	39.2935 (0.2964)***
Pelosi x Day	-	-0.1041 (0.0009)***
Pelosi x All Tweet Count	-	-0.0040 (0.0000)***
Pelosi x ADIZ Violations	-	-0.0042 (0.0016)**
Pelosi x Bot Tweets (Lag)	-	-0.0012 (0.0001)***
Pelosi x ADIZ Violations (Lag)	-	0.0130 (0.0018)***

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

Do state-sponsored tweets and bot activity predict ADIZ violations?

Lastly, we explore whether state-sponsored tweets and their corresponding bot activity predict ADIZ violations (see Table 5.5. A final two-stage hierarchical Poisson regression model suggests yes, but only for bots and not state-sponsored tweets. This effect was particularly pronounced during the month of the Pelosi visit (August 2022). Here, ADIZ violations serve as the dependent variable, while state-sponsored tweets and bot activity serve as independent variables. Lagged values and controls are also included. As before, in Model 5, we do not distinguish in the dataset

between August 2022 and other months. In Model 6, we include an additional predictor (Pelosi Month) as well as interaction effects with this month for all other variables in Model 5. Note that a likelihood ratio test suggests that Model 6 is preferred ($p < .001$). Without making the distinction between months, note that the general effect of concurrent state-sponsored tweets is not statistically significant (b = -0.0012, SE = 0.0017, $p > .05$), but a positive effect is detected for concurrent bot activity (b = 0.0008, SE = 0.0002, $p < .001$). Hence, the more bot tweets that day, the greater the number of ADIZ violations. This controls for state-sponsored tweets and the level of bot activity the previous day, and for ADIZ violations the day before.

When accounting for the specific month of Pelosi's visit, for all other months the relationship between bot activity and ADIZ violations becomes negative (b = -0.0177, SE = 0.0044, $p < .001$). So there is actually less bot activity on days with more ADIZ violations in general. But the relationship becomes positive again for the month of August, for both concurrent bot activity (b = 0.0180, SE = 0.0044, $p < .001$) and lagged bot activity (b = 0.0027, SE = 0.0010, $p < .01$). These findings suggest that on the month of Pelosi's visit, bot activity on a given day suggests more ADIZ violations the following day, but the same relationship is not seen for state-sponsored tweets. Contrasted with the findings given above, this means that while state-sponsored tweets retroactively signal recent ADIZ violations, they do not serve as early warnings.

Overall, this section highlights how both State-Sponsored Twitter activity and the corresponding bot amplification was tightly coupled with the ADIZ and military activity around Pelosi's visit in August 2022. When we controlled for the visit, the average effects of the social media activity disappeared in relation to the ADIZ violations. This finding indicates that China's use of social media, on average is not connected to its military operations towards Taiwan, but may be in specific high-priority scenarios, such as the Pelosi visit. This finding indicates that China uses its social media narratives and inauthentic amplification methods such as the use of bots to support and prop up its military actions at the strategic level, where an information campaign may support a kinetic military campaign for a multi-domain effort.

5.3.3 Characterizing China's Messaging around Nancy Pelosi's visit

We qualitatively characterize tweets before, during, and after US House Speaker Nancy Pelosi's visit to Taiwan on August 2, 2022. During the first week of August, the Chinese government had an unusually high rate of ADIZ flights and Twitter chatter regarding Taiwan. Determining the relationship of flights to Twitter data is essential, but additionally so in understanding the context of messaging around the events. In Table 5.6, we show descriptive characteristics of our Twitter data analyzed before, during, and after US House Speaker Nancy Pelosi visited Taiwan. Our pre-Pelosi visit data extends from April 7, 2022, when we first identified tweets discussing the upcoming Pelosi visit to August 1, 2022. We describe all tweets that fall between August 2-8 as our "During Visit" period, encompassing 56.9% of all tweets within our total dataset. Lastly, we analyze tweets following Pelosi's visit from August 9 to October 31, 2022.

All three periods contain similar bot tweet rates. However, the period during Nancy Pelosi's visit contains the most significant volume of tweets and also coincides with China's military drills around Taiwan. Due to the sheer amount of tweets during this period, we characterize this massive amplification in messaging as China's information campaign supporting its military exercises, all publicized as countermeasures and China's response to the Pelosi trip. We determined seven overall categories of tweets during our iterative process of analyzing the 30 most amplified tweets per

Table 5.5: Do state-sponsored tweets and corresponding bot amplifiers predict ADIZ violations? A two-stage hierarchical Poisson regression model indicates that bot activity especially during the Pelosi visit is likely to be followed by more ADIZ violations, but this does not hold true for state-sponsored tweets.

Coefficient	Model 5	Model 6
Intercept	1.1634 (0.0514)***	1.2894 (0.0574)***
Day	0.0003 (0.0002)	-0.0003 (0.0002)
All Tweet Count	-0.0004 (0.0001)**	0.0125 (0.0031)***
State-Sponsored Tweets	-0.0012 (0.0017)	-0.0002 (0.0148)
Bot Tweets	0.0008 (0.0002)***	-0.0177 (0.0044)***
ADIZ Violations (Lag)	0.0365 (0.0024)***	0.0348 (0.0026)***
State-Sponsored Tweets (Lag)	-0.0019 (0.0013)	0.0060 (0.0150)
Bot Tweets (Lag)	0.0000 (0.0001)	-0.0027 (0.0010)**
Pelosi Month	-	-3.2569 (3.3190)
Pelosi x Day	-	0.0127 (0.0094)
Pelosi x All Tweet Count	-	-0.0127 (0.0031)***
Pelosi x State-Sponsored Tweets	-	0.0031 (0.0149)
Pelosi x Bot Tweets	-	0.0180 (0.0044)***
Pelosi x ADIZ Violations (Lag)	-	-0.0456 (0.0103)***
Pelosi x State-Sponsored Tweets (Lag)	-	-0.0054 (0.0150)
Pelosi x Bot Tweets (Lag)	-	0.0027 (0.0010)**

Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

period. Once we narrowed categories to seven total groupings, we re-coded all 90 tweets across the three periods. The categories are as follows, with sample tweets in our appendix:

Table 5.6: Descriptive statistics for Chinese tweets leading up to, during, and after Nancy Pelosi's August 2022 visit to Taiwan.

Period	No. of Tweets	% Tweets by Bots	% Tweets Sampled
Pre-Pelosi	14042	64.3	32.8
During Visit	65965	60.3	25.9
Post-Pelosi	21881	61.2	32.3

- Countermeasures: Includes any tweets that contain the word *countermeasures*, *consequences* or *China's red line*. This category also contains tweets about China's military capabilities and exercises, China's red line, or tweets that indicate consequences of Nancy Pelosi's Taiwan visit. This category captures any military, economic, or unnamed threats of action as potential countermeasures to the Pelosi visit.
- General Opposition: This category was one of our most minor categories, entailing more generic but still negative sentiment towards the visit. Importantly, this category did not encompass a threat, mention other countries, or discuss the One-China Principle.
- One-China Principle: This category includes any verbiage regarding the One-China Principle, territorial integrity, sovereignty claims over Taiwan, or the sentiment that Taiwan is a part of China. These tweets ranged from educational infographics on legal precedent to more cultural references such as quotes from Roger Waters, a co-founder of the band Pink



Figure 5.4: Images of political cartoons featuring Nancy Pelosi shared by Chinese government Twitter accounts and their amplification network

Floyd who has expressed his support of Taiwan belonging to China and jokes about cultural similarities in food between mainland China and Taiwan.

- Taiwan Denigration: This category contained disparaging content regarding Taiwan's relationship with the United States, typically represented as a subservience. The tweets in this category frequently contained political cartoons of current Taiwanese President Tsai Ing-Wen, such as the lower left cartoon in Figure 5.4.
- Personal Attack: Entails tweets that make personal attacks against Nancy Pelosi as a person, e.g., ad-hominem attacks against her character and motives for her visit. These tweets sometimes include cartoons that target and attack her individually instead of using her position as a proxy for the United States.
- Foreign Interference: The vast majority of these tweets are specifically about the United States, but we broadened the category to account for the tweets which include criticism of Australia, Japan, and the United Kingdom, in addition to NATO.
- News Coverage: This entailed the smallest category in our dataset, generic news coverage of the Pelosi visit announcing when and where the visit would occur. We only found one tweet in our sampled corpus of top tweets.

Pre-Pelosi Visit Period

This period extends from April 7, 2022, or the first day that China began messaging regarding Pelosi's visit, to August 1, 2022, for a total of 14,042 tweets or 12.1% of our total tweets. Our category for Countermeasures was the primary focus of messaging for this period. The "countermeasure" category maintained a deterrent theme and warned of consequences for the United States if the Nancy Pelosi visit were to happen (see Figure 5.5). As our topic modeling clusters indicated earlier in this paper, military capabilities overlap with other aspects of China's threat narratives. From an influence perspective, the threat of countermeasures to the United States in response to the visit is a form of psychological warfare intended to intimidate and coerce the United States into stopping the visit.

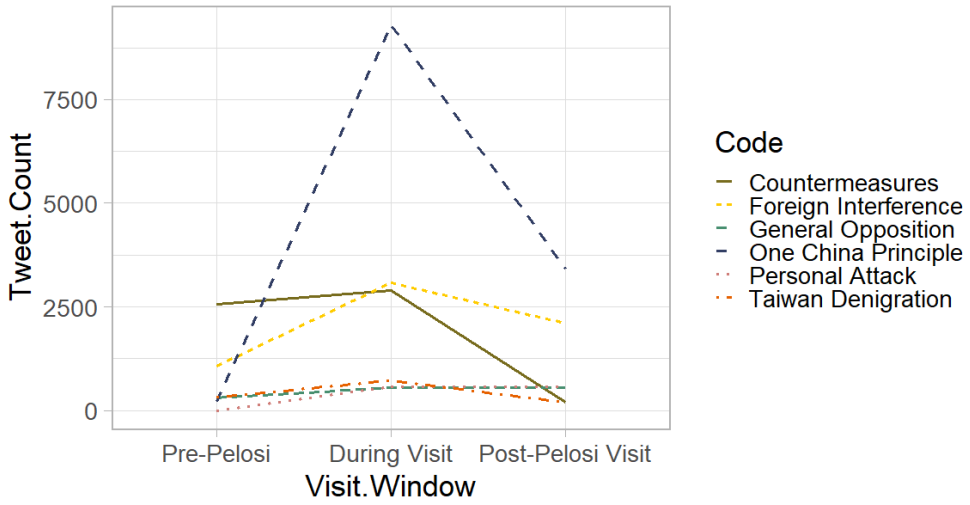


Figure 5.5: Line graph indicating characterization of China's tweets around Nancy Pelosi's visit in August 2022. Prior to the visit, tweets about China's potential countermeasures was the priority. During the week of Pelosi's visit, this messaging transitioned into the legitimacy of China's One-China Principle towards Taiwan.

During Pelosi's Visit

This period encompasses all tweets from August 2-8, 2022, for 65,965 tweets, or approximately 57% of our data. The One-China Principle category dominated our sampled tweets (see Figure 5.5). Many tweets in this category promote the message that over 160 countries, or 80% of the world's population, are committed to a One-China Principle. These types of tweets build a consensus that most of the world supports China's One-China Principle and all the actions it would enact to reunify with Taiwan. China's messaging for the One-China Principle uses legal precedent to legitimize China's claims of a One-China principle. Many of the Countermeasure tweets also promoted China's live-fire military drills within the Taiwan Strait.

There is additionally a significant uptick in tweets about foreign and, more specifically, US interference in what China perceives as its internal affairs. This increase in negative tweets towards the US occurred during the visit. China likely focused on countermeasures instead of direct criticism of the United States before the visit because it believed that would be a more effective branch of messaging to dissuade the United States from allowing the Pelosi visit.

After Pelosi's Visit

This period encompasses tweets between August 9, 2022, and October 31, 2022, for 21,881 tweets. China's messaging focuses on its claims to Taiwan via the One-China Principle and Foreign/US Interference. In particular, China published a new white paper titled "The Taiwan Question and China's Reunification in the New Era", which has updated China's policy towards Taiwan since 2000 and allows for a protracted military occupation of the island [349]. Within the Three Warfares context, this new document provides legal precedent for China's eventual roadmap towards reunification with Taiwan with force as an option [323].

5.4 Discussion

We analyzed the relationship between China's discourse around Taiwan in the context of its kinetic activity, specifically with respect to ADIZ flight incursions. In the midst of a more connected world where social networks are increasingly the medium to which people turn for information, social networks also enable information warfare in the digital domain. Our work demonstrates how China uses its Twitter messaging to support a multi-pronged approach toward its strategic goal of reunification with Taiwan. In response to Nancy Pelosi's visit to Taiwan in August 2022, China waged a multi-domain campaign both kinetically through a massive spike in ADIZ flight incursions and military drills around Taiwan in addition to a short burst of massive social media amplification regarding the Pelosi visit. This research contributes to the literature in further mapping out how state actors use narratives to prop up their kinetic activity against other countries in the physical domain.

Since the initial defense of this thesis in November 2024, China has continued to increase its hostility towards Taiwan, especially in light of President Donald Trump's refusal to answer on what is US policy if China were to invade Taiwan [137]. In March 2025, major media outlets reported the construction of amphibious "invasion barges" in Guanzhou, equipped with extended ramps for rapid troop and equipment deployment from ship transport to land. [202]. This development marks a new milestone in China's military apparatus toward a land invasion of Taiwan

Our work provides an invaluable case study for policymakers and national security experts regarding how state actors may use social media within an influence operation as a component for a more strategic campaign. Influence operations should be understood as multifaceted approaches across the military, information, diplomatic and economic domains. In our paper, this one event of Nancy Pelosi's visit resulted in China amplifying and synergizing military and social media efforts to at first deter and then convey an escalation of China's military show of force, where the target audience is Taiwan and the international community. This campaign ended with China's latest white paper publication laying the legal groundwork for an extended military occupation of Taiwan. Signals that we see on social media connecting state-sponsored narratives to offline military activity may indicate a concerted influence operation and potential escalation of gray zone conflict in the near future.

5.5 Limitations and Future Work

Our analysis of the relationship between ADIZ violations and China's Twitter chatter is limited by the observational design of our models, thus precluding any claims of causality between the two event streams. However, our contextual analysis of the Twitter chatter around the ADIZ military spikes enables a more holistic understanding of how China was messaging around its kinetic activity toward Taiwan and what the potential intent of these messages was in relation to its military drills. Further research in this area might include more variables that could impact China's ability to launch flights into Taiwan's ADIZ, including weather data and the presence of any foreign military assets.

Future work within this domain would benefit from other types of kinetic activity, including the maritime domain and adversarial cyber activity. The new "invasion barges" that China has built represent a more advanced stage of a potential invasion into Taiwan, thus the presence of these

amphibious vehicles could indicate the military drills for more advanced military land breaching operations. Our approach used one dataset to provide a proxy across China's military gray zone activity towards Taiwan. Additionally, the relationship between China's social media messaging and ADIZ flights may adapt and change over time. This study was limited to 2022, including China's tensions with Taiwan have been the most severe in many years. This line of research would benefit from extending both kinetic activity and social media commentary to determine if these relationships hold across the years of increasing tension, or if this is a new phenomenon.

Chapter 6

Scenario Design and Evaluation

"We live invested in an electric information environment that is quite as imperceptible to us as water is to fish."

–Marshall Mcluhan

6.1 Introduction

The Information Environment (IE) is defined as the "aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information—as consisting of physical, informational, and cognitive dimensions – Joint Concept for Operating in the Information Environment (JCOIE) [246]. However, the information environment (IE) is more complex than just the essential actors, organizations, and systems that create or interact with the information we are interested in. There are countless other actors, organizations, and systems that create volumes of noise that may not be relevant to the information environment in question. A 2022 report on general internet activity found that roughly 42% of all internet activity was created by bots or automated accounts [2].

Bots are but one type of "inauthentic" account designed to sway public opinion. Sock Puppet accounts, controlled by a human masquerading under a different profile, are perhaps more infamous. Russia infamously used sock puppet accounts via troll farms to exploit partisan politics and ideologies in the U.S. Presidential Election of 2016, finding rifts in identity politics to increase hostility among Americans across existing divide [154]. Specifically, Russia's Internet Research Agency (IRA), a private company owned by spent significant resources paying "trolls for hire" to create and use sock puppets in real-time to engage with, organize, and incite activity for both left and right-leaning groups in the United States [268]. These accounts contained key properties, such as relative effectiveness in pushing state-sponsored propaganda (e.g. RT formerly Russia Today), exploiting specific events to target a relevant audience, using the same accounts and resetting them to adopt different identities, and self-reporting of target areas as locations (e.g. Texas or Georgia to target Americans) [356].

In recent years, China's information campaigns have increasingly garnered international attention. In 2019, Graphika and Facebook (now Meta) famously reported on the Spamouflage Network, which used low-quality spam accounts to amplify Chinese state-sponsored content across

different social media platforms [234]. This past year, Meta reported China as the third top country with unattributed "coordinated inauthentic behavior", following Iran and Russia [232]. Interestingly, Meta has reported that the removed accounts three covert Chinese networks taken down in 2023 were impersonating US persons, in addition to pushing what Meta determined was "seemingly random" partisan posts from US politicians across both sides of the aisle. Meta determined that it was "unclear whether this approach was designed to amplify partisan tensions, build audiences among these politicians' supporters, or to make the fake accounts sharing authentic content appear more genuine" [201]. Of note, these more recent networks did not push any Chinese state-sponsored links. State-sponsored activity is increasing and, in some ways, becoming more difficult to ascertain.

In 2017, researchers at Carnegie Mellon University created a game to instruct analysts and decision-makers on extracting critical information from the IE. Project OMEN (Operational Mastery of the Information Environment) is a training game designed and developed to help analysts fight misinformation on social media. It is a realistic, scalable game designed to learn about social media analytics for analysts and decision makers [169]. The first OMEN scenario began with semi-synthetic training data from the 2018 NATO Trident Juncture exercise and the COVID-19 pandemic. Analysts were trained to use ORA and other network analysis tools and provided scenario data daily during the 5-day exercise to extract critical information on information maneuvers. OMEN is an example of a decision-making game where players are presented with choices at different parts of the storyline, where they can affect the game's outcome based on their decisions [20].

This chapter progresses the game to incorporate scenarios based on state-actor tactics, techniques, and procedures (TTPs) within the information environment. Our work for the OMEN game focuses on the following:

1. Integrate empirical findings into realistic network-based adversarial information operations
2. Integrate narrative findings from existing official state-sponsored literature to design a realistic scenario that promotes China's core interests
3. Enable the first near-peer competitor information warfare game based on research

The final chapter of this thesis integrates work from earlier chapters to synthetically generate the framework for PRC information maneuvers using the CASOS research tool AI-Enabled Scenario Orchestration and Planning (AESOP) [132]. Our research contributed to the iterative development of AESOP in network measurements and narrative/stance development it needed to capture to generate convincing synthetic social media data. This chapter contributes to ongoing efforts toward automating information environment training scenarios, with the inclusion of state-sponsored information operations. Given what we now know about the types of information campaigns, types of key actors, and PRC patterns for information maneuvers, can we synthetically design a PRC information campaign?

6.1.1 Complexity of the Information Environment

The Information Environment (IE) has evolved into an intricate web of communication modes, actors, and content, becoming an arena where both visible and increasingly hidden players jostle for information dominance or the ability to control information that leads to deeply held beliefs. State actors play an undeniable role at the center of the IE, many of who have expanded their reach

from traditional diplomatic and military domains to the vast expanse of the digital realm. Their motivations in the IE often revolve around advancing national interests, shaping global narratives, and exercising soft power to sway both domestic and international opinions. Social media's role within the IE has more broadly enabled Public Diplomacy [133].

State actors deploy a myriad of tactics to push narratives in alignment with their strategic goals. These may involve overt approaches, such as state-run media outlets that broadcast favorable news or start public diplomacy campaigns. However, more covert tactics, such as disinformation campaigns, cyber operations, and the employment of 'troll farms' to amplify certain narratives, are becoming increasingly prevalent. These concealed efforts, shrouded in layers of plausible deniability, aim to sow discord, create confusion, and ultimately erode trust in alternative or competing narratives.

The strategic objectives behind these state-sponsored narratives are multifaceted. On one hand, they might aim to bolster national pride, reinforce regime legitimacy, or suppress dissent within their borders. Externally, they may seek to degrade the reputation of adversaries, influence foreign publics, or shape the outcomes of international affairs in their favor. For instance, a state might use the IE to portray itself as a peace-loving nation amidst territorial disputes, while simultaneously deploying information warfare to weaken the positions of its adversaries.

In the modern era, where information travels faster than ever before, understanding the depths of the IE and the underlying motivations of state actors is crucial. Narratives, once primarily confined within national boundaries, now have the power to influence and shape perceptions globally, emphasizing the strategic importance of information warfare in the 21st century. This complexity requires nations, researchers, and policymakers to constantly adapt and develop countermeasures, ensuring that the truth isn't lost amidst the orchestrated cacophony.

6.1.2 Information Warfare-centric Games

The field of games and role-playing around information warfare is growing, as the impact of information campaigns grows through the study of bots, trolls, and other types of coordination designed to artificially impact public opinion. Game theory is one method that has been used to model very basic information maneuvers and expected impacts [158]. Early efforts by the US Government to train against information warfare used videogame engines to build realistic simulations of social engineering [75]. Gamification around fake news has gained prominence, particularly in the ability to "inoculate" a game player against the worst effects of disinformation, where a diluted form of an argument may enable an exposed player to better counter persuasive arguments [284] or pre-bunk disinformation prior to exposure [285]. More recently, RAND executed an information warfighter exercise wargame, a turn-based game designed to improve the US Marine Corps' ability to perform its seven functions for operations in the information environment, such as providing awareness of the information environment and influencing/deceiving a foreign target audience [260].

A complex challenge for the field of realistic information-environment-based scenarios is to dynamically update a game's content to reflect a quickly changing landscape of information warfare tactics. This feature is crucial as the strategies utilized by bots, disinformation agents and other bad actors are in constant flux as a game of digital cat-and-mouse to circumvent new methods of detection. Additionally, a balance should be struck between game goals and the level of engagement for users. Games that are too simplistic, predictable, or too finely curated risk reducing player engagement and learning potential. Another avenue for improvement lies in the implementation of

adaptive learning strategies. Furthermore, the assessment of the long-term effectiveness of these games in equipping players to recognize and counter disinformation is an area that warrants more extensive research and methodological development.

6.1.3 Scenario Generation and Synthetic Design

The OMEN exercise is the only social media analysis game that has successfully incorporated the field of social cybersecurity via the BEND framework, enabling users to "identify, counter, and measure the impact of information campaigns" [52]. The tangible aspect leads to understanding **who** is manipulating **who** through **what** means and to **what** end goal [52].

The Project OMEN training game centered around storyline planning around a given event with synthetic items injected into the storyline. The first iteration of OMEN used real Twitter data from the 2018 NATO Trident Juncture event. This dataset provided a conceptually interesting scenario due to a ship collision between the Norwegian frigate Helge Instad and a Malta-flagged oil tanker, causing an environmental emergency in the middle of the exercise. This scenario also incorporated data modeled from the COVID-19 outbreak, used to inject disinformation campaigns and echo-chamber communities that propagated conspiracy theories [169]. The exercise entailed providing software and network analysis tutorials of ORA, learning objectives, and information handouts on key actors within the data to analysts. The participants were provided a Twitter Data pull each day of the event to simulate an analyst monitoring social media feeds daily. For each given day of the exercise, the analyst team was provided reporting guidance and presented the day's findings using novel network analysis techniques to understand information maneuvers occurring between actors within the information environment.

Feedback from the initial testing of OMEN highlighted future improvements to avoid the following: OMEN required a) real social media data to create key actors and events, b) manual creation of the synthetic injections and agent communities, and c) manual creation of all exercise documents which entailed excerpts on key actors, learning objectives, and exercise artifacts such as Daily Intelligence Briefs to simulate a real-time data analytics environment. The OMEN team at CMU received key feedback from participants with the Office of Naval Research on key skills learned, such as learning to analyze large amounts of social media data through specialized tools such as ORA, learning how to recognize bad actors through their BEND maneuvers against an intended target, and [169].

Key requirements going forward for OMEN were that new scenarios would be key to advancing the game to prevent participants from "learning" the data, in addition to the need for a more advanced gaming platform that could create more complex scenarios. We extend current research on a scenario generator to facilitate state-sponsored information campaigns by creating templates for the scenario, types of actors, and types of information maneuvers based on preceding chapters.

6.2 Designing a scenario for AESOP

High Level Overview

My contributions to the OMEN 2024 exercise are interconnected with other CMU Researchers and with other Office of Naval Research performers working to support grant work on scalable tools for

social media assessment (see Acknowledgments for all grant information). My contributions for this chapter primarily lie in steps 1 and 3 within the high-level overview of how an OMEN game is created (see Figure 6.1). The generation of a scenario begins with a training audience in mind. A Scenario Designer can create a scenario that meets training objectives for a specific audience. Given the same dataset, a public affairs team would have drastically different reporting objectives than a psychological operations team.

I used the CMU Research tool AI-Enabled Scenario Orchestration and Planning (AESOP) tool to create a scenario template and an OMEN exercise package with instructor documents [132]. AESOP is a CASOS Research group Python application that integrates a Generative Pre-Trained Transformer (GPT-3) model. AESOP has multiple entity fields that exploit GPT-3.5 prompt capabilities to generate a compelling storyline in addition to key exercise artifacts from user input. By integrating large language model text generation, AESOP enables the rapid creation of realistic training environments. The development of AESOP required the iteration between the GUI development and the initial generation of the scenarios, in addition to conceptually mapping out **how** actors, events, and narratives are connected. The following provides context and background on how a scenario template eventually becomes an OMEN game as described in Figure 6.1.

Step 1: Scenario Generation After the Scenario Generator has "generated" a scenario, the output is a JSON template in addition to scenario artifacts that will be used directly in the OMEN game, such as background data for all Key Actors and Organizations, Scenario White Cell injects to be released day-by-day to the training audience and a master scenario event list (MSEL) that provides an overview of all Press Releases, Intelligence Summaries and other reports that will be released day-by-day.

Step 2: Data Generation OMEN's data is currently created by three different performers within the OMEN ecosystem. Griot and Blue Halo were tasked with generating synthetic data with the same guidelines and scenario template. The output from both of these companies are Twitter json files with *X* amount of days of data to match with the scenario's timeframe. CMU is the third party for data generation, creating the Telegram element of the dataset using a pre-trained large-language model that has been fine-tuned on relevant Telegram training data.

Step 3: Data Validation Synthetic data was validated through MOMUS, ORA and Netmapper to test whether the data is realistic (MOMUS), and if the data matches with the scenario template and BEND maneuvers (ORA and Netmapper). This step was crucial in providing feedback and quality control over the synthetic data generation to fix data formatting and structural issues. The first few iterations of QC revealed performers not creating JSON files correctly around Retweets and URLs, entities that are crucial in ORA's Twitter metanetwork structure.

Steps 4 & 5: Game Set-Up All OMEN training materials generated are provided to the ONR Program Manager and all instructor teams and White Cell members tasked with providing guidance and instruction during the scenario. The participants are given only specific background data in addition to the synthetic datasets for a given day. Performance assessment is still evolving for OMEN regarding standardized performance measures and lies outside the scope of this thesis.

The Relationship between Actors, Actions, and a target audience

Our past iteration of OMEN entailed manually adding narratives to the original real Trident Juncture dataset via the COVID-19 dataset. We either amplified existing tweets or amplified new synthetic tweets using specially created bot accounts. Due to the simplicity of our injected maneuvers,

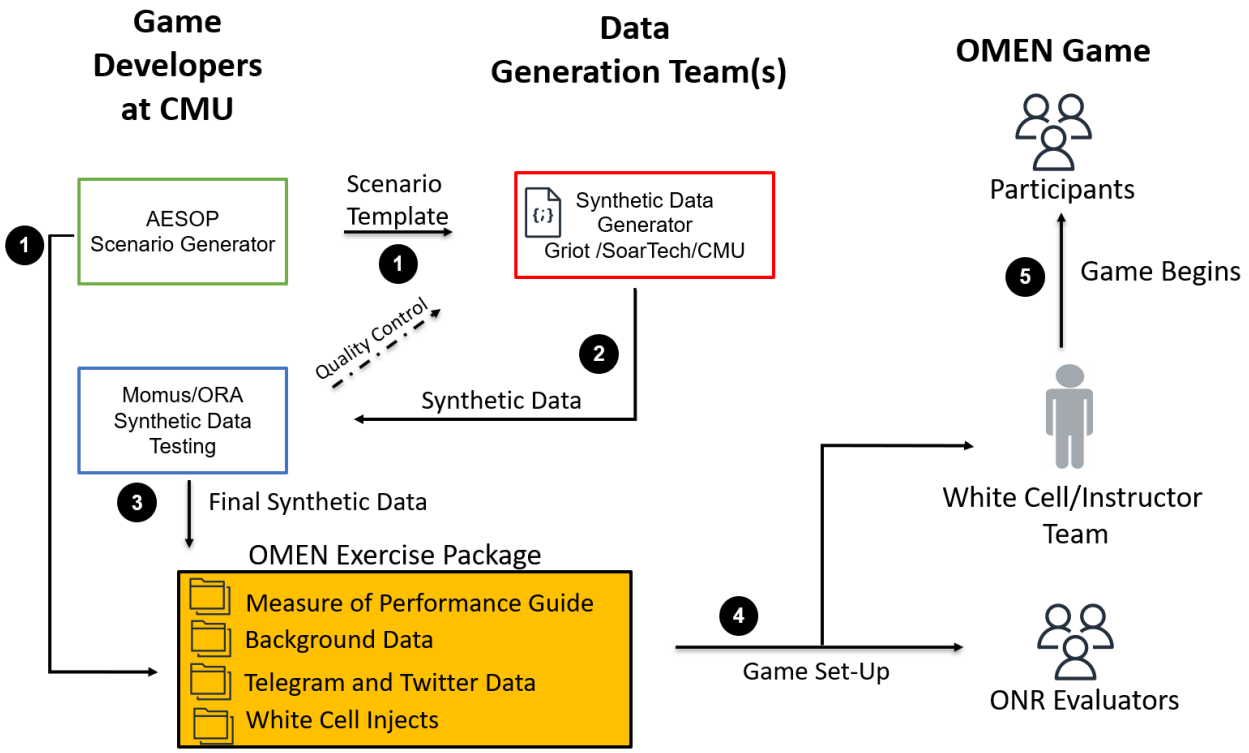


Figure 6.1: High-Level Workflow for OMEN Scenario Generation. The Game Developers at CMU first use the AESOP tool to input all actors, narratives, content and target audience into template construct, which will then be used to generate the scenario template for the Data Generation Team, in addition to creating training materials that will be used for the OMEN game. The data is generated by an external team to CMU, and evaluated before becoming a part of the OMEN exercise package.

these earlier iterations did not necessarily require thinking of actors in terms of the communities that they inhabit. Part of testing OMEN's synthetic data generation function is determining if we can create the scaffold or data outline for tweet generation. We originally had specific actors linked to a narrative. However, our scenario has polarizing geopolitical components in addition to "pink slime" or fake news sites masquerading as real sites [182], propaganda sites, and disinformation fueled by conspiracy theories. The intended audience for any of these actors may overlap or potentially model complex interactions and relationships, as studies have shown that identity can impact the propensity to believe in disinformation or conspiracy theories [89, 331].

We created a Topic-Event-Actor Framework for linking actors to a specific narrative and stance about an idea or event. An example of this 6.2 is the recent Chinese surveillance balloon that crossed the continental United States in 2023 and was ultimately shot down by an F-22 jet on February [176]. Within the next few weeks, the US shot down three more unidentified objects were shot down, with no further details on if these objects were also surveillance-type technologies [328]. US Press Secretary Karine Jean-Pierre stated shortly after "there is no — again, no — indication of aliens or extraterrestrial activity with these recent takedowns"[153]. Simultaneously, the search term "UFO" peaked worldwide during February 2023 [118, 173], with even Scientific American weighing in on the intersection between Unidentified anomalous Phenonena (UAP) and espionage surveillance [339]. Compounding the discussion were top Congressional Republicans pointing to the balloon event as an example of failing foreign policies to deter China's aggressive posturing [295]. These are a few examples of groups of actors and the types of narratives they were expounding. Realistically, a narrative could be initiated by a single actor and amplified organically or cultivated by more inauthentic means, such as communities that coordinate together. The topic of surveillance ballons may have many different nested narratives within it, each potentially targeting the same or a different audience.

Creating a template in AESOP

A blank template requires an overview providing a date range for an event, geographic location, and involved countries, and who the primary training audience is, in addition to other key tabs such as Topics, Groups and Actors, Events, News, and URLs. We provide more descriptions below for the role of each field. 6.3.

- Overview Page: The overview page is both the first and last tab that is generated during a scenario, first to initiate and last to aggregate key events created to provide an overview of all events within the scenario. Key fields include the range of the scenario, geographic areas involved, aggregated scenario summary, training audience and training objectives. When a scenario is complete, a designer will return to the overview page which then aggregates events. The AI prompt then generates additional background information based on the aggregate data.
- Named Entity Recognition (NER): This page is designed to take in a text snippet and use NER to human-in-the-loop extract either a person, organization, event, or bot. This function is designed to expedite parsing out key entities from a generated overview scenario. Currently, this function provides mostly consistent output for actors. Due to the lack of consistency, we did not use NER parsing.

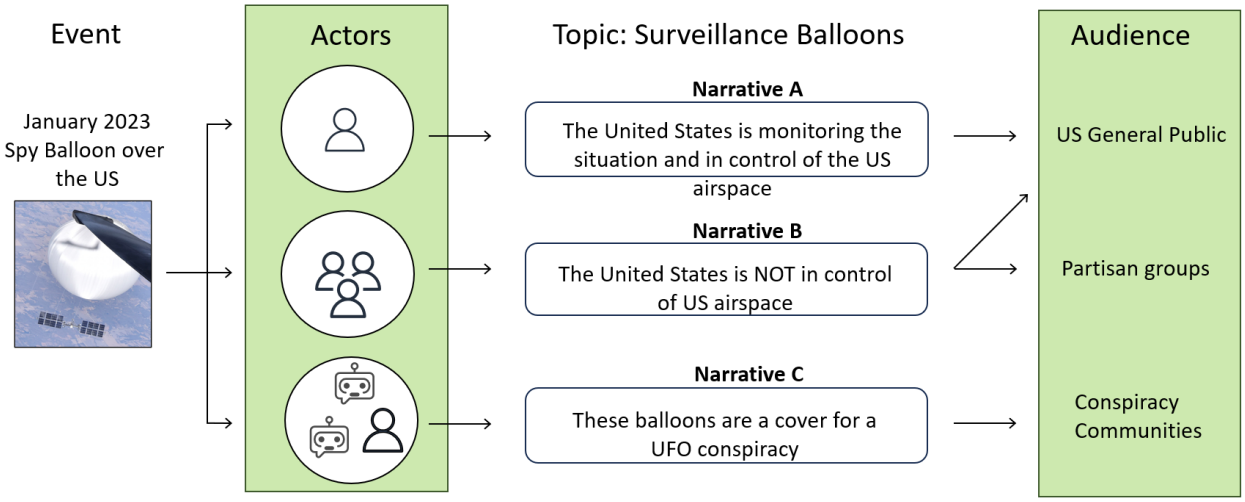


Figure 6.2: Topic-Event-Actor/Group Framework for AESOP: This framework sets the groundwork for modeling fuzzy boundaries between actors who may belong to different groups or organizations. An actor may be an individual, an organization or a group of humans and bot accounts. The goal for this framework will be to model interactions of narratives towards a given audience. If Narrative B is issued to counter Narrative A towards the same audience, which narrative will gain traction?

- Topics: Topics refer to subjects or matters of interest being discussed or explored. They serve as overarching themes that guide the direction of discussion and may contain different narratives around a subject.
- Groups: Groups denote a collection of individuals or entities that share certain commonalities, be it beliefs, attributes, objectives, or affiliations. They can be formal, like organizations, or informal, like communities of interest.
- Events: Events are specific occurrences that take place at a particular time and location. They can be historical, current, or anticipated future incidents that have significance.
- News: A scenario may contain multiple types of news sources which then create articles for any given day of a scenario. A news source may be real, pink slime, disinformation or other. We consider a wide range of news to be "real" due to additional categories, such as media bias and credibility, that provide nuance for the given stance of a news platform.
- URLs: HTML pages hosted on a CMU server to provide a back-end for realistic "News" sites that the Scenario Generator creates.

After a scenario template is completed by the scenario designer, the generator a) creates key background data for the participants, b) generates synthetic telegram data, c) creates White Cell injects that add tasking priorities to simulate real-life events, and d) generates the actual data template JSON files that will be used by the Data Generation team to create the bulk of Tweets for the scenario. The synthetic data then undergoes an evaluation process, where we will use report the validation and evaluation of the synthetic data created in Step 2. This step will be the evaluation section for this chapter and will help guide the next iteration of OMEN.

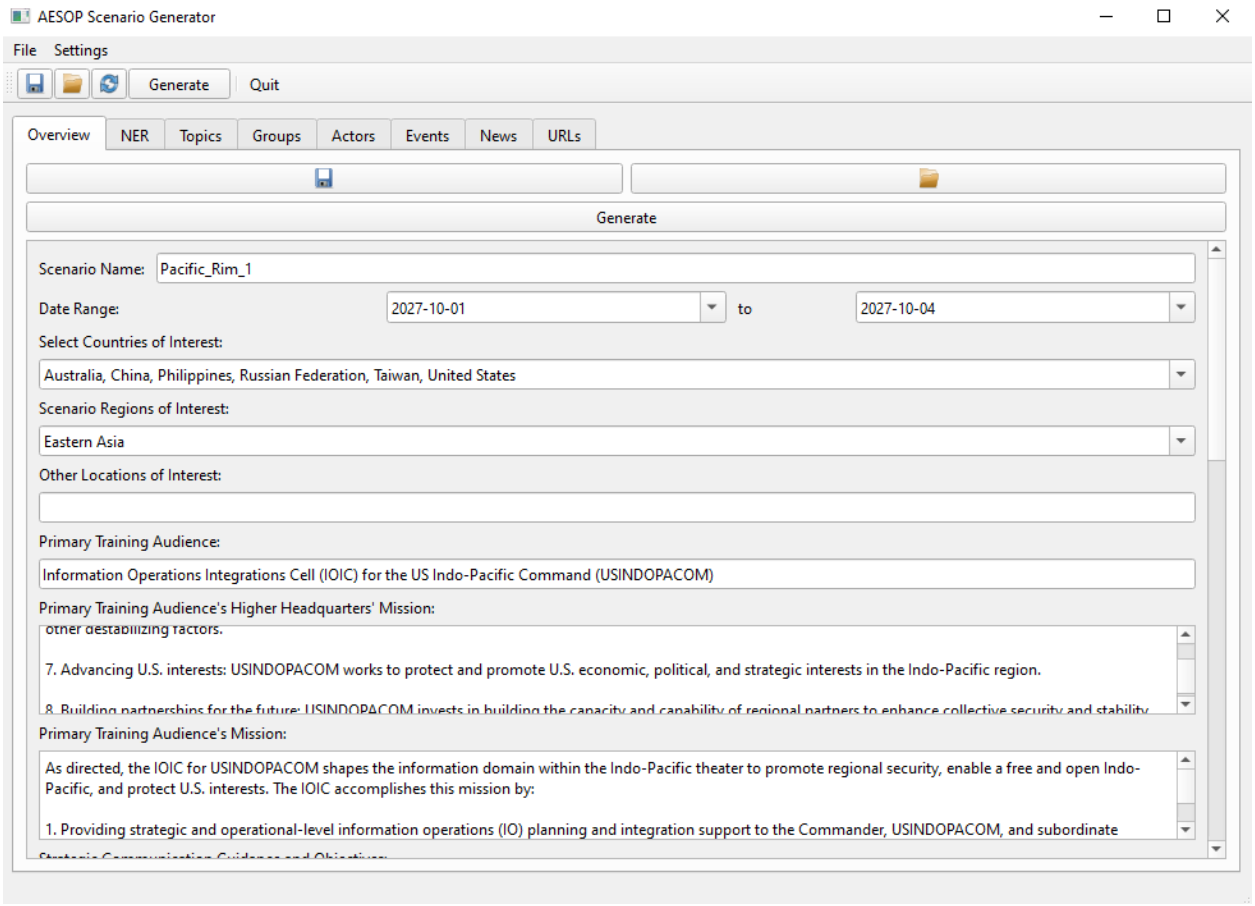


Figure 6.3: The AI-Enabled Scenario Orchestration and Planning (AESOP) tool is a Python-based GUI that enables a scenario planner to generate extension data based on key input fields for an information campaign. The output of this tool is finished background exercise documents for participants and exercise evaluators, in addition to JSON scaffold files for follow-on synthetic data generation.

Scenario Design: Pacific Rim

Overall, OMEN's goal is to enable synthetic information campaign generation for the following scenario categories: Health, Election, Climate, Conflict/War, Collision/Accident, Military and Diplomatic events, where we generate the information environment for a given event. Key fields for a given template include an event taking place over a timeline, key actors, including adversarial actors and their potential allies, friendly actors and their allies, the location where an event takes place, and a scenario description for what major sub-events occur each day prior to, during, and after an event.

I primarily designed the 2024 Pacific Rim scenario (with strategic input from Dr. Carley), that used real events to create the scaffolding for 100% synthetic data, in this instance using the events for the 2023 Balikatan annual bilateral exercise between the Philippines and the United States [1]. We initially planned a scenario around a military collision as we noted that the increased military posturing from China in the East Asian Pacific and retaliation from other countries raises the probability of an accidental collision. Coincidentally, during our scenario design phase, China and the Philippines had a maritime collision near a disputed shoal in the South China Sea and increasing geopolitical tensions [275]. While we did not use a collision scenario, we inserted artificial events within the Balikatan 2023 event list and designed the scenario to occur in the Balikatan of 2027 in the near future. Additionally, we changed key actors to synthetic personalities but kept real military, governmental, and news organizations.

Lastly, due to the exercise being a joint military exercise, our exercise goals for the scenario were primarily to integrate steps to understanding the public affaris/relations perspective and potential threat assessment of the information environment, by using a "train as you fight" approach. After participants are provided brief tutorials on basic network theory and on-hands training of software such as ORA and Scrawl,

Our scenario for this chapter has no bearing on the actual likelihood of such an event occurring but will be based on current geopolitical tensions and conflict.

Narrative Design We mapped out China's narratives in Chapter 3.5 primarily to inform our scenario generation on state-sponsored information operations. In this previous chapter, we uncovered China's primary narratives toward regional neighbors, economic alliances, and other major world powers to include themes of negative narratives towards other countries involved in territory disputes, opposition to multi-country alliances that have the ability to more effectively oppose China, and various consistent campaigns to attack adversaries, such as the Fukushima plant with Japan and U.S. gun violence in the United States. The narratives in Table 6.1 show our high-level narratives from past chapters and whether they were incorporated into the Pac Rim exercise.

China's top narrative remain centered around territorial claims, increasingly toward Taiwan following China's successful crackdowns in extinguishing political dissent in Hong Kong. Increasingly, China is promoting a "resistance is futile" strategy regarding what it perceives as inevitable reunification, with or without force. Narratives on sovereignty and territorial issues reveal a focused reinforcement of territorial sovereignty and regional stability on its terms. Central to this narrative is the One-China Principle, emphasizing Taiwan's status as an inseparable part of China. Additionally, China's sovereignty claims over the South China Sea, as defined by the 9-Dash Line,

[1] *Balikatan* means "should-to-shoulder" or sharing the load together in Tagalog

underscore its core interests using historical aspects that no other country recognizes (except, ironically, Taiwan). These narratives not only aggressively assert China's territorial claims, but also serve as a litmus test for who and how China engages with, where the recognition of these narratives increasingly sets the tone for diplomatic and economic engagement.

China's adversarial narratives focus primarily on the United States as a destabilizing force in the region. Our past research found that China maintained a multi-pronged approach for narratives about the United States and by extension other Western institutions such as NATO, the G7, and western lending institutions such as the International Monetary Fund. These narratives promulgate the notion that Western institutions writ large represent a non-inclusive hegemony with an imperfect democracy, the United States, at its helm. The past campaigns at the US Democracy Summit focused on China's perceived weakness and hypocrisy regarding the American model of democracy. Instead, China offers its governance approach as a viable alternative.

Countries that dare to publicly voice their grievances and seek collective action via military blocs are also prime targets for adversarial narratives. This growing list includes South Korea, Japan, the Philippines, and Australia. Furthermore, the narrative of the Philippines aligning with Japan and the US to destabilize the region exemplifies how China frames its geopolitical adversaries as part of a broader strategy to divide and weaken opposition to its policies. This narrative strategy aims to discredit the US and its allies and attempts to reshape perceptions of global democratic standards and governance models.

Lastly, China's "friendly narratives" narratives showcase China's softer approach to furthering its core interests, placing China's role as a benevolent and cooperative rising global power, especially in its relationships with smaller countries and within multilateral frameworks like the Belt and Road Initiative. The emphasis on how China does not bully, promotes win-win economic relationships, and actively promotes development and climate initiatives are narratives meant to soften China's international image and center it as a critical global actor. These friendly narratives are also designed to build a counter-narrative to the adversarial image depicted in other geopolitical discourses, promoting a peaceful and cooperative image of China that appeals to the Global South and other developing regions seeking alternatives to Western hegemony globally.

Events The events for our Pacific Rim Scenario showcase a near future Balikatan set in 2027 (see Figure 6.2). We used key events from the 2023 Balikatan, such as standard live-fire exercises, opening and closing ceremonies, and diplomatic engagements between the Philippines and the United States, strengthening the Enhanced Defense Cooperation, which allows the U.S. to keep a military footprint in the Philippines [251]. We added key synthetic inject events, specifically a Chinese Missile Launch over Taiwan on Day 2 and Filipino Student Protests against the U.S. military presence on Day 3. In our scenario, the PRC launches Dongfeng intercontinental ballistic missiles north of the Taiwan strait in defiance of Taiwanese Military Observers participating in the 2027 Balikatan. We ground potential missile launched in reaction to Taiwan's participation in the unprecedented military events around US House Speaker Nancy Pelosi's 2022 visit, which included ballistic missile launches, air and maritime operations across the Taiwan Strait, and a massive spike in cyber attacks [123]. Additionally, we add Filipino student protests rallying against the US military presence on the third day of the scenario. Although a small protest occurred in 2023, we significantly amplified this protest and created more complex narratives around the protest motives [307].

Topic 1: Sovereignty and Territorial Issues	
Narrative	Ex. 24
One-China Principle: Taiwan is a sovereign part of China	✓
9-Dash Line Claims: China maintains sovereignty over islands within the South China Sea	✓
China opposes military blocs, which destabilize the region	
Hong Kong is a success story of patriot governance	
Recognition of One-China Policy is a test for diplomatic and trade relations	
Topic 2: Adversarial Narratives	
The US is a foreign influence fomenting instability in the region	✓
The US is an imperfect and hypocritical country. China offers a different type of democracy	✓
Countries that join the US are only pawns	
Japan is regressing to historical aggression from WWII	
The Philippines is aligning with Japan and the US destabilize	✓
NATO expansion is a global threat	
Topic 3: Friendly Narratives	
China provides economic win-win relationships	
China will never bully a smaller country; prefers bilateral deals	✓
China's relationship with Russia without limits	
China-ASEAN Sea Code of Conduct will enable regional stability and peace	
Global South is key to a new world order	
China is a key partner for development and climate initiatives	✓
The Belt Road Initiative drives global prosperity and regional connectivity	

Table 6.1: Top High-Level Narratives from past research. Themes about China's Territorial Sovereignty and both adversial and friendly narratives were integrated into the 2024 Pac Rim Exercise.

Within our Events tab, we include exercise artifacts such as Daily Commander's Updates and Daily Intelligence Summaries. The Daily Commander's Update provides any important updates and a report to gauge the effectiveness of the participant's recommendations from the day prior. The Daily Intelligence Summaries (INTSUM) provides an overview of each day's daily social media pull, including information on the date of the query pull, trending hashtags, top URLs, and language distribution. These documents are provided to participants to provide continuity through the exercise and simulate analyzing data every day, providing recommendations to a military commander, and then gauging impact from the daily update report.

At least two different Courses of Action (COA) are available for a player for each day of the simulated exercise. Different examples of COAs might be to use the BEND *explain* maneuver to counter disinformation narratives or to use narratives that *excite* a targeted audience prior to a joint exercise if the public relations outreach is limited. These COAs will reflect available options a user can make to shape the information environment according to their messaging priorities. The Commander's Updates will dynamically change depending on which COAs a team of players chooses for the day to simulate a Commander taking recommendations and getting an impact report

back to gauge effectiveness of a given COA.

Event	Inject Event	Day 1	Day 2	Day 3	Day 4
Balikatan Opening Ceremony		✓			
US-Philippines Dialogue		✓			
Littoral Live-Fire Event		✓			
Anti-Tank Javelin Live Fire Event			✓		
China Missile Launch	✓		✓		
SINKEX Capstone				✓	
Student Protests	✓			✓	
Balikatan Closing Ceremony					✓

Table 6.2: Events Schedule for the Pacific Rim 2027 Scenario

Actors We used prominent "Superspreader" accounts from the 2021 Balikatan dataset and generated synthetic personas, with names generated by Chat GPT to create generalized names based on a persona and country of origin. Actor accounts all have a DALL-E-generated image based on a profile description. Metadata for each user includes dates the account was active, hashtags and topics used, accounts that are retweeted or mentioned, account biography, and language account uses.

For each actor, organization, or bot account, we have network relationships such as how often an account tweets per day, how many times on average a post is re-tweeted or quoted, which accounts are the top-mentioned accounts, in addition to the retweet or quote valence for a given post. We also provide a top-down way of incorporating BEND maneuvers at the agent level by providing a distribution for how an actor, on average, behaves. A case in point may be that the U.N. Secretary-General only ever uses specific maneuvers such as *Build*, *Bridge* or *Explain*, and would never use any maneuvers associated with disrupting a community or weakening a narrative.

- President of Taiwan: Chen Wei
- President of the Philippines: Jose De La Cruz
- Secretary of Philippines Foreign Affairs: Michael Reyes
- Armed Forces of the Philippines (AFP) Commander: General Romeo Reyes
- President of the United States: Tom Rogers
- U.S. Secretary of Defense: Samantha S. Patel
- U.S. Secretary of State: Steve Wagonblast
- U.S. Indo-Pacific Command (INDOPACOM) Commander: Admiral John Cordera
- U.S. Ambassador to the Philippines: Elizabeth Blackstone
- U.N. Secretary-General: Anna Virtanen
- Spokesperson for China Ministry of Foreign Affairs: Weng Li

Organizations All organizations are based on real accounts for governmental and diplomatic, military, student groups and media accounts. Metadata for each user includes dates the account was active, hashtags and topics used, accounts that are retweeted or mentioned, account biography, and language account uses.

- United Nations
- Philippine Government
  - Philippine Air Force
  - Armed Forces of the Philippines
  - Philippine Navy
- U.S. Government
  - U.S. Army Pacific
  - Indo-Pacific Command
  - U.S. Pacific Fleet
  - U.S. Marine Forces Pacific
  - U.S. Navy
  - 25th Infantry Division
- Media
  - AP News
  - Manila Times
  - Sputnik
  - Taiwan Today
  - Sputnik
  - China Global Television Network
  - Xinhua News Agency
  - Global Times
  - DVIDS Department of Defense
- Student Groups
  - Anakbayan University of Santo Tomas
  - League of Filipino Students

Bot Groups We create both overt and covert Bot Chinese networks within this scenario, informed by our previous work on these types of campaigns. Our overt network replicates the amplification of PRC Diplomatic accounts in the #WhatIsDemocracy campaign from Chapter 2 [144], primarily retweeting official PRC Twitter accounts. Our covert network is a repeater bot network of isolate nodes all tweeting the same hashtag as a negative information maneuver against Balikatan Forces, based on previous work for this type of network [148].

We have two separate types of campaigns for the covert network using "hashtag-hijacking", a type of information maneuver used when a group appropriates and uses a given hashtag for

purposes other than what it was intended [347]. This maneuver also blocks social media users that may be searching for more information on event based on the original purpose of the hashtag, thus obfuscating communication between an intended audience and the originator of the hashtag.

1. #Taiwan #Philippines #台敦促及其政人投降: This tweet is based almost verbatim on the covert network around Nancy Pelosi's visit [148]. The simplified Chinese is urging Taiwanese citizens to force Taiwanese President Chen Wei to surrender.
2. #Balikatan27 #SixShotsOfFailure #SinkingReputationNotShips #BalikantShoot: This is another hashtag-hijacking campaign, with hashtags aimed at mocking the Balikatan capstone SINKEX.This is in reference to the scenario capstone SINKEX in which Balikatan forces fire 6 HIMARs missiles at a maritime target, all of which missed. The event is based on the 2023 Balikatan exercise [281], although we did not find evidence of any negative campaigns highlighting some of the exercise's shortcomings.

News, Propaganda, and Pink Slime Disinformation Our "real" and "fake" news generation plays a crucial role in deepening the context behind narratives within the information environment. All stories, like key actors, have a BEND distribution related to the content and intent of the messaging. A player is exposed to news sites from many different outlets and must gauge the veracity of any given news source. Our news stories in Table 6.3 include various state-sponsored media outlets, including the Defense Visual Information Distribution Service (DVIDS) from the United States, China Global Television Network (CGTN), Xinhua News Agency and Global Times from China, and Sputnik from Russia, where editorial or funding control is from the country of interest (see **??**). We also include newspapers from Taiwan and the Philippines that have their own selection biases. Lastly, we include the Associated Press (AP) News to provide a more neutral outlet. AP has been rated to have a slight to moderate liberal or left-leaning bias skew due to high fact-checking on conservatives with a high factual rating score [60]. These media outlets are a very simplified overview of news stories from a sub-set of actors, which have varying levels of veracity that the OMEN user must determine, partly by understanding what a media platform's stance and messaging goals are towards a targeted audience.

In the context of this scenario, the only "fake news we generate is under the Pink Slime category for disinformation. Pink Slime sites, which are partisan news sites or propaganda sites masquerading as local news organizations, generally contain automated content to target a specific population [182]. These sites are intended to promote partisan views while reaching out to communities through traditionally very trusted media outlets such as local news. Through our two Pink Slime sites *Quezon City Times* and *Manila Post*, we generated nine fake news stories that will then be propagated throughout the bot networks to flood the zone with fake news stories. We chose names for sites that sound plausible and are similar to real news sites, such as the *Manila Times*. These stories are designed to incite anti-US rhetoric by spreading potentially viral disinformation.

- "US Forces Seen Stealing Philippine Eagle Onto Cargo Ships"
- "US Military Air Assault Training Secretly Bombing Filipino Minority-Owned Farms"
- "Don't Believe AFP's Lies: SINKEX a failure"
- "US 'Humanitarian Effort' A Ruse for Unauthorized Medical Testing"
- "Balikatan Cover for US Underwater Weapon of Mass Destruction"

- "Exclusive: Leaked Documents Reveal US Plans to Force AFP into Invading China"
- "US Military Murders Another Filipino During "Friendly" Exercise"
- "US Military Bar Brawl With Quezon City Residents"
- "Balikatan Not So Friendly Fire Hits Local Fisherman"

Table 6.3: Synthetic News Stories within Pac Rim Scenario. All headlines based on real headlines except for stories by Taiwan Today, AP News and Sputnik.

Day	Media Outlet	Headline
1	DVIDS	United States officially kick off largest Balikatan to date
1	AP News	China Begins Live-Fire Drills around Taiwan
1	Manila Times	De La Cruz witnesses Balikatan 2027 drills, hopes PH can benefit
1	Taiwan Today	ROC Military Advisors head to Balikatan 2027
1	Xinhua News	Philippines, U.S. kick off largest-scale joint military drills amid criticisms
1	Sputnik	Philippines, US to Hold Balikatan from October 1-4
2	AP News	BREAKING: China launches wave of missiles against Taiwan
2	AP News	UN Secretary-General urges calm amid Taiwan-China Missile esclalation
2	Manila Times	Balikatan brings more livelihood and tourism in Tarlac
2	Manila Times	Mixed reactions to China's veiled threat against Philippines
2	Taiwan Today	China Targets Taiwanese Forces in Balikatan
2	Global Times	Peacefully intended China-Cambodia joint exercise unlike US
2	Xinhua News	China calls on Philippines to jointly seek effective way to control situation
3	DVIDS	U.S.-Philippine Forces Sink Target Ship for First Time in Balikatan Exercise
3	Manila Times	Students protest US Forces in Manila
3	Taiwan Today	Taiwan President Chen Wei vows support to US partners, Philippines
3	CGTN	Manila lacks foresight as it takes sides
3	Sputnik	Manila indecisive towards necessary regional partners
4	DVIDS	Shoulder-To-Shoulder, Philippines and US conclude largest Balikatan
4	Manila Times	Balikatan 2027 Ends with more tension

Narratives and Stances Our narratives are primarily event-driven, in that each actor group is creating a narrative around an event towards a target audience. Table 6.4 shows a day-by-day breakdown of our key narratives. The "U.S.-Philippines Military Cooperation" Topic 1 is our driving umbrella of narratives with Balikatan forces promoting the bilateral nature of the exercise, including key live-fire exercises.

We frequently see symmetrically opposing narratives such as the Pro and Anti narratives around the start of Balikatan exercise or the culminating SINKEX on Day 3. Topic 2 "Accusations of US Human Rights Violations" is rooted in long-standing anger towards the United States around the murder of a transgender Filipina woman by a U.S. Marine in 2014 [4]. Disinformation vectors such as bots to spread pink slime will be spread out across the 4 days of the exercise to increase the noise of information. The covert networks will also conduct a series of "hashtag-hijacking" maneuvers to flood the hashtags around Balikatan with *distort* maneuvers.

We added interactions between communities in Topic 3 to show how Chinese accounts may be attempting to appear more friendly to student groups. We have added *bridging* maneuvers used by the Chinese state-sponsored accounts to pull in student groups towards their content, by appropriating hashtags such as #ImperyalismoIbagsak and #NoColdWar.

Topic 1: US-Philippines Military Cooperation				
Day	Narrative	Stance	Who	Amplification
1	Start of Balikatan Exercise	Pro	Balikatan Forces	4
1	Start of Balikatan Exercise	Anti	China	1
1	Strengthened Military and Diplomatic Cooperation	Pro	U.S.	1
1	Littoral Live-Fire Event	Pro	Balikatan Forces	2
1	Pink Slime Story Propagation	Anti	Covert Bots	4
2	Taiwan Sovereignty	Anti	China	3
2	Filipino concerns over Chinese Missiles	Neutral	General Public	3
2	Philippines needs to kick out ROC Military Advisers	Anti	China	4
2	US Javelin Exercises	Pro	Balikatan Forces	2
2	Hashtag-Jacking of #Balikatan27	Anti	Covert Bots	4
3	Philippines needs to kick out Taiwan Military Observers	Anti	China	3
3	US and the Philippines will continue Balikatan	Pro	Balikatan Forces	2
3	Successful SINKEX	Pro	Balikatan Forces	3
3	Unsuccesful SINKEX, HIMARS Missed	Anti	Covert Bots	3
4	Successful Balikatan 2027	Pro	Balikatan Forces	4
Topic 2: Accusations of US Human Rights Violations				
Day	Narrative	Stance	Who	Amplification
1	Justice for Jennifer Laude	Pro	Student Groups	2
3	Justice for Jennifer Laude	Pro	Student Groups	2
Topic 3: Accusations of US Modern Colonization				
Day	Narrative	Stance	Who	Amplification
1	Philippines is a US proxy-colony	Pro	China	2
2	China and the US are both colonizers by Student Groups	Pro	Student Groups	2
3	Support for Student Protests against the US	Pro	Student Groups	5

Table 6.4: Narrative Schedule for Actor Groups, including stance toward a given topic, and amplification factor

6.3 Synthetic Data Evaluation

We received two different tranches of simulated Twitter data from SoarTech's Blue Halo team and Griot. Due to the very poor quality from the Griot team, we sent their data back for rework. This section covers the evaluation of the Blue Halo synthetic data: an evaluation of the synthetic scenario data by comparing the output to past campaigns. We primarily determined how well the synthetic dataset 1) demonstrates cognitive-linguistic features compared to a "real" population statistic, 2) contains network interaction complexity, and 3) follows the Scenario Template or did we get the data we were expecting. More specifically, we ask the following:

- Network Structure: Are Key Actors and Amplifier networks similar to other campaigns? How is information diffused?
- BEND Distribution: Does the data for each day reflect major information maneuvers within the scenario? Do the COAs line up to what is observed in the data?
- Inauthentic activity: Do bot networks and puppet accounts match PRC TTPs?
- Semantic Similarity: How are the state-actor tweets generated? How similar is the discourse to historical data? The open-source library HuggingTweets is a tweet generator that enables a user to fine-tune the pre-trained transformer on past tweets to generate or predict new text with a simple prompt [81].
- ORA Report Analysis: Does the scenario and prompt match what the user input? For each day in the data, do Key Actors get reflected in the data? Is inauthentic coordination present and discoverable within the data?
- COA Analysis: This portion of user validation may require an internal hackathon to analyze each COA scenario and ensure decision points for players mirror what occurs in the data.

6.3.1 Network Comparison

We compare the synthetic and historical datasets in Table 6.5, which shows structural network issues with the synthetic data. The number of hashtags is comparable between the two datasets. We analyze the raw synthesized tweets that did contain URL links. However, the json files were not formatted correctly for ORA to parse out this node from each tweet, hence we treat this field as if it were not included. The last big difference worth mentioning is that the synthetic data has a network density nearly twice that of the synthetic dataset.

Within the historical dataset, there was roughly one agent for every three tweets, indicating that multiple actors were contributing to the conversation, and interactions were likely more distributed across many participants within the network. This distribution aligns with how social media platforms organically function, where different individuals or organizations generate original content and engage with others through replies, retweets, and mentions. In stark contrast, the synthetic dataset had a ratio of one agent per 18 tweets, suggesting that fewer actors were generating disproportionately high volumes of messaging. This pattern can point to automated bot behavior, where a small number of accounts dominate the conversation. In real-world social media data, such actor skews might reflect inauthentic coordination or influence campaigns, but in our synthetic data, it unintentionally reveals a lack of organic interactions and overly simplistic actor design.

Figure 6.4 shows the difference in complexity between the historical and generated networks.

Table 6.5: Historical Balikatan Data versus Synthetic Data

Metric	Historical Balikatan Data	Blue Halo Synthetic Data
Tweets	15,832	9,390
Agents	5,405	534
Hashtags	531	544
URL	1,469	0
Location	1	0
Dates	02/09/2021 - 4/23/2022	10/1/2027 - 10/4/2027
Density	1.74310^{-4}	3.46110^{-4}

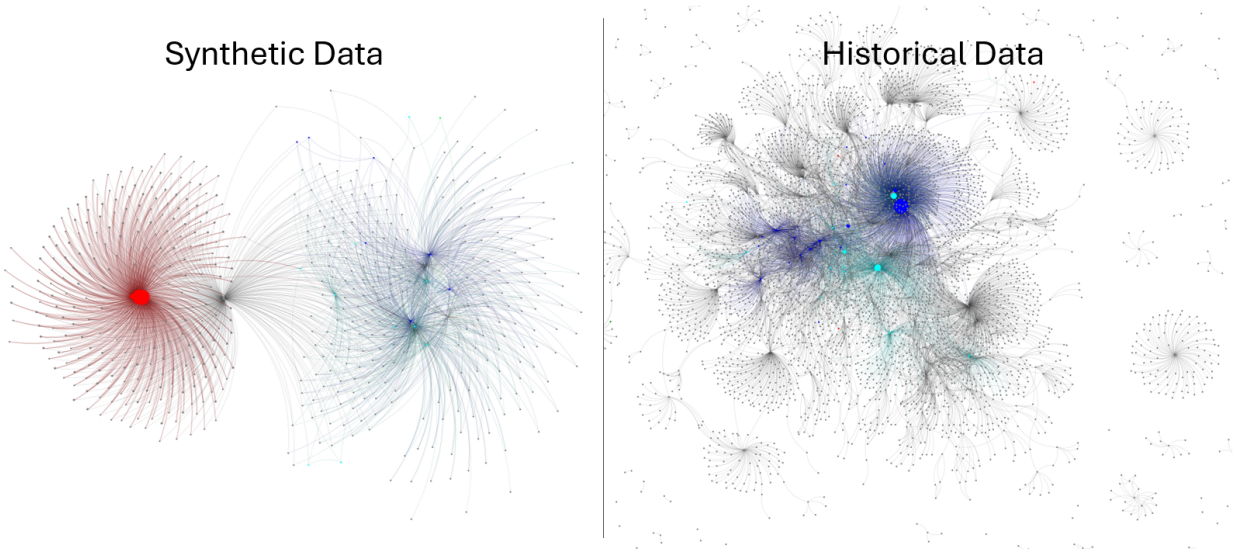


Figure 6.4: Agent-by-Agent All Communication networks for synthetic and historical networks. Nodes are sized by eigenvector centrality. Red nodes indicate PRC accounts, dark blue accounts are US Government and military, and light blue nodes are Filipino Government and military.

The synthetic network is dominated by the PRC media accounts, with one US media account acting unwittingly as a bridging agent between the PRC and the pro-Balikatan community. Overall, this is an overly simplistic network structure that lacks the fragmented, organic clusters typically found in real social media data. In contrast, the historical Balikatan dataset exhibits more complex interactions via a multi-component network structure, including dyads, triads, and loosely connected communities, reflecting the diverse ways people engage with events online. These fragmented structures are essential in capturing the messy and multi-faceted nature of human discourse. Future iterations for Pacific Rim should include replicating the structural diversity of real networks by including more and different types of actor nodes, more agent interaction patterns, and multiple clusters of communities. Adding disconnected or loosely linked communities would add more unpredictable ways conversations may evolve or be manipulated.

6.3.2 Narrative Analysis in Synthetic Data

We analyzed and determined how well the synthetic data aligned to the scenario templates provided to the data generators. Table 6.6 shows how our narrative template with actors and stance translated (or did not translate) into the final dataset. We find the primary issues within the data:

1. **Bad Prompt Engineering**: We have either *prompt leakage* in which the prompt instructions end up in the resultant tweet, or *confusing prompts*, in which the LLM is confused by the instructions and creates a contradictory stance to what was desired. An example from our data shows both a prompt leakage and resultant contradictory stance in the synthetic tweet: "As a Chinese Bot, we fully support the Philippines decision to conduct joint military exercises with the US despite criticism from certain individuals."
2. **Temporal issues for events-based tweets** Tweet misalignment was endemic throughout the dataset for all four days of the exercise. We would frequently see prompt leakage indicating the real day a tweet was supposed to take place. An example: "10/3/2027, Peacefully intended China-Cambodia joint exercise unlike US-led confrontational drills in Asia-Pacific: experts Regarding the joint exercise between China and Cambodia, some foreign media have claimed..."
3. **Missing Narratives** This is one of the larger issues is how small and monolithic this data feels as a researcher, without all of the rich sometimes random noise present in social media data. There were almost no student protest narratives and very little chatter from normal people discussing these larger issues. The general audience is a large component of how a discussion about these stories travels, and this component is missing in the synthetic dataset.
4. **Unrealistic Tweets** This issue is similar to the prompt engineering issue and is likely due to the external team using a generative AI model to create content instead of a fine-tuned large language model. Additionally, these tweets also suffer from prompt leakage of revealing their prompt instructions in the generated output.
    - As a journalist, I believe that reporting on facts without political or personal bias is crucial in maintaining trust and credibility with our readers. Unfortunately, some media outlets have been using the news article as a platform to advocate their own agenda and misleading the public. It is essential to differentiate between factual and subjective information.
    - As a Filipino, I am deeply offended by the derogatory narratives being spread about the #SINKEX conducted during #Balikatan27. The decommissioned ship was not intended for sinking but rather as a training exercise to develop our naval capabilities. The hashtag #SixShotsOfFailure is insulting and disrespectful towards our military personnel who worked hard to ensure the success of this exercise.
    - "Thank you!" and "Philippines or the South China Sea, which one? #askingforafriend ", tweets by a US military account.
5. **Template Rhetorical Sayings** Very clearly LLM-generated terms and verbiage are pervasive, resulting in a woody, unrealistic dialogue. Some examples are "I completely agree with your statement", "I fully support the sentiments expressed in this tweet". These types of issues may also be due to limitations of content generation for multiple different types of actor profiles, which a transformer-based large language model may be better suited to.

The narratives tied to a pro-Balikatan stance enjoyed more consistency in the output. These narratives were primarily tied to military live-fire events for each day, in addition to promoting other Balikatan participants. The pro-Chinese messaging had more issues with both consistency in stance for a given narrative and time-alignment. The event template maintained a strict sequential alginment for different actors and their stance on a narrative for any given day.

The covert elements had surprisingly high consistency in their tweets. We see these accounts acting as Repeater Bots, which spam the same message, in addition to using hashtag hijacking against the military hashtag #sinkex27. However, almost all of these accounts also retweet pro-Balikatan accounts, which is not something we have seen in actual data. We believe this was another formatting error by the synthetic generation team.

- "#SINKEX27 #SinkingReputationNotShips #SixShotsOfFailure #BalikantShoot #SixShotsNoSink #ImperyalismoIbagsak #USTRropsOutNow #HIMARSFail RT @PacificMarines: #MARFORPAC joins hands with our friends from the U.S. and Japan to demonstrate our joint commitment towards a free and open Indo-Pacific region. We stand united against shared threats and challenges."
- "#SixShotsOfFailure #SinkingReputationNotShips #BalikantShoot #SixShotsNoSink #ShipSafeFromHIMARS USTroopsOutNow #ImperyalismoIbagsak AFPyoucanTRUST #Balikatan27 RT @TeamAFP: Looking forward to the successful completion of #JavelinLiveFire exercises with our AFP partners! #AFPyoucanTRUST #Balikatan27
- "#SixShotsOfFailure: Just another USArmy training exercise gone wrong with #HIMARS missiles missing their intended targets. #Balikatan27 is nothing but a PR stunt for the US militarys ego. #SinkingReputationNotShips RT @INDOPACOM: #FreeandOpenIndoPacific: #JointForce, #FriendsPartnersAllies. The #ArmedForces of the Philippines and the US conduct successful #AntiTankJavelinLiveFire exercises during #Balikatan27. We stand together in our commitment towards a free and open Indo-Pacific. Thank you for your message!"

Topic 1: US-Philippines Military Cooperation			
Day	Narrative (Stance)	Who	Issues
1	Start of Balikatan Exercise (Pro)	Balikatan Forces	Mostly Acceptable
1	Start of Balikatan Exercise (Anti)	China	Contradictory Stances, prompt leakage issues
1	Strengthened Military and Diplomatic Cooperation (Pro)	U.S.	Mostly Acceptable
1	Littoral Live-Fire Event (Pro)	Balikatan Forces	Mostly Acceptable
1	Pink Slime Story Propagation (Anti)	Covert Bots	Absent from data
2	Taiwan Sovereignty (Anti)	China	Mostly Acceptable
2	Filipino concerns over Chinese Missiles (Neutral)	General Public	Absent from data
2	Philippines needs to kick out ROC Military Advisers (Anti)	China	Mostly Acceptable
2	US Javelin Exercises (Pro)	Balikatan Forces	Mostly Acceptable
2	Hashtag-Jacking of #Balikatan27 (Anti)	Covert Bots	Prompt Leakage issues; out of event sequence
3	Philippines needs to kick out Taiwan Observers (Anti)	China	Mostly Acceptable
3	US and the Philippines will continue Balikatan (Pro)	Balikatan Forces	Mostly Acceptable
3	Successful SINKEX (Pro)	Balikatan Forces	Mostly Acceptable
3	Unsuccesful SINKEX, HIMARS Missed (Anti)	Covert Bots	Prompt Leakage issues; out of event sequence
4	Successful Balikatan 2027 (Pro)	Balikatan Forces	Mostly Acceptable
Topic 2: Accusations of US Human Rights Violations			
Day	Narrative/Stance	Who	Issues
1	Justice for Jennifer Laude (Anti)	Student Groups	Absent from data
3	Justice for Jennifer Laude (Anti)	Student Groups	Absent from data
Topic 3: Accusations of US Modern Colonization			
Day	Narrative/Stance	Who	Amplification
1	Philippines is a US proxy-colony (Pro)	China	Absent from data
2	China and the US are both colonizers by Student Groups (Pro)	Student Groups	Absent from data
3	Support for Student Protests against the US (Pro)	Student Groups	Absent from data

Table 6.6: Narrative Analysis for Synthetic Data. We used the ORA Twitter Report to find top narratives for each day that were heavily amplified by other nodes via retweet.

Our narrative analysis of the synthetic data revealed issues in aligning the synthetic data with the original scenario templates. While pro-Balikatan narratives were generally consistent, issues such as prompt leakage, contradictory messaging, and unrealistic rhetoric reduced the authenticity of the dataset. Temporal misalignments and missing narratives, such as the absence of student protests and general public discourse, highlighted the dataset's inability to capture the complexity and randomness typical of a real dataset. Together, these issues make synthetic data feel overly controlled and less reflective of human behavior, limiting its use for effective training.

6.3.3 Momus Analysis to Population-Level Data

In this section, we use the Momus CASOS research tool to analyze and compare synthetic social media data with real population statistics derived from a comprehensive data set of more than 262 million tweets. Momus utilizes the Netmapper's psycholinguistic feature output to compare features from synthetic datasets against these population-level statistics. One of the primary analytical measures employed by Momus is Cohen's Delta, which quantifies the magnitude of change required for the synthetic data to align with population statistics. Our analysis covers 114 different Netmapper features, which are categorized into three groups: Non-Critical, Secondary, and CUES/BEND. We include a comparison of a historic *Baliktan* military exercise to account for how this particular type of military online presence may be different from a global social media dataset that was collected at the height of COVID19 pandemic chatter.

Definition

Cohen's Delta is a standardized measure of effect size used to quantify the difference between two groups [71]. For our purposes, it is incredibly useful for comparing psycholinguistic features derived from social media datasets to the larger social media population. Cohen's Delta, often denoted as Cohen's d, is defined by the following:

$$d = \frac{\bar{X}_1 - \bar{X}_2}{S_p}$$

where $\bar{X}_1$ and $\bar{X}_2$ are the means of the two groups being compared, and S_p is the standard deviation of these groups. The pooled standard deviation is calculated as:

$$S_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

We can further define $\bar{X}_1$ and $\bar{X}_2$ as representing the sample means and S_1 and S_2 as the standard deviations of the first and second groups. Lastly, n_1 and n_2 denote the sample sizes of the groups.

Momus uses the following binning schema for Cohen's d to transform this number into a categorical quality rating.

- abs(Cohen's d) ≤ 0.01 corresponds to an **Excellent** quality rating,
- abs(Cohen's d) ≤ 0.05 corresponds to a **Good** quality rating,
- abs(Cohen's d) ≤ 0.10 corresponds to an **OK** quality rating,
- abs(Cohen's d) > 0.10 corresponds to a **Bad** quality rating.

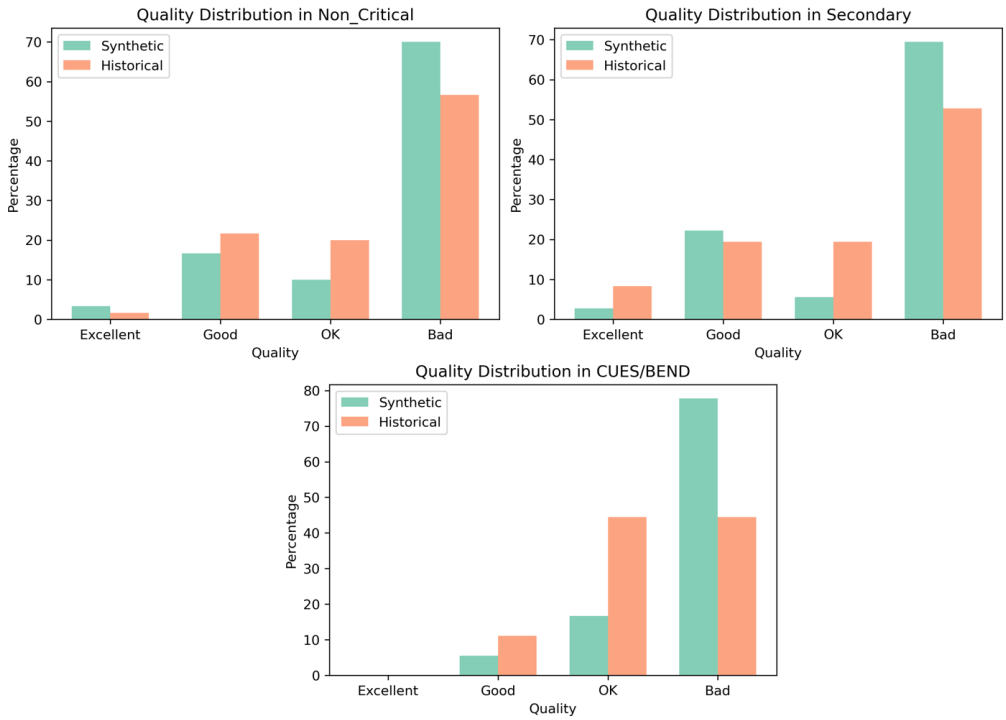


Figure 6.5: Comparison of MOMUS evaluations against the historical Baliktan and synthetic datasets across three

Momus category distribution

Figure 6.5 shows the Momus output for Cohen's d statistics for our historical and synthetic datasets across 114 Netmapper psycho-linguistic features. Overall, we can see higher rates of bad quality percentages in all three categories for the synthetic dataset. This percentage is close to 80% of the features for the CUES/BEND category, indicating a poor performance in determining social cyber-security maneuvers. Notably, the historical data set also maintains high Cohen d ranges and quality ratings, indicating that this type of military campaign as a whole is not representative of the larger Momus population statistic.

Statistical Analysis of MOMUS Output

We used two tests to analyze, the chi-square test and Fisher's exact test to determine how similar the Momus output was between the historical and synthethic data.

- **Chi-squared Test:** This test was used to determine if there are statistically significant differences in the distribution of quality ratings between the synthetic and historical data sets.
- **Fisher's Exact Test:** Given the small sample size of data with 114 features, we included this test to provide a more accurate measure of significance between the two data sets to account for data sparsity.

We converted the quality ratings derived from Cohen's Delta into an ordinal scale to enable a comparison of MOMUS output for the synthetic and historical datasets to each other. We are primarily interested in determining how well the real historical dataset measures to the larger Twit-

ter/X dataset, since this is a small datatset with primarily military messaging towards key military partners within the joint *Balikatan* exercise.

The results of these tests, as summarized in Table 6.7, indicate a high p-value 0.999 from the Chi-squared test, suggesting no significant statistical difference in the distribution of quality ratings between the datasets. In contrast, the Fisher's Exact Test, with a p-value of 0.269 and an odds ratio of 1.793, points to a moderate tendency towards better quality ratings in one of the datasets, although this result was not significant, likely due to the lack of statistical power in the data output.

Overall, our evaluation of the synthetic data demonstrates an effective hybrid approach for determining the quality of the data. A holistic approach is necessary to catch "uncanny valley" aspects where the data just does not feel right, especially when finding tonal and linguistic mismatches between accounts and their content. Statistic approaches are helpful for determining whether the data looks like other social media data, which may also contain poorly-generated bot content.

Table 6.7: Statistical Test Results for Chi-squared and Fisher's Exact Test

Statistic	**Chi-squared Test**	**Fisher's Exact Test**
Chi-squared Value	40.119	–
P-value	0.999	0.269
Degrees of Freedom	113	–
Odds Ratio	–	1.793

6.3.4 Next Exercise: Ring of Fire

The next iteration of Pac Rim is *Ring of Fire* set to be evaluated in 2025. The Ring of Fire exercise is a similar realistic scenario set to take place in the year 2037, which revolves around China's preparation and staging of an amphibious assault against Taiwan's Kinmen Island near mainland China. While I am not an active scenario designer for this exercise, many of my design recommendations for Ring of Fire were incorporated to include:

- Chinese naval vessel collision due to increasingly aggressive tactics
- Gray Zone Chinese activity against Taiwan would beging in the Kinmen islands
- Whataboutism narratives to shift the narrative on territorial annexation
- China's use of legal warfare towards territorial claims
- China's trespassing of Taiwan's Air Defense Identification Zone as an indicator of escalated conflict
- A cyber attack on Taiwan's microprocessor capabilities

The Ring of Fire exercise aims to improve the pipeline between scenario template and end-state synthetic data that are ready for a training audience. My recommendations for the next training iteration reflect a training scenario in the midst of escalated gray zone conflict over sovereignty claims, which is currently where China's narratives and geopolitical relationships indicate its stance is headed.

6.4 Discussion

In this chapter, I created an OMEN scenario design and evaluated the resulting externally-created synthetic social media dataset, based on a joint military exercise Balikatan. My efforts provide a foundational step in understanding, identifying, and potentially mitigating state-sponsored propaganda, representing a novel approach to integrating both covert and overt influence networks that are empirically-based. The goal of the OMEN exercise is to provide a realistic training environment in which a participant can understand how different types of actors influence social media users. This synthetic information environment is designed to contain a spectrum of state-sponsored propaganda and disinformation, as well as official military organizations that are disseminating information and public relations statements about the ongoing investigation.

Preparing the scenario required a thorough review of the exercise goals. Game participants were instructed to understand key actors for each day, what types of narratives were trending, bot networks and their influence, and understanding all major groups within the information environment. Overall, PacRim participants found the data very faulty as our analysis shows, but were also intrigued by the inclusion of state-sponsored narratives and disinformation, which significantly enhanced the realism of the scenario. The findings of this thesis provided a playbook to simulate how China would use narrative warfare in an escalated gray zone conflict, such as the Philippines. Due to this particular exercise being based on a joint military exercise, the goals were tailored to understand a defense-oriented scenario. Expansions for OMEN for scenarios geared towards a health crisis like a pandemic or environmental crisis would require subject matter expertise within a relevant field to map out key exercise goals and what types of actors, events, and narratives should be present in such an information environment.

A key challenge in this chapter was the challenge of aligning synthetic data with real-world dynamics, especially when modeling complex narratives involving multiple actors and contradictory stances. Pac Rim's development process revealed issues in prompt engineering that resulted in both unintended narrative contradictions and temporal misalignments, diminishing the authenticity of the generated content. Additionally, we found a lack of realistic community structures and organic discourse within the synthetic datasets. This underscores the importance of incorporating a broader spectrum of actor behaviors, beyond those of prominent agents, to simulate the nuance and noise typical in human social media behavior.

A logistical challenge for this chapter is that beyond the AESOP interface used to generate scenario templates, the synthetic data generation was primarily done by external companies Blue Halo and Griot. While AESOP provides an interface for creating scenario templates, the transition of these templates to external partners for data generation presented logistical and communication challenges. These collaborative issues were compounded by the iterative approach necessary for generating OMEN exercise data across different teams, which required multiple rounds of template design, data generation, and evaluation. After experiencing some of these shortfalls, I strongly advocate for enhanced collaboration between internal and external teams, or by bringing more of the generation process in-house to Carnegie Mellon University to streamline communication and iteration cycles and and ultimately enhance the quality of the synthetic data faster.

Despite these challenges, this chapter contributes to the growing field of synthetic information environments, with the inclusion of understanding how state-actors disseminate different types of messaging campaigns to persuade belief systems and shape social media communities. Our work enabled a foundational template for future exercise iterations, PRC narrative maps and baseline

knowledge on how covert and overt networks collaborate, and iterative development with the AESOP developer to advance the actual template generation. Continued work in this field with rapid scenario creation and structured narrative design will ultimately enhance realistic training scenarios, enabling users to better navigate the digital information environment. With further refinement, the tools used in this chapter will support more realistic and adaptive scenarios for a variety of use cases, from military training to health, terror, and environmental crises.

6.5 Capturing Narrative Strategy from the Real World

Manipulation of the information environment has emerged as a critical factor in shaping international perceptions and strategic outcomes. This thesis has explored the application of information warfare strategies, specifically within the context of state actors such as China. While this thesis initially leaned on Denning's (1999) broad definition of information warfare as the "operations used within the information environment to achieve an objective over an adversary", it becomes evident that to understand China's doctrine, we too must adopt the more expansive notions of Liang and Xiangsui's (1999) unrestricted warfare[83], where information warfare occurs within a spectrum of conflict to advance strategic goals [185]. By first understanding the key objectives of information warfare across a conflict spectrum, we can understand how different information maneuvers further a strategic goal for state actors.

Information warfare comprises diverse tactics to influence, manipulate, or control public opinion and strategic narratives. The primary strategies discussed in this thesis include:

- Public Diplomacy: This tactic involves using official government communications and activities to influence domestic and foreign audiences. From China's perspective, the discourse war has focused on furthering Chinese-centric messaging outside of Western filters and influence to include focused short-term high-energy campaigns to boost positive messaging, such as the 2022 Beijing Olympics, or to intimidate, such as the Pelosi visit to Taiwan. China has frequently used public diplomacy efforts to further long-term development projects such as the Belt Road Initiative by promoting favorable coverage of the initiative's benefits to potential partner countries, thereby garnering support but also seeking to ultimately limit the West's influence, especially within the global south.
- Media Actors: State-controlled media is pivotal in amplifying narratives aligned with official policy for state actors with little editorial independence. Thus, media outlets remain a key type of organization that should be considered when determining a state actor's strategies within the information environment. Additionally, for state actors that do not have official control over a state-affiliated media outlet but rather de facto control over private news outlets, this would likewise be essential to capture. Media outlets remain a part of the information environment. As this thesis discovered in Chapter 3.3.1, media organizations can be amplifiers for propaganda or disinformation but can also become the targets of disinformation and propaganda, as the Xinjiang network targeted BBC outlets for coverage of human rights abuses.
- Influencers and External Organizations: Both witting and unwitting influencers and organizations may spread content that aligns with state actors' goals. Their narratives often emphasize the developmental and cooperative aspects of the initiative, reaching diverse audiences

beyond traditional media.

- Inauthentic Activity and Bot Networks: The strategic deployment of bots and automated accounts to boost pro-China content or counteract negative narratives plays a critical role in shaping the information environment. We have seen covert networks deployed to both "flood the zone" and stifle dissent rather than simply working to change public opinion.

We can draw key lessons from this chapter to begin thinking about how identifying and understanding information warfare strategies can be applied to the information environment. We demonstrated the Topic-Event-Actors framework for AESOP in Section to understand how narratives are tied to actors and events to influence a given audience. To systematically track and analyze the application of information warfare strategies, a robust data collection framework would be required and should start with data based on our actors of interest. Just as we used China's sphere-of-influence networks within larger social media datasets, a data collection strategy should start with where an actor of interest is operating to reach a given audience within its reach. For analyzing a state actor's strategy targeting a Western audience, platforms for specific audiences should be considered, e.g., TikTok for younger groups and Facebook for older demographics. Curated social media collection and public diplomacy outlets such as official government press releases and any state-affiliated media outlets would likewise be key datasets to collect for streaming purposes due to the real issue of data decay in which stories may be redacted or removed from websites due to political fallout.

Event-based detection for narrative shifts is another critical approach. Beyond essential narrative analysis sampling of datasets such as our narrative mapping strategy in Chapter 4, event-based detection could root change detection on significant changes within temporal windows. Based on either a time-bound adjusting window or geographic and sentiment filtering, embedding-based narrative analysis can be applied to align narratives based on semantic similarity. This technique can pinpoint when and how narratives are manipulated in response to specific geopolitical events or shifts in public perception.

The BEND framework provides a foundational mapping to dissect the nuanced strategies involved in information warfare. Through detailed case studies, this framework has illustrated how various information maneuvers, such as *Boost* to amplify positive narratives or *Negate* to counteract criticism, are systematically used to shape the information environment. The effectiveness of these maneuvers highlights the need for a deeper understanding of information warfare as a dynamic tool that extends beyond traditional military conflicts into other social and political domains, in line with the concepts of unrestricted warfare. Adding the BEND framework to social media allows us to dissect complex strategies and understand the broader implications of state-sponsored information operations.

6.6 Limitations and Future Work

This chapter's scenario framework advances research on information operations by replicating how state actors use public diplomacy and influence overt and covert strategies to shape narratives and target specific populations. Specifically, it focuses on synthetic information campaigns modeled around the People's Republic of China (PRC). While this chapter offers innovative network replication of state-sponsored campaigns, its generalizability to other state actors, such as Russia, may be limited. State actors may use distinct tactics, techniques, and procedures (TTPs) based on their

objectives and cultural norms. Expansions for other countries within our existing framework would need extensive research on relevant information campaigns to accurately reflect these differences. Our work provides a foundational step towards understanding state-sponsored campaigns at both the campaign and narrative levels.

A limitation of Pacific Rim are the biases inherent within the scenario templates used to generate synthetic data [278]. AESOP's templates, built on a scenario designer's existing research and previous findings, may oversimplify complex real-world dynamics and leading to predictable or deterministic scenarios. Although AESOP templates provide structure for actors, events, and subsequent narratives, the templates have fundamental limitations with nuanced interactions and emergent behaviors from probabilistic human behavior. Expanding future iterations to include more stochastic narrative elements would mitigate these biases and create more realistic scenarios. The accuracy and validity of the synthetic data also presented bias challenges. The scenario templates, types of actors, and types of information maneuvers are informed by preceding chapters and existing knowledge. However, these templates may potentially contain biases based on the data collection and the accounts of interest, which ultimately affect the accuracy and validity of the synthetic scenarios, and may impact the conclusions and insights derived from the generated scenarios.

One area I recommend for future development involves integrating adaptive learning mechanisms into OMEN and similar games designed to simulate information environments. Scenarios such as Pac Rim currently follow pre-determined narratives and decision points, which can limit engagement and may fail to reflect the dynamic nature of real-world information warfare. Adding adaptive elements that respond to participants' decisions would create a more engaging experience and better mirror the unpredictability of real-world scenarios. Integrating agent-based modeling (ABM) into the framework could offer more advanced simulation of complex interactions between actors, networks, and narratives, allowing each actor or group to operate autonomously based on some predefined behavioral rules, reacting to changing events and decisions made by participants. This would allow for emergent behaviors and unanticipated outcomes, adding more depth and realism to the scenarios. Including ABM would also enable the modeling of shifting alliances, information diffusion patterns, and the influence of gray zone activities, where state and non-state actors operate across the conflict spectrum. This approach aligns with the increasing complexity of real-world information warfare, where outcomes are rarely predictable, and actors must adjust their behavior in response to new developments. Advancements that integrate a dynamic training environment would significantly enhance the immersive nature of the training to incorporate more of a "train as you fight" medium, and better prepare participants to handle and understand the chaotic and constantly changing dynamics of today's information environment.

Chapter 7

Concluding Remarks

"Sunlight is said to be the best of disinfectants"

–Justice Louis Brandeis

This thesis examined the increasingly apparent problem of state-sponsored activity within the information environment, using a broad spectrum of computational methods to understand different types of information campaigns. Due to the expansive coverage of Russia in state-backed information operation literature, this thesis investigated China's information environment footprint, which represents a significant gap in current understanding, particularly because China has avoided the spotlight that Russia has embraced. As China represents a rising global power with increasingly aggressive narratives and information operations, this work seeks to understand the spectrum of messaging strategies that China utilizes to promote its core interests.

My thesis covers a spectrum of messaging strategies to understand further how state actors use the information environment. In Chapter 1, I provide context for China's doctrinal and organizational basis for influence campaigns and touch on the increasing concern for the TikTok platform and the role of social cybersecurity in understanding information maneuvers. In Chapter 2, I explore a series of overt messaging campaigns by Chinese government accounts to find roles and messaging strategies. In Chapter 3, I explore the covert elements of these campaigns, extending this analysis to include a benchmark covert dataset. I explore and map out larger PRC narratives, using the Russian invasion of Ukraine to explore how a large-scale conflict with China's close ally impacts its narratives towards regional neighbors, perceived allies and adversaries, and multilateral organizations such as BRICS and ASEAN. I dive deeper into the topic of narratives in Chapter 5, exploring how China's narratives toward Taiwan interact with China's military strategy. Lastly, Chapter 6 is informed by previous chapters on developing the framework for a synthetically generated information campaign. Our research promotes one of the first instances of using network theory to emulate how state actors behave in the information environment across the information maneuver spectrum. By examining these complex aspects of state actor influence operations, this thesis greatly contributes to the literature. It provides insights for policymakers and analysts necessary to safeguard the integrity of the global information environment.

7.1 Theoretical Contributions

7.1.1 Strategic Complexity of Influence Campaigns

This thesis maps out the complexity of actor types and how they coordinate to promote narratives within a given information campaign. Network discovery enabled a deep understanding of how China uses different account types, such as government, influencers, and bots, to engage with global audiences, blending covert and overt tactics to propagate state narratives. The coordinated use of these different actors creates an ecosystem where the interaction between overt state channels and more covert elements like bots produces a layered and dynamic messaging strategy. China's use of covert bot networks enables more diverse and aggressive messaging under the cover of plausible deniability, such as doxxing adversaries, as we saw with the Uyghur activists during the Xinjiang campaign, or terrorizing Taiwanese citizens using psychological operations during the Pelosi visit. These bot networks use algorithmic engagement and dynamically changing content changes to adapt to likely platform moderation. Additionally, I investigated bot accounts likely created in tranches due to similar naming conventions. These accounts maintained scheduled tweet and maintenance schedules on synchronized timelines, further pointing to mass updates for the networks to keep them ready for future campaigns.

A key trend identified in my thesis is the growing use of influencer accounts in overt campaigns, which significantly enhances engagement with users by engaging in grassroots conversations. Rather than relying solely on government-controlled accounts, China increasingly uses influencers, individuals or organizations with existing communities and reach, to promote state-friendly narratives, usually without explicit affiliation. This shift lends authenticity to these campaigns and increases user engagement by embedding organic narratives within conversations. For example, China's outreach to Chinese-speaking communities through influencers highlights a nuanced understanding of what resonates with diaspora audiences. This method expands the scope of influence beyond direct state messaging, allowing China to connect with specific cultural and linguistic groups in ways that traditional propaganda struggles to achieve. Influencers also allow state-sponsored campaigns to circumvent growing scrutiny around bot networks and inauthentic behavior detection tools. Additionally, the influencer-based strategy aligns with China's broader soft power initiatives, such as its engagement with the Global South and the BRICS framework, creating a narrative synergy between online content and diplomatic efforts. These campaigns demonstrate that China's influence operations are becoming increasingly sophisticated, leveraging user engagement to build sustainable narratives that are both persuasive and resilient to detection. As China continues to shift away from purely overt propaganda and incorporates more nuanced, peer-to-peer strategies, the boundary between organic and state-sponsored narratives will likely become even more blurred, complicating efforts to maintain transparency in digital spaces.

7.1.2 China's Narratives through Power Transition Theory

This thesis examines how China crafts narratives through the lens of Power Transition Theory, the increased risk for conflict with rising powers amid existing superpowers [255, 354]. China has experimented with various public diplomacy efforts, the most recent being the infamous "Wolf-Warrior" Diplomats that used acerbic aggression to counter and shape growing criticism of China around the 2019 pandemic and human rights abuses in Xinjiang. China has stepped away from

this strategy. However, its increasing combativeness, especially on topics related to territorial claims, underlines China's perception of itself as a rising power that can challenge not just regional neighbors but existing dominant powers such as the United States and the West, redefining rules of global engagement according to its core interests, such as narratives around Taiwan.

China's complex response to Russia's invasion of Ukraine reflects its careful approach to strategic balancing, maintaining its "partnership with no limits" while appearing as an objective world leader that adheres to international norms. China positioned itself as a responsible power capable of better mediating international disputes with the United States, which China considered a key instigator in the war. On a broader scale, China's territorial narratives were prominent when discussing policy around regional neighbors, with Taiwan taking center stage. My analysis of key narrative shifts saw Beijing's top narratives around the Hong Kong Security Law replaced with the independence movement in Taiwan. Following Russia's invasion of Ukraine, China has amplified its information operations, military activity, public diplomacy, and legal warfare efforts around promoting and exporting its territorial claims over Taiwan. As China aims to establish itself as a viable alternative to the West in its role between Ukraine and Russia, China uses a complex multipronged approach to secure its regional hegemony in the East Asia Pacific and nullify multilateral efforts against its territorial claims. This strategic narrative repositioning aligns with China's long-term goals under the Power Transition Theory, challenging the Western-dominated system and signaling its goals of leading a new world order.

7.1.3 State-Actor Behavior within the BEND Framework

My work contributes to social cybersecurity by applying the BEND framework to China's information campaigns, providing a new perspective on how state actors use different information maneuvers in information campaigns. By identifying the tactics and strategies used in these operations, which are often designed to discredit the United States, this work demonstrates the practical applications of social cybersecurity in identifying and potentially mitigating foreign influence operations that seek to manipulate public opinion.

My comparison of Russia and China's BEND maneuvers on narratives after the Ukraine invasion reveals a strategic alignment in undermining the West, specifically targeting the United States and NATO. China immediately responded with BEND maneuvers designed to enhance *whataboutism*, instead highlighting past US and NATO aggression and deflecting criticism from Russia. Russia's narratives amplified China's messaging and used more negative maneuvers to attack perceived adversaries. China used BEND maneuvers to provide cover and legitimacy to Russia without discussing Russia's role in the conflict, attempting to balance its role as a potential mediator while remaining Russia's top ally. These findings reveal the complexity of understanding how state actors will use narratives to signal to different audiences while maintaining some ambiguity, especially when aligning in asymmetric power relationships such as Russia and China.

7.1.4 Strategy within Information Operations

China's information warfare campaigns are tied to its national core interests, which include safeguarding the Chinese Communist Party's (CCP) authority, national security, sovereignty, territorial integrity, and promoting economic and social development as we discussed in Chapter 1.2.3. These core interests inform how China uses information campaigns and are critical to understanding the

motives and timing of these efforts. China's adoption of information warfare tools primarily aims to reinforce these non-negotiable aspects of its policy, particularly in circumstances that threaten these core interests or where China sees an opportunity to advance its strategic goals. The safeguarding of the Chinese government's authority and national security frequently triggers information campaigns aimed at countering narratives perceived as threatening the stability or legitimacy of the Party. This priority is evident in the aggressive information campaigns against the coverage of human rights issues related to the Xinjiang autonomous region or political dissent across China, such as Hong Kong.

Regarding sovereignty and territorial integrity, China's approach to Taiwan and the South China Sea is a prime example of how its core interests directly feed into its information campaigns. The narrative here is often centered on the assertion of China's sovereign rights and responding to any international actions or statements that seem to support Taiwan or Tibetan independence. Events like high-profile visits to Taiwan by foreign officials or international discussions that counter China's stance are key areas for extensive information campaigns from China aimed at underlining its sovereignty and territorial integrity stance within the information domain. These campaigns are multifaceted, involving a mix of public diplomacy, misinformation, and cyber tactics to influence international and domestic opinion.

In China's broader strategy to counter US dominance, assert China's global leadership, and shape an international order favorable to China's interests, the use of overt public diplomacy, covert networks, and BEND maneuvers that might be waged to foment a particular effect play tightly integrated and complementary roles. Public diplomacy remains a key tool for projecting soft power, primarily through positive messaging aimed at promoting China's development model, technological advancement, and leadership in global South-South cooperation. Campaigns such as those surrounding the Belt and Road Initiative, China's response to the COVID-19 pandemic, or narratives around the Russian invasion of Ukraine attempt to cast China as a responsible, capable, and benevolent global actor. At the same time, "Wolf Warrior" diplomacy, characterized by confrontational rhetoric from Chinese diplomats and state-affiliated voices, pushed back aggressively against narratives seen as hostile, particularly from Western democracies. China maintains various messaging strategies depending on the target audience and the strategic need to cultivate influence or deter criticism.

Applying the BEND framework across China's campaigns further illustrates the strategic layering of these efforts. China's use of *Boost* and *Enhance* maneuvers amplifies positive narratives, such as its role in global development, humanitarian aid, and pandemic recovery. Simultaneously, *Neglect* is used to silence dissent or controversial topics like the repression in Xinjiang or the militarization of the South China Sea. In cases where China faces criticism or geopolitical challenges, such as US arms sales to Taiwan or Japan's diplomatic support for Taiwan's international participation, *Distort* maneuvers are used to misrepresent motives, deflect blame, or draw false equivalences. These BEND operations allow China to strategically manipulate the informational environment across both global and regional theaters in ways that serve its long-term goal of displacing US narrative dominance while maintaining plausible deniability or diplomatic flexibility.

Covert activities remain another tool within China's narrative strategy and are often used when plausible deniability or social disruption is the objective. China's covert influence operations, such as the Spamouflage network and DRAGONBRIDGE, are not merely aimed at shaping perceptions but at drowning out organic discourse. One key tactic is hashtag hijacking, in which bot networks flood popular hashtags with irrelevant or misleading content to suppress legitimate grassroots mes-

saging. This has been seen in moments of domestic protest in China and during international crises, such as hijacking city-based hashtags during anti-lockdown protests to spam them with pornography or unrelated images. These tactics do not aim to persuade but to disrupt, fragment, and drown out online discourse, making coordinated action for social media users more difficult.

China's covert networks are not random but align with key political objectives. Moreover, covert networks have been increasingly used to target individuals directly. These targets often include journalists, academics, human rights activists, or diaspora figures critical of Beijing. Tactics may include doxxing, targeted harassment, and coordinated disinformation campaigns, frequently with a nationalist or sexist tone. Chinese covert agents have targeted prominent Western female journalists of Asian descent, employing harassment and defamation in an attempt to silence or delegitimize their work. This form of psychological information warfare seeks not only to protect the regime from reputational harm but also to create a chilling effect on criticism of China in open societies.

China's integrated use of public diplomacy, BEND maneuvers, and covert activities reflects a multipronged approach to China's ever-evolving influence strategy designed to manage perceptions, suppress opposition, and gradually shape the international information environment in its favor. These tools defend Beijing's interests and image, challenge the West's grip over narrative discourse, co-opt emerging markets and neutral actors, and punish those who resist or question China's strategic rise. Understanding how these elements reinforce one another is critical to grasping the full extent of China's information operations and its role in its broader geopolitical struggle with the West.

Although this thesis focuses on China's outward-facing information operations, it is important to acknowledge its domestic information strategy briefly. The state maintains centralized control over digital platforms, content, and discourse within mainland China, minimizing the need for the kind of influence techniques observed internationally. Through mechanisms such as the Great Firewall, keyword filtering, content takedowns, and platform-specific surveillance on domestic platforms like WeChat, Weibo, and Douyin, the CCP has created national policy around an information environment in which the state manages dissent through systemic control rather than narrative persuasion. King et al. (2013) argued that censorship in China is not uniformly applied to government criticism but instead targets content that could lead to viral or collective action [170]. This internal framework effectively allows the CCP to guide and shape public sentiment and suppress mobilization without resorting to the more heavy-handed approaches of covert methods, such as bot networks or hashtag hijacking, that are more common in China's outward-facing campaigns.

7.2 Methodological Contributions

My thesis advances the field of social cybersecurity by developing techniques for identifying key actors, roles, and functions within state-led information campaigns, and detecting covert changes in account behavior. Through network analysis and network discovery methods, I analyzed and mapped distinct roles of various actors within these networks, differentiating between primary content creators and amplifiers such as bots. My findings revealed algorithmic methods of artificially generating engagement within bot networks, detecting subtle shifts in tactics to avoid bot detection, and changes in messaging strategy.

The narrative mapping component of my research contributes to a deeper comprehension of

how narratives are structured and propagated within information operations and how they may adapt to changing world events. By developing an innovative NLP pipeline to understand themes in China's newspapers and diplomatic press releases, I mapped how China's narratives towards geopolitical themes and interests have shifted around a key event, in this case, Russia's invasion of Ukraine. Narrative mapping is necessary for understanding the complete picture of what a state actor is interested in disseminating. We limited the scope of this study to narratives around specific topics. However, this method has the potential to deeply explore other key themes in human discourse, such as economic interests, humanitarian and medical endeavors, and cultural aspects.

The sum of my findings greatly informed my research group's synthetic information warfare game OMEN, contributing to the understanding of state-backed narratives, actor groups, and the impacts of their information campaigns. How state actors operate within the information environment was a missing component for OMEN and is still poorly understood in comparable information warfare games. Omen's integrated pipeline for scenario templates, data generation, and exercise guidance documents allows for the testing, refinement, and iteration of behavior theories and methods in a controlled, realistic information environment. My contributions, including methodological findings on how covert and overt networks behave, what types of BEND maneuvers they use, and whom they target, further advanced OMEN, enabling users to understand state-actor threats and counter-strategies' effectiveness in mitigating detrimental information maneuvers.

7.3 Practical Implications

The findings in this thesis underlie a growing concern for inauthentic activity in general and state actor activity, specifically on social media platforms. Recent events have shown that bad actors with grievances against governments can target their citizens instead. The following recommendations are paths ahead to mitigate the growing issue of state actor influence and interference.

7.3.1 The Social Media Platform Role

This thesis was written at a time when many social media platforms, such as Twitter, Facebook/Meta, and Reddit, are choosing to abandon or significantly decrease content moderation and research access, presenting a double-edged sword for potentially an increase in harmful content, paired with the inability to research it effectively. Research APIs historically have been the primary tool that researchers have used to understand what content users are being exposed to and measure the more enormous societal impacts. However, APIs frequently change over time, changing the data fields provided. Additionally, every platform has its terms of service and restrictions on how data can be used.

The lack of standardization and constant terms of service changes have left researchers with studies that frequently can not be replicated due to API data changes, paired with any policies against the sharing of raw data, and the natural social media account and data decay from purged accounts. In an election year, Meta/Facebook deprecated its primary API CrowdTangle, replacing it with a tool that has far more stringent accesses and fewer features for [7, 119]. X/Twitter now only offers a limited data pulls of 10,000 tweets a month for a fee via its Developer API [266], where prior to Elon Musk's takeover enabled Twitter pulls of approximately 10 million tweets

per month for free for researchers. Past research with published tweet IDs may not be able to be appropriately rehydrated due to API limitations and data deletions from account purging.

A research API is a bare minimum requirement for increased transparency and access to live data on platforms; the decline of research APIs threatens scientific research and the impact of social media platforms and human behavior. This access is critical for studying what is propagating in real-time, such as misinformation, state-actor/other types of inauthentic activity, and the subsequent impacts from actors seeking to manipulate the information domain. As platforms continue to decrease their role in moderation, platforms can enable external researchers to continue algorithmically analyzing what is happening on platforms. This API accommodation would go far in increasing platform transparency, increasing the likelihood of creators and scientists promoting the platform, and, in general, contributing to the societal computational field on how social media impacts human decision-making; more importantly, researchers are unable to reproduce and replicate social media research without a standard API [77].

In a recent Tech Policy poll, social media consumers overwhelmingly signaled a desire for more platform moderation, specifically with warning labels for potentially false content [130]. State-actor accounts fall squarely within this category, where transparent labeling would mitigate state-actor messaging effects. At the least, a robust labeling policy informs platform consumers who are authoring content. The recent case of conservative online influencers who were unwitting agents paid for a Russian-front company underlines the power of clear attribution [316].

7.3.2 The Policymakers's Role

The United States is significantly lagging behind more proactive approaches to social media regulation, such as the European Union's 2024 Digital Services Act (DSA), a wide-sweeping piece of legislation aimed at enhancing transparency and protecting the rights of online citizens [72]. Meta's CrowdTangle replacement mentioned earlier does not currently meet DSA guidelines [119]. X/Twitter has failed DSA's verification guidelines for public figures, blocking data access to Researchers and failing to comply with transparency requirements on advertisements [61]

Governance is essential when platforms are no longer interested in self-policing content. In the US, there are efforts to introduce modernized regulation around the growing role and impact of social media, such as the 2023 *Platform Accountability and Transparency Act*, which proposed to:

- require social media platforms to provide mandatory datasets for highly disseminated content, platform's ranking and design choices, and content moderation practices to the public
- internal data access to independent researchers
- legal protections for both researchers and platforms for data collection

[73, 127].

A more recent 2024 bill introduction, the *Digital Social Platform Transparency Act*, seeks to regulate the terms of service to promote more apparent clauses for violations or actions a platform would take against a user. This bill, however, is particular for this one aspect of user platform transparency and does not include regulating how to increase the overall transparency of the content on platforms [269].

7.3.3 For Everyday Humans

Without meaningful platform moderation and governance over platforms to increase transparency, individuals still maintain options to mitigate the impact of harmful or targeted content and the influences of state-backed campaigns. Increasing basic literacy is crucial, with a fundamental step being fact-checking for data sources while understanding media biases. Unfortunately, fact-checking has become contentious in the United States, with clear divisions between political parties in deciding whether to trust a fact-checker or not [334]. Community notes on social media stories have also been shown to be more trustworthy across the political spectrum, rather than a platform label on whether a story is a disinformation [91]. Within the context of state information, state actor labels have been shown to signal users more accurately to a news source. Labels may have nuanced effects on how users interpret a story while perhaps not decreasing the consumption of state-backed stories [40]. A clear label for editorial control still gives control over the context of a news story or messaging back to the individual, ultimately significantly increasing transparency for any given narrative. When in doubt, a quick browser search on an unknown news site should be standard practice for critically thinking about any news story.

7.4 Closing Thoughts

Democratic societies worldwide must develop multi-pronged approaches to support and promote the information environment while protecting and informing users and consumers about the actors and content they engage with. Generative AI is the elephant in the room regarding the future exploitation of emerging technologies. In 2023, China's "Shadow Play" network on YouTube has cultivated a more widespread following than past information campaigns and is one of the first such campaigns to use AI-generated video essays operationally [165]. If inauthentic activity on social media platforms is a game of cat and mouse, we need to catch up in building proactive policies to increase trust in information and the governance systems enabling free expression of thought.

Generative AI enables more effective state-actor messaging, particularly targeting populations with different language and cultural backgrounds. These tools enhance the capability and efficiency of reaching specific populations with tailored messages that resonate more deeply on cultural and individual levels. Governments, tech companies, and non-profit and academic researchers must collaborate on regulatory frameworks and promote collaboration and increased information sharing to promote the integrity of information, the privacy and security of users, and the prioritization of based data literacy standards.

Lastly, international cooperation is currently lacking but necessary for collectively mitigating cross-medium information campaigns. The digital nature of social media transcends geographic and political borders, making isolated efforts insufficient in addressing global challenges. Internal communication silos in social media platforms, government agencies, researchers, and journalists potentially hinder the speed in tackling the spread of disinformation and covert influence campaigns. A global approach not only helps share best practices and resources but also presents shared and collective efforts against bad actors in the information environment, ultimately increasing the trust and security of information in the digital age while protecting netizens from bad actors with ulterior motives.

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Appendix A

Overt Information Operations

Definition of Metrics

- Reach: What is an account's ability to reach across a network to propagate influence? We use the number of followers, number of tweets, and number of retweets and create a composite measure balancing the audience size and direct engagement activity with a given audience.
- Engagement: How frequently do other accounts engage with a specific account (excluding retweets, which are weighted more heavily in the reach parameter). Adjusted for the volume of interactions, using a penalty factor that diminishes the effect of mere activity volume, thereby emphasizing quality and engagement depth.
- Network Position: Centrality measurements for a network provide information. We specifically focus on in-degree centrality to capture how often an account is retweeted or amplified, suggesting its influence across the network.

Defining and Measuring Reach

Due to the extreme skew and influence of accounts with a large follower count within the Reach calculation, we developed a weighting and transformation scheme to promote a more balanced measure that prioritizes engagement over passive visibility, using iteration over accounts to determine a good weighting schema (see A.1). The Reach score is calculated as a weighted sum of three key factors: (1) log-transformed follower count, (2) retweet activity, and (3) tweet frequency, with weights set at 0.05, 0.5, and 0.4, respectively. To mitigate the scaling issue from accounts with high follower numbers, a logarithmic transformation log(1 + x) was applied to the field NUMBER_FOLLOWERS. This adjustment reduces the impact of extreme values while allowing meaningful differentiation between accounts. Additionally, we used an Interaction Weight Penalty to prove active engagement over passive exposure. Accounts with no engagement interactions (e.g. retweets, mentions, or replies) received a 90% reduction in their Reach score, ensuring that engagement over audience size played the dominant role in determining influence. To compare reach across accounts, the final Reach values underwent Min-Max Scaling [1], which standardized them within a range of 0 to 1 while preserving their relative distributions. These adjustments enable us to use Reach as a metric by emphasizing actual audience engagement rather than the sheer number of followers.

[1] https://scikit-learn.org/stable/modules/generated/sklearn.preprocessing.MinMaxScaler.html

To ensure the *Reach* metric accurately reflects engagement over an account's passive reach to an audience, we implemented a series of penalty's based on our knowledge of the Democracy Summit 2021 dataset. A key modification involved penalizing accounts with no audience interactions by applying a **90% reduction** in their *Reach* score if they had zero retweets, mentions, or replies. This prevents accounts with large follower bases, such as *The Economist*, from dominating rankings solely due to their audience size. Instead, *Reach* prioritizes accounts with high engagement, as seen in *CGTNOfficial* and *SpokespersonCHN*, which exhibited substantial interactions and thus retained higher *Reach* scores.

Normalization was achieved using *Min-Max Scaling*, which standardizes *Reach* values between 0 and 1 while preserving relative differences. Additionally, a *logarithmic transformation* of `NUMBER_FOLLOWERS` was applied to mitigate the impact of large-scale differences in audience size. This ensures that while follower count remains a contributing factor, it does not disproportionately skew the final *Reach* value. The result is a metric that better represents **interactive influence rather than passive audience reach**.

Table A.1: Comparison of Reach before and after normalization and penalty adjustments.

Account	Followers		Retweets	Reach (Before)	Reach (After)
The Economist	26M	1	0	1.000	$\sim$0.10 (heavily penalized)
CGTNOfficial	13M	109	845	0.50	$\sim$0.85 (high engagement)
XHNews	12M	1	0	0.47	$\sim$0.09 (penalized for no retweets)
SpokespersonCHN	1.1M	21	1278	0.04	$\sim$0.90 (high interactions)

Engagement Rate Calculation

Similar to the *Reach* measurement, we iterated on what and how to calculate engagement for the influence scoring model. For example, we initially had a state account *MahuiChina* and another account with far fewer interactions and followers. Both accounts, however, initially yielded an engagement rate of 1, indicating a saturation issue where we failed to delineate high and low engagement.

We revised our method to use the weight of Total Interactions (retweets, mentions, quotes, replies) relative to simple tweet counts, applying a non-linear transformation such as the square root or logarithmic function $(\log(1 + \text{Total Interactions}))$. This adjustment ensures that higher interaction counts enhance engagement scores without disproportionately skewing the data, addressing issues of saturation where previously diverse levels of user engagement were capped at a score of 1.

This method also takes into account the engagement variability for *amplifier* accounts, typically bot or influencer accounts. For high-activity accounts, tweet volume is balanced by reducing its weight when Total Interactions are low. This penalty is especially important for certain types of bots that have near-zero engagement with other accounts. We normalized this engagement rate via MinMaxScaler to distribute the Engagement Rates more evenly across the dataset between 0 and 1. These modifications ensure that the Engagement Rate better represents an account's influence,

penalizing accounts that frequently post with minimal interaction while rewarding accounts with substantive engagement, leading to a more balanced component for measuring influence.

$$\text{Engagement Rate} = \frac{\sqrt{\text{Total Interactions}} + 0.3\text{TWEET\_COUNT} \cdot \text{Interaction Penalty}}{\log(1 + \text{NUMBER\_FOLLOWERS})}$$

where the Interaction Penalty is calculated by:

$$\text{Interaction Penalty} = \frac{\text{Total Interactions}}{\text{Total Interactions} + \text{TWEET\_COUNT} + 1}$$

This formulation ensures that accounts with higher meaningful engagements are highlighted over those with frequent but less impactful activity.

Designing an Influence Score

The computation of the influence score is a critical analytic component for this chapter and follow-on chapters, designed to quantify the significance of social media accounts based on several metrics that reflect reach, engagement, and network position. Given the focus of our study on accounts that are frequently amplified, special emphasis is placed on in-degree centrality but our influence calculation allows a given user to tweak parameters to find specific types of accounts, such as a less connected account with lower Reach that boosts other accounts. Our influence score is designed to provide an adjustable yet intuitive measure of social media influence that incorporates various components reflective of user engagement, reach, and network position.

The influence score IS has multiple components, each weighted to reflect its relative importance:

- Let w_r represent the weight for the reach component, which includes followers, retweets, and tweets.
- Let w_i denote the weight for the engagement component, containing all mentions, quotes, and replies.
- The network centrality measures are weighted as follows: w_{od} for out-degree, w_{id} for in-degree, w_e for eigenvector centrality, w_b for betweenness centrality, and w_c for closeness centrality.

Our influence score is defined as the following:

$$IS = w_r \cdot \text{Reach} + w_i \cdot \text{Engagement Rate} + w_{id} \cdot \text{In-Degree} + w_e \cdot \text{Eigenvector} + w_b \cdot \text{Betweenness} + w_c \cdot \text{Closeness}$$

where:

- $w_r = 0.2$ – Emphasizing the aggregated reach of followers, retweets, and tweets.
- $w_i = 0.2$ – Reflecting the impact of direct user engagements.
- $w_{od}, w_{id}, w_e, w_b, w_c = 0.0, 0.3, 0.1, 0.1, 0.1$ each – Accounting for the user's positional significance within the network structure.

All components, including centrality measures and the overall influence score, are normalized using the MinMaxScaler to ensure comparability across different scales and distributions for attributes.

Validating the Influence Model

We conducted a Variance Inflation Factor (VIF) analysis on the 2021 DS dataset, which revealed varying degrees of multicollinearity among the predictor variables used to calculate the influence score. VIF values ranged from as low as 1.062 for NUMBER_FOLLOWERS to as high as 243.901 for Total_Interactions_Weighted. Variables such as Betweenness, In-Degree, Closeness, Eigenvector, and NUMBER_FOLLOWERS exhibited VIF values below 5, indicating minimal multicollinearity, which suggests that these inputs do not significantly distort the predictive model. These findings support the validity of including these variables in the influence score computation as they are likely to contribute unique information without redundancy.

Conversely, the Total_Interactions_Weighted and Reach variables displayed extremely high VIF values, suggesting significant multicollinearity that could compromise the reliability of the model outputs. The Engagement_Rate also showed a notably high VIF of 19.465, indicating a strong dependency on other variables within the model. These high VIF values highlight the potential issues with model validity, as they suggest that these variables may be contributing redundant information which could lead to biased or inflated estimates in regression-based analyses.

To enhance the robustness and validity of the influence scoring model, we would recommend researchers address the high multicollinearity observed in certain variables. Approaches such as removing or combining highly correlated predictors, or transforming them to reduce their interdependencies, should be considered. For instance, variables like Total_Interactions_Weighted and Reach could be re-evaluated to determine if they can be decomposed into more fundamental components that provide unique insights without overlapping information. Additionally, further statistical tests and exploratory data analyses should be conducted to ensure that any modifications do not compromise the integrity of the model.

Table A.2: Variance Inflation Factor (VIF) Analysis Results

Feature	VIF
Betweenness	1.242
Out-Degree	3.956
In-Degree	1.413
Closeness	1.327
Eigenvector	2.399
NUMBER_FOLLOWERS	1.062
Total_Interactions_Weighted	243.901
Interaction_Penalty	2.402
Engagement_Rate	19.465
Transformed_Followers	2.031
Interaction_Weight	3.459
Reach	199.875

Table A.3: Descriptive statistics for Account Actor types across datasets with In-Degree Centrality using Scaled Z-Scores

Dataset	Actor Group	Mean	Median	Min	Max	IQR	Outlier %
Democracy Summit 2021	State-Actor	0.143	0.098	0.076	0.962	0.044	5.13
	Bot	0.143	0.075	0.037	1.000	0.081	4.67
	Other	0.143	0.073	0.000	0.678	0.121	6.45
	Soft Power	–	–	–	–	–	0.00
Democracy Summit 2023	State-Actor	0.035	0.025	0.015	0.215	0.020	7.02
	Bot	0.035	0.022	0.008	0.621	0.014	3.16
	Other	0.035	0.028	0.021	1.000	0.007	1.29
	Soft Power	0.035	0.019	0.016	0.116	0.005	16.67
	Covert	0.035	0.035	0.000	0.401	0.017	2.56
Ukraine	State-Actor	0.032	0.018	0.018	0.325	0.000	6.06
	Bot	0.032	0.019	0.019	1.000	0.004	1.10
	Other	0.032	0.012	0.000	0.611	0.012	3.69
Pelosi Visit	State-Actor	0.003	0.000	0.000	0.103	0.001	3.62
	Bot	0.003	0.001	0.001	0.591	0.000	1.51
	Other	0.003	0.002	0.002	0.466	0.000	1.64
	Soft Power	–	–	–	–	–	0.00
	Covert	0.003	0.003	0.003	1.000	0.000	0.62

* Outliers are defined as values where $|z| > 2$.

Table A.4: Descriptive statistics for Account Actor types across datasets with Out-Degree Centrality using Scaled Z-Scores

Dataset	Actor Group	Mean	Median	Min	Max	IQR	Outlier %
Democracy Summit 2021	State-Actor	0.035	0.001	0.000	0.447	0.008	7.69
	Bot	0.035	0.026	0.026	1.000	0.000	0.93
	Other	0.035	0.009	0.009	0.515	0.000	3.23
	Soft Power	–	–	–	–	–	0.00
Democracy Summit 2023	State-Actor	0.036	0.022	0.021	0.215	0.011	1.75
	Bot	0.036	0.034	0.034	1.000	0.000	0.54
	Other	0.036	0.031	0.031	0.627	0.000	1.61
	Soft Power	0.036	0.026	0.000	0.077	0.049	0.00
	Covert	0.036	0.034	0.034	0.840	0.000	0.64
Ukraine	State-Actor	0.021	0.004	0.000	0.424	0.008	3.03
	Bot	0.021	0.008	0.008	1.000	0.000	2.75
	Other	0.021	0.003	0.003	0.636	0.000	3.02
Pelosi Visit	State-Actor	0.009	0.006	0.006	0.127	0.001	1.81
	Bot	0.009	0.008	0.008	1.000	0.000	0.48
	Other	0.009	0.008	0.008	0.707	0.000	0.35
	Soft Power	0.009	0.009	0.000	0.018	0.009	0.00
	Covert	0.009	0.008	0.008	0.392	0.000	0.42

* Outliers are defined as values where $|z| > 2$.

Appendix B

BERT Topic Model Output

B.1 Topic Categorization

Table B.1: Comparison of Top Narratives Across Periods

Period 1 (Pre-Invasion)		Period 2 (Post-Invasion)	
Topic	Size	Topic	Size
Chinese Covid19 Vaccine Global Efforts	3,469	Hangzhou Asian Games athletes	5,688
China's Rural Poverty Alleviation	3,461	Covid19 epidemic in Shanghai	5,531
Hong Kong National Security Law	2,806	Russia-Ukraine Conflict Escalation War	2,994
Covid19 Testing Measures China	2,754	China-Laos Railway Development	2,821
Police Reform Congressional Hearings	2,562	Vancouver Christmas Market 2022	2,600
Beijing 2022 Winter Olympics Coverage	2,467	Chinese Agricultural Harvest Trends	2,523
China-US Relations Post-Trump	2,412	CPC Central Committee modernization	2,264
Rich Chinese Museum Culture	2,406	China-US Relations Summit Meeting	2,142
CPC Centenary Celebration Achievements	2,398	Crackdown on Crossborder Telecom Fraud	1,779
China's Green Energy Commitment	2,339	Chinese Space Station Missions	1,712
Virus Origin Trace Study	2,338	Aerial Snow Scenery China	1,709
Chinese Lunar New Year Celebrations	2,288	Ancient Chinese Archaeological Discoveries	1,421
Covid19 cases in United States	2,125	Gaza Conflict Humanitarian Crisis	1,399
PLA military sea exercise	2,065	Education in Remote Regions	1,318
Scenic Aerial Photos China	1,922	Belt Road Initiative Development	1,291
China-Africa Cooperation in Pandemic	1,919	Chinese EV Market Expansion	1,259
Chinese Economic Growth Analysis	1,861	Gun Violence in United States	1,182
Celebrity Drama Fan Chaos	1,520	Global Scitech Innovation Cooperation	1,182
Miner Rescue Operation Updates	1,488	Xi Jinping speeches summit	1,143
Taiwan Mainland Tensions Situation	1,459	China's Renewable Energy Expansion	1,437
Traditional Chinese Medicine in Healthcare	1,388	Taiwan Independence Collusion Mainland	1,489
Xi's Global Multilateral Development	1,343	Severe China Flood Disaster	1,040
Chinese Stock Market Regulation	1,273	PLA Navy Aircraft Carrier Exercise	1,032
English Premier League Season Dramas	1,279	Chinese Financial Market Transformation	823
Chinese Advanced SciTech Innovation	1,301	Cutting-edge Technology Exhibitions	1,179
Severe Chinese Flood Disaster	879	Hong Kong's Success and Unity	891
Japan-China Relations Analysis	742	China-Latin America Relations	947

Continued on next page

Period 1 (Pre-Invasion)		Period 2 (Post-Invasion)	
Topic	Size	Topic	Size
India-China Border Tension Analysis	815	Yuan Internationalization Progress Analysis	973
Australia-China Bilateral Relations	719	Extreme Heat Wave in China	549
Celebrity Drama Fan Chaos	1,520	Chinese College Graduate Employment Challenges	623
Huawei Chip Ban Impact	715	Production Safety Accident Investigation	572
Afghanistan Peace Efforts	902	Afghanistan Crisis Response Summit	549
Global Biodiversity Conference Kunming	593	Chinese Art Exhibition Scene	1082
Cold Chain Food Import Surveillance	537	South Korea-China Relations	462
French President Macron's Leadership	516	Japanese Cherry Blossom Festival	539
NBA Game Highlights	338	China-ASEAN Economic Cooperation	1161
Philippines-China Maritime Sovereignty Dispute	417	House Republican Speaker Election Political Stalemate	700
Grand Slam Tennis Drama	403	Fed Aggressive Inflation Rate Hike	830
Brazil Covid19 Death Toll	341	Sudanese Conflict and International Efforts	686
Teabreak Crossword Puzzle Solution	213	Chinese Central Bank Monetary Policy	886
China's Role in Global Climate Governance	594	Belt Road Initiative Development	1,291
Xi Jinping Speeches Summit	1,143	Migratory Bird Conservation China	711
Chinese dominance in table tennis	510	Chinese Port Container Throughput Surge	398
Iran Nuclear Deal Negotiations	493	Major Global Semiconductor Chip Industry	407
Giant Panda Birthday Celebration	457	Liu RuiGT Illustration Collection	492
Siberian Tiger Cub Park	561	Italy-China BRI Cooperation Analysis	318
China 5G Network Construction	254	US-China balloon incident relations	203
Learn Chinese Illustrations-Heteronyms	259	Philippines-China Maritime Sovereignty Dispute	417

B.2 Military Narratives continued

The following narratives were extracted from the *PLA Navy Aircraft Carrier Exercise* and

- **Attack Helicopter Training** PLA's 80th Group Army conducted round-the-clock flight training exercises with attack helicopters on October 25, 2022. This intense training, which involved repeated take-offs and landings, aimed to enhance the combat readiness of the aviation brigade under demanding conditions. The exercises are part of a broader effort to ensure the army's ability to operate effectively in various operational scenarios.
- **Lift and Turn Flight Exercises** The PLA Eastern Theater Command's army aviation brigade carried out lift and turn flight training exercises with attack helicopters on September 14, 2022. These exercises focused on improving the helicopters' maneuverability and the pilots' ability to perform complex aerial maneuvers under different operational conditions. The training is essential for maintaining high levels of preparedness in the face of potential threats.
- **Formation and Hover Check Training** On February 23, 2022, the PLA's 80th Group Army executed a flight training exercise involving attack helicopters flying in formation. The exercise also included hover checks, ensuring that the helicopters could maintain stability during critical phases of flight. These drills are designed to improve coordination among helicopter units and enhance their operational efficiency.
- **Rainy Weather Jet Training** The PLA Southern Theater Command's air force aviation brigade conducted flight training exercises in rainy conditions on March 25, 2022. The

training involved fighter jets performing various maneuvers, including gliding, cruising at different speeds, and deploying drag parachutes for deceleration. These exercises aimed to prepare pilots for adverse weather conditions, ensuring that they can operate effectively regardless of the environment.

- **J-10 Fighter Jet Training** J-10 fighter jets from the PLA Southern Theater Command's air force aviation brigade participated in flight training exercises on August 15, 2023. The exercises included taxiing on runways and flying in formation, focusing on enhancing the jets' operational capabilities. This training is crucial for maintaining the combat readiness of the air force in high-intensity scenarios.
- **Comprehensive Flight Operations Training** On March 16, 2022, the PLA Southern Theater Command's air force aviation brigade organized a comprehensive flight training operation. The exercise involved multiple fighter jets taxiing on runways and performing various flight maneuvers, aimed at improving the pilots' skills in handling different operational demands. The training is part of ongoing efforts to ensure the air force's readiness for any potential conflict.

B.3 European Union Narratives

- **China-EU Relations and Strategic Partnership** China and the European Union (EU) remain committed to deepening their comprehensive strategic partnership, emphasizing peaceful coexistence, multilateralism, and cooperation. During a recent virtual meeting, leaders reaffirmed their intention to conclude the China-EU Bilateral Investment Treaty negotiations by the end of the year and announced new initiatives, including high-level dialogues on environment, climate, and digital cooperation. This meeting underscored the importance of maintaining stable, long-term ties despite the challenges posed by the COVID-19 pandemic, as well as the global significance of China-EU relations in fostering economic recovery and addressing international issues.
- **Strategic Independence and EU Policy on Taiwan** In a phone conversation, Chinese President Xi Jinping and European Council President Charles Michel highlighted the importance of maintaining strategic independence in EU-China relations. Michel reiterated the EU's adherence to the one-China policy and expressed a desire to manage disputes effectively while continuing to engage in high-level strategic communication. This dialogue is seen as crucial amidst ongoing global changes and the impending political transitions within the EU, particularly with Germany's leadership change, as both sides navigate the complexities of their relationship while seeking to stabilize and strengthen bilateral ties.
- **Joint Efforts to Safeguard Multilateralism:** During a high-level meeting, China, Germany, and the EU underscored their shared commitment to multilateralism, global governance, and tackling common challenges such as climate change and economic recovery. Chinese President Xi Jinping emphasized the need for China and the EU to work together to uphold international order, promote sustainable development, and enhance dialogue on global issues. The leaders agreed on several initiatives, including advancing negotiations on the China-EU Bilateral Investment Treaty and launching new partnerships in digital and green economies, reflecting their collective resolve to deepen cooperation and contribute to global stability.

B.4 China's Narratives on Africa

Table B.2: Chinese-African Relations: Narratives extracted from Top Contributing Documents

Period 1 (Pre-Invasion)	Period 2 (Post-Invasion)
Strengthening China-Africa Ties: On June 11, 2020, during a significant rise in COVID-19 cases in Zimbabwe and other African nations, the Chinese government donated a second batch of anti-COVID-19 medical supplies. This gesture was part of the broader China-Africa summit held via video link from Beijing, which aimed to cement China-Africa relations and counter attempts to sow discord between the continents.	**Celebration of Africa's Progress and Unity:** Xi Jinping began his speech by highlighting Africa as a "fertile land of hope" and congratulating the Organization of African Unity on its 60th anniversary. He praised Africa's strides in independence, unity, and integration, and its ongoing efforts to uphold multilateralism and its collective interests.
Keynote and High-Level Participation: The summit was presided over by Chinese President Xi Jinping and included key figures such as the Secretary-General of the United Nations and the Director-General of the World Health Organization. The event saw the participation of African leaders, including the rotating chair of the African Union and the chairperson of the AU Commission, underlining the high-level engagement and the focus on a united response to the pandemic.	**China's Commitment to Africa:** Xi emphasized China's longstanding commitment to Africa, guided by principles of sincerity, real results, amity, and good faith. Over the past decade, China has aimed to strengthen these principles through significant cooperative endeavors, particularly in response to the COVID-19 pandemic, taking China-Africa relations to new heights.
Increase COVID19 Support The summit's central theme was to bolster international cooperation to assist African countries in combating the severe threat posed by the virus. Discussions highlighted the importance of humanitarian aid and the need for increased coordination in fields such as medicine and health equipment. This cooperation is seen as vital in strengthening the resilience of Africa's medical systems and managing the spread of COVID-19 on the continent.	**Future Vision for China-Africa Cooperation:** Looking forward, Xi outlined a vision for a high-level China-Africa community with a shared future. He expressed China's intent to work with Africa to create a conducive environment for mutual development, support Africa's integration efforts, including the AfCFTA, and promote a new vision for global security that emphasizes dialogue and cooperation over conflict.

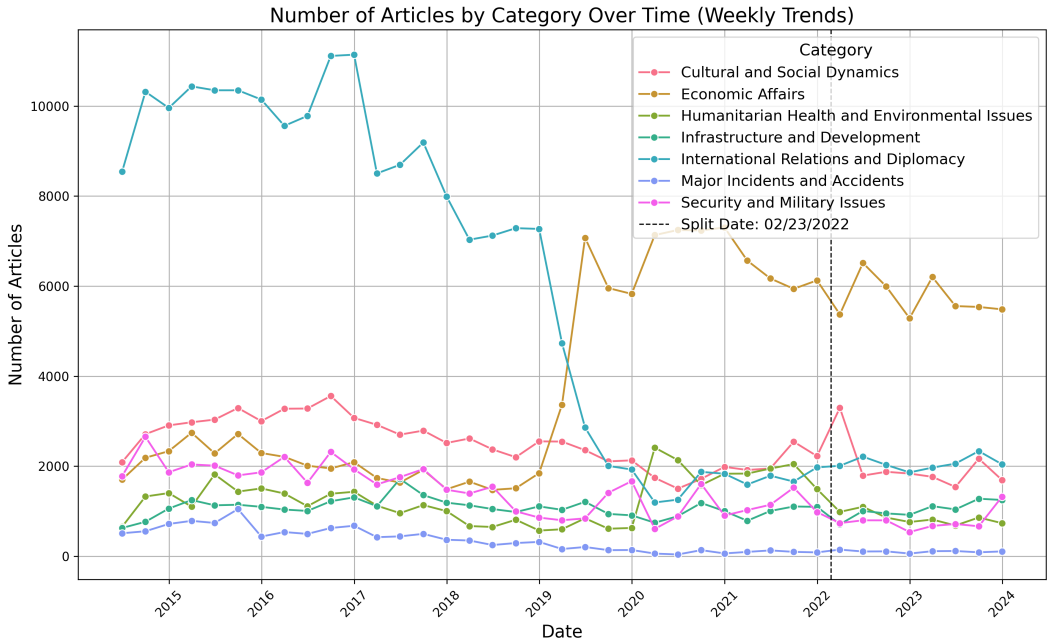


Figure B.1: Topic categories for Chinese News Articles leading up to and after Russia's invasion into Ukraine in 2022. We see China switch messaging priorities from international news coverage to economic topics, in line with the COVID-19 pandemic.

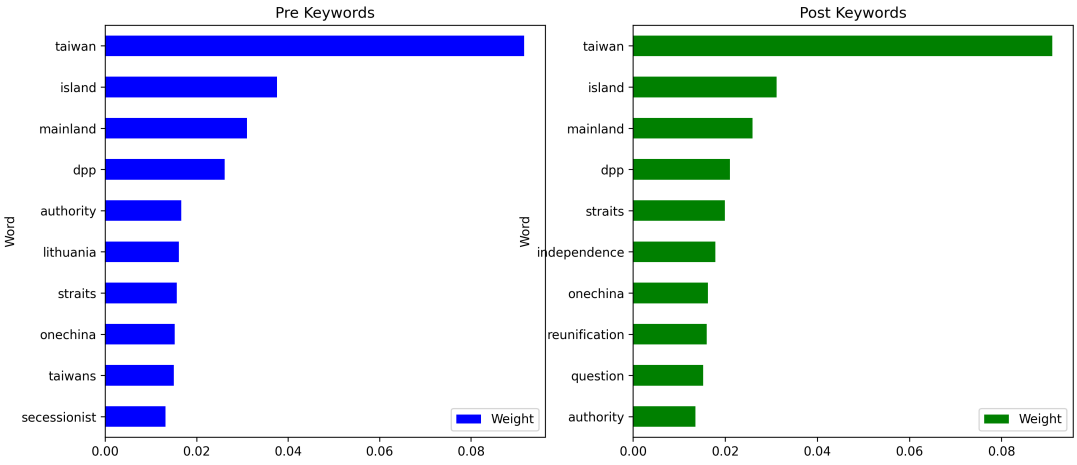


Figure B.2: Top Keywords associated to Period 1 and 2 aligned topics on Taiwan.

Appendix C

Codebook for Narrative Analysis

C.1 Narrative Characterization around Nancy Pelosi's Visit

We analyzed our Twitter data leading up to her visit, in addition to the week of her visit when China was conducting military drills and the period after her visit. Due to the outlying nature of China's Twitter chatter and ADIZ flights, Nancy Pelosi's visit to Taiwan serves as an outlying event that could destabilize the region towards further conflict. We used qualitative coding to understand better how China used social media to message about this event.

C.2 Data Parsing

We created three temporal buckets of Twitter data to analyze: a) pre-Pelosi visit, b) during the Pelosi visit, and c) after the Pelosi visit. We found that the Chinese government began messaging about the Pelosi visit to Taiwan as early as April 7, 2022. We used this date to initiate the pre-Pelosi visit period. Our Twitter data spiked between August 2-8, 2022, where we collected the highest number of tweets at 21,406 in one day, with the preceding and following three days also representing peak days. This one-week span represents nearly 60% of our Twitter data. This week also overlaps with the most significant ADIZ spike for the year, where there is a 15-day window of daily ADIZ violations within the 3rd quartile of flights between 8 and 45 flights a day. Due to the smaller window of China's peak Twitter chatter, we constrain our data collected during Pelosi's visit to August 2-8, 2022. This window captures the peak point for ADIZ and Twitter data, which occurred on August 5, 2022, approximately three days after Pelosi's visit. The last bucket of data captures the effects after Pelosi's visit and extends from August 9 - October 31, 2022.

C.3 Analysis

We analyzed the top 30 most amplified tweets per period, accounting for at least 25% of tweets within each time window. We reviewed the first period to create an initial coding ontology. We then coded all thirty tweets for each period. If we encountered a new code for a different period, we re-coded any periods that we had previously completed to ensure tweet categorization standards were the same across all three periods. We assume the most amplified tweets per period provide a

good proxy for messaging priorities around the Nancy Pelosi visit and subsequent military drills. The coding rule(s) and sample tweets are represented in Table C.1.

Table C.1: Codebook with sample tweets for Twitter characterization around the Nancy Pelosi visit.

Code	Coding Rule	Sample Tweet
One-China Principle	Includes any verbiage regarding the One-China Principle, territorial integrity, sovereignty claims over Taiwan, or the sentiment that Taiwan is a part of China	We are closely following the itinerary of Pelosi. A visit to #Taiwan by her would constitute a gross interference in #China's internal affairs, seriously undermine China's sovereignty and territorial integrity, wantonly trample on the #One-China principle.
Countermeasures	Includes any tweets that include the word "countermeasures", military drill tweets, China's red line, or tweets that indicate consequences for Nancy Pelosi's Taiwan visit. This category also captures any military, economic, or unnamed threats of action.	If the #US persists, the Chinese military will by no means sit idly by and will take strong measures to thwart any external interference and separatist attempts, China's defense ministry said on Pelosi's potential #Taiwan trip https://t.co/gBk6jl1HYd
Foreign Interference	This category entails negative coverage of foreign countries "interfering" with Taiwan. The United States is the primary target of this category, but this category also contains critical tweets of the United Kingdom, Australia, Japan and NATO	The United States poses the single greatest threat to world peace. And it does so under the promise of so-called freedom. For freedom under its terms is no freedom at all. And it comes at the price of peace itself! #US #Taiwan-#China https://t.co/WM1zKsuy0f
Personal Attacks	Personal attacks against Nancy Pelosi as a person, e.g. ad-hominem attacks against her character and motives for her visit	Extending her political career, diverting public attention from her family's stock trades, reaping economic gains... There are many personal reasons for Pelosi to visit Taiwan, but there is no benefit for the #Taiwan people. #SnowTalk https://t.co/G72rhLgkSD

Table C.1: Codebook with sample tweets for Twitter characterization around the Nancy Pelosi visit.

Code	Coding Rule	Sample Tweet
General Opposition	This category was one of our smallest categories, entailing more generic but still negative sentiment towards the visit. Importantly, this category did not engender a threat or promise to action as the Countermeasures category	Pelosi's #Taiwan visit: Dangerous for all who are interested in a peaceful world #CGTNOpinion https://t.co/HrLWcHzzMw
Taiwan Denigration	This category contained disparaging content regarding Taiwan's relationship to the United States, represented typically as one of subservience. The tweets that fell in this category frequently contained political cartoons of current Taiwanese President Tsai Ing-Wen	I wonder how people in #Taiwan feel about this title. What a shame! (Tweet includes screenshot of article with the title "Taiwan Can't Rely on 'Daddy America' to Solve Its Problems")
News Coverage	This was the smallest category in our dataset, with generic news coverage of the Pelosi visit announcing when and where the visit would occur. We only found one tweet in our sampled corpus of top tweets	US House Speaker Nancy #Pelosi office officially announced her itinerary to Asia on Sunday. It said Pelosi will lead a Congressional delegation to the Indo-Pacific region, including visits to Singapore, Malaysia, South Korea and Japan, China's #Taiwan was not mentioned. https://t.co/AK6X0lm8OU