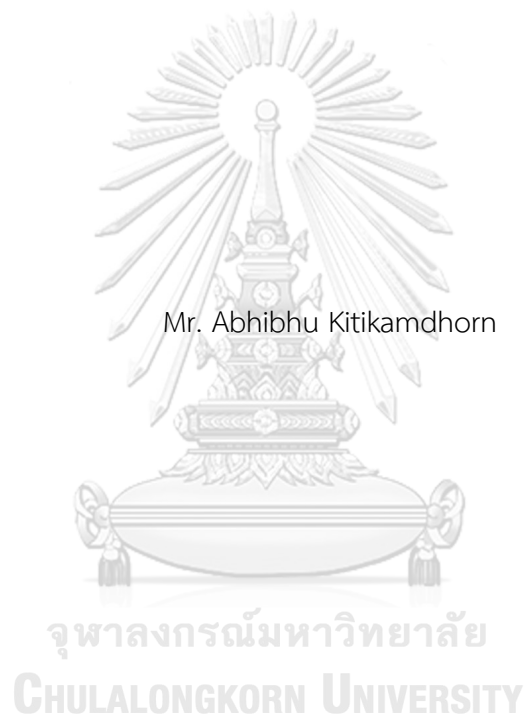


COVID-19 Infodemic and Social Media Platforms in Thailand



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ภาวะการระบาดของข้อมูลในวิกฤตไวรัสโคโรนา กับแพลตฟอร์มสื่อสังคมออนไลน์ในประเทศไทย



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาโทสาขาสถาปัตยกรรมศาสตร์
สาขาวิชาสถาปัตยกรรมศาสตร์
คณะสถาปัตยกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
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อภิถุ กิติคำธ : ภาวะการระบาดของข้อมูลในวิกฤตไวรัสโคโรนากับแพลตฟอร์มสื่อสังคมออนไลน์ในประเทศไทย. (COVID-19 Infodemic and Social Media Platforms in Thailand) อ.ที่ปรึกษาหลัก : ศ. ดร.พิรงรอง รามสูต

การศึกษานี้มีวัตถุประสงค์ดังต่อไปนี้ 1) เพื่อเติมเต็มช่องว่างองค์ความรู้ในประเด็นข้อมูลเท็จ/ข้อมูลบิดเบือนนอกบริบทตะวันตกโดยศึกษาปรากฏการณ์การแพร่ระบาดของข้อมูลในประเทศไทย ครอบคลุมช่วงเวลาตั้งแต่วันที่ 31 ธันวาคม 2562 ถึงวันที่ 31 กรกฎาคม 2564 2) เพื่อศึกษารูปแบบการแพร่กระจายของข้อมูลเท็จ/บิดเบือนเกี่ยวกับโควิด-19 บนเฟซบุ๊กและทวิตเตอร์ในไทย รวมถึงประสิทธิภาพของแนวทางในการรับมือกับปัญหาดังกล่าวด้วยข้อมูลหลัก และ 3) วิเคราะห์ช่องว่างทางนโยบายในการแก้ไขปัญหา ระเบียบวิธีวิจัยที่ใช้ได้แก่ การวิเคราะห์เนื้อหา อารมณ์/ความรู้สึก และเครือข่ายทางสังคม ควบคู่ไปกับการวิจัยเอกสารและการสัมภาษณ์เชิงลึก

ผลการวิเคราะห์เนื้อหาพบว่าข้อมูลเกี่ยวกับสมุนไพรรักษาโควิด-19 เป็นการเมือง โดยเฉพาะประเด็นการเซ็นเซอร์ข่าวสารปรากฏเด่นชัด ซึ่งแสดงให้เห็นถึงอิทธิพลของบริบทที่มีต่อธรรมชาติของเนื้อหาและการแพร่กระจายของข้อมูลเท็จ/ข้อมูลบิดเบือน ผลการวิเคราะห์เครือข่ายในแพลตฟอร์มสื่อสังคมออนไลน์ที่ทำการศึกษาค้นพบโครงสร้างการสื่อสารแบบห้องเสียงสะท้อน ซึ่งแสดงให้เห็นว่าความพยายามของรัฐบาลในการเผยแพร่ข้อมูลหลักยังไม่สามารถต้านผลภาวะทางข้อมูลได้ นอกจากนี้ งานศึกษานี้ยังชี้ให้เห็นช่องว่างทางนโยบายหลายประการ ได้แก่ การขาดกรอบกฎหมายเฉพาะที่เอื้อให้เกิดความร่วมมือจากหลายฝ่าย การไม่มีภาระรับผิดชอบทางกฎหมายของแพลตฟอร์มสื่อสังคมออนไลน์ในประเด็นเกี่ยวกับข้อมูลเท็จ/ข้อมูลบิดเบือน การใช้อำนาจกฎหมายเป็นเครื่องมือปิดปากผู้เห็นต่างทางการเมือง และการขาดสมดุลระหว่างเสรีภาพการแสดงออกและสิทธิในข้อมูลข่าวสารในการกำกับดูแลข้อมูลเท็จ/ข้อมูลบิดเบือน

บทเรียนที่ได้จากการศึกษานี้สามารถนำไปใช้ในการพัฒนานโยบายด้านการสื่อสารในภาวะวิกฤตโรคระบาดและการพัฒนาความรู้เท่าทันสื่อและข้อมูลสารสนเทศในสังคมไทย เนื่องจากความเข้าใจปัญหาในบริบทที่แท้จริงสามารถนำไปต่อยอดพัฒนาแนวทางการตอบสนอง/รับมือกับปัญหาที่เหมาะสมและมีประสิทธิภาพยิ่งขึ้นได้ รวมทั้งใช้กับปรากฏการณ์แบบเดียวกันอนาคตได้

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This study aims to fill a knowledge void on disinformation in a non-western context by examining the infodemic phenomenon in Thailand covering an extensive period from 31 December 2019 to 31 July 2021. The research examines how disinformation about COVID-19 spreads on Facebook and Twitter in Thailand, as well as the effectiveness of counter-disinformation approaches, and policy gaps in addressing the infodemic. Data collection relies on these methodologies—content analysis, sentiment analysis, social network analysis, in-depth interviews, and document analysis.

Content analysis of sampled data shows that herbal medicine claims, and politicized COVID-19 information, especially about censorship, are prevalent. Contextual factors evidently shape the nature and spread of disinformation. Meanwhile, social network analysis in the two selected social media platforms indicates the presence of echo chamber phenomenon. This in effect has impeded counter-narratives from reaching users under the disinformation clouds. In addition, the study also identifies several policy gaps: absence of policy frameworks for multi-stakeholder collaboration in curbing disinformation, lack of liability or accountability regime for social media platforms regarding disinformation, potential misuse of existing laws to silence political dissidents, and maintaining balance between freedom of information (access) and freedom of speech in the regulation of disinformation.

The lessons learned from this study could contribute to policymaking concerning public communication during the pandemic and the promotion of media and information literacy regarding infodemic in Thai society. A contextualized and nuanced understanding of the problem from triangulated analysis could lead to the development of appropriate and effective policy measures as well as multi-sectoral approaches in tackling future infodemic.

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Chapter 1

Introduction

Background and rationale

Since the initial outbreak in late December 2019, the ongoing COVID-19 pandemic has drastically changed the world. Aside from causing death, the ongoing pandemic has wreaked havoc on health systems and exerted lasting impacts on economies¹ and societies² across the globe. COVID-19 has forced people to take all sorts of activities to digital platforms. Social media now plays a more prominent role in work, education, socialization, entertainment, and above all in health communication. Social media and digital platforms are the backbone of health communication, used by governing bodies at the global, national, and local levels as a direct means of health communication with the public. Despite the fact that it brings great benefits to keeping people informed and safe during the crisis, research has shown that social media is a breeding ground for disinformation and misinformation regarding Covid-19 (Bridgman, Merkley, Zhilin, Loewen, Owen, & Ruths, 2021). In this way, the pandemic is far more than a health crisis as one of the formidable challenges that the world has been facing during the pandemic is this “infodemic.”

The term “infodemic” is a fusion of “information” and “epidemic” which is defined as “an overabundance of information—some accurate and some not—that occurs during an epidemic.” According to WHO, the information crisis creates a “virtual tsunami of data” that “spreads between humans in a similar manner to an epidemic, through digital and physical information systems” and it brings confusion or harmful consequences during the time of an epidemic because people will find it difficult to

¹ The COVID-19 pandemic has plunged majorities of countries into the economic recession, and a slow recovery is expected. From a bird’s eyes view, the global economy, based on the World Bank’s Global Economic Prospects (2020), is in the worst recession since 1870 (the Second World War) (The World Bank Group, 2020).

² For the social impacts, the most obvious implication of the COVID-19 pandemic is that the world has entered into the era of new normal. Due to the easiness of transmission, society as a whole is required to adapt to life with COVID-19 in many dimensions including social and personal dimensions. Several sorts of activities have to be migrated to digital platforms, and social media play a more prominent role in work, education, socialization, and entertainment, and in crisis management during the pandemic. Social media and digital platforms are used by governing bodies at global, national, and local levels as a direct means of health communication with the public.

find accurate information and reliable sources when they are in need (World Health Organization, 2020). That is, COVID-19 causes “a parallel pandemic of disinformation³” which is considered “communications emergency” in the UN Secretary-General’s term (United Nations, 2020).

Social media disinformation and misinformation concerning COVID-19 often have real-world impacts. News reports and studies indicate that false information about COVID-19 has cost lives, inflicted harm, undermined health responses, and caused social unrest due to hate speech and stigmatization (Coleman, 2020; Guy, 2020; Spring, 2020a; Timberg & Chiu, 2020). For example, in Iran, 796 people died from drinking methanol because of social media rumors claiming its curative properties (Spring, 2020a). Also, Anti-Asian hate speech, Asian ethnic violence, and hate crimes against Asians became prominent as people in Western countries blamed them for spreading the virus (sCAN Project, 2020; Human Rights Watch, 2020b; Peltz, 2021).

Countries have adopted different legislative and policy responses to the pandemic and the infodemic, so the situations in each social context differ. Studies show that shows that the problem differs from one social context to another. To illustrate, an analysis of the infodemic at global level shows that during the period between January 21, 2020 and April 5, 2020, stigmatization was more common in the US than the others within the top three (India, and China), and conspiracy theories were more widespread in China and the US than India where rumors were particularly prevalent in India (Islam et al., 2020). Similarly, a large-scale examination of rumors and conspiracy theories related to COVID-19 vaccine in 24 languages from 52 countries within the period between January 10 to November 30, 2020 reveals that there were three different waves of rumors and conspiracy theories concerning COVID-19 vaccines. Facebook and Twitter were the two main sources and the amount of information pollution differed from one platform to another (Islam et al., 2021). Based on a research report on COVID-19 infodemic in Europe, there was no content concerning

³ Disinformation, based on a framework presented by the collaboration between the International Telecommunication Union (ITU), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Broadband Commission for Sustainable Development, refers to “false or misleading content that can cause specific harm—irrespective of motivations, awareness, or behaviors” (Bontcheva et al., 2020).

the topic of migrants in France but there was such topic in Germany (AFP et al., 2020). Furthermore, due to the difference in legal framework, online intermediaries respond to disinformation differently. In some cases, imposing legal restrictions could result in threatening freedom of expression (Radu, 2020). A previous study points out that the spread of false information on Twitter in countries with strict legal environment are less dynamic than that of loose legal environment (Stephens, 2020). This exemplifies that legal environment exerts influence on how social media platforms respond to information pollution as well as indirectly creates chilling effects on instigators and agents of disinformation.

Since the infodemic is influenced by the interplay between social context and legal environment, a political dimension is added to the problem. Evidence shows that the spread of framed messages to advance political agendas has worsened the situation. For instance, a surge of anti-vaccine content (e.g., framed messages attacking government vaccine strategies) has led to vaccine hesitancy in countries such as India (Menon, 2021), Indonesia (Yuniar, 2021), and at the international level (Bond, 2021). Due to the spread of COVID-19 conspiracy theories, anti-lockdown and anti-mask groups claiming COVID-19 to be a hoax and a bioweapon popped up in many countries. An investigation of viral COVID-19 conspiracy theories and disinformation on social media offers evidence for the involvement of official bodies, political figures, state media, and allied networks of media which complicates the issue as sometimes social media platforms did not fact-check or flagged/labeled their content despite a policy to label or fact-check government funded content (Kinetz, 2021). Apparently, disinformation and politicization of COVID-19 information have caused confusion, hindered health efforts, and worsened the situation.

Although the COVID-19 infodemic on social media has been explored from various angles, many cover a fairly short period and focus primarily on the West. For instance, a systematic review of scholarly primary research publications concerning the COVID-19 infodemic on social media published in 2020 reveals that most of the reviewed studies provide merely snapshots of the phenomenon with the longest studying period of 123 days, and English content and the Western contexts are the

central focuses (Gabarron et al., 2021). Given that there is currently a handful of extensive researches, this study aims to cover longer phases of the pandemic.

Unlike many countries in the West that place an emphasis on freedom of expression and human rights, those in Southeast Asia take a different route to tackle the infodemic, taking a coercive approach to the problem. Countries such as Singapore, Vietnam, Indonesia, Cambodia, and Thailand implement so-called “anti-fake news” laws and relevant restrictive measures to curb the spread of COVID-19 dis- and misinformation; however, the coercive approach, especially censorship, is often criticized as politicization (Dang, 2021). Thailand is a case in point. The country used to be considered one of the top nations with successful COVID-19 management and recovery (Issac et al., 2021; Pornbanggird, 2020), but deep down, Thailand historically has taken a restrictive approach to manage disinformation even to the point of censorship which is quite apparent in social media. This is also apparent in the time of the pandemic. Until now, there has not yet been a report of fatal consequence from the spread of COVID-19 related disinformation (e.g., death from drinking methanol to cure COVID-19) in Thailand; however, evidence suggests that the problem does exist and has been prevalent on social media, especially Facebook in which it was ranked among top five problems concerning internet use in 2019 and 2020 (ETDA, 2020a, 2020b; National Health Commission Office, 2020; Royal Thai Government, 2020). The Thai government’s fake news curbing has been criticized for adversely affecting the freedom of expression, especially during the COVID-19 pandemic (Human Rights Watch, 2020a).

At the time of writing, COVID-19 infodemic in the context of Thailand has not been widely studied since many existing studies have focused on the pandemic rather than the infodemic (Goodwin et al., 2020; Marome & Shaw, 2021; Maude et al., 2021). This study aims to explore the phenomenon in the context of Thailand, which is very different from the existing literature (largely in the context of the West) in terms of social context, COVID-19 situation, and responses.

It is also important to note that many studies deal with merely a single element of the problem, such as an analysis of the characteristics and forms of COVID-19 misinformation and consequences (Enders, Uscinski, Klofstad, & Stoler, 2020), a study

of propagation network to formulate prediction model for fake news detection (Mookdarsanit & Mookdarsanit, 2021), an examination of the roles of bots on Twitter (Xu & Sasahara, 2020), and a comparative analysis of the phenomenon on different platforms (mainstream social media platforms: Twitter, Instagram, and YouTube versus less regulated ones: Gab and Reddit) (Cinelli et al., 2020). Only a handful of them approach the issue from a holistic perspective—considering more than one element of the problem. To bridge the knowledge gap, this study deals with four aspects of the problem by exploring the spread pattern of disinformation, users' engagement with disinformation and factors that influence it, counter-disinformation approaches by online intermediaries, and policy gaps to address for online disinformation.

Research questions (RQs)

The study seeks to explore the COVID-19 infodemic phenomenon in Thailand, focusing on social media platforms, so the main research questions (RQs) include:

- 1) How does disinformation regarding COVID-19 spread on different types of social media platforms in the context of Thailand?
- 2) Do users in different social media platforms in Thailand interact with COVID-19 disinformation differently, how and why?
- 3) What are major approaches taken by online intermediaries in the selected social media platforms in countering disinformation about COVID-19?
- 4) What are the major policy gaps, from platforms and users' perspectives, that need to be filled to resolve disinformation problem and associated policy recommendations?

Research objectives (ROs)

This proposed study has four main objectives:

- 1) To investigate spread patterns or network structure of COVID-19 infodemic in two social media platforms – Facebook and Twitter – in the context of Thailand.
- 2) To examine users' engagement with COVID-19 infodemic and their associated sentiment on the selected platforms.
- 3) To explore approaches taken by online intermediaries in the selected social media platforms in countering disinformation about COVID-19.

4) To identify major policy gap that needs to be filled to tackle disinformation in online social media platforms.

This proposed study will provide fundamental understanding of the phenomenon through understanding of the spread patterns and key actors involved in the spread. In other words, the spread patterns and sensitivity interaction patterns will be studied and identified. Moreover, this paper will also examine how social media platforms and intermediaries (operators on platforms) counter the spread of disinformation concerning COVID-19.



Chapter 2

Literature review

1. Conceptualizing infodemic/disinfodemic

The terms misinformation, disinformation, and fake news have been interchangeably used in various disciplines and by various actors such as the media, politicians, and scholars leading to ambiguity and confusion. Fake news is used to refer to a wide range of information types including misinformation, disinformation, and malinformation. So, some forms, i.e. a combination of accurate and false information or satire (Tandoc, Lim, & Ling, 2018), flatly contradict the definitions of the terms “fake” and “news” (Wardle, 2019a). These reflect the complexity of the problem and inadequacy of mutual understanding of the problem.

Realizing the demand for unified terminology and typology concerning the phenomenon, attempts have been made to put forward a coherent framework. Early attempts had focused on developing a framework with a set of criteria for classifying types of information and providing precise definitions for each type. Literature on defining fake news and its counterparts points out that intention behind the spread and facticity are defining common characteristics (Tandoc, 2019). For example, information disorder is a framework developed to explain and define information pollution using intention to harm and degree of falseness as criteria. Three main concepts are used to define information pollution in general: misinformation, disinformation, and malinformation (Wardle & Derakhshan, 2018; Wardle, 2019b). This later has become a widely used framework to differentiate types of information pollution in academic as well as policymaking. For instance, Wardle and Derakhshan’s information disorder framework has been adopted by the UNESCO to create a handbook and module in journalism (Ireton & Posetti, 2018). A bibliometric analysis of academic studies relating to the topic of information disorders (from the Web of Science Core Collection database from 1975 to June 2021) is another example adopting the information disorder framework to provide basic understanding of phenomena concerning information pollution. Based on the study, statistics shows that the topic of information disorders (i.e. topics relating to three concepts namely

misinformation, disinformation, and malinformation) and relevant topics such as fake news and post truth have gained momentum since 2010 and reached its peak in 2020 when topics relating to COVID-19 particularly the infodemic have arrived on the scene⁴ (Bran, Tiru, Grosseck, Holotescu, & Malita, 2021).

In academia, attempts have been made to analyze types of information pollution concerning COVID-19, but due to the timeliness of the issue, number of studies have limitation to provide framework for the problem as a whole. For this reason, a number of them are cross-sectional studies to identify types of information pollution based on a small number of data collected from a short period of time (e.g. Gutiérrez-Coba, Coba-Gutiérrez, & Gómez-Díaz, 2020; Galhardi, Freire, Minayo, & Fagundes, 2020; Hansson et al., 2021). Some studies are of broader scope. For instance, Brennen, Simon, Howard, and Nielsen's analysis of COVID-19 false information (in English) (2020) tries to identify recurrent themes and types of the problematic messages as well as sources/agents of the spread (Brennen, Simon, Howard, & Nielsen, 2020). Naeem, Bhatti, and Khan's analysis of social media COVID-19 infodemic from fact-checkers, myth-busters and dashboards indicates a typology of common forms of information pollution: false claims, conspiracy theories, and pseudoscientific health therapies (Naeem, Bhatti, & Khan, 2021). These examples reflect that the underlying focus is to identify and classify information types.

However, in response to the pandemic, there is a marked shift to develop a framework to make sense of the problem as a whole in order to provide timely and effective responses rather than developing a framework to conceptualize precise criteria for classification of subtypes. UNESCO and partners argue that the operationalized descriptions using intention as a criterion need refinement as sources and spreaders of problematic information oftentimes could not be uncovered easily or remain unknown and sometimes misinformation and disinformation are shared with

⁴ Top 20 authors keywords identified in the study include “*fake news (1106 papers), misinformation (899), social media (852), COVID-19 (499), disinformation (467), Twitter (229), internet (164), infodemic (141), post truth (137), coronavirus (136), social networks (132), fact checking (125), media (123), memory (123), journalism (122), communication (116), pandemic (114), false memory (113), machine learning (112) and public health (103)*” (Bran, Tiru, Grosseck, Holotescu, & Malita, 2021).

intention to help (i.e. when a person does not realize the falseness of the content), so different approach to the issue should be taken. Thus, a framework called “disinfodemic” is established to develop proper understanding of the problem with significance attached to the targets/interpreters of information rather than the producers/spreaders because the impacts of information pollution concerning COVID-19 can result regardless of intentions (Bontcheva et al., 2020; Posetti & Bontcheva, 2020). That is to say, the new disinfodemic framework argues that instead of giving significance to the intention of the creators and spreaders, an emphasis should be put on the implications because the interpretation lies at the root of the problem no matter what the intentions are. When a person is misinformed, the chance for being affected by the piece of information is still practically the same. So, an alternative approach to define disinformation in a more abstract way is proposed.

Based on the framework, disinformation is used as an umbrella term for “false or misleading content that can cause specific harm,” regardless of intentions (Bontcheva et al., 2020). This means that disinformation, in a nutshell, covers the spectrum of misinformation, malinformation and disinformation as defined by Wardle & Derakhshan (2018). To avoid confusion, the term disinformation will be hereinafter defined according to the UNESCO’s framework, and the term information pollution, infodemic, and disinfodemic will also be used in this article as a hypernym. In the big picture, this section traces factors involved in COVID-19 infodemic at micro level.

2. Infodemic at microlevel

To comprehensively understand the infodemic, it is necessary to identify elements involved in the spread of disinformation. The life cycle of information pollution in general can be divided into three phases: creation⁵, (re)production⁶, and distribution (Wardle & Derakhshan, 2018) (see **Error! Reference source not found.**).

⁵ A message or core idea is created. For example, chief architects of networked disinformation campaign come up with an idea of disinformation.

⁶ Media are produced/reproduced based on the original message/idea. For example, original idea is transformed into meme or infographic to suit the target audience of the networked disinformation campaign.

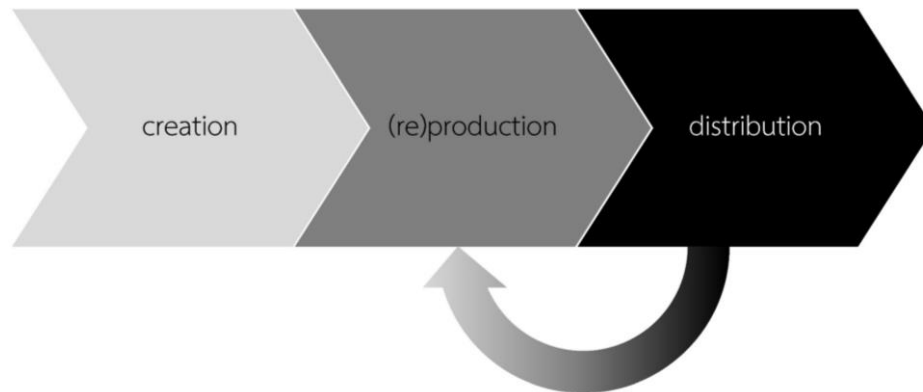


Figure 1 Phases of information disorder

To capture the entire life cycle of disinformation—from initiating and creation of messages to means of distribution, together with real-life impacts, the disinfodemic framework develops “IAMIT” to conceptualize elements involved in disinfodemic as follows (see **Error! Reference source not found.**):

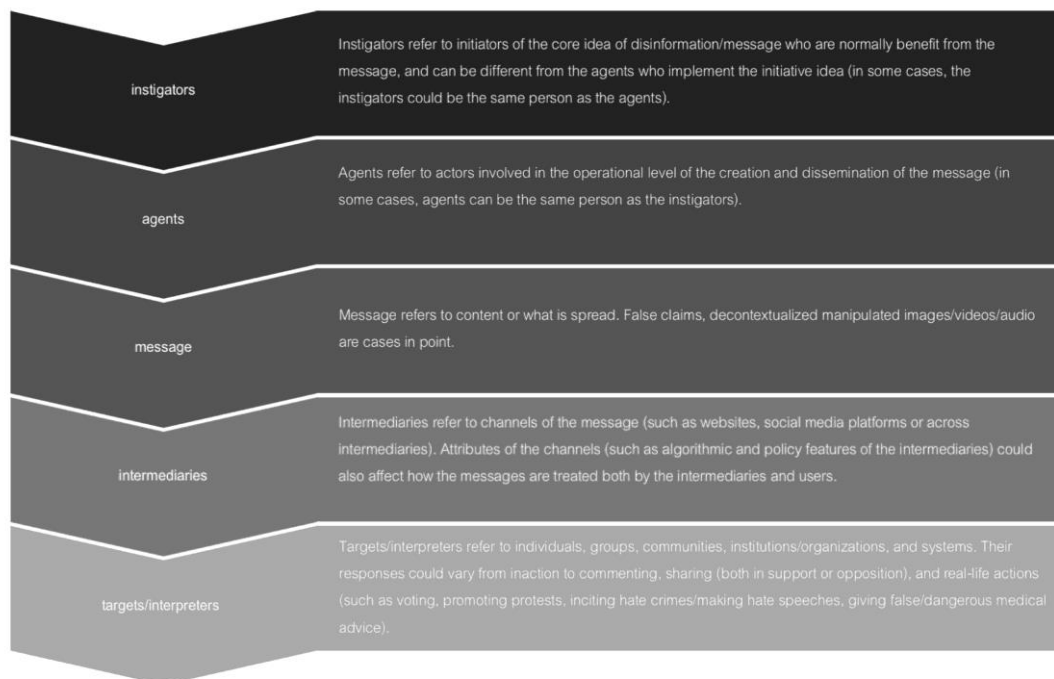


Figure 2 IAMIT framework for conceptualizing elements involved in disinformation life cycle

1) Instigators: initiators of the core idea of disinformation/message who are normally benefit from the message. The initiators can be different from the agents who implement the initiative idea, but in some cases, the instigators could be the

same person as the agents. History shows that in several large-scale cases the latter could be hired, voluntary, or unwitting participants (Bontcheva et al., 2020).

2) Agents: actors involved in the operational level of the creation and dissemination of the message. In some cases, the instigators and agents could be the same (Bontcheva et al., 2020). Actors vary in terms of attributes (see **Error! Reference source not found.**).

Table 1

Attributes of an agent

type of agents	unofficial ⁷	official ⁸
level of organization	working alone (individual)	having loose organization (i.e. having common interests)
use of automation	human (not using automated technology)	cyborg (bot-assisted human/human-assisted bot)
identity	matching	not matching/fake

Note. Adapted from *Information Disorder: Toward an interdisciplinary framework for research and policymaking* (29) by C. Wardle and H. Derakhshan, 2018, Council of Europe.

3) Messages: content or what is spread.

As mentioned earlier that the focus of disinfodemic framework is not on establishing criteria for classifying information types, grounded approach is taken to

⁷ Unofficial agent refers to ordinary agents without official affiliation such as individuals, groups, opinion leaders/online influencers, celebrities, experts.

⁸ Official agent has certain official affiliation such as to official group, party, organization, institution, or professional body.

operationalize message in terms of an element of the problem that require a response. There are four main disinfodemic message format types:

3.1) emotive narrative constructs and memes: textual content typically contains false/misleading narratives (i.e. lies, opinions, and/or incomplete information/element of truth) in various formats such as news coverage, documentary, along with emotional appeal. Images and/or videos may be used together with textual information to frame interpretation.

3.2) fraudulently altered, fabricated, or decontextualized images, videos, and synthetic audio: this type of content includes decontextualized images and videos ((almost)unchanged material from the original often used for clickbait), altered decontextualized audio, images, and video (such as clips from the original video without timestamp), staged videos, and tampered/software manipulated images and videos, computer-generated imagery (CGI), and synthetic audio.

3.3) fabricated websites/sources and polluted (manipulated) datasets

3.4) disinformation infiltrators and orchestrated campaigns: large-scale disinformation campaigns involve an organized network of actors and in some cases, bots and trolls are used to amplify the spread or to antagonize the targets (Bontcheva et al., 2020).

In a broader sense, one of the distinguishing characteristics of a message is the duration of the spread which is associated directly with message design. Thus, message can be categorized into three board groups: long term, short term, and event-based/trend riding (Wardle & Derakhshan, 2018).

4) Intermediaries (of content): channels (such as websites, social media platforms or across intermediaries), attributes of the channels (such as algorithmic and policy features of the intermediaries which affect how the messages are treated both by the intermediaries and users) (Bontcheva et al., 2020).

5) Targets/interpreters: individuals, groups, communities, institutions/organizations (including news media), and systems (such as electoral processes, public health, norms). At individual level, the targets' interpretation can

influence their real-life actions (such as hate crimes, providing false medical advice) (Bontcheva et al., 2020; Posetti & Bontcheva, 2020).

In social media environment, interaction or engagement with messages is a crucial factor in extending the reach of information, and the IAMIT implies that user engagement with information pollution is affected by a complex string of factors. The influence on the engagement is twofold—first, social context and legal environment which affect not only how users expose and interact with disinformation but also how social media platforms respond to information pollution, and second, user-related factors (such as cognitive psychology, affection, and media and information literacy) and technological factors (such as platforms' algorithmic recommendation system and bots) (Wardle & Derakhshan, 2018; Wardle, 2019b; Greifeneder et al., 2020; Cooke, 2018; Dalkir & Katz, 2020).

2.1 Filter bubble and echo chamber in social media environments

In the social media environment where users are generally allowed to decide what to be displayed and what not and who to connect (creating their own social network), there is a strong possibility that people get stuck in filter bubble or echo chamber in extreme cases.

Researches have suggested that echo chamber results from interaction of two different sets of factors: technological and psychological factors. Social media's machine learning algorithm, on the one hand, constitutes an environment of one-sided pool of information reflected users' preferences and beliefs rather than providing users with heterogeneous information. Due to their business model⁹, popular social media like Facebook and Twitter feed information to users based on their digital footprints (interactions with information) together with history of the engagement with their own virtual social network. Use of social media as main information source raises the possibility of filter bubble, having a narrow feed of personalized information based on users' preference, excluding what the users do not want to see. Users' cognitive

⁹ Social media platforms such as Facebook and Twitter rely on advertising revenue generated mainly from user microtargeting system that matches advertising with users' profiles and user profiling. The algorithmic system selectively provides users with personalized information as well as advertisements based on their past use (Stephens-Davidowitz, 2018; Wieringa, 2020).

psychology, on the other hand, could lead to homophily or polarization in social network and an imbalanced feed of information that could lead to the formation of echo chamber. Researches show that by nature, human beings tend to be a cognitive miser or to inherit a tendency to avoid cognitive effort to process information, both congenial and uncongenial unless it crosses certain threshold of justification, choice, and investment (Crisp & Turner, 2014; Greifeneder, Bless, & Fiedler, 2018), and selective exposure theory explains that in order to avoid cognitive dissonance, human beings tend to selectively expose to new information and social network (Cinelli, De Francisci Morales, Galeazzi, Quattrociocchi, & Starnini, 2021). Put another way, when building a social network, people are likely to cling to like-minded people rather than the ones with conflicting views, and people tend to have confirmation bias in information processing or bias in favor of their beliefs.

In fact, relevant researches on online echo chamber indicate that in social media environment, selective exposure is a key variable influencing information diffusion and the creation of “homogeneous clusters” or echo chambers, and each echo chamber differs in dynamics of information and the dynamics may differ in different platforms (Cinelli et al., 2021; Del Vicario et al., 2016). Study also suggests that highly polarized communication patterns (echo chambers) in social media could amplify the spread of information pollution (Cinelli et al., 2021; Törnberg, 2018) because in an echo chamber, there is a tendency for people to express in accordance with what perceived to be mainstream (Flaxman, Goel, & Rao, 2016). Wang and Qian’s study entitled *Echo Chamber Effect in Rumor Rebuttal Discussions About COVID-19 in China: Social Media Content and Network Analysis Study* (2021) provides empirical evidence that social media algorithm and network structure exert an influence, to some degree, on patterns of interactions and commenting with debunking messages as the homophily of interactions are manifested rather than cross-cutting interactions (Wang & Qian, 2021). Information pollution is likely to spread like “wildfire” (starting from a small initial origin and aggravated by larger engagement) in divided network than the one without clusters because like-minded users or homophily in a network may greatly increase the virality (Törnberg, 2018). The reach and speed of the spread of disinformation are associated with users’ social media interactions which constitute

different network structures, thereby, to a certain extent, shape the spread patterns of disinformation accordingly.

Recently, the concept of “informational homogeneity” which explains a similar phenomenon to echo chamber has been introduced and applied in a body of researches concerning the topics of political ideologies as well as COVID-19 disinformation. It suggests that in the context of social media disinformation where there is filter bubble feeding users with content based on their previous exposure, the tendency for informational homogeneity would be high if they are in a closely connected cluster forming with like-minded users who would feed similar types of content (i.e. disinformation) and have weak links with those who could provide contradict or fact-checked information. In other words, the concept suggests that in a (social media) network with subnetworks of like-minded users where there is little or no contradiction would reinforce the homogeneous flow of information. However, studies suggest that the state of informational homogeneity tends to rather be a long-term implication than sudden emergence, and contextual factors including societal situation and platform’s architecture have influence over it (Röchert, Shahi, Neubaum, Ross, & Stieglitz, 2021). Based on the literature review in this section, the following research hypothesis (RH) is made.

RH1: based on the notions of echo chamber and informational homogeneity, there is a possibility that homophily network structure may manifest (the network graph would likely be fragmented with subgraphs of nodes with similar attributes) because there is a tendency for people to form like-minded social network and cluster together in a largely isolated fashion.

Although social media’s structure/architecture¹⁰ and environment could have influence over users’ action/engagement to a degree, there is still room for users to freely use the platforms as well as decide what to do with information at hand. Individuals’ social media interactions are governed by their affiliation to different classes, groups, and standing in their respective society. These affiliations and

¹⁰ The way in which social media platforms allow users to make connection and interact with those in their network (Bossetta, 2018).

associations enable and constrain their social actions, both online and offline. That is, the way a user interacts with others depending on how they interpret information using their cognitive schemas (preexisting knowledge, perception, and attitude), the social norms and rules at different levels (such as social media norms and norms at societal level), and power relations between the user and others (Craib, 1992; Cassell, 1993; Liu & Xu, 2018).

Methodological choices play a vital role in studying echo chambers because different patterns of results emerge from studies adopting different methodologies. Borge and Terren's review of 55 studies on social media echo chambers published between 2011 and 2020 reveals different patterns of findings between studies based on digital trace data and self-report data. Unambiguous evidence for social media echo chambers was shown in over half of the former (24 out of 43), whereas no evidence of social media echo chambers (i.e. cross-cutting interactions) was found in almost half of the latter (5 out of 11). The rest yield "mixed" or inconsistent results; for example, echo chambers were for the most part involved with political/controversial issues. On the surface, the difference reflects limitations of self-report methods such as survey and interview, which respondents could fall under the influence of social desirability bias and give report based on what is perceived to be desired by the society—not falling into echo chambers. A closer look reveals that by relying only on digital trace data—the manifested social media engagements, the findings may not show the actual holistic view of social media usage because it leaves out lurkers or those who do not participate but observe (Terren & Borge-Bravo, 2021). Therefore, choices of methodological approach play a vital role in studying echo chambers.

As one of the primary focal points of this study is on analyzing digital trace data on the dissemination of COVID-19 information pollution, a network approach to study Facebook and Twitter data indicating actual users' interactions can be adequately used to empirically examine whether there is an echo chamber effect involved in the perpetuation of COVID-19 infodemic in Thai context or not.

2.2. Network approach to social media engagement

A theoretical approach to study how information flow through a social network which lies at the root of information disorder and infodemic is social network analysis

(SNA). Social network can be viewed as a structure facilitating social interactions among network members, thus enabling information diffusion. So, SNA is a perspective for examining a network representation of a phenomenon and analyzing the network's properties such as relationship between the network members and the pattern they form (Scott & Carrington, 2014).

A growing body of research shows that SNA can be employed to gain insight on how information pollution and fact-checked or debunking messages diffuse in social media which can be used in the field of fake news (including dis-/misinformation) detection¹¹ and mitigation (e.g. Agarwal, Dokoohaki, & Tokdemir, 2019; Aldwairi & Alwahedi, 2018). Studies show that this can also be directly applicable to the topic of COVID-19 infodemic. For instance, Cheng et al. (2021) investigates the phenomenon from network analysis perspective and shows that SNA can be used to find the distinct characteristics of disinformation network (Twitter dataset), resulting in a deep learning based solution for predicting key influential nodes in the network (Cheng et al., 2021). Similarly, Ashford et al. (2022) uses SNA to examine patterns of user interaction within social media communities (Reddit) in order to gain insight on characteristics of having potential for the involvement of COVID-19 dis-/misinformation (Ashford, Turner, Whitaker, Preece, & Felmler, 2022), and study the social media discussions on COVID-19 debunking messages in order to investigate the highly discussed topics, examine the echo chamber network structure, and the sentiments expressed by users (Wang & Qian, 2021¹²). This suggests that the way dis- and misinformation concerning COVID-19 diffuse in social network exhibits defining characteristics, compared to non-dis-/misinformation. For this reason, the following hypothesis is proposed.

RH2: the spread pattern of the COVID-19 information pollution is expected to have more layers than those of debunking/fact-checked information.

¹¹ A literature survey on different types of information pollution on social media indicates that studies on the detection of information pollution could be broadly divided into three main groups: content-based methods, social context based methods—user-based (i.e. focusing on analysis of users' interactions) or network-based analysis (i.e. focusing on structure of propagation), and hybrid methods (Mosinzova, Fabian, Ermakova, & Baumann, 2019).

¹² Here, SNA is used incorporation with other methods: content analysis and sentiment analysis.

2.3 Factors affecting users' engagement with information pollution

In social media environment, interaction or engagement with messages is a crucial factor in extending the reach of information, and user engagement with information pollution is affected by a complex string of factors.

One of the factors directly involved in the engagement is the perception of ease in information processing. It often leads to heuristic evaluation whereas difficulty in information processing may lead to analytic evaluation (Greifeneder et al., 2020). Despite the fact that people can process information analytically, statistics reveal that humans in general lack adequate level of ability to accurately identify false information¹³. Hence the wisdom of the crowd or crowd-provided commentary on social media is often used (Shu et al., 2020). People often take heuristic route to assess information from “friends” and opinion leaders on social media (Metzger, Flanagin, & Medders, 2010 as cited in Duffy, Tandoc, & Ling, 2019). That is, there is a tendency for people to trust in their social network. A study points out that important figures often play a vital role in amplifying the spread of information pollution—attracting high level of social media engagement (Brennen et al., 2020).

Next factor is an illusion of truth effect. Illusory perception of (information) being believable, which is mainly stemmed from message design and trust in social networking, allows disinformation to bypass user's immune system—media and information literacy. An analogy can be drawn between the actual virus and disinformation or the so called “media virus.” The term is used to explain the mechanism of the spread of a message, placing emphasis on message design, in interactive communication environment. An actual virus consists of a shell that allows it to penetrate a person's immune system unrecognized, and it passes on its genetic code through the weak spots of the host's cell to get reproduced. Then the infected person can spread the virus to others if their immune systems do not recognize the virus's shells. However, a virus cannot harm a person if they are inoculated or have a capable immune system that can identify the shell and neutralize the code. The “media virus” works in a similar way. It has a “shell” (such as false information in

¹³ The success rate of identification of false information is one-third (Shu et al., 2020).

disguise as credible sensational news) and “provocative memetic material” that tempts a person to interact with it. Without a healthy immune system or adequate literacy level and cognitive capacity, the virus could penetrate a person’s system (Rushkoff, Pescovitz, & Dunagan, 2018). Typical characteristics of a message that encourages the spread of information pollution could be sum up as follows: designed to provoke emotional response, having visual component, having strong narrative, and being in repeated production/reproduction (Wardle & Derakhshan, 2018). Furthermore, studies have shown that debunking messages could cause backfire effect, feeling familiar with to disinformation, leading to illusory truth (Soon & Goh, 2018; Bailey, & Hsieh-Yee, 2019).

At cognitive level, literature suggests that humans, by nature, have a negatively-biased credulity and informational negativity bias (various cognitive factors such as knowledge base, perceptions of the threats, and ability to cope with threats can influence the bias, so levels of bias varies from case to case). That is, there is a tendency for information concerning threats to get more attention, provoke more emotional responses, or be more memorable compared with positive information. Also, humans have a pattern-seeking brain and so because of the negativity-biased credulity and informational negativity bias, there is a tendency to select and interact with information concerning threats. Evidence suggests that there is also a tendency for people to pass on information in order to enhance one’s own prestige, and arousal is one of crucial factors influencing people’s willingness to pass on information. With this in mind, negative information is typically more arousing than positive information. This assumption is supported by several experimental results (Vasu, Ang, & Jayakumar, 2019). Additionally, previous studies in the fields of psychology and communication have shown that negativity bias is empirically tested to be one of the causal factors for selective exposure to online news. For example, it has been found that there is a high tendency for people to have bias towards negativity when consuming thematic online news, especially health care, compared to a more episodic issue such as immigration problem. Logical explanation of the bias is that human beings instinctively look for threats in their environment and negative information has a psychological value of being a potential threat to individuals, so negative information tend to attract

more attention and be more arousal, compared to positive information (Meer et al., 2020).

To conclude this section, at individual level, cognitive factors as well as the message and its design can have influence over our ability to distinguish information pollution from objective information. And trust in ones' own social network can exert influence on social media engagement which in turn affects the reach of the message. Therefore, the following RHs are proposed.

RH3: based on the concepts of negatively-biased credulity and informational negativity bias, there is a high possibility that negative information would gain more momentum in the network, compared to those with positive or neutral sentiment. And the manifested sentiment of the infodemic is hypothesized to be largely in a negative light.

RH4: according to the literature review on factors affecting users' engagement with information pollution, there is a possibility that the influential nodes in the social network, i.e., accounts with a high number of followers, would play an important role in the spread of information pollution.

3. Infodemic at macro Level

3.1 Political polarization and post-truth

At macro level, political polarization amplified by social media's personalized information feeding could lead to post-truth communication. For instance, in context of the US, deep political polarization gives rise to an alternative information ecosystem on social media. A conservative typically has political bias and a deep mistrust of the mainstream media (due to conflicting view), so they generally turn to alternative sources of information. In some cases, this becomes media distrust symptom which leads them to reject objectivity or the way mainstream media present their content based on objective information. In the extreme post-truth communication atmosphere, they reject objective knowledge such as information on global warming presented by the media or even in scholarly works and turn to an alternative source of information, particularly the one that does not go against their belief. This symptom is, in part, a result of cognitive dissonance resulted from encountering information containing conflicting ideas or beliefs found in new information. Social media environment is also considered a contributory factors of a post-truth communication context as the algorithmic personalized information consumption facilitates the connection between users and information matched with their core political beliefs (Kelkar, 2019). Elements constituting polarized information ecosystem and post-truth communication context in the US include political polarized sources of information that take different approaches to information production than mainstream institutions, different set of agenda setters, algorithm-driven communicative environment (social media) which help the sources and audience meet, and users' cognitive psychology which help perpetuate the division of information ecosystem. Post-truth, in a nutshell, is a contributory factor in information disorder.

3.2 Legal environment

The problem of infodemic has legal dimension since different governments adopt different set of laws, rules, and regulations on information pollution based on their social and historical contexts. From a bird's-eye view, direct responses to disinformation can be categorized into four broad groups according to their targets (see

Table 2). However, different countries and platforms take different approaches to tackle the problem which in turn help shape the information ecosystem as a whole.

Table 2

Typology of disinformation responses

Types	Sub-types	Examples
1. Identifying responses	1.1 monitoring and fact-checking responses: usually done at level of organizations including social media platforms, academic, civil society organizations and collaborations between organizations	Global level -First Draft ¹⁴ -International Fact Checking Network (IFCN ¹⁵) -Duke University Reporter's Lab database ¹⁶ -Facebook Third-Party Fact Checking network ¹⁷ -Agence France- Presse (AFP) news agency
		Regional responses -Africa: AfricaCheck ¹⁸ : - Latin America ¹⁹ : Chequeado -Europe: SOMA ²⁰ -Arab States: not institutionalized collaboration ²¹
		National responses -India ²² -Indonesia ²³

¹⁴ focusing on content verification, content-monitoring programs

¹⁵ focusing on standards of content monitoring and fact checking

¹⁶ focusing on documenting fact-checking operations

¹⁷ focusing on reviewing and rating/labeling content on Facebook and Instagram, based on the company's policy

¹⁸ focusing on news media

¹⁹ focusing on verification of public discourse and invention of fact-checking methods

²⁰ focusing on providing fact-checking tools

²¹ There are various initiatives by independent fact-checking organizations such as Fatabyyno, De Begad, Matsad2sh, Falsoo, Verfy Syria, AFP (each covers different territories).

²² There are 15 active fact-checking operations (mostly individuals, teams, and small organizations—some are members of the Facebook fact-checking network).

²³ The initiatives include Mafindo (via Facebook, WhatsApp, Google Chrome extension, and a website), five other debunking initiatives by news media, and members of the Facebook fact-checking network.

		<ul style="list-style-type: none"> -Philippines²⁴ -Republic of Korea²⁵ -US²⁶ -Thailand
	<p>1.2 investigative responses: in-depth studies on coordinated disinformation campaigns such as state-sponsored media, extremist movements, anti-migrant, and far-right networks.</p>	<ul style="list-style-type: none"> -entities with a primary focus on disinformation²⁷ -entities with methodologies relevant to disinformation²⁸ -investigation by existing non-governmental watchdogs or monitors with a thematic or sectoral freedom of expression focus -in-depth investigations by news outlets -action-oriented academic research -commercial entities working in social network analysis and cyber-security -investigations by internal company threat mitigation teams (such as major social media's teams)
<p>2. Responses aimed at producers and distributors</p>	<p>2.1 legislative, pre-legislative, and policy responses: imposition of law, regulations, measures, and policy at different levels such as nation states, organizations</p> <hr/> <p>2.2 national and international counter-disinformation campaigns: producing counter-narratives</p>	<ul style="list-style-type: none"> -inquiries, task forces, and guidelines -legislative proposals -adopted legislation -law enforcement and other state intervention -dissemination of authoritative information/ fact-checking and debunking (via website, TV program, online platform, database,

²⁴ There are four independent fact-checkers and three members of the Facebook fact-checking network.

²⁵ There are five fact-checking organizations including SNU Factcheck (Seoul National University).

²⁶ Snopes (fact-checking organization)

²⁷ such as foundations, government-funded entities, non-government-funded organizations, academic programs.

²⁸ Open-source investigation such as using open source and social media sources to conduct investigations.

	social media accounts, training programs, crowdsourcing portal)
	-US: online platforms ²⁹ -Europe: online platforms and TV programs ³⁰ -collaborative responses on elections ³¹ -responses by the internet communications companies such as Facebook, Google -regulatory responses such as agreement with internet communications companies
2.3 electoral responses: a multi-dimensional approach to deal with election-related disinformation (a combination of different types of responses)	
3. Responses aimed at the production and distribution mechanisms	3.1 curatorial responses: changes to tackle the spread of disinformation through services provided by online communication platforms and curation of content to point users to reliable sources
	internet communication companies: -flagged and review of content -filtering, limiting, blocking/removal of content -promotion/demotion of content -disabling/removal of accounts -transparency in sponsored content -user involvement -appeal mechanisms accountability journalism
3.2 technical and algorithmic responses: use of automation and/or Artificial Intelligence (AI) to detect and prevent the spread, or to provide extra information on individual pieces of information	Internet communications companies: -automated tools for detecting and managing disinformation behavior

²⁹ FactCheck.org, The Fact Checker (The Washington Post), Politifact, Snopes.

³⁰ UK's Channel 4's blog, French press's blogs, FullFact.org, BBC's Reality Check, Nieuwscheckers, Faktencheck (TV show).

³¹ Electionland (US), CrossCheck (Europe, Australia, Nigeria), FactCheckEU.info (Europe), SOMA (Europe), Mexican Verificado 2018, Comprova (Latin America), Reverso (Argentina), Checkpoint project (India), Real411 (South Africa).



-automated tools for content identification and removal (including upload filters)

-tools for media and civil society to engage with platforms' systems

Third-party:

-disinformation analysis (manual)

-automated (AI) message/content analysis

-tools for detection of bots, computational

amplification, and fake accounts, or to create

machine-learning based content trust information

-tools to assist third-party fact-checking

-semi-automated tools to complement content verification

-tools for detection of new forms of algorithmically-generated manipulated media

-Google

-Facebook

-Twitter

-YouTube

-Reddit

-Tiktok

(Note. Each platform has different set of policies)

3.3 de-monetization responses:

interventions used to remove incentives and prevent revenue generation from disinformation

4.1 ethical and normative responses:

publication of guidelines/recommendations, resolutions, statements, and content aimed at sensitizing the public to the issue

-intergovernmental

responses: United Nations level, regional level,

-civil society responses

4. Responses aimed at the target audiences of disinformation campaigns

	-responses from the internet communications and news industries -anti-hate speech initiatives
4.2 educational responses: responses aimed at improving the people’s media and information literacy including critical thinking and digital verification skills	-improving citizens’ media and information literacy (MIL) and global citizenship education (GCED) -improving journalistic professionalism
4.3 empowerment and credibility labelling efforts: creating and using content verification tools or indicators which help the people avoid falling for disinformation	-provenance-tracking initiatives: tools from news providers, tools at point-of-capture of images/videos, platform responses -trust- and accreditation-based initiatives (trust and transparency standards for media sources)

Note. Summary by author from *Balancing Act: Countering Digital Disinformation While Respecting Freedom of Expression* by K. Bontcheva, J. Posetti, D. Teyssou, T. Meyer, S. Gregory, C. Hanot and D. Maynard, 2020.

As an illustration, the United States attaches great significance on the freedom of expression as its First Amendment is built based on the principle of free marketplace of ideas. The model of “truth” here is based on the competition between different ideas—both true and false. Therefore, in the US context, the First Amendment largely shields those involved with the spread of information pollution from legal liability, especially the social media platform operators. The Communications Decency Act³² (CDA), for instance, states that social media platforms are viewed as internet intermediaries, so they do not bear legal responsibility for content circulated in their

³² Section 230(c)(1) of the CDA states “no provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider” (Pollicino & Bietti, 2019, pp. 64-65).

platforms. This means that US law by design hinders efforts to tighten the law, rules, and regulations regarding information pollution (Pollicino & Bietti, 2019).

On the surface, the US and European Union (EU) seem to be subject to the same democratic regime. Beneath the surface there is a big difference in legal framework for information pollution as critical importance is placed on human rights³³ and pluralism in the EU's context. Unlike the US, in the EU's legal context, freedom of expression is not considered absolute but is kept within certain limits so there is more autonomy for legislative efforts to tackle the problem of information disorder (Pollicino & Bietti, 2019). In the eyes of the EU, the information ecosystem is an integral component in maintaining sound democracy, so social media platforms are not considered merely passive intermediaries like that of the US. The EU takes a reactive approach to establish legal framework for addressing the problem and gears to encourage social media platforms together with governmental bodies to take a reactive role (Ungku, 2019). For instance, at regional level, Action Plan against Disinformation³⁴ focusing on increasing the capacity to tackle the problem and promote cooperation among the member states was launched in 2018, and the Code of Practice on Disinformation³⁵ has been implemented to set standards for self-regulatory practice for online platforms³⁶ and advertising sectors (European Commission, 2021). High-level group of experts (HLEG³⁷) is also formed to provide guidance on dealing with online fake news and disinformation at policy level. At national level, Germany, for example, has imposed the “Netzwerkdurchsetzungsgesetz” or Network Enforcement Act (also known as NetzDG³⁸)

³³ For example, Article 10 of the European Convention on Human Rights (ECHR) stipulates that everyone has freedom of expression with responsibilities so that it is given under the law for preventing “crime or the protection of the rights and freedoms of other” (as cited in Pollicino & Bietti, 2019).

³⁴ <https://ec.europa.eu/digital-single-market/en/news/factsheet-action-plan-against-disinformation>

³⁵ <https://ec.europa.eu/digital-single-market/en/code-practice-disinformation>

³⁶ Signatories include Facebook, Twitter, Google, Mozilla, Microsoft, and TikTok.

³⁷ 39 members of the HLEG are from the civil society, social media platforms, news media, fact-checking organizations, and academia (*A multi-dimensional approach to disinformation: Report of the independent high level group on fake news and online disinformation*, 2018).

³⁸ NetzDG came into effect on January 1, 2018

which requires social media platforms with more than two million users to remove “obviously” unlawful content such as fake news, disinformation, hate speech, and pro-Nazi ideology within certain time limit (Funke & Flamini, 2019; Pollicino & Bietti, 2019; Panel for the Future of Science and Technology, 2021; Ungku, 2019). The inclusion of pro-Nazi ideology in Germany’s law reflects influence of historical and social context on legal framework which in turn help shape the information ecosystem as a whole.

In contrast to the US and EU, the problem of information disorder in the context of politically polarized Thailand is closely intertwined with politics. Despite the fact that Thailand does not have a specific piece of legislation on fake news or related concepts, its “Computer Crime Act” has been used to prosecute wrongdoers for what is considered fake news, false information, online offence, or inappropriate online content in the eye of the state. Many of those cases are politically related (Smith & Perry, 2020). To illustrate, in 2018, the Thai state charged 29 people for involving with “false claim” suggesting government corruption (“Thai government steps up efforts to crack down on fake news,” 2018). In 2019, Technology Crime Suppression Division (TCSD), a unit operates under the Act, charged a political activist who posted what the unit considered “inappropriate content” (about history of foreign monarchy—not Thai monarchy) on Facebook (พลวุฒิ สงสกุล, 2019). The Ministry of Digital Economy and Society (DES) had taken legal actions against social media platforms: Facebook and Twitter by asking them to take down content and social media accounts³⁹ violating the Computer Crime Act (largely involved with anti-government narratives), along with requiring private enterprises to store customers’ activity log for at least 90 days for prompt the DES’s investigation of “fake news” (Post Reporters, 2019, 2020). A special panel or task force was also appointed to exercise discretion and jurisdiction over the law, and Cyber Scout Program⁴⁰ was launched in 2010 to help monitor online inappropriate information about the monarchy (Smith & Perry, 2020; Sombatpoonsiri, 2018). Thailand has long been criticized to use state apparatus, particularly the

³⁹ 15 Facebook accounts and 4 accounts on Twitter belong to Thai exiled political activists and the leaders of anti-government protesters (Post Reporters, 2020).

⁴⁰ Cyber Scout Program (<http://www.cyberscout.in.th/home.php>) recruits the youth on voluntary basis to conduct online surveillance of inappropriate information, potential threat, and political dissents (Sombatpoonsiri, 2018).

Computer Crime Act for advancing political agendas as well as suppressing freedom of expression (Charoen, 2013).

Thus far, this section suggests that COVID-19 infodemic is affected by contextual factors such as the pandemic situation and countermeasures which are influenced by the legal and social structures of a society. Members of society are vulnerable to the infodemic due to their cognitive psychology, social network, norms, and their social media environment.

4. Conceptual framework

The following conceptual framework is drawn from the literature review (see Figure 3). At societal level, contextual factors, particularly the COVID-19 situation and responses help shape the infodemic, and at platform level, social media algorithm helps shape the communicative environment—personalized information feeding based on users’ preferences and previous behavior (filter bubble). At individual level, both user attributes (e.g., being an opinion leader—having high number of Likes/Followers) and message attributes (e.g., content themes, prior interactions, and sentiments) play a key role in users’ information processing and social networking, so they are considered determining factors in network homophily. In short, these factors have influence over the overall interaction pattern which in turn could lead to certain disposition: cross-cutting or echo chamber.

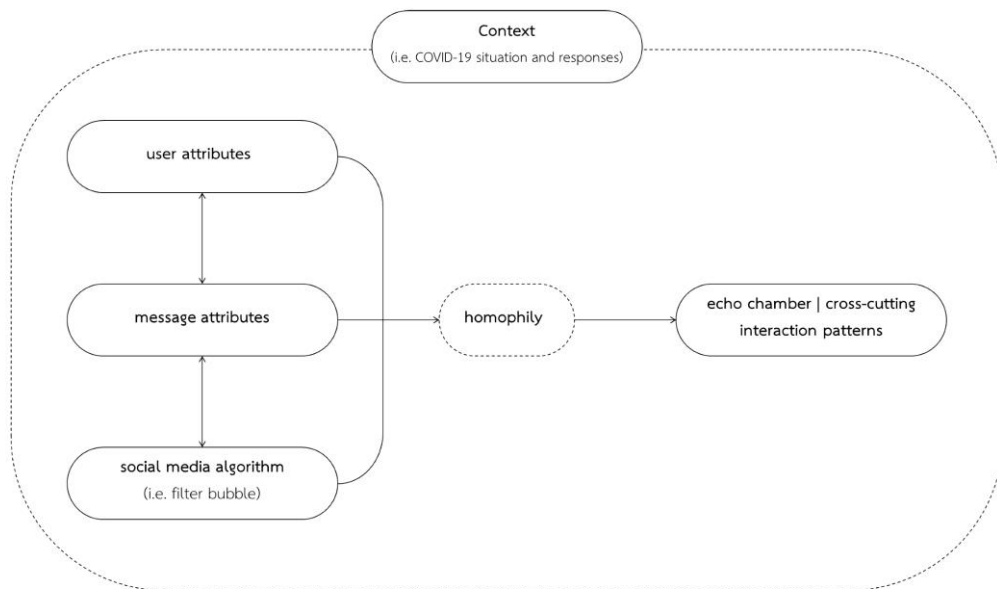
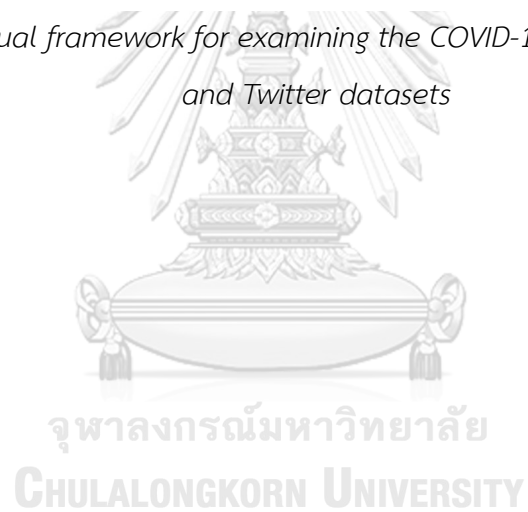


Figure 3 Conceptual framework for examining the COVID-19 infodemic on Facebook and Twitter datasets



Chapter 3

Methodology

1. Methodological approach

This chapter outlines the varying methods used in the research to reach the ROs and tackle the RQs. These methods, appropriate for different lines of inquiry, are shown in Table 3 below.

RQs:

The study seeks to explore the COVID-19 infodemic phenomenon in Thailand, focusing on social media platforms, so the main research questions (RQs) include

- 1) How does disinformation regarding COVID-19 spread on different types of social media platforms in the context of Thailand?
- 2) Do users in different social media platforms in Thailand interact with COVID-19 disinformation differently, how and why?
- 3) What are major approaches taken by online intermediaries in the selected social media platforms in countering disinformation about COVID-19?
- 4) What are the major policy gaps, from platforms and users' perspectives, that need to be filled to resolve disinformation problem and associated policy recommendations?

ROs

This proposed study has four main objectives:

- 1) To investigate spread patterns or network structure of COVID-19 infodemic in two social media platforms – Facebook and Twitter – in the context of Thailand.
- 2) To examine users' engagement with COVID-19 infodemic and their associated sentiment on the selected platforms.
- 3) To explore approaches taken by online intermediaries in the selected social media platforms in countering disinformation about COVID-19.
- 4) To identify major policy gap that needs to be filled to tackle disinformation in online social media platforms.

Table 3

Research methods

Methods	RO1	RO2	RO3	RO4	Applicability
Content analysis	/	/			<p>-Content analysis is used to identify prominent types of disinformation that circulate widely in the Thai online sphere. This method is used to classify the message/information into categories before conducting social network analysis and sentiment analysis to examine the dynamics of the information pollution.</p>
Social network analysis (SNA) and sentiment analysis	/	/			<p>-As the main tenet of SNA is to discover network structures and roles of actors involved in a social network, it is employed to examine spread patterns of COVID-19 infodemic (viewed as a social network) at various aspects such as closure/openness, reachability, connectivity, and clustering. Overall, SNA can yield insights into relations among units in a network at macro level such as network structures and communication patterns (RO1), and at micro level such as roles, relations, and implications among network units including behavior, influence, and structural opportunities and constraints of a node, group, or subnetwork (RO2).</p> <p>-Sentiment analysis is used to enhance the SNA by examining the textual content in the dataset and categorizing them in groups/topics, along with classifying them based on expressed sentiments (RO2).</p> <p>The assessment of sentiments could reveal users' perceptions and attitudes to the topics discussed in the content, so sentiment analysis could be used to provide well-rounded view of network structure such as explaining the formation of homophily clustering (RO1).</p>
Interview		/	/		<p>-Interview: it can be used to gain qualitative information on users' perception of the infodemic and its impacts such as impacts on trust in COVID-19 responses, along with their perception on disinformation responses. The acquired information could contribute to understanding on user engagement with disinformation (RO2).</p> <p>Interviewing with the intermediaries (of content) could reveal their perception of the infodemic, their roles in tackling the problem, and their policy concerning the problem which in turn</p>

Methods	RO1	RO2	RO3	RO4	Applicability
					help shape the information ecosystem as a whole. The acquired information could contribute to RO3.
Documentary research			/		- Document research into news, policy documents, and other documents relating to COVID-19 infodemic responses from various countries where different policies/responses are implemented could contribute to RO4.

2. Social media data collection

The scope of the social media data collection is from two of the most popular platforms in Thailand⁴¹ (Facebook and Twitter), and as this study seeks to explore social media data which consist mainly of textual data, data mining and text mining (covering text classification) are used for data collection. Overall, Twitter data⁴² and Facebook data⁴³ can be accessed through application programming interfaces (APIs), but with certain limitation, particularly data access for public data only, so this study focuses on only public data. Social listening tools, namely Meta’s CrowdTangle (Facebook-owned tool) and Twitter API for Academic Research⁴⁴ are used to fetch data from the two platforms during a span of 19 months (starting from 31 December 2019 to July 2021) which will cover three surging waves of COVID-19 pandemic in Thailand.

Both tools track similar data metrics on public content. CrowdTangle, in brief, tracks public content from influential Pages, Verified accounts⁴⁵, and Groups—private accounts/groups are excluded. Not all Pages, Verified accounts, and Groups are being tracked. There is an algorithmic calculation criteria for how the platform tracks

⁴¹ According to the Electronic Transactions Development Agency (ETDA) Thailand’s report—Thailand Internet User Behavior 2020, Facebook (ranked first) and Twitter (ranked fifth) were ranked among top five popular social media platforms in Thailand (ETDA, 2021).

⁴² Twitter data refer to “tweets” which contain two main components: the content (textual data) and metadata which include entities (i.e. the information embedded in a tweet which are about a user being mentioned, hashtag, and link), and places (geographical locations). Twitter allows data access only for public data (Russell & Klassen, 2019).

⁴³ Facebook data refer to only public posts from public groups and pages due to the platform’s privacy and security protocol (Russell & Klassen, 2019).

⁴⁴ <https://developer.twitter.com/en/products/twitter-api/academic-research>

⁴⁵ Facebook verified accounts refers to accounts that has been confirmed (given a badge) by Facebook that the accounts represent who they say they do (Meta, 2021a).

accounts, and the calculation is constantly updated on a monthly basis. For instance, the chance of a Facebook Page with 25,000 Likes or Followers and more to be tracked is around 99% whereas the chance that a Page with less than 500 Likes/Followers to be included is around 2%. But a particular Page or Group can be manually added if needed. Tracked data metrics include interactions (also known as engagements)—total number of reactions (i.e. Like, Heart, Sad, Angry, Haha, Wow, or Care), comments, and shares, along with number of (3-second native) video views⁴⁶, and Page's Likes or Group's size. Due to technical limitation of the tool, this study focuses only on Facebook standalone posts, not dialogues/exchanges between users in the comments (Fraser, 2021). Similarly, Twitter API tracks only public data and its data metrics include text messages/tweets, engagement data (i.e. number of Likes, Retweets, Reply, and Quotes), and Twitter account's followers and followings. In essence, account IDs (e.g., names of Pages, Groups, and accounts), posts' content and engagement, and number of Likes/followers will be included in the data metrics.

Fact-checked keywords, generated by analyzing data (within the time frame) derived from selected fact-checkers, are required to fetch Facebook posts and tweets containing COVID-19 information pollution. Based on the researcher's preliminary exploration of fact-checking bodies operating in Thailand, three different fact-checkers are selected namely Anti-Fake News Center Thailand (AFNC Thailand, run by Ministry of Digital Economy and Society), AFP Fact-Check ประเทศไทย (AFP Thailand), and อ้อ มันเป็นอย่างนี้เอง by อาจารย์เจษฎ์ (OhISeebyAjarnJess—a Facebook page run by a local scientist and university lecturer who rose to national fame particularly in social media through his role in fact-checking and investigating with scientific evidence and verification) as they provide clear-cut text-based archives compared to others such as Cofact (using crowdsourcing approach) and SureAndShare (using non-text based approach—video content).

⁴⁶ Video views here refers to a count of native video views lasting for at least three second.

The execution of data fetching is twofold (see Figure 4). First, fact-checked data are fetched, using CrowdTangle, from the selected archives⁴⁷ within the 19-month time frame. The data have to undergo a labeling/tagging process to filter out noise. Because original posts containing false/misleading information are shown as screenshots, the dataset also needs to be further processed manually—manually perform word tokenization (separating sentences into words) in order to extract keywords. Keywords are extracted in accord with the main ideas of the verdicts rendered by the fact-checkers (see Table 4 for some examples). Then the acquired keywords are prepared (e.g., grouping spelling variants of a term together) and processed (e.g., converting uppercase text to lowercase and separating text into tokens/chunks) to create keyword sets to suit CrowdTangle’s requirements. For example, in the web-based platform, a space is used to combine a group of spelling variants to denote “OR” (e.g., “covid covic covit” refers to “covid OR covic OR covit”), and a comma (,) is used as “AND” to combine keywords to narrow down the data fetching results.

The second batch of data fetching is done using the prepared keyword sets. The acquired dataset then undergoes filtering, topic labeling, and sentiment analysis processes before starting network mapping process or preparing data for conducting social network analysis. (see details about content analysis and sentiment analysis below)



⁴⁷ Because the Anti-Fake News Center Thailand’s Facebook data did not exactly match its website (i.e. some Facebook posts did not appear in its website and vice versa), its fact-checked corpus is derived from both website and Facebook archives.

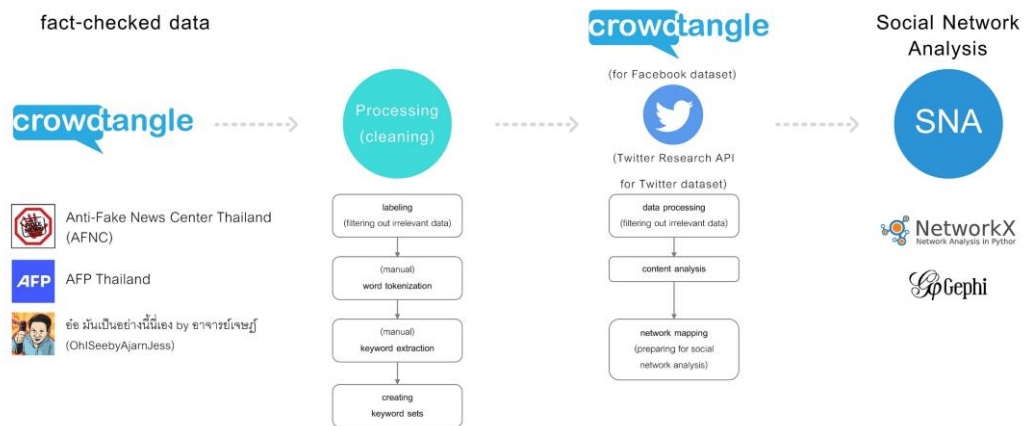


Figure 4 Data fetching process

Table 4

Examples of the extraction of keywords from the selected fact-checked corpus

Fact-checkers	Keywords										URL
	1	2	3	4	5	6	7	8	9	10	
AFNC Thailand	covid	แผ่น	ห้อยคอ	ป้องกัน	#covid19						link ⁴⁸
AFNC Thailand	โควิด	ราชินี	ทรงพระประชวร	อนุทิน	เตรียม	วัดจีน	pfizer	ด่วน			link ⁴⁹
AFNC Thailand	โควิด	เฟส 3	ไทย	#COVID2019	#โควิด19						link ⁵⁰
AFNC Thailand	covid	ห้าม	advil	ibuprofen	ออกฤทธิ์มาก	10 เท่า					link ⁵¹
AFNC Thailand	covid	ล็อกดาวน์ตัวเอง	แพทย์	ขอความร่วมมือ	ด่วน						link ⁵²
AFNC Thailand	covid	เรือเวสเตอร์ดัม	คัดกรองผู้โดยสาร	จากทรมแปญเข้าไทย	ไม่ได้รับการประสาน	เจ้าหน้าที่กระทรวงสาธารณสุข	#การบินไทย	#เรือเวสเตอร์ดัม	#covid19		link ⁵³
AFNC Thailand	covid	จีน	หน้ากากให้ไทย	รัฐบาลไทย	ขยายต่อ	#covid19					link ⁵⁴
AFNC Thailand	โควิด	กรมการแพทย์	ปรับลด	ระยะกักตัวเหลือ 5 วัน	#โควิด						link ⁵⁵

⁴⁸ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/192672145500300>

⁴⁹ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/507603764007135>

⁵⁰ <https://www.facebook.com/AntiFakeNewsCenter/posts/195502318550616/>

⁵¹ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/220157226085125>

⁵² <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/406008094166703>

⁵³ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/178458456921669>

⁵⁴ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/206245710809610>

⁵⁵ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/542419357192242>

AFNC Thailand	วัคซีน	จีนโนแวก	ฉีด	เจ้าหญิงนิทรา				link ⁵⁶
AFNC Thailand	covid	ศิริราช พยาบาล	วิธีฆ่าไวรัส	ด้วยตนเอง	คนบตี	คณะ แพทยศาสตร์		link ⁵⁷
อ้อ...อ. เจษฎ์	covid	charles lieber	ผลิต	จำหน่าย	จีน	มหาวิทยาลัย	ฮาวาร์ด	link ⁵⁸
อ้อ...อ. เจษฎ์	covid	bonnie henry	สาธารณสุข	ระบาดวิทยา	ภูมิปัญญา			link ⁵⁹
อ้อ...อ. เจษฎ์	โควิด	น้ำมันชอย						link ⁶⁰
อ้อ...อ. เจษฎ์	covid	จิบน้ำ	ประจำ	แพทย์	ชาวญี่ปุ่น	รักษา		link ⁶¹
อ้อ...อ. เจษฎ์	covid	วัคซีน	อวัยวะเพศ	แพทย์	ฉีด			link ⁶²
อ้อ...อ. เจษฎ์	covid	รักษา	ใบมะละกอ					link ⁶³
อ้อ...อ. เจษฎ์	covid	mike	yeadon	pfizer	วัคซีน	ฉีด		link ⁶⁴
อ้อ...อ. เจษฎ์	covid	แพทย์หญิง	เอาชนะ	ติด	กิน	ซูปโก		link ⁶⁵
อ้อ...อ. เจษฎ์	covid	ป้องกัน	สมุนไพร	กระทรวง สาธารณสุข	เพิ่มภูมิ ต้านทาน			link ⁶⁶
อ้อ...อ. เจษฎ์	covid	ฟ้าทะลาย โจร	สารแอนโด รกรา ไฟไลด์	ยับยั้ง	สร.			link ⁶⁷
AFP	โควิด	5g	bill gates	วัคซีน				link ⁶⁸
AFP	covid- 19	สัญญาณ	อาการ	วันต่อวัน				link ⁶⁹
AFP	โควิด	ต้าน	ฟ้าทะลาย โจร	กระทรวง สาธารณสุข	ยืนยัน			link ⁷⁰

⁵⁶ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/520111402756371>

⁵⁷ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/213567863410728>

⁵⁸ <https://www.facebook.com/219186678564393/posts/855632581586463>

⁵⁹ <https://www.facebook.com/OhISeebyAjarnJess/photos/pcb.1138457506637301/1138457423303976/>

⁶⁰ <https://www.facebook.com/219186678564393/posts/1138576619958723>

⁶¹ <https://www.facebook.com/219186678564393/posts/822155961600792>

⁶² <https://www.facebook.com/219186678564393/posts/1070458810103838>

⁶³ <https://www.facebook.com/219186678564393/posts/839760469840341>

⁶⁴ <https://www.facebook.com/219186678564393/posts/1132682093881509>

⁶⁵ <https://www.facebook.com/219186678564393/posts/847926529023735>

⁶⁶ <https://www.facebook.com/219186678564393/posts/846556172494104>

⁶⁷ <https://www.facebook.com/219186678564393/posts/1133366783813040>

⁶⁸ <https://factcheckthailand.afp.com/clip-german-tv-programme-circulates-misleading-posts-about-coronavirus-vaccines-and-bill-gates-th>

⁶⁹ <https://factcheckthailand.afp.com/advisory-covid-19-from-Singapore-MOH-th>

⁷⁰ <https://factcheckthailand.afp.com/old-video-shared-alongside-claim-green-chiretta-can-protect-covid-19-th>

AFP	covid-19	โรคระบาด ทุก	100 ปี				link ⁷¹
AFP	วัคซีน	dna	เปลี่ยน				link ⁷²
AFP	covid	ดื่ม	น้ำร้อน	น้ำอุ่น	เวียดนาม	เศรษฐกิจ	link ⁷³
AFP	โควิด	ต้าน	กระท่อม				link ⁷⁴
AFP	โควิด	รักษา	กัญชา	ภูมิคุ้มกัน			link ⁷⁵
AFP	วัคซีน	coronavirus	ยาชา	ห้าม			link ⁷⁶
AFP	covid	5g	แบคทีเรีย	who	ชั้นสูตร	ศพ	link ⁷⁷

Note. Tabel 4 only displays keywords and URLs of 30 entries out of a total of 2,901 (other data metrics such as Page Likes, date, timestamp, interactions etc. are filtered out) to exemplify the keyword extraction.

3. Content analysis

In order to fulfil RO1 and RO2, it is necessary to identify prominent types of information pollution circulated in the Thai online sphere. Content analysis is undertaken to identify and categorize disinformation into different themes based on the corpus derived from the selected fact-checkers, and the tallying is also done to identify significant terms and themes.

Overall, content analysis is used in the two phases of data fetching: the initial phase dealing with the fact-checked archives and the second phase dealing with the actual social media dataset. The category is formed by adapting common themes of COVID-19 disinformation that have been identified in previous literature (Brennen et al., 2020; Posetti & Bontcheva, 2020) to the aforementioned fact-checked corpus (see Table 5). In the second phase, social media text messages undergo word tokenization, frequency measuring of keywords, and content categorizing processes. That is, text

⁷¹

<https://factcheckthailand.afp.com/phuuechiywchaaydaansukhphaaphptiesthkhmklaawaangplmthiirabuwaaoorkhbaadccaekidkhuenthuk-100-pii>

⁷² <https://factcheckthailand.afp.com/vaccines-dont-change-your-dna-th>

⁷³ <https://factcheckthailand.afp.com/false-claim-circulates-online-that-drinking-water-every-10-minutes-can-help-prevent-covid-19-infections-th>

⁷⁴ <https://factcheckthailand.afp.com/social-media-posts-share-misleading-claim-traditional-herb-prevents-covid-19-th>

⁷⁵ <https://factcheckthailand.afp.com/smoking-marijuana-cannot-protect-against-covid19-th>

⁷⁶ <https://factcheckthailand.afp.com/false-posts-circulate-thailand-about-use-anaesthesia-after-covid-19-vaccination-th>

⁷⁷ <https://factcheckthailand.afp.com/thai-social-media-users-share-debunked-coronavirus-myths-th>

messages will be separated into chunks, and keywords will be extracted to map onto the initial corpus. Computer programs particularly Python with relating Natural Language Processing packages such as PyThai⁷⁸ and Microsoft Excel will be used in the processes. The analysis will be summarized and narrated in accordance with the research objectives, and the results will be presented in tables and graphs.

Table 5

Themes of COVID-19 information pollution

Themes	Examples from fact-checked dataset (translation in square brackets)
1. origins and spread of the virus (i.e., content about the origins/causes of the virus and/or content about the spread of the virus in certain areas or communities without statistics; content blaming actors/causes)	-“...COVID-19...ไม่ใช่ไวรัส แต่เป็นแบคทีเรียที่สัมผัสกับรังสี 5G...” ⁷⁹ [COVID-19 is caused by bacteria and spread by 5G] -“ไวรัสโคโรน่าลงเบตงเหตุนักท่องเที่ยวจีนชุก” [coronavirus spread in Betong (Thailand) as Chinese tourists swarm]
2. false and misleading statistics	-“...สมุทรปราการอันตราย...ติดเชื้อCovid-19...รักษาตัว...1 คน” ⁸⁰ [Samut Prakan is dangerous...one infected cases]
3. economic impacts	“...หลายๆบริษัทปิดตัว พนักงานตกงานกันเต็มเลย ถึงกับต้องมานั่งรออาหารจากคนที่ใจดี...” ⁸¹ [several companies have closed, employees are laid off...lining up for free food]
4. vaccines	“เปิดจองวัคซีนล็อตพิเศษสุด VIP...” ⁸² [open vaccine booking, special lot, for VIP]
5. medical information (e.g., symptoms, diagnosis, treatment, and recommendations)	“กัญชา...เคลือบ...ปอดทำให้เชื้อไวรัสโควิด-19 ไม่สามารถฝังตัวได้” ⁸³ [cannabis...coats...lungs, so COVID-19 virus cannot damage our lungs]
6. impacts on society and the environment	“พยาบาลศิริราช...บอกว่า...ทุนของไว้...จะมีการปิดเมืองแล้ว...” ⁸⁴ [Siriraj’s nurse...said...we should stock up...cities will be in lockdown...]

⁷⁸ <https://github.com/PyThaiNLP/pythainlp>

⁷⁹ <https://factcheckthailand.afp.com/thai-social-media-users-share-debunked-coronavirus-myths-th>

⁸⁰ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/192925198808328>

⁸¹ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/539260360841475>

⁸² <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/473603427407169>

⁸³ <https://www.facebook.com/219186678564393/posts/842558276227227>

⁸⁴ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/199624524805062>

7. public responses and politicization	“พรกฉุกเฉิน...ห้ามใช้อินเทอร์เน็ตว่าร้ายรัฐบาล...” ⁸⁵ [the emergency decree prohibits the use of internet to criticize the government]
8. content driven by fraudulent financial gain (+trying to steal personal information)	“ทำตามนี้ 5,000 บาทเข้าแน่นอน www.เราไม่ทิ้งกันhttp://xn--q3c.com/...โทร 1111 ได้เงินทันที” ⁸⁶ [follow this to get 5,000 THB...www.เราไม่ทิ้งกันhttp://xn--q3c.com/...call 1111 to get money immediately]
9. celebrities/prominent figures	“ราชินีฯ...ทรงพระประชวรด้วยโรคโควิด-19...” ⁸⁷ [the queen has been sick with COVID-19]
10. others (e.g., foreign affair)	“อิตาลีฝังศพที่ติดโรคโควิด-19 นับพันศพในสภาพนี้...” ⁸⁸ [thousands of COVID-19 infected bodies were buried like this in Italy]

4. Sentiment analysis

The objective of using sentiment analysis is to address the methodological limitation of the SNA in which the relations between nodes are depicted without analyzing the content. SNA is used primarily to study how nodes in a network connect or how information flows through a social network, but it does not delve into the content. It cannot differentiate whether a person shares a message expressing opposition or not. Therefore, the assessment of sentiments could reveal users' perceptions and attitudes to the topics discussed in the content.

Here, the process is semi-automated. The National Electronics and Computer Technology Center's (NECTEC) S-Sense, a sentiment analysis solution using machine learning approach, is used to perform automated initial sentiment analysis, and the results are then manually fine-tuned by the researcher. NECTEC, a research and development center emphasizing electronics and computer technologies run by the Ministry of Science and Technology, provides AI for THAI platform with a machine learning-based sentiment analysis solution embedded in the platform. The solution performs a tokenization process (a process of separating sentences into chunks of words). It then uses its machine learning model to evaluate text-based input according

⁸⁵ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/210685400365641>

⁸⁶ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/220858492681665>

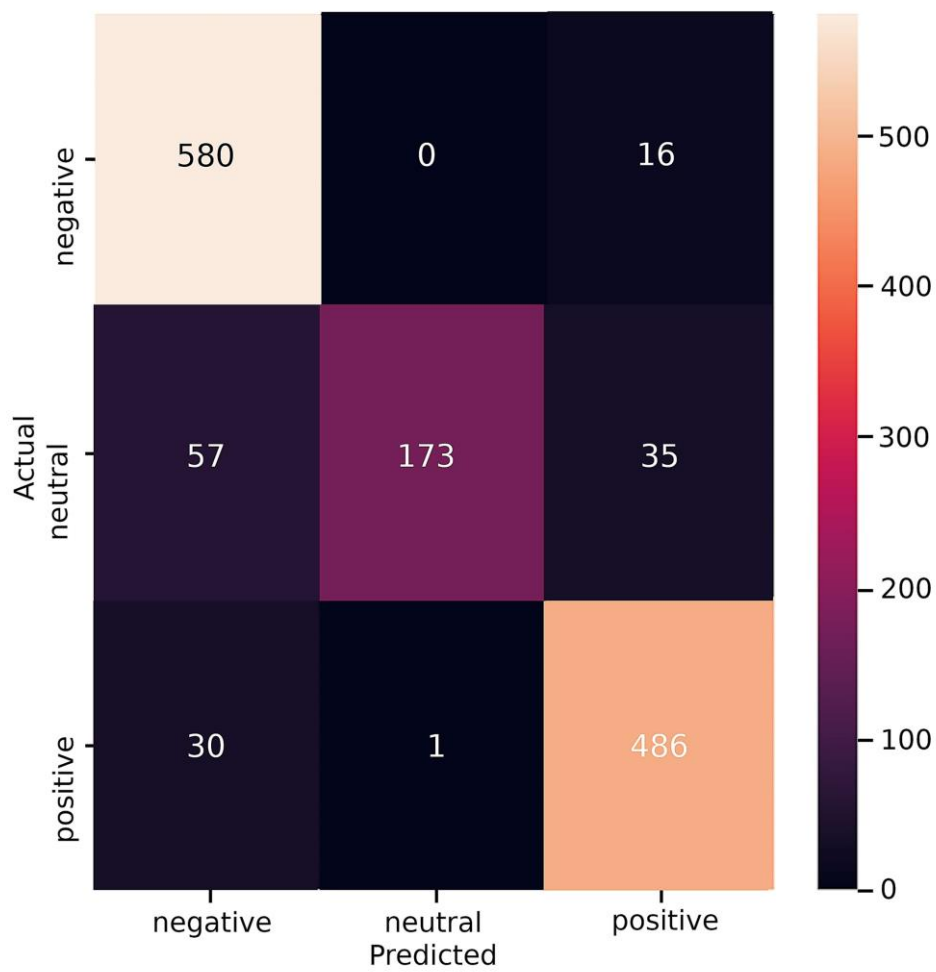
⁸⁷ <https://www.facebook.com/AntiFakeNewsCenter/photos/a.113638500070332/507603764007135>

⁸⁸ <https://factcheckthailand.afp.com/khlipniiepnaakcchaakchiiriyothrthasnhrathemrikaerueng-pandemic-chuengerimchaayainpii-2550>

to its corpus derived from actual Thai language use in social media, giving the result as negative, neutral, and positive (NECTEC, 2016; 2019a; 2019b). Natural language use concerning COVID-19 on social media could involve complex expressions such as sarcasm and unusual denotations of words (e.g., “หาย” usually means missing or lost [negative sentiment], but in the context of COVID-19, it could mean recovery [positive sentiment]), so the model could misread the input. The results are double-checked and adjusted based on the denotative tone of the text.

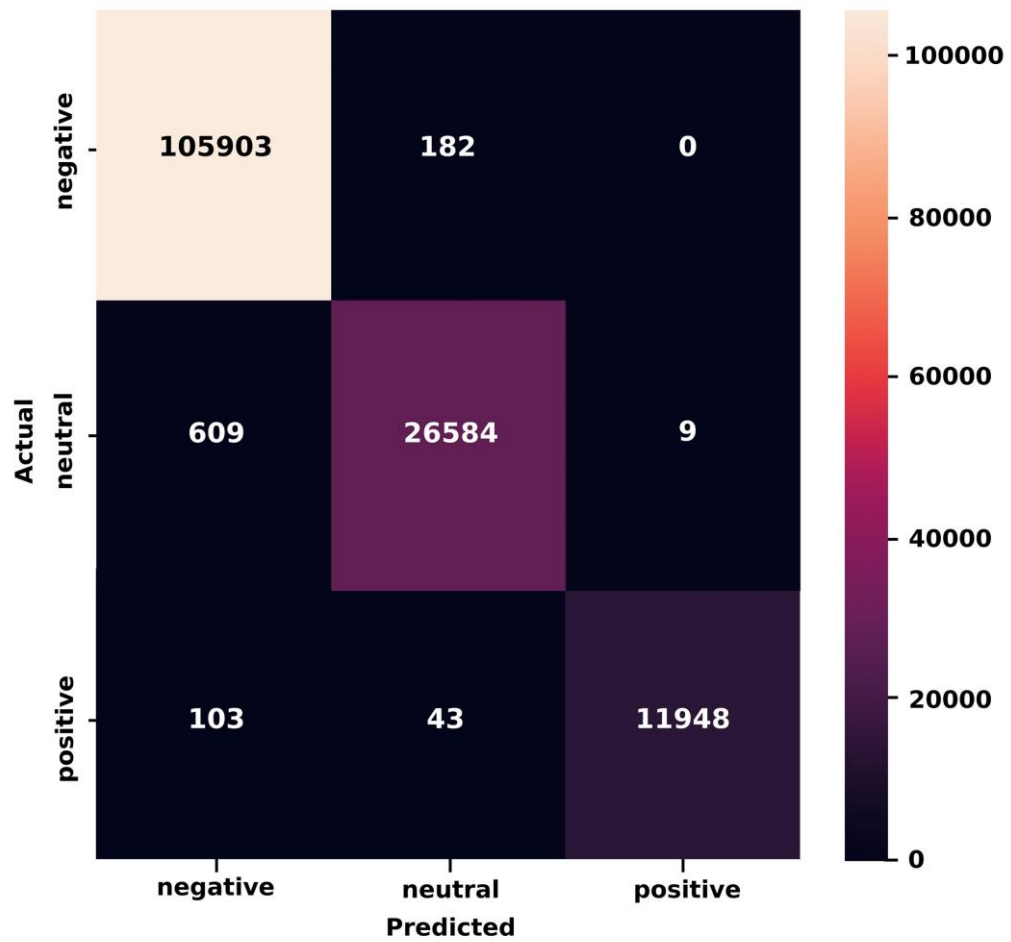
Next, the results are processed and transformed into a supervised machine learning-based text classification model⁸⁹ to evaluate its accuracy. In other words, the pre-labeled data derived from the S-Sence results are used to train the algorithm (using Python’s Scikit-learn machine learning library, also known as sklearn, that can perform text classification) to learn to classify the text-based input into three categories: negative, neutral, and positive. Then the performance of classifying is assessed against the actual Facebook and Twitter datasets based on standard metrics used to measure a model’s prediction performance: Accuracy (the calculation of “the overall accuracy or proportion of correct predictions”), Precision (“the number of predictions made that are actually correct”), Recall (“the number of instances of the positive class that are correctly predicted” when the classifier successfully evaluates a sample as positive and the evaluation matches the actual pre-labeled positive data entry), and F1 score (an accuracy measure that is calculated by taking the harmonic mean of the precision and recall”) (Igual & Seguí, 2017; Sarkar, 2016). The overall accuracy rate for model evaluation is 0.90 (90%) for the Facebook dataset (see Figure 5) and 0.99 (99%) for the Twitter dataset (see Figure 6).

⁸⁹ Text classification is one of the common supervised approaches—approaches to categorize text into predefined categories based on given examples—used to perform sentiment analysis (Ignatow & Mihalcea, 2018, pp. 171-186).



	precision	recall	f1-score	support
negative	0.87	0.97	0.92	596
neutral	0.99	0.65	0.79	265
positive	0.91	0.94	0.92	517
accuracy			0.90	1378
macro avg	0.92	0.86	0.88	1378
weighted avg	0.91	0.90	0.89	1378

Figure 5 Model evaluation of the sentiment analysis of the Facebook dataset



	precision	recall	f1-score	support
negative	0.99	1.00	1.00	106085
neutral	0.99	0.98	0.98	27202
positive	1.00	0.99	0.99	12094
accuracy			0.99	145381
macro avg	0.99	0.99	0.99	145381
weighted avg	0.99	0.99	0.99	145381

Figure 6 Model evaluation of the sentiment analysis of the Twitter dataset

5. Social network analysis (SNA)

To pursue the RO1 and RO2, social network analysis (SNA) will be carried out. A social network can be viewed as a structure facilitating social interactions among network members, thus enabling information diffusion. For this reason, SNA is employed to study the dynamics of COVID-19 infodemic and identify key players that perpetuate the problem.

To perform SNA, the dataset needs preparation for network mapping tools. Nodes require labeling (node ID), and relationships need to be identified as well—relations between the sources and targets within the dataset are a prerequisite for network mapping. Tools for network analysis and visualization such as Gephi and NetworkX (a Python package) will be used. This study examines networks of information diffusion, so for network visualization, a node represents a Facebook account/group or Twitter account involved in the networks, and a link refers to how a piece of information flow within the networks.

In the big picture, SNA is used to examine network structures—to see whether they depicts notable clusters, substructures/subgraphs such as segregated substructures which imply the disposition of echo chamber, or cross-cutting communication pattern (no echo chamber). Community detection methods such as modularity⁹⁰ and bridge removal⁹¹ will be used to detect communities or clustering patterns. Basically, structures of the networks will be examined in order to identify a division or communities/clusters (community-like subnetwork) (if any), which will, in turn, reflect how information flows. In addition, key actors in the networks will be examined, along with assortativity⁹² or their common properties. For instance, centrality measures can be calculated to identify influential nodes, otherwise known as hubs (i.e. nodes with high degree value or high number of links) and/or bridges (nodes with crossing

⁹⁰ Modularity, in a nutshell, is an approach to detect the manifestation of clustering (also known as community) by measuring the difference between the density of links within clusters against an expected baseline (based on mathematic calculation) (Scott & Carrington, 2014).

⁹¹ The idea of bridge removal is to detect the “bridges” or nodes with high degree value and remove them, so the clusters/communities will be disconnected and manifested (Menczer, Fortunato, & Davis, 2020).

⁹² Assortativity network refers to a network that contains nodes having similar properties/features (e.g., a network of friends having similar interests)

connections between clusters). Degree assortativity can be measured to examine how nodes' properties/features play a role in network structures. Relevant literature shows that if high degree nodes flock together, a network will have a core-periphery structure (also known as assortative network). In contrast, if the relations are mixed between high and low degree nodes, the network is disassortative. That is, measuring the assortativity of a network could reflect homophily (Menczer, Fortunato, & Davis, 2020).

To sum up, the networks of social media COVID-19 infodemic will be visualized to analyze the manifest spread patterns at macro level and identify nodes' roles in terms of information diffusion. In other words, network visualization will be created to depict the structures of relationships within networks that enable information diffusion, along with influential nodes within the networks. In the visualization, names of the nodes will be excluded to avoid risk associated with identification of those involved in the network, and in the discussion of findings about the influential nodes, descriptions of nodes (e.g., news media accounts, public figures, or news (Facebook) groups) will be given instead of node names.

6. Human subjects protection for social media users

Overall, to diminish risk involved with relevant users in the dataset, no screenshots of posts and IDs of Facebook Pages, Verified accounts, Groups, and Twitter accounts will be shown.

For content analysis, the objective is to observe the manifest types of information pollution, there is no need to display the names of accounts/Pages/Groups. This means that the results will be presented in tabular and/or graph forms, and the inference from the analysis will be summarized and narrated in accord with the research objectives.

Sentiment analysis is used to perform content analysis to categorize posts into groups based on the manifest sentiments. In order to reduce potential risk involved with relevant users, the results will be presented in graph form showing the overview of sentiments rather than showing sentiments attached to each individual account.

The results of SNA will be presented in the form of network visualization, and the relating findings will be presented in tabular and/or chart forms, along with

narration. To avoid risk relating to relevant users, no screenshots of posts and IDs of accounts/Pages/Groups will be displayed.

7. Interview

To provide qualitative explanation of user engagement with disinformation, interview is used to collect information on users' perception of the infodemic and its impacts such as impacts on trust in COVID-19 responses, along with their perception on disinformation responses. Social media use seems to be an important variable concerning the infodemic as social media is known to be polluted with disinformation. Annual survey on Thailand Internet User Behavior (2020) points out that social media has been ranked number one among top ten online activities for eight consecutive years and the degree of internet use varies from generation to generation. Facebook was ranked among top three popular sources of online information, and to the majority of the respondents (94.7%), online fake news is apparent in Thai context (ETDA, 2021). Given these points, there is a tendency that heavy social media users would be likely to be more exposed to disinformation, leading to a possibility of having different perception and experience with COVID-19 infodemic than medium and light users.

Convenience sampling technique is used to collect information from social media users from three different generations: X, Y, Z⁹³ (10 for each generation, making a total of 30). To ensure an ethical safeguard for the minors aged under 18, Gen Z group covers only samples aged 18 and over. Without those aged under 18, the collected information still represents the three generations, and the research objective to gain social media users' perception of the problem as well as its impacts and responses can still be met. The participants are expected to be Facebook and/or Twitter users who voluntarily enroll in the study, so social media recruitment is used to attract potential candidates. A public Facebook post embedded with recruiting material—poster with QR code for preliminary online survey asking about age, experience with social media, willingness to participate, and email (for contacting potential participants), will be made by the researcher to function as a passive

⁹³ Gen X refers to a person born between 1965 and 1979; Gen Y refers to a person born between 1980 and 1994; Gen Z refers to a person born between 1995 and 2009 (McCordle, 2011).

recruitment, and will be distributed to universities' social media channels such as student or staff groups because the EDTA's statistics show that students had been ranked number one two years in a row (2019-2020) in terms of internet use (ETDA, 2021). In addition, a Facebook ad⁹⁴ will also be used for recruiting in order to extend the reach to potential participants.

Then, the candidates are categorized into groups based on information derived from the preliminary survey. An interview consists of questions on social media use⁹⁵ focusing on the frequency of social media access, time spent on the platforms, and their attitude towards the platforms, along with a set of questions on perception and experience with the problem as well as the responses. The acquired information could contribute to RO2. (See Appendix 1 for samples of interview questions)

Key informant interview is used to collect information and develop in-depth understanding about how content providers operating in the selected social media platforms as they, to certain extent, function as intermediaries of content who in turn help shape the information ecosystem as a whole. Purposive sampling technique is used to select samples (two representatives from each type) from government bodies (websites/social media accounts), news media (websites/social media accounts/traditional media⁹⁶), civil society organizations/institutions, and social media influencers. (See Appendices for samples of interview questions). Government bodies such as the Anti-Fake News Center Thailand, Center for COVID-19 Situation Administration (CCSA) and the Thai Health Promotion Foundation, news media such as ข่าวสด, ข่าวจริงประเทศไทย, civil society organizations such as Cofact and Hfocus, and social media influencers such as หมอแล็บแพนด้า, อ้อ มันเป็นอย่างนี้เอง by อาจารย์เจษฎ์, หมอเวร, and Dr.Review are cases in point. The key informants will be initially contacted via available contact information provided in their websites and social media accounts.

⁹⁴ Facebook has ad targeting which allows campaigner to specifically set target audience, for example, using age, location, language, and interest as criteria (Meta, 2021a). The post will be boosted using daily budget plan to run within a certain time period until the number of potential participants is adequate.

⁹⁵ The questions are adapted from Facebook Intensity Scale (Ellison, Steinfield, & Lampe, 2007).

⁹⁶ It is common for traditional media content such as TV news to be digitalized and publicized via websites or social media.

They will be given a brief on this research and asked whether they will be willing to participate or not. Then, those who are willing to participate will be contacted to schedule a convenient time for the interview.

Because of the pandemic, online interviews are carried out via online communication platforms. The interviews are recorded in digital formats and transcribed for analysis. Overall, the transcript is analyzed based on the theoretical frameworks discussed in Chapter 2. The acquired information is analyzed and categorized into groups based on the interview questions. When a direct quotation is used in narrating the analysis, pseudonym such as [Gen Z interviewee1 or news media1] are used instead of the interviewees' real names.

7.1 Participant information, consent, and retention of interview data

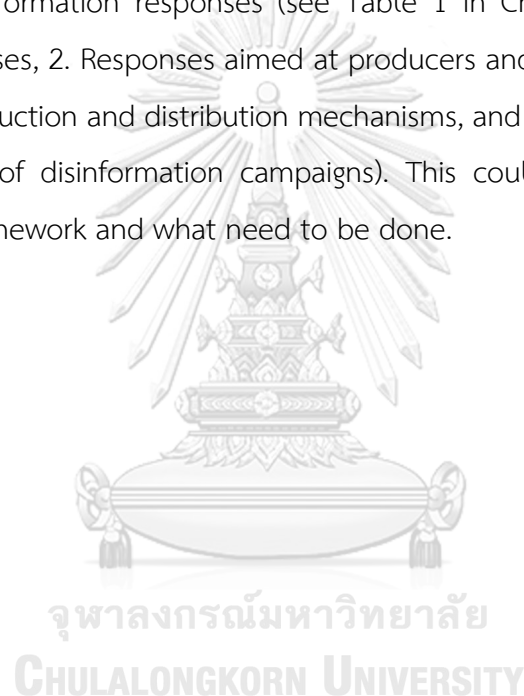
Participants are given a clear brief on the research, and are freely allow to withdraw their consent to participate in the research at any time. If a participant wishes to be withdrawn from the study, their collected information (if any) is not used in the study. In this case, an additional participant is recruited as a replacement. It may be the case that a participant feels uncomfortable answering some questions, they can skip them, and if the questions do not relate to the main research questions and objectives, a replacement is not recruited. However, if a participant feels uncomfortable answering some important questions and wants to be withdrawn, a replacement is recruited unless those who have withdrawn are additional participants. The same recruiting approach is used. Similarly, if a participant manages to answer some or all the questions but the answers inadequately meet the research questions and objectives, a replacement is recruited.

Interview records are not used beyond this study, and any identifying information derived from interviewing is deleted after the completion of research for five years in order to cover a possibility to defend against a claim about scientific misconduct.

8. Documentary research

To achieve RO3, documentary research is employed to study policy and legislative measures concerning the intermediaries (or channels of the messages) since their roles in dealing with the problem are affected by their policy and the legal

framework, and attributes of the channels (i.e. algorithmic and policy features of the intermediaries) could affect how the messages are treated both by the intermediaries and users. Documentary research is also conducted to identify the major policy gap that needs to be filled to tackle disinformation in online social media platforms (RO4). This study examines news, policy documents, research reports, academic materials, and other related documents in Thai and different contexts, especially from the contexts where concrete COVID-19 disinfodemic responses are implemented. That is, documents concerning different types of disinformation responses, based on the Typology of disinformation responses (see Table 1 in Chapter 1), are in focus (1. Identifying responses, 2. Responses aimed at producers and distributors, 3. Responses aimed at the production and distribution mechanisms, and 4. Responses aimed at the target audiences of disinformation campaigns). This could reveal shortcomings of current policy framework and what need to be done.



Chapter 4

Results

This chapter reports on the findings of the research. It is organized into five main sections: content analysis, sentiment analysis, social network analysis, in-depth interview, and documentary research.

1. Content analysis

1.1 Common themes of the infodemic

This study adopts the common themes proposed by previous literature, but adjustments have been made to address a different infodemic phenomenon as reflected in the collected datasets.

For the Facebook dataset, the categories of “medical information” and “vaccine” from Table 6 are expanded into two⁹⁷ and seven subcategories respectively. Also, a category of “variety⁹⁸” is added (see also Figure 7 below). The newly added subcategories still carry the main categories’ denotations but with additional meanings. Within the Facebook dataset, fact-checked⁹⁹ and debunking messages account for a total of 29.88% whereas the rest (information pollution) accounts for 70.12%. Likewise, within the Twitter dataset, debunking/fact-checked messages account for 28.68%, while the rest (71.32%) are information pollution (see Table 6).

⁹⁷ The category of “medical information” is expanded into two following subcategories. “medical info_mask” refers to content containing what seems to be medical information about protective masks, and “medical info_test” refers to content containing medical information about COVID-19 test kits. “Vaccine” is expanded into seven subcategories. “vaccine_celebrities” refers to information concerning vaccines and celebrities or prominent figures, “vaccine_conspiracy theory” refers conspiracy theory concerning vaccine, “vaccine_effects” concerns the adverse side effects of COVID-19 vaccines, “vaccine_foreign” refers to content about vaccine in the foreign contexts, “vaccine_medical info” refers to medical information concerning vaccines, “vaccine_phishing” refers to content tricking users into giving away their information and/or tricking users into visiting a certain website, and “vaccine_politics” refers to politicized information concerning vaccines.

⁹⁸ The category “variety” refers to content containing more than one issues, overlapping more than one tags such as CoFact’s report covering ten pieces of COVID-19 fake news.

⁹⁹ Fact-checked messages, here, refer to messages containing information from fact-checkers operating in Thai, namely Anti-Fake News Center Thailand, AFP, ออ มั่นเป็นอย่างนี้เอง by อาจารย์เจษฎ์ (OhlSeebyAjarnJess), ชัวร์ก่อนแชร์ (SureAndShare), and CoFact as well as the key health authorities such as the Ministry of Public Health, the Department of Disease Control, and the Knowledge Center for COVID-19.

Table 6

Analysis of the Facebook and Twitter datasets based on message categories

Category	Facebook	Twitter
information pollution	3,865 (70.12%)	414756 (71.32%)
debunking/fact-checked messages	1,647 (29.88%)	166764 (28.68%)
Total	5,512 (100.00%)	581520 (100.00%)

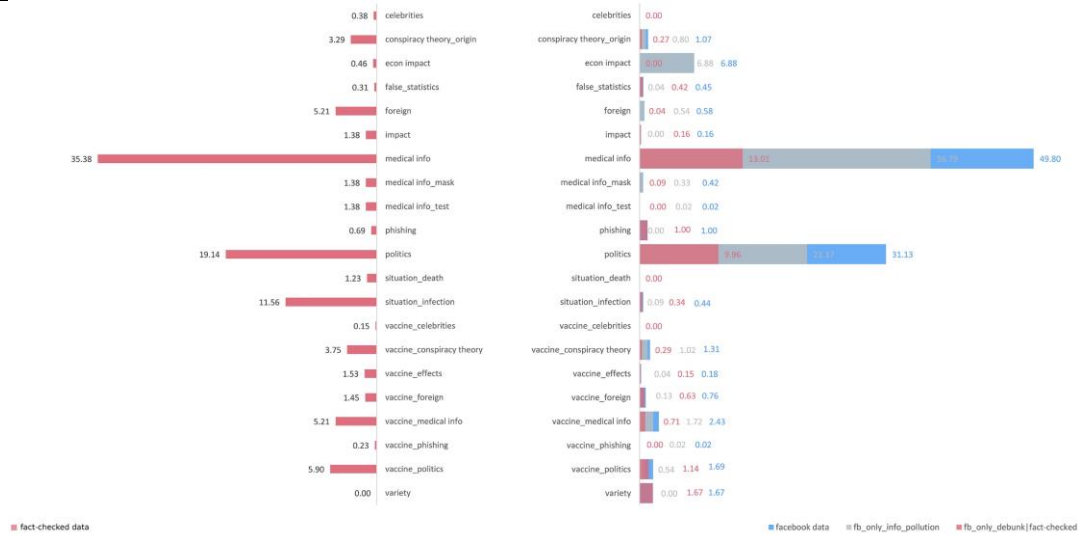


Figure 7 Comparison between the fact-checked and Facebook datasets (in percentage)

Figure 7 compares how the data entries distribute within both fact-checked dataset and the Facebook dataset. Overall, the actual Facebook dataset is broadly similar to the fact-checked dataset with “medical information” and “public responses and politicization” (“politics”) ranked number one and two respectively, except for the third rank. The “situation” (“situation_death” and “situation_infection”) is ranked number three in the fact-checked dataset while “economic impacts” (“econ impact”) holds the third rank in the Facebook dataset. The rest are sparsely populated. The actual Facebook data entries without debunking/fact-checked messages (the “fb_only_info_pollution” color-coded bars) exhibit subtle difference in number of entries not in the ranking.

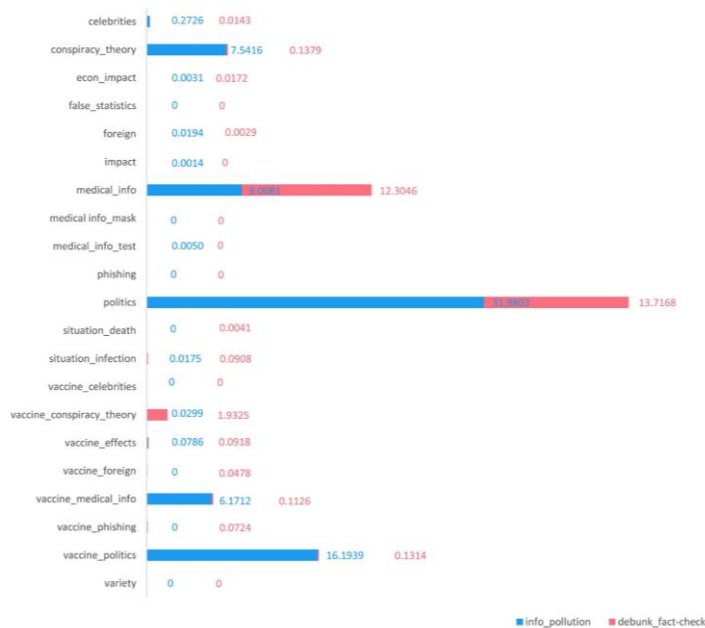


Figure 8 Comparison between the fact-checked messages and information pollution in the Twitter dataset (in percentage)

Figure 8 shows that the distribution pattern of the Twitter dataset differs from that of the fact-checked and Facebook datasets. Unlike the fact-checked and Facebook datasets in which there are three densely populated categories, five categories are standout in the Twitter dataset while the rest are sparsely populated. The “politics” (45.6971%), “medical information” (21.3128%), “vaccine_politics” (16.3253%), “conspiracy_theory” (7.6795%), and “vaccine_medical_info” (6.2839%) rank number one to five respectively in the Twitter dataset. What is interesting here is certain categories are missing in the Twitter dataset: “false_statistics”, “medical_info_mask”, “phishing”, “vaccine_celebrities”, and “variety”. For the Twitter dataset, the former category of “conspiracy_theory_origin” found in the fact-checked and Facebook datasets is altered to “conspiracy_theory” since the data reflect a broader theme than the conspiracy theories concerning only the virus’s origin. This suggests that the dynamics of COVID-19 information pollution differ from one social media platform to another, and in different social media platforms, different topics of COVID-19 disinformation gain public attention at different levels.

Contrary to the debunking/fact-checked messages found in the Facebook dataset, different patterns of debunking/fact-checked messages interestingly emerge

from the Twitter dataset. There are only two categories of debunking/fact-checked messages in the Facebook dataset: debunking (i.e., posts containing debunking messages without evidence) and fact-checked messages (i.e., posts containing debunking messages with evidence or posts from a fact-checker). However, for the Twitter dataset, the debunking/fact-checked messages can be grouped into three distinct themes: “debunk” (i.e., tweets containing debunking messages without evidence), “debunk_3rd_person_effect” (i.e., tweets containing debunking messages reflecting that the tweeter perceives the others to fall under the influence of COVID-19 information pollution), “debunk_satire” (i.e., a satire on a piece of information pollution), and “fact-checked” (i.e., tweets containing debunking messages with evidence or debunking messages from a fact-checker) (see Table 7).

Table 7

Analysis of the debunking/fact-checked messages within the Twitter dataset

Category	Count
debunk	141717 (24.3701%)
debunk_3rd_person_effect	2185 (0.3757%)
debunk_satire	13783 (2.3702%)
fact-checked	9079 (1.5613%)

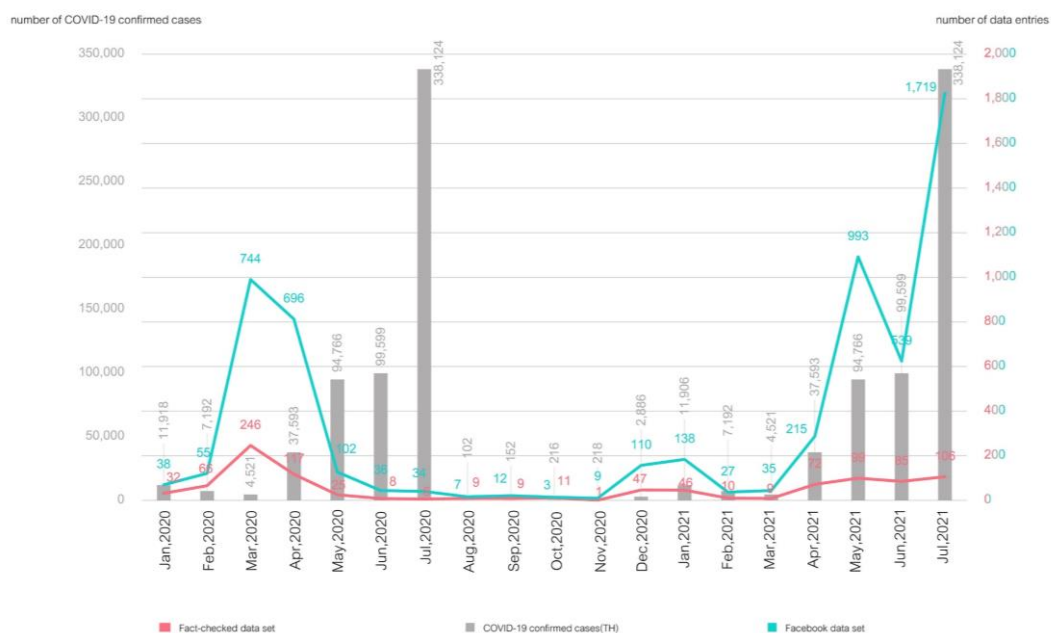


Figure 9 Comparison between COVID-19 confirmed cases and trends in the fact-checked dataset and the Facebook dataset

When mapping the fact-checked and Facebook datasets onto the temporal sequence (see Figure 9), the chart reflects a prevailing trend in 12 out of 19 months (from August 2020 to July 2021), showing that when the number of reports on COVID-19 confirmed cases rose, the number of information pollution increased and vice versa.

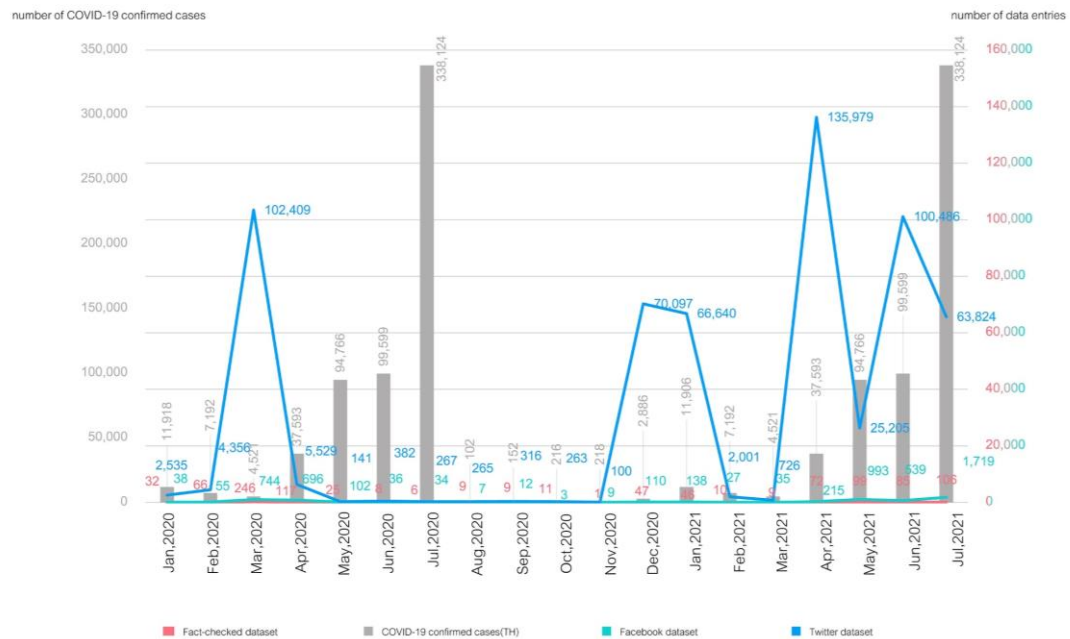


Figure 10 Comparison between COVID-19 confirmed cases and trends in the fact-checked, Facebook, and Twitter infodemic datasets

A roughly similar trend with a slight fluctuation can be seen in Figure 10, in which the Twitter dataset is mapped onto the same temporal sequence. As a study on information disorder suggests that the problem often connects with newly emerging incidents, especially crises, or issues with considerable uncertainty (such as issues that cannot be resolved by existing knowledge base) (Shu et al., 2020), it can be inferred that contextual factors including the pandemic and its responses have a noticeable influence on the dynamics of the infodemic.

1.2 Sentiment analysis

Looking at the assessment of sentiments expressed in the Facebook dataset, sentiment distribution seems to be evenly balanced between positive and negative. However, in detail, there is apparent difference between sentiments expressed in debunking/fact-checked messages and those containing information pollution (see Figure 11). It is largely negative for the former because negative terms are normally used to explain

why the information is considered false or misleading (see Figure 12). For the latter, most of the data entries fall into the “medical information” and “politics” categories in which the majority of them contain persuasive alternative pseudo-scientific claims using positive or neutral tone such as narratives about alternative/herbal remedies, how-to information on COVID-19 diagnosis, and positive information about Thailand’s COVID-19 responses (see Figure 13).

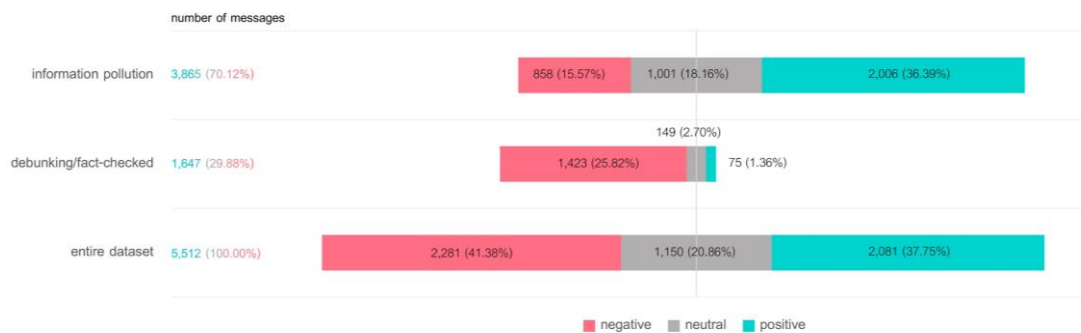


Figure 11 Sentiment analysis of the entire Facebook dataset

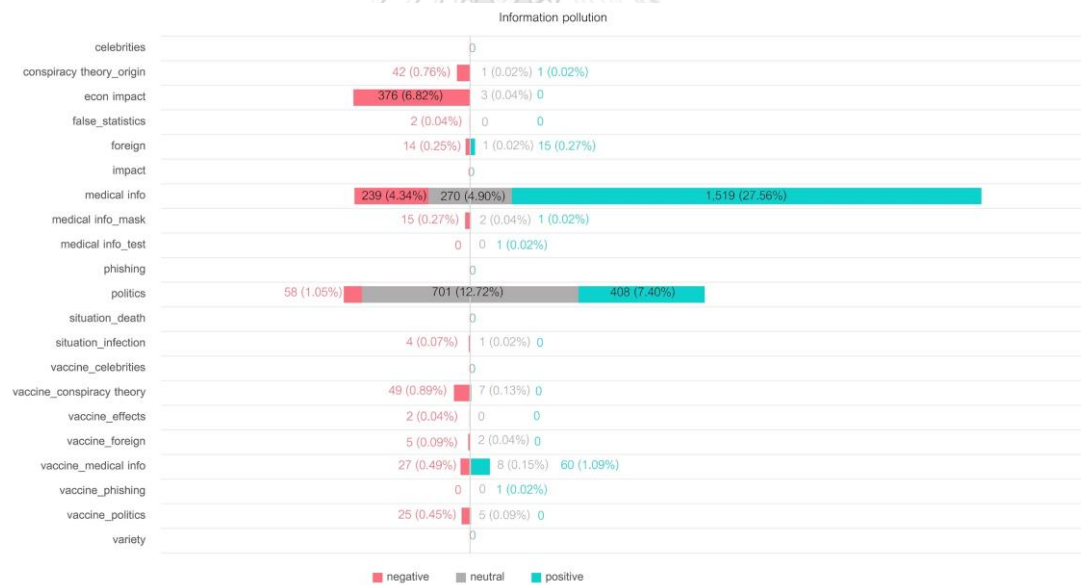


Figure 12 Sentiment analysis of only the information pollution data entries in the Facebook dataset



Figure 13 Sentiment analysis of only the debunking/fact-checked data entries in the Facebook dataset

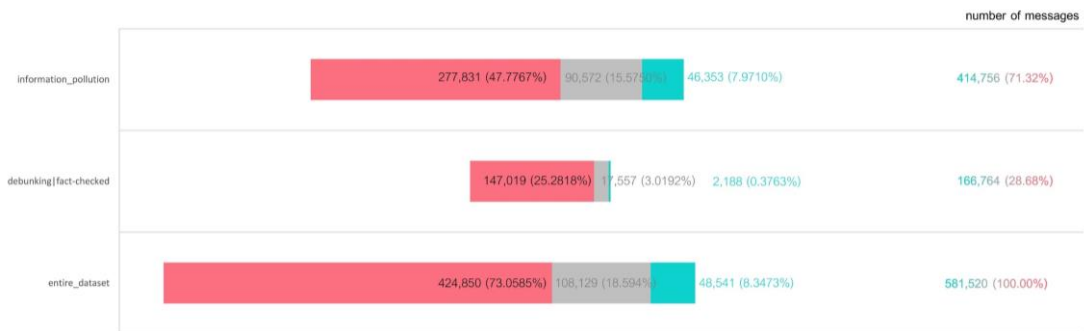


Figure 14 Sentiment analysis of the entire Twitter dataset

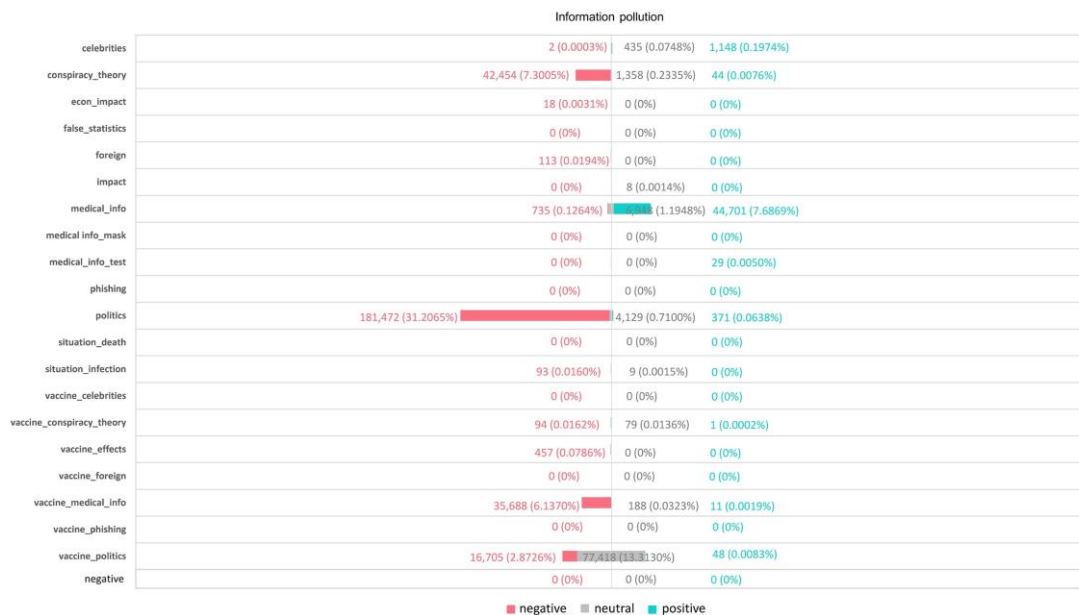


Figure 15 Sentiment analysis of only the information pollution data entries in the Twitter dataset



Figure 16 Sentiment analysis of only the debunking/fact-checked data entries in the Twitter dataset

The sentiment analysis results of the Twitter dataset differ from those of the Facebook dataset. Figure 14 shows a highly unbalanced distribution as both the debunk/fact-checked and information pollution messages are predominantly negative. The most densely populated negative theme is “politics” (see Figures 15 and 16). A false information about news blackout is a case in point (see Figure ปี ด ข าว 1 in

Appendix). A probable explanation for the manifestation of negativity is that there is a tendency for the communication environment where users can preserve their anonymity to encourage hate speech. In other words, in Twitter's absence of a "Real-Name Policy," a requirement for users to use only identifiable usernames, users tend to be openly aggressive, even with hate speech (Mondal et al., 2017; Peddinti et al., 2014). On the one hand, studies point out that social media anonymity could lead to other relating problems such as the use of bots together with anonymous social media accounts to spread disinformation (*A multi-dimensional approach to disinformation: Report of the independent high level group on fake news and online disinformation*, 2018, p. 5; Pollicino & Bietti, 2019, p. 46; Tucker et al., 2018, pp. 4-5, 11-14) or information operation (IO) using COVID-19 disinformation to support the government and attack the dissidents (วงศ์พันธ์ อมรินทร์เทวา, 2022a, 2022b).

However, evidence shows that the anonymity of Twitter has inherent virtue of being a safeguard for free speech in the society where the chilling effect is fairly strong that self-censorship is a norm for the people to avoid being considered a political dissident. This fosters a subculture of anonymous social media communication, e.g., the spread of political messages "from a friend" ("มิตรสหายท่านหนึ่ง"), political satire, and public recognition of anonymous social media influencers (Chainan, 2020; Wantanasombut, 2019). Future studies on the issues of anonymity and disinformation are needed to be explored further in the context of Thailand.

1.3 Social network analysis

From the Facebook dataset, a bipartite directed network graph comprising 2,820 nodes and 3,446 edges is created. There are two types of nodes in the network visualization: Facebook accounts (Facebook Pages, Verified Accounts, Groups) representing the sources and tags (representations of the analyzed keywords embedded in a post) representing the targets. The edges (lines) represent the relationships between the sources and targets.

It has been suggested that a force-directed network visualizing approach by design visualizes a network with an emphasis on drawing "aesthetically pleasing" graphs due to their "crossing-free layouts" (Kobourov, 2014). Compared to other layouts, ForceAtlas2, which creates movement between nodes based on the

calculation of repulsive force to a balanced state, is suitable for depicting modularity or visualizing structural clustering (Jacomy et al., 2014). The algorithm draws graphs “based on similarities and/or differences in the data” (Cherven, 2013, p. 25), and it also emphasizes visualizing the role of important nodes by clustering them towards the center of a network (Khokhar, 2015, pp. 64-73). Thus, ForceAtlas2, a force-directed layout algorithm, is used to draw the network graphs.

Relations within the Facebook and Twitter datasets differ as edges in the Facebook dataset signify straightforwardly directed relations, whereas Twitter’s edges represent undirected relations. Edges in the Twitter dataset signify original tweets, quoted tweets, replies, and retweeted tweets, so the orientation of connections is more complex than those of the Facebook dataset. Due to the difference, a bipartite undirected network graph with 204,359 nodes and 376,900 edges is generated. Twitter accounts represent the sources and tags represent the targets. The edges signify the relationships between the sources and targets.

1.3.1 Modularity

To test **RH1**, modularity, a measure to detect clustering patterns, is computed to examine the overview of the network structures. Modularity, in a nutshell, is an approach to detect the manifestation of clustering (also known as community) by measuring the difference between the density of links within clusters against an expected baseline (based on mathematic calculation) (Scott & Carrington, 2014). Simply put, the measure shows “the number of communities present within a graph” (Cherven, 2013, p. 74). The modularity computation groups and color-codes nodes to see the manifested clustering pattern.

The computation indicates that the Facebook network consists of 33 communities (denoting by color-coded nodes with labels ranging from number 0 to 32); however, only three big components (purple, green, and red) constitute the largest proportion of the network (2,635 out of the total of 2,695 nodes—the remainders are small communities situated at the periphery of the visualization) (see Figure 17 and Table 8). Nodes’ sizes are computed based on the degree values (the number of edges/connections of a node). A glance at the graph shows that although the debunking/fact-checked messages account for 29.88%, they involve a more highly

concentrated pattern of interactions, compared to the more widely scattered patterns of the information pollution nodes which account for 70.12%.

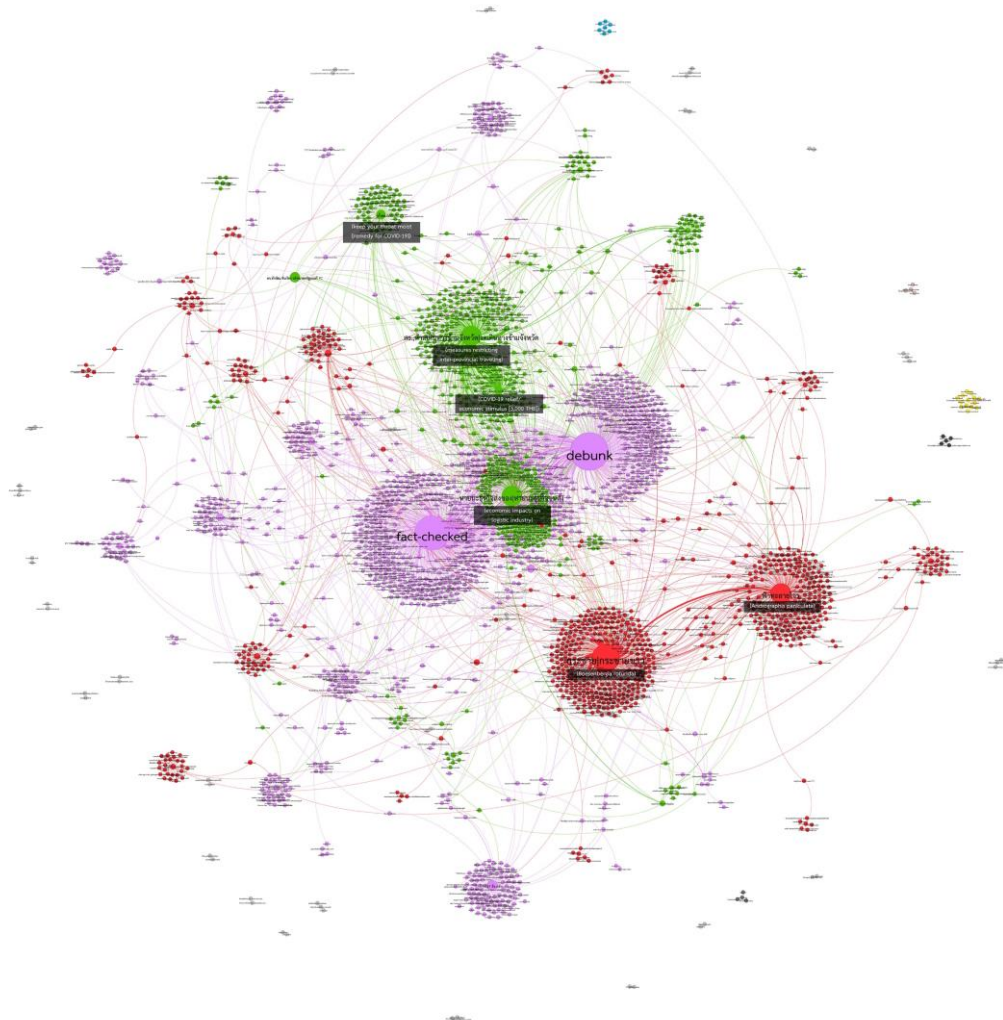


Figure 17 Network visualization of the Facebook dataset based on modularity classes

Table 8

Number of nodes in modularity classes within the Facebook dataset

Modularity class ID	Node count (unfiltered)	Node count (filtered)
6 (purple)	1,238 (43.90%)	1,188 (44.08%)
10 (red)	790 (28.01%)	769 (28.53%)
5 (green)	702 (24.89%)	678 (25.16%)
sum of the remainder	90 (3.19%)	60 (2.23%)
Total	2,820 (100.00%)	2,695 (100.00%)

Note 1. The data entries (nodes) are grouped into 33 different modularity classes ranging from number 0 to 32.

Note 2: The column “Node count (filtered)” here refers to the filtered data showing only the number of actual nodes representing Page and/or Group without nodes representing messages.

Within those three components, the vast majority of nodes (68.05%) engage solely with information pollution (see Table 9). Figure 18 shows that medical information, particularly content about alternative medicine/herbal remedies: “ฟ้าทะลายโจร” (*Andrographis paniculate*, otherwise known as green chiretta) and “กระชาย|กระชายขาว” (*Boesenbergia rotunda*, otherwise known as fingerroot) form the biggest clusters within the red group, and messages containing information on public responses and politicization of COVID-19 measures, particularly content about “สธ., ห้ามเดินทางข้ามจังหวัด/งดเดินทางข้ามจังหวัด” (measures restricting inter-provincial traveling/lockdown) and content about economic impacts—“หายนะธุรกิจส่งของ|หายนะธุรกิจขนส่ง” (economic impacts on logistic industry) form the biggest clusters within the green one. This indicates the same trends reflected in the content analysis (see Figure 7). Unlike the other two clusters within the biggest components (green and red) which consist of nodes interacting with both debunking/fact-checked and information pollution messages (containing labeling tags indicating the two broad categories), a closer look at the purple cluster shows that most nodes engage solely with debunking/fact-checked messages (695 out of the total of 1,188). Within the entire dataset, those 695 nodes are the only groups displaying one-sided interactions (the rest interact with both debunking/fact-checked and information pollution messages). Moreover, while 66.53% of all nodes engage in information pollution, only 5.45% engage in both debunking/fact-checked and information pollution messages. This implies that a significant proportion of the debunking/fact-checked messages did not reach those interacting with the information pollution.

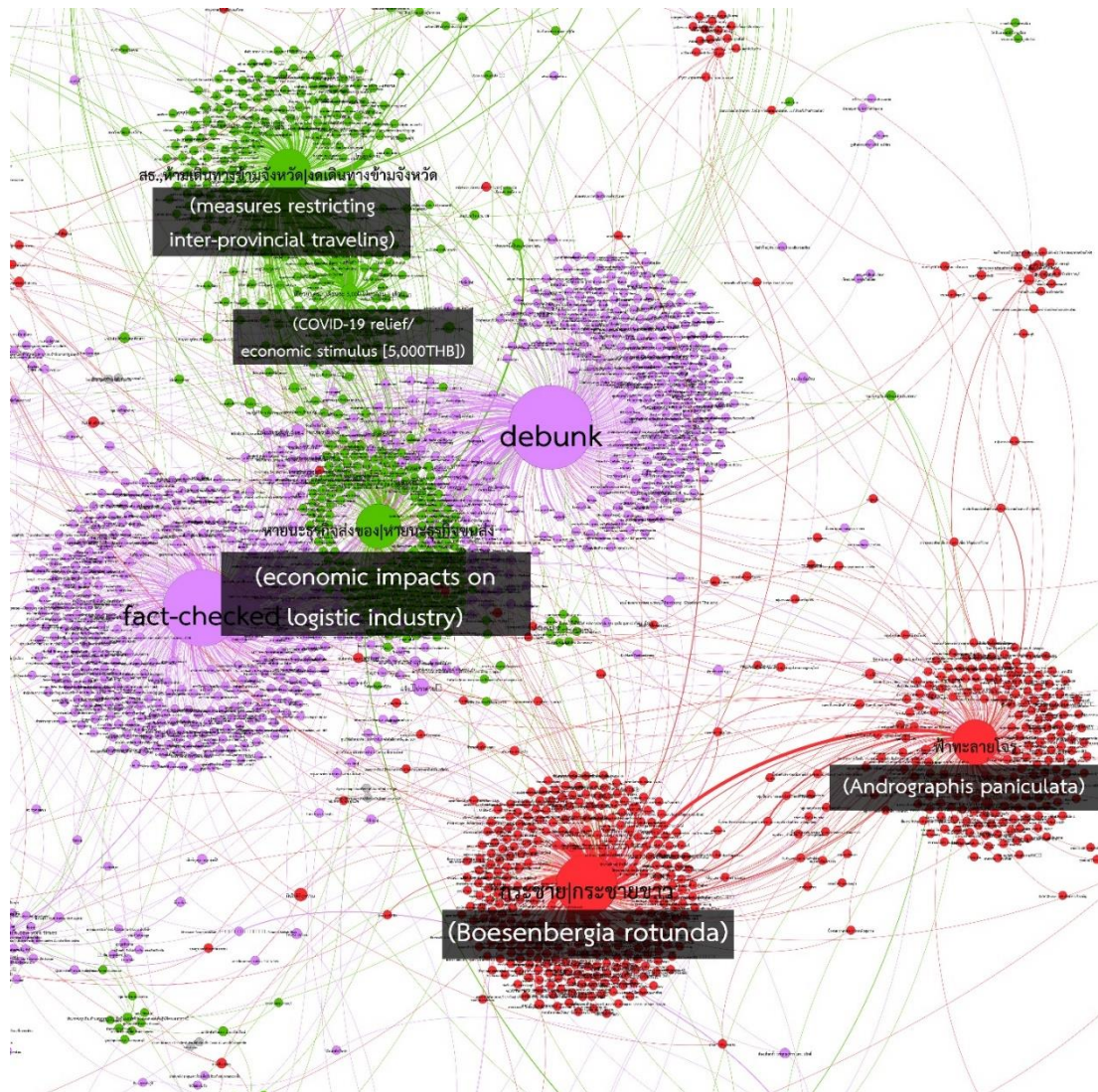


Figure 18 A zoom in image of the biggest clusters within the three biggest components of the Facebook network visualization

Table 9

Comparison between the modularity classes of nodes (within the three biggest components) interacting with debunking/fact-checked and information pollution messages within the Facebook dataset

Modularity class ID	Node count (modularity classes)	Debunking/fact-checked tags	Information pollution tags	Both tags
6 (purple)	1,188 (44.08%)	695 (25.79%)	396 (14.69%)	97 (3.60%)
10 (red)	769 (28.53%)	0	746 (27.68%)	23 (0.85%)
5 (green)	678 (25.16%)	0	651 (24.16%)	27 (1.00%)
Total	2,635 (97.77%)	695 (25.79%)	1,793 (66.53%)	147 (5.45%)

Grand total	2695 (100.00%)
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Note. the grand total of node count here refers the total number node count (filtered) in Table 9 (2,695)

To see the manifested clustering pattern within the Twitter network, modularity is computed, and the result indicates that there are 14 communities. Similar to the Facebook's results, only two components (purple [0] and green [1]) are heavily populated and clearly visible (see Figure 19 and Table 10). These two components account for more than 80 percent of the network, while the rest is largely dispersed.

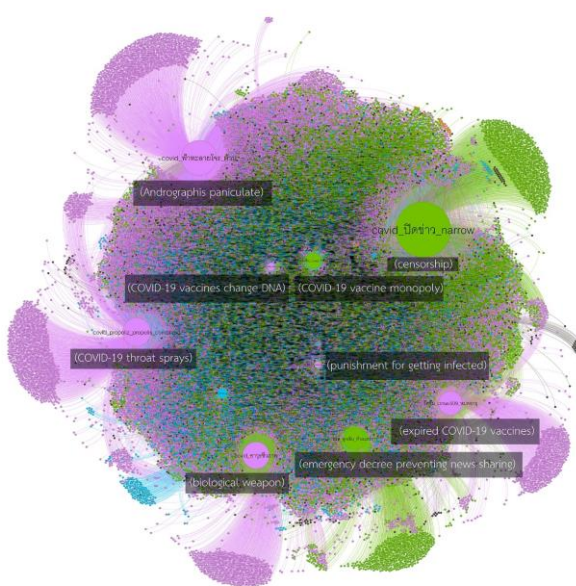


Figure 19 Network visualization of the Twitter dataset based on modularity classes

Table 10

Number of nodes in modularity classes within the Twitter dataset

Modularity class ID	Node count (unfiltered)	Node count (filtered)
0 (purple)	106,562 (52.144510%)	106,534 (54.262168%)
1 (green)	71,588 (35.030510%)	63,672 (32.430781%)
12 (light blue)	12,642 (6.186172%)	12,635 (6.435528%)
2 (black)	11,416 (5.586248%)	11,353 (5.782552%)
13 (orange)	2,115 (1.034943%)	2,112 (1.075729%)
sum of the remainder (less than 1%)	36 (0.017616%)	26 (0.013243%)
Total	204,359 (100%)	196,332 (100%)

Note 1. The data entries (nodes) are grouped into 14 different modularity classes ranging from number 0 to 13.

Note 2. The column “Node count (filtered)” here refers to the filtered data showing only the number of actual nodes representing users without nodes representing messages.

A closer examination of the two largest components (0 [purple] and 1 [green]) in the Twitter network reveals nine nodes with high engagement (see Figure 20):

- politics: covid_ติด_ครู_ไม่ป้องกันตัวเอง_ลงโทษ, พรก_ฉุกเฉิน_ห้ามแชร์ข่าว, covid_ปิดข่าว_narrow;
- vaccine_politics: covid_ผูกขาดวัคซีน_covid_วัคซีน_อย_ผูกขาด;
- medical_info: covid_ฟ้าทะลายโจร_ต้าน, covid_propoliz_propolis_combined;
- vaccine_medical_info: วัคซีน_ctmav509_หมดอายุ;
- conspiracy_theory: covid_อาวุธชีวภาพ;
- vaccine_conspiracy_theory: covid_วัคซีน_เปลี่ยน_dna.

Node sizes are determined by their degree values, indicating higher engagement for larger nodes. In the purple cluster, six nodes stand out, and there are three high engagement nodes within the green cluster.

Within the purple cluster, the node representing claims politicizing COVID-19 measures, particularly claims about punishment for teachers if they get infected, falls into the category of "politics" (i.e., politicization of COVID-19 related issues). The largest node in the green cluster, which concerns censorship of COVID-19 reporting, also falls into the 'politics' category. Furthermore, two smaller nodes in the green cluster belong to the 'politics' and 'vaccine_politics' categories, respectively. One node addresses claims about an emergency decree preventing news sharing, categorized as 'politics,' while another deals with claims about COVID-19 vaccine monopoly, categorized as 'vaccine_politics.' However, it's worth noting that the engagement levels differ from the Facebook network, where vaccine-related content is less engaged.

In the purple cluster, two notable nodes are in the "medical_info" category, which deals with medical information about COVID-19. This is consistent with the pattern seen in the Facebook network, where the largest cluster in the largest

component is centered on medical information, particularly alternative medicine and herbal remedies.

Here, the first one represents claims about the use of *Andrographis paniculate* to prevent COVID-19 (55,875 nodes), and the other one represents claims about COVID-19 throat sprays (43,891 nodes). Once again, the Twitter dataset differs from the Facebook network in that it includes a category for vaccine medical information (i.e., “vaccine_medical_info”) (35,932 nodes).

Moreover, engagements with content about conspiracy theories add a variety to the Twitter network, compared to those of the Facebook network. Within the Twitter’s purple cluster, the one representing COVID-19 bioweapon claims falls into the “conspiracy_theory” category (i.e., conspiracy theories about COVID-19). The smallest one in the purple cluster representing claims that COVID-19 vaccines change human DNA falls into the “vaccine_conspiracy_theory” category (i.e., conspiracy theories about COVID-19).

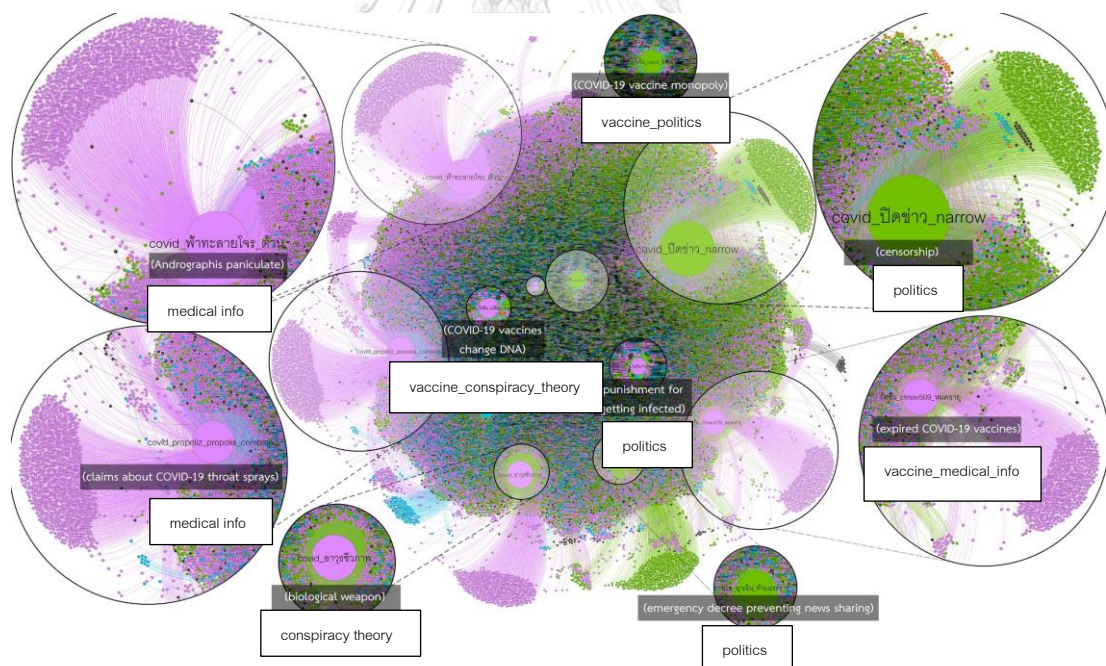


Figure 20 A zoom in image of the high engagement nodes within the two biggest components of the Twitter network visualization

Similar trends to the Facebook modularity network are evident in the Twitter modularity network. Table 11 shows a consistent trend that the majority of nodes interact with information pollution (59.512458%), while only a small proportion of the

nodes engage with debunking/fact-checked messages (16.874478%) or both information pollution and debunking/fact-checked messages (23.613064%). The same trend can be observed in each cluster in the network. This again indirectly implies that a significant proportion of the debunking/fact-checked messages did not reach those interacting with the information pollution. Despite the similarity, engagements with both tags in the Twitter network form a higher proportion compared to the Facebook network. That is, exposure to different or oppositional stances is more common in the Twitter network, compared to the Facebook network.

Table 11

Comparison between the modularity classes of nodes interacting with debunking/fact-checked and information pollution messages within the Twitter dataset

Modularity class ID	Node count (modularity classes)	Debunking/fact-checked tags	Information pollution tags	Both tags
0 (purple)	106,534 (54.262168%)	20,892 (10.641159%)	58,350 (29.720066%)	27,292 (13.900943%)
1 (green)	63,672 (32.430781%)	8,650 (4.405802%)	43,767 (22.292342%)	11,255 (5.732637%)
12 (light blue)	12,635 (6.435528%)	6 (0.003056%)	9,457 (4.816841%)	3,172 (1.615631%)
2 (black)	11,353 (5.782552%)	3,575 (1.820895%)	3,667 (1.867755%)	4,111 (2.093902%)
13 (orange)	2,112 (1.075729%)	5 (0.002547%)	1,581 (0.805269%)	526 (0.267914%)
sum of the remainder	26 (0.013243%)	2 (0.001019%)	20 (0.010187%)	4 (0.002037%)
Total	196,332 (100%)	33,130 (16.874478%)	116,842 (59.512458%)	46,360 (23.613064%)

1.3.2 Betweenness centrality

The betweenness centrality, in brief, measures how much a node is considered being in “between” position (intermediary role) allowing others to connect through it or allowing information to flow through it (Cherven, 2013, pp. 366-67). By examining the betweenness centrality of the Facebook dataset, the computation shows that the nodes with betweenness centrality values (215 unique values ranging from 0.50 to 237,462.18) functioning as “bridges” locate only in the three biggest components, and the nodes in the remaining smaller communities do not have betweenness centrality values. Even though these “bridge” nodes allow debunking/fact-checked messages to flow to those interacting with information pollution, they account for only 5.45% (see Table 12). This reflects a similar trend found in Table 11 above. The “bridge nodes” can be categorized into 34 categories, and in terms of frequency, “online news media,” “geographical location,” and “politics” rank number one, two, and three respectively (see Table 13). This implies that these are the spaces with a diverse pool of information as the “bridges” are embedded in these categories. A further examination of nodes’ attributes relating to the betweenness centrality scoring indicates that among the top five percent of high betweenness centrality nodes (27 out of 553 nodes), most of them have a high number of Likes which reflects their importance in the network, and the majority of them engage with both debunking/fact-checking and information pollution messages (20 nodes—those containing “debunk” and/or “fact-checked” in the last column) (see Table 14).

Overall, the findings of the Facebook’s social network analysis show the disposition of two distinct echo chambers: debunking/fact-checked and information pollution clusters. Since only a small number of nodes exhibit interconnections between the two clusters, information flow between them is limited. Given that facticity is a defining attribute, this implies that homophily is manifested, and supports the **RH1**.

Table 12

Analysis of nodes' betweenness centrality scoring based on the modularity classes within the Facebook dataset

Modularity class ID	Node count (betweenness centrality)	Debunking fact- checked tags	Information pollution tags	Both tags
6 (purple)	241 (8.94%)	101 (3.75%)	43 (1.60%)	97 (3.60%)
10 (red)	128 (4.75%)	0	105 (3.90%)	23 (0.85%)
5 (green)	184 (6.83%)	0	157 (5.83%)	27 (1.00%)
Total	553 (20.52%)	101 (3.75%)	305 (11.32%)	147 (5.45%)
Grand total	2695 (100.00%)			

Table 13

Categories of the high betweenness centrality nodes within the Facebook dataset

Rank	Category (nodes)	Count	Description
1	news media	(156)	“News media” refers to a Page/Group representing a media outlet that focuses on delivering news to the public.
	-online news media	89	
	-local news	35	“Online news media” refers to an account representing an online news media outlet.
	-online news paper	27	
	-fan club of online news media	4	“Local news” refers to local news media outlet.
	-online news media (agriculture)	1	“Online newspaper” refers to an account representing a newspaper company.
2	geographical location	89	“Geographical location” refers to a community for users with shared interest in a geographical location such as a Page/Group for people living in Suphan Buri, a city about a hundred kilometers from Bangkok.
3	politics	(53)	“Political community” refers to a community for users with shared interest in certain political content such as a fan club (Page/Group) for the former prime minister of Thailand and a Page/Group for “people against dictatorship”.
	-political community	52	
4	-politician	1	
	lottery	49	“Lottery” refers to a Page/Group that focuses its content on lottery.
5	trading	42	“Trading” refers to a Page/Group that functions as a marketplace for users.
6	governmental body	(28)	“Governmental body” refers to a Page/Group representing a government organization.
	-governmental body	26	
	-COVID-19 focus, governmental body	2	

7	general interest	25	“General interest” refers to a Page/Group discussing about general interest or without specific interest.
		(34)	–“Heal and medical information” refers to a Page/Group that focuses its content on health and/or medical information in general.
	health and medical information	14	–“Alternative medicine” refers to a Page/Group that
	-health and medical information	9	focuses its content on herbal medicine or non-
8	-alternative medicine	6	mainstream treatments.
	-COVID-19 focus	3	–“COVID-19 focus” refers to a Page/Group that
	-beauty and health	2	focuses its content on COVID-19.
	-vegan		“Beauty and health” refers to a Page/Group that focuses its content on beauty and/or health.
			“Vegan” refers to a Page/Group that focuses its content on vegetarianism.
9	business	14	“Business” refers to a Page/Group representing a business/company.
10	TV channel	10	“TV channel” refers to a Page/Group representing a television channel.
11	food	8	“Food” refers to a Page/Group that focuses its content on food.
	public figure	(12)	“Public figure” refers to a Page/Group representing a
12	-public figure	7	public figure or a fan club of a public figure.
	-fan club of a public figure	5	
13	knowledge	7	“Knowledge” refers to a Page/Group with a focus on knowledge sharing.
14	Buddhism	4	“Buddhism” refers to a Page/Group that focuses its content on Buddhism.
15	fact-checker	4	“Fact-checker” refers to a Page/Group that focuses its content on fact-checking.
16	economic stimulus	3	“Economic stimulus” refers to a Page/Group that focuses its content on the government’s economic stimulus and COVID-19 relief.
17	loan	2	“Loan” refers to a Page/Group that focuses its content on available loans and mortgages.
	social media influencer	(3)	“Social media influencer” refers to a Page/Group
18	-social media influencer	2	representing a social media influencer or a fan club
	-fan club of a social media influencer	1	of a social media influencer.
19	jobs	2	“Jobs” refers to a Page/Group that focuses its content on job vacancy.

20	energy	1	“Energy” refers to a Page/Group that focuses its content on energy company and/or oil prices.
21	S.Korea focus	1	“S.Korea focus” refers a Page/Group that focuses its content on South Korea.
22	entertainment	1	“Entertainment” refers to a Page/Group that focuses its content on entertainment.
23	review	1	“Review” refers to a Page/Group that focuses its content on reviewing a product/service.
24	architecture	1	“Architecture” refers to a Page/Group that focuses its content on architecture.
25	sports	1	“Sports” refers to a Page/Group that focuses its content on sports.
26	dating	1	“Dating” refers to a Page/Group that focuses its content on dating.
27	movies	1	“Movies” refers to a Page/Group that focuses its content on movies.

Table 14

Top five percent of high betweenness centrality nodes within the Facebook dataset

Rank	Category (nodes)	Type	Sum of Likes (at posting)	Betweenness Centrality	Category (messages)
1	political community	Group	6,085,111	237,462.2	debunk fact-checked conspiracy theory_origin econ impact medical info politics vaccine_foreign vaccine_politics
2	online news media	Group	341,553	146,926.1	debunk fact-checked medical info politics vaccine_medical info
3	geographical location	Group	18,738	89,083.03	fact-checked conspiracy theory_origin medical info politics vaccine_medical info
4	geographical location	Group	118,788	78,761.39	fact-checked medical info politics
5	governmental body	Page	713,451	72,828.79	debunk fact-checked medical info politics
6	public figure	Group	1,937,238	68,597.15	econ impact medical info vaccine_conspiracy theory vaccine_politics
7	governmental body	Group	5,003,323	61,825.03	econ impact medical info politics
8	online newspaper	Group	8,801,322	59,385.03	econ impact medical info politics

9	political community	Group	2,762,705	54,898.69	debunk conspiracy theory_origin econ impact medical info politics vaccine_medical info
10	geographical location	Group	224,404	51,896.51	debunk fact-checked medical info politics
11	geographical location	Group	176,031	49,453.86	debunk medical info politics
12	online news media	Page	247,889	47,146.24	debunk medical info vaccine_medical info
13	TV channel	Group	328,819	44,549.07	debunk fact-checked medical info politics
14	geographical location	Group	486,931	43,921.77	medical info politics
15	online newspaper	Page	3,781,184	43,321.18	debunk fact-checked medical info phishing vaccine_medical info vaccine_politics
16	entertainment & social trends	Group	523,123	42,674.81	fact-checked econ impact politics vaccine_medical info
17	online newspaper	Group	522,295	42,674.81	fact-checked econ impact medical info politics
18	local news	Group	147,303	39,927.54	econ impact medical info politics
19	local news	Group	230,489	39,318.66	debunk medical info politics
20	geographical location	Group Page	511,793	38,176.24	fact-checked medical info politics
21	geographical location	Group	794,614	38,010.00	debunk foreign politics
22	geographical location	Page	142,881	36,296.43	fact-checked false_statistics medical info politics
23	alternative medicine	Group	318,829	35,196.88	debunk medical info vaccine_conspiracy theory
24	online news media	Page	29,504,271	34,119.76	fact-checked medical info politics
25	online news media	Group	1,246,903	32,848.08	econ impact politics vaccine_medical info vaccine_politics
26	TV channel	Page	433,391	32,766.48	debunk fact-checked medical info variety
27	trading	Group	0	31,798.46	econ impact medical info

Note 1. “|” refers to “and” in the “Category (messages)” column.

Note 2. This “Category (messages)” column shows a list of message categories which a node has links with.

Note 3. “political community” refers to a community for users with shared interest in certain political content such as a fan club (Page/Group) for the former prime minister of Thailand and a Page/Group for “people against dictatorship”.

Note 4. “geographical location” refers to a community for users with shared interest in a geographical location such as a Page/Group for people living in Suphan Buri, a city about a hundred kilometers from Bangkok.

Note 5: To ensure an ethical safeguard for users, the categories of the nodes are displayed instead of their actual usernames.

Unlike the network structure of the Facebook dataset, the computation of the Twitter network’s betweenness centrality reveals rather a cross-cutting spread pattern because nodes occupying the “bridge” positions are broadly distributed, compared to those of the Facebook network (see Table 15). The majority of “bridge nodes” here (22.509897%) contain both debunking/fact-checked and information pollution tags. This implies that they not only allow information to flow between clusters by connecting different tags within the same categories but also between debunking/fact-checked and information pollution tags. In other words, there is a higher chance of Twitter users encountering more diverse content concerning COVID-19 than Facebook users.

A deeper look at the “bridge nodes” within the Twitter network shows that the top five percent of the “bridges” (4,278 nodes) can be divided into 11 categories (see Table 16 below), and “UGC,” user-generated content, “S.Korea focus,” and “politics” are the top three. Categories that emerged from the Twitter dataset differ markedly from the Facebook dataset due to the difference in data collections and social norms between the two platforms. For the former, the Facebook dataset is derived from Groups and Pages, not profiles while Twitter’s digital architecture allows only profiles. In other words, Facebook Groups or Pages, by design, tend to have a stronger orientation of their content as they commonly serve as places to communicate shared interests, compared to Twitter data derived from individuals’ profiles. For the latter, Twitter, in Thai context, is known as a place of K-pop fandoms and political

communication. Based on a renowned Thai political science's observation on political communication on Twitter, injustice of the K-pop industry inspired South Korean focus accounts to tweet or retweet about political injustice of Thai society, and this pointed the way to a heightened sense of political awareness among the younger generation users who are typically fans of the K-pop industry (เทวฤทธิ์ มณีฉาย, 2021). This social awareness among Twitter users is evident in the Twitter dataset as the S.Korea focus and politics nodes are among the top three in terms of frequency which imply that they occupy prominent positions allowing information flow between different clusters in the network.

Among the top 0.01 percent of high betweenness centrality nodes (10 out of 85,570 nodes), most of them have a high number of engagements which reflects their prominent positions in the network, and the majority of them engage with both debunking/fact-checking and information pollution messages (7 out of 10 nodes) (see Table 17). What stands out in the Twitter dataset is the presence of nodes representing user-generated content, South Korea focus content, and fact-checkers which are absent from the “bridges” in the Facebook dataset. Bridge nodes play a crucial role in enabling the flow of information between topics and clusters. Users connecting with the “bridges” have the chance to encounter COVID-19 content from various viewpoints or sources with different attributes.

In summary, despite having more bridge nodes than Facebook, Twitter's network structure still indicates the presence of two distinct echo chambers - one for debunking/fact-checking and the other for information pollution. The limited number of bridge nodes suggests that homophily is present and supports the **RH1**.

Table 15

Analysis of nodes' betweenness centrality scoring based on the modularity classes within the Twitter dataset

Modularity class ID	Node count (betweenness centrality)	Debunking fact- checked tags	Information pollution tags	Both tags
0 (purple)	49,162 (25.040238%)	3,793 (1.931932%)	18,264 (9.302610%)	27,105 (13.805696%)
1 (green)	22,516	312	10,968	11,236

	(11.468329%)	(0.158914%)	(5.586456%)	(5.722959%)
	6,868	0	3,705	3,163
12 (light blue)	(3.498156%)	(0%)	(1.887110%)	(1.611047%)
	5,952	759	1,225	3,968
2 (black)	(3.031600%)	(0.386590%)	(0.623943%)	(2.021066%)
	1,066	0	541	525
13 (orange)	(0.542958%)	(0%)	(0.275554%)	(0.267404%)
sum of the	6	0	2	4
remainder	(0.003056%)	(0%)	(0.001019%)	(0.002037%)
Total	85,570	4,864	34,705	46,001
	(43.584337%)	(2.477436%)	(17.676691%)	(23.430210%)
Grand total	196332			
	(100.000000%)			

Table 16

Categories of the high betweenness centrality nodes within the top five percent of the Twitter dataset

Rank	Category (nodes)	Count	Description
1	UGC	4153	“UGC” refers to an account producing user-generated content in general.
	S.Korea focus	(79)	“S.Korea focus” refers to an account that focuses its
	-S.Korea focus	78	content on South Korea related content such as K-
2	-trading, S.Korea focus	1	pop idols, celebrities, artists, and tourist attractions.
3	politics	27	“Politics” refers to an account that focuses its content on politics.
	news media	(5)	“Online news media” refers to an account representing an online news media outlet.
	-online news media	4	-“Online newspaper” refers to an account
4	-online newspaper	1	representing a newspaper company.
5	trading	4	“Trading” refers to an account that focuses its content on selling goods/providing services.
6	fact-checker	3	“Fact-checker” refers to an account representing a fact-checker.
7	lottery	2	“Lottery” refers to an account that focuses its content on lottery.
8	governmental body	2	“Governmental body” refers to an account representing a government organization.
9	public figure	1	“Public figure” refers to an account representing a public figure or a fan club of a public figure.

10	review	1	“Review” refers to an account that focuses its content on reviewing products/services.
11	business	1	“Business” refers to an account representing a business.

Table 17

Top 0.01 percent of high betweenness centrality nodes within the Twitter dataset

Rank	Category (nodes)	Verified	Sum of Followers	Sum of Tweet count	Sum of Interactions (Retweet, Reply, Quote, Like)	Betweenness Centrality	Category (messages)
1	fact-checker	True	516479	187401	0	0.000499	fact-checked
2	S.Korea focus	False	90	50043	60238	0.000440	conspiracy_theory_origin debunk_3rd_person_effect
3	UGC	False	2896	3318517	103310	0.000306	debunk fact-checked medical_info politics vaccine_medical_info vaccine_politics
4	UGC	False	16659	4762277	2118	0.000269	conspiracy_theory_origin debunk debunk_3rd_person_effect fact-checked politics
5	UGC	False	31700	12189022	225008	0.000245	conspiracy_theory_origin debunk debunk_3rd_person_effect debunk_satire fact-checked me

							dical_info po litics situatio n_infection v accine_medi cal_info vacc ine_politics
6	politics	False	7733	3841926	3733	0.000222	debunk fact- checked me dical_info po litics
7	news media	True	74708207	1711016 2	0	0.000171	debunk fact- checked
8	UGC	False	1521	2729603	156943	0.000167	debunk fact- checked me dical_info po litics vaccine _politics
9	S.Korea focus	False	5076	7266887	381984	0.000156	conspiracy_t heory_origin debunk fact- checked me dical_info po litics vaccine _medical_inf o vaccine_p olitics
10	fact-checker	True	31368	103276	1609	0.000152	debunk fact- checked

1.3.3 Hub nodes

To identify important nodes in the network, Hyperlink-Induced Topic Search (HITS), an algorithm used for connection analysis based on eigenvalues, is used to compute the score of “hub and authority.” The hub score indicates the quantity of connections to “highly informative nodes or authoritative nodes” a node has (Khokhar, 2015, p. 128).

The results show that within the Facebook dataset, all hub nodes belong to only the three biggest components. Among the total of 2,624 “hub” nodes (hub nodes refer to nodes with a hub score >0), 66.12% of them interact exclusively with

information pollution. 15.99% of hub nodes interacting with only debunking/fact-checked messages belong to only the biggest component (modularity class ID 6). The rest interacting with both debunking/fact-checked and information pollution messages scatters across the three biggest components (see Tables 18). Among the top one percent of the “hub” nodes (26 out of 2,624 nodes), Facebook accounts with a focus on news reporting account for the highest number, and all of them get involved with both debunking/fact-checked and information pollution messages (see Table 19). This reflects how a typical online news media outlet operates—posting and/or sharing information from various sources as well as how connections around them are formed—involving many influential actors in society. This also shows that information from news media could sometimes be false. But the larger picture implies that a significant proportion of hub nodes get involved with the spread of information pollution. This supports the RH4.

Table 18

Analysis of hub nodes within the Facebook dataset based on modularity classes and message categories

Modularity class ID	Node count (hub)	Debunking/fact-checked tags	Information pollution tags	Both tags
6 (purple)	1186 (44.01%)	431 (15.99%)	394 (14.62%)	361 (13.40%)
10 (red)	765 (28.39%)	0	742 (27.53%)	23 (0.85%)
5 (green)	673 (24.97%)	0	646 (23.97%)	27 (1.00%)
Total	2624 (97.37%)	431 (15.99%)	1782 (66.12%)	411 (15.25%)
Grand total	2695 (100.00%)			

Table 19

Categories of the top one percent of the “hub” nodes

Category	Count
news media	
-online newspaper (6)	
-online news media (4)	
-TV news program (3)	
-TV channel (2)	
-local news (1)	
	16
political community	3
entertainment & social trends	2
governmental body	2

blogger	1
financial institution	1
geographical location	1
Total	26

Note 1. “political community” here carries the same meaning as shown in Table 6—a community of users with shared interest in certain political content such as a fan club (Page/Group) for the former prime minister of Thailand and a Page/Group for “people against dictatorship.”

Note 2. “geographical location” carries the same meaning as shown in Table 6—a community of users in a common or proximate geographical location such as a Facebook Page/Group for people living in Suphan Buri, a city about a hundred kilometers from Bangkok.

Within the Twitter dataset, only six components contain hub nodes. Among the total of 196,119 “hub” nodes, 66.12% of them interact exclusively with information pollution. 15.99% of hub nodes interacting with only debunking/fact-checked messages belong to only the biggest component (modularity class ID 6). The rest interacting with both debunking/fact-checked and information pollution messages scatters across the three biggest components (see Table 20). Hence, the **RH4** is confirmed as most of the hub nodes are affiliated with the information pollution cluster.

Table 20

Analysis of hub nodes within the Twitter dataset based on modularity classes and message categories

Modularity class ID	Node count (hub)	Debunking/fact-checked tags	Information pollution tags	Both tags
0 (purple)	106454 (54.221421%)	20863 (10.626388%)	58299 (29.694090%)	27292 (13.900943%)
1 (green)	63666 (32.427724%)	8649 (4.405293%)	43762 (22.289795%)	11255 (5.732637%)
2 (black)	11269 (5.739767%)	3525 (1.795428%)	3633 (1.850437%)	4111 (2.093902%)
3 (gray)	0	0	0	0
4 (teal)	0	0	0	0
5 (desaturated red)	0	0	0	0

6 (gray)	0	0	0	0
7 (gray)	0	0	0	0
8 (gray)	0	0	0	0
	6		2	4
9 (light red)	(0.003056%)	0	(0.001019%)	(0.002037%)
10 (gray)	0	0	0	0
11 (gray)	0	0	0	0
	12615	5	9438	3172
12 (light blue)	(6.425341%)	(0.002547%)	(4.807163%)	(1.615631%)
	2109	5	1578	526
13 (orange)	(1.074201%)	(0.002547%)	(0.803741%)	(0.267914%)
Total	196119	33047	116712	46360
	(99.891510%)	(16.832203%)	(59.446244%)	(23.613064%)
Grand total	196332			
	(100.000000%)			

1.3.4 Layers of the spread patterns

The network visualizations of both the Facebook and Twitter datasets show only a few layers of spread patterns of both debunking/fact-checked and information pollution messages. This does not go in line with what the study by Zhao et al. suggests—a higher number of spreading layers for fake news, compared to those of legitimate news (Zhao et al., 2020). Thus the **RH2** is rejected. One plausible explanation of this observation is that the previous study's findings are based on Weibo and Twitter and not during the COVID-19 pandemic, so it is obvious that there is a big difference in platforms' architectures and environments as well as social context.

1.3.5 Sentiment networks

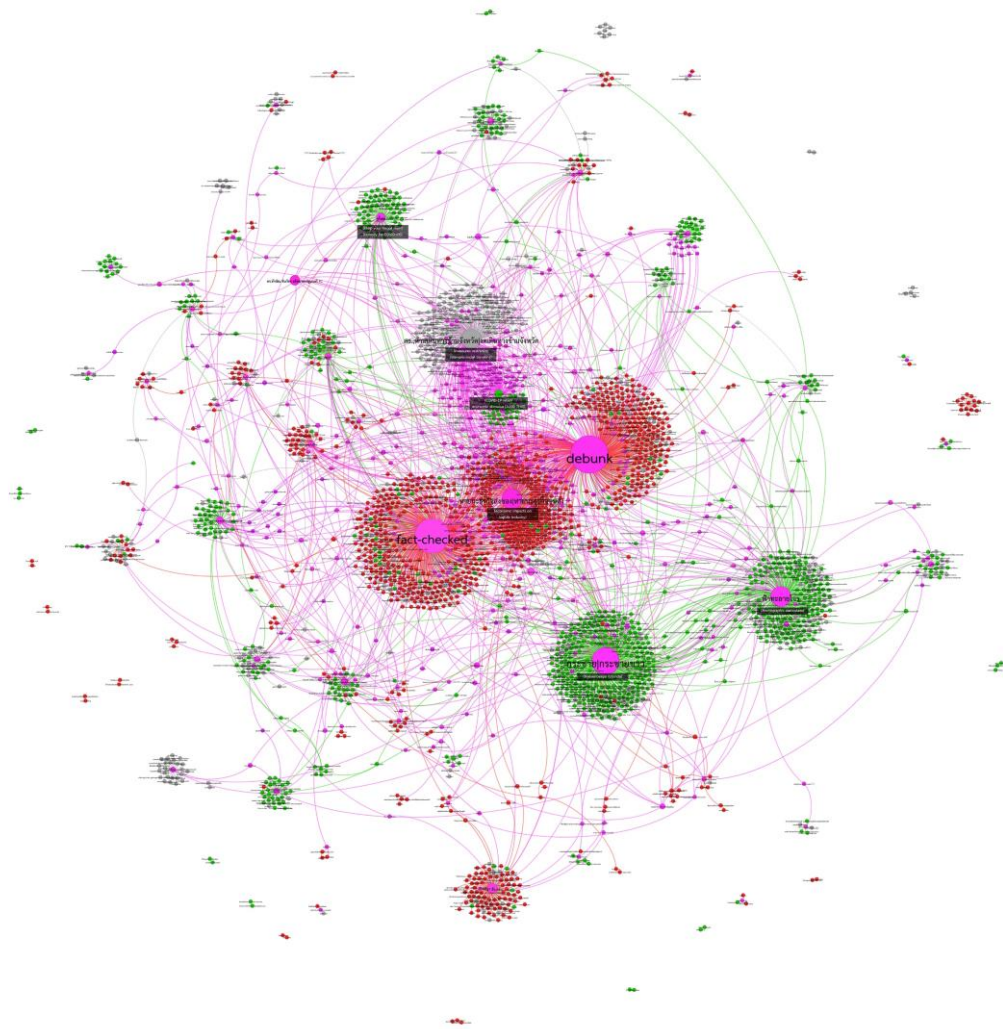


Figure 21 Network visualization of the Facebook dataset based on sentiments

To assess users' stance on the manifested topics in the dataset, sentimental attributes are used to visualize the Facebook network in Figure 21. Nodes are color-coded according to their sentiments as follows: red for negative, gray for neutral, green for positive, and purple for mixed sentiments. Mixed sentiments reflect the complexity of temporal dimension in network visualization as a node can create and/or share more than one post during the time frame of research. It is clear that this sentimental network visualization is in line with the findings of content and sentiment analyses, where negative sentiment is overwhelmingly dominant among nodes with the debunking/fact-checked tags while positive sentiment is clearly evident among nodes

engaging with the information pollution tags, especially those representing messages about alternative medicine.

To test **RH3**, the attribute of total interactions is examined to identify whether the negative messages attract more interactions than the rest or not. Within the Facebook dataset, negative sentiment dominates the others because not only do the majority of nodes in the Facebook network engage solely with negative messages (1,041 nodes), giving a total of 437,697 interactions, but also the total interactions of nodes expressing negative sentiment stands at 1,110,015 based on the sum of 1,342 nodes (negative, negative|neutral, negative|positive, and positive|neutral|negative). The most plausible explanation for the overwhelmingly negative sentiment expressed is that not only do the debunking/fact-checked messages contain negative terms but also a proportion of information pollution messages, particularly those in the “economic impact” category (see Table 21 below and see also Figures 12-13 above).

Table 21

Sentiment Network of the Facebook dataset

Sentiment	Node count	Total interactions
negative	1,041 (38.63%)	437,697
positive	855 (31.73%)	270,078
neutral	397 (14.73%)	58,601
negative neutral	140 (5.19%)	551,155
negative positive	117 (4.34%)	49,162
neutral positive	101 (3.75%)	27,220
positive neutral negative	44 (1.63%)	72,001
Total	2,695 (100.00%)	1,465,914

The Twitter sentiment network is generated in the same way as the Facebook network. That is, tweets are categorized into positive (green), neutral (gray), negative (red), and mixed (purple) interactions based on the expressed sentiments. Table 22 shows that the network is dominated by negative sentiment because there are 195,878 nodes (99.77%) engaging with messages containing negative tags, and the total interactions stand at 61,422,391,264 based on the sum of negative|neutral, negative, positive|neutral|negative, and negative|positive nodes. Figure 22-24 reflect the same trend shown in Table 22. Despite the fact that the highest number of nodes engage with both negative and neutral messages, the isolated visualizations of the biggest

(purple) and second biggest (green) components of the Twitter dataset clearly show that the network is overwhelmed by negative sentiment (red edges). Looking back at Figures 12 and 13 above, both debunking/fact-checked and information pollution messages within the Twitter dataset are largely expressed in negative sentiment. The most likely explanation is that negative messages, based on the concepts of negatively-biased credulity and informational negativity bias, are more likely to draw attention and engagement compared to positive information. The largest proportion of the messages are negative “politics” messages, and negative terms tend to be used to debunk false claims, so there is a high possibility for users to bias and perceive negative information as mainstream and interact with them accordingly. The results reported here confirm the **RH3** as negative information concerning COVID-19 attract a high amount of social media engagement.

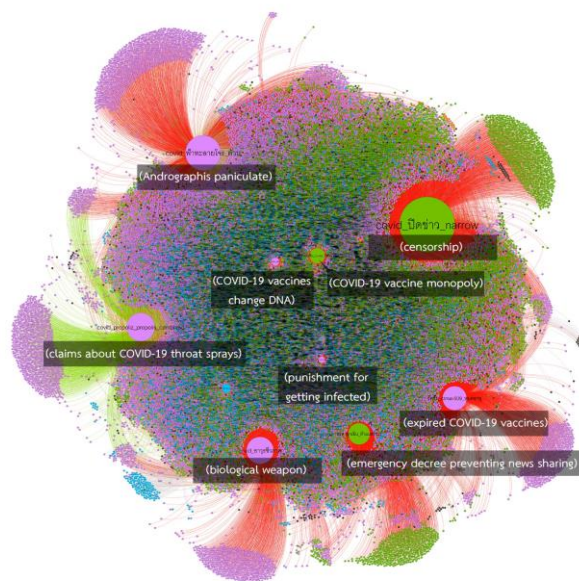


Figure 22 Network visualization of the Twitter dataset based on sentiments

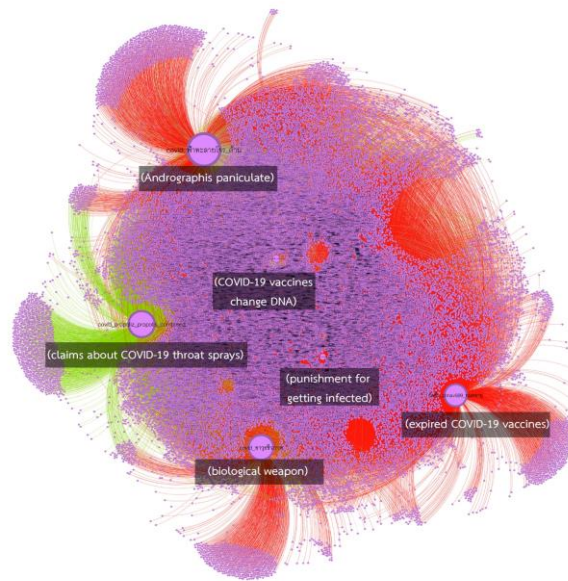


Figure 23 Network visualization of the biggest component of the Twitter dataset based on sentiments



Figure 24 Network visualization of the second biggest component of the Twitter dataset based on sentiments

Table 22

Sentiment Network of the Twitter dataset

Sentiment	Node count	Total interactions
negative neutral	195,494 (99.57%)	60,931,618,928
positive	272 (0.14%)	11,561,101
positive neutral negative	195 (0.10%)	398,216,606

negative positive	170 (0.09%)	84,795,481
neutral	151 (0.08%)	8,719,213
neutral positive	31 (0.02%)	8,528,619
negative	19 (0.01%)	7,760,249
Total	196,332 (100.00%)	61,451,200,197

Note. interactions here refer to the sum of tweets, retweets, replies, quotes, and likes at posting.

In the Figure 24, it is evident that the green cluster comprises the three largest nodes categorized under “politics” and “vaccine_politics,” all demonstrating a prevailing negative sentiment. The predominant claims in this cluster revolve around government censorship of COVID-19 information, the issuance of an emergency decree that restricts the sharing of COVID-19 news, and the monopoly of COVID-19 vaccines by Thailand’s Food and Drug Administration (FDA). These observations underscore the significant influence of the coercive political climate on shaping the infodemic. A possible explanation for the more negative sentiment expressed in political topics on Twitter than on Facebook is that the norm of anonymity on Twitter gives users a sense of security when criticizing the government’s coercive approach to the problem.

1.3.6 Dynamic networks

In a dynamic context, it can be inferred from the network visualizations at different timestamps that there are two key characteristics of the information pollution messages: long-lived context-independent messages and short-lived context-dependent messages. Figure 10 shows the cumulative interactions between nodes based on the Facebook dataset. For the Facebook network, claims containing medical information appeared in January 2020 (indicated by the red arrow in Figure 25) and remained active throughout the time frame (gain more interactions) is an example of the former. Claims about 24-hour curfew announcements which appeared on a particular date following the rise of COVID-19 confirmed cases and died out shortly after is an example of the latter.

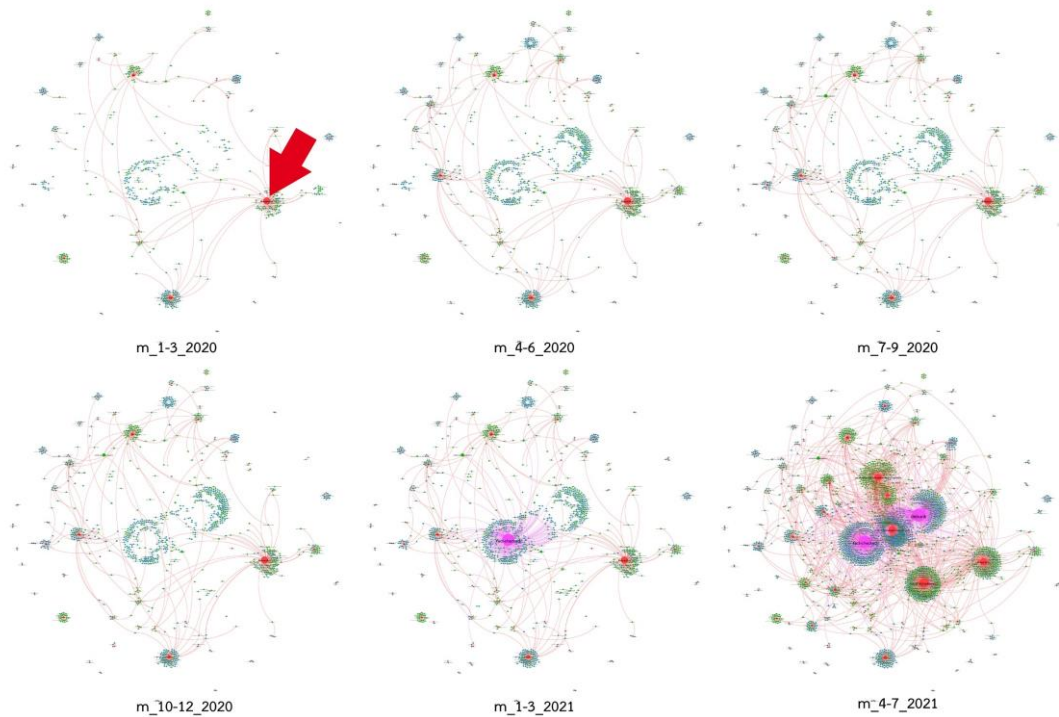


Figure 25 Temporal sequences of Facebook dataset network visualizations

Due to its comparatively large dataset, the Twitter network is far more complex than the Facebook network. Its cumulative network visualization does not clearly show the small changes occurred between April 2020 and March 2021, but the big changes taking place between April and July 2021 are apparent (see Figure 26). As can be seen in Table 23 below, some categories such as “conspiracy_theory,” “medical_info,” and “politics” are long-lived context-independent messages because they are posted throughout the time frame. The fluctuations observed in the “politics” nodes clearly illustrate the reasons behind their classification as long-lived messages. Contrary to these categories, the rest are short-lived as they are posted in a particular context. For instance, claims about COVID-19 situation report (situation_infection), such as a claim about a large influx of infected immigrants at the border of Thailand and claims about side effects of certain COVID-19 vaccines, follow a growing concern expressed on social media or reported by the press.

To conclude, the results presented in this section demonstrate that both Facebook and Twitter exhibit echo chambers in their network structures. These findings support **RH1**, which posits that individuals tend to form social networks with like-

minded people and cluster together in an isolated manner, as suggested by the literature. However, Twitter provides users with a greater opportunity to encounter diverse opinions compared to Facebook. In terms of the spread pattern, both networks show only a few layers. Hence, it can be concluded that the **RH2**, which postulates that information pollution is likely to spread through more layers compared to legitimate information, is not supported. Both Facebook and Twitter's networks are dominated by negative sentiment and such messages tend to gain significant engagement. As a result, the **RH3**, which suggests that negativity has the tendency to attract and hold people's attention due to concepts such as negatively-biased credulity and informational negativity bias, is validated. The **RH4** states that influential nodes in social networks play an important role in the spread of information pollution. This is supported by the results of this study, which show that a large number of hub nodes in both Facebook and Twitter's networks interact exclusively with information pollution. It is noteworthy that the results of the social network analysis provide further evidence of the influence of contextual factors, such as the COVID-19 situation, and societal-level factors, such as political atmosphere and polarization, on the infodemic. The presence of natural remedies categorized under the medical_info cluster and the information related to government censorship categorized under the politics cluster are examples that illustrate this point.

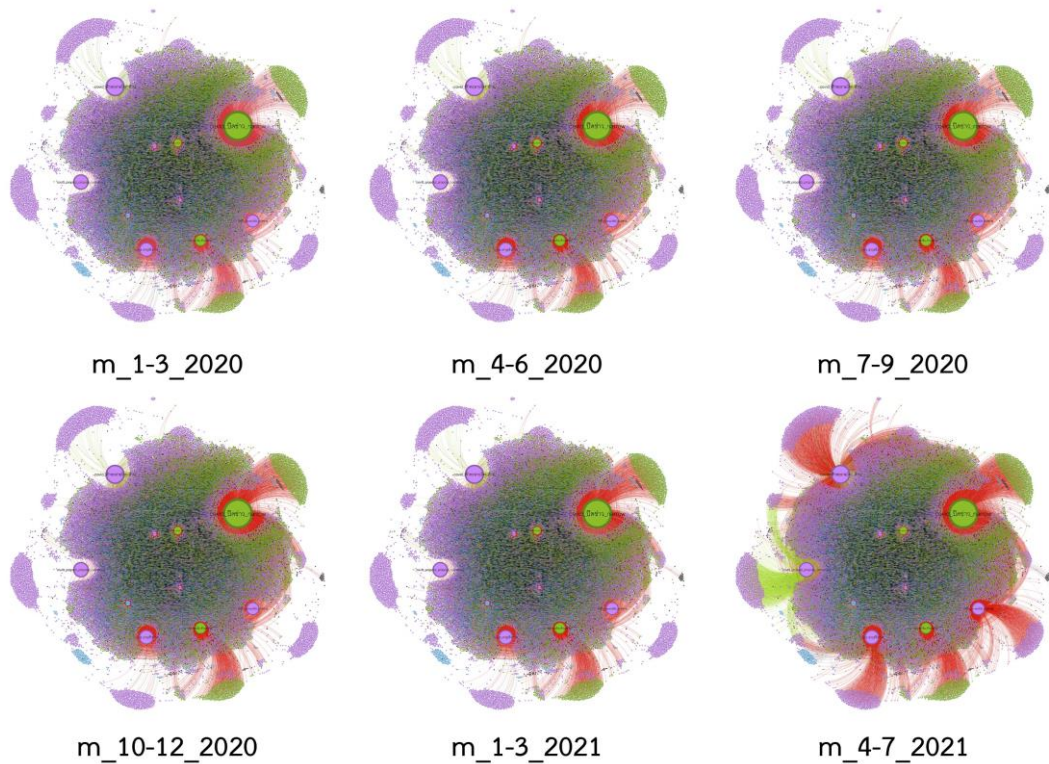


Figure 26 Temporal sequences of Twitter dataset network visualizations

Table 23

Mapping of temporal sequences and sentiment analysis of the Twitter dataset

Message category	m_1- 3_2020	m_4- 6_2020	m_7- 9_2020	m_10-12_2020	m_1- 3_2021	m_4- 7_2021
	2	0	0	0	0	0
celebrities	434	0	0	0	1	0
	1132	4	0	0	8	4
conspiracy_theory	2404	39	9	20	14	39968
	769	40	5	23	13	508
	1	40	0	1	0	2
debunk	2865	1017	427	981	355	129391
	336	355	21	88	26	3725
	362	6	0	2	20	1740
debunk_3rd_person_effect	90	41	10	7	274	746
	167	60	2	5	19	760
	0	0	1	0	0	3
debunk_satire	1872	2	1	16	6	150
	77	2	0	5	6	11629
	4	0	0	0	4	9
econ_impact	0	0	0	0	0	18

	0	0	0	0	0	0
	0	0	0	0	0	0
	1789	236	24	269	500	5950
fact-checked	38	5	6	1	12	212
	0	0	0	0	0	37
	104	3	0	0	0	6
foreign	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
impact	0	0	0	0	0	8
	0	0	0	0	0	0
	449	22	0	1	55	208
medical_info	1340	54	7	386	74	5087
	481	100	11	8	95	44006
	0	0	0	0	0	0
medical_info_test	0	0	0	0	0	0
	0	0	0	0	0	29
	92447	3075	95	68550	273	17032
politics	2131	800	45	70	42	1041
	1	150	184	10	11	15
	0	0	0	0	0	124
politics_vaccine_effects	0	0	0	0	0	0
	0	0	0	0	0	0
	2	0	0	0	0	91
situation_infection	0	0	0	0	0	9
	0	0	0	0	0	0
	3	0	0	0	0	91
vaccine_conspiracy_theory	0	0	0	0	0	79
	0	0	0	0	0	1
	0	0	0	0	0	333
vaccine_effects	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	35688
vaccine_medical_info	0	0	0	1	1	186
	0	0	0	0	0	11
	0	0	0	16	4075	12614
vaccine_politics	0	0	0	0	63451	13967
	0	0	0	0	32	16
	102027	4435	566	69860	5552	242410
Sum	5292	1316	86	579	63645	37211

	1981	300	196	21	170	45873
Grand total	109300	6051	848	70460	69367	325494

Note 1. red (the top row) = negative sentiment, gray (the middle row) = neutral sentiment, green (the bottom row) = positive sentiment.

Note 2. the “category” column represents information pollution categories, except for the following categories: debunk, debunk_3rd_person_effect, debunk_satire, and fact-checked.

2. In-depth interview

In-depth interview is used to fulfill two research objectives: RO2 and RO3. It is used to gain insight into users’ perception and experience of the COVID-19 social media infodemic and gather information about how prominent content providers functioning as intermediaries of content help shape the information circulated on social media.

2.1 Social media users’ perspectives on COVID-19 Infodemic

To gain insight into users’ perception and experience of the COVID-19 social media infodemic, in-depth interviews are conducted. This section is based on in-depth interviews with 30 participants conducted between August and October 2022. The participants are evenly grouped into three different generations: X, Y, and Z, but to ensure ethical protection of minors under 18 years of age, the Gen Z group only covers samples over 18 years of age. The interviews are conducted in two modes: face-to-face and online interviews, and they are transcribed for thematic analysis. The results are then narrated based on the emerging themes, supported by examples from the interview data. Any interview quotes included in this paper are translated into English, and the translations are indicated in square brackets. If the translations are integrated into the narration, the original texts are shown in square brackets instead.

From Table 24, it can be seen that the use of social media differs considerably between the three generations. Line is the most used platform among Gen X participants while Facebook is the top platform of choice among GenY and Z participants. Instagram is the second most used platform for Gen Y and Z participants whereas Facebook is ranked number two among Gen X participants. Line and Twitter are the third most used platform among Gen Y participants. This is also true for Gen Z

participants, except that they also rank Tiktok as one of the third most used platforms. Actually, Tiktok is included in the Gen X participants' list of the third most used platforms as well, apart from Instagram and Twitter.

The majority of interviewees across three generations cited social networking and obtaining news as the top two reasons for their use of social media. Gen X and Y participants' reasons are fairly similar as they also include work and lifestyle in addition to the top two, except that some Gen Y participants sometimes use social media for entertainment. When asked about their thoughts on their addiction, the majority of Gen X participants do not see themselves as addicted to social media despite their high screen time. Their obvious explanation for their "all day" social media use is that due to their work, they have to stay logged in. Their social media use is rooted in necessity. Among Gen Y participants, those with high screen time do not necessarily dedicate their screen time to their work, unlike their Gen X counterparts, because only three cite work as one of their reasons. Gen Z participants are straightforward about their addiction, and their high screen time correspond closely to their answers. Gen Z participants' reasons for social media use differ greatly from the others because some of them have a second anonymous account dedicated to following influencers, especially K-pop idols (i.e., South Korean idols) or Japanese artists, and some view the platforms as marketplace. Moreover, one uses social media to create and share his/her content rather than passively consume information like those of the other two generations.

Table 24

List of the participants and their social media use

Interviewee	Gen	Platform use (top-to-bottom ranking)	Reasons of use (top-to-bottom ranking)	Estimated screen time	Addiction	Exp. with COVID-19 disinfo.	Means of verification
1	X	Line, Facebook, Instagram, Twitter	news source, work	all day	FALSE	Line	Line group, Facebook Pages

2	X	Line, Facebook, YouTube, Twitter	social networking	4 hrs/day	TRUE	Facebook	Google search
3	X	Instagram, Facebook, Twitter, Tiktok, Telegram	work, lifestyle	all day	FALSE	Line	Network of friends (experts)
4	X	Facebook, Line	social networking	all day	FALSE	No experience	Google search
5	X	Line, Facebook	work, social networking	5-6 hrs/day	FALSE	Line	Official Facebook Pages, Pantip
6	X	Facebook, Line, Tiktok, Twitter, YouTube	work, news source, lifestyle	all day	FALSE	TV	none
7	X	Line, Facebook, Twitter, YouTube	news source, work, and social networking	8 hrs/day	TRUE	Line	Network of friends (experts)
8	X	Line, Facebook	social networking, work	not much	FALSE	Line	Fact-checker, Google search
9	X	Facebook, Tiktok, Line	news source, lifestyle, social networking	all day	TRUE	Line	Social media influencer (healthcare)
10	X	Facebook, Line	social networking, news source	3-4 hrs/day	FALSE	No experience	Google search
11	Y	Facebook, Instagram, Twitter, Tiktok	social networking	2 hrs/day	FALSE	Twitter	Check the source/author
12	Y	Facebook, Instagram, Line, Tiktok	social networking	4 hrs/day	TRUE	Facebook, Line	Read the content, Google search
13	Y	Instagram, Facebook, Line, Twitter	social networking, lifestyle	2-3 hrs/day	FALSE	Facebook, Line	Google search

14	Y	Facebook, Line, Instagram, Twitter, Tiktok	social networking, work, news source	6 hrs/day	TRUE	Facebook, Line	Google search, Twitter search
15	Y	Line, Facebook, Twitter, Instagram,	social networking, news source	5 hrs/day	FALSE	Facebook, Line	Official Facebook Pages, Google search
16	Y	Facebook, Instagram, Twitter, Line	news source, social networking	10 hrs/day	FALSE	Facebook	None
17	Y	Instagram, Facebook, Twitter, Line, YouTube	lifestyle, work, social networking, entertainment	12 hrs/day	TRUE	Facebook, Line	Check the source/author, Google search
18	Y	Facebook, Instagram, YouTube, Line, Twitter	work, lifestyle, social networking	9 hrs/day	FALSE	No experience	Google search, Twitter search
19	Y	Facebook, Instagram, Twitter, Tiktok	lifestyle, social networking, news source, entertainment	3-4 hrs/day	FALSE	Facebook, Line	Official Facebook Pages
20	Y	Facebook, Instagram, Line, YouTube	news source, social networking, entertainment	3 hrs/day	FALSE	Facebook	Official Facebook Pages, Network of friends (experts)
21	Z	Tiktok, Twitter, Instagram, Facebook, Line	content creation, news source, social networking, marketplace	5-6 hrs/day	TRUE	Tiktok	Google search, Twitter search, Check comments
22	Z	Facebook, Line, Twitter, Instagram	social networking, following influencers, entertainment, lifestyle	16 hrs/day	TRUE	Line, Twitter	Check the source/author, Google search, Network of

							friends (experts)
23	Z	Instagram, Facebook, Tiktok, Line, Twitter	social networking, entertainment, news source	15 hrs/day	TRUE	Tiktok	Google search, Network of friends (experts)
24	Z	Line, Twitter, Instagram, Tiktok, Facebook	work, social networking, following influencers, lifestyle, entertainment	10 hrs/day	TRUE	Line, Twitter	Google search, Facebook search, Twitter search, Network of friends (experts)
25	Z	Instagram, Facebook, Line, Twitter	news source, social networking	4-5 hrs/day	FALSE	Facebook	Google search
26	Z	Facebook, Instagram, Line, Twitter	social networking, marketplace, news source, lifestyle	6 hrs/day	TRUE	Line	Network of friends (experts), Pantip, Google search
27	Z	Facebook, Line, Instagram, Twitter, Tiktok	work, social networking, news source	7-8 hrs/day	FALSE	Facebook, Line	Google search, Network of friends (experts)
28	Z	Twitter, Instagram, Facebook, Tiktok	following influencers, lifestyle, news source	10 hrs/day	TRUE	Facebook, Tiktok	Twitter search, Google search
29	Z	Facebook, Instagram, Twitter	social networking, news source, lifestyle	12 hrs/day	TRUE	Facebook	Google search
30	Z	Instagram, Line, Tiktok, Facebook, Twitter	social networking, news source, entertainment	1-2 hrs/day	FALSE	Facebook, Line	Official Facebook Pages,

Note 1. Social networking here means using social media to connect, communicate, and post/share information about themselves with other people.

Note 2. Lifestyle refers to lifestyle content such as content about fashion and clothing.

2.2 COVID-19 information sources and perception of trustworthiness of COVID-19 information on social media

The majority of interviewees (22) had negative opinion towards COVID-19 information on social media. Some expressed negative views, tied to the perception that information on social media could be user-generated, anonymous, or even fabricated. The following excerpts from the transcript were cases in point. Participant number 7 (Gen X) believed that television content was a more trustworthy source of information compared to social media, as the former clearly cited its sources, while the latter could often be user-generated or anonymous. She said, “compared to television content which information sources are clearly cited, social media content can be user-generated or anonymous” (Participant 7, personal communication, September 12, 2022). Similarly, participant number 4 (Gen X), expressed mistrust in social media content due to the lack of cited sources and the possibility of disinformation, while contrasting it with television content that underwent editorial processes. “I don’t trust them (social media content). There is no credit given and if there is one, I am not sure whether it comes from the given source or not. In some cases, credits are given, but the information doesn’t come from the source. Television content, in contrast, has to undergo editorial process,” said participant number 4 (Gen X) (Participant 4, personal communication, September 7, 2022). Participant number 20 (Gen Y) asserted that COVID-19 information on Facebook could be fifty-fifty in terms of trustworthiness because she had to verify whether claims on Facebook were made by the cited affiliations such as the Ministry of Public Health or Chiang Mai Provincial Public Health Office Page or not, but she also noted that false information “comes from friends or tagged posts from friends of friends” that appeared in her feed (Participant 20, personal communication, September 8, 2022). Participant number 27

similarly said, “things said on social media are not reliable, compared to television content” (Participant 27, personal communication, September 8, 2022).

2.2.1 Participants’ trust in their platforms of choice

Some suggested that the communication environment of certain platform encouraged the proliferation of disinformation. Participant number 11 (Gen Y) contrasted her perception of Facebook’s architecture that allowed her to choose content on her feed with Twitter’s hashtags, which function as a pool of mixed content that she could not choose. She said, “Facebook is mostly free from disinformation/fake news because I can choose my content. But Twitter has hashtags, places where most people emotionally express towards a topic, this makes it a mix between facts and false information” (Participant 11, personal communication, August 22, 2022). The following excerpt from participant number 1 (Gen X) reflected a similar view but from an opposite stance on Twitter. “There are deep insights on Twitter because people are not afraid to express, but the information has to be re-checked. There is a lack of formality on social media, so bad information exists, or the information there is one-sided,” said the Gen X interviewee (Participant 1, personal communication, September 1, 2022).

By contrast, the rest had trust in social media information. For instance, participant number 26 (Gen Z) stated that she put “80% trust” in social media information. Facebook was her main source during the pandemic because “television news, such as Amarin TV and Sorayuth (a renowned anchor), is also on Facebook, and these are reliable sources.” She added, “Facebook is not full of fake news. The amount is not that high to discourage me from using the platform” (Participant 26, personal communication, September 8, 2022). A similar viewpoint was expressed by another Gen Z participant (number 22), who considers social media information to be trustworthy. He explained that “the perception of trustworthiness varies from one person to another, depending on the news sources and people within their social network. While news from official news agencies is often reliable, those from Top News may not be due to a possible hidden political agenda. Nevertheless, this is not always the case, and the overall trustworthiness of social media information is estimated to be around 80%” (Participant 22, personal communication, September 1, 2022). In the

same vein, participant number 21 (Gen Z) believed that information on Twitter was reliable. She said: “Unlike Facebook, Twitter is ‘real’. People have the courage to criticize the government because they can have anonymity through ‘unidentified accounts.’ Tiktok has a playful atmosphere because it is full of children. This makes it chaotic” (Participant 21, personal communication, September 1, 2022). These excerpts indicated that they trusted the media they consumed in spite of their negative perception of social media information.

Some participants highlighted users’ free will to choose their social networks, which, in turn, shaped their information feed. Participant number 9 (Gen X) explained that trust in information sources varied from one person to person, but for her, she put trust in what aligned with her thoughts. She said, “trustworthiness (of social media information) depends on us. When it comes to political conflicts, we will trust more in the arguments we advocate than in the opposite view” (Participant 9, personal communication, September 12, 2022). Participant number 12 (Gen Y) said:

trustworthiness (of information) depends on the sources that users follow. I follow reliable news agencies such as Khaosod, Kammakorn Khao (i.e., a Facebook Page run by Sorayuth, a renowned anchor), Thairath, One31, a Thai television channel’s page, and Nation, but I don’t follow social media influencers. So my feed is similar to television content because of the Facebook following list. I’m not sure about Line because people often pass on screenshots of information (Participant 12, personal communication, August 23, 2022).

A similar view was expressed by participant number 13 (Gen Y). Her answer reflected her perspective on how social networking choices could shape the information one received. She explained that due to having a network consisting of only a few formal contacts, she did not receive much reliable information. She said, “trustworthiness of information circulated on social media is fifty-fifty because there are only a few formal people in my social network” (Participant 13, personal communication, August 25, 2022).

According to the self-reported data, the factors that influence trust in social media platforms can be summarized as follows:

- the communication environment or norms within the platforms (e.g., the degree of anonymity, the extent of freedom of expression permitted, and post-truth elements such as content that reflects distrust of the media);
- the information sources and presence of official media on the platforms;
- the presence of filter bubbles and echo chambers, signifying a lack of information diversity.

2.3 Role of contextual factors in shaping the infodemic

Another common view amongst a group of participants was that COVID-19 situation shaped the social media infodemic. For example, participant number 15 (Gen Y) explained that information appeared in her Facebook feed differed greatly from time to time depending on the changing COVID-19 situation.

Based on my feed, looking back to 2020, it was a mix of facts and false information. The ratio was around fifty-fifty. In 2022, fake news had faded, and facts accounted for 70% of the content shown on my feed. I guess the purveyors of fake news lacked any incentive to spread fake news because people no longer cared about COVID-19, mentioned the participant (Participant 15, personal communication, September 2, 2022).

Similar to participant 15, participant number 17 (Gen Y) asserted that in the initial phase of COVID-19, social media information was not reliable as people posted in panic, but as time passed, she found social media to be more reliable, especially after dedicated pages for COVID-19 information were established. She said:

In the early days, there was a huge panic about the pandemic. I was afraid just like everyone else, so I chose to get news from television, especially live situation reports by the Ministry of Health (to social media), rather than social media. As the pandemic progressed, I began to rely more on online news sources. I believe that the reported figures (number of confirmed cases) did not accurately reflect the true reality of the situation, but in terms of news coverage in general, I think there was an increase in the availability of information as the

pandemic evolved. Television content began to flow through social media, and dedicated pages for COVID-19 information were established. That was when social media became reliable (Participant 17, personal communication, September 5, 2022).

Participant number 24 (Gen Z) expressed a different view, saying that social media platforms should not be blamed because social context and political climate were at the root of the infodemic. She said,

We are in an untrustworthy country. Although my job is in the field of television production, I put the least trust in television news as it is heavily filtered, outdated, and politicized. It is controlled by the government. To be frank, during the COVID-19 pandemic, television content could not be trusted. To answer the question, I would say I choose social media, but I have to rely on many sources. For example, I have to read from various Twitter accounts, including scholars and experts in the field. Sometimes I read foreign news to see how information on the same subject is reported. As I am a K-pop fan, I often read news from Korea (Participant 24, personal communication, September 7, 2022).

The interviewee's standpoint, as reflected in the interview, aligned with the post-truth ideology. She believes that television news is politically influenced and controlled by the government, and that it does not correspond with her personal understanding of the COVID-19 situation. This suggests that she distrusts the media and prefers to rely on information that aligns with her own beliefs.

Participant number 29 (Gen Z) held a unique view saying that sloppy journalism was an aggravating factor in the infodemic. She explained: "As I work in the field of mass media, I have observed a persistent lack of professional ethics among news agencies. They often publish unverified information, which may ultimately result in the dissemination of false information" (Participant 29, personal communication, September 13, 2022).

2.4 Third-person effect

When asked about their media and information literacy skills, the majority of the participants (14) perceived that they had higher skills than others, 12 of them saw

themselves at the same level as others around them. The rest (4) gave themselves lower scores than others (see Table 25). Although Gen Y had the highest number of participants (6) who rated themselves higher than others, compared to Gen X (4) and Gen Z (4), the difference was not significant enough to conclude that Gen Y exhibited a higher degree of the third-person effect.

Table 25

How participants rate their own media and information literacy skills compared to others

	Lower than others	Same as others	Higher than others
Gen X	3	3	4
Gen Y	0	4	6
Gen Z	1	5	4
Total	4	12	14

Note. The participants were asked to rate their own ability to detect COVID-19 disinformation on a scale of 0 to 5, with 5 being the highest score, and to rate the skills of others using the same scale.

The following excerpts exemplified how participants expressed concern about other people's ability to detect disinformation, and highlighted that it was one of the causal factors of the infodemic. Many of them saw the older generation as the most vulnerable group in the society. Participant number 20 (Gen Y), for example, pointed out that the elderly lacked digital literacy. She stated,

Verifying information on social media is possible for me, but for the elderly, the ability to use Facebook is already impressive. Attempting to double-check with a public health page can be difficult for them, and they typically believe their first source of information. It's like seeing, believing, and doing, which can have a significant impact on them (Participant 20, personal communication, September 9, 2022).

Likewise, another Gen Y participant presumed that the older generation lacked critical thinking. "If it's our parents' generation, they may tend to believe what they consume without critically evaluating it. It happens, you know," said Participant number 19 (Gen Y) (Participant 19, personal communication, September 9, 2022). Participant number 3 (Gen X) described Line as a platform mainly used by Generation X and baby boomers,

whom he perceived to be susceptible to disinformation, to share information including fake news. He said:

I see Line as Generation X and baby boomers' platform. It is a place where they share information like a Ponzi scheme. They believe that people of their generation are more worldly than others, so our parents become highly problematic during the pandemic. They are very concerned and share all kind of information including fake news. And if we warn them, we get scolded. They trust what their Line friends share because they believe it is not made up by the mass media. The reality is that all of them are fooled (Participant 3, personal communication, September 7, 2022).

Similarly, participant number 14 (Gen Y) gave an example showing that the older people were susceptible to disinformation. She said: "I trust Twitter the most, and then Facebook. Line is the worst because of the elderly. They receive information that has been widely shared, and it is often out-of-context information such as content about things happened in 2019 that is reframed to be shared in 2021" (Participant 14, personal communication, September 8, 2022). According to participant number 2 (Gen X), about half of society lacked the necessary media and information literacy skills to effectively handle disinformation. The highly vulnerable group to him was the elderly. When asked about his thought on COVID-19 disinformation, he answered,

I think it's a problem, because about half of those who share disinformation, they see the messages and instantly believe them. They then share the messages, often in a negative tone. So this definitely brings about panic to the society. The other half may be just like me. That is, they analyze the messages, make comments, and look for relevant information. Based on my experience, the people who would be affected by the infodemic are the elderly. I see that they are in many Line groups, where they copy and share false information (Participant 2, personal communication, September 6, 2022).

Similarly, when asked about their views on the implications of COVID-19 infodemic, 16 participants (Gen X: 3, Gen Y: 9, and Gen Z: 4) expressed concern that the elderly were the most vulnerable groups affected by the infodemic. The following excerpts reflected the participants' perception that the elderly were more susceptible

to the content they consumed than younger generations. Participant number 11 (Gen Y) said, “The impact is real. For example, people fell for fake news and even drank urine. However, the extent of the impact is limited to a small minority of the population, such as the elderly, who lack literacy” (Participant 11, personal communication, August 22, 2022). Participant number 18 (Gen Y) saw that the impact of the infodemic was not dramatic and limited to the elderly whom she perceived to be the most vulnerable group to disinformation. She said that the younger generations (Gen Y and below) were less likely to fall for it (Participant 18, personal communication, September 5, 2022). Some participants highlighted the fact that the elderly lacked digital literacy, and this made them more susceptible to falling for COVID-19 disinformation on social media. Participant number 27 (Gen Z), for example, expressed a concern that Line was exclusively used by baby boomers as their primary source of information, which often flowed through their friends, leading them to believe everything they received. In contrast to the younger generations (X, Y, Z) who were digital natives and were better able to differentiate between fake and reliable sources of information, the elderly lacked digital literacy (Participant 27, personal communication, September 8, 2022). Participant number 29 (Gen Z) contrasted the older generation’s digital literacy skills with the younger generation. She said:

The younger generation, typically 18 to 30 years old, are not stupid, they know how to search for and gather relevant information. Conversely, the elderly, due to their lack of critical thinking skills or literacy, are of concern. For instance, my family members are part of Line groups comprising their friends and relatives, and sometimes, they share information from these groups to our family's group. Much of the shared information is false (Participant 29, personal communication, September 13, 2022).

Participant number 13 (Gen Y) pointed out the root of the infodemic in Thai society at the macro level. She explained that as Thailand was considered an aging society, it made sense that there were more elderly people than children, so the proportion of disinformation was likely to be large in proportion to the population (Participant 13, personal communication, August 25, 2022). In other words, she argued that due to Thailand’s substantial elderly population, a larger segment of the population is more

prone to disinformation. This demographic composition leads to a higher likelihood of disinformation spreading widely within society.

These participants expressed concerns about the vulnerability of the elderly to COVID-19 infodemic due to their limited digital literacy and propensity to trust and act upon their primary source of information. For example, they seemed to believe that their own critical thinking skills were strong enough to discern reliable information from falsehood, whereas others, especially the elderly, were more easily swayed by disinformation. They may also assume that others were more susceptible to the negative effects of exposure to disinformation, while believing that they themselves were immune. This was an example of the third-person effect in action, as the participants perceived the impact of social media information on the elderly to be greater than its impact on themselves.

Although some participants did not view generation as a significant factor in the spread of COVID-19 disinformation, their thoughts still reflected the third-person effect. Participant number 6 (Gen X) said,

The elderly may not get information solely from Line, but they are influenced by their younger relatives who could reinforce their thought on the received information or give false information that contradicts the factual information from Line to the elderly. In my case, my parents trust and believe me without question. I believe this is true for the kids as they could be influenced by their parents (Participant 6, personal communication, September 9, 2022).

Comment made by participant number 6 (Gen X) provided evidence pointed to the presence of third person effect, but she reasoned that the elderly were not to be blamed as they could be influenced by the younger generations.

Children and grandchildren often feed social media information (assumed to be false) to their parents or grandparents, and this reinforces the parent's/grandparents' pre-existing false beliefs they were exposed to earlier. In some cases, what the parents/grandparents exposed to is reliable, but their children complain that it is wrong even though their information might have

been correct, said the participant (Participant 6, personal communication, September 9, 2022).

Taking into account these observations, it was apparent that many participants considered themselves to be equally or more capable than others when it came to detecting COVID-19 disinformation. Meanwhile, the majority of them perceived the elderly as being the most susceptible group to false information.

2.5 Participants' ability to spot COVID-19 disinformation

To get insight into how the participants detect COVID-19 disinformation, they were asked to give their verdicts on six screenshots of social media posts, three of which were from Facebook and three from Twitter. All of the screenshots were derived from fact-checkers' archives and had been marked as false information. From Table 26, it could be seen that out of 29 participants answering this question, most participants had relatively high scores, indicating a reasonable ability to identify false COVID-19 information on social media. It was apparent that Gen X participants scored the highest, compared to the other two.

Table 26

Participants' scores on detecting COVID-19 disinformation

	6 points	5 points	4 points	3 points
Number of Gen X participants	4	5	1	0
Number of Gen Y participants	3	1	5	1
Number of Gen Z participants	2	3	2	2
Total	9	9	8	3

When asked about means of verification, Google search (19 participants), network of friends (experts) (6 participants), and official Facebook Pages (5 participants) were the most common ways to verify COVID-19 disinformation. For instance, Participant 4 (Gen X) explained, "I use Google search to check whether there is any mention of this issue in other media or if there is any similar news or information being circulated. If not, we should be skeptical and suspect that it may not be true" (Participant 4, personal communication, September 7, 2022). Participant number 13 (Gen Y) commented that she did not normally verify information, but Google was her choice if necessary. "Generally, I don't verify information, but if I feel the need to check, I rely on Google search to see if other sources or individuals discuss the same

matter. For instance, I search for the topic on Google and look for the predominant views,” said the participant (Participant 13, personal communication, August 25, 2022). Comments by Gen Z participants not only showed that Google search was the most common means of verification but also reflected their trust in their platform of choices. Participant 21 (Gen Z) typically relied on Google to find reliable information on a particular topic of interest. If she came across posts containing false information, she often reported them and left a comment under the post to alert others that the information was incorrect (Participant 21, personal communication, September 1, 2022).

Six participants from different generations mentioned that they depended on their friends, especially those who had expertise in the healthcare field. Participants 3 and 7, both from Gen X, preferred to ask their doctor friends in person when they were unsure about information, rather than searching online as this way, they could discuss the information together. Five participants, who were from different generations, stated that they relied on official Facebook Pages to obtain accurate and trustworthy information. Participant 5 (Gen X) and 20 (Gen Y) relied on Pages run by the government such as the Ministry of Public Health’s “ไทยรัฐสู้โควิด” (thaimoph) and the Government Public Relations Department’s “ศูนย์ข้อมูล COVID-19” (informationcovid19) (Participant 5, personal communication, September 8, 2022; Participant 20, personal communication, September 8, 2022).

Apart from the most common ways of verifying COVID-19 disinformation, the findings revealed that participants used various sources and means to verify information. It was interesting to note that two participants (one from Gen X and one from Gen Z) mentioned that they consulted the Thai internet forum, Pantip, where anyone could write about anything, for information on COVID-19 (Participant 6, personal communication, September 9, 2022; Participant 26, personal communication, September 8, 2022), one relied on trusted non-expert friends (Participant 30, personal communication, September 13, 2022), one consulted a social media influencer with a healthcare focus (Participant 9, personal communication, September 12, 2022). Surprisingly, only a single participant confirmed information by consulting with fact-checkers. Participant 8 (Gen X) stated that although she usually did not fact-check

information, she used Google search to locate trustworthy sources of information about the topic of interest. Additionally, she communicated with the Anti-Fake News Center Thailand via Line Official to verify the information (Participant 8, personal communication, September 12, 2022). To sum up, this section examined how participants detected COVID-19 disinformation and explored their methods of verification. The findings showed that most participants demonstrate average ability to detect false COVID-19 information on social media, and they relied on Google search as the most common method of verification. Notably, some participants had trust in specific sources they utilized to verify information, like the case of using Pantip. Moreover, only a single participant was familiar with fact-checking, indicating that fact-checking bodies were not widely recognized in the society.

2.6 Experience with COVID-19 disinformation

Most of the participants (26 out of 30) had encountered with COVID-19 disinformation on social media while only one participant reported having experienced it on TV and three participants reported having no experience at all (see Table 24). Of the various social media platforms, Line groups and Facebook were the sources most commonly reported for COVID-19 disinformation in this study. A total of 17 participants reported experiencing disinformation in Line groups and 14 participants reported experiencing it on Facebook. Their experiences ranged across different topics, including poor quality news reporting, herbal remedies for COVID-19, and conspiracy theories about COVID-19 vaccines. Participant number 12 (Gen Y), for example, said “I have seen a lot of false information on Line and Facebook, even from news agencies such as Thairath. They reported wrongly, and I only realized that it was incorrect afterward. This shows that, in addition to what users pass on to each other, news agencies also make mistakes” (Participant 12, personal communication, August 23, 2022). Participant number 1 (Gen X) said, “I saw COVID-19 disinformation in Line groups, such as a group of friends and a group of family members with older people. The messages include topics about the tough COVID-19 situation in Thailand and the death toll, and they aggravated the situation” (Participant 1, personal communication, September 1, 2022). Participant number 9 (Gen X) gave example saying “There were shared messages on Line about vaccines. For example, one claim stated that Sinovac was more effective

than Moderna, which allegedly contained a chip for tracking and destruction” (Participant 9, personal communication, September 12, 2022). “There was news about herbs that could supposedly cure COVID-19, but I can’t recall which herb it was. The news claims that taking this herb could kill the virus. I have come across this news being shared on Facebook and Line groups, including a work group and a group of friends,” said Participant number 15 (Gen Y) (Participant 15, personal communication, September 2, 2022). Participant number 16 (Gen Y) shared similar experience with disinformation about herbs on Facebook. She said, “My dad saw information about “ฟ้าทะลายโจร” (Andrographis paniculate) as COVID-19 prevention on Facebook, and I saw false information about quarantine on Facebook” (Participant 16, personal communication, September 5, 2022). The responses related to herbal remedies for COVID-19 confirmed the findings of the social network analysis, which indicated that medical information, particularly content related to herbs, was one of the major clusters in Facebook and Twitter networks.

Participants from the younger generation (Participant 21, 23, and 28 from Gen Z) reported Tiktok, while Participant 11 (Gen Y) and Participant 22 (Gen Z) reported Twitter as sources of COVID-19 disinformation. In addition to Line groups and Facebook, several participants stated that they came across COVID-19 disinformation on the social media platforms they frequently used. For example, participant 23 (Gen Z), who was a frequent user of Tiktok, reported encountering Tiktok content related to a spiritual cult leader called “Phra Bida.” She said, “According to his disciples, consuming his urine or excrement can cure illnesses including COVID-19” (Participant 23, personal communication, September 6, 2022).

A notable trend evident from the participants’ answers was that none of them reported coming across and sharing COVID-19 disinformation unknowingly and later realizing it. This observation could be attributed to three possible factors: their selective choice of social networks, their lack of awareness about the falsity of the posts they encountered and shared, and their overestimation of their own abilities, which reflected the third-person effect.

2.7 Perceptions and attitudes towards COVID-19 disinformation purveyors

The participants were asked about their views on the instigators and agents of COVID-19 disinformation. The majority of them believed that the instigators engaged in this behavior for personal gain or benefit (12 participants), while the agents or those who shared such information did not realize that it was false (14 participants). For example, Participant 26 (Gen Z) said,

Regarding those who create disinformation, there must be some motive behind their actions. They might create a page to sell later on or heavily promote their posts for future leverage. Alternatively, they may simply want attention or generate buzz. As for why people share such content, it's common for Thai people to follow trends. For instance, they may see a post on their friend's Facebook and share it without much thought. They may not have even read or clicked on the post, but because their friend liked, commented, or shared it, they share it too. Some people also share news without verifying its accuracy, basing their decision on the post's number of likes, comments, and shares. It could be something that resonates with them or that Facebook's algorithm deems relevant to their interests. However, for someone to share something out of genuine interest, they must first have a shared connection or interest with the content (Participant 26, personal communication, September 8, 2022).

Another frequently shared view about the instigators was that they were motivated by the desire for recognition or to be viewed as influencers or insiders in society (11 participants), while the second most commonly held view about the agents was that they shared information out of concern for those around them (6 participants). Participant 19 (Gen Y), for example, said:

The producers of disinformation strive to become trendsetters and obtain Likes on social media. Nowadays, social media addiction to Likes and Shares has become prevalent. People tend to gravitate towards controversial issues and hot topics regardless of their veracity. It is my belief that these producers are aware of the falsehood of their content. On the other hand, I do not think the group who shares such content on Facebook is aware of its falsehood. Their decision to share is not well-thought-out, and they may do so with the intent

of informing others about issues that affect them. I believe their intentions are good (Participant 19, personal communication, September 9, 2022).

Similar patterns emerged from participants' responses regarding both the instigators and agents, including creating content or sharing information to gain acceptance, politicization, particularly censorship, and personal experiences. These findings demonstrated a strong connection with the results of the social network analysis, which indicated that medical information, particularly content about herbal remedies for COVID-19 and information about vaccines, was widely circulated on Facebook and Twitter.

2.8 Tackling the spread of disinformation on social media: effective measures and responsible actors

The participants were asked for their views on how to effectively combat the spread of COVID-19 misinformation on social media. The two most common views emerged.

The first view was that the government should take full responsibility for addressing this issue because it directly impacted people's well-being (11 participants). For instance, Participant 24 (Gen Z) commented that the government needed to do more than what they had done so far and enhance their communication with the people in the society. She said,

In my opinion, those in positions of power should have control over the information that is released to the public. It is crucial that government officials and public health authorities provide accurate, confident, and precise news or announcements. Unfortunately, each time they make an announcement, there is a lack of mindfulness, attention, and accuracy. This issue also applies to the media industry, where accuracy is often disregarded. Therefore, the NBTC and other communication-related agencies, as well as those who work in the media industry, must take responsibility for ensuring that the information they present is both accurate and timely. For instance, in the case of the fake call center gang, action should have been taken earlier to prevent it from becoming a significant social problem. However, this may be challenging since people's level of media and information literacy varies widely. Therefore, instead of

fixing individuals in society, it would be more effective to change relevant government bodies and the media industry. When it comes to matters of life and death, such as public health, the media should not prioritize ratings or social media engagements. Finally, I believe that the government must prioritize presenting true news before attempting to control anyone else (Participant 24, personal communication, September 7, 2022).

Participant 28 (Gen Z) held a similar perspective that the government should adopt an active approach to address the issue. She stated,

It is clear that the government, being in a position of power, has the ability to make change, and it is obvious that it is their responsibility to tackle problems, manage information flow, and inform the public of what is true and false. Since not everyone can distinguish between fact and false information, the government must serve as the first line of defense in filtering information for the public. However, they should not hide what the public deserves to know. If the government collaborates with social media platforms, it could be an effective way to combat fake news. It is not the responsibility of users to change their behavior (Participant 28, personal communication, September 8, 2022).

When asked about her opinion on the government's Anti-Fake News Center, expressed that she had no idea about it.

The second view was that relying solely on the government or social media platform providers would not be effective in tackling this issue because it was a problem on a larger scale and required collaboration from relevant government bodies, platform providers, and everyone in society (11 participants). Participant 4 (Gen X) stated,

All the stakeholders concerned with the issue should play an active role and take necessary actions as it cannot solely rely on the government. In fact, not everyone trusts the government, and the responsibility of curbing the issue cannot be solely on social media platforms. Thus, multiple sectors should take responsibility and play a role in tackling the issue (Participant 4, personal communication, September 7, 2022).

Participant 7 (Gen X) shared the same viewpoint that all parties involved, including users, platform providers, and the government, should take responsibility and exercise caution in communication related to COVID-19. She said,

In my opinion, it is the responsibility of users to verify the information before sharing it on social media platforms. These platforms have the authority to address false information and should have a clear policy regarding the removal of such content. The government must also have a transparent communication policy to deal with this issue and utilize various communication channels to effectively communicate with the public. Unfortunately, the government has failed to do so (Participant 7, personal communication, September 12, 2022).

The participants expressed additional perspectives on the matter, which included the importance of users improving their media and information literacy skills, as well as contributing to a better communication environment by reporting and warning others about false information. Some participants suggested the creation of an intermediary or specialized task force to deal with the issue of COVID-19 fake news. Participants also suggested that the mass media should be more cautious in their reporting and that traditional communication channels such as public address systems, mobile public address systems, and bulletins should be used to disseminate accurate information to people who were not on social media.

3. Perspectives of key informants on tackling COVID-19 infodemic in Thailand

The purposive sampling technique was used to select key informants from various sectors, including government bodies, news media, civil society organizations, and social media influencers. The representatives from government bodies were a representative of the Anti-Fake News Center Thailand and a representative of the Thai D.I. Machine, a natural language processing fact-checking website sponsored by the Office of Thai Media Fund. The Thai D.I. Machine is funded by the government and indirectly represents its efforts to combat disinformation. To gain diverse viewpoints on how news media tackle COVID-19 disinformation, one representative from a national news organization and one from a local news organization were selected. The key informants representing the news media were a representative from the Thai Public Broadcasting Service (Thai PBS) and a representative from the Voice of Mass

Communication (FM100), a local news media outlet situated in Chiang Mai. The representatives from civil society organizations were a representative of Zen-Dai (เส้นด้าย) เชียงใหม่, a regional branch of a non-governmental and non-profit organization that focuses on responding to the COVID-19 crisis, and a representative of Cofact.org, a fact-checking platform run by a network of Thai civil society organizations. The social media influencers were a representative of a fact-checking Facebook Page called “อ้อมันเป็นอย่างนี้เอง by อาจารย์เจษฎ์” (OhlSeebyAjarnJess) and a representative of “Drama-addict,” a social media influencer operating under the alias “จำพิชิต ขจัดพาลชน,” who is seen by millions of followers as a legitimate crisis actor during the pandemic.

3.1 Government bodies

When questioned about how they or their institutions started combating disinformation, the representative of the Anti-Fake News Center (AFNC Thailand) and the representative of the Thai D.I. Machine expressed similar ideas that their starting point was to aid people in addressing the problem. The representative from AFNC Thailand stated,

AFNC Thailand is what people can rely on for verifying information in a society where a lot of disinformation is circulated. We coordinate with responsible institutions such as the Thai Meteorological Department and municipal offices to verify information and provide fact-checked information to the public, making the verification process more accessible (AFNC Thailand representative, personal communication, October 19, 2022).

The representative of the Thai D.I. Machine explained that his research on media literacy led to the development of the project. The research revealed that media literacy could be improved by following three simple steps: questioning, verifying, and responding. The first step involves questioning whether the information is true or not, and the participants were found to have adequate capability for this. However, verifying information was a major challenge for media literacy improvement as many people did not know how or where to start when it came to verifying information. He wanted to create something to facilitate the second step, so this became his starting point for the project (Thai D.I. Machine representative, personal communication, September 20, 2023).

While their starting points were similar, their standing and workflow differed significantly. AFNC Thailand was a fact-checking body functioning as an intermediary, gathering authoritative information from responsible sources to verify targeted information. It employed social monitoring tools such as Google Trends and Twitter Trends to keep track of public communication on all open social media platforms, except for private ones like Line. In addition, AFNC Thailand relied on input from the public through a reporting channel, where individuals could submit screenshots of potential disinformation for verification. The process of verifying information could be divided into two main approaches and steps: using social monitoring tools to gather data and relying on human workers to filter out noise, opinions, and private matters such as posts containing statements like “the government is so good” and personal gossip or entertainment industry-related information that did not impact society as a whole. The AFNC Thailand representative noted that viral disinformation could sometimes be based on personal matters such as a politician’s scandal and emphasized that the level of engagement a post received was crucial in identifying such disinformation. He stated that “an abnormally high level of engagement often serves as a clue and can lead to the discovery of viral disinformation.” He also emphasized that AFNC Thailand’s primary role was that of an intermediary, coordinating with different actors to perform fact-checking. Therefore, AFNC Thailand refrained from providing a final verdict without having access to authoritative information. According to the representative, people trusted and depended on AFNC Thailand because it was run by the government and had a proven track record of reliability due to its long-term operation (AFNC Thailand representative, personal communication, October 19, 2022).

On the other hand, Thai D.I. Machine positioned itself as a facilitator that assisted users in making decisions regarding the information they had, rather than as a fact-checker. It relied solely on machine learning, which could detect disinformation with an accuracy rate of approximately 80%. The Thai D.I. Machine representative explained,

In the field of communication studies, we have theories to help us identify fake news, but we lack expertise in IT. To address this gap, we collaborate with a

research team from King Mongkut's University of Technology North Bangkok who specialize in machine learning, and we apply for sponsorship from Thai Media Fund. Our web application operates as follows: it analyzes information using a set of parameters and generates scores: "fake score" and "real score." The machine then assigns a color-coded percentage of trustworthiness, such as green for 90-100% trustworthiness and red for the lowest level of trustworthiness. Behind the scenes, the machine crawls Thai websites, stores the data it collects, and regularly updates it to create rules for generating the scores mentioned earlier. Thai D.I. Machine verifies collected information by checking it against verified data sources such as the Ministry of Digital Economy and Society's Anti-Fake News Center. Our accuracy rate was around 80% before launching the application. The most difficult aspect is the communication context, where a single word may have multiple connotations and denotations. Satire is a good example of this challenge. To tackle this, we manually add additional rules for our machine learning model to comprehend (Thai D.I. Machine representative, personal communication, September 20, 2023).

When asked about the situation of the COVID-19 social media infodemic and its impact on society, both representatives shared similar thoughts: they acknowledged the abundance of COVID-19 disinformation being spread on social media and considered it a pressing national issue that requires urgent attention. The representative of the AFNC Thailand shared that he perceived social media information to be untrustworthy due to its tendency to contain biased and distorted information. He elaborated,

It's not very trustworthy, to be honest. The information is often twisted or distorted to fit people's biases. People tend to only believe what they want to believe and don't really fact-check. Sometimes, different people will see things differently, so even if something is true, it may be presented in a biased way. Therefore, I can't really say if it's right or wrong. It also depends on the media itself. If they present information in a clear and unbiased way, then it can be beneficial. But people don't like to receive information in that manner. That's not how our society works. Otherwise, we wouldn't have influencers

like “ลุงพล¹⁰⁰.”... COVID-19 seems to be a national agenda. Everyone talks about it, but with the passage of time, the problem can be solved with knowledge. ... Drawing from our experience, we have found that the public possess the necessary knowledge and skills to identify fake news. However, I believe that emotions such as the desire to be the first one to share information or wanting to share it with loved ones may cloud their judgment. Therefore, while Thai citizens may possess immunity to fake news, they need to become more conscious when consuming COVID-19 related information. ... AFNC Thailand has categorized COVID-19 disinformation circulated in our society into four broad groups based on the data we collected: content related to government policy, content related to monetary policy and banking, health-related content, and content related to disasters. If asked whether we are content with our work now, I would say that we are not fully satisfied. We aim to improve our fact-checking process to make it more precise, cover additional categories, and take less time. (AFNC Thailand representative, personal communication, October 19, 2022).

The representative of the Thai D.I. Machine expressed a similar perspective, stating that COVID-19 disinformation was prevalent during the pandemic. He further explained that several factors contributed to information disorder, such as sloppy journalism, false content created by users, fake social media accounts and information operations, as well as a lack of specific law for this issue. He said,

My previous researches suggest Thai people, across all generations, possess a high level of “media knowledge.” Despite this, I believe that they are aware that the media may deceive them, but are still willing to be misled. For this reason, the responsibility of improving media literacy skills should not solely fall on users; media outlets themselves should also strive for greater reliability. In the past, before the Internet era, such problems were nearly nonexistent

¹⁰⁰ ลุงพล (Lung Phol) is a man who gained popularity following the investigation into the mysterious death of Nong Chompu, a 3-year-old girl who went missing from her dormitory in Ban Kok Kok, Mukdahan Province. He was initially considered a suspect in the case, he later became a social media influencer and frequently featured on television.

because the media was held to high standards, emphasizing balanced, objective, and accurate reporting. For instance, newspaper journalists had to undergo rigorous information checking processes before publication. These were kind of fact-checking processes. However, nowadays it seems that media outlets are not upholding those same standards, and I don't know why. User-generated content may contribute to the issue, as many lack the knowledge needed to verify information but still contribute content to the public. Therefore, it is necessary to change their attitudes to prioritize sharing factual news rather than being the first to share false information. ... Finally, individuals in positions of authority should enhance regulations regarding the dissemination of fake news. Individuals who are found to be sharing false information should face consequences, and they cannot use freedom of speech as an excuse for their actions, as this right does not extend to spreading lies (Thai D.I. Machine representative, personal communication, September 20, 2023).

The two representatives had differing opinions regarding the reasons behind the creation and dissemination of COVID-19 disinformation on social media. The AFNC Thailand representative identified three categories of instigators: clickbait, cyberbullying, and phishing. He explained,

Those who shared clickbait content were easily lured by sensational headlines and wanted to know more about the content. Cyberbullying attracted those who shared a common like or dislike. Phishing appealed to those who were greedy. Additionally, fear-driven content, such as edited movie clips that depicted COVID-19 in a terrifying manner, attracted people who were already afraid of the disease (AFNC Thailand representative, personal communication, October 19, 2022).

On the other hand, the Thai D.I. Machine representative described different types of instigators of COVID-19 disinformation on social media: those who spread false information unintentionally, those who use disinformation for political purposes, and those who use phishing scams to trick people into revealing personal information or to generate financial benefits. Some post false information without realizing it, with

good intentions. Others post disinformation to advance political agendas, discredit someone, or gain monetary benefits. There are also those who post to boost their self-esteem or driven by FOMO (fear of missing out). Regarding generation-related factor, his research showed that there was a stereotype that the elderly lacked media and digital literacy, but enjoyed sharing information on social media and were therefore often blamed for the spread of COVID-19 disinformation. However, he suggested that we should avoid stereotyping them. Although many of them reported sharing such information out of concern for those around them, many elderly people reported that they were cautious when they were unsure or did not fully understand the message and chose to ignore it, which prevented them from falling for fake news (Thai D.I. Machine representative, personal communication, September 20, 2023).

The two representatives had different views on how to address the issue of COVID-19 infodemic. The AFNC Thailand representative stated that no channel could reach everyone, even with increased advertising credits or by including all online and offline media outlets. He proposed that their role was to create a platform that the public could rely on and expand to cover all the platforms they use. Furthermore, they plan to expand to other popular social media platforms like TikTok and collaborate with social media influencers to reach more people in the future (AFNC Thailand representative, personal communication, October 19, 2022). Conversely, the Thai D.I. Machine representative recommended focusing on three crucial areas: improving the public's literacy level, enhancing media fact-checking processes, and enforcing stricter regulations. Regarding his project, he explained that in addition to expanding the current database, he “plans to focus on adding new features. One of the features is an image search tool that can detect signs of image editing similar to Google Image Search.” He also said that he “plans to develop an add-on for Facebook that can alert users about false information” (Thai D.I. Machine representative, personal communication, September 20, 2023).

Viable future strategies proposed by AFNC Thailand and Thai D.I. Machine include:

- extending their operations to cover additional widely used platforms and adding more features;
- using social media influencers to help amplify fact-checked messages;
- a three-pronged approach:
 - fostering high-quality fact-checking processes among stakeholders,
 - increasing the public's media and information literacy,
 - imposing stricter regulations.

3.2 News media

National and local media had different approaches to verifying information. As stated by the Thai PBS representative, journalists received information from top-down and bottom-up sources. The top-down sources included the “ศูนย์ข้อมูล COVID-19” (informationcovid19) or COVID-19 information center, as well as the journalist teams at Thai PBS. They also cross-checked information with open data from government bodies, research studies, and international news agencies. The bottom-up approach involved the C-site application, which allowed the public to report news based on location pins, and the journalist could verify the information remotely or by visiting the location. The application also provided user details, such as a phone number, to request additional information (Thai PBS representative, personal communication, September 3, 2022). In contrast, the local news media, FM100, verified information by consulting experts in Line groups or contacting representatives from relevant institutions, such as the municipal office, before airing the news (FM100 representative, personal communication, September 2, 2022).

Both representatives expressed similar views when asked about the impact of the COVID-19 infodemic on society. The Thai PBS representative stated that social media was filled with “disinformation, misinformation, and malinformation, along with content created by information operations (IO) to discredit political dissidents.” He also noted that social media reflected the real world, where people had to rely on themselves and their social networks because they could not trust government organizations like the Ministry of Public Health or the media. “I personally perceive information from the government as propaganda that carries concealed political

agendas, and their decision-making process lacks transparency,” he added. He emphasized “social media communication had given rise to a culture of ignorance, where individuals who posted misleading content or baseless claims questioning social institutions were prevalent. These actions lead to widespread misunderstanding, and such individuals often fail to recognize the harm they cause. This resulted in the decay of trust in society.” He believed that the public had a low level of media and information literacy, and he divided them into two groups: those who could verify information (40% of the population) and information operations (60% of the population) who intentionally created content with hidden political agendas. This could be a contributing factor to the widespread dissemination of disinformation in society. The representative also observed that the norms, user interfaces, and user experiences of Facebook are significantly different from those of Twitter. “To me, Twitter appears to be a platform for fact-based communication, while Facebook appears to be more opinion-based,” said the representative. According to him, Twitter’s UI and UX focused on the post itself, while Facebook’s UI and UX emphasized comments. Despite the difference, he concluded that information flows from one platform to another like a rock creating ripples in a pond. When discussing the implications of COVID-19, he observed that COVID-19 has exposed the government’s inability to manage both the situation and the infodemic, leading to individuals having to rely on their own resources (Thai PBS representative, personal communication, September 3, 2022).

In contrast, the FM100 representative had a different viewpoint, stating that the COVID-19 infodemic was not a new phenomenon and did not require urgent attention. She explained,

The problem of fake news has always existed, not just during COVID-19. The issue of disseminating inaccurate information, a combination of facts and falsehoods, or completely fabricated stories has been prevalent in Thai society for an extended period. During the early stages of the pandemic, there was widespread panic. However, as time has passed, people have become more knowledgeable, and the impact is now limited to those who believe in fake news, such as the elderly. I would say that in the beginning of the pandemic,

the public had a media and information literacy skills' rating of around one or two out of five. However, now, I believe that they deserve a rating of about four out of five (FM100 representative, personal communication, September 2, 2022).

When discussing feasible solutions to the problem, the two had different perspectives. The Thai PBS representative believed that the sustainable way to handle the issue was to build an immune system or “antibodies” to coexist in a world full of viruses. That is, to enhance the public’s understanding of the nature of society, where disinformation is always present. We cannot entirely eliminate it, so we should comprehend it and equip ourselves with knowledge, such as digital literacy. Although fact-checkers aim to enhance people’s immunity to disinformation, their impact is limited as merely sharing a screenshot of false information does not significantly improve individuals’ understanding of the problem. Even if COVID-19 ends, there will be another pandemic or crisis, resulting in new disinformation topics. Therefore, it is better to develop our immune systems (Thai PBS representative, personal communication, September 3, 2022). The representative from the local news media suggested that addressing the issue of disinformation required the cooperation of all parties involved because leaving it solely to the government did not yield effective results. The government failed to provide timely management, causing confusion for the public. As a result, people turned to the media they trusted for information verification. The frequency of information distribution was also an overlooked aspect of the solution. Therefore, there should be regular announcements or outlets for more frequent information distribution (FM100 representative, personal communication, September 2, 2022).

3.3 Civil society organizations

The two civil society organizations had distinct areas of focus and work processes. One was a fact-checking organization, while the other was a volunteer organization aimed at providing assistance to society during the COVID-19 pandemic. The representative of Zen-Dai (เซ็น-ด้าย) Chiang Mai stated that Zen-Dai was established with the core principle of assisting ordinary individuals who lacked privileges and connections in obtaining necessary help or resources during the pandemic. Recognizing

that the health system was overwhelmed, Zen-Dai aimed to bridge the gap by serving as an intermediary between the healthcare sector, including village health volunteers, and those in need, while also providing reliable information. Zen-Dai not only disseminated information through social media but also deployed volunteers to remote areas to actively provide essential information. The volunteers had to participate in a training program to acquire the necessary knowledge to work in the field, including COVID-19 first aid and protocols for dealing with infected individuals. The Zen-Dai representative described the three types of content they posted, which included recommendations and guidelines on COVID-19 from the Zen-Dai headquarters, anecdotes from volunteers to caution people about harmful content, and reposted content from official health bodies (Zen-Dai Chiang Mai representative, personal communication, September 7, 2022).

The representative from Cofact described the origins of Cofact, which can be traced back around 30 years ago to a joint seminar on fake news, information disorder, and human rights. The seminar was hosted by a collaboration between government bodies and academic institutions, such as the Thai Media Fund, ThaiHealth Promotion Foundation, and leading universities. The idea for Cofact was sparked by Audrey Tang, the inaugural Minister of Digital Affairs of the Republic of China (Taiwan), who believed that fact-checking should be accessible to the people and not limited to just the media. Cofact.org was born as a crowdsourcing platform for fact-checking, with a focus on health-related information. Cofact's database was the second largest textual database in Thailand, allowing keyword searches (with the AFNC Thailand being the largest). Behind the scenes, Cofact received input from three key sources: part-time staff who monitored social media communication, input from its reporting channel where people could submit information for verification, and input from South Cofact, a branch of Cofact that focused not only on health issues but also on issues concerning the deep South of Thailand. The staff had to complete a training program to acquire the necessary knowledge on how to select reliable sources for information verification and effectively use search engines to gather information for verification purposes. In addition to relying on secondary information, Cofact also connected with a network of experts to verify information when needed. Cofact's workflow began with the staff

submitting their reports to the website admin, who then forwarded them to the editorial board for final screening before the information was made public through social media and the website. Furthermore, Cofact engaged in agenda-setting by checking and aligning with the agendas of other fact-checkers, such as AFP and AFNC Thailand, in order to establish intermedia agenda-setting. The representative also mentioned that in addition to the website and social media platforms, Cofact had a chatbot that operated through Line, and it had received positive feedback from users who found it useful to share the chatbot's answers with their family members as a way to provide warnings without family quarrelling. However, the userbase for the chatbot was currently limited to around 10,000 users (Cofact representative, personal communication, October 6, 2022).

The two representatives held differing opinions when asked about the impact of the COVID-19 infodemic on society. The representative from Zen-Dai explained that she could not make a generalization about the overall level of trustworthiness of information on social media, as it depended on the sources that individuals received. For instance, while there were many medical doctors and scholars actively posting accurate information about COVID-19 on social media, there were also teenagers who received false information from Facebook and passed it on to their elderly relatives, or individuals who shared disinformation simply because the posts had a high number of Likes. Thus, those who shared disinformation could be categorized into two broad types: those who did not realize that the information they shared was false, and those who deliberately shared it to gain Likes or popularity. The former group may have shared content with good intentions, such as claiming that “green chiretta can prevent COVID-19,” while the latter group often shared completely fabricated content. Drawing from her experience, as well as that of the staff and village health volunteers who actively engaged with villagers, it was observed that false claims, such as the one about consuming green chiretta, had tangible implications. Villagers were consuming large amounts of the herb under the false belief that it helped prevent COVID-19. As a result, the staff and volunteers had to inform them that these claims were false and provide accurate information on what should be done instead (Zen-Dai Chiang Mai representative, personal communication, September 7, 2022).

Based on the Cofact's representative, COVID-19 disinformation was widely spread throughout society over the past two years. It was not just Cofact that was busy debunking these false claims, but also other relevant organizations. One classic example of viral false information was an audio clip claiming to be from the dean of the Faculty of Medicine at Siriraj Hospital, Mahidol University, which was widely shared and reshared. This false claim generated a significant amount of fact-checking inquiries to Cofact, ranking it among the top five most widespread disinformation during the pandemic. Another viral false claim that caused widespread chaos was conspiracy theories about COVID-19 vaccines, leading to vaccine hesitancy in society. Cofact dedicated resources to creating numerous infographics to debunk these claims, as well as launching workshops to promote factual information about COVID-19 vaccines. She noted that one root cause of the problem was a lack of trust, as some people did not trust the government, leading them to doubt the information shared by the government about the effectiveness of COVID-19 vaccines. In response to the inquiry about her perspective on the media and information literacy skills of the general public, she asserted that Thai people generally possess a moderate level of these skills. She cited a statistic from a research study on ASEAN countries including Thailand, which included data on the number of individuals sharing uncertain information and engaging in fact-checking (Cofact representative, personal communication, October 6, 2022).

The two proposed different solutions to the problem. The representative from Zen-Dai believed that face-to-face communication, particularly with volunteers, would be instrumental in resolving the trust issue. This was because it allowed for two-way synchronized communication and outreach efforts could help counteract fake news. Furthermore, people tended to believe trusted sources of information, such as volunteers who were often members of the community, rather than anonymous online sources (Zen-Dai Chiang Mai representative, personal communication, September 7, 2022).

The Cofact representative had a contrasting view. She believed that although communication on Facebook and Twitter could lead to echo chambers, the nature of these platforms allowed for comments and conflicting ideas to be shared in response

to posts. This enabled users to encounter different viewpoints. However, in some cases, even though when users had access to different viewpoints, they still selectively believed in information that confirmed their preexisting thoughts, possibly due to their political viewpoints, then it was an issue beyond platforms' architecture. The Cofact representative suggested that the root of the problem could lie in cultural or psychological factors. In Thai culture, there was a tendency to show consideration and respect towards seniors or those in higher social positions, which could hinder people from warning or correcting them. Therefore, the solution to address the issue would be to create new countermeasures to challenge the problematic cultural norms. For instance, Taiwan utilized a Line social bot named Aunt Meiyu to specifically detect and verify false information in private chat groups, such as family groups. This approach was used instead of relying on younger relatives to tell older relatives to avoid family conflicts caused by false information. The Cofact representative emphasized the importance of empathy in convincing people with conflicting views. She also mentioned that such exchanges had occurred on Facebook and Twitter, but they were often driven by opinions rather than facts. Therefore, there was a need to find ways to improve and foster a culture of open and constructive communication in our social context. When asked about the future direction of Cofact, she mentioned three possible paths: upgrading it to a full-fledged fact-checker and joining the International Fact-Checking Network (IFCN), which would require recruiting a large number of professional fact-checkers; transforming it into a hybrid between an NGO and an academy; or expanding Cofact to become a facilitator, similar to fact-checking initiatives in the Philippines. This would entail fostering collaboration among organizations and fact-checkers to proactively promote trusted media within the media landscape and encourage social responsibility among providers of social media platforms (Cofact representative, personal communication, October 6, 2022).

3.4 Social media influencers

Despite their different backgrounds and content, the two social media influencers had a similar starting point and approach to their work. The OhlSeebyAjarnJess representative revealed that his hobby of debunking began over 8 years ago on Pantip, a popular Thai web board. He gained overnight recognition for

debunking the government's explosives trace detectors called "GT200." As Facebook gained popularity in Thai society, he transitioned to use his personal Facebook account to continue his work. With time, he gained popularity and eventually published a book titled "อ้อ มันเป็นอย่างนี้เอง by อาจารย์เจษฎ์" (OhSeebyAjarnJess), which focused on debunking viral issues using scientific evidence. Subsequently, he established an official Facebook page under the same name as his book, dedicated to debunking, fact-checking, and answering questions about misunderstood content, particularly pseudo-science from the public. He went on to explain that his workflow could be delineated into three distinct steps: gathering relevant information through research or, in some cases, reverse image search, writing posts using simplified language, and providing empirical evidence, quotes, and proper citations. In addition to analyzing secondary data, the representative also received input from the chat box on his page. He made an effort to personally answer each query, and if he noticed multiple people asking the same question, he would feature it on his page, in line with his slogan "science has answers." When gathering and verifying information, he generally used Thai keywords to search on search engines. However, for more advanced or specific issues, he would switch to English. He would then analyze the obtained information and create a summary in his own words. He also mentioned that he checked with fact-checkers like AFNC Thailand to verify information, but he did not solely rely on a single fact-checker, as they could also make mistakes. He referred to his approach to fact-checking as "science communication" and identified himself as a "science communicator." "I design my posts to feature a large red cross over a screenshot to show that the information is false, while also using it as an attention-grabbing element to capture the audience's attention and prompt them to pause and view the content," added the representative. (OhSeebyAjarnJess representative, personal communication, September 1, 2022).

Similarly, Drama-addict, who used to work as a medical doctor, shared that he started his page about 10 years ago out of his own interest and passion for debunking false claims related to illegal dietary supplements and other topics. However, he later diversified his content to cover a wider range of subjects. "I believe my appeal to followers lies in my use of vulgar language and my focus on topics that are of public

interest, including pressing issues that I get from my audience. My team then collaborates with relevant government institutions and the media to address these concerns,” explained the administrator. He described his workflow as typically starting with gathering data from scholarly research databases and international academic journals such as PubMed, and analyzing meta-analyses to determine whether an issue is worth reporting or not. “If it’s worth it, I report the issue,” he added. In addition to collecting and analyzing secondary data, he also maintained chat groups with a diverse range of individuals, including popular social media influencers, scientists, medical doctors, and government personnel, particularly those in the army and police. Within these groups, members were able to share and request additional information on topics of interest. Regarding COVID-19 disinformation, he developed an interest in the disease when there were reports of an unusually high number of people being infected with Wuhan's flu even before it was officially named. He then reported the issue via his page and continued to follow the topic (Drama-addict representative, personal communication, September 17, 2022).

When asked about the societal impact of the COVID-19 infodemic on social media, the two representatives expressed differing views. The OhlSeebyAjarnJess representative mentioned that the COVID-19 infodemic posed a significant challenge as he had to dissent from the government on multiple occasions. From the beginning, he emphasized that COVID-19 was a pressing issue of large-scale magnitude that would persist for a long time. However, the government claimed otherwise, stating that the spreading disease was not a pressing concern, and this narrative was widely believed by the public. As the situation worsened, the government established the Center for COVID-19 Situation Administration (CCSA) to communicate a unified message to the public and implemented a nationwide lockdown. Although this reduced confusion at the societal level, it was challenging for him to voice dissent from the mainstream, especially as the government communicated with hidden agendas that aimed to shape public perception in a certain way. For example, when the government insisted on “zero cases of infection in the country,” the OhlSeebyAjarnJess representative contradicted this, stating that it was impossible. This led to a political discourse with the emergence of the slogan “we have to believe the doctors, not dogs.” During this

time, information operations were rampant, with aggressive comments attacking perceived political dissidents. This threw the society into chaos. Fixing the situation became even more difficult as those who shared such disinformation contributed to its further spread. These individuals could be divided into two groups: those who genuinely believed in the information and those who shared it for Likes and Shares. He also observed that the level of media and information literacy among people on social media has improved over time. This was evident in my followers. For instance, he said,

In the past, I used to debunk claims about lemonade curing illnesses almost every day. However, as time has passed, the frequency of such claims has dramatically reduced. Although they are not completely gone, they are now only a small fraction of what they used to be. I would rate the level of media and information literacy among my followers as one in the past, gradually climbing up to nine or ten nowadays. In fact, I have even noticed some of my followers helping me by providing proper answers to such questions.

However, he also stressed that he did not generalize to refer to the majority of users. He reasoned that he might be stuck in an echo chamber of like-minded people who were eager to seek answers when they were uncertain (OhlSeebyAjarnJess representative, personal communication, September 1, 2022).

The Drama-addict representative noted that social media platforms were inundated with false and manipulated information, citing examples such as exaggerated claims and advertisements for health-related products like anti-aging products. In the context of COVID-19 disinformation, he believed that the most vulnerable groups in society were the elderly and individuals with extreme ideologies, such as members of a urine-drinking cult or those who hold anti-modern medicine beliefs. These individuals exhibited strong biases and unwavering trust in their beliefs. Based on his experience with such people, he observed that they often had a deep-rooted faith in alternative medicine, particularly herbs, as they viewed nature as the best remedy for illnesses. Additionally, those with strong political ideologies could be challenging to engage with, as they readily embraced conspiracy theories that attacked the government and harbored radical biases. Hence, Drama-addict did not intend to

cater to these groups. Drama-addict's communication style indicated a target audience of the general public, rather than those with radical thoughts. This was evident in how the page conveyed its messages. He also noted that, in general, social media users, excluding those who were less educated or illiterate, possessed a moderate level of media and information literacy, ranging from six to seven out of 10, as they frequently requested references or relevant research before accepting information as true topic (Drama-addict representative, personal communication, September 17, 2022).

During the discussion of viable solutions to the problem, the OhlSeebyAjarnJess representative and his counterpart held differing perspectives. The OhlSeebyAjarnJess representative expressed his trust in mass media, particularly private media organizations. He explained that based on his personal experience, his voice alone was not enough to challenge the government or make his agenda a public agenda, limiting the impact of his voice. For instance, he recalled his efforts to push the GT200 issue to be public agenda for several months without success. However, when Channel 3 Thailand picked it up and broadcasted it, the message's impact was significantly amplified. "I didn't just post. I used my name as a keyword to gauge the reach of my messages. Did they become part of the media agenda or not? If yes - if the media picked it up - then it meant that more people would see the message. Therefore, my proposed solution would be for the media to reform and turn to constructive journalism, providing well-rounded information. For instance, when addressing fake news, both sides of the information should be reported," said the OhlSeebyAjarnJess representative (OhlSeebyAjarnJess representative, personal communication, September 1, 2022).

The Drama-addict representative expressed a different perspective compared to the OhlSeebyAjarnJess representative. The Drama-addict representative stated that, from his standpoint, the algorithms used by social media platforms were at the core of the problem. This, he believed, was why research and articles about echo chambers were prevalent worldwide. "I believe that social media providers intentionally curate similar types of information to users' feeds, resulting in an endless loop of similar information," he explained. "As a solution, I propose making Facebook and Twitter more diverse in terms of information circulation. I understand that it will be extremely

challenging, but I don't see any other viable options. I also believe that users need to learn from their mistakes when it comes to misinformation and develop their own immunity to such information,” the Drama-addict representative added. When asked about his future direction, he revealed that he was currently working on creating short infographic clips to raise public awareness about the prevalence of fake dietary supplements and Ponzi schemes in Thai society. In essence, he was experimenting with video content and may focus more on this approach if he receives positive feedback (Drama-addict representative, personal communication, September 17, 2022).

In summary, the representatives from various organizations and media outlets in Thailand proposed different approaches to tackle the issue of disinformation. While some emphasized the need for improved literacy levels, media fact-checking processes, and stricter regulations, others focused on building public immunity through enhancing understanding of the nature of society and promoting digital literacy. Cooperation among all stakeholders was seen as crucial, rather than relying solely on the government. Face-to-face communication and outreach efforts were highlighted as effective ways to counteract fake news and build trust. The role of social media algorithms in perpetuating echo chambers was also recognized, and the need for more diverse information circulation on platforms like Facebook and Twitter was proposed. Additionally, cultural and psychological factors were identified as potential underlying causes of the issue, and the importance of empathy and open communication was emphasized. Finally, private media organizations were seen as important amplifiers of messages and were urged to practice constructive journalism by providing well-rounded information and reporting both sides of the story. There was some overlap in the need for improved literacy, fact-checking, regulations, and cooperation among stakeholders as common themes among the proposals.

4. Documentary research

To achieve RO4, which involves identifying significant policy gaps that need to be addressed in order to tackle disinformation on online social media platforms, a documentary research approach is employed. Scholars emphasize that efforts to combat disinformation can be broadly categorized into two types: company efforts,

which include preventative measures implemented by social media platforms such as content penalization, advertising restrictions, and information curation; and government efforts, which involve laws, acts, and regulations (Pielemeier, 2020). Therefore, this section is divided into two parts: the first one examines the policies of Facebook and Twitter in addressing COVID-19 disinformation, while the second part presents an analysis of how infodemic responses to COVID-19 are manifested in four selected societies.

4.1 Scrutinizing the measures implemented by social media platforms to address the COVID-19 infodemic

In March 2020, major social media platforms, including Facebook, Google, Reddit, Microsoft, and Twitter, publicly announced their joint commitment to combatting COVID-19 infodemic at a global level. They also committed to promoting authoritative content on their platforms and sharing important updates in coordination with global government healthcare agencies (Bedre-Defolie, 2020). Different platforms implemented this objective in varying ways. For instance, some introduced new harm policies to remove posts that were perceived as posing a serious risk of harm, as seen with Facebook's use of the term "imminent physical harm." On the other hand, Twitter chose to introduce labels to identify "misleading information" and "disputed claims." The coordinated efforts of tech companies to promote authoritative content also varied in strategies and applications, with Twitter utilizing labels and warning messages to limit the spread of potentially harmful and misleading content, while YouTube prohibits content that contradicts explicit guidance from the WHO or local health authorities on COVID-19 treatment, prevention, diagnosis, transmission, and existence. These tech companies have implemented coordinated efforts to promote authoritative content in different ways. For example, Twitter has used labels and warning messages to limit the spread of potentially harmful and misleading content. On the other hand, YouTube has a policy of not allowing content that contradicts explicit guidance from the WHO or local health authorities on COVID-19 treatment, prevention, diagnosis, transmission, and existence. Hence, conducting a thorough examination of the measures implemented by social media platforms to address the

COVID-19 infodemic would provide a comprehensive understanding of the situation, thereby partially addressing RO4.

Based on Krishnan, Gu, Tromble, and Abroms's *Research note: Examining how various social media platforms have responded to COVID-19 misinformation*, which analyze the responses of 10 social media platforms (Facebook, YouTube, Twitter, Instagram, Reddit, Snapchat, LinkedIn, TikTok, Tumblr, and Twitch), as well as two messaging platforms (Messenger and WhatsApp), Facebook, Instagram, Twitter, and YouTube are the only platforms that have specific policies to address COVID-19 disinformation. The remaining platforms do not have dedicated measures, but rather general measures to combat disinformation. The analysis reveals that Facebook and Twitter have similar approaches to tackling the COVID-19 infodemic: monitoring and fact-checking responses, policy responses, curatorial responses, technical and algorithmic responses, and de-monetization responses (Krishnan et al., 2021). In terms of policy responses, both platforms have implemented specific policies to address the issue, such as Facebook's COVID-19 and Vaccine Policy Updates & Protections (Facebook, n.d.), and Twitter's policy on misleading information related to COVID-19 (Roth & Pickles, 2020). After being acquired by Elon Musk, Twitter underwent significant changes at the policy level, including the discontinuation of its COVID-19 misinformation policy on November 23, 2022 (Klepper, 2022). However, during the period when the analysis for this dissertation was conducted, Twitter's COVID-19 misinformation policy was still in effect, making it noteworthy to mention as it was relevant and had an impact on social media communication during that time. Table 27 below provides details on the types of COVID-19 content that are prohibited on Facebook and Twitter, along with some examples.

Table 27

Prohibited content based on Facebook and Twitter's COVID-19 policy

Types of prohibited content	Platform	Example of false/misleading claims
Transmission of the virus	Facebook	-claims that deny the existence of COVID-19 or downplay its severity. -claims about means of transmission, vulnerable groups, and location-specific characteristics that may contribute to the spread of the virus
	Twitter	-claims about asymptomatic transmission

		-claims about how the virus is transmitted indoors
Cures and prevention methods	Facebook	-claims about guaranteed unproven medical, herbal, and external remedies
	Twitter	-claims about ineffective methods such as sunlight prevent COVID-19
Vaccines	Facebook	-claims that contribute to vaccine hesitancy or refusal
	Twitter	-claims suggesting that vaccines are deliberately used to control populations or inflict harm
Health practices	Facebook	-claims about wearing a face mask -claims about social/physical distancing
	Twitter	-claims about Personal protective equipment (PPE) including face mask -claims about sanitation practices and social/physical distancing
Statistical data	Facebook	-claims about the capacity of health system
	Twitter	-claims related to the capacity of the healthcare system. -claims that downplay the significance of the disease.

Note. Adapted from *Research note: Examining how various social media platforms have responded to COVID-19 misinformation (17-19)* by N. Krishnan, J. Gu, R. Tromble, and L. C. Abrams, 2021, Harvard Kennedy School Misinformation Review.

Facebook and Twitter not only have specific policies for content moderation to combat COVID-19 disinformation, but they also employ similar responses to address this problem. Their responses can be broadly categorized into two groups: preventative measures (such as content removal and account suspension/ban) and remedial measures (such as warning labels, notifications, and links, penalizing content, and advertising restrictions), also known as hard and soft measures. In the case of the former, responses can be categorized into five types as outlined below:

1. Warning labels, notifications, and links: This involves actions taken by Facebook and Twitter to attach warning labels, provide notifications, and/or include links to credible information related to COVID-19 disinformation.

2. Penalizing content (decreasing visibility of content): This refers to actions taken by Facebook and Twitter to limit the visibility or reach of COVID-19 disinformation messages and/or accounts.

3. Content removal: This entails actions taken by the two platforms to remove content that violates their COVID-19 disinformation policies. The prohibited content includes themes related to the nature of the virus, COVID-19 treatments/cures and

preventions, COVID-19 vaccines, misleading COVID-19 health advisories, and false/misleading statistics.

4. Account suspension: This involves actions taken by Facebook and Twitter to lock or ban/suspend accounts that violate COVID-19 disinformation policies.

5. Advertising restrictions: This refers to actions taken by Facebook and Twitter to prohibit the promotion and monetization of COVID-19 disinformation (Krishnan et al., 2021).

For the remedial measures to empower the users, the responses can be thematically grouped into four types as follows:

1. Information curation: This pertains to actions undertaken by Facebook and Twitter to compile trustworthy information into a centralized information pool such as Facebook's COVID-19 Information Center (Meta, n.d.), Twitter's COVID-19 tab in Explore¹⁰¹, and Twitter's search prompt¹⁰² dedicated to COVID-19 where users can readily access it. However, Twitter's policies limit the availability of certain features to selected countries rather than worldwide. For example, the COVID-19 tab in the Explore section is not accessible in Thailand, while the COVID-19 search prompt is available in a broader range of countries, including Thailand (Twitter, 2020). This may also involve proactive efforts to provide resources that assist people in finding reliable information from official health authorities, such as Facebook's pop-up at the top of the Newsfeed that displays links to WHO, CDC, or regional health authorities.

2. Health promotion and communication campaigns: Facebook and Twitter engage in various efforts to implement and promote health communication campaigns, including initiatives like Facebook's "Together Against Covid-19 Misinformation"

¹⁰¹ This feature is only available in "Argentina, Australia, Brazil, Canada, Colombia, Egypt, India, Ireland, Japan, Mexico, New Zealand, Saudi Arabia, Spain, United Arab Emirates, United Kingdom, and United States" via "twitter.com, iOS, and Android" (Twitter, 2020).

¹⁰² This feature is only available in "Austria, Belgium, Brazil, Brunei, Cambodia, Canada, Cyprus, Denmark, Egypt, Estonia, Finland, France, Germany, Hong Kong, Iceland, India, Indonesia, Ireland, Italy, Japan, Jordan, Korea, Laos, Latvia, Lebanon, Malaysia, Mongolia, Myanmar, Netherlands, New Zealand, Norway, Paraguay, Philippines, Poland, Singapore, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Kingdom, United States, Uruguay, Vietnam, and Yemen" (Twitter, 2020).

campaign, as well as hashtags activated by Twitter and its partners (such as UNICEF), such as #vaccinated, #StayHome, #WashHands (Twitter, 2021).

3. Boosting official content: This involves efforts made by Facebook and Twitter to increase the visibility and reach of content from official health organizations, such as measures and policies to promote such content in Facebook’s Newsfeed and Twitter’s search, as well as providing advertising credits to government and public health organizations for disseminating COVID-19 information.

4. Q&A on COVID-19: This pertains to actions taken by Facebook and Twitter to address queries related to COVID-19, such as Mark Zuckerberg’s live Q&A session on Facebook with Dr. Anthony Fauci, a top infectious disease expert in the US (Zuckerberg, 2020), and Twitter’s live Q&A sessions using the hashtag #AskWHO (Krishnan et al., 2021; Twitter, 2021; World Health Organization, 2022).

While Facebook and Twitter have similar responses, there are slight differences in their details. For example, Facebook utilizes an automated detection system that employs machine learning classifiers¹⁰³, artificial intelligence (AI), along with reporting tools and certified third-party fact-checking networks endorsed by the International Fact-checking Network (Iosifidis & Nicoli, 2020; Meta, 2021b). This system is used to identify, review, and take appropriate actions. Twitter’s detection system varies slightly, as it does not rely on third-party fact-checking networks. It uses reporting tools, an automated system based on machine learning models, and partnerships with public health authorities and governments to monitor, identify, and review content that violates its policy (Twitter, 2021; Twitter Philippines, 2022). It is noteworthy that Facebook’s AI has the capability to handle both textual and non-textual content, including image/video manipulations, with a “very high degree of precision (Meta, 2020; Sumbaly et al., 2020),” whereas Twitter characterizes its solution for detecting non-textual content as an “ongoing experiment” (Twitter Philippines, 2022). Although both Twitter and Facebook utilize a mix of soft and hard measures to combat misinformation by targeting those who produce and distribute it, there are variations in their strike systems (Meta, 2023; Twitter Safety, 2021) as outlined in Table 28.

¹⁰³ Facebook’s machine learning solution performs similarity detection based on training data.

Notably, unlike Twitter, Facebook does not include permanent account suspension as one of its response measures.

Table 28

A comparison of Facebook and Twitter's strike systems

Counting strikes	Facebook	Twitter
1	warning (no further actions)	no action
2	1-day restriction from creating content	12-hour account lock
3	3-day restriction from creating content	12-hour account lock
4	7-day restriction from creating content	7-day account lock
5 or more	30-day restriction from creating content	permanent suspension

In retrospect, prior to the pandemic, Facebook and Twitter commonly used labeling as an approach to combat disinformation. For instance, analysis by Iosifidis and Nicoli of Facebook's announcements on disinformation reveals that the detection and categorization of harmful content were Facebook's most frequently used methods to address this issue (Iosifidis & Nicoli, 2020). Meanwhile, according to Sanderson et al.'s study, Twitter's most common approaches were labeling and penalizing (Sanderson et al., 2021). One notable difference observed between the pre-pandemic and post-pandemic periods is the shift in emphasis from election-related information to health-related information.

From a normative perspective, social media platforms have historically been a target to be blamed for being responsible for the spread of disinformation and criticized to "shrink" their responsibility for the problem. There have been calls for these platforms to take greater responsibility in combatting disinformation (Iosifidis & Nicoli, 2020; Pazzanese, 2020; Spring, 2020b). For example, Frances Haugen, a Facebook whistleblower, leaked internal reports from Facebook that revealed the company's researchers had conducted studies and produced internal reports on the dissemination of COVID-19 and vaccine-related disinformation on the platform. These documents indicate that Facebook employees were aware that the disinformation was prevalent in certain sections of the platform, leading to "echo-chamber-like effects"

that reinforced vaccine hesitancy. The documents also suggest that Facebook extensively studied the spread of COVID-19 and vaccine disinformation, but did not disclose this information to Congress or take appropriate action to mitigate the spread of misinformation on its platform. It is highlighted in the documents that a small number of users, referred to as “Covid super-spreaders,” were responsible for a significant percentage of the content growth in terms of vaccine disinformation. Additionally, the documents reveal that Facebook was aware of external research that supported these findings but aggressively disputed them. However, Facebook spokesperson Aaron Simpson said that the studies mentioned in the leaked documents were not conclusive evidence and were only meant to provide guidance to Facebook’s internal product team. These revelations have sparked strong criticism of Facebook’s responsibility in the spread of COVID-19 misinformation (Lima, 2021).

However, from an academic perspective, studies indicate that the issue of COVID-19 infodemic is intricate and multifaceted, requiring collaborative efforts from various sectors of society, including government, academia, civil society, media, and social media platforms. It should be noted that scholars have acknowledged that a one-size-fits-all approach to content moderation is not practical because social media platforms vary in terms of their functions, users, and rules. In other words, achieving complete alignment of responses across platforms is unattainable. Research has also demonstrated that disinformation can persist and propagate on other platforms despite efforts made by some platforms to combat it because platforms are often interconnected (i.e., Tiktok videos can be shared on Facebook) (Krishnan et al., 2021; Sanderson et al., 2021). As exemplified by the fact that social media platforms’ responses are influenced by a complex string of factors such as COVID-19 situation and social context, it is equally vital to consider the legal framework that affects the operations of these platforms in different contexts. This will help identify best practices and policy gaps that need to be addressed in order to gain a comprehensive understanding of the issue as a whole.

4.2 Examining infodemic responses to COVID-19 in four selected societies

The geographical context plays a role in shaping how social media platforms respond to the COVID-19 infodemic, as it is influenced by the jurisdiction in which they

operate. According to Sophie Lecheler and Jana Laura Egelhofer's study titled *Disinformation, Misinformation, and Fake News: Understanding the Supply Side*, which identifies three types of actors involved in the supply of information pollution: political actors, media actors, and citizens. Examples of political actors include instances of Donald Trump spreading election-related disinformation, as well as information operations conducted by state actors like Russian state actors, who use fake social media accounts and bots on platforms like Facebook and Twitter. Media actors, according to Lecheler and Egelhofer, are not limited to journalists, as social media platforms also play a significant role in the supply of disinformation. Citizens refer to users who generate content on social media platforms (Lecheler & Egelhofer, 2022). To put it differently, the polarization of politics in a social context and the level of professionalism exhibited by the media are crucial factors that shape the information landscape within a society. Therefore, examining these factors in different contexts will help achieve the RO4, identifying policy gaps that require attention.

There are three key reasons why it is crucial to conduct a contextual analysis of how various countries address the issue of COVID-19 disinformation. First, the media institution plays a critical role in shaping the information ecosystem of a society, and understanding the media systems in different countries, including their diversity, standards, and principles, can provide insights into how information is produced, distributed, and consumed, and how it may contribute to the spread of COVID-19 disinformation. Second, the legal framework of a country significantly influences how individuals and social media platforms handle the problem of COVID-19 disinformation. Analyzing the legal frameworks in different countries can provide a better understanding of the policy approaches and regulatory measures in place to address COVID-19 disinformation, including their strengths, weaknesses, and potential impact on mitigating the spread of false information. Third, political polarization in a society is an important factor that shapes how COVID-19 communication unfolds on social media. In countries with high levels of political polarization, false claims, misinformation, and disinformation may be amplified in echo chambers, leading to further polarization and mistrust. Understanding the role of political polarization in the spread of COVID-19 disinformation in certain societies can shed light on the challenges

and complexities of addressing this issue in a politically charged environment. Hence, four distinct social contexts, characterized by differences in media systems, legal environments, and political climates, are chosen. These include the US, EU, Singapore, and Thailand. The media systems in these countries are categorized according to the models developed by Daniel C. Hallin and Paolo Mancini, which analyze the interrelationships among various characteristics of political and media systems, as well as other models that have been developed based on these analyses. It is important to note that the models are simplified representations meant to serve only as conceptual tools for organizing discussions on media and political systems in a comparative perspective. They do not fully encompass the complexity of media systems in individual countries.

At a global level, fact-checking projects and initiatives have been expanding with the support of the IFCN since 2015. In 2020, to combat the infodemic, Poynter's IFCN established the #CoronaVirusFacts Alliance, which encompasses over 110 countries and 40 languages, with the aim of bringing together fact-checkers from around the world to publish, share, and translate facts related to the COVID-19 pandemic. Additionally, the CoronaVirusFacts/DatosCoronaVirus Alliance Database was created to compile all the falsehoods detected by the Alliance (Poynter, n.d.). According to the database of global fact-checking sites maintained by Duke Reporters' Lab at Duke University, there are currently over 370 active fact-checking organizations from over 100 countries, operating in at least 69 languages across six continents, including Australia (6), Africa (36), South America (39), North America (83), Asia (103), and Europe (111), as of 2022 (Stencel et al., 2022). This clearly indicates that monitoring and fact-checking efforts are evident across all selected societies. Table 29 below presents a summary of the responses to the COVID-19 infodemic in selected countries, categorized based on the typology of responses proposed in **Chapter 2**.

Table 29

Mapping the four selected societies' responses to the Typology of disinformation responses (Table 2)

Context	Media System	Responses									
		Identifying responses	Responses aimed at producers and distributors	Responses aimed at the production and distribution mechanisms	Responses aimed at the targets						
		monitoring and fact-checking responses	investigative responses	legislative, pre-legislative, and policy	national and international counter-disinformation campaigns	curatorial responses	technical and algorithmic responses	de-monetization responses	ethical and normative responses	educational responses efforts	empowerment and credibility labelling
US	Liberal model	/	/	/					/	/	
EU	Democratic Corporatist Model	/	/	/					/	/	
Singapore	Partisan Polyvalence	/	/	/	/						
Thailand	Partisan Polyvalence	/	/	/						/	

4.2.1 United States

In the United States, due to the protection of freedom of speech and the press under the First Amendment of the US Constitution, the government is unable to censor or impose restrictions on speech or press content. As a result, there is no official fact-checking initiative by the government. Typically, fact-checking is carried out by independent organizations in the US context. Examples of fact-checking organizations include FactCheck.org, which is operated by the Annenberg Public Policy Center at the University of Pennsylvania, and PolitiFact, which is run by the Poynter Institute. For investigative response, the Center for Countering Digital Hate (CCDH), a UK/US non-profit and non-governmental organization, runs in-depth investigation on coordinated

disinformation campaigns and published “The Disinformation Dozen” revealing that 65% of 812,000 Facebook posts and Tweets concerning COVID-19 vaccines were responsible by 12 online anti-vaxxers, having a combined following of 59 million people across multiple social media platforms, who play leading roles in spreading COVID-19 disinformation (Salam, 2021). This suggests that in the context of the US, a significant portion of social media communication exhibits a disposition towards post-truth communication.

In the context of the US, the media system aligns with the Liberal model, as per the framework proposed by Daniel C. Hallin and Paolo Mancini, due to its long-standing history and development of democracy, non-institutionalized self-regulation of mass media, widespread press penetration, significant press freedom, and limited state intervention in media operations. Despite some apparent media partisanship, the overall commercial press maintains neutrality and upholds strong professionalism. In other words, the media in this context exhibits a high level of professionalism, characterized by a strong emphasis on information-oriented journalism (Hallin & Mancini, 2004). Despite the framework suggesting that the media in the US is information-oriented, the country has a long-standing issue of political polarization, as seen in the existence of partisan media outlets. Previous research has indicated that a major factor contributing to this polarization is the changing media landscape in the US, including the emergence of cable news and social media. Both cable news media and social media platforms have played a role in exacerbating political polarization by spreading disinformation to their audiences, posing a threat to American democracy (Roscini, 2021). Research has indicated that social media is recognized as one of the factors that exacerbate political polarization in the United States, leading to a widening gap in trust towards media. Firstly, liberals who align with the Democratic Party tend to trust national news media. Secondly, conservative Republicans have shown a gradual decline in trust towards national news media since the 2016 United States presidential election (Gottfried & Liedke, 2021). As a result, right-leaning individuals have turned to alternative social media information sources that are often filled with disinformation or hate speech (Stocking et al., 2022). According to a survey report from the Pew Research Center, approximately 20% of politically aligned citizens tend to

stay within echo chambers, obtaining political news from sources that cater to their like-minded audiences (Jurkowitz & Mitchell, 2020a). This has resulted in a prevalent belief, based on Pew Research Center, that media coverage of COVID-19 has been exaggerated or COVID-19 virus was made in a lab. However, fewer Americans now hold this view, though significant partisan gaps still persist (Jurkowitz & Mitchell, 2020b; Schaeffer, 2020).

Legal scholars emphasize that in the United States, where freedom of expression is highly valued, the First Amendment is regarded as a “negative right” that discourages government intervention or restrictions on government coercion. Consequently, in this context, a self-regulatory approach is adopted to tackle the spread of disinformation (Huang, 2022; Park, 2018). The First Amendment's foundation lies in the concept of a free marketplace of ideas, facilitating the exchange of diverse ideas in pursuit of truth. This means that false statements are often afforded legal protection to safeguard other values such as diversity of opinion, freedom of the press, and broader debates. In essence, false information may hold instrumental value in promoting other values like plurality and democracy, rather than having inherent value on their own. Moreover, in the context of the US, social media platforms are granted safe harbor protections under Section 230(c)(1) of the Communications Decency Act (CDA), which shields them from legal liability for content posted by users on their platforms (Pollicino & Bietti, 2019). An instance of this is the failed attempt in California to pass a bill that would penalize doctors for spreading misinformation or disinformation related to COVID-19, which was later ruled out by the court (Pierson, 2023). As a result, there is no specific law enacted to directly address COVID-19 disinformation. However, the imposition of excessive burdens on private social media platforms has raised concerns about potential censorship (Huang, 2022).

Considering these aspects, the US government has implemented various educational responses as well as ethical and normative responses to address the issue of COVID-19 disinformation. As an example, the Cybersecurity and Infrastructure Security Agency (CISA) has released a COVID-19 Disinformation Toolkit in the form of a poster that contains information for State, local, tribal, and territorial (SLTT) officials to increase awareness about misinformation, disinformation, and conspiracy theories

related to COVID-19's origin, severity, government response, prevention, and treatment, which are circulating online (America's Cyber Defense Agency, 2020). Apart from the aforementioned efforts by CISA, the US government has also set up reliable sources of information, including www.Coronavirus.gov and a website dedicated to debunking coronavirus rumors at www.FEMA.gov/coronavirus/rumor-control, where individuals can obtain accurate information about specific disinformation campaigns. The Center for Health Security has also published a report titled "National Priorities to Combat Misinformation and Disinformation for COVID-19 and Future Public Health Threats: A Call for a National Strategy," which presents a comprehensive plan for a nationwide approach to combating misinformation and disinformation (Sell, n.d.). Civil society organizations are actively engaged in educational response efforts to combat disinformation. For instance, UNICEF, with the support of the U.S. Agency for International Development (USAID) and the Media Development Foundation (MDF), conducted in-person training sessions and online webinars across Georgia from April to September 2022. These sessions aimed to equip children and young people with accurate information about COVID-19 prevention measures and vaccines, dispel myths, and enable them to spread correct information among their peers (Unicef, 2022).

A noteworthy finding is that a research study conducted in the United States with the objective of evaluating the dissemination of authoritative health content via social media platforms during the COVID-19 pandemic reveals that a significant number of respondents relied on social media for information and noticed authoritative health advice published on these platforms. However, they had mixed perceptions about the content moderation practices undertaken by the platforms. A majority of respondents indicated that contradictory advice should be removed due to the efforts made by the platforms in curating information. Others cited challenges in practical implementation and expressed concerns about the potential politicization of public health. The legitimacy of authoritative health content disseminated by government healthcare agencies was further undermined by controversies surrounding government handling of the pandemic and perceived scandals eroding trust, resulting in low institutional trust and potential implications for the reception of authoritative content on social media. Trust in social media, scientific expertise, and public health authorities

is contextual and interconnected with perceptions about corporate and institutional intentions and political interests (Walsh et al., 2022).

To sum up, the US has a long-standing issue of political polarization, and social media is recognized as a factor that exacerbates political polarization, leading to a widening gap in trust towards media. Right-leaning individuals have turned to alternative social media information sources that are often filled with disinformation or hate speech. However, there is no specific law enacted to directly address COVID-19 disinformation due to the First Amendment's discouragement of government intervention. Efforts to combat COVID-19 disinformation in the US involve monitoring and fact-checking responses, typically conducted by independent organizations, as well as implementing educational, ethical, and normative responses by the government and civil society organizations. Despite efforts to curate reliable information for the public, the perception of the presented information varies depending on individuals' political standpoints, which is influenced by deep political polarization and their trust in the media they typically consume.

4.2.2 European Union

The media system in the European Union follows a Democratic Corporatist Model, which is marked by a well-established freedom of the press, information-oriented journalism with high standards, and widespread media penetration. There is a coexistence of press freedom with significant state support and regulation of media. The media landscape includes both robust commercial media industries and politically affiliated media, with a high degree of political parallelism. Additionally, these countries often have organized social groups and a history of segmented pluralism (Hallin & Mancini, 2004). This means that there are organized groups within society, such as interest groups or advocacy groups, and there is a history of societal divisions along various lines, such as political, cultural, or social, which may also be reflected in the media landscape. In addition to maintaining high standards, media organizations also engage in fact-checking initiatives and have gained global recognition as reputable fact-checkers. Examples of such organizations include AFP (France), Correctiv (Germany), Demagog (Poland), Pagella Politica / Facta (Italy), EU DisinfoLab (Belgium), and Fundación Maldita.es (Spain) (Tardáguila, 2019). These organizations have formed

a consortium, the European Fact-Checking Standards Network (EFCSN), to establish standards of transparency, as well as methodological and journalistic quality, that are required for recognition as an independent fact-checking organization (EFCSN, 2022).

Fact-checking organizations actively monitor and conduct thorough empirical investigations to expose networked disinformation campaigns. For instance, the EUvsDisinfo's COVID-19 Disinformation EEAS Special Report reveals state-sponsored disinformation efforts by Russia and China aimed at undermining trust in Western-made vaccines, EU institutions, and European vaccination strategies (EUvsDisinfo, 2021). Another notable example is the Oxford Internet Institute's Computational Propaganda Project, which conducts studies to uncover state-sponsored disinformation campaigns in the EU, such as those targeting French, German, and Spanish-speaking social media users with COVID-19 news and information from state-backed outlets (Oxford Internet Institute, 2020).

A noteworthy aspect of the media system in the European Union, in contrast to that of the US, is that it is regulated by the state while maintaining a significant level of press freedom. This difference can be attributed to the policy and legal framework of the EU where Article 10 of the European Convention on Human Rights (ECHR) has played a significant role. Unlike the First Amendment, which views free speech as an absolute right, Article 10(1) emphasizes freedom of expression in the context of human rights, while Article 10(2) acknowledges that interferences with this freedom may be necessary in situations where society is facing pressing issues. Considering this viewpoint, one could argue that false and misleading information falls outside the scope of protection under European free speech rights. In contrast to the US, the e-Commerce Directive of the EU provides partial immunity from liability to online intermediaries that passively transmit, cache, or host online content, known as safe harbors. The key difference in the EU is that online intermediaries will only be granted immunity if they remain passive and are not aware of disinformation on their platforms (Pollicino & Bietti, 2019). In addition to the Directive, the Digital Services Act (DSA) of the EU classifies service providers into different groups, each with distinct obligations depending on their classification. These groups include intermediary services (internet access providers, domain name registrars), hosts (cloud and web hosting services),

online platforms (app stores and social media platforms), and very large online platforms (platforms reaching over 10% of 450 million monthly European consumers). As an example, hosts are required to establish transparent rules for the Notice and Takedown (NTD) procedure, which includes disclosing the reasons for takedown. This information should be available in a database that is under the control of the EU Commission, allowing for access. Online platforms and very large online platforms are required to comply with a “trusted flagger” system, where flaggers notify platforms of illegal content, and platforms are expected to take action on it “with priority and without delay.” Additionally, very large platforms must verify the identities of advertisers and disclose relevant information about their advertising profiles. However, it is important to note that the DSA focuses only on political advertising. Overemphasizing political advertising alone is problematic as it only represents a subset of the broader problem of disinformation, not the problem in its entirety (Shattock, 2021). The DSA’s categorization aids in clarifying the legal liability of social media platforms in relation to the dissemination of disinformation. In other words, the legal framework of the EU enables it to go beyond relying solely on self-regulation by social media platforms.

The European Union has a longstanding history of combatting disinformation even prior to the COVID-19 pandemic. For instance, an independent High-Level Expert Group (HLEG) was established by the European Commission with the specific aim of countering disinformation. The group has delivered a report containing a range of recommendations that focus on five pillars: 1) enhancing the transparency of the digital information ecosystem, 2) promoting media and information literacy to counter disinformation, 3) developing tools to empower users and journalists and foster positive engagement with rapidly evolving information technologies, 4) safeguarding the diversity and sustainability of the European news media ecosystem, and 5) conducting continuous research on the impact of disinformation in Europe. Additionally, in 2018, the European Commission implemented a communication policy called “Tackling online disinformation: a European approach,” which aims to enhance transparency regarding the origin of information to detect potential manipulation, promote diverse sources of information, improve traceability and authentication of

information providers, raise public awareness and media literacy, and involve stakeholders in finding long-term solutions. The European Union has drawn on its past experiences in combating disinformation, allowing it to be prepared and proactive in response to the COVID-19 infodemic. In June 2020, the European Commission introduced a joint communication policy called “Tackling COVID-19 disinformation – Getting the facts right.” In 2021, the Commission issued the EU Code of Practice on Disinformation, which has been agreed upon by various online platforms including Facebook, Twitter, and TikTok. The Code aims to commit online platforms and the advertising industry to a set of objectives outlined in five pillars: 1) improving the scrutiny of advertisement placements to reduce revenues of disinformation purveyors, 2) increasing the transparency of political and issue-based advertising, 3) ensuring the integrity of services with regards to accounts that spread disinformation, 4) empowering consumers by reducing the visibility of disinformation, improving the findability of trustworthy content, and providing users with accessible tools to report disinformation, and 5) empowering the research community by providing access to privacy-compliant data for fact-checking and research activities, relevant data on the functioning of their services, and general information on algorithms (Hoboken & Fathaigh, 2021; European Union, 2018, 2020, 2021). To sum up, four different approaches can be identified: 1) self-regulation, which involves voluntary actions by digital platforms; 2) co-regulation, which entails collaboration between EU-level and national-level authorities, internet platform companies, media organizations, researchers, and other stakeholders; 3) direct regulation, which encompasses legal measures and sanctions; and 4) audience-centered solutions, such as fact-checking and media literacy initiatives (Durach et al., 2020).

Durach et al.’s analysis of how the EU tackle disinformation reveals that self-regulatory approach in addressing disinformation has been criticized for its lack of transparency, which can be attributed to the voluntary nature of commitment and overreliance on automation, resulting in insufficient verifications.

To overcome the limitations of the self-regulatory approach, the European Commission has established a cooperation framework, “Tackling online disinformation: a European approach,” involving various stakeholders such as HLEG, Member States,

social media platforms, the media, and researchers. Additionally, the Code of Practice on Disinformation has been implemented to enhance transparency in online political advertising, combat fake accounts, enable consumers to report disinformation, and promote more research. However, recent evaluations indicate that the Code has yielded mixed results and has not been able to completely satisfy all parties or effectively address the issue of disinformation. In detail, the following improvements should be made: persuading social media platforms to grant access to their APIs for researchers to expose the phenomenon of disinformation, fostering mutual trust among industry, government, academia, and civil society in addressing disinformation campaigns and social media black markets, as well as funding trans-European policy-driven research projects and creating a shared database of analytics for policymakers and the research community.

As the direct regulation approach is controversial due to concerns related to accusations of censorship, limitations on freedom of speech, and potential impacts on democracy, this approach lacks consensus among member states. Only a few EU Member States, including Germany, France, and Hungary, have implemented laws that impose fines or imprisonment for publishing and disseminating content considered illegal. For instance, Germany has NetzDG, also known as the “hate speech law,” which requires digital platforms with at least two million registered users in Germany to remove illegal content within 24 hours or face fines of up to EUR 50 million. France has a law that allows electoral candidates or political parties to appeal to a judge to take down false information during an electoral campaign within 48 hours. The same law empowers the French broadcasting regulator, the Audio-visual Council, to block foreign state-controlled broadcasters that publish false information. In Hungary, the Parliament approved emergency powers during the COVID-19 pandemic, allowing the ruling party to govern by decree indefinitely, including measures targeting the spread of misinformation with penalties of up to five years of imprisonment for those accused.

The last set of solutions is designed to empower the people to develop necessary critical thinking skills and resilience to disinformation. The strategies rely on fact-checking projects and media literacy programs. At EU-level, EUvsDisinfo is the flagship initiative to create a database of messages in the international information

space that are identified as providing a partial, distorted, or false depiction of reality (Durach et al., 2020). In addition to independent initiatives, the European Commission oversees the EFCSN Project, which aims to unite Europe's fact-checking and open-source intelligence (OSINT) community to establish a Code of Professional Integrity that will provide guidance in their efforts to combat misinformation (EFCSN, 2022). An example of a campaign aimed at promoting media and information literacy skills is the #ThinkBeforeSharing initiative, which is a collaborative effort between the EU Commission's Directorate General for Communication Networks, Content and Technology (DG Connect), the UNESCO Brussels Office, and Twitter (UNESCO, 2020).

In summary, although the EU has implemented various countermeasures to combat COVID-19 disinformation on social media, an analysis of the EU's responses to online disinformation suggests that existing policy recommendations are fragmented, one-dimensional, and regulatory in nature. These recommendations do not fully consider the multifaceted nature of the problem. A more effective approach would be a multi-dimensional, multifaceted, and multi-stakeholder policy framework that involves all relevant stakeholders and assigns fair responsibility while requiring decisive action. One potential framework is a six-dimensional policy approach that includes enhancing transparency in the digital media ecosystem, promoting media literacy and digital skills among diverse groups of citizens, empowering stakeholders such as platform users, citizens, and journalists, strengthening media independence and pluralism, promoting ethical conduct in media, journalism, and platforms, and supporting independent research on monitoring disinformation phenomenon (The Left in the European Parliament, 2021). It is important to remember that there is no single solution to this complex problem. A comprehensive approach that involves all stakeholders is essential.

4.2.3 Asian countries: Singapore and Thailand

According to Katrin Voltmer's *How Far Can Media Systems Travel? Applying Hallin and Mancini's Comparative Framework outside the Western World* and Duncan McCargo's *Partisan Polyvalence: Characterizing the Political Role of Asian Media*, Hallin and Mancini's framework for comparing media systems is not directly applicable to non-Western contexts. However, the four pillars of the framework can be used as

analytical elements to compare media systems in these contexts. In other words, generalizing Asian countries using Hallin and Mancini's models which are developed based on different contexts fails to capture the actual complexity of their media landscape (McCargo, 2012; Voltmer, 2012). Instead, the analysis should utilize the same conceptual elements that define Hallin and Mancini's models, which include media market, quality of journalism, political parallelism, and state intervention, in order to provide a more accurate portrayal of the media system based on these elements. McCargo argues that in many Asian contexts, newspapers do not openly endorse specific political parties during elections. Instead, influential publications tend to maintain strong connections with a wide range of formal and informal power holders and actors, adopting a flexible approach (McCargo, 2012).

4.2.3.1 Singapore

According to Cherian George's *Freedom from The Press: Journalism and State Power in Singapore*, Singapore's political system has been categorized as non-liberal political system, and the news industry is dominated by two major players: Singapore Press Holdings (SPH) and MediaCorp. SPH is a privately owned corporation, but it is closely supervised by the government. It publishes the Straits Times, the de facto national newspaper of Singapore. MediaCorp is a government-owned company that publishes the only non-SPH Singaporean daily newspaper, Today. It also operates free-to-air television channels and radio stations. Singapore has a strict press control system that is regulated by the government. The Newspaper and Printing Presses Act (NPPA) of 1974 gives the government the power to license and regulate newspapers. The NPPA also gives the government the power to appoint key personnel in newspapers, such as editors and publishers. This gives the government significant control over the content of newspapers. In addition to the NPPA, the government also uses other methods to control the media, such as direct censorship and self-censorship. News organizations in Singapore tend to be large corporations that are hierarchically structured. This means that the content producers, whose work is directly subject to censorship, do not have any control over ownership or senior management functions. The government's control over the media has been effective in preventing the emergence of an adversarial press. However, the government has found it more

difficult to control the internet. The internet has made it possible for people to access news and information from a variety of sources, including sources that are critical of the government. This has made it more difficult for the government to control the flow of information and to maintain its monopoly on the truth. The internet has led to the emergence of a number of independent news media outlets, such as The Online Citizen and Temasek Review. These websites are volunteer-run and do not receive government funding (George, 2012). Political researchers have found that political news in Singapore is often depoliticized, meaning that it is presented in a way that removes or downplays the political aspects of the story. This is due to the strict government control of the media, which allows the government to influence how news stories are covered (Lee & Willnat, 2009). This is the reason why the media system is categorized as Partisan Polyvalence, but pluralism in this sense does not follow party-political lines. Singapore is unusual in that it openly acknowledges the existence of “OB markers,” (out-of-bounds markers) or unspoken rules about what topics are considered taboo for public discussion (McCargo, 2012). Given these factors, the government of Singapore has a certain level of control over the flow of information in society. This is due to the following factors: political parallelism, government interference, and dominance of large media organizations that are either run or supported by the government.

In October 2019, Singapore enacted the Protection from Online Falsehoods and Manipulation Act (POFMA). The Act makes it illegal to share “false statement of fact” that are likely to be prejudicial to Singapore’s security, public health, safety or tranquility, friendly relations with other countries, or likely to incite feelings of ill-will. Violators face criminal penalties of up to S\$50,000 (about US\$37,000) and/or five years in prison. Under this act, government ministers are authorized to issue orders to individuals or internet intermediaries to remove or correct false statements of fact without the need for judicial approval. Failure to comply with such orders may result in criminal fines and/or imprisonment of up to twelve months. In cases of non-compliance, the government can further order internet access services to block access to the offending statement or require internet intermediaries to correct the material. Companies that do not comply may face substantial criminal fines. Although individuals and companies have the right to appeal these orders, the grounds for

appeal are limited, and the orders remain in effect during the appeal process. The Act has been criticized for being too broad and for giving the government too much power to censor information. In one instance, the government ordered Facebook to post a correction on a post that criticized the government. Facebook complied with the order, but it also included a link to a page that stated the company “doesn't endorse the truthfulness of either the posts on its site or government corrections” (Aswad, 2020). Since its enactment in 2019, Singapore’s “fake news law” has been invoked 33 times, with 19 of these cases involving the correction of disinformation related to Covid-19 (Chee, 2021).

It is apparent that Singapore has a direct regulatory approach to disinformation. This approach has been effective in some ways, such as helping the country rank number one out of 83 countries in 2020 for the most reliable and accurate news shared on Twitter concerning COVID-19. However, the government’s censorship of online content has been criticized for lacking transparency (Dang, 2021). This lack of transparency makes it difficult for people to challenge the government’s decisions.

Given Singapore’s direct regulatory approach, it is logical for the government to have established its own fact-checking body to tackle disinformation. Nevertheless, there are both government and non-government initiatives in place when it comes to fact-checking and educational responses. On the government side, Singapore has its own fact-checking body called “Factually¹⁰⁴” which actively deals with COVID-19 disinformation. It debunks false claims about COVID-19 through its website, social media channels, and public education campaigns (gov.sg, n.d.). On the non-government side, Nanyang Technological University (NTU) runs “Sure Anot” via social media: Facebook and Whatsapp. Sure Anot is an initiative focused on social media literacy, which was launched in 2019 by NTU’s Centre for Media Engagement. In addition, there is a fact-checking organization called Black Dot Research¹⁰⁵, which is operated by a group of market and social research agencies known as Black Dot Communications Group. This fact-checking initiative specifically focuses on COVID-19

¹⁰⁴ <https://www.gov.sg/factually>

¹⁰⁵ <https://blackdotresearch.sg/factcheck/>

related issues (#COVIDWATCH) and vaccines (#VACCINEWATCH) (National University of Singapore, n.d.).

4.2.3.2 Thailand

Thailand and Singapore have similar media systems in that they both exhibit a high degree of partisan valence and have unspoken taboos on discussing certain topics, such as the political role of the monarchy in Thailand. However, unlike Singapore, Thailand's media system is not primarily controlled by the government. Instead, Thailand's media system, based on McCargo's analysis, is characterized by extreme internal pluralism, or diversity of viewpoints within a single media outlet. This can be seen in the Thai Rath newspaper, one of the top-selling newspapers in Thailand. Thai Rath is a mass-market newspaper that makes most of its profits from advertising and other activities rather than sales of copies. As a result, it covers a wide variety of topics, including news stories that are often sensationalized and graphic in nature. This practice challenges the Western concept of party-political parallelism, which is the idea that media organizations are aligned with political parties. Like other neighboring countries in the Asian context, political parallelism in Thailand is often not based on formal organizational ties, but rather on personal connections. Media organizations tend to assign reporters to key sources who share common characteristics, such as being from the same region, ethnic or language group, or having graduated from the same educational institution. This practice is believed to significantly enhance journalists' effectiveness in obtaining insider information. Partisanship is not defined by party loyalty because these loyalties are constantly changing. Instead, it means that journalists are free to express their opinions, which are often influenced by their personal and financial connections to power holders. This is the dominant mode of news reporting, where objective news coverage is often difficult to find. In terms of state intervention, censorship and state interference are prevalent in most Asian media. However, censorship in these contexts is predominantly self-imposed, often by individuals who are not even consciously aware of their own self-censorship, due to the chilling effects caused by state interference (McCargo, 2012).

In contrast to the Western trend of decentralized fact-checking, state-owned fact-checking bodies are an important source of information in Asia. Similar to

Singapore, Thailand has the AFNC Thailand, which is run by the government. It covers not only the internet but also traditional media sources. An analysis of AFNC Thailand posts from November 2019 to April 2020 by Lasse Schuldt reveals that COVID-19 accounted for the highest number of posts (53%), followed by a small number of posts on other topics. The main sources of checked content were domestic social media platforms (Schuldt, 2021). This clearly highlights the urgent concern of the COVID-19 infodemic on social media. It is evident that the Thai government has described falsehoods on the internet as a “critical threat” that could “harmfully affect people’s lives and the economy” (Leesa-Nguansuk, 2019 as cited in Schuldt, 2021). The Thai army chief has referred to the fight against fake news as “cyber warfare.” Government fact-checks are thus part of wider efforts to frame the fake news problem. Scholars hypothesize that state-operated fact-checking serves two implicit goals: to help frame disinformation as a threat to public interests, which in turn would lend legitimacy to related restrictions of free speech; to bolster the government's reputation and approval rates, or in short, for propaganda or political communication that excessively defends the government against allegations of misconduct or accuses political opponents and critics (Schuldt, 2021).

Thailand has taken additional measures beyond fact-checking initiatives to combat COVID-19 disinformation. In fact, Thailand has a history of taking legal actions against political disinformation purveyors. In 2017, the National Legislative Assembly amended the Computer Crime Act of 2007, extending its coverage to false information disseminated online. The Act not only applies to cases where threats to national security or public anxiety are likely, but also to situations where “public safety, national economic security, or public infrastructure serving national public interest” may be adversely affected. The Act grants authorities significant powers to order access restrictions and content removals, making it a crucial tool in addressing the spread of disinformation (Schuldt, 2021). However, a study by Pattamon Anansaringkarna and Ric Neo on “fake news” regulations in Thailand finds that the Computer Crimes Act has been used frequently against political activists who are accused of spreading disinformation. As a result, civil rights and free speech activists have campaigned against the broad provisions of the Computer Crimes Act. Furthermore, international

and local rights groups have condemned the Thai government's imposition of the COVID-19 emergency decree, expressing concerns about the suppression of free speech during the pandemic. Numerous reports have documented instances where whistleblowers in the public health sector and online journalists have faced lawsuits and intimidation from authorities as retaliation for criticizing the government's handling of the outbreak and exposing alleged corruption related to hoarding of surgical masks and profiteering in the black market (Anansaringkarn & Neo, 2021). The Thai government has been employing laws aimed at curbing disinformation as a means to silence political dissidents.

The deep political polarization within Thai society is a key factor that complicates the management of the COVID-19 infodemic, as it is closely tied to trust in the government's responses. Like the US, Thailand is deeply divided into two political groups with incompatible visions for the country. Based on Janjira Sombatpoonsiri's *Two Thailands: Clashing Political Orders and Entrenched Polarization*, one group believes that the king is the country's legitimate ruler, while the other group believes that sovereignty resides with the people. In recent years, the conflict has been exacerbated by the rise of Thaksin Shinawatra, the Prime Minister of Thailand from 2001 to 2006. The rise to power of Thaksin was perceived as a threat by the royalists because his populist policies challenged the hierarchical worldview of the royalists, which feared that radical economic change could lead to a redistribution of wealth and a challenge to the status quo. Therefore, the conflict between these two groups is not just about politics. It is also about culture, class, and religion. The Thai monarchy has been able to maintain its power and influence in part due to the construction of a royal nationalist ideology. This ideology blends historical myths and Buddhist narratives to portray the king as the divinely ordained ruler of the nation. It also justifies the country's hierarchical social order, which is seen as natural and fixed. This ideology has helped to legitimize the monarchy and make it more difficult to challenge. It has also helped to maintain social stability by providing a justification for the country's unequal social structure. However, this ideology has also been criticized for being outdated and undemocratic. It has also been blamed for contributing to Thailand's current political polarization. (Sombatpoonsiri, 2020). Political polarization

has led to the passage of legislation that targets political dissidents, such as the Computer Crime Act. Thai society's division is evident from the way people communicate about politics on social media, and this has been the case long before the pandemic. A study conducted by Pironrong et al., titled *Online echo chamber and first-time voters in the 2019 general election*, indicates a significant correlation between political partisanship and communicative behavior on social media. The study further reveals that Twitter users in Thailand tend to engage with others who share their political views, resulting in the creation of echo chambers (Ramosoota et al., 2022).

The political climate in Thailand remained turbulent throughout 2020 and 2021. The government's communication on critical issues, particularly COVID-19 management and vaccine management has eroded public trust and led to widespread dissatisfaction. This dissatisfaction has manifested itself in protests and calls for the government to resign, with thousands of protesters rallying against the government's handling of the COVID-19 situation, vaccine management, and economic impact (Phasuk, 2021; Reuters in Bangkok, 2021). For example, in the early days of the COVID-19 outbreak, social media users shared information about the high lethality and contagiousness of the virus. However, the Minister of Public Health made statements that downplayed the severity of the virus. He stated that the Ministry of Public Health could handle it and referred to it as a "krajok" virus (meaning a weak virus) in December 2019 (The Nation, 2021a). In January 2020, he even dismissed COVID-19 as "just a cold" (BBC, 2021). These remarks received widespread criticism and led to a decrease in public trust in the government. Pavel Slutskiy and Smith Boonchutima's study on the government's health communication during the pandemic presents an example of a tweet that stated, "China and Hong Kong have declared a state of emergency. The US has sent planes to evacuate people from China. However, this person still claims it's just a common cold. When will they start taking it seriously?" According to the analysis, individuals who lacked trust in the government turned to alternative sources of information, which were frequently unreliable. This made it even more difficult for the government to contain the virus (Slutskiy & Boonchutima, 2022).

During the lockdown phase, the government also faced an uphill battle in legitimizing its public health measures, such as extending the emergency decree and limiting mass gatherings, as the public perceived these measures to be politically motivated. According to a news report, the emergency decree was implemented on March 25, 2020, to manage the COVID-19 situation and had since been extended numerous times. However, a total of 1,447 individuals were charged with violating the decree, mainly for participating in mass gatherings (Lawattanatrakul & Sutthichaya, 2022).

The Thai government's handling of COVID-19 vaccines is another example of its loss of credibility. According to Johns Hopkins University, less than one percent of Thai population was fully vaccinated by March 2021. This delay in the vaccination program was met with criticism, as was the government's choice of vaccines. The first COVID-19 vaccine administered in Thailand was made by Sinovac Biotech Ltd., which was not trusted by the public. A poll conducted in May 2021 found that Sinovac was not in the top five most trusted vaccines in Thailand, and it was not approved by WHO. Moreover, the government's reliance solely on the AstraZeneca vaccine produced by Siam Bioscience, which is linked with the authorities, during the third phase of the pandemic resulted in problems with vaccine availability. The vaccine was expected to enhance the country's reputation, but the public began to doubt any potential conflict of interest, as many shareholders were connected to the police, military, and crown property (Lawattanatrakul & Sutthichaya, 2022). Public sentiment towards vaccines in Thailand was different from that in many Western countries. In Western countries, people were skeptical of coronavirus vaccines, especially those based on the new mRNA technology. Some people even spread rumors that these vaccines could cause the extinction of the human race. In contrast, social media users in Thailand were eager to get vaccinated, and they criticized the government for not procuring the latest generation of vaccines (Lawattanatrakul & Sutthichaya, 2022).

The lack of trust in government communication in Thailand results in a unique difference in public sentiment towards mRNA vaccines compared to Western countries. Pavel Slutskiy and Smith Boonchutima's analysis shows that in contrast to many Western countries where vaccines against COVID-19 were met with skepticism, public

sentiment towards vaccines in Thailand was different. Social media users in Thailand expressed a different sentiment, questioning the government's decision to rely solely on Sinovac and AstraZeneca vaccines and criticizing its refusal to procure the latest generation of vaccines. Skepticism in Thailand was not directed towards new mRNA technology vaccines. Instead, some skeptics spread rumors about these vaccines leading to the extinction of the human race (Lawattanakul & Sutthichaya, 2022). The case of Thailand underscores the significance of public trust in managing the infodemic. If the public has confidence in the government, they are more likely to comply with public health guidelines. Conversely, if people lack trust in official messages, they are more susceptible to believing alternative narratives and disinformation.

The government's politicization of messages related to COVID-19, particularly in a climate of public distrust, created confusion as various conflicting discussions or alternative narratives concerning the issue emerged. This scenario was particularly probable in an atmosphere where people were already skeptical of the government's motives, making it challenging for people to determine what to believe and potentially resulting in poor health-related decisions.

For educational responses, the government has set up information centers on social media to disseminate reliable COVID-19 information to the public and to help improve media and information literacy skills. These centers include the Ministry of Public Health's “ไทยรัฐสู้โควิด” (thaimoph) and the Government Public Relations Department's “ศูนย์ข้อมูล COVID-19” (informationcovid19). In addition to the COVID-19 information centers on social media, the Ministry of Public Health also produces episodes of its Health Review program on YouTube, aimed at engaging with the younger generation and addressing health-related issues, including COVID-19 disinformation, ways to fact-check information (ClubHealth, 2021), and where to get vaccinated (ClubHealth, 2022). COVID-19 communication Health Review Domestic media outlets have also dedicated sections of their websites to COVID-19 information, such as ThaiPBS's COVID-19 section, which compiles all sorts of COVID-19 situation updates, news, and knowledge (Thai PBS, n.d.).

To sum up, Thailand adopts a direct regulatory approach to manage the infodemic. This approach includes legal measures, such as the Computer Crime Act

and the emergency decree. Additionally, the government has established the AFNC Thailand fact-checking initiative as a crucial tool for addressing online disinformation. Educational efforts to enhance media and information literacy skills are also made by the government. However, due to the lack of trust in the government, these efforts have not gained public support. There is evidence that relying too heavily on a coercive approach could lead to restrictions on freedom of expression, especially in contexts where public trust in official sources is low due to political polarization.

In summary, contextual analysis of selected societies indicates that various factors impact the COVID-19 infodemic, including the quality of journalism, political parallelism, state intervention, political climate, public trust in the government, government regulatory approaches, and COVID-19 responses. That is, to obtain a general understanding of the infodemic situation in each society, it is necessary to consider information from political actors, the media, and user-generated content. While there is no direct way to measure and compare the situation, the Infodemic Risk Index can provide a rough estimate of the likelihood that a social media user will be exposed to potentially unreliable sources of information about COVID-19. The index quantifies how users are exposed to circulating information. The index ranges from low risk (0.00-0.25), low/medium risk (0.26-0.5), medium/high risk (0.51-0.75), and high risk (0.76-1.00). Figure 27 shows a comparison of the Infodemic Risk Index¹⁰⁶ during the study period (January 2020 to July 2021), based on the Covid19 Infodemics Observatory run by Fondazione Bruno Kessler, a leading research institute in Italy (Fondazione Bruno Kessler, n.d.).

¹⁰⁶ The Infodemic Risk Indexes of the European Union are determined by averaging the indexes of its current member states, which consist of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

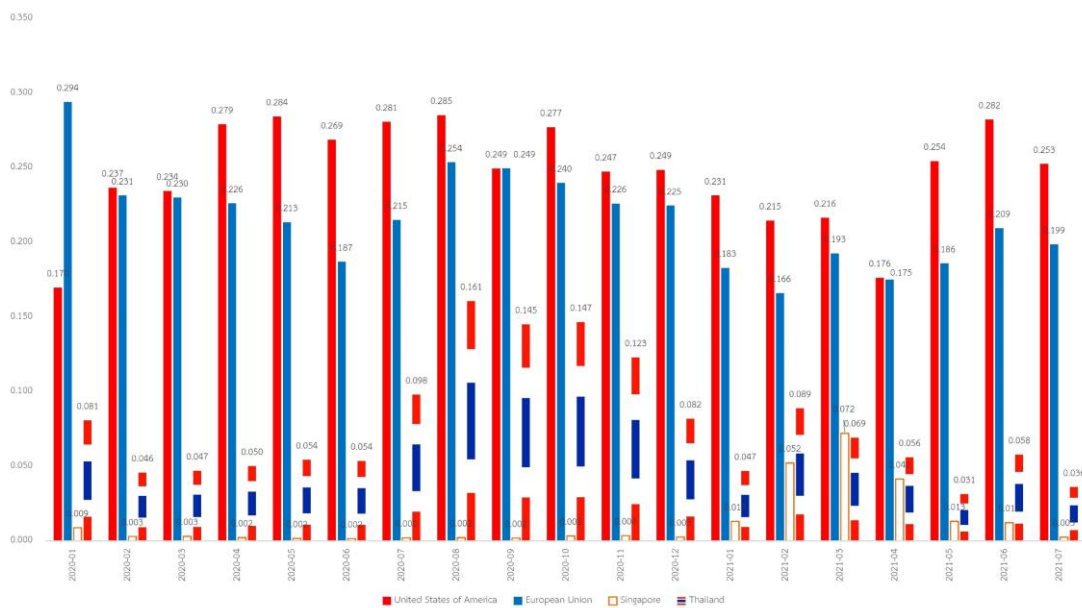


Figure 27 Comparison of the Infodemic Risk Index during the study period (January 2020 to July 2021)

At first glance, it appears that Singapore and Thailand's regulatory methods have resulted in a lower Infodemic Risk over the study period compared to the EU and the US. It is plausible that stringent measures, such as censorship and government-led fact-checking, may have contained the spread of COVID-19 disinformation. However, upon closer inspection, both countries have received significant criticism for their coercive measures, with reports suggesting a lack of transparency and violations of freedom of expression and press. Overall, the implementation of strict countermeasures by the EU against the COVID-19 infodemic results in a lower risk index compared to the US, which only relies on a self-regulatory approach.

Chapter 5

Conclusion and discussion

This concluding chapter synthesizes the journey undertaken in this thesis, beginning with an exploration of the knowledge gap, proceeding through the revelation of research findings in alignment with the predefined research objectives, and culminating in the presentation of a comprehensive framework summarizing the factors influencing the infodemic at both micro and macro levels. Additionally, it offers a set of policy recommendations designed to address the policy gaps identified in the research results.

After reviewing the literature, it has been found that many studies have focused on a single aspect of the problem, such as the common topics of COVID-19 disinformation, and have often been limited to the West and a short period of time. Therefore, this study takes into account three distinct phases of the pandemic in a non-Western setting and investigates four primary aspects of the problem, which are RO1) the distribution pattern, RO2) users' engagement with disinformation and their expressed sentiments, RO3) the measures taken by online intermediaries to counter disinformation, and RO4) the policy gaps that need to be addressed to tackle online disinformation.

To investigate how disinformation is distributed and how users interact with it, the analysis includes the study of content, sentiment, and social networks, and this involves social media data and self-report data. Social media data is collected from Facebook and Twitter platforms through Meta's CrowdTangle and Twitter API for Academic Research, covering 18 months from December 31, 2019, to July 2021, including three surges of the COVID-19 pandemic in Thailand. In addition, to gain a qualitative understanding of social media users' perceptions and experiences of the COVID-19 infodemic, in-depth interviews are conducted. As statistics show that social media usage varies across different generations, and that individuals from different generations also respond differently to disinformation. To account for these differences, convenience sampling method is applied to gather samples, and they are categorized into three generations, namely X, Y, and Z (excluding those who are under

18 years of age). In-depth interviews are also conducted with key informants to understand how content providers operating on Facebook and Twitter play a role in tackling the issue and help shape the information ecosystem. Purposive sampling is used to select key informants from government bodies: Anti-Fake News Center Thailand and Thai D.I. Machine, news media: Thai PBS and FM100, civil society organizations: Cofact and Zen-Dai, and social media influencers: อ้อ มันเป็นอย่างนี้ที่เอง by อาจารย์เจษฎ์ and Drama-addict. Lastly, a documentary research is conducted to review the platforms' policy and legal frameworks in different social contexts to achieve RO4.

The results of content and social network analyses reveal that disinformation spreads differently on different platforms and during different stages of the pandemic. Within the analyzed datasets, the majority of posts on Facebook (70.12%) and Twitter (71.32%) contain disinformation, while the rest are either debunked or fact-checked messages, with 29.88% on Facebook and 28.68% on Twitter. The most common topics of COVID-19 disinformation found on both platforms are medical information, particularly herbal remedies, and the politicization of COVID-19 related issues. However, there are differences in the remaining categories between the two platforms. For instance, "economic impacts" is ranked third in the Facebook dataset, while "vaccine politics" is ranked third in Twitter. The content related to alternative medicines in the social media posts reflects Thai culture's reliance on herbal remedies. The interest in alternative medicines in Thailand is reflected in the high levels of engagement with content about herbal remedies on social media. This is evident in both Facebook and Twitter's network visualizations, which show that these topics receive a lot of attention and engagement from users. In addition, a number of participants in in-depth interviews reported having experience with disinformation about herbal remedies for COVID-19, particularly "ฟ้าทะลายโจร" (Andrographis paniculate). The high engagement with the politicization of COVID-19 related issues such as censorship from the Twitter dataset suggests the impact of contextual factors on the infodemic, particularly the political climate and public trust in the government's response to the pandemic. To illustrate, analysis of the content and social networks on both Facebook and Twitter indicates that "politics" is one of the most common

topics. For instance, one of the highly engaged nodes in Twitter’s network visualization is “covid_ปิดข่าว,” which features content about the government’s censorship of COVID-19 related issues (see Figure 20 above). Additionally, one participant characterizes the government’s public communication as “propaganda with concealed political agendas.”

The emergence of content related to herbal remedies and political topics, especially government censorship of COVID-19-related issues, the use of the emergency decree to silence those who share COVID-19 news, and punishment for those who get infected, highlights the unique dynamics of the COVID-19 infodemic in the Thai context. High engagement with content about herbal remedies reflects not only Thai culture’s reliance on these remedies, as previously mentioned, but also the overwhelming nature of the health system during the COVID-19 pandemic. This led to a vast majority of people (around 80% according to the head of the Department of Thai Traditional and Alternative Medicine) depending on herbal medicines during home isolation (อาสา, 2021). In fact, the ‘herbal market’ in Thailand grew substantially during this period, contrary to the trend in other markets or industries. In 2020, the government identified the Thai herbs market as an economic pillar and launched a campaign promoting selected herbs as “champion products.” This campaign aimed to support local herbal businesses in 14 cities and narratives promoting the “anti-viral properties” of these herbal medicines were distributed by both government bodies and the media (The Nation, 2021b; ชุติพร อร่ามเนตร, 2021). However, as the development of Thai herbal medicine is still in its early stages, claims stating that they can prevent COVID-19 infection were marked as false by local fact-checkers. These conflicting narratives have, in part, created confusion at a societal level. The fact that discussions about government censorship occur on Twitter, a platform known for anonymity and political communication in Thai context, as opposed to Facebook, where a real-name policy is enforced, reflects a chilling effect on the societal level. It also indicates widespread government distrust and political polarization, leading to an alternative information ecosystem and post-truth communication.

When it comes to network structure, the Facebook network demonstrates two separate echo chambers, which are the debunking/fact-checked and information

pollution clusters. Since only a small fraction of nodes (5.45%) have interconnections between these clusters, there is limited information flow between them. Conversely, the network analysis of Twitter indicates a more widespread and cross-cutting spread pattern, as the nodes occupying “bridge” positions are more broadly distributed (22.51%). This suggests that Twitter users are more likely to come across a broader range of COVID-19-related content or more diverse sources than Facebook users. The reason for this contrast can be attributed to the distinctive architectures and norms of the two platforms. Twitter’s hashtag system enables users to access a wider range of information sources by aggregating information from various sources into a single topic. This function is widely adopted by Twitter users. Conversely, Facebook users generally lack this norm, which could explain why they have less exposure to diverse content. However, self-report data reveals that some could view the function in opposite light such as Participant number 11 (Gen Y) saying that Facebook’s architecture allows her to choose content on her feed but Twitter’s hashtags does not. She said, “Facebook is mostly free from disinformation/fake news because I can choose my content. But Twitter has hashtags, places where most people emotionally express towards a topic, this makes it a mix between facts and false information.”

The self-report data revealed a noteworthy finding: while the majority of interviewees (22) expressed a negative view of COVID-19 information on social media, citing concerns that it can be user-generated, anonymous, or even fabricated, they still place trust in their preferred platforms and believe they are able to detect disinformation when they encounter it. This is despite the fact that only one of the 30 participants is familiar with fact-checking. Clearly, the participants’ continued engagement with and trust in social media platforms during a health crisis, even in the face of disinformation, stems from their confidence in their ability to recognize and steer clear of such false information. This trust in their chosen platforms indirectly demonstrates optimism bias. Literature on online optimism bias suggests that within a social media environment, individuals often believe that they are more likely to encounter positive things online, such as being less susceptible to disinformation, and less likely to experience negative things, compared to other people (van der Meer et al., 2023). This underestimation of personal risk is exemplified in the literature by

situations such as perceiving lower privacy risks on Facebook (Metzger & Suh, 2017) or encountering fewer instances of social media phishing on TikTok (Lei et al., 2023). As an example, two participants, one a light user and the other a heavy user, expressed comparable views about Twitter, but from opposite perspectives. Participant 11, the light Twitter user, emphasizes her ability to selectively curate content on her Facebook feed. In her opinion, this makes it relatively free of disinformation, unlike Twitter's hashtags, where hashtags group tweets on specific topics, often leading to a mixture of accurate information and falsehoods. On the other hand, Participant 1, the heavy Twitter user, holds a favorable perspective of Twitter's communication environment, attributing this positivity to the platform's characteristics such as anonymity and hashtags. Hashtags allow users to discuss specific topics and encourage a variety of viewpoints, while anonymity provides a sense of security that enables users to freely express their opinions, especially on political subjects. The contrasting views of these two participants on Twitter provide evidence of optimism bias, a phenomenon in which people frequently maintain an optimistic outlook on their choices while downplaying their vulnerability to negative experiences.

A sentiment analysis of the two datasets indicates that the distribution of sentiment differs significantly between Facebook and Twitter. Facebook's results are generally evenly distributed between positive and negative sentiment. However, upon closer examination, a clear difference is observed between the heavily negative sentiment conveyed in debunking/fact-checked messages and the positive sentiment expressed in messages containing disinformation. In the former, negative language is often used to explain why the information is deemed false or misleading, while the latter mostly consists of entries containing persuasive pseudo-scientific claims that use positive or neutral language. The sentiment analysis results for the Twitter dataset show a significant difference compared to those of the Facebook dataset, with a highly uneven distribution of sentiment. It is noteworthy that while the Facebook dataset includes only two categories of debunking/fact-checked messages, namely "debunking" and "fact-checked" messages, the Twitter dataset displays three distinct themes for these messages: "debunk," "debunk_3rd_person_effect," "debunk_satire," and "fact-checked." The emergence of "debunk_3rd_person_effect"

reflects the third-person effect, which is the tendency for people to believe that others are more susceptible to persuasion, in this case, disinformation than they are themselves. This type of content usually uses negative language to blame third persons for spreading disinformation, and this is supported by self-report data from in-depth interviews, which shows that many participants expressed this belief. Many participants believed that they are just as good or better than others at detecting COVID-19 disinformation. They also believe that the elderly are the most susceptible group to false information. Their confidence in detecting disinformation may arise from their limited experience with the implications of COVID-19 disinformation. However, it is worth noting that their confidence is not a result of official campaigns because among the 30 participants, only one mentioned having knowledge about fact-checking.

One possible reason for the abundance of negative sentiment in the Twitter dataset, aside from negative language used to debunk disinformation, could be the anonymous nature of communication on the platform, which may encourage the use of vulgar language in criticizing the government responses and even hate speech in politicizing government responses. The results of both content analysis and social network analysis indicate that “politics” is the most common negative theme in the Twitter dataset and it generates a high level of engagement. The emergence of “politics” messages with overwhelmingly negative sentiment, particularly those concerning government censorship of COVID-19 information, echoes the participants’ views on the sense of security enabling them to freely communicate on political issues. What is noteworthy is that Twitter users do not view anonymity as a drawback, but rather as a beneficial attribute that facilitates free expression in an oppressive communication environment. For instance, participant number 1 (Gen X) said that “There are deep insights on Twitter because people are not afraid to express.”

Documentary research results is divided into two parts: the first one examines the policies of Facebook and Twitter in addressing COVID-19 disinformation, and the second part presents an analysis of how infodemic responses to COVID-19 are manifested in four selected societies. As the literature suggests that the infodemic vary from one social context to another, contextual analysis of how various countries address the issue of COVID-19 disinformation is carried out in four different social

contexts: the US, EU, Singapore, and Thailand. The selected four social contexts differ in terms of media systems, legal environments, and political climates.

The findings of the first part indicate that although there are some collaborations between governments and social media platforms and among different platforms to combat disinformation, the overall response is fragmented. One illustration of this is the joint commitment made by major platforms like Facebook and Twitter to fight against the COVID-19 infodemic at a global level. However, it is important to note that this is only a commitment and not a fully synchronized joint effort between the platforms. Both platforms use similar approaches, including monitoring and fact-checking, policy changes, curatorial changes, technical and algorithmic changes, de-monetization, and specific policies for COVID-19 disinformation, but their efforts are largely independent. Social media platforms have taken a two-pronged approach to combating COVID-19 disinformation, using both preventative and remedial measures. Preventative measures, also known as hard measures, include warning labels, notifications, and links; penalizing content (decreasing visibility of content); content removal; account suspension; and advertising restrictions. Remedial measures, also known as soft measures, include information curation; health promotion and communication campaigns; boosting official content; and Q&A on COVID-19. However, it is important to note that not all of these measures are available in all regions of the world. For example, Twitter's COVID-19 tab in Explore and both Facebook and Twitter's Q&A on COVID-19 do not available in Thailand.

Despite efforts by social media platforms to combat false information, they have faced criticism for not doing enough and for being slow to take action. Nevertheless, studies argue that the issue of COVID-19 infodemic is too complex to be solved by any one group or organization, and requires collaboration among various sectors of society, including the government, academia, civil society, media, and social media platforms. Social media platforms vary in terms of their architectures, functions, users, and rules. This makes it difficult to develop a single set of moderation policies that will be effective across all platforms. In addition, disinformation can persist and propagate on other platforms even if it is removed from one platform. This is because platforms are often interconnected. As a result, scholars have acknowledged that a

one-size-fits-all approach to content moderation is not practical because social media platforms vary in terms of their functions, users, and rules. The legal framework that affects social media platforms also varies from country to country. This can make it difficult for platforms to develop consistent policies across all of their markets. Given the complexity of the COVID-19 situation and the various social contexts in which social media platforms operate, it is important to understand the social context in which social media platforms operate. This includes understanding the legal framework that governs these platforms in different countries. By taking into account the legal framework, it is possible to identify best practices and policy gaps that need to be addressed.

In the US, freedom of expression is championed with the First Amendment, so social media platforms are shielded from legal liability for content posted by users on their platforms. In response, a self-regulatory approach is adopted, and fact-checking initiatives are typically implemented by non-governmental organizations. To tackle the issue, the government needs to implement key countermeasures that focus on educational and ethical responses. Such measures can include awareness-raising programs that educate the public about disinformation, and the publication of guidelines and recommendations, training sessions, and other forms of content that sensitize people to the issue. Despite efforts to provide the public with reliable information, studies show that people's perception of that information can vary depending on their political beliefs. This is due to deep political polarization and people's trust in the media they consume which can lead to people becoming more distrustful of information that comes from sources that they perceive to be aligned with the opposing political standpoint. People's trust in the media is also a factor in how they perceive information. Those who trust the media are more likely to believe information that is presented to them, while those who distrust the media are more likely to question or dismiss that information. The politicization of public health is a serious concern, as it can lead to people making decisions about their health based on political beliefs rather than on scientific evidence. This can have a negative impact on public health outcomes such as vaccine hesitancy.

The EU's responses to disinformation stand out among the four selected cases due to the adoption of four distinct strategies to address the COVID-19 infodemic. These include: 1) self-regulation, which involves voluntary actions by social media platforms, 2) co-regulation, which is a collaborative effort between EU-level and national-level authorities and relevant stakeholders such as social media platforms, media organizations, and researchers, 3) direct regulation, which involves legal measures and sanctions, and 4) audience-centered solutions, which are initiatives designed to enhance media literacy among the public. The EU's legal framework differs significantly from others in that it balances freedom of expression with human rights. In certain situations where society is confronted with urgent issues, interference with this freedom may be necessary. In the context of the EU, social media platforms are granted partial immunity from liability, known as safe harbors, as long as they are passive and unaware of disinformation on their platforms. Instead of placing a heavy burden on social media platforms to deal with the problem of disinformation, the EU establishes a special task force and a Code of Practice on Disinformation. These measures not only address the issue directly but also promote collaboration among stakeholders and set standards for self-regulation. However, studies point out that the EU's policy recommendations and laws do not fully take into account the complex nature of the problem of disinformation and focus mainly on political disinformation, particularly political advertising, which is only a small part of the larger issue of disinformation. It implies that some member states do not adopt the countermeasures, and some laws focus primarily on political communication, rather than COVID-19 disinformation.

Singapore and Thailand share many similarities in their approach to combating COVID-19 disinformation. They both utilize direct regulatory measures and have established strong chilling effect due to their governance structure. That is, the governments have tight control over the flow of information in society. The enactment of the Protection from Online Falsehoods and Manipulation Act (POFMA) in Singapore criminalizes the sharing of "false statements of fact" that may harm the country in any way such as its security, public health, safety, or tranquility. Singapore's direct regulatory approach towards tackling disinformation led to the establishment of its

fact-checking body, called “Factually,” which actively combats COVID-19 disinformation by debunking false claims through its website, social media channels, and public education campaigns. Since its implementation in 2019, the law has been utilized 33 times, with 19 of these cases pertaining to the correction of Covid-19 disinformation. The Act has faced criticism for being overly expansive and for conferring excessive power on the government to censor information. Thailand has a comparable approach to Singapore. It uses its Computer Crime Act to criminalize those who spread false information, fake news, inappropriate online content or engage in online offences. The country has also employed emergency decrees to manage the infodemic. Similar to Singapore’s Factually, Thai government has established its own fact-checking body, known as the “Anti-Fake News Center Thailand,” to oversee the online space. The international community has criticized the Thai government’s responses, citing violations of human rights. The measures are often viewed as being politically motivated, with some using them to punish political dissidents for participating in mass gatherings during the pandemic. Singapore and Thailand have implemented educational initiatives, overseen by their governments, to increase public awareness and knowledge about COVID-19 disinformation. Along with these governmental efforts, both countries have non-governmental responses aimed at empowering individuals with media and information literacy skills to counteract COVID-19 disinformation.

However, one key difference between Singapore and Thailand is that people in Singapore trust the government and the media (Lim & Perrault, 2020), while the communicative environment in Thailand is characterized by confusion, echo chambers, and post-truth. The underlying reason for this could be attributed to the current political climate and deep political polarization in Thailand, where the government lacks public trust and is often seen as politicizing its communication. Both qualitative evidence from self-reported information through in-depth interviews and quantitative evidence from social network analysis results of this study support this claim. One example of post-truth communication that caused confusion in society is when the Minister of Public Health describes COVID-19 as a minor illness, such as “just a cold” or the “krajok virus.” According to one of the key informants in this study, the OhlSeebyAjarnJess representative, he emphasized that COVID-19 was a major and long-

lasting issue. However, the government claimed the opposite, suggesting that the disease was not a significant concern, and this narrative was widely accepted by the public. Another example of this, as reported by the OhlSeebyAjarnJess representative, is the emergence of a political message that goes: “We have to believe the doctors, not the dogs,” which advocates for trusting the doctors (i.e., the representatives of the Center for COVID-19 Situation Administration (CCSA) who are medical doctors) rather than other sources. This message also targeted the OhlSeebyAjarnJess representative’s dissenting opinion on the government’s announcement of “zero cases of infection in the country.” These instances demonstrate the prevalence of post-truth where individuals tend to believe information that confirms their existing beliefs or aligns with their political views. Facebook and Twitter’s social network analyses with structure of echo chambers support this observation. In the big picture, the situation in Thailand highlights the crucial role of public trust in dealing with the infodemic. When the government enjoys the public’s trust, people are more inclined to follow public health guidelines. Conversely, when people doubt the credibility of official messages, they become more vulnerable to believing alternative narratives and misinformation.

After considering the above-mentioned points, it is possible to refine the conceptual framework and categorize the key factors that influence the infodemic and the information ecosystem of a society into two main categories: macro and micro-level factors. This can be illustrated in Figure 28 and 29. Micro-level factors are psychological factors (such as selective exposure, cognitive dissonance, confirmation bias, and optimism bias) linked to political attitude, previous experience with disinformation, media and information literacy skills, and social networks, and technological factors (particularly social media platforms’ algorithmic configurations) that influence users’ engagement (see Figure 28). Homophily interaction patterns and echo chambers can lead to the formation of alternative information ecosystems and the proliferation of post-truth communication, ultimately exacerbating the problem of disinformation at the societal level. Cross-cutting communication patterns, in contrast, can increase exposure to different perspectives, which can help pop filter bubbles and reduce polarization. Cross-cutting communication can also help people to become more understanding and tolerant of others, leading to increased civic engagement and

resilience to disinformation. The macro-level factors refer to the characteristics of the media system, legal framework, platform policy, political climate, and the history of political polarization that affect public trust in the media and government. These factors influence how social media users interact with each other, the content they share, and how they communicate, as well as how social media platforms regulate communication, particularly their content moderation algorithms. That is to say, these factors have an impact on shaping social media communication, which in turn plays a role in shaping the society's information ecosystem as a whole (see Figure 29).

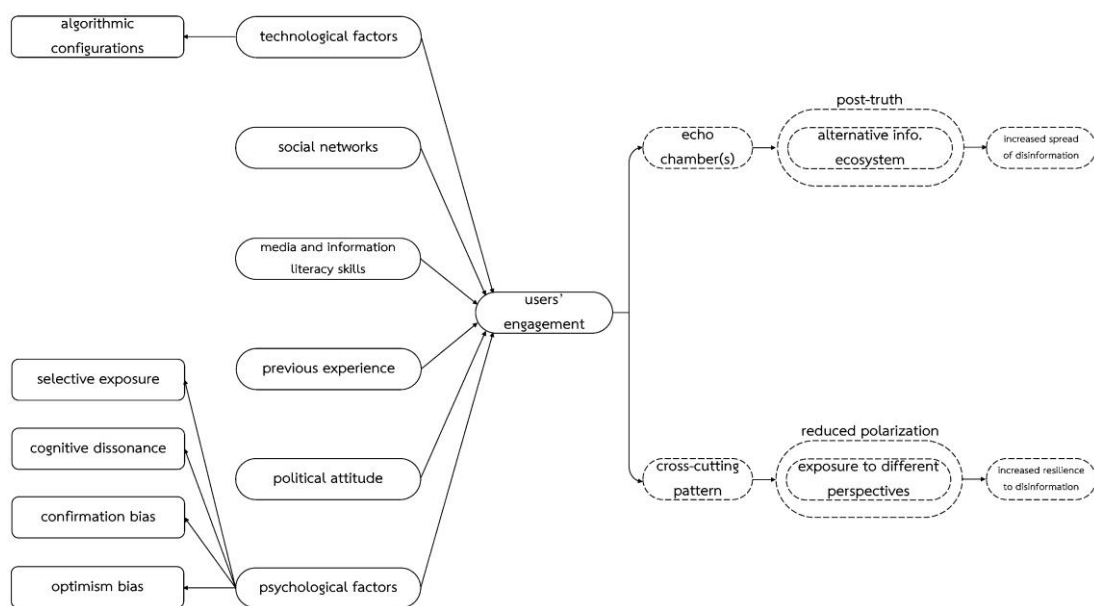


Figure 28 Key factors shaping the interaction patterns at micro level

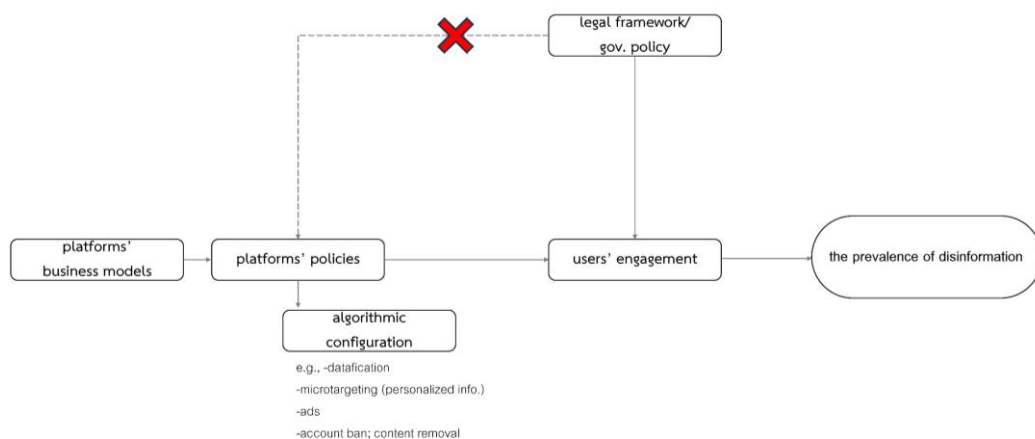


Figure 29 Key factors shaping users' engagement with disinformation at macro level

Nonetheless, complexity at the macro level surpasses that at the micro level due to various factors including the influence of platforms' business models, policies, and algorithmic configurations such as datafication, microtargeting, advertisements, account bans, and content moderation (see Figure 29). These elements also significantly influence the engagement of users, which is fundamental to the prevalence and spread of disinformation on social networks. It is important to note that platforms are profit-oriented, with their primary revenue source being the commodification of users' data and microtargeting advertising. Therefore, social media platforms' business models influence the dynamic of information flow on their networks. As stated in the *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media*, social media platforms operate under their own set of policies and rules that govern how users interact with each other and with the content on the platform. This governance includes how profiles and interactions are structured, how social exchanges are preserved, and how information is organized algorithmically. User engagement is at the core of their algorithmic configurations, influencing what content appears on users' information feeds, search results, and trending topics. These rules and logics can have a significant impact on what users can and cannot do on the platforms, as well as what content they see. In fact, platforms' algorithmic content curation mechanisms, by design, segment social network interactions into clusters based on users' interests and preferences (Gillespie, 2018). That is platforms are not fully neutral by design due to their business models' which shape their algorithmic configurations and content moderation practices. The fact that their algorithmic configurations are not fully transparent poses regulatory challenges.

The shift from ex post to ex ante regulation, driven by the implementation of algorithms, has put the discussion of social media platforms' transparency of algorithmic configuration at the forefront of policy recommendations for addressing disinformation on social media. Central to this discussion is the call for enhanced transparency on social media platforms (Forum on Information and Democracy, 2020). In their initial stage, social media platforms used to let people share any type of information on their platforms, and then they would remove it later if it was identified

false or harmful. However, they are now using algorithms to filter or warn users about disinformation before content is seen by users. This is called *ex ante* regulation. *Ex ante* regulation is a way of controlling something by designing rules beforehand. This is in contrast to *ex post* regulation, which is a way of controlling something by reacting to problems after they happen. Social networks like Facebook use algorithmically determined rules or logics to “steer users’ activities in a certain direction” (Van Dijck 2013, p.144 as cited in Gritsenko & Wood, 2022). With the shift to unified “Community Standards” integrated within algorithms, social media platforms no longer have the ability to decide on a case-by-case basis what information is allowed on their platforms. There are some potential downsides to this approach. For example, it could lead to the censorship of legitimate content, if the algorithms are not properly designed. For instance, users have reported instances where Facebook’s algorithm inappropriately blocked campaigns aimed at exposing racist language in publications on its platform (Gritsenko & Wood, 2022). This highlights the evolving roles of social media platforms, which deviate from the traditional definition of “intermediaries.” It also emphasizes that the current self-regulation of these platforms remains insufficient in dealing with disinformation. Consequently, there is a need to enhance transparency requirements and reevaluate self-regulation.

In fact, platforms’ transparency is one of the key challenges related to algorithmic governance and disinformation, as identified by relevant literature. The literature on algorithmic governance has identified three key challenges related to algorithmic governance and disinformation:

1. Automated decision-making: Automated decision-making systems can be biased, leading to discrimination, information distortion, and echo chambers. For example, echo chambers can occur when social media feeds only provide information that is tailored to the user’s interests, leading the user to believe that their views are more widely held than they actually are;

2. Invisibility and opacity: Algorithmic systems are often invisible and opaque, making it difficult to understand how they work and to identify and address potential biases;

3. Ethics and values: Algorithmic systems are not neutral, and their design and operation raise ethical and value-based concerns (Gritsenko & Wood, 2022).

This study's findings align with existing literature on filter bubbles and echo chambers, indicating a tendency towards homophily interaction patterns in algorithm-driven social media communication environments. Such patterns can trap users in echo chambers, potentially leading to poor decision-making, particularly during health-related crises like the COVID-19 pandemic. The root of this issue lies in the platforms' algorithms. In the big picture, these algorithms are shaped not only by the business models of the social media platforms but also by the legal environment.

The way social media platforms operate and moderate content are influenced by the conditions and legal frameworks of their geographical origins, which, in turn, present regulatory challenges. This means that the geopolitics of platforms play a role in shaping their business models and policies, as well as how they are regulated. Social media platforms inherited the legal status of safe harbor from the internet's regulatory framework¹⁰⁷ which views them as platforms or intermediaries that provide a free public sphere, rather than publishers of content they host. However, the book argues that their roles have evolved beyond this definition and the existing framework has limitations because it was not originally designed with social media platforms in mind. Unlike the internet, social media platforms “don't make the content; but they do make important choices about it” as they “host, organize, and circulate users' shared content or social interactions” (Gillespie, 2018, p. 18) and “moderate the content and activity of users, using some logistics of detection, review, and enforcement” (Gillespie, 2018, p. 21). Facebook and Twitter's COVID-19 policies serve as examples of their editorial review mechanisms designed to identify problematic content or behavior based on their policies and community guidelines. When content violates these policies (e.g., content that is deceptively altered but does not directly threaten the safety and well-being of others), both platforms employ labeling or flagging with warnings as a primary measure to regulate disinformation, rather than removing them (Tan, 2022). This approach reflects their commitment to the concept of a free

¹⁰⁷ Section 230 of U.S. telecommunication law

marketplace of ideas, where all types of ideas, even false ones, should be available to the community. The existence of COVID-19 disinformation on social media platforms proves that the current regulatory framework is inadequate and that platforms value the concept of a free marketplace of ideas over protecting users from harmful content.

Another challenge lies in the fact that intermediary liability regulations are typically bound by individual nations or regions, whereas platforms often operate on a global scale. This condition allows them to respond to the problem of disinformation in some areas on a voluntary basis (e.g., evidence shows that some major platforms have been reluctant to comply with content removal requests from local governments) (Gillespie, 2018). For example, Thailand's Ministry of Digital Economy and Society (DES) made requests to Facebook and Twitter to remove certain politically oriented accounts accused of being involved in the spread of political disinformation in 2020, 2021, and 2023 (e.g., Pavin Chachavalpongpun, Andrew MacGregor Marshall, รอยัลลิสต์มาร์เก็ตเพลส-ตลาดหลวง), and tried to force Facebook to comply with court-issued takedown orders to remove scams and political disinformation (anti-government and anti-monarchy posts), but the platforms did not comply (Tanakasempipat & Thepgunpanat, 2020; Thai PBS World's Political Desk, 2021; The Nation, 2023). However, in 2020, without any official requests or directives from the Thai government or authorities, Facebook and Twitter proactively removed accounts linked to the Royal Thai Army, as these accounts were accused by the platforms of spreading disinformation (News Agencies and Post Reporters, 2020). The fact that transnational social media platforms have ignored Thailand's requests to remove politically oriented accounts and content while proactively removing accounts linked to the Royal Thai Army exemplifies not only the limitations of Thailand's jurisdiction over these platforms but also the evolving roles of the platforms as content moderators. The geopolitics of social media platforms, their evolving roles as content moderators, and the limitations of the current regulatory framework pose significant challenges to addressing the spread of disinformation on these platforms. The refusal of platforms to comply with local government requests, contrasted with their proactive actions in other instances, highlights their significant influence and autonomy. This situation calls for a reevaluation of existing regulations and a more nuanced understanding of the

roles and responsibilities of social media platforms. It also emphasizes the need for a balance between maintaining a free speech and protecting users from harmful content.

Governments around the world have pushed social media platforms to grant full transparency regarding how their algorithms work (i.e., content moderation, information ranking, and microtargeting) and to amend their policies and algorithmic settings to combat disinformation (Brown, 2021; Forum on Information and Democracy, 2020; Fox, 2020). However, it is important to note that due to the existing legal framework's constraints, which do not assign them legal responsibility, making it highly challenging to implement such changes.

Upon analysis of the aforementioned macro-level factors, the following policy gaps can be observed in the Thai context:

- Conflicting information from government bodies can cause confusion at the societal level, leading to the proliferation of narratives based on this conflicting information. Such conflicting narratives can undermine public trust, especially in times of crisis. Therefore, it is crucial for governments to maintain transparency and accuracy in their communication about public health issues.
- Fragmented current efforts: There is no specific legal framework or policy allowing for multi-stakeholder collaboration on disinformation;
- Lack of jurisdiction: There is no jurisdiction over social media platforms' algorithmic configurations and content moderation;
- Politicization: Existing laws dealing with disinformation may potentially give excessive power to the state, which could be used to silence political dissidents;
- Limited reach of counter narratives: Fact-checking initiatives are not widely recognized;
- Deeply ingrained norms: Norms such as respect for seniority may hinder debunking efforts, as people may lack the courage to warn others, especially those older than them;
- Aging society: A large proportion of the population is vulnerable to disinformation (the elderly);

- Inadequate comprehensive understanding: There are a small number of studies on disinformation and health crises.

Although the key factors shaping the infodemic, as outlined in Figure 28, are supported by content, sentiment, and social network analyses, it is important to note that further research is needed to confirm the relationship between these factors as the findings are derived from only two social media platforms. Additionally, user-level factors such as selective exposure, confirmation bias, cognitive dissonance, and political attitude, which play a role in shaping the infodemic, require further study as well. This is because the literature review gathered for this study is from various fields beyond COVID-19 disinformation, including political communication during elections and from Western countries, rather than Thailand. Therefore, it is possible that these psychological and contextual factors may have different influences when it comes to COVID-19-related issues. Furthermore, based on anecdotal evidence from the interview data, several participants and key informants have reported that disinformation frequently originates from communication platforms such as Line and video-based platform—Tiktok, which currently lack fact-checking mechanisms. Hence, it would be useful to explore of these platforms in future research.

To conclude, it is important to explore practical strategies for policymaking in the context of the infodemic. Based on the analysis of four different societies, it is evident that depending solely on a single approach, such as self-regulation in the US or direct regulation in Thailand, is insufficient. This puts a significant burden on both the platforms and the public while failing to strike a balance between coercive measures and the right to freedom of speech and human rights. In reality, for Thailand to influence or negotiate changes in the policies of social media platforms, particularly regarding disinformation, the country would need to have a similar level of economic and political impacts as the EU. However, this is far from reality, so there is no incentive for these platforms to address Thailand's requests. This leaves Thailand with ex post regulation as the only option.

To bridge the gap, this paper proposes the following solutions, adapted from the synthesis of documentary research results and insights gained from key informants:

- Creating a taskforce with relevant expertise to address the issue on a long-term basis;
- Establishing a specific policy that facilitates collaboration among key stakeholders, including the government, social media platforms, and the media;
- Promote media and information literacy and digital skills among diverse groups of citizens. The campaigns should be designed with vulnerable groups (such as the elderly) in mind, and an emphasis should be put on:
 - Creating a comprehensive understanding of the nature or life cycles of both short-lived and long-lived context-independent messages, especially about herbal medicines and politicized messages;
 - Creating awareness of social media use based on the concepts of filter bubble and echo chamber in relation to political viewpoints, to inoculate them against future infodemics;
- Promote a norm of understanding and empathy when it comes to debunking. Encourage the idea that debunking messages does not imply disrespect;
- Strengthening and empowering the media with an emphasis on ethical conduct;
- Supporting independent research on disinformation to improve comprehensive knowledge about the phenomenon and future crises.

This proposed approach is based on the understanding that disinformation is a complex problem that requires a multi-pronged solution. In the long run, the taskforce could be responsible for developing and implementing strategies to combat disinformation, as well as monitoring and evaluating the effectiveness of those strategies. Furthermore, the taskforce should be entrusted with the responsibility of fostering collaboration with relevant stakeholders, drawing from multidisciplinary perspectives and expertise to address disinformation challenges and pushing combating disinformation into national policy. Above all, it requires interdisciplinary active collaboration among key stakeholders. To materialize such multi-stakeholder actions and support the operation of the taskforce, a policy or legal framework is needed. It is equally vital to encourage ethical behavior in the media sector,

recognizing its pivotal role in amplifying messages circulating on social media platforms. Empowering individuals with the insights and lessons learned from the Thai context is imperative, particularly the distinctions between short-lived and long-lived context-dependent messages as inferred from this study's analysis of the longer phases of the COVID-19 pandemic and infodemic. This will help them become inoculated and resilient against future infodemics. The concept of fostering a norm related to debunking, proposed by the Cofact representative, is both valuable and practical. She suggests that the emphasis on respect and deference to elders and individuals of higher social status in Thai culture might discourage people from pointing out or correcting their mistakes. However, she also highlights a silver lining. While communication on social media platforms such as Facebook and Twitter can sometimes lead to echo chambers, they also provide spaces for divergent viewpoints in comments responding to posts, enabling users to encounter a variety of perspectives. The real challenge lies in breaking the filter bubble that envelops some individuals who, driven by political views or other cultural and psychological factors, might still choose to accept information that confirms their existing beliefs, even when exposed to different viewpoints. In such situations, debunking becomes extremely challenging. Therefore, the development of new countermeasures to challenge these cultural norms becomes essential in addressing this issue. A workable solution to mitigate the potential conflicts arising from violating cultural norms, such as the Thai tendency to respect seniority, could be the use of social bots to disseminate verified or debunking messages, similar to the approach adopted in Taiwan. Discovering effective approaches to tackle such deeply ingrained norms is a challenging task that requires further experimental analysis. Therefore, future research could focus on exploring the cultural aspect of disseminating debunking messages.

However, implementing such a multifaceted and multi-stakeholder approach requires significant effort to transform it into a national policy. This may be difficult to achieve in Thailand, where government actions and responses are often perceived as having hidden political agendas. Moreover, altering the algorithms of social media platforms to help deal with context-specific disinformation is challenging because the country does not possess the economic and political power to negotiate or persuade

these platforms. Instead of recommending a reconceptualization of the role of social media platforms and changes to the algorithms in addressing disinformation, this study utilizes potential and workable suggestions put forward in the field of internet policy for solutions to social media disinformation. One promising solution is the development of tools embedded within the platforms that facilitate collaboration among diverse stakeholders, such as academics, experts, journalists, and fact-checkers. These tools should be based on a central database and incorporate features like a dashboard summarizing flagged disinformation topics within the platforms. They should also include a function that allows stakeholders to connect with each other and share insights from the system with other relevant parties (Kyza et al., 2020). In brief, these not only allow policymakers to make data-driven decisions but also enable the taskforce and relevant stakeholders to see the overview and dynamics of the problem, bringing them onto the same page.



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APPENDICES

Samples of interview questions for social media users

- Do you consider yourself being heavy, medium, or light social media user? (platforms?)
- In the past week, on average, approximately how much time per day have you spent using Facebook and/or Twitter?
- Do you consider social media use (Facebook and/or Twitter) part of your everyday activity/routine?
- Do you feel out of touch when not logging onto Facebook and/or Twitter for a while?
- What are your main sources of information concerning COVID-19?
- How trustworthy would you say the news and information from social media are? (comparing to other sources)
- What are your views on disinformation/misinformation, especially concerning COVID-19?
- Have you encountered disinformation/misinformation on social media (based on your perception), and if so, how often do you come across them and how do you react? (and what are the characteristics of the sources of disinformation?)
- Do you use any fact-checking services and how do you evaluate credibility of the information and its sources?
- How would you rate yourself in terms of ability to identify disinformation/misinformation, and what about others in your opinion?
- Why do you think people share disinformation/misinformation on social media?
- Do you think disinformation/misinformation can influence people, and if so, how and why?
- What should be done to effectively tackling the problem of the spread of disinformation/misinformation on social media? (by whom?)

Samples of interview questions for intermediaries

- How trustworthy would you say the news and information from social media are? (comparing to other sources)
- What are your views on disinformation/misinformation, especially concerning COVID-19?
- How do you evaluate credibility of the information and its sources? (and is there any policy on this?)
- How would you rate yourself in terms of ability to identify disinformation/misinformation, and what about others in your opinion?
- Why do you think people share disinformation/misinformation on social media?
- Do you think disinformation/misinformation can influence people, and if so, how and why?
- What should be done to effectively tackling the problem of the spread of disinformation/misinformation on social media? (by whom?)

ฉบับภาษาไทย

ตัวอย่างคำถามสัมภาษณ์สำหรับกลุ่มผู้ใช้สื่อสังคมออนไลน์ (Facebook และ/หรือ Twitter)

- คุณคิดว่าตัวเองใช้งานสื่อสังคมออนไลน์ในระดับมาก ปานกลาง หรือน้อย และใช้งานแพลตฟอร์มใด (Facebook และ/หรือ Twitter ฯลฯ) (อธิบายพฤติกรรมการใช้สื่อสังคมออนไลน์ที่ใช้ในการประเมินระดับการใช้ของตนเอง)
- ในช่วงสัปดาห์ที่ผ่านมา เฉลี่ยแล้วการใช้งาน Facebook และ/หรือ Twitter ของคุณอยู่ที่ประมาณกี่ ชั่วโมง/นาทีต่อวัน
- คุณคิดว่า Facebook และ/หรือ Twitter เรียกว่านับเป็นหนึ่งในกิจกรรมที่ต้องทำประจำหรือไม่ เพราะอะไร
- คุณจะรู้สึกเหงาหรือไม่มีอะไรทำหรือไม่ หากไม่ได้/ไม่สามารถเข้าใช้ Facebook และ/หรือ Twitter ได้ในช่วงเวลาหนึ่ง หากคุณรู้สึก เพราะอะไรจึงรู้สึกเช่นนั้น
- แหล่งข้อมูลหลักเกี่ยวกับโควิด-19 ของคุณคืออะไร หรือจากใคร
- คุณคิดว่าข้อมูลข่าวสารจากสื่อสังคมออนไลน์น่าเชื่อถือมากน้อยแค่ไหน (เทียบกับสื่ออื่น ๆ) เพราะอะไร
- คุณมีความเห็นหรือมุมมองต่อข้อมูลเท็จ/ข้อมูลที่บิดเบือน โดยเฉพาะที่เกี่ยวกับโควิด-19 อย่างไร

- คุณเคยมีประสบการณ์พบเห็นกับข้อมูลเท็จ/ข้อมูลที่บิดเบือนบนสื่อสังคมออนไลน์ (ตามความเข้าใจของคุณที่คิดว่าเข้าข่าย) มาก่อนหรือไม่ ถ้าเคยพบ บ่อยแค่ไหนและตอบสนองอย่างไร ในความเข้าใจของคุณอะไรคือคุณลักษณะของข้อมูลที่คุณมองว่าเป็นข้อมูลเท็จ/ข้อมูลที่บิดเบือนและลักษณะของแหล่งข้อมูลที่เป็นผู้เผยแพร่เป็นอย่างไร
- คุณมีวิธีการประเมินความน่าเชื่อถือข้อมูลอย่างไร และคุณเคยทราบข้อมูลหรือเคยสืบค้นข้อมูลที่มีการตรวจสอบข้อเท็จจริง (fact-checking) หรือไม่ ถ้าเคย ยกตัวอย่าง
- คุณให้คะแนนตัวเองว่ามีความสามารถในการแยกแยะข้อมูลเท็จ/ข้อมูลที่บิดเบือนได้ในระดับใด (ต่ำสุด 1 คะแนน; สูงสุด 5 คะแนน) และคุณคิดว่าระดับความสามารถของคนทั่วไปอยู่ที่เท่าใด
- คุณคิดว่าเพราะเหตุใดคนจึงแชร์ข้อมูลเท็จ/ข้อมูลที่บิดเบือนบนสื่อสังคมออนไลน์
- คุณคิดว่าข้อมูลเท็จ/ข้อมูลที่บิดเบือนมีอิทธิพลหรือส่งผลกระทบต่อผู้คนได้หรือไม่ อย่างไร และเหตุผลคืออะไร
- คุณคิดว่าวิธีการรับมือกับปัญหาการแพร่กระจายของข้อมูลเท็จ/ข้อมูลที่บิดเบือนบนสื่อสังคมออนไลน์ที่มีประสิทธิภาพควรเป็นอย่างไร และใครควรเป็นผู้รับผิดชอบ

ตัวอย่างคำถามสัมภาษณ์สำหรับกลุ่มตัวกลาง/กลุ่มผู้มีบทบาทในการรับมือกับปัญหา

- คุณคิดว่าข้อมูลข่าวสารจากสื่อสังคมออนไลน์น่าเชื่อถือมากน้อยแค่ไหน (เทียบกับสื่ออื่น ๆ) เพราะอะไร
- คุณมีความเห็นหรือมุมมองต่อข้อมูลเท็จ/ข้อมูลที่บิดเบือน โดยเฉพาะที่เกี่ยวกับโควิด-19 อย่างไร
- คุณมีวิธีการประเมินความน่าเชื่อถือข้อมูลและแหล่งข้อมูลอย่างไร และหน่วยงาน/องค์กรของคุณมีนโยบายหรือแนวทางการประเมินความน่าเชื่อถือในลักษณะนี้หรือไม่ อย่างไร
- คุณให้คะแนนตัวเองว่ามีความสามารถในการแยกแยะข้อมูลเท็จ/ข้อมูลที่บิดเบือนได้ในระดับใด (ต่ำสุด 1 คะแนน; สูงสุด 5 คะแนน) ขอให้คุณอธิบายเหตุผลประกอบการให้คะแนน และคุณคิดว่าระดับความสามารถของคนทั่วไปอยู่ที่เท่าใด
- คุณคิดว่าเพราะเหตุใดคนจึงแชร์ข้อมูลเท็จ/ข้อมูลที่บิดเบือนบนสื่อสังคมออนไลน์
- คุณคิดว่าข้อมูลเท็จ/ข้อมูลที่บิดเบือนมีอิทธิพลหรือส่งผลกระทบต่อผู้คนได้หรือไม่ อย่างไร และเหตุผลคืออะไร
- คุณคิดว่าวิธีการรับมือกับปัญหาการแพร่กระจายของข้อมูลเท็จ/ข้อมูลที่บิดเบือนบนสื่อสังคมออนไลน์ที่มีประสิทธิภาพควรเป็นอย่างไร และใครควรเป็นผู้รับผิดชอบ

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