

The Role and Trust Toward World Health Organization (WHO) in Managing Covid-19 Pandemic: Network and Text Analysis in @Who Twitter

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Abstract

The purpose of this study is to analysis the role and trust toward World Health Organization (WHO) in managing Covid-19 pandemic, through social media twitter. This research is to compare the network and public trust on a three (3) different time period. This study employs social network analysis method and text analysis on @WHO twitter account. Researcher used Netlytic and Gephi Software to retrieve data on social media and to calculate network statistic. Data used is based on 3 different time period, they are, 27 February, 20 March, and 9 April 2020. More than 7500 node and 15.000 edges were collected for this research. The result of this study suggests that @WHO account network is very large, but is not fully utilized. The lack of information disclosed by WHO through their Twitter account and one-way communication, have resulted in many negative accusations toward WHO in managing the pandemic. The most frequent accusation directed is the inability of WHO and Dr. Tedros in managing Pandemic, WHO and China are collaborating in hiding the data on Pandemic, and accusation that the pandemic is a pretence and politic of China. WHO Twitter account has become public attention for seeking information on the Pandemic, however this organization has yet to carry out two-way communication on answering public question directed to them. This research sought to see the role and trust of WHO as an organization responsible in managing the Pandemic through social media twitter by comparing three result on a different time period and to analyse the content of the message directed towards WHO.

Keywords: @WHO; Pandemi; Social Capital; Twitter; World Health Organization

1. Introduction

WHO is the main body for health in United Nations system (Koskenmaki, Riikka, Granziera, Egle, Burci, Gian Luca, [2009](#)). WHO's central role in promoting public health in its Member States, and its core function is to articulate ethical and evidence-based policy options, places ethics at the heart of WHO's work (Reis and Saxena, 2016). The role of WHO is very important in managing Covid-19, since the first case was identified in Wuhan, on 31 December 2019 (Archive of WHO, [2020](#)). Based on World Health Organization (WHO) April 2, 2020 data, more than 20 million people had been exposed to Covid-19 pandemic and more than 157.000 people had died (WHO, [2020](#)). Based on that data, Covid-19 is a disease with

high mortality rate in the world. Many researchers analyze and acquire knowledge from the data available on social media that can help staff and government organization to acquire benefit from those data, and to understand the public's reaction and feeling (Alsaedi & Khan, [2019](#)). In this research, researcher collected data from social media World Health Organization (@WHO) Twitter account and extract it through the site netlytic.org and analyze it using gephi software. This research also sought to find the contents of the tweets in relation with @WHO account with the total of 5523 tweets in the range of 3 months period.

Social network can be established through relational data and can be defined as a social entity, that occur because of a relationship or interaction between actors (Tabassum & Fabiola & Fernandes, [2018](#)). At this time, social media platform such as Twitter, Youtube, and Facebook is a source of information known as social data (Tyagi & Tripathi, [2019](#)). Social media around the world is flooded with contents related with the Corona Virus. Twitter is a micro-blogging service (Samatan, Fatoni, Murtiasih, [2020](#)) and social network where user can post messages using tweets and is limited up to 240 characters. This research sought to see the role and trust of WHO as an organization responsible in managing the Pandemic through social media twitter by comparing three result on a different time period and to analyze the content of the message directed towards WHO.

2. Literature Review

2.1 Managing Pandemic Covid-19

A pandemic is an outbreak of an infectious disease spreading to vast areas and causing economic, political and social disruptions. The increased movement of humans and the great exploitation of nature over time show evidences of pandemics increase during the last century (Jones et al, 2008. Morse 1995). Policies focusing on identifying and limiting outbreaks are needed in pandemic preventions. In addition, policies on expanding and building health preparedness and capacity are also needed (Smolinsky, Hamburg and Lederberg, 2003). History records several pandemics occurred in the world, including HIV/AIDS, Hong Kong Flu, Asian Flu, Cholera, Russian Flu, and Black Death, which have caused the most deaths.

The diversity of pathogens and their interactions with humans drives a variety of pandemic threats. Every pandemic hitting the world requires optimal preparedness and effective response strategies. When the new H1N1 influenza virus hit the world in the early 2009, many people questioned the world's readiness to handle this pandemic. The World

Health Organization (WHO) took steps to announce that the 2009 H1N1 virus pandemic had been upgraded to “6th Phase” or the highest level (Morens, Gregory K. Folkers, Anthony S. Fauci. 2009).

At the end of January 2020, WHO declared an international health emergency for Covid-19 outbreak which had spread to several countries. For countries with vulnerable health systems, the threat of this epidemic originating from China will pose a high risk to the country. WHO carries out strategic plans to prevent and to assist countries in handling and stopping the spread of Covid-19. The strategic planning includes early detection, isolation, appropriate treatment and tracing system for people infected with Covid-19 (WHO, 2020). The main objective of implementing this strategy is to minimize the economic impact of this virus and to counter misinformation on the global scale.

2.2 Social Media Twitter and Pandemic

Social media platforms such as Twitter, Facebook, and Instagram have become part of modern media (Newman, et al., [2017](#)). Previous study have found that twitter account is becoming an important power for someone who is with the status as public official (Straus, at.al, [2016](#)), building open communication in public space (Palmer and Udawatta, [2019](#)), twitter has also become an effective and efficient communication tool for sharing information (Okay, Gole and Okay, [2020](#); Cripps, Singh, Mejtoft and Salo, [2020](#); Spiliotopoulos, Tasos. and Oakley, Ian.([2020](#)), building image, and influences (Sridevi, Niduthavolu, and Vedanthachari, [2020](#)), conveying ideas, promoting and innovating (Cripps, Singh, Mejtoft and Salo, [2020](#)) and entertainment (Spiliotopoulos, Tasos and Oakley, Ian. ([2020](#)). Communication during Covid-19 Pandemic forced people to be more frequently mediated through online technology. Technology provides a platform to innovate, and for users to express their opinion on how they feel toward information (Pardo, [2013](#)). Social media is used as a platform to make able twitter users to acquire information disclosed by WHO through their twitter account.

One resource that can be used in disease outbreak tracking systems is the internet. In 2015, in India, Twitter was used to detect the H1N1 disease outbreak. Supervision for symptoms, preventive measures and drug availability can be carried out properly through twitter (Jain & Kumar, 2015). Twitter have an important role in the medical information dissemination during Covid-19 pandemic (Rosenberg, H., Syed, S., & Rezaie, S, 2020). During the H1N1 pandemic, twitter was used to identify public sentiment, to track and to measure disease activity, as well as to measure public interest and concern for health in the US (Signorini et al., 2011). Eight out of the nine G7 world leaders use their verified Twitter

accounts to communicate with their communities during Covid-19 pandemic. There are 203 viral tweets from those leaders. Those tweets contain information connected to the government website, including motivation to increase morale during a pandemic, and politics (Rufai & Bunce, 2020).

WHO uses their twitter account to share information in relation with its role as an organization in health sector. In carrying out its role, almost every hour WHO disclosed information in relation with health in its Twitter account (Research team, observation result, 25 July 2020).

2.3 Social Capital Theory

According to Hanifan, in social capital which includes goodwill, friendly, sympathetic to one another, as well as social relationship and tight collaboration between individuals and families created a social group (Hanifan, [1916](#)). Social capital focuses on relationship or social relationship as a capital for other individual. Members of society is not able to face the many existing problems alone, it requires togetherness and collaboration either from the entire members of the society that has a stake in managing such affairs (Syahra, [2003](#)). According to Putnam ([2000](#)) and Woolcock ([1998](#)), in reality social capital is using relationship for working together helping people in improving their lives (Field, [2010](#)).

Social capital is the capacity of actors to ensure the benefit that relies on membership in social network and other social structures (Portes, [1998](#)), social capital is “the sum of actual and potential resources, available through, and from network relationship owned by individuals or social units” (Nahapiet dan Ghoshal, [1998](#)). Lee, et.al. ([2015](#)) noted, many research on social capital has been carried out either individually or in groups (Burt, [1997](#)), team (Bartsch et al., [2013](#); Lee et al., [2013](#)), and organizational level (Chow dan Chan, [2008](#)). Research on social capital, has also been conducted by Yu et al. ([2013](#)) who divided social capital into individual social capital and team to study the impact on the behaviour of individual knowledge sharing in group. Their study suggest that both kinds of social capital has combination effect on individual by sharing knowledge explicitly and implicitly (Yu et al., [2013](#)).

In many studies, the more social capital integrated, the more beneficial it is to carry out creation and sharing of intellectual capital, for instance, ideas, team innovation, and product innovation as well as service (Auh dan Menguc, [2013](#); Hu dan Randel, [2014](#); Muraet al., [2013](#)). Several studies employs Social Capital Theory, including Min (2020),

Lau (2020), as well as Fraser and Aldrich (2021). Social capital plays a very important role in terms of reducing the spread of covid-19 in some communities (Min, 2020). People having a high level of social trust among each other lead to a reduction of Covid-19 widespread. This is due to the social ties formed by community cooperation in adhering health protocols (Min, 2020; Aldrich, 2021), distributing facemasks, and recommending hygiene steps as parts of a common goal (Lau, 2020).

The spread of covid-19 is increasing as reported in several studies conducted by Nugroho (2020), Bartscher, et al (2020), Pitas and Ehmer (2020), and Park (2020). Those studies illustrate that social capital can provide a significant impact on reducing the infection curve of the spread of covid-19 (Nugroho, 2020). Social capital provides a number of benefits during the Covid-19 pandemic crisis scenario in several countries (Pitas & Ehmer, 2020; Bartscher et al, 2020). People having a high social capital response usually experience faster healing of Covid-19 than those with low social capital (Pitas & Ehmer, 2020). People must also practice social distancing to reduce the Covid-19 transmission (Park, 2020).

Cheng (2020) states that many people, probably, will experience depression, as they are required to stay at home, up to an indefinite time limit (Cheng, 2020). Meanwhile, people having no social ties among their community members, probably, will take a long time for the recovery process (Cheng, 2020; Jean-Baptise et al. 2020). People doing activities online can feel various levels of social support provided by family, neighbors and even friends so that they can reduce the risk of depression that may occur (Jean-Baptise et al. 2020).

Other studies employing Social Capital Theory are conducted by Fattah and Sujono (2020) and Al-Omous et al. (2020). Fattah and Sujono (2020), through their research on “Ruang Guru (an online tutoring application)”, found that “Ruang Guru” presents and is active through social media to support the learning process from home during the Covid-19 pandemic. Al-Omous et al (2020) found that social capital has an important role for online-based companies in achieving the productivity of electronic business activities during the Covid-19 pandemic.

3. Methods

3.1 Method and Sample

This research is to compare the data on social media twitter on 27 February, 20 march, 9 April 2020 when the pandemic has spread across to almost all parts of the world. On 27 march 2020, crawling data on twitter using the @WHO, trawled 1000 tweets; on 20 march 2020 crawling data with the same method trawled 2023 tweets, and on 09 April 2020 crawling data trawled 2500 tweets. Data collection on 27 February 2020, when the pandemic has started to spread, but several countries including Indonesia claimed that Covid-19 has yet to enter Indonesia. Countries that were confirmed according to the data retrieved on Kompas.com on 19 February 2020 was 30 countries (Putri, Kompas.com, [2020-a](#)). Data collected on 20 march 2020, when Covid-19 has been confirmed in many countries, including in Indonesia which made confirmation that Covid-19 has entered the country since 02 March 2020 (Kemenkes.go.id, [2020](#)), and the Covid-19 case has been confirmed in one hundred and fifty countries including fifty countries with the highest case (Putri, Kompas.com, [2020-b](#)). Data collection on 09 April 2020, was based on the spread of Covid-19 which has spread across to two hundred and one cases in the world, including Indonesia (Bramasta, Kompas.com, 2020).

3.2 Instrument

To crawl social media data, the researcher uses the site netlytic.org with the limitation of API. This research uses mix method (Samatan, [2017](#); Samatan, Fatoni and Murtiasih, [2020](#)) that is social networking analysis to describe and calculate network statistic, as well as text analysis to see the kinds of message entering the twitter account of World Health Organization (WHO). Researcher compared the system statistic level and actor level on @WHO account on a three (3) different time period and see the change of information being tweeted by @WHO account or tweets that mentioned @WHO account. Keyword used in this research is the name of World Health Organization account that is @WHO. Sample of tweets used by this research numbers to 5523 tweets in the determined time span.

4. Findings And Discussion

4.1 Social Network of @Who (World Health Organization) Account

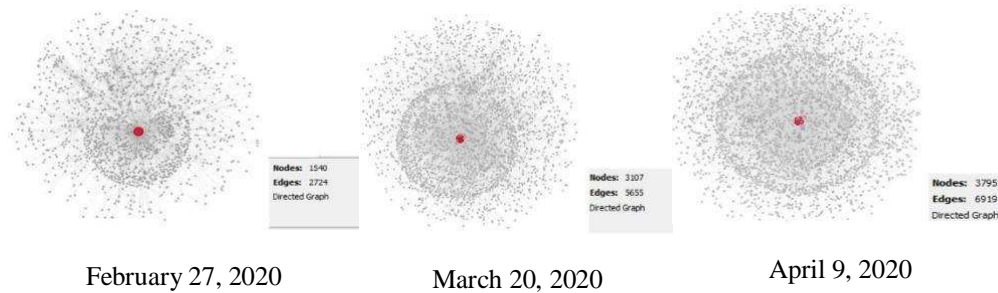


Figure 1. Comparison of Social Network account of WHO in three different time period

Social network such as social media Twitter creates possibility for people to form online community and content sharing. Several of this online groups joined together because of one common interest. Similar to World Health Organization Twitter account, this network is formed because of one common interest that is to seek information on the Pandemic. In figure 1. The network of this @WHO Twitter account has a vast network. Through this vast network WHO can easily reach people who are seeking for information on the Pandemic in Twitter. Many assumption emerged on Covid-19 Pandemic in social media, the role of WHO is to provide valid information on this Pandemic is crucial. Due to the many nodes that are directly interwoven in this @WHO Twitter account, represent that people are still very much believe and wishes to acquire precise information of the condition of Covid-19 pandemic.

During the data collection process in three (3) different time period, there has been in increase of nodes that are interwoven or in communication with the @WHO Twitter account. On 27 February 2020, researcher obtained sample node as many as 1540 and edge 2724. And then on 20 March 2020, there were 3107 node and 5655 edge. Lastly on 9 April 2020, there were 3795 node and 6919 actors. This suggests that there are still many information gap in the society. The development of ICT has made it easy to communicate between users in virtual environment.

4.2 System Level

This system level represent the network as a whole and does not mention actors or groups in the network. With this system level analysis the researchers wished to see the characteristic and the structure of @WHO Twitter account. This level is very useful especially for comparative study of several communication network (Eriyanto, [2014](#)). Researcher compared 3 indicator, diameter, density, and modularity of @WHO network Twitter account.

Table 1. Comparison of Network Properties of WHO account in 3 different time period.

Network Properties			
Date	February 27, 2020	March 20, 2020	April 09, 2020
Diameter	3	3	3
Density	0.001	0.001	0
Modularity	0.693	0.712	0.7

Diameter in this network, based on table 1, everything has point 3. This diameter, represent a structure within a network. Diameter is the longest distance between two actors in 1 network (Carolan, [2013](#)). The network formed in this @WHO account is including small diameter, where the actors congregate or with ease can interact directly with WHO account. Dense network in theory will result smaller distance, compared with separated network based on groups (Eriyanto, [2014](#)). Density represent intensity of communication between members within the network by comparing the number of available links with the number of links that may emerge in the network. The density in this @WHO account network on three (3) different time period has a small number. This number showed intensity of communication between actors in this network is very small. This is caused by WHO only uses its twitter account to share information without replying messages/tweets mentioned in their account. The number of this density is 0 to 1, the bigger the number therefore the denser the network.

In social networking, it is important to understand the formation of group structure. Modularity is used to determine whether the available clusters in the network represent people with different background. Modularity in this @WHO account has bigger point that 0,5. If the number of modularity is higher than 0,5 it indicates that the actors involved in this network have different background.

4.3 Actor Level

In researching an intact network, unit of analysis that can also be used is by analysing its actor. Researcher focuses on @WHO account, because this account plays an important role in the era of Covid-19 Pandemic. Whoever determines or stand out is called centrality in the network (Bonacich, [1987](#)). The researcher analyses @WHO Twitter account using two (2) indicators they are degree of centrality and Eigenvector.

4.3.1 Degree Centrality

This degree shows that level of actor's popularity in social network. The level of degree is the sum of relation from and to an actor. Theoretically, the maximum number of centrality level for actor is $N-1$ (Eriyanto, [2014](#)).

Table 2. Comparison of WHO Account Degree of Centrality on Three (3) Different Time Period

Network Properties			
Date	February 27, 2020	March 20, 2020	April 09, 2020
@who	787	1591	1960
@drtedros	119	155	372
@cdcgov	81	99	99

In table 2 on the level of degree comparison, @WHO Twitter account has a larger level of degree compared to other account. On 27 February 2020, @WHO account has a degree level of 787. On 20 March 2020, the level of degree has increased to 1591 and on 9 April 2020, the @WHO level of degree increased to 1960. This shows that World Health Organization Twitter account has become a popular account for people who wish to acquire information or to convey their ideas on Pandemic Covid-19. Aside from @WHO account, account with a much higher level of degree is the account of @drtedros. @drtedros account is the Twitter account owned by the Director-general of World Health Organization. Aside from that there is the @cdcgov account that is the account of the Center for Disease Control & Prevention.

4.3.2 Eigenvector Centrality

Eigenvector is able to describe how important the people are in connection with the actor. Important actor in the network is described as how many network ranks owned by actor that has relationship with other actor. Eigenvector speaks of the importance or how popular a node in network with the actor (Eriyanto, [2014](#)).

Table 3. Comparison of WHO Account Eigenvector Centrality in Three (3) Different Time Period

Network Properties			
Date	February 27, 2020	March 20, 2020	April 09, 2020
@who	1.0	1.0	1.0
@drtedros	0.15	0.15	0.3
@cdcgov	0.1	0.09	0.07

Based on the result on Table 3, @WHO account becomes a popular and important account in this period of pandemic. This eigenvector centrality also has normal value, from 0 to 1. @WHO Twitter account has a value of 1.0. Although has smaller number, @drtedros, @cdcgov and @glblctzn account has higher popularity rank below WHO when they are ranked. @glblctzn is an account owned by Global Citizen with the Twitter description “Global Citizen is a movement of engaged citizens committed to defeating poverty, demanding equity, and defending the planet.

Join us today” (Global Citizen).

4.4 Text Analysis on World Health Organization Account Network

When the entire world is facing Covid-19 Pandemic, global collaboration is required in handling Covid-19. The advancement of information and communication, can help build relationship and corporation for information sharing on Covid-19 pandemic rapidly. WHO as a global organization under United Nations that manages the health sector, should carry out effective synergy to all actors (Aginam, [2006](#)), and should have a social media account that can be used to build relations and provide information to the entire citizen of the world on Covi-19. Based on the research during the time of data collection, researcher capture only 9 tweets issued by WHO. This is in contrary with the tweets entering World Health Organization (WHO) twitter account, therefore citizens of the world doubted their performance in handling this Covid-19 issue.

On 27 February 2020, based on data crawling carried out by the researcher. There has not been any information related to pandemic and the means of managing it issued by the WHO through @WHO twitter account. Meanwhile, many people state their opinions, accusation, and direct questions to WHO through @WHO twitter account.

Table 4. Result of Codification data, 27 February 2020

No Codification Result	Total Number	Percentages
1 WHO is considered not optimal in doing their work, and not professional	60	6 %
2 Suggestions for WHO	20	2 %
3 Suggestions for Dr. Tedros to provide safety guidance for the world	12	1 %
4 Information	354	35 %
5 Accusations toward WHO as a spokesperson of China @SpokespersonCHN	58	6 %
6 Accusations that WHO is manipulating data	10	1 %
7 Accusations directed to China on hiding data	36	4 %
8 Other information	450	45 %

However, during the communication process carried out by @WHO, similar to the data previously explained, @WHO account did not provide information, and also did not answer several questions from other nations especially from nations that have been exposed by the Covid-19 pandemic. Communication process only happened one way, from global citizen to @WHO, while @WHO did not answer their questions, provide clarification or data required by the society. Several accounts tried to provide links to the

public, either in the form of you tube links on @WHO activities, although without any feedback from @WHO twitter account.

Below is the codification result of 1000 tweets data during the crawling on the 27 February 2020, it can be categorized as follows:

1. WHO is considered not optimal in doing their work, and not professional
2. Suggestions for WHO
3. Suggestions for Dr. Tedros to provide safety guidance for the world
4. Information
5. Accusations toward WHO as a spokesperson of China @SpokespersonCHN
6. Accusations that WHO is manipulating data
7. Accusations directed to China on hiding data
8. Other information

In the pie-chart figure the result of 1000 tweet processed data that were crawled on 27 February 2020, can be seen in figure 2 below:

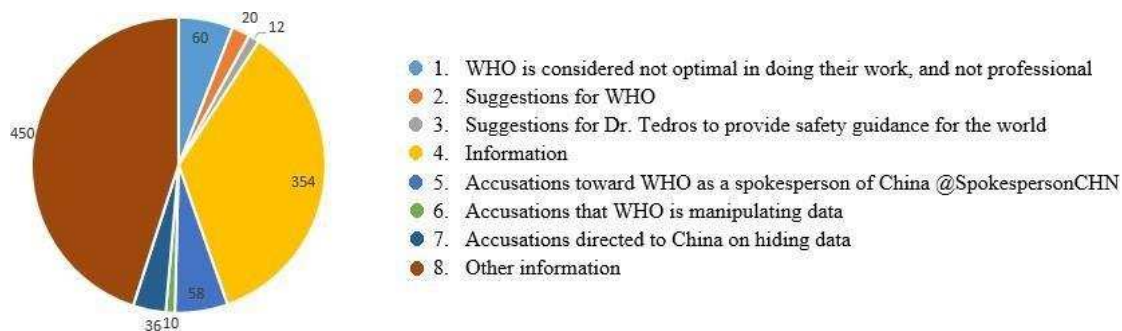


Figure 2. Result of Data Analysis on @WHO Tweet 27 February 2020

Category of other information (in point 8), are posts with the following classification (1) post is ineligible, because posts are in the form of meaningless symbols, posts in the form of @WHO and several other, and there is no information contain within it; (3) information is not directed to @WHO or to global citizens in relation with Covid-19; and (4) personal information that uses @WHO therefore during data crawling, this tweet is also trawled as part of data from and to @WHO. While, data that were crawled on 20 March 2020, is seen as in Table 5 below:

Table 5. Codification Result Data, Crawling on 20 March 2020

No	Codification Result	Total Number	Percentages
1	WHO is considered not optimal in doing their work, and not professional	160	8%
2	Suggestions for WHO	57	3%
3	Suggestions for Dr. Tedros to provide safety guidance for the world	197	10 %
4	Information	1.040	51 %
5	Accusations toward WHO as a spokesperson of China @SpokespersonCHN	142	7 %
6	Accusations that WHO is manipulating data	40	2 %
7	Accusations directed to China on hiding data	65	3 %
8	Other information	322	16 %

Data obtained from 20 March 2020, information provided through tweets from global citizens to @WHO, the more varied, and other information in point 8 is becoming smaller. Several informational tweets has started to increase significantly from information previously obtained, is (1) information on Iran, Pakistan, Italia and Mexico has started to increase; (2) information on Taiwan and opinions of global citizens through tweet and re-tweet that have started to increase and accusations that WHO is working together with China and excessive accusation on the pressure directed to Taiwan.

In the figure, the data on 2023 tweet that have been crawled and processed on 20 March 2020, is seen as in figure 3 below:

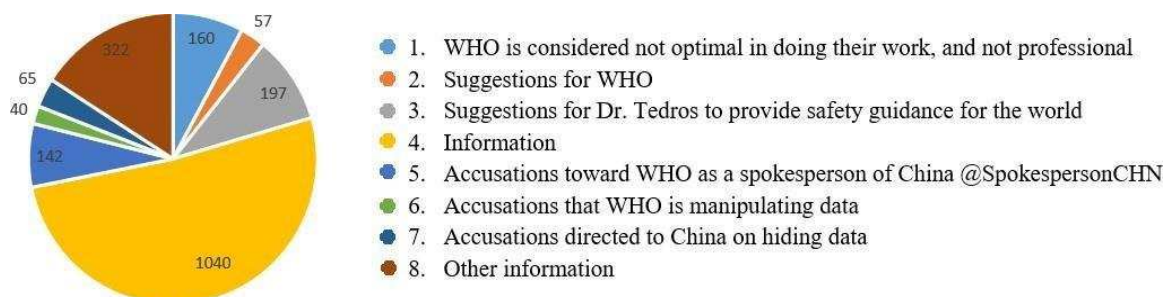


Figure 3. The result of data analysis of @WHO tweet 20 March 2020

The result of data that were crawled on 20 April 2020, were full of variation, with the total number of tweets that were trawled numbering to 2500. To simplify for the reader, especially on the third crawling result, categorization was divided into five category, they are: (1) performance, critique, and support towards WHO; (2) condition of nations in dealing with

Covid-19, questions and empathy from and for citizens and global citizens; (3) WHO and China, including accusation directed WHO that they are working together with China. China is hiding data, and also accusations and attacks toward Dr. Tedros as China spokesperson; and (4) attacks and supports towards Taiwan, as well as (5) other information, provided in table 6 below:

Table 6. The result of Data Codification, Crawled on 09 April 2020

No	Codification Result	Total Number	Percentages
1	Performance, critique, and support toward WHO	530	21,2 %
2	Condition of nations in dealing with Covid-19, questions and empathy from and for citizens and global citizens	1.290	51,6 %
3	WHO and China	223	8,92 %
4	Attacks and supports towards Taiwan	192	7,68 %
5	other information	265	10,6 %

The third data trawling, in the pie chart is seen as in figure 4 below:

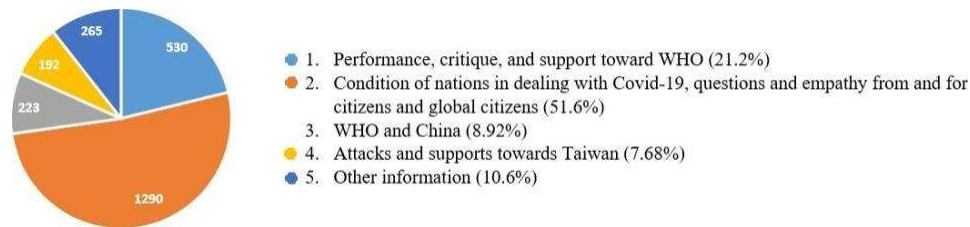


Figure 4. Data analysis result of @WHO Tweet 09 April 2020

4.5 Performance, Critique and Support toward WHO

Virus Covid-19 was first found in late December of 2019 in Wuhan, China. Since the report, WHO has taken anticipative steps. Director General WHO, Tedros Adhanom Ghebreyesus, was always present in the middle of the crisis. Coordination and monitoring were prepared by WHO since the spread of the virus. WHO has offered strategic transition to maintain the transition of the spread of the virus at the lowest level. Therefore, WHO issued several guidelines in dealing with Covid-19, such as clinical care guideline, the use of masks, and guideline for offices and business central. Aside from that WHO also invited governments, citizens, media, influencers and communities to take part of preventing and removing stigma through social media.

"WHO has published interim clinical care guidance for hospitalized new #coronavirus (2019-nCoV) patients and for mildly ill patients at home, and developed a standardized clinical case record form that will be available on the web <http://bit.ly/37C3jVA>" (@WHO, 19 January, 2020)

"Governments, citizens, media, key influencers & communities have an important role to play in preventing & stopping stigma. We all need to be intentional & thoughtful when communicating on social media & other platforms, showing supportive behaviors around #COVID19. Do your part!" (@WHO, 25 February, 2020)

WHO through its twitter account opened question-answer session with the public to acquire precise information on this Covid-19. With the hashtag #AskWHO, people can directly interact with WHO and make confirmation on issue or information that have circulated in the society. Such as, the origin of Covid-19, the use of ibuprofen as antidote for Covid-19, counselling for people with disability, prevention on the spread of Covid-19, etc.

"#AskWHO on disability considerations during #COVID19. #coronavirus <https://t.co/FxWxu4NUET>" (@elvisarturo)

"@WHO #AskWHO Who is Responsible for corona Virus? from which Animal Corona Virus has Started." (@dnyanesh_aware)

"@WHO #AskWHO Very Low Percentage of death After Coronavirus positive in human. So why it is very dangerous. because in our india nearly 200 people positive and only 4 have dead. That dead people they Had very old age. means it is not dangerous to people" (dnyanesh_aware)

Although WHO has taken several preventive steps, but the public still consider it as not very beneficial, since those steps have yet to stop the spread of the virus. The spread of the virus to several countries such as Algeria, Greece, India, Italia, and Sweden 39 countries, as well as the African continents that are being informed by many parties in this network have created critiques from the society on the work that have been carried out by WHO. Countries that have been exposed to this virus, the majority of them have yet make preparations since Covid-19 is a new virus. Several citizens have asked for assistance from WHO to help them in dealing with this virus. In the tweet from @ZahraTavakoli98, provided information that Iran requires several health equipment to handle covid in its country. The @SUNDARmyth account, informed that the Ministry of Health of India has provided suggestions to its people to increase body immunity by sunbathing for 15 minute, this step has yet to be proven to be able to kill Covid-19 virus.

"@WHO @mvankerkhove People in Iran need World's Support. All of us are in danger and who help may save many lives. We need medical Masks, Antiseptics

and testing kits in all states and hospitals. @WHO Please help us #WHOHelpIran #WHOHelpiran #coronavirus” (@ZahraTavakoli98)



Figure 5. Tweet from @SUNDARmyth

Source: <https://twitter.com/RitwikMohanty13/status/1240869861024129024>

Similar incident occurred in Pakistan, where the Pakistani government isolated people with Covid-19 together in 1 room. Such information can be acquired from account @Jam_Baloch, he posted a sebuah video that shows the condition of the isolation room for Covid-19 patients.



Figure 6. Re-tweet from @adiscover

Source: <https://twitter.com/adiscover/status/1240871213209014272>

On February 2020, although the virus has spread to many different countries, WHO has yet to determine it as a Pandemic because WHO considers it as controllable, this made people consider the work carried out by WHO as not optimal.

“The first confirmed case of #coronavirus in Brazil was not imported from China or Asia but from Italy. The first case in Iraq comes from Iran. Still not a #CoronavirusPandemic @WHO? No #COVID — 19 pandemic yet because of fear to nonpublic health reactions” (@jorgesaavedramx, February 26, 2020)

“@WHO is the most failed organization and @DrTedros is the worst leader ever, no one of. It is time to dissolve this disgraceful organization. We would be better handling covid-19 pandemic without @WHO and @DrTedros” (@AndyinUS2020, March 20, 2020)

The public's trust towards WHO to handle the spread of the virus has reduced, accusation of corruption in WHO, to the point of suggesting Dr. Tedros to resign from WHO and direct hate speech towards Dr. Tedros, makes this trust even lower. One account suggesting Dr. Tedros to resign was Guy Reschenthaler, a parliamentary member of the Republican U.S. The message was tweeted and retweeted 3.8 thousand times by 6.2 thousand people.



Figure 7. Tweet from @GReschenthaler

Source: <https://twitter.com/HKmcduell/status/1248169232992317440>

The public consider WHO of being over protective of China from the public opinion on Covid-19. In the tweet by Anders Corr, Ph.D (@anderscorr), he informed that WHO acknowledged that China did not provide sufficient data on this Virus and Dr. Tedros as Director General of WHO did not make statement on this issue.



Figure 8. Tweet from @anderscorr

Source: <https://twitter.com/laylaflower5/status/1232864409703174146>

Due to the lack of explanation from Dr. Tedros, it creates a public opinion that WHO is collaborating with China in Covid-19 case. @laylaflower tweeted that there is no country

than can surpass china in handling this plague. While Dr. Eric Feigl-Ding, an epidemiologist and Health Economics, considers China being successful in hiding data on infection towards health provider.

*“China is hiding data from even @WHO on infections in healthcare workers. #COVID19 what a d**k move of CCP” (@DrEricDing).*

The public consider this Covid-19 plague as a biological weapon and is a political propaganda from China and state that in a tweet #China_is_Terrorist. The issue on the collaboration between WHO and China becomes more evident when WHO and China both considered Taiwan is overacting by restricting visitors from mainland China entering its country.



Figure 9. News from Taipei Times.com

Source: <http://www.taipeitimes.com/News/front/archives/2020/02/06/2003730448>

Defence was brought forward by one of the members of the Taiwanese parliament responding to claims from WHO and China. In his account (@MPWangTingyu), he stated that Taiwan carried out travel restriction for the people from mainland China because they wanted to prevent the spread of the Covid-19 virus, where the entire world is not prepared to deal with it.



Figure 10. Tweet from @MPWangTingyu

Source: <https://twitter.com/MPWangTingyu/status/1232852598497017857>

Support from the international community flowed to Taiwan for the steps that were

taken. The result was Taiwan became the fastest country in preventing the spread of Covid-19 and the people think that WHO must learn from Taiwan.



Figure 11. Re-tweet from @SamCheuk2

Source: <https://twitter.com/SamCheuk2/status/1240871614264143872>

Although many critiques had been directed toward the work of WHO, many people were supportive of the work carried out by WHO. Starting from that the WHO was working together with China in handling Covid-19, to the point that WHO carried out counseling issued by WHO by way of re-tweeting and recommending to other people.

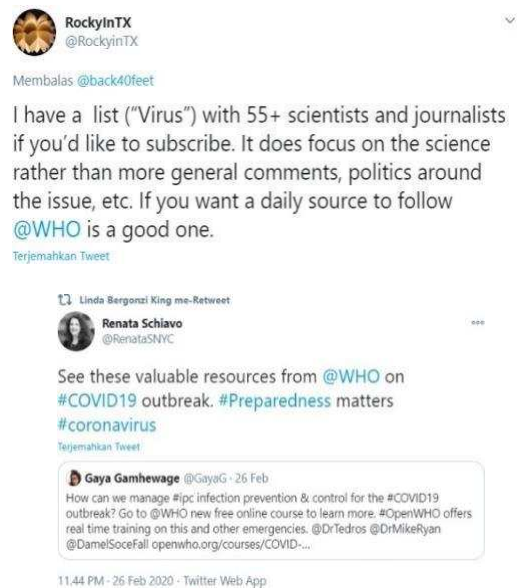




Figure 12. Tweet and Re-tweet for Recommended information from WHO

The lack of corporation between WHO with countries around the world that are currently affected by the Covid-19 Pandemic, have created a deteriorating social relationship for the people around world. The distrust of people toward the performance of WHO, created accusations that were directed toward this global health organization. This can be seen, even until 2020 is ending, this pandemic problem is not yet solved because the lack of corporation between countries and this global health organization WHO. The emergence of implication caused by Covid-19 is also massive (Morris, [2020](#)), in health sector, educational sector, implementation of education and (Morris, [2020](#)), financial risks (Heo, Grable and Rabbani, [2020](#)) mental health sector caused by the social and economic instability (Jaspal, Assi and Maatouk, [2020](#))

5. Discussion

This study aims to analyze the role of and the trust for WHO in managing Covid-19 Pandemic via @WHO Twitter. The analysis of this research employs Social Network Analysis (SNA) and text analysis. This study is conducted in three time periods: 27 February, 20 March and 9 April 2020. This study analyzes 5523 tweets.

First, WHO is an organization under the United Nations dealing with world health problems (Koskenmaki, Riikka, Granziera, Egle, Burci, Gian Luca, 2009). The role of WHO is very important in managing Covid-19, since the first case was identified in Wuhan, on 31 December 2019 (Archive of WHO, 2020). Based on WHO data, on April 2, 2020, more than 20 million people exposed to Covid-19 and more than 157,000 people died (WHO, 2020). It shows

that Covid-19 becomes a pandemic needing to be watched out for. It is hoped that social media, especially the @WHO Twitter account, can be expected to be a useful media for world citizens in searching for data and in obtaining valuable information related to Covid-19 pandemic.

Second, the analysis based on SNA shows that the @WHO Twitter account has a wide network (Figure 1). The presence of WHO to provide valid information about a pandemic is urgently needed. It can be noticed from the number of nodes that are directly tied to @WHO Twitter social network (Figure 1). The node shows that the community is very confident and wants to get certain information about Covid-19 pandemic. During data collection in three (3) different times, there are an increase in nodes that are tied to or that communicate with @WHO Twitter account. On February 27, 2020, there were 1540 sample nodes and 2724 edges. On March 20, 2020, there were 3107 nodes and 5655 edges. On April 9, 2020, there were 3795 nodes and 6919 edges. Those show that there are information gaps in society.

Third, at the system level, with indicators of diameter, density and modularity, @WHO account network has a diameter of 3 (Table 1). The diameter is categorized into small. It indicates that actors get together or can easily get in touch directly with @WHO Twitter account. Density is recorded with a value of 0.001 in the first and the second data collection. In the third data collection, density is recorded at a value of 0.01. Those show that intensity of communication between actors in the @WHO Twitter network is very low. It is due to WHO only uses its Twitter account to provide information without replying to messages / tweets. The density number (density) is 0 to 1. The greater the density number, the denser the network. Besides that, modularity shows that the first data filter is 0.693, the second data is 0.712, and the third data is 0.7 (Table 1). Modularity is used to determine whether the clusters in the @WHO Twitter account have different backgrounds or not. A modularity value that is greater than 0.05 indicates that the actors involved acquire different backgrounds (Eriyanto, 2014).

Fourth, there are two indicators at the actors level: degree centrality indicator and eigenvector centrality indicator. The degree of centrality indicator shows that @WHO Twitter account has a large degree compared to other accounts. On February 27, 2020, the @WHO account had 787 degree level. On March 20, 2020, the degree level increased to 1591. On April 9, 2020, the degree level increased to 1960. Those show that @WHO Twitter is a popular account for people who want to get information or to express their opinions about Covid-19 Pandemic. Apart from the @WHO account, accounts with high degree are the @drtdros and the @cdcgov (Table 2). Eigenvector centrality describes the level of interests of people who have a network of

actors and their relationships with other actors (Eriyanto, 2014). It also shows that @WHO Twitter account becoming the most popular and the most important account during Covid-19 pandemic. The centrality of this eigenvector also has a normal value, from 0 to 1. The @WHO Twitter account has a value of 1.0 (Table 3).

The fifth regards to the tweet text analysis of @WHO account. Data browsed on February 27, 2020 with 1000 tweets contains information including: WHO is considered working not maximally (6%); requests to WHO (2%); a request to Dr. Tedros to provide safety instructions (1%); information (35%); accusing WHO as China's spokesperson @SpokespersonCHN (6%); accusing WHO for data manipulation (1%); accusing China for hidden data (4%); and other information (45%) (Table 4). Text analysis on March 20, 2020 with 2023 tweets contains information including: WHO is considered working not optimally and not professionally (8%); requests to WHO (3%); a request to Dr. Tedros to provide safety guidelines for world (10%); information (51%); accusing WHO as spokesperson for China @SpokespersonCHN (7%); accusing WHO for data manipulation (2%); accusing China for hidden data (3%); and other information (16%) (Table 5). The results of data codification through browsing on April 9, 2020, with 2,500 tweets contains information including: performance, criticism and support for WHO (21.2%); conditions, questions, and empathy of various countries in facing Covid-19, (51.6%); WHO and China (8.92%); attacks and supports for Taiwan (7.68%); and other information (10.6%) (Table 6).

Sixth, @WHO Twitter account has provided clinical care guidance by opening question and answer sessions, so that the public can get right information about Covid-19. By hashtag #AskWHO, public can interact directly with WHO. WHO's efforts are still considered useless as the efforts does not stopped the spread of the virus to various countries around the world. Public trust in WHO in dealing with the spread of the virus is decreasing. In addition, WHO is accused of corruption. Other include Tedros is pushed back from WHO; hate speech to Dr. Tedros, and decreasing trust in WHO. One that suggested Dr. Tedros to step down is Guy Reschenthaler, a Republican member of parliament in the USA. The tweet made by him was retweeted 3.8 thousand times and liked by 6.2 thousand people. People suppose that Covid-19 outbreak is a biological weapon and is a Chinese political propaganda. It is conveyed via #China_is_Terrorist.

6. Conclusion

There is no certainty for Covid-19 pandemic to end. World Health Organization (WHO) has an important role in controlling the pandemic, their performance is still lacking. The utilisation of information technology and communication, such as social media Twitter, has yet to be fully utilised by WHO as a means to spread information concerning Covid-19 pandemic. The result of the research showed the frequency of tweets on this pandemic is still lacking, considering almost all countries have been affected by Covid-19. From the perspective of actor level and network, @WHO Twitter account can actually be fully utilized as a means of two way communication to the public with lack of information concerning the pandemic. In the current era, corporation in addressing a problem is needed. Not only economy and technology capital, but also social, they are very important collaboration and resolving the pandemic. The lack of public trust toward WHO caused by the lack of information, creating accusations directed toward this global health organization.

7. References

- Aginam, Obijioforz. (2006). "Globalization of Health Insecurity: The World Health Organization and the New International Health Regulations", National Center for Biotechnology Information, 25(4), 663-672. PMID: 17263033
- Al-Omoush, Khaled Saleh, Simon-Moya, Virginia, Sendra-Garcia, Javier. (2020). The Impact of Social Capital and Collaborative Knowledge Creation on e-business Proactiveness and Organizational Agility in Responding to the Covid-19 Crisis. *Journal of Innovation & Knowledge* 5 (2020) 279-288. DOI: <https://doi.org/10.1016/j.jik.2020.10.002>
- Alsaeedi, A., & Khan, M. Z. (2019). A Study on Sentiment Analysis Techniques of. 10.
- Auh, S. and Menguc B. (2013). "Knowledge sharing behaviors of industrial salespeople: An integration of economic, social psychological, and sociological perspectives". *European Journal of Marketing* 47 (8), 1333–1355. Emerald Insight. <https://doi.org/10.1108/03090561311324354>
- Bartsch, V., Ebers, M. and Maurer, I. (2013), "Learning In Project-Based Organizations: The Role Of Project Teams' Social Capital for Overcoming Barriers To Learning", *International Journal of Project Management*, 31 (2), 239-251.
- Bartsch, Vera, Ebers, Mark and Maurer, Indre. (2013), "Learning in Project-based Organizations: The Role of Project Teams' Social Capital for Overcoming Barriers to Learning", *International Journal of Project Management*, 31 (2), 239-251. DOI: 10.1016/j.ijproman.2012.06.009
- Bartscher, et al. (2020). Social Capital and The Spread of Covid-19: Insight From European Countries. ECONtribute Discussion Paper No.007, June 2020. www.econtribute.de
- Bonacich, P. (1987). Power and Centrality: A Family of Measure. *American Journal of Sociology*, 1-35.

- Bramasta, Dandy Bayu. 2020. "Update Virus Corona di Dunia 1 April: 854.608 Kasus di 201 Negara, 176.908 Sembuh." *Kompas.com*. Accessed July 23th 2020, by: <https://www.kompas.com/tren/read/2020/04/01/070200365/update-virus-corona-di-dunia-1-april-854608-kasus-di-201-negara-176908?page=all>
- Burt, R.S. (1997), "The contingent value of social capital", *Administrative Science Quarterly*, Vol. 42 No. 2, pp. 339-365. Published By: Sage Publications, Inc. <https://www.jstor.org/stable/2393923> DOI: 10.2307/2393923
- Burt, Ronald S. (1997), "The Contingent Value of Social Capital", *Administrative Science Quarterly*, 42 (2), 339-365. <https://www.jstor.org/stable/2393923>. DOI: 10.2307/2393923
- Carolan, B. (2013). *Social Network Analysis and Education: Theory, Methodes and Application*. London: Sage Publications.
- Cheng, Cecilia, et al. (2020). Social Capital–Accrual, Escape-From-Self, and Time-Displacement Effects of Internet Use During the COVID-19 Stay-at-Home Period: Prospective, Quantitative Survey Study. *Journal of Medical Internet Research*, 2020. Vol. 22, Issue 12, e22740. DOI: 10.2196/22740
- Chow, W.S. and Chan, L.S. (2008), "Social Network, Social Trust and Shared Goals in Organizational Knowledge Sharing", *Information & Management*, 45 (7), 458-465. Elsevier. DOI: <https://doi.org/10.1016/j.im.2008.06.007>
- Citizen, Global. 2020. Twitter Account. Accessed: July 24th 2020, by: <https://twitter.com/glblctzn>
- Cripps, Hellen, Singh, Abhay., Mejtoft, Thomas and Salo, Jari. (2020), "The use of Twitter for innovation in business markets", *Marketing Intelligence & Planning*, 38 (5), 587-601. @EmeraldInsight. DOI: <https://doi.org/10.1108/MIP-06-2019-0349>
- Eriyanto. (2014). *Analisis Jaringan Komunikasi*. Jakarta: Prenadamedia Group.
- Fattah, Raihan Abiyan, dan Sujono, Firman Kurniawan. (2020). Social Presence of Ruangguru in Social Media during Covid-19 Pandemic. *Jurnal The messenger*, Vol. 12, No. 2 July, 2002, Hal: 180-191. DOI: 10.26623/themessenger.v12i2.2276
- Fraser, Timothy and Aldrich, Daniel P. (2021). The Dual Effect of Social Ties on Covid-19 Spread in Japan. *Scientific Reports*, (2021) 11:1596. DOI: <https://doi.org/10.1038/s41598-021-81001-4>
- Heo, Wookjae; Grable, John E. and Rabbani, Abed G. 2020. "A Test of The Association Between the Initial Surge In COVID-19 Cases and Subsequent Changes In Financial Risk Tolerance", *Review of Behavioral Finance*, Vol. ahead-of-print No. ahead-of- print. <https://doi.org/10.1108/RBF-06-2020-0121>
- Hu, Lingyan and Randel Amy E. (2014) Knowledge sharing in teams: "Social Capital, Extrinsic Incentives, And Team Innovation". *Group & Organization Management*, 39(2), 213–243. SAGE Publications. DOI: <https://doi.org/10.1177/1059601114520969>
- Jain, Vinay Kumar., Shishir Kumar. 2015. An Effective Approach to Track Levels of Influenza-A (H1N1) Pandemic in India Using Twitter. *Procedia Computer Science* 70 (2015) 801 – 807
- Jaspal, Rusi; Assi, Moubadda and Maatouk, Ismael, 2020. "Potential Impact Of The COVID- 19 Pandemic On Mental Health Outcomes In Societies With Economic And Political Instability: Case of Lebanon", *MENTAL HEALTH REVIEW JOURNAL*, 25(3), 215-219 © Emerald Publishing Limited, ISSN 1361-9322. DOI 10.1108/MHRJ-05-2020-0027

- Jean-Baptiste, Cindy Ogolla, et al. (2020). Stressfull Live Events and Social Capital during The Early Phase of Covid-19 in The U.S. *Social Sciences and Humanities Open* 2 (2020) 100057. DOI: <https://doi.org/10.1016/j.ssaho.2020.100057>
- Johnson, Amri B. 2020. "How to Build Social Capital When Working Remotely." Article, Accessed July 23th 2020, by: <https://medium.com/swlh/how-to-build-social-capital-when-working-remotely-2c6e2eb69332>
- Jones K E, Patel N G, Levy M A, Storeygard A, Balk D., and others. 2008. "Global Trends in Emerging Infectious Diseases." *Nature* 451 (7181): 990–93.
- Kemenkes.2020. "Situasi Terkini Perkembangan Coronavirus Disease (COVID-19) 2 Maret 2020." [Kemenkes.go.id](https://covid19.kemkes.go.id/situasi-infeksi-emerging/info-corona-virus/situasi-terkini-perkembangan-coronavirus-disease-covid-19-2-maret-2020/#.X4qgo5myTcs). Diakses pada 20 Juli 2020, by: <https://covid19.kemkes.go.id/situasi-infeksi-emerging/info-corona-virus/situasi-terkini-perkembangan-coronavirus-disease-covid-19-2-maret-2020/#.X4qgo5myTcs>
- Koskenmaki, Riikka; Granziera, Egle; Burci, Gian Luca. 2009. "The World Health Organization and its Role in Health and Development", pp. 16-55, Book Chapter from: A. Gatti et al. (eds.), *Health and Development* © Palgrave Macmillan, a division of Macmillan Publishers Limited 2009
- Lau, Pui Yan Flora. (2020). Fighting COVID-19: Social Capital and Community Mobilisation in Hong Kong. *International Journal of Sociology and Social Policy* , Vol. 40 No. 9/10, 2020 , DOI: 10.1108/IJSSP-08-2020-0377
- Lee, Seyoon; Park, Jun-Gi and Lee, Jungwoo. 2015. "Explaining knowledge sharing with social capital theory in information systems development projects. " *Industrial Management & Data Systems*, 115(5), 883-900. © Emerald Group Publishing Limited 0263-5577. DOI 10.1108/IMDS-01-2015-0017
- Lee, Seyoon; Park, Jun-Gi and Lee, Jungwoo. 2015. "Explaining Knowledge Sharing with Social Capital Theory in Information Systems Development Projects", *Industrial Management & Data Systems*, 115(5), 883-900 © Emerald Group Publishing Limited 0263-5577. DOI 10.1108/IMDS-01-2015-0017
- Min, Jungwon. (2020). Does Social Trust Slow Down or Speed Up The Transmission of Covid-19? *PLOS ONE* 15 (12): e0244273. DOI: <https://doi.org/10.1371/journal.pone.0244273>
- Morens, David M., Gregory K. Folkers, Anthony S. Fauci. 2009. *The Journal of Infectious Diseases*, Volume 200, Issue 7, 1 October 2009, Pages 1018–1021, <https://doi.org/10.1086/644537>
- Morse S S. 1995. "Factors in the Emergence of Infectious Diseases." *Emerging Infectious Diseases* 1 (1): 7–15
- Morris, Rebecca J. 2020. "Editorial", *The Case Journal*, 16 (3), 273-278, © Emerald Publishing Limited, ISSN 1544-9106. DOI 10.1108/TCJ-05-2020-131
- Mura, Matteo; Lettieri, Emanuele; Radaelli, Giovanni and Spiller, Nicola. 2013. "Promoting Professionals' Innovative Behaviour through Knowledge Sharing: The Moderating Role of Social Capital". *Journal of Knowledge Management*, Volume 17, Issue 4, pp. 527–544. Emerald Insight. DOI: <https://doi.org/10.1108/JKM-03-2013-0105>
- Newman, N., Fletcher, R., Kalogeropoulos, A., L., D. A. L., & Nielsen, R. K. (2017). Reuters Institute Digital News Report 2017. Retrieved from https://reutersinstitute.politics.ox.ac.uk/sites/default/files/Digital%20News%20Report%202017%20web_0.pdf

- Nugroho, Iwan. (2020). Fostering Online Social Capital During The Covid-19 Pandemic and New Normal. *Journal of Socioeconomics and Development*, 3(2), 74-78. DOI: <https://doi.org/10.31328/jsed.v3i2.1640>
- Oh, H., Chung, M.H. and Labianca, G. (2004), "Group Social Capital and Group Effectiveness: The Role of Informal Socializing Ties", *The Academy of Management Journal*, 47(6), 860-875. <https://www.jstor.org/stable/20159627>. DOI: 10.2307/20159627
- Okay, Aydemir; Gole, Pedja Asanin; and Okay, Ayla. 2020. "Turkish and Slovenian Healthministries' Use of Twitter: A Comparative Analysis", *Corporate Communications: An International Journal* Vol. ahead-of-print No. ahead-of-print @Emerald Publishing Limited 1356-3289. DOI 10.1108/CCIJ-01-2020-0019
- Palmer, Stuart and Udawatta, Nilupa. (2019), "Characterising "Green Building" as a topic in Twitter", *Construction Innovation*, 19(4), 513-530. Publisher Emerald Publishing Limited. DOI: <https://doi.org/10.1108/CI-02-2018-0007>
- Pardo, A. (2013). Social learning graphs: combining social network graphs and analytics to represent learning experiences. *Int. J. Social Media and Interactive Learning Environments*, 43-58. doi:<http://dx.doi.org/10.1504/IJSMILE.2013.051652>
- Parks, Vanessa. (2020). The Critical Role of Social Capital During The Covid-10 Pandemic: Lessons From Disaster Research. *Population Brief* (2). https://egrove.olemiss.edu/population_brief/2
- Pitas, Nicholas and Ehmer, Colin. (2020). Social Capital in the Response to Covid-19. *American Journal of Health Promotion* 2020, Vol 34 (8) 942-944. DOI: 10.1177/0890117120924531
- Portes, A. (1998). Social Capital Its Origins and Applications in Modern Sociology. *Annual Review of Sociology*.
- Putri, Gloria Stevani. 2020-a. "Update Virus Corona 19 Februari: 2.009 Meninggal, 75.213 Terinfeksi", *Kompas.com*. Accessed, July 20th 2020, by: <https://sains.kompas.com/read/2020/02/19/101500523/update-virus-corona-19-februari-2.009-meninggal-75.213-terinfeksi-?page=all>
- Putri, Gloria Stevani. 2020-b. "Update Virus Corona 15 Maret: 75.953 Pasien di 155 Negara Sembuh." *Kompas.com*, Accessed July 20th 2020, melalui: <https://www.kompas.com/sains/read/2020/03/15/113100723/update-virus-corona-15-maret-75953-pasien-di-155-negara-semuh?page=all>
- Reis, Andreas; and Saxena, Abha . 2016. WHO. *Encyclopedia of Global Bioethics*, Living Edition. DOI: https://doi.org/10.1007/978-3-319-05544-2_444-2. Springer Link
- Rosenberg, H., Syed, S., & Rezaie, S. (2020). The Twitter pandemic: The critical role of Twitter in the dissemination of medical information and misinformation during the COVID-19 pandemic. *CJEM*, 22(4), 418-421. doi:10.1017/cem.2020.361
- Rufai, Sohaib R, Catey Bunce. 2020. World leaders' usage of Twitter in response to the COVID-19 pandemic: a content analysis. *Journal of Public Health*, Volume 42, Issue 3, September 2020, Pages 510–516, <https://doi.org/10.1093/pubmed/fdaa049>
- Samatan, Nuriyati; 2017. *Riset Komunikasi*. Jakarta: Gunadarma.
- Samatan, Nuriyati; Fatoni, Ahmad; Murtiasih, Sri. 2020. "Disaster Communication Patterns and Behaviors On Social Media: A Study Social Network #Banjir2020 On Twitter (Social Network Analysis #Banjir2020 On Twitter)," *Humanities & Social Sciences Reviews*, 8(4), Pp. 27-36. DOI: <https://doi.org/10.18510/hssr.2020.844>

- Signorini A, Segre AM, Polgreen PM (2011) The Use of Twitter to Track Levels of Disease Activity and Public Concern in the U.S. during the Influenza A H1N1 Pandemic. *PLoS ONE* 6(5): e19467. <https://doi.org/10.1371/journal.pone.0019467>
- Smolinsky M S, Hamburg M. A, Lederberg J. eds. 2003. *Microbial Threats to Health: Emergence, Detection, and Response*. Washington, DC: National Academies Press.
- Spiliotopoulos, Tasos and Oakley, Ian.(2020), "An exploration of motives and behavior across Facebook and Twitter", *Journal of Systems and Information Technology*, Vol. 22 No. 2, pp. 201-222. @EmeraldInsight. DOI: <https://doi.org/10.1108/JSIT-12-2019-0258>
- Sridevi, P.; Niduthavolu, Saikiran; and Vedanthachari, Lakshmi Narasimhan(2020), "Analysis Of Content Strategies Of Selected Brand Tweets and Its Influence on Information Diffusion", *Journal of Advances in Management Research*, Vol. ahead- of-print No. ahead-of-print. @EmeraldInsight. DOI: <https://doi.org/10.1108/JAMR-06-2020-0107>
- Straus, Jacob R.; Williams, Raymond T.; Shogan, Colleen J.; and Glassman, Matthew E. 2016. "Congressional Social Media Communications: Evaluating Senate Twitter Usage", *Online Information Review*, 40(5), 643-659. Publisher Emerald Publishing Limited. DOI: <https://doi.org/10.1108/OIR-10-2015-0334>
- Syahra, R. (2003). Modal Sosial: Konsep dan. *Jurnal Masyarakat dan Budaya*, 5, 1-22.
- Van Dijck, J. (2011). Tracing Twitter - The Rise of a Microblogging Platform. *Journal of Chemical Physics*.
- WHO. 2020. Novel Coronavirus(2019-nCoV) - Situation Report - 12
- WHO. (2020). World Health Organization. Retrieved from <https://www.who.int:https://www.who.int/about/what-we-do>
- WHO. 2020. Archief WHO Timeline COVID-19. Publish, April 27th 2020, update June 29th 2020. By: <https://www.who.int/news/item/27-04-2020-who-timeline---covid-19>. Accessed, July 12th 2020.
- Yu, Y., Hao, J.X., Dong, X.Y. and Khalifa, M. (2013), "A Multilevel Model for Effects Of Social Capital and Knowledge Sharing in Knowledge-Intensive Work Teams", *International Journal of Information Management*, 33(5), 780-790. DOI: 10.1016/j.ijinfomgt.2013.05.005
- Zhao, D., & Rosson, M. B. (2009). How and why people Twitter: The role that microblogging plays in informal communication at work. *Proceedings of the GROUP'04 Conference*. Sanibel Island.