

Luciano Floridi's Information Ethics: An Effort to Defend Infosphere against Entropy (Case of COVID-19 Infodemic)

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Abstract

The emergence of Coronavirus disease (COVID-19) pandemic in the end of 2019 have caused innumerable changes to people worldwide. People are experiencing pandemic and infodemic in parallel, whether it is realized or not. While pandemic is related more to a far-reaching epidemic, infodemic is a phenomenon of massive information dissemination, resulting in abundance of invalid information. Both pandemic and infodemic have caused panic among the people. Emergence of invalid information, hoax, misinformation and disinformation has exposed people to uncertainty. This research specifically analyzes infodemic phenomenon during COVID-19 pandemic using the perspective of information ethics proposed by Luciano Floridi. What is the substance and effect of infodemic to information environment? How does information ethics analyze infodemic phenomenon? This research applies philosophical hermeneutics method focused on critical interpretation of the emerging phenomenon as the result of human acts. Floridi's information ethics is founded on the condition of human habitat in the form of information habitat called infosphere. The principle of information ethics is the assessment of morality related to infosphere existence. Numerous acts conducted by moral agents, i.e., humans, ideally do not caused entropy (chaos, disorganization) which happens in infosphere. The occurring infodemic along with COVID-19 pandemic have caused entropy which eventually disrupts infosphere. Thus, infodemic must be eliminated by focusing on the improvement of information quality by enhancing the assurance of information validity, reliability, and accuracy.

Keyword: infodemic, pandemic, ethics, infosphere, entropy

Introduction

Since the emergence of COVID-19 pandemic in the end of 2019, world community unknowingly experience pandemic and infodemic in parallel. While pandemic is defined as an epidemic infecting extensive geographical regions simultaneously, infodemic is the concurrent spread of information to various directions (kbbi.web.id, 2020). Both COVID-19 pandemic and infodemic are harmful. As a matter of fact, Director General of World Health Organization, Tedros Adhanom Ghebreyesus, stated in his reception in Munich Security Conference in Germany, February 15, 2020, that "We are not just fighting an epidemic; we are fighting an infodemic" (www.un.org, 2020).

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Infodemic is viewed as harmful as COVID-19 pandemic due to the continuous and massive dissemination of information related to the details of the epidemic by both mass media and social media. Abundance of information causes problem, because news validity is difficult to be verified. In the mayhem of misinformation, disinformation, and hoax storming global community everyday, they still have to directly face the threat of Coronavirus.

Innumerable disinformation and misinformation are found about the virus, ranging from fake medicine for Coronavirus, unclear ways of virus spread, dangerous health recommendation, to outrageous conspiracy theory causing the people to doubt this virus. In turn, this disinformation can expedite the spread of the disease, impede health response to the people, and cause confusion, fear, and distrust.

In April 2020 alone, Facebook reported almost 50 million contents related to COVID-19 that must be labeled as disinformation. Still in the same month, Twitter warned more than 1.5 millions of its users due to spreading false information and displaying manipulative behavior. In addition, Google blocked almost 18 millions of scam email related to Coronavirus through Gmail (Nurhajati, 2020).

This research is specifically directed at analyzing the substance and effect of infodemic to information environment during COVID-19 pandemic using Floridi's concept of information ethics. An important argumentation underlying this research states that information is a component of humans' living environment, which Floridi designates as infosphere. Negative external influence can cause instability and information randomness which may disrupt the existence of infosphere.

Research Method

This research is a qualitative research which applies library research method to collect data. Library research is one of the techniques of data collection by means of analyzing books, notes, literatures, reports, and journals containing the observed issues (Nazir, 2013). With regard to research under the theme of COVID-19 infodemic, the sources of library research are data taken from internet, books, e-books, and journals that are relevant to the theme. Once all library data are collected, the next step is data inventarization, identification, and categorization. The next important step is analysis. This research applies hermeneutic method of analysis. Hermeneutic method is one of the methods of interpretation which focuses on the aspect of "meaning" which emerges as the result of each of human act. Thus, hermeneutics is a process to convert a matter or situation of ignorance into comprehension, and to understand the meaning behind a text, human act, and the existing social phenomenon (E. Sumaryono, 2013). Hermeneutic method offers a set of perspective to view human acts, texts, and other meaningful materials in a more comprehensive and holistic manner. This method is different from other qualitative methods which views a phenomenon only in spatial and partial ways (Mantzavinos, 2016). The underlying philosophy of this method for researcher is the capability to interpret text and unexperienced phenomenon in the past to be reflected in today's situation.

Covid-19 infodemic

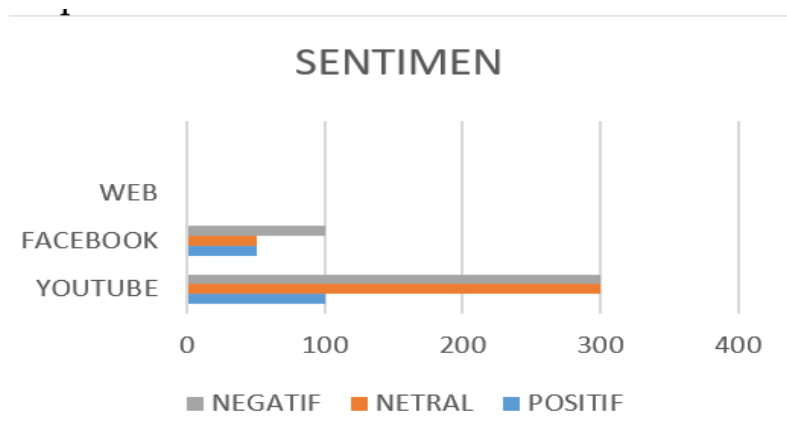
Information and reporting on COVID-19 pandemic is global and massive, including the spread of hoax. The spread is immense that WHO stated that there has been an information pandemic (infodemic) in relation to COVID-19 issue in the world (Thomas, 2020). The same case also occurs in Indonesia. Initial reportings of COVID-19 pandemic presents unvalidated

news of the virus in various versions. A situation of uncertainty caused uncontrolled negative, positive, and neutral sentiments, particularly when discussed in online and social media.

The context of social media in this study includes activity, practice, and behavior of communities who gather online to share information, knowledge, and opinion by means of conversation media. The media itself are web-based applications (Facebook, Snapchat, Twitter, Instagram, Pinterest, WordPress, LinkedIn, and others) which allow their users to easily create and transmit contents in the form of word, image, video and audio (Luttrell, 2019).

This research seeks to capture the phenomenon of Coronavirus-related conversation in Indonesia using a quite large amount of data by means of big data analysis. To narrow down the conversation material, the observed discourse keyword is Corona Indonesia. During research period from March 2, 2020 to April 7, 2020, there are a total of 23,229 conversations collected successfully, comprising of 8,855 conversations in website, 1,584 in Facebook, 2,904 in YouTube, and 9,886 in Twitter, where data capture from Twitter is measured at the last week of research. Conversation data regarding Coronavirus in Indonesia in online media (website) and social media (YouTube and Facebook) indicates 821 conversations in the first two weeks (March 2 – March 14) following the announcement of the finding of COVID-19 case in Indonesia by the President in March 2, 2020. By then, total impressions (total of impression contents presented to the audience) in online media and social media in the first two weeks were 37,600,765. This indicates that the conversations regarding issues and information of COVID-19 in Indonesian digital domain are rapid and extensively spread from their initial point of conversation (Nurhajati, 2020).

Below is media-sourced data indicating positive, neutral, and negative sentiments towards COVID-19 issue.



Graph 1. Sentiment data of COVID-19 issue

Analysis of sentiment movement indicates that negative sentiment was seen to peak on several first days following the announcement of COVID-19 case dinding in Indonesia. However, in the following week, i.e. March 7-8, the negative sentiment disappeared temporarily only to went up on March 11-12. This was mostly probable due to the reporting of WHO declaration of COVID-19 as a global pandemic, for example the news released by Kompas.com on the issue (<https://nasional.kompas.com/read>). The rise of negative sentiment was predicted to prolong with the news on the demand of WHO Director General, Tedros Adhanom, to the President of Indonesia, Joko Widodo, to follow preventive measures against COVID-19 as specified by WHO. The organization also demanded Indonesia to enact emergency response towards the spread of the virus in Indonesia (<https://www.inews.id>).

In total impression, there is a rapid increase of 114,557,906 in online media and social media, leaving far behind the number in the previous two weeks, 37,600,765. This shows that the conversation regarding COVID-19 issues and information in the digital domain in Indonesia is not only rapid, massive, and widespread, but also incessantly developed in terms of information amount and conversation. This is an indispensable situation, but needs to be kept under observation, particularly when the conversation cannot be monitored for its truth. In this state, there is a high possibility that hoax becomes the main lead in the existing conversation.

Ministry of Communication and Information (Kementerian Komunikasi dan Informasi/Kominfo) also recorded more than 147 contents of hoax and disinformation on COVID-19 collected in January to the beginning of March 2020. However, on March 18, the hoax has doubled into 242. It was such a steep spike in only 15 days, compared to the number in the past two months. The hoax spread in various platforms, i.e. social media such as Facebook, Twitter, Instagram, and YouTube, as well as chatting platform such as WhatsApp Group (WAG).

Overall, data collected during research period indicated that the number of conversation and impression of Corona Indonesia amounted to 23,314. This increase is highly significant compared to data in the first two weeks with 281 conversation and rose drastically to 2,800 percent in only a month. Total impression also climbed to nearly 450 millions (449,614,903) from 114,559,906 in the first two weeks, indicating an increase of almost 400 percent.

This indicates that the conversation on COVID-19 issues and information in Indonesia is rapid and massive. Due to the worldwide spread of the virus, the conversation on it also expands extensively, including to social, political, and cultural domain. It affects the way all media present their perspective in reporting the virus. However, emphasize still need to be put on when the conversation cannot be monitored for its truth, hoax or false news is highly probable to be the “main lead” in the existing conversation as mentioned earlier.

Floridi’s information ethics

In general, Floridi’s view on communication is strongly influenced by Shannon’s idea on mathematical theory in communication, how communication is viewed as message transmission process requiring accuracy and efficiency. The main focus of this theory is on the relations between message transmission speed and transmission accuracy, as well as the quality of human voice transmission in a phone line. Afterwards, the mathematical assumption functions as the foundation for applying the theory in human communication, that communication among humans is a relationship through a certain channel with transmission of certain codes (encoding) and code translation (decoding) (Weaver, 1963).

The Shannon-Weaver Mathematical Model, 1949

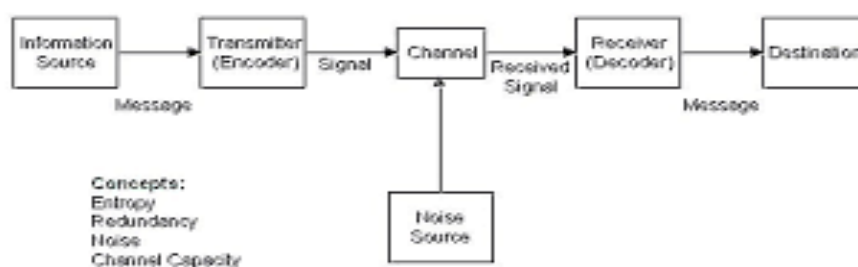


Chart 1. Shannon Weaver communication model

Perbincangan tentang etika, penilaian secara rasional terhadap hal yang baik dan buruk, tidak dapat dilepaskan dari pandangan tentang realitas. Demikian juga dengan Floridi, realitas dunia saat ini sedang mengalami perubahan besar, sebagai akibat kemajuan teknologi komunikasi dan informasi. Secara khusus teknologi informasi saat ini sedang membangun sebuah habitat baru bagi manusia, yaitu habitat informasi yang disebut dengan infosphere, inilah definisi dasar pertama yang disampaikan oleh Floridi. Infosphere merupakan lingkungan informasi yang dibentuk oleh berbagai bentuk entitas informasi antara lain, agen informasi, properti informasi, interaksi, proses dan hubungan bersama dalam kerangka informasi (Floridi 2013, 59). Infosphere berbeda dengan bio-sphere yang hanya terbatas pada lingkungan di bumi yang mendukung kehidupan. Sedangkan, infosphere mencakup lingkungan yang biologis sekaligus non-biologis, mencakup yang nyata dan yang maya, yang organik dan yang artifisial, oleh karena itu infosphere berbeda dengan cyberspace yang hanya membatasi diri pada ruang analog.

Discussion on ethics and rational evaluation of good and bad matters cannot be separated from the view on reality. Floridi also stated that in reality, today's world is experiencing major change resulted from advancement of communication and information technology. Floridi's fundamental definition suggests that in particular, information technology is currently developing an infosphere, a new habitat of information for human beings. Infosphere is an information environment formed by various information entities, i.e. information agent, information property, interaction, shared process and connection in an information framework (Floridi, 2013). Infosphere is different from biosphere which is limited to only environment on earth which supports life. On the other hand, infosphere comprises of both biological and non-biological environments, including the real and unreal as well as the organic and artifisial. Thus infosphere is different from cyberspace which only limits oneself in an analog room.

Second definition of infosphere is the reality itself. In infosphere, reality is information and information is considered as reality. Infosphere reality is a change of reality from analog to digital ones, and such digital information experiences constant increase, that even humans spend most of their time in digital world (Floridi 2013, 41). In infosphere, humans are only an element of diverse information organisms (algorithm, bots, troll, alter account, artifisial intelligence, etc.). Thus, in infosphere concept, non-biological agents have equal role and position with humans in creating life reality.

In his book *Onlife Manifesto*, Floridi suggests four signs which ontologically indicate the difference between current world and previous world, as a result of change in infosphere reality. The signs are: (1) increasingly vague boundary between real and virtual worlds; (2) vague boundary between human, machine, and nature; (3) reversal from information scarcity to information abundance; and (4) shift of meaning from independent matters and binary relations to complex interaction connectivity patterns among various matters (Floridi, 2009).

Change in infosphere reality also affects the way humans understand themselves (who we are), concept of reality, and interaction method (how we socialize). In relation to the basics of philosophy, a conclusion can be drawn that infosphere as an ontological view on reality influences the way humans obtain knowledge, which at epistemological level. In one of his researches, *A Look into the Future Impact of ICT on Our Lives* as published in *The Information Society* (2007) journal, Floridi suggested that ICT will change not only the way humans communicate and connect to technology, but also the ontology of reality itself. Initially and habitually interpreted through humans' material experience, reality experiences change along with rapid development of technology, which eventually changes into multi-information

humans' experience. Humans no longer live in all-biological space, a space of life that is limited to physical experience of extensive biotic environment on earth. They also spend their lives in abiotic world experience, i.e. digital world which offers completely different experience from all-material world.

When human knowledge is focused on the experience of biotic world, i.e. digital world, the way humans comprehend values and evaluate aesthetic aspects and moral consideration towards living reality in the world (ethics) will eventually change as well. Increasingly diverse realities in infosphere cause values to be more subjective. Values related to splendor and moral goodness eventually becomes relative.

The phases of human understanding towards infosphere reality up to the phase of ethical understanding can be illustrated in the following chart:

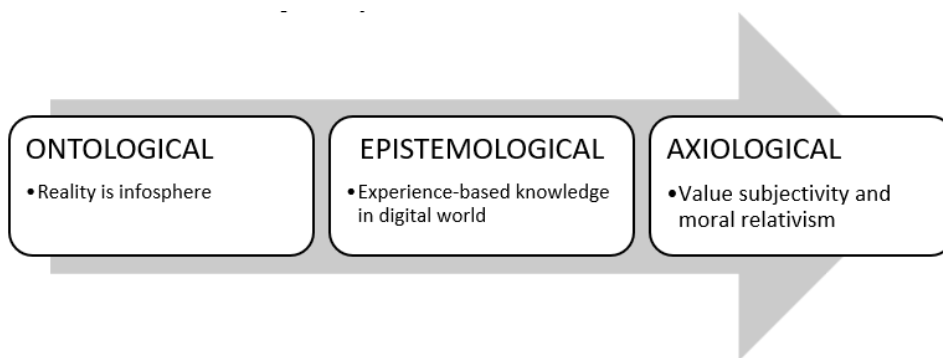


Chart 2. Phases of reality comprehension

Floridi introduces information ethics under the term ontocentrism in ecological macroethic domain, i.e. macroethics related to ecological environment issues (Floridi, 2013). Under ethics study, there are microethics and macroethics. Microethics refers to moral dilemmas and small scope issues particularly the ones experienced by moral subjects, e.g. researchers of biomedical ethics study, journalist of journalism ethics study, or entrepreneur of business ethics study. Thus, macroethics refer to moral dilemmas and issues which collectively involve moral subjects, e.g. environment ethics, mass media ethics, and political ethics. In accordance with Floridi's view, study on information ethics can be categorized into macroethics as it refers to global issues related to the effect of information and communication technology advancement.

As mentioned earlier, Floridi's discussion of ethics is inseparable from the concept of infosphere as a place for humans to interact with the world, which can be illustrated as follows:

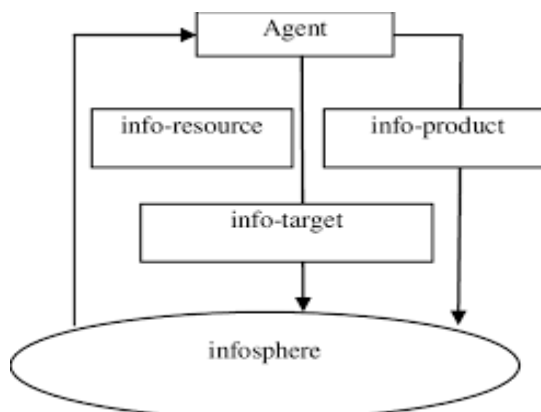


Chart 3. Relation between Humans and Information

To facilitate moral evaluation and decision in relation to infosphere, Floridi developed a mode of relation between humans and information called RPT (Resource, Product, and Target) Model, explained as follows (Floridi, 2013):

1. Information as a source, in relation to several matters as the focus of attention, i.e. availability, accessibility, and accuracy of information source. Frequent problems within the context of information as a source are digital gap, infoglut problem, reliability analysis and trustworthiness of information source. In other words, the problems is not only in the management of information as a source that is often conducted by information professionals such as librarian, journalist, academician, scientist, and IT expert.
2. Information as a product. In this context, information is defined as a result of an activity to then be consumed by the society. Development of IT, communication, and internet have caused new problems related to creation, consumption, sharing, and control of all kinds of information that are widely and rapidly distributed in a huge population. In addition, online community population also increases, which is highly dependent to various digital devices and platforms (mobile phone, internet, email, online game, etc.). As a product that is directly consumed by the society, information has caused several problems, i.e. accountability problem, hoax, plagiarism, advertisement, propaganda, misinformation and disinformation.
3. Information as a target emphasizes on the relation of information to influence information environment, e.g. customers data theft on the internet, privacy violation in the form of one's social media account hacking, data misappropriation, and negative impact of big data utilization.

Based on the explanation of the chart above, humans as one of the agents in infosphere have significant role in RPT model. With this model, it is understandable that every technology which ontologically to epistemologically changes information life will have implication to infosphere, including to humans within it (Floridi, 2013). A change in information life is what Floridi refers to as entropy.

In Floridi's view, information ethics is not the kind of ethics commonly understood by people with normative and classical questions. In information ethics, the questions raised are not 'What should information be?' or 'What should information do?'. Basically anyone can answer such questions because they relate to ideal situation expected by humans. However, in Floridi's information ethics, the questions raised are 'What should be respected or improved?' and 'What is well-being that may matter the most?'. Those questions focus on the process of information transmission from communicant to communicator, which relates to higher quality and more valuable communication process to provide well-being for as many people as possible.

The concept of entropy started to be introduced in this discussion. Shannon's influence in this concept is noticeable when entropy, as a physics concept in relation to the law of thermodynamics, is adopted by Floridi to explain information ethics. Entropy is defined as a principle of randomness or the lack of predictability within a system. Low-entropy system will have higher predictability, thus uncertainty will lessen. In contrast, a system with high entropy will have lower predictability and certainty of an information (Weaver, 1963).

Pertaining to the concept, Floridi formulates four principles of universal information ethics:

1. Information entropy should not occur in infosphere.
2. Information entropy must be prevented.
3. Should information entropy occurs in infosphere, the entropy must be eliminated.
4. Presence of information should have been encouraged to expand, increase (the quantity), improve (the quality), enrich (the variation) and open infosphere in terms of security, ownership, privacy, pluralism, and access (Floridi, 2013).

The act to diminish infosphere entropy is a good act, and the one to increase it is a bad act. For Floridi, entropy refers to destruction or disappearance of infosphere diversity, or total reality which comprises of information object. Floridi's view is similar to Spinoza, stating that basic reality is the foundation for normative evaluation.

Thus, moral responsibility is always related to infosphere condition with regard to which information circulates within the society. Moral responsibility is directly proportional with the increase of information level in infosphere. Moral evaluation is also highly dependent on the information regarding current issues, as well as society's understanding and desire. Floridi identifies three elements of the act of moral agent, i.e. good will, authority, and information. They are related to each other. Moral agent's good will to provide better information will result in reduced crime in the society. Floridi claimed that revolution of technology and information has caused information abundance and widespread imbalance between authority and information. Intensive flow of information in infosphere can enrich information diversity, but it can also contaminate, aggravate, and cause severe entropy at information level.

Infodemic as the cause of entropy

Until the end of March 2020, Facebook, Google, LinkedIn, Microsoft, Reddit, Twitter, and YouTube admitted their roles in directing information to the society to develop infodemic about COVID-19, and they pledged to collectively fight against fraud and creation of false information about the virus. However, considering the massive number of social media users, discontinuation of false news about the pandemic in social media is challenging. Until August 2020, most posts in well-known social media containing false information about the virus continuously spread without any control. Such extensive and prolonged spread of information, ranging from the valid one to hoax, is called infodemic.

Fundamental thesis discussed in this research defines infodemic as one of the factors of entropy in infosphere. Thus, what happens in infosphere when infodemic enters infosphere reality? What effect does entropy has for infosphere which contains information agent and inter-human interaction pattern in a wider framework?

Floridi stated that the existence of information should be encouraged to expand, increase, enrich and open infosphere. However, it is important to note that the information which circulates and enters the infosphere must have the quality, variation, and security for its consumers, valid ownership, privacy for information users, guarantee of users plurality and comprehension, as well as guarantee of access for users.

How significant is the role of infodemic during pandemic? Is infodemic affecting infosphere existence? The following table briefly illustrates infodemic phenomenon in relation to infosphere existence:

Table 1. *Ideal Condition of Infosphere Information with Infodemic Phenomenon*

INFORMATION IN INFOSPHERE	INFODEMIC IN INFOSPHERE
Information increases	Amount of information increases
Information expands	Scope of information expands
Information is enriched	Information owned by the society is enriched
Infosphere is more opened	Infosphere is more opened to be accessed
Information quality can be accounted for	Information quality cannot be accounted for yet
Information is more varied	Information is highly varied in terms of content and perspective
Information is more secure to be accessed	Information security is not guaranteed yet
Information ownership is more valid	Information ownership can be disputed
Guaranteed privacy for information users	Privacy of information users is not guaranteed yet
Information plurality	Information plurality soars
Guarantee of access to information	No guarantee of access to information yet

The table indicates that in terms of quantity, infodemic has expanded and multiplied the amount of information. However, in terms of quality, information circulated in infodemic cannot be accounted for, particularly regarding its validity, security and ownership (information source). This is the starting point of entropy, disorganization and randomness in the reality of information. Random, disorganized and incoherent reality will affect the way information agents, i.e. the society, understand and access source of knowledge, which is information within infosphere. Consequences of error in selecting information source are information confusion, information error, and information misleadingness.

- a. Information confusion is defined as failure, misunderstanding, and false interpretation of available information (Widyastuti, 2016). Information confusion is usually caused by massive information abundance, resulted from factors such as (1) overchoice; and (2) ambiguous and misleading information.
- b. Information error is defined as inaccuracy and fallacy in interpreting information, both deliberately and undeliberately (e.g. due to ignorance and negligence).
- c. Information misleadingness is defined as an incapability to draw final conclusion based on the existing data, resulting in incoherent and false argumentation and conclusion. Failure to draw conclusion is usually caused by incapability to perform correct reasoning process and error in organizing premises.

Information abundance as an infodemic phenomenon, which occurs during COVID-19 pandemic, must be addressed critically. Information obtained in the quantity required by the society will not become a problem. Consequently, when overdose of information occurs during the pandemic, it is important to pay close attention to the perception and mental health of the society. When they have to guard themselves physically from the threat of COVID-19, they also have to mentally face the confusion and uncertainty of information. This is a depressing concern. Entropy, disorganization and randomness caused by infodemic during this pandemic are manifested in various ways, among them is the spread of widely-believed information without any validity of its truth. The source of information is also unclear, but the public accept and believe it guilelessly without any filter.

Such massive production of information along with advancement of communication technology surely affects infosphere existence. Prevention of entropy-caused damage in infosphere must be pondered over. In the context of information ethics, Floridi have stated that moral act of information agent is measured from entropy point of view, meaning the act causing the least entropy is a good act. This principle indicates that an information agent has

responsibility and concern towards the existence of entropy-free infosphere.

As information agents, the society plays significant role in information circulation within infosphere, starting from producing valid information, consuming it wisely, distributing it, and controlling information circulation. These should also be applied in COVID-19 infodemic phenomenon.

Referring to Floridi's earlier view that information ethics is part of environment ethics, the basic principle to be developed is appreciation to nature existence, i.e. infosphere, that should not be disrupted by entropy. Thus, information production should be conducted in a way that does not disrupt infosphere. In addition, information agent must maintain harmonious relationship with other elements of information, i.e. biotic and abiotic environment. Lastly, all information agents have the same responsibility and concern to all impacts caused by infodemic.

Conclusion

Infodemic is one the factors behind entropy, disorganization, randomness and instability in infosphere. In the context of information ethics, moral act conducted by information agent is regarded as a good act when it results in the least entropy in infosphere. Thus, information abundance, indicated by the emergent infodemic and results in entropy in infosphere, can be regarded as a bad act. Hence, information which circulates and enters the infosphere must be filtered (in terms of both quantity and quality), in order to expand, increase, enrich, and open the infosphere. This principle indicates that an information agent has a responsibility and concern to the existence of entropy-free infosphere.

Bibliography

- Floridi, Luciano. (2007). A Look into the Future Impact of ICT on Our Lives. *Journal The Information Society, Information Society Journal*, 23(1).
- Floridi, Luciano. (2009). *The Onlife Manifesto: Being Human in a Hyperconnected Era*. Springer Cham Heidelberg.
- Floridi, Luciano. (2013). *The Ethics of Information*. Oxford.
- <https://bangkok.unesco.org/index.php/content/press-provides-antidote-fake-news-time-covid-19>
- <https://kbbi.web.id>
- <https://nasional.kompas.com/read/2020/03/03/15330451/selama-23-januari-3-maret-2020-kominfo-deteksi-147-hoaks-soal-virus-corona>
- <https://www.inews.id/techno/internet/kominfo-telah-temukan-242-konten-hoaks-tersebar-di-dunia-maya>
- <https://www.inews.id/techno/internet/kominfo-telah-temukan-242-konten-hoaks-tersebar-di-dunia-maya>
- <https://www.un.org/en/un-coronavirus-communications-team/un-tackling-infodemic-misinformation-and-cybercrime-covid-19>
- Luttrell. (2019). *Social Media: How to Engage, Share and Connect*. Rowman & Littlefield.
- Mantzavinos, C. (2016). *Hermeneutics*. <http://plato.stanford.edu/entries/hermeneutics/>.
- Nazir, M. (2013). *Metode Penelitian*. Ghalia Indonesia.
- Nurhajati, Lestari. (2020). *Perbincangan Isu Corona COVID-19 di Media Daring dan Media Sosial di Indonesia*, Lembaga Penelitian, Publikasi dan Pengabdian Masyarakat,

- London School of Public Relation.
- Sumaryono. (2013). *Hermeneutika*. Kanisius.
- Thomas, Z. (2020). WHO says fake Corona virus claims causing “infodemic”
<https://www.bbc.com/news/technology-51497800>
- Weavver, Shannon. (1963). *The Mathematical Theory of Communciation*. Board of Tustees of The University of Illinois.
- Widyastuti. (2016). Perbandingan Teori Perilaku Pencarian Informasi Menurut Ellis, Wilson dan Kuhlthau. *Jurnal Pustaka Budaya*. 3.