

Infographic Data Visualization as an Alternative Form of News (Content Analysis of Covid-19 Vaccine Issues of Data Journalism-Based Media)*

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Abstract

Vaccines and vaccinations have become the issues taking over the media coverage during the Covid-19 pandemic. The media deliberately displays data visualizations in infographics to help the audiences understand the situation in a less complicated way. This study aims to identify messages conveyed through visualizations of infographic data in data journalism-based media in Indonesia. The samples of infographic contents were acquired through the information posted by the official Instagram accounts of [@katadata.co.id](https://www.katadata.co.id) (@katadatacoid) and [@tirto.id](https://www.tirto.id) (@tirtoid) as media that declared themselves to practice data journalism. The research method used in the study was content analysis using descriptive statistical analysis. The study results show that vaccine and vaccination issues are presented with statistical-based, writing elements, background info, graphics, photos, icons, and diagram elements. The infographic includes elements of news completeness, such as using 5W+1H questioning method (what, who, where, when, why, and how) and mentioning credible sources. Infographic is an alternative way of reporting news during a pandemic. In addition, this research is expected to contribute to the media's editorial reporting policies in the digital era, especially related to pandemic issues.

Keywords: Covid-19, data journalism, data visualization, infographic

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Introduction

One of the current issues that has caught the world's attention is the Covid-19 pandemic. In Indonesia, the government announced the first positive case in March 2020. Not long after, the World Health Organization declared a pandemic status, pointing out that Covid-19 was detected to have spread in 123 countries in Asia,

Europe, South Africa, and the United States (kompas.com, 2020). This problem has impacted the health sector and social, educational, economic, etc. In addition, people are confused and lack literacy about the virus, which was first discovered in China at the end of 2019.

In this situation, the media is vital in providing enlightenment in eradicating people's uncertainty. It is therefore not surprising that disinformation, misinformation, and hoaxes about Covid-19 spread to the community. By May 2021, the data from the Ministry of Communication and Information of the Republic of Indonesia noted that there were 1,733 hoaxes of Covid-19. Of these, 177 hoaxes were related to the Covid-19 vaccine (Kominfo.go.id, 2021).

The enormous number of hoaxes related to vaccines is a proof that the issue is quite essential and attracts the attention of many people. For example, the following are some misinformation, disinformation, and hoaxes related to vaccines stating that vaccines cause Covid-19 infection; they can change DNA; they contain microchips; many people die after being vaccinated, etc. (liputan6.com, 2021) (mediaindonesia.com, 2021). In this situation, the media carries out social responsibility (Mcquail, 2010) to correct the misinformation. For that reason, a news presentation should be rich in data, accurate, but easy to understand, considering that the issue is closely related to medical terms, which tend to be complicated for ordinary people.

In translating complex narratives, data visualization can help the audiences to understand complex information quickly (Jacob, 2020) (Siricharoen, 2013). Visual information delivery is believed to be more effective than reading or listening (Siricharoen, 2015). One way of data visualization currently trending amid social media's growing popularity is infographics. Infographic is defined (Khouzam et al., 2019) as a visual representation of data, such as a chart or diagram.

The existence of social media in the digital era has unexpectedly proliferated. In recent years, social media has become one of the largest distributors of news (Krumsvik, 2017) and a critical space for sharing and recommending news (Indrajaya & Lukitawati, 2019). Therefore, it is not surprising that many hoaxes are mostly found on social media since there is no fact verification filter as mainstream media does.

The issue of hoaxes has also disturbed mainstream media to enliven social media. Adopting the data-driven journalism genre or data journalism is believed to be able to fight the spread of hoaxes on social media (Badri, 2017). The survey (datareportal.com, 2020) revealed that in January 2020, the number of Indonesian social media users reached 160 billion, with the most popular media being Youtube, WhatsApp, and Instagram.

The popularity of Instagram as a social media with visual content encourages mainstream media to present independent infographic posts as content. However, data journalism-based media consistently composes data into a journalistic work presentation through a mixture of text narratives and data visualization. In the digital era, data visualization (Van Der Haak et al., 2012) is the key to the success of the storytelling component in the news presenting the information through graphic design, data mapping, and interactive graphics.

However, any form of a journalistic product should not be separated from Bill Kovach's nine elements of journalism. The elements are (1) Journalism's first obligation is to the truth journalism's first loyalty is to the citizens; (2) the essence of journalism is the discipline of verification; (3) journalism must maintain independence; (4) journalist must serve as an independent monitor of power; (5) journalist must provide a forum for public criticism and compromise; (6) journalist strives to make the significant interesting, and relevant; (7) journalists must keep the news comprehensive and proportional, and (8) journalists must be allowed to exercise their conscience (Kovach & Rosenstiel, 2007).

In Indonesia, katadata.co.id, tirto.id, and lokadata.id are the media that proclaim themselves to practice data journalism (Badri, 2017). The three of them consistently display data visualization in their journalistic products; both published through websites and social media. Katadata.co.id and tirto.id solemnly present the data visualization by creating a special section for infographics (katadata.co.id, 2021) (tirto.id, 2021). Meanwhile, infographics presented by lokadata.id are meant to complement the published news articles (lokadata.id, 2021). Nonetheless, there of them consistently present infographic news which is intended as simple news in the form of visuals, through Instagram.

The use of infographics by the media is not new. For example, since the 1930s, Fortune magazine in the United States has captured attention through its graphic data visualization designs (Dur, 2012). Recent research on the use of data visualization in the form of infographics includes analyzing the use of visual storytelling models by online media in Indonesia through infographics (Sukardani, 2019), scrutinizing the most attractive visual/graphic types to promote the Human Papillomavirus vaccine (Teoh et al., 2019), and analyzing the content of data visualization by two Indian media during the Covid-19 pandemic (Jacob, 2020).

Meanwhile, this study aims to identify messages conveyed through infographic data visualization in data journalism-based media in Indonesia. The issue of vaccines and Covid-19 vaccinations was chosen to focus more on identification. In contrast to previous research, this study tries to fill the void of communication message research by focusing on infographics produced by data journalism-based media in Indonesia. The complexity of the characteristics of Indonesian people supported by the increasing number of Instagram users is very likely to require a different media editorial policy in delivering messages.

Method

The study employed content analysis to identify visible communication messages objectively and properly (White & Marsh, 2006). The research population was the media of infographic news in Indonesia, katadata.co.id, tirto.id, and lokadata.id, that consistently apply data journalism (Badri, 2017). The sample of the study is the infographics on vaccine and vaccination issues published through the Instagram accounts of the three media.

The data was collected by recording every infographic post related to vaccines and vaccinations on the aforementioned Instagram accounts within a period of three months, January-March 2021. This period was selected as the initial period for the Covid-19 vaccination program in Indonesia started at that time. Therefore, the assumption is that the portion of news related to this issue is more significant, considering that this is something new and has sparked controversy among the Indonesian people regarding vaccine safety, effectiveness, and halalness.

There are 35 articles containing infographics from the January-March 2021 data collection. After that, the data were classified based on the availability of infographic elements such as combinations of written language, photography, time maps, icons, diagrams, and two-dimensional illustrations. The classification results are then processed statistically descriptively to produce data visualization patterns on the three media.

Based on the initial data collection, 25 infographic content were obtained from the katadata.co.id Instagram account, 10 content from tirto.id, and 0 (zero) content from lokadata.id. Based on this initial finding, the researchers decided not to include the lokadata.id as the research sample even though it implements data journalism in Indonesia. Furthermore, from the samples obtained, statistical tests were carried out by giving identity, classification, weighting, and drawing conclusions.

Discussion

Data visualization has become a journalism trend in the digital era (Yu & Shi, 2019), where there are many open sources (big data) that can be used as news sources (Badri, 2017) for visually literate audiences (de Haan et al., 2018). The primary purpose of infographics is to present summary information quickly in the sea of information (Siricharoen & Siricharoen, 2015). However, infographics are not only relying on attractive and nice-looking designs but also must adhere to the content to be conveyed (Siricharoen & Siricharoen, 2015). Thus, not all information can be visualized (Yu & Shi, 2019).

In addition to producing journalistic products, mass media also create visual products. Infographics as a visual product refer to a new form of language in presenting information through the elements of images (Obad Bima Wicandra, 2006). Pinto mentioned the eight characteristics of journalistic infographics, namely 1) having a complete and independent meaning, 2) presenting up-to-date information fairly, 3) presenting enough information to provide a clear understanding of the facts, 4) building a specific content hierarchy, 5) using iconic elements that do not distort reality, 6) performing the function of complementing the information presented in the text, 7) respecting the aesthetic principles, and 8) offering clarity and accuracy (Pinto, 2017).

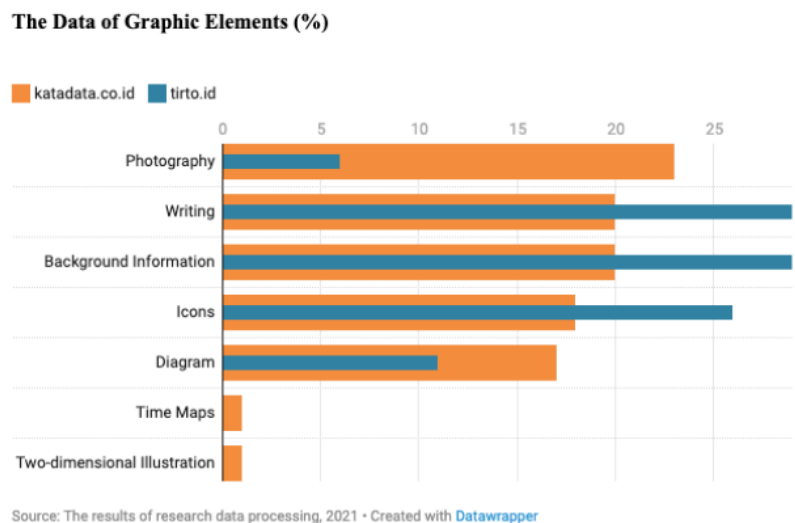
There are many types of infographics. Generally, they can be divided into four types: statistical-based, timeline-based, process-based, and location/geography-based (Artacho-Ramírez et al., 2008). First, the statistical-based includes graphs, tables, charts, lists, and charts that show how the system works. Second, timeline-based shows the time sequence of an event or chronology. Third, process-based shows the clarification of certain technical/practices, such as an explanation of cooking recipes. Fourth, location/geography-based attempts to display geographic information through maps or geographic information systems (GIS), including icons, diagrams, symbols, tables, and graphs.

Meanwhile, even though it is visual, infographics produced by the media are still journalistic products. Therefore, they should comply with journalistic principles. News must uphold the truth and be loyal to the community (Kovach & Rosenstiel, 2007), and so do infographics, especially those which stand alone as one piece of content. Furthermore, news as a journalistic product has an element of completeness of information represented by answering the questions What, Who, When, Where, Why, and How (5W+1H) (Ishwara, 2011).

The Types and Elements of Infographics

After the grouping was conducted, it can be seen that there are seven infographic elements employed by data journalism-based media, the katadata.co.id and tirto.id. However, not all elements were implemented by both. The data shows that katadata.co.id use all graphic elements in writing, background information, time maps, icons, photography, diagrams, and illustrations with n=126 graphic elements. The most frequently used elements by katadata.co.id were photography n=29, writing n=25, and background information n=25 with an average usage of above 20% (Table 1).

Table 1. The Data of Graphic Elements



Source: The results of research data processing

Meanwhile, tirto.id omitted two graphic elements. Of the seven elements, it seems that tirto.id never used time map elements and two-dimensional illustrations where the infographic shows $n=0$. The data processing results (Table 1) show that the writing $n=10$, the background information $n=10$, and the icons $n=9$ or with an average usage of above 25% are the most frequently used by the tirto.id. If the two media are compared, the use of photographic elements is the most striking difference with 23% at katadata.co.id and 6% at tirto.id. While the elements that have almost the same percentage are text, background information, icons, and diagrams.

From these elements, the researcher observed that the types of infographics used by katadata.co.id were more diverse, where statistical-based $n= 17$; timeline-based $n= 2$; process-based $n= 5$, and location-based $n= 1$. Meanwhile, for tirto.id, the infographics used statistical-based $n= 6$. and process-based $n= 4$. As for examples of the use of types are described in Figures 1, 2,3 and 4.



Source: Instagram @katadacoid

Figure 1. Type of location-based infographics on katadata.co.id



Source: Instagram @katadacoid

Figure 2. Type of process-based infographics on katadata.co.id



Source: Instagram @katadacoid

Figure 3. Type of timeline-based infographics on katadata.co.id



Source: Instagram @katadatacoid

Figure 4. Type of Statistical-based Infographics on tirto.id

Based on the exposure of the research data, it can be understood that katadata.co.id and tirto.id as data journalism-based media in Indonesia, mostly use the statistical type. According to Artacho-Ramírez et al. (2008), statistical-based elements of graphs, diagrams, and charts are used in line with data journalism work systems that seek to process data into informative narratives for the audiences. However, the two media also did not completely ignore the other types. Every infographic is produced by considering how the data should be presented, whether in statistical form, timeline, process, or location. This is the purpose of infographics as a form of data visualization to make it easier for audiences to understand (Jacob, 2020) (Siricharoen, 2013). To achieve this goal, the use of graphic elements also matters. Both katadata.co.id and tirto.id use various elements in one infographic content.

The Completeness of News Elements and Infographic Sources

The results of data processing conducted by researchers on the infographic sample content of katadata.co.id and tirto.id indicate that all meet the of news elements, although not everything is explicit. This can be seen from the title element and background element presented in a short narrative as an introduction to the infographic. One example is in the katadata.co.id infographic entitled “Vaksin Bukan Akhir Pandemi” (Vaccine is Not the End of the Pandemic) in Picture 1, which presents the completeness of news elements: Who= former President of the World Bank, Jim Yong Kim; What= states that vaccines are not the end of the pandemic; When= during the pandemic; Where= whole world; Why: the virus mutates, vaccination is more effective,

community participation, recovery with 3T (tracing, testing, treatment); How= vaccination; empowerment of local communities; passive 3T.

The infographic of trito.id entitled “Berbicara Kemungkinan Vaksin Gagal” (Speaking of Possible Failed Vaccine) shows no much different (Picture 6), presenting the completeness of news elements: Who= Griffith University Epistemologist, Dicky Budiman; What= the possibility of the vaccine failing to overcome the pandemic; When= during the pandemic; Where= Indonesia; Why: ignoring health protocols, not reaching the minimum number of vaccinations, low 3T; How= the body needs 14 days to form antibodies; vaccine dependence on the vaccine provider, the presence of the vaccine lowers the 3T.



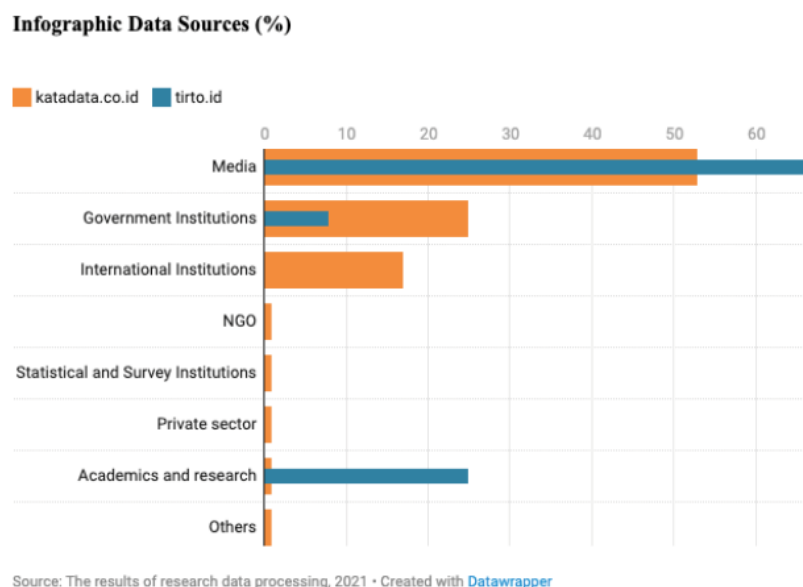
Source: Instagram @katadatacoid, March 24, 2021
Figure 5. Infographic “Vaksin Bukan Akhir Pandemi”



Source: Instagram @tirtoid, February 1, 2021
Figure 6. Infographic “Berbicara Kemungkinan Vaksin Gagal”

Regarding news sources, the results of data processing (Table 3) show that ten source groups were used as reference sources, such as government institutions, international institutions, non-governmental organizations, media, independent, statistical and survey institutions, private sector, academics and research results, as well as other sources. For katadata.co.id, where n=89, they mostly took data from the media with n=47 or 53% and government institutions with n=22 or 25%. Meanwhile, the sources of non-government institutions, independent, private, and others were rarely used, where n = 1 or 1%.

Table 3. Infographic Data Sources



Source: The results of research data processing

By examining the same data table, tirto.id n=12 mostly used media sources n=8 or 67% and academics and research n=3 or 25%. Meanwhile, sources that were never taken, n= 0, are the international institutions, non-governmental organizations, independents, statistical and survey institutions, the private sector, and others. Both katadata.co.id and tirto.id show a similar trend in choosing media sources as their main source.

Table 4. Infographic Content Liked by Readers

Audience Engagement

Infographic Title	Like	Comments	Media
Betapa bahayanya Konten Antivaksin (How Dangerous the Content of Anti Vaccine Is)	8,280	13	tirto.id
Penolak Vaksin Masih Banyak (A Great Number of Vaccine Repellents)	5,982	18	tirto.id
Vaksin Pertama yang Diizinkan WHO (The First Vaccine Allowed by WHO)	4,769	188	katadata.co.id
Tahanan Korupsi Dapat Prioritas Vaksin (Corruption Prisoners Get Vaccine Priority)	4,353	149	tirto.id
Menanti Vaksin Covid-19 (Waiting for the Covid-19 Vaccine)	3,536	50	tirto.id
Vaksin Gratis AstraZeneca untuk Indonesia (Free AstraZeneca Vaccines for Indonesia)	2,408	83	katadata.co.id

Source: The results of research data processing

Examining the audience side, it can be seen how this infographic can grab attention through Instagram’s likes and comments features (Table 4). From the rankings carried out by researchers, the infographic with the title “Betapa Bahayanya Konten Antivaksin” ranked at the top with 8,280 likes and 13 comments broadcast by tirto.id. Meanwhile, for the katadata.co.id, the highest attention-grabbing infographic was entitled “Vaksin Pertama yang Diizinkan WHO” with 4,769 likes and 188 comments. Based on Table 4, it can be said that although tirto.id was superior in the number of likes, katadata.co.id was leading the average number of comments.

As media institutions that are bound by press laws and professional ethics, katadata.co.id and tirto.id do not abandon the principles of journalism in producing their journalistic content. This can be seen from the research findings which show that both media completely displayed news elements in their infographic content. This is in line with Kovach (Kovach & Rosenstiel, 2007) who believes that the first obligation of

journalism is the truth and its loyalty to society. Changes in society and technology are opportunities for the media to develop themselves (Ishwara, 2011), one of which is building creativity through infographics as an alternative form of reporting.

This argument is strengthened by the attention given by audiences through the likes and comments feature of Instagram as one of the most popular social media in Indonesia (datareportal.com, 2020). Research data shows issues that receive attention including new and/or controversial ones. Infographics deliver information in a simpler, clearer, and more effective way (Siricharoen, 2015) (Pinto, 2017) to explain new and controversial issues that are complicated.

The selection of credible data sources is also part of the efforts to adhere to journalistic principles (Kovach & Rosenstiel, 2007), which is administered by katadata.co.id and tirto.id. Based on the results of the data presentation, it can be seen that one infographic content is not taken from one data source, but varies. Therefore, the number of sources based on the results of data processing is much different from the number of units of analysis. The infographics produced, especially tirto.id, are the essence of articles published on their website. This is why the results of the data presented show media sources as the most used data sources for the two media. The media need to present credible sources (Kovach & Rosenstiel, 2010) to support the narrative of the facts presented.

Conclusion

Data journalism-based media that utilizes, processes, and visualizes data as a journalistic product has different characteristics from the media. This characteristic is suitable to be applied in the digital era with the availability of abundant data sources (big data). This is illustrated by the research results showing the diversity of data sources in processing data visualization in infographics. For example, the amount of detailed information about vaccines and vaccinations fits well in infographics rather than long news narratives. Furthermore, creativity in using graphic elements and presenting infographic types can change complex issues to appear simple, and easy to understand without compromising the essence of the news content. This is illustrated by the complete presentation of the infographic that meets the completeness of news

elements answering the 5W+1H (What, Who, When, Where, Why, and How), although not everything is explicit.

This research has limitations because it has yet to examine the variety of issues that are appropriate and effectively presented in infographics as a communication message. Nonetheless, this research is expected to contribute to the media in making editorial reporting policies in the digital era, especially regarding the issue of the pandemic. In addition, it is also expected to minimize erroneous perceptions due to the complexity of issues published by the media.

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