Informasi Informasi - ISSN (p) 0126-0650; ISSN (e) 2502-3837
Vol. 53, No. 1 (2023), pp. 15-28 doi: http://doi.org/10.21831/informasi.v53i1.54247.15-28

Show and tell: Audience engagement in reporting on Covid-19 vaccination in data journalism-based media

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Abstract

Data journalism is a new genre in journalism that utilizes data visualization to engage the audience in news reporting. This engagement also provides certainty and minimizes the spread of misinformation regarding the COVID-19 vaccination policy in Indonesia. This study aims to explain how data journalism-based media, *Katadata.co.id*, communicates their news and embodies audience engagement through data visualization. The type of research is content analysis with quantitative and qualitative data collection techniques. In quantitative data collection, 49 news titles were searched, the results of keyword discovery in January-March 2021 in the "Data Journalism" rubric of *Katadata.co.id*. The data were coded according to indicators from a multimodal perspective in the ergodic work concept: static information graphs, non-interactive dynamic data visualizations, and interactive dynamic data visualizations. Furthermore, in the qualitative step, the data was analyzed in-depth to explore how *Katadata.co.id* communicated news about COVID-19 vaccination with the showing and telling models. As a result, the COVID-19 vaccination news on *Katadata.co.id* also involved the audience in communicating it. In reporting the news, *Katadata.co.id* uses narrative techniques, which is the instance of the narrators' technique to characterize the narrative through the presence of news writers, the *sequentiality* technique to show the movement from one event to another by sliding the pages, the *temporal dimension* technique to describe the changes over the time with the help of dynamic elements, and *tellability* techniques to describe the worth-presenting COVID-19 vaccination news.

Keywords: *Data Visualization, Data Journalism, COVID-19 Vaccination, Martini Glass, Multimodal*

INTRODUCTION

Information related to vaccines and vaccinations for COVID-19 is crucial. The reason is that it affects public participation in vaccination policies by the Indonesian government considering, the ongoing pandemic. The emergence of misinformation in several mass media and social media has led to public distrust of the COVID-19 vaccine. From 15 June 2020 to 15 September 2020, the media research organization, First Draft, examined the inclusion of the word "vaccine" or "vaccination" on social media such as Twitter, Instagram, and Facebook. The results showed that much information on vaccines and vaccinations was wrong and not equipped with data (data deficit). Unfortunately, these messages are released mainly by key figures who are relatively trusted by the public. This impacts on decreasing public confidence in vaccination (Smith et al., 2020). First Draft recommends anyone, including the mass media, to reproduce proactive messages that are interesting and tailored to their audience segment (Dodson et al., n.d.).

Center for Strategic and International Studies (CSIS Indonesia) proved the same through their latest research. According to the research conducted on January 13-18, 2021, 42.5% of people in Jakarta and 29.5% of the citizens disbelieved the Covid-19 vaccine. One of the causes of this uncertainty is the spread of vaccine disinformation (CSIS Indonesia, 2021). Referring to the research recommendations of First Draft, proactive messages that are engaging, rich in information and data, and able to adjust the interests and needs of the audience can be implemented through data visualization of the COVID-19 vaccine.

Online data visualization is familiar, except in journalism (especially online portal-based data journalism) in Indonesia. In the field of journalism, various forms of graphs, charts, and maps are used to explain, persuade, and tell complex quantitative data to be more effective and simplify it for the audience to understand the identification of patterns, trends, or phenomena that the media wants to convey (Jacob, 2020; Knaflic, 2015) Data visualization is believed to be more effective than reading or listening in conveying information (Siricharoen, 2015). Nevertheless (Yu & Shi, 2018) believe data visualization cannot be applied to all information. In reporting news, data is valued and relied upon because it plays an essential role in its audience's decision-making and knowledge of the world. Thus, data visualization needs to be adequately presented, followed by a comprehensive journalistic storytelling ability. The reason is to avoid audience confusion and the emergence of manipulative information (Engebretsen et al., 2020; Rogers, 2013). Therefore, media that claim to be data journalism-based media need to study the requirements in reporting their news through data visualization, including *Katadata.co.id.*

Katadata.co.id is the pioneer of data journalism-based media that appeared first in 2021. Two other media claim to be similar, such as *Beritagar.id*, which transformed into *Lokadata.id* (appeared in 2015) and Tirto.id (appeared in 2016). As a pioneer of this new genre of journalism, *Katadata.co.id* holds values of Independent (based on facts and impartiality), In-depth (offering quality in-depth), Insightful (offering new viewpoints and perspectives), and Intelligible (engaging and easy to understand without losing the essence) (Nathaniel, 2019). In addition, the media implements data visualization in journalistic products included in the "Data Journalism" channel. In *Katadata.co.id*, journalism channels are divided into the "Infographic" sub-channel, which contains graphic information accompanied by numerical data, and the "Data Analysis" sub-channel, which includes in-depth long-form reporting and several data with various types of visualizations.

Katadata.co.id was chosen in this study because this media is the pioneer of data journalism that was established the earliest, and because the number of posts containing numerical data is higher than *tirto.id* and *lokadata.id*. For example, from January to March 2021, *Katadata.co.id* media displayed 43 data journalism posts (23 of which were infographics containing numerical data), *tirto.id* only displayed 36 data journalism posts about Covid-19 (only 18 displayed infographics number data) and *lokadata.id* displays 9 data journalism posts (all infographics contain data).

At *katadata.co.id*, there were 8 out of 10 infographics with the highest Instagram engagement ("likes" and "comments") reporting information related to the Covid-19 pandemic. In addition, two of them (infographics 2 and 10) reported the COVID-19 vaccine (**Table 1**). From these observations, it can be seen how enthusiastic the public was in getting information related to the COVID-19 pandemic and vaccine.

Table 1. 10 Best Infographics in Audience Engagement (Instagram Likes and Comments) in January-March, 2021

No	Infographic Title	Likes	Comments
1	Indonesia Didominasi Gen Z dan Milenial (Indonesia is Dominated by Gen Z and Millennials)	8,996	153
2	Vaksin Pertama yang Diizinkan WHO (The First Vaccine Allowed by WHO)	4,769	188
3	Covid-19 akan Jadi Seperti Flu (Covid-19 Will Eventually Become the Flu)	3,605	148

No	Infographic Title	Likes	Comments
4	Era Baru Bank di Indonesia (A New Era of Banks in Indonesia	3,257	38
5	Susah Cari Kerja di tengah Pandemi (It's Hard to Find a Job in the Middle of a Pandemic)	3,015	34
6	Varian Baru Covid-19 Memicu Lockdown (New Variant of Covid-19 Triggers Lockdown)	2,770	152
7	Waspada Varian Baru Covid-19 (Beware of the New Variant of Covid-19)	2,706	290
8	Penjualan Online Jadi Penyelamat Saat Pandemi (Online Sales Acted a Savior During a Pandemic)	2,576	15
9	Pandemi Membuat Limbah Medis Melonjak (Pandemic Makes Medical Waste Soar)	2,538	30
10	Vaksin Gratis AstraZeneca untuk Indonesia (Free AstraZeneca Vaccines for Indonesia)	2,408	83

Source: *Katadata.co.id*, processed by researcher (July 2021)

Data visualization as part of data journalism is not separated from combating misinformation circulating in the community regarding the COVID-19 vaccines and vaccinations. The pandemic highlights the role of data-driven journalism to provide the audience with fact-based information in emotional situations to provide context and generate insights; thus the audiences can make decisions (Gruen, 2020). Some studies related to data journalism have been conducted. For example, Badri mentioned in his research that one of the online media's efforts to fight hoaxes is by adopting the innovations of data journalism. Data journalism-based media such as *Katadata.co.id*, *Tirto.id*, and *Lokadata.id* mainly implements data journalism and visualization on soft news journalistic products (Badri, 2017). However, that research is limited only to quantifying of the graphic forms in data journalism products. It differs from this study which discussed the involvement of graphic elements of data journalism.

Meanwhile, (Dur, 2012), in his research, examined data visualization in newspapers or print media from the perspective of visual communication design. Data visualization in daily newspapers can inform longer, better articles. However, the most important thing a designer needs to do is decide the colors, typography, and graphics that match the visual expression; thus the visual codes are easy to understand. No matter how good the choice of data is, the not attractive visualization will most likely fail to convey the message (Dur, 2012). This research is different from Dur's (2012) as it investigated data visualization from the perspective of journalistic communication. Other studies have linked infographics usage as an effective data visualization method in reporting the value of information to the audience (Belmonte & Porto, 2020; Sukardani, 2019). Her research, (Indah & Hasanah, 2022) revealed infographics as a form of data visualization as an alternative to conveying Covid-19 news regarding vaccines and vaccination issues in two media based on data journalism in Indonesia.

However, the research conducted by Hiippala (2017) only describes long-form journalism in online media as a form of multimodal journalism that combines video, written language, photography, and other combinations to merge multiple titles that exploit page space in the media into one intact narrative (Hiippala, 2017). Hippala's study did not use the perspective of long-form journalism as a product that can increase audience engagement. Meanwhile, this study emphasizes the meaning of audience engagement. Furthermore, the previous studies have yet to observe the use of mode principles and narrative transition techniques in the multimodal perspective of data visualization used by online media to show how a media engages its audiences in each article and narrated data visualization.

Therefore, this study analyze how data journalism-based media, *Katadata.co.id*, communicates or narrates the Covid-19 vaccination news and realizes audience engagement through data visualization. In contrast to the existing research, this research has a novelty as it involves the multimodality perspective to see how data

visualization is presented to engage the audience. The discussion is complemented by an analysis of the narrative techniques used by *Katadata.co.id* in narrating articles with visualized data, thus they can "show" and "tell" to increase audience engagement.

LITERATURE REVIEW

As digital developments benefit journalism by involving the public in various phases of the news cycle, newsrooms are competing in delivering data journalism products to increase audience engagement and unravel the complexity of news for their audiences (de-Lima-Santos & Mesquita, 2021). One perspective that can be used to view how data visualization plays a role in data journalism is the multimodal perspective.

The multimodal perspective in data journalism products focuses on how meaningful the combination of written language, illustrations, photography, diagrams, maps, layouts, and other expressions appear in data visualizations. Visualization of dynamic data and information on static graphs (infographics) is recommended to demand different types of audience engagement. Bateman (2017) characterizes the engagement in question as a concept of ergodic work, in which there are two forms of communicative and participatory activities of the audiences: exploration and composition. According to this concept, the audience needs to explore or be involved in producing their meaning for a new narrative presented by the media (Bateman, 2017).

While exploring, the audience can choose their data preferences or the data they need, presented in interactive data visualizations. The audience engagement in exploration activities is limited to exploring data the audiences will see according to their needs in a news narrative. Meanwhile, what is beyond the capacity of the audience is changing the data presented. In other words, the presentation of the data can be changed by the users, but they cannot change the content of the data (Bateman, 2017). Another activity in ergodic work is composition, which requires the audience to involve in eye-tracking to produce a visual perspective and selective interpretation of the news consisting of text, images, and others (Hiippala, 2017).

Bateman (2017) identifies three types of data visualization which are as follows: first, static information graphics (infographics) that require compositional activities to process various elements such as written language, photography, maps, two-dimensional illustrations, and the elements of diagrams in one report. Second, non-interactive dynamic data visualization. This type only requires compositional activities because visualization presents embedded graphics, not those that result in exploration or audience navigation engagement. Third, dynamic interactive data visualization with the most significant degree of interactiveness. This type allows the audiences to explore the data presented and represent it themselves.

Meanwhile, Weber (2020) interprets data visualization in news reporting as more than just storytelling and data visualization that requires audience exploration and composition. Visualization of data in news reporting also requires the collaboration of telling and showing activities or "telling while showing," which focuses on how events are presented in a narrative (Weber, 2020). According to Weber (2020), both the presence of a narrator (news writer) and exploration activities by the audience are equally essential. It allows a communication process to occur where the narrator conveys events through data visualization and narration, which is then captured by the audience with various perspectives resulting from ergodic work. This collaborative process is a narrative technique analogous to a "martini glass." First, the narrator, who linearly narrates the events, describes the glass's stem as a telling technique. Then, it was followed by the opening mouth of the glass describing the showing technique by offering space for data exploration for the audience and letting them generate their perception. After that, the telling technique takes over, in which the narrator returns to control the story after allowing the audience to explore the data on their own (Weber, 2020).

METHODS

This study uses the Sequential Explanatory Design method. The method combines quantitative research methods in the first stage and then is followed by qualitative data analysis in the second stage to strengthen the results in the first stage.

In the first stage, the researcher used the quantitative content analysis research method (visual content analysis) on the infographics presented on Katadata.co.id from January-March 2021. Content analysis is a research technique to conclude by identifying specific characteristics of a message individually objective and systematic (frequency of appearance of content characteristics) (Holsti, 1969; Nasrullah, 2014). At this stage, the researcher and two coders coded the visual content to find patterns of data visualization used in the Data Journalism rubric on Katadata.co.id media (indicators: static graphic information, non-interactive data visualization, and visualization of dynamic interactive data).

After all, the researcher completes the results of the first stage by carrying out a descriptive case study strategy, including analysis of semantic data and data interpretation of several Katadata.co.id infographics which display interactive and non-interactive data visualizations through a multimodal perspective and the narrative technique "martini glass" in an interactive way deeply.

This research will analyze 49 news headlines regarding COVID-19 vaccines and vaccinations in the Data Journalism rubric of the Katadata.co.id media for the January-March 2021 period. The data samples were taken using a keyword sampling technique. Some articles do not directly mention the title of the Covid-19 vaccine or vaccination, but the articles contain information related to the Covid-19 vaccination. The period chosen was the beginning of the appearance of news regarding Indonesia's COVID-19 vaccines and vaccinations in the media.

RESULTS AND DISCUSSION

The rapid development of scientific knowledge and the practice of journalism needs to be balanced with research related to the latest journalism. In terms of using data visualization, it has become a new way to do journalistic work that involves transparency (Engebretsen & Kennedy, 2020). However, most of the respondents in his research on 60 media editorials and newsroom leaders still think that data visualization only emphasizes the news angle and is considered a formation or framing from a news perspective. Thus, in this context, data visualization is interpreted as having the potential to provide a "false quality of objectivity." Meanwhile, in data journalism, Katadata.co.id uses data visualization to simplify complex issues or information without losing its essence and making it easy for the public to understand (Tentang Katadata, 2012). The purpose of Katadata.co.id is in line with Kirk (2016), that data visualization is created to 'facilitate understanding' and carry out the function of persuasion (Kirk, 2016).

In terms of the identification of data visualization types (Bateman, 2017), Katadata.co.id implements three types of data visualization, which are as follows: static information graphs, non-interactive dynamic data visualizations, and interactive dynamic data visualizations. For example, in the January-March 2021 period, out of 49 titles of journalistic products on the "data journalism" channel, there were 37 static information graphs and 12 data analyses leaning to be a dynamic non-interactive and interactive data visualization type. This means that Katadata.co.id tends to communicate more information related to Covid-19 vaccines and vaccinations to the audience through static infographics than using dynamic, interactive, and non-interactive data visualizations.

Static Information Graph

If (Bateman, 2017) unspecifically debates whether infographics are part of data visualization, Kennedy and Allen mention that graphic information or infographics are only sometimes data visualizations(Kennedy & Allen, 2016). According to them, some infographics only sometimes contain numeric data. For example, from January to March 2021, the Data Journalism channel of Katadata.co.id produced 37 infographics discussing vaccines and Covid-19 vaccinations. Of those, 23 infographics were accompanied by numerical data (62.16%), while the infographics that were not accompanied by numerical data or only contained qualitative information were only 14 (37.84%). The infographics that only contained qualitative information were sponsored infographics labeled "Ingat Pesan Ibu" (Remember Mother's Message).

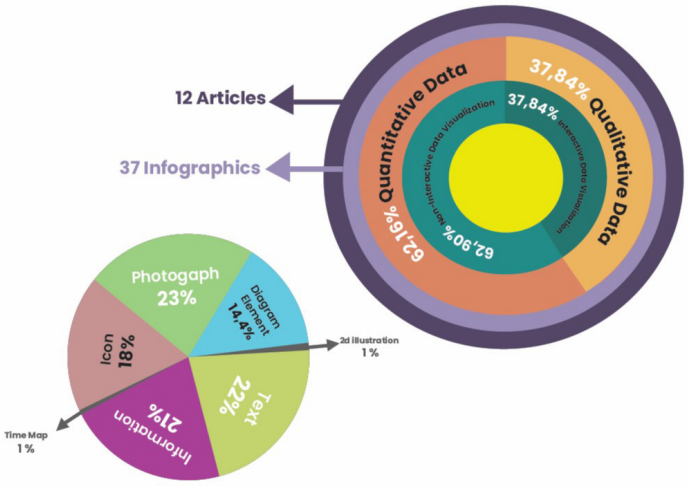

Figure 1. Composition of data visualization in infographics on Covid-19 news on *Katadata.co.id* media during January-March 2021

According to the observations, in practice, *Katadata.co.id* still categorizes infographics that only contain written information or qualitative data as part of the Data Journalism channel. The most dominating elements in infographics related to vaccine and vaccination information were photography (23%) and writing or written information (22%). Meanwhile, the infographics used by them inclined to at least employ two-dimensional illustrations and timelines. A timeline was only found in the article '*Lamanya Waktu Penemuan Vaksin Flu*' (The Time Needed to Discover the Flu Vaccine) which presented the development time of the 8 types of flu vaccine in the world.

In terms of presenting infographics, the audiences of *Katadata.co.id* were more involved in composition work within the framework of ergodic work, which is eye-tracking activities in producing visual perspectives and selective interpretation of news containing text, images, and others. As a result, *Katadata.co.id* published more infographics on vaccines and vaccinations than the "Data Analysis" during January-March 2021 resulting in good audience engagement, primarily through their Instagram.

Dynamic Interactive and Non-Interactive

The data journalism channel does not only consist of infographics but also data analysis articles with visualizations. In this rubric, data analysis presents writing using data-based narrative and storytelling techniques. There were 12 articles of data analysis related to vaccines and vaccinations from January-March 2021. In those 12 articles, there were 62 diagrams/graphs. The most dominating was the data of diagrams/graphs as non-interactive data visualization, which were 39 diagrams/graphs (62.90%). The charts consisted of bar charts which were dominant at 73%, line charts, pie charts, timeline charts, and mixes. Meanwhile, the remaining 23 diagrams/graphs (37.09%) of data visualization were done interactively with the most use of bar charts (74%). In other words, *Katadata.co.id* presents narratives of articles based on data statically rather than interactively by utilizing data visualization tools such as Flourish and Amchart.

Katadata.co.id employs static, dynamic interactive, and non-interactive graphic data visualization to optimize audience engagement. They knew the importance of arousing the audience's emotions on a crucial issue such as vaccination. As noted (Kennedy & Hill, 2018), data visualization various feelings in the people involved, including the audience. Feelings are evoked through visualizing textual content, experiences, or phenomena relevant to the audience and other psycho-social situations. These feelings will develop emotions, whereas without emotions, one's ability to make decisions will be hindered (Damasio, 2006).

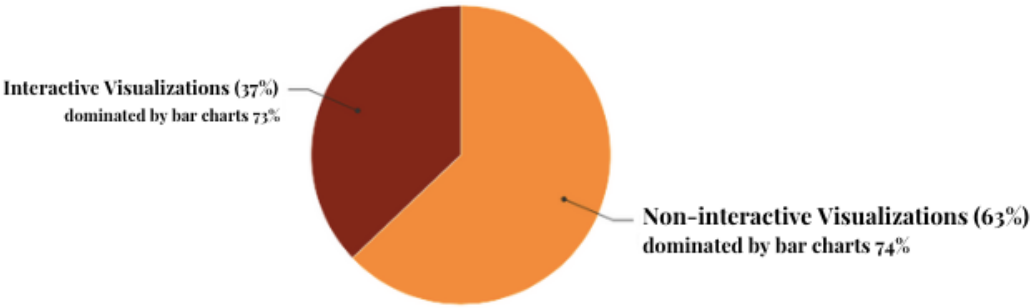

Figure 2. Percentage of interactive and non-interactive data visualization in the rubric "Analisis Data" on media *katadata.co.id* January-March 2021

Show and Tell: Audience Engagement

Another factor that can determine the success of a data visualization in news reporting is the convenience given to the audience in navigating it through data visualization (de Haan et al., 2018). Although mostly publishing infographics on vaccine and vaccination issues, *Katadata.co.id* also involved the audience through 23 diagrams/graphs as an interactive dynamic data visualization in 12 'Data Analysis' articles. The audience is made not only to do ergodic work at the composition stage but also asked to independently explore or navigate the data presented by the narrator (news writer). For example, in the Data Analysis article entitled 'Waspadai Gelombang Ketiga Pandemi dari Varian Baru Covid-19' (Beware of the Third Wave of Pandemic from the New Variant of Covid-19), the audience was asked to navigate themselves to the data presented. For example, in the bar graph of the data entitled 'Jumlah Orang Sudah Divaksin Covid-19 di Indonesia' (The Number of Covid-19 Vaccinated People in Indonesia), the audience could independently choose whether they prefer to see data on the first dose, the second one, or both. The audience could also navigate to the graph of '*Persentase Rata-rata Kepatuhan terhadap Protokol Kesehatan*' (The Average Percentage of Compliance with the Health Protocols) data, where they could choose one of the data from the health protocol indicators, which were 'wearing a mask' and 'physical distancing'. If the audience clicks on the option 'wearing a mask', then Jambi was the top region that was most compliant with the health protocols. Whereas, if the audience clicks on 'physical distancing', then Bali appeared as the top region that adhered to the health protocol the most.

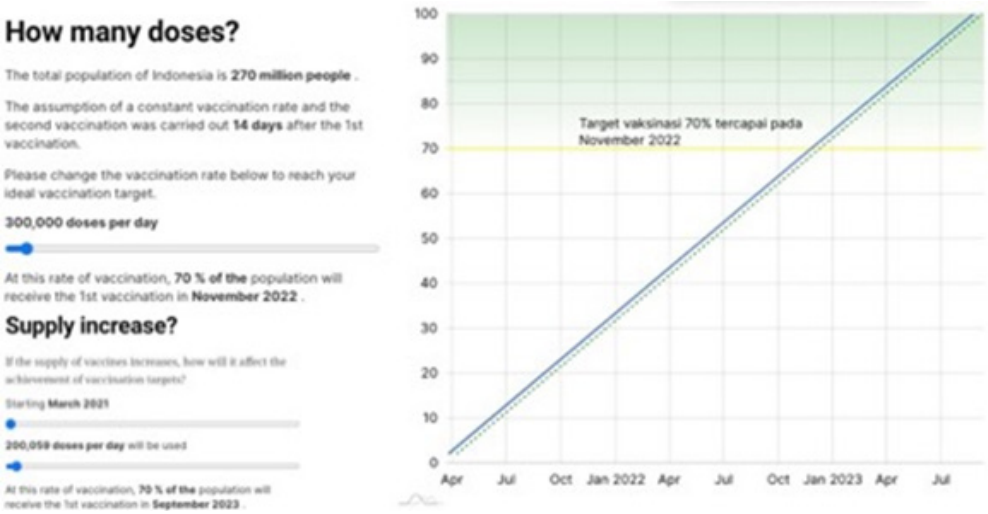

Figure 3. The interactive graph in the article '*Sulitnya Mencapai Herd Immunity*' (How Hard It Is to Achieve Herd Immunity).

Source: *Katadata.co.id*, 2021

In the same way, it applies to the article '*Sulitnya Mencapai Herd Immunity*' (How Hard It Is to Achieve Herd Immunity) (**Figure 3**). The audience was invited to predict the vaccination target that Indonesia will achieve in 2022 if the vaccine doses and supply are increased. They were asked to choose how many vaccine doses to be injected into the Indonesian population to predict the vaccination target. The larger the vaccination dose they choose, the faster the Indonesian vaccination target will be achieved. The audience was also requested to select the number of vaccine supplies to see when Herd Immunity is achieved. The more supply of vaccines, the faster Herd Immunity is achieved. It has become a unique way to open horizons and make the audience aware of how important it is for people to vaccinate during a pandemic.

Show and Tell: Martini-Glass Model

In the Journalism Academics of Temple University, Meredith Broussard mentioned data journalism as finding stories in numbers and using numbers to tell stories (Howard, 2014). Storytelling skills are the main feature that a data journalist needs to improve. For Broussard (Howard, 2014), data is socially constructed and is not something that cannot be changed or independent of certain people. Data journalists need to understand the intention of the data maker in telling the story behind the data in journalistic writings to be conveyed to the audience.

However, more than telling itself is needed in the narrative technique. To increase audience engagement, it is necessary to have a showing model to allow the audience to be involved and witness a story for themselves (Weber, 2020). As distinguished by Weber, narrative techniques with a telling model tend to be characterized as follows: creating distance between the audience and events; mediating more (due to the presence of a narrator/writer); telling fewer things; having less dialogue with the audience; containing comments or subjective evaluations by the narrator/writer; only focusing on the summary of the story, the meaning, and moral of the story which is explained explicitly. From the audience's perspective, they will only narrate the story being told.

Meanwhile, the showing model provides the illusion for the audience as if they were in the event and close to it (because there is no intervention from the narrator/writer). The information is more detailed, focuses on the atmosphere, rarely takes sides, and has high objectivity (because it is purely the result of the audience's interpretation). In addition, not only does the audience obtain the story, but it is as if they witness the story's events because of the high interactivity (Weber, 2020).

In increasing audience engagement, the channel of Data Journalism of *Katadata.co.id* does not only the telling model but also the showing model. The combination of the two models in the narrative technique is known as the author-driven and audience-driven techniques (Segel & Heer, 2010).

In an author-driven context, writers encourage the audience to read the story and data according to what they narrated (linear), with heavy messages, and minimal interaction. Meanwhile, in an audience-driven context, a writer reads data without leading the audience to particular messages. It also tends to be free and has high interaction. The writers are asked to prove how events occurred (Segel & Heer, 2010; Weber, 2020). The combination of narrative techniques is reinforced as a modified model of the Martini-Glass Structure (**Figure 3**), which describes the work combination of a narrator and the audience in a data and data visualization-based news article.

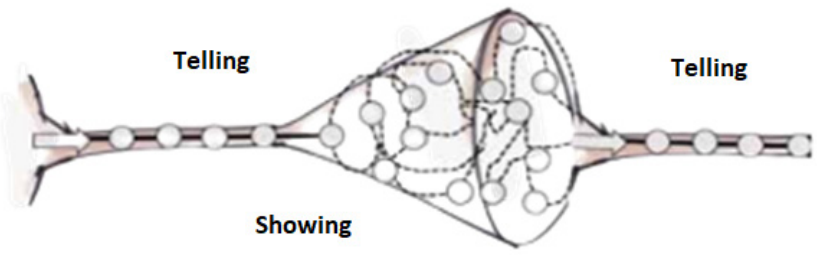

Figure 3. Modification of the Martini-Glass Structure

Source: Weber, 2017

The Model

'*Sulitnya Mencapai Herd Immunity*' (How Hard It Is to Achieve Herd Immunity), a special edition for one year of the pandemic in Indonesia, is a combination of the two techniques of the Martini-Glass model, which are telling, showing, and telling. Firstly, the glass stem is described as the presence of a narrator, writer, or journalist to control the data set, tell a story linearly, include bias or subjectivity, and provide a summary of an event based on data from the narrator's point of view. At the beginning of the article, the narrator conveyed the narrative of the Indonesian government ordering vaccines from time to time. She also emphasized the vaccination target for 182 million or about 70% of the Indonesian people.

Furthermore, the showing model is marked by the glass mouth, where data visualization appears to provide space and invites the audience to explore information through the presented data. In this article, the audience was given the space to explore sets of data regarding the link between the amount of vaccine supply and the speed at which herd immunity could be achieved. The writer lets the audience feel as if they were very close and in amid events that occur, thus making them not take sides (Weber, 2020). The article also shows the presence of a journalist as a narrator through the provision of titles, descriptions or captions, and labels on graphs the audience can explore. The journalist, as the narrator, also appears on the information display in the form of text or images when the audience moves the cursor (tooltip).

Although the narrator's presence is visible, the core activity in this phase is an exploration by the audience. The journalist, as the narrator, only provides control over the data explored by the audience. For example, when they choose a vaccine dose of 300,000 doses per day, the narrator would show that 70% of the population would receive the first vaccination by November 2022. Sometimes, in a showing model, the narrators are not only coming from journalists but also programmers who carry out coding as well as designers who help the audience simplify the content for observation and exploration of data visualization (Weber, 2020).

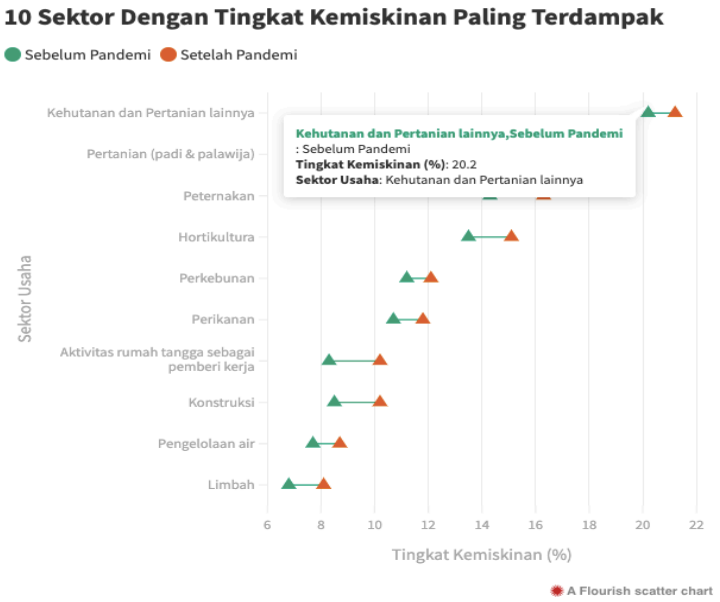

Figure 4. The graph in the article 'Pandemic, the Momentum of Transformation to a Green Economy'

Source: Katadata.co.id, 2021

In the final phase, the narrator returned to the telling model to take control of the audience over the

article. The narrator brought back the narrative stating that the government needs to keep increasing the number of vaccine injections daily. The presence of the narrator was also seen in sentences that indicate taking a side such as '*terkait dengan program vaksinasi nasional ini, perlu adanya percepatan penyuntikan tiap harinya*' (related to this national vaccination program, there needs to be an acceleration of daily injection)' or in the sentence '*Pada bulan Januari-Februari, rata-rata suntikan vaksinasi Covid-19 per hari sekitar 40 ribu. Jumlah ini cenderung meningkat seiring dengan jumlah kedatangan dosis vaksin*' (In January-February, the average Covid-19 vaccination injection per day was around 40 thousand. This number inclined to increase as the number of vaccine doses arrived).

Elements of Narrative Technique

Elements of a good narrative technique are needed to complete the data visualization and narrative formed in each data journalism product. In addition to the presence of a narrator element (which consists of journalists or programmers and designers), other elements needed to indicate the implementation of narrative techniques in data visualization-based reporting are elements of sequence or sequentiality, temporal dimension, and tellability. As for the sequentiality method, *Katadata.co.id* mainly uses the scroll method which is the up and down scroll modes. In the article '*Sulitnya Mencapai Herd Immunity*' (How Hard It Is to Achieve Herd Immunity), the dramatic effect was shown by scrolling down the news page. While scrolling, the audience can see interactive graphs of '*berapa banyak dosis?*' (how many doses are there?), '*kapasitas vaksinasi saat ini*', (the current vaccination capacity), and '*pasokan bertambah?*' (is the supply increasing?). Another article related to vaccinations and pandemics, '*Pandemi, Momentum Transformasi ke Ekonomi Hijau*' (Pandemic, the Momentum of Transformation to a Green Economy), used a narrative scrolling technique in showing examples of green bonds and green *sukuk* from year to year as an alternative to economic recovery during the Covid-19 pandemic.

Sequence marking using the navigation bar is also implemented in the article, for example, in the graph of the most affected sectors during the pandemic, allowing the audience to click on the 'before the pandemic' and 'after the pandemic' buttons to see the sequence of events. Notwithstanding having implemented this technique, news coverage of vaccination issues on *Katadata.co.id* during January-March 2021 still did not use various sequentiality techniques such as animated transitions, steppers, the use of 'click' or 'continue' instructions, or transitions using models of changing colors or shapes that signal a change in order. In addition to sequentiality, another element used in a number of interactive data visualizations related to the Covid-19 vaccine and vaccination news is the visualization that can describe changes in circumstances from time to time.

The presence of signs such as arrows, changes marked by color, text descriptions, and other cues can also be a factor in the success of a data visualization in news reporting (de Haan et al., 2018). Espeland & Sauder mention the importance of explanatory text in visualization so that it is not multi-interpreted and free-floating from the original context as a combination of numbers and images "in the wild" (Bounegru & Gray, 2021). In the article '*Pandemi, Momentum Transformasi ke Ekonomi Hijau*' (Pandemic, the Momentum of Transformation to a Green Economy) (**Figure 4**), there was a line graph showing a change in value. In this context, the visualization is marked with a line on the graph showing the increase in poverty levels before and after the pandemic for people working in 10 sectors affected by the Covid-19 pandemic (**Figure 4**). Likewise, in the graphs of the article '*Gerak Lambat Vaksinasi Covid-19 di Indonesia, Kapan Selesainya?*' (The Slow Progress of the Covid-19 Vaccination in Indonesia, When Will It End?), some lines indicate an increase in the vaccination rate in the achievement scenario of Covid-19 vaccination in Indonesia. The dash dominated the marking of changes in circumstances from time to time in 12 articles related to vaccines and Covid-19 vaccinations that have dynamic data visualization.

The last element of a narrative technique most essential in journalistic products is news value. In making a piece of news, there are several newsworthy conditions. At least one must be fulfilled in conveying a piece of story news; thus journalistic products, including data journalism, provide meaning and influence for their audience. Some requirements include elite power, bad news, good news, news that has an impact or involves many people, and news that is relevant to community issues (Caple & Bednarek, 2016; Harcup & O'Neill, 2017).

Data journalism articles during January-March 2021 that discussed vaccines and vaccinations for Covid-19 during the pandemic meet several requirements to be newsworthy. The most visible requirement is that data journalism-based news has a significant impact and involves many people, especially the Indonesian people. In addition, the news should be relevant to the condition of the people surrounded by the Covid-19 pandemic. Another important thing is that the news alludes to the plans of public officials with elite power in Indonesia. These values make data journalism-based news reporting related to vaccination important to be broadcast by the media.

Journalism is valuable when it deepens people's understanding of their world, country, region, city, or environment (Meijer, 2021). The elements of narrative techniques are accompanied by an attitude of prioritizing audience engagement in each implemented article. Consequently, the audience can immediately imagine the worst possibility if the Indonesian people do not support the Covid-19 vaccination program due to being exposed to too much misinformation about the vaccine.

CONCLUSION

As a data journalism-based media, *Katadata.co.id* implementing the engagement of their audience through data visualization on articles related to vaccines and covid-19 vaccinations in Indonesia, as identified by Bateman. They mainly employed infographics (37 articles or around 75.5%) to engage the audience through compositional activities. In communicating the news, *Katadata.co.id* allows the audience to do eye-tracking to generate visual perspectives and selective interpretations of the Covid-19 vaccine and vaccination infographics.

The most involvement that the audience can feel is the exploration activity of 12 articles equipped with interactive and non-interactive dynamic data visualization (30.7%). In telling mode, the presence of a narrator (journalist) leads the audience to obey the content of the writing and the direction of the message in writing, followed by the showing model, in which the audience is asked to explore the data presented through visualization on their own. The expectation is that they would feel very close to the event and be closely involved. After that process, the narrator (journalist/programmer/designer) regains control over the audience to straighten the message in the news.

As a complement to data visualization, the narration built by the narrator is presented by applying several elements of narrative techniques, which are as follows: presenting a narrator as a journalist/programmer/designer; providing a marker of the sequence of events with page scrolling techniques, signs or cues in the form of arrows; displaying text information that will change when the cursor shifts (tooltip); and providing the element of tellability where each narrated data journalism product needs to have news value or is newsworthy.

In this context, the news contained on the Data Journalism channel during January-March 2021 regarding vaccines and vaccinations for Covid-19 is worth reporting because it is very relevant and concerns the lives of Indonesian people who are shackled by the pandemic. Although it has involved essential elements in narrative techniques, *Katadata.co.id* still needs to be more varied in using cues, signs, and sequentiality techniques. However, at the very least, the efforts to involve the audience through data visualization can serve as literacy for them regarding the importance of the Covid-19 vaccination as an effort to protect themselves and reduce the number of victims during the pandemic. The value presented in the news makes data journalism-based news important for media broadcasts to deepen readers' understanding of emergency issues. By involving readers in every visualization on *katadata.co.id* media, it is assumed that readers are highly aware of looking for simple but valuable information according to data and actual. That fact follows the vision of *Katadata.co.id*, namely trying to simplify complex issues without losing essence "Simplicity is the Ultimate Sophistication."

The novelty of this study is that it completes the analysis of previous studies, especially on the media in Indonesia, which still need to be expanded to quantification or categorization of the use of data journalism graphic types. In addition, this research has described how the media *katadata.co.id* communicates disaster information by involving its readers through various data visualizations and letting readers choose their data on what segments are needed.

The limitation of this study is that information on vaccination in the *Katadata.co.id* media is still running until the completion of the research, thus, several data journalism products have yet to be studied. This study has yet to compare several data journalism-based media in Indonesia. Further study can complement this research by participating in examining several media that claim to be based on data journalism.

ACKNOWLEDGEMENT

The author would like to thank the Institute for Research and Community Service (LPPM) UPN "Veteran" Yogyakarta which has provided funding support in completing this research.

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