Detroit water shutoff: The dynamics of intermedia agenda setting

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Abstract. There are competing hypotheses in examine the flow of agenda setting between Twitter and traditional media, from the reversed agenda setting where Twitter is conceptualized as public, and the dynamic flow of intermedia agenda setting where Twitter is seen as media. This study analyzed the transfer of the first level agenda between Google Trends as the proxy to the public agenda, Twitter as social media agenda and traditional local media in the context of Detroit Water Shutoff by using time series analysis. This study reveals that on the first level agenda, the online public agenda could create the social media agenda and in turn influenced the traditional media agenda with no reciprocity. The findings contribute to the larger debates on the definition of the public agenda and intermedia agenda setting in the era of democratization of the news.

1. Introduction
The explosion of social media make public who was usually positioned as the passive audience became more active and allowed themselves produce messages in the many-to-many online platform. For agenda-setting theory, this changing landscape of mass communication challenges the assumption of the transfer of issues from mass media to the public. Now, public have more power to set their own media agenda because they produce their own messages. Scholars suggested that the core assumption of agenda setting theory will transform from what agenda media make public to think about to what issue public express to media they want to talk about [1].

Several scholars proposed a new paradigm for agenda setting theory by claiming there is a reverse agenda setting based on ability of the public to create an agenda through social media and influence traditional mass media agenda [2], [3]. However, the notion of reversed agenda setting was rejected because what is appear in social media is not equivalent with public agenda [4]. Social media is a new media, as strange as it is from our references about mass media. Moreover, the unit analysis in social media data is usually the frequency message and not an individual as the member of public [5]. If social media possible to transfer their agenda to mass media, it will be an intermedia agenda setting and not a reversed agenda setting. The dynamics transfer of agenda setting, both issue and attribute salience, between social media, search engine use, and mass media were demonstrated by several scholars [6]-[10].

This study tries to examine the dynamic flows of intermedia agenda setting in an unobtrusive and event centered issue such as Detroit Water Shutoff by analyzing the transfer of issue salience between Google search, Twitter, and local mass media. Moreover, this study also examines the dynamic of transfer of attribute salience between twitter and local mass media. The Detroit water shutoff is an
event based, different from issue-based agenda or hot-button issue such as abortion, gun control, and gay marriage, which might trigger spikes in social media conversations while low coverage in traditional media outlets [11]. The timing of Detroit Water Shutoff was also near to the Midterm election that made the issue more salience for the public agenda. This study uses online search data as actual public salience, Twitter as social media agenda and seeks the intermediary agenda between Twitter, Google Trends index, and local traditional media to examine competing hypothesis of intermediary agenda setting.

2. Intermedia and reversed agenda setting

2.1. From agenda setting to intermedia agenda setting

In its maturity, agenda setting must face the challenge of the fast-changing landscape of media and communications technology. There were many predictions on the endurance of agenda setting in a new media landscape. Some researchers posed the problem of multiplication of news outlets in an online environment and the lack of salience cues in online news might create fragmentation and diminishing the power of agenda setting [12], [13]. While other researchers emphasized the differences of the new media from traditional media, namely, ability to absorb huge contents, become alternatives and interactivity, to point out the withering power of agenda setting effects [3].

Some researchers further pushed the boundary of agenda setting by proposing that ordinary citizens are able to set the media agenda in the Internet-mediated agenda or the reversed agenda setting [2], [3]. According to them, the process of internet-mediated agenda setting starts with an agenda-rippling stage when the citizen opinions in online channels spread fast and have great influence in the Internet or become major agenda in the blogosphere. The second stage is the opinions further influence the Internet news site and portals. The last stage is when the reversed agenda setting happened, which is the opinions in online settings become public agenda with the help from traditional news outlets [3]. However, they claimed that some internet-mediated agenda setting would have a different order. It can be started from traditional media coverage before become a trend in online media and in turn re-emerges as a major agenda or it is possible to go through all the stages instantaneously [3].

Some scholars also used the term reverse agenda setting to signify the ability of the public to set the media agenda [14]. They argued that the web 2.0 world, the audience can be easily monitored and, therefore, the vocal online voices can influence the media agenda. In other words, the Web 2.0 would democratize news creation and agenda-setting theory would transform from media told public what to think about to public tell media what they want to talk about [1]. Scholars found in their analysis that the first level agenda building be slowly than reverse agenda setting as search-led impact [14]. All of studies using reversed agenda setting hypothesis demonstrated that online search behavior and social media can influence the evolution of agenda setting effect by put into account the ability of citizens to disseminate their opinions and selecting their news preferences by using a search engine and the news are used by journalists or traditional mass media as agenda building factors.

To answer the challenges from scholars, the creators of agenda setting theory claimed that agenda setting theory still has the explanatory power of the new media saturated world by proposing the intermediary agenda setting and agendamelding as the evolution to adapt the new media landscape [4]. The intermediary agenda setting is part of agenda building to explain the instances when the media agenda is shaped by the other media [15]. They first dismissed the notion that social media agenda is public agenda by presenting the proportions of social media users in the US populations and the fact that it analysis of social media is the message not individual [4]. Furthermore, they elaborated three subsets of social media agenda: (1) hot button issues such as homosexual marriage, abortion, and gun control that spark conversation in social media with little contribution from the news media agenda, (2) event-based issue in social media when citizens reported live the events that become trends in the online world, and (3) the monitoring of social media by traditional mass media organizations that influence the media agenda in continuing news coverage [4]. In the third subset, a social media agenda is consisted from a two-stages transfer of issue and attribution salience processes. The first is when mass media transfer issue and attribution to the public agenda. And the second process is when the public agenda subsequently inspire the news media agenda using social media networks [16], [17].
2.2. Twitter, online search, and agenda setting

Besides the controversy of reverse agenda setting, some researcher found that different level agenda setting [7], different topic and social media [6], different ideological stance [8], different event and social media [9] have diverse intermedia flows from online media to mass media and vice versa. However, there is a lack of research of intermedia agenda setting between Twitter or microblogging platform with online search behavior and traditional local media.

A study found that tweets from political leaders were used by journalists in ways that suggest first and second-level agenda building [18]. Another study demonstrated a complex and dynamic intermedia agenda setting in a big data analysis between Twitter and other social media also with traditional media [9]. Some scholars analyzed the issue and event in Twitter compared to traditional media, which suggested that traditional media as a predictor of Twitter in all issues and event, however, they also proposed that Twitter reflects the evolution of the event becomes an issue [19]. [6] found that Twitter sets the traditional media agenda in cultural issue and almost do the same in political coverage. Some scholars found agenda building function of Twitter in nation accidents in China, however, the authors also counted the censorship of China government as contributing factor in the result [20].

Online search data had been used to capture public interest online [14], [21]-[23]. It provides a non-obtrusive measure and also is not affected by questions and responses as that usually found in the traditional self-reported survey [24]. Compared with the survey on public opinion, online search data was more represented actual salience by indicating the public’s motivation for seeking information about the particular issue [14]. The evidence from researches on online search data demonstrated that there are reciprocal processes in intermedia agenda setting between mainstream media agenda and online search behavior [22], [23]. The online search behavior was also proved leading the media agenda in the earlier stages whereas the reversed impact builds more slowly [14]. However, the dynamics of online search agenda and social media agenda had not been sufficiently studied.

Because there is no conclusive finding from previous researches on reversed or intermedia agenda setting between Twitter, traditional media, and public agenda, which represented by online search behaviour, this research proposed a research questions: [RQ1] How did the flow of the first-level intermedia agenda setting between Twitter, local traditional media outlets, and Google search in the Detroit water Shutoff?

3. Method

To analyze the intermedia agenda setting on the Detroit Water Shutoff, this study examined Google Trends index, Tweets that available publicly, and two local media in Detroit, namely Detroit Free Press and Channel 4 local news. The Detroit Free Press is one of the oldest newspapers and has the largest circulation in the Detroit area. The local TV shared 32% news consumers with Twitter and Twitter is second after Reddit in the percentage of users who ever get news on the site [25].

The Detroit Water Shutoff coverage in news began on March 21, 2014 when the news by Associated Press was published in almost all networks in local and national then followed by the tweets on the event. Content analysis of tweets and news was purposefully selected based on sub-events within the Detroit Water Shutoff topic. The search index represents search online behavior, which in this research become a proxy for the agenda setting time span [14]. From the Google Trends, “Detroit” or “Detroit water” as the keyword, the peak of search in google for Detroit water was in the last week of July 2014. The search index’s lowest point after the peak was on the second week of September 2014, thus become the end of the time period for analysis.

The articles from the Detroit Free Press were obtained from ProQuest database, using the keyword of Detroit water shut off or crisis or cut or off or off or off or s result in 72 articles. The data from Channel 4 local news were acquired from the website of the TV station with 77 news related with Detroit water shutoff. The data from both news outlets, 149 news coverage from the local media, were aggregated for further analysis.

Google Trends was used as the source of online search behavior, with the keyword “Detroit water” from March 2014 to September 2014 and US only as the regional interest. Ragas et al. (2014)
demonstrated that the aggregated online search data from Hitwise and from Google Trends were almost perfectly correlated. Therefore, the use of Google Trends as single source data on online search behavior was sufficient. Twitter data was obtained from Twitter search feature, using the keyword “Detroit water shut OR off OR crisis OR service OR cut”, resulted in 36,560 tweets. The tweet data were cleaned from RT and non-English language tweets. All of the data were structured in a frequency for each week as the unit of time series analysis (N=29).

To detect the flows of issue salience on the Google Trends, Twitter, and local media, a correlation analysis, and Granger causality analysis was employed. Granger causality that included in the vector autoregression (VAR) framework was used to analyze multi-directional relationship while there is less certainty about the nature of the relationship [26]. The lag time used in the time series analysis were up to five weeks lags, which was in accordance with previous research [14].

Figure 1: Detroit water shutoff’s issue salience index of frequency. The horizontal axis represents the weeks and the vertical axis represents index of frequency from Google Trends, Twitter, and media coverage. For the data presentation, the Twitter and Media data were scaled and corrected.

4. Results and Discussions

The trend of online search behavior, tweets, and news coverage in the local media were presented in the Figure 1. The spikes in search behavior and Twitter were almost parallel in the initial stages of the Detroit water shutoff issue. They started to build up in the mid of June 2014 when the tweet about the plea from the activist to the United Nations became viral. The Google search and Twitter had two peaks, the first was about the plea from the activist to the United Nations and the second was about the rally at the Detroit to protest the water shutoff. Media, on the other hand, had different patterns of rising and fall except in the week 18 when the rally dominated at the Detroit to protest the water shut off all the data series.

For the analysis, this study used non-indexed and non-corrected data. The correlation analysis showed that search behavior, Twitter, and local media news coverage received a robust support. The correlation between search behavior and Twitter was the highest ($r = 0.89$, $p < 0.001$) while the correlations between search behavior and local media was slightly higher ($r = 0.64$, $p < 0.001$) than the correlations between Twitter and local media ($r = 0.61$, $p < 0.001$). However, these correlations only gave general linkage between issue salience in the search behavior, Twitter, and local media agenda.

To assess the flow of intermedia agenda in the Detroit water shutoff, Granger causality analysis of up to five weeks lag were employed. The result of Granger causality analysis can be found in Table 1. There was a consistent flow of issue salience from Google search to the local media with the highest impact was on the two-weeks lag ($F(2, 28) = 14.08$, $p < 0.000$). However, the reciprocal effect could not be found in the local media agenda in relation with Google search in all time lags. The relations between Google search and Twitter were only one-sided. The flow of issue salience from Twitter to Google search could not be found, while Google search was slightly significant Granger caused Twitter at the second week lag ($F(2, 28) = 3.41$, $p = .05$). There were no effects on the rest of the lag
from Google search to Twitter. Twitter influenced local media agenda only from second-week lag \( F(2, 28) = 6.04, p = .008 \) until the rest of five-week lags. The local media did not cause the Twitter issue salience in any week lag.

| Table 1. Granger causality test for the first level intermedia agenda setting |
|--------------|--------------|--------------|--------------|--------------|
| Lag 1        | Lag 2        | Lag 3        | Lag 4        | Lag 5        |
| Google → Twitter | 3.49*         | 3.41*         | 2.02         | 1.38         | 0.83         |
| Google → Media   | 12.85***      | 14.08***      | 6.98**       | 7.53**       | 6.61         |
| Twitter → Media   | 2.73          | 6.04**        | 4.62*        | 4.93**       | 6.61         |
| Twitter → Google  | .01           | .14           | .46          | .63          | .46          |
| Media → Google    | .00           | 1.70          | 1.62         | 1.29         | .66          |
| Media → Twitter   | .98           | .84           | .63          | 1.51         | .02          |

* symbol “\( \rightarrow \)” means Granger cause.

The F-statistic for each test is reported with + p< .10, * p< .05, ** p< .01, *** p< .001.

In answering the research question about the flow of issue salience, the result discovered that issue salience from the search behavior went to Twitter and local media. Twitter agenda affected local media agenda, while there is no reciprocity from local media to the online search behavior and Twitter. In other words, online public agenda influence social media agenda and lead to the local media agenda.

5. Conclusions

This study examines the competing hypotheses of intermedia agenda setting by tracking online search behavior on the Detroit water shutoff as linked to the Twitter and local media news coverage during 29 weeks from the trigger event. The Granger causality analysis provides a test to determine whether online public agenda represented by online search behavior causes social media agenda and local media agenda. The study also examined the reciprocal intermedia agenda setting between online public agenda, social media agenda, and local media agenda.

The research question asked the flow of intermedia agenda setting between Google Trends, Twitter, and local media agenda. From the 6 possible flows of the agenda, the primary finding from the study was that in an unobtrusive event, the social media agenda can influence the traditional media agenda. This finding is in line with the results from other studies [2], [3]. The study also found that there was no reciprocity up until five-week lag, an assumption that media agenda will slowly build over time and influence the public agenda, both from local media agenda to the social media agenda and from social media agenda to the online public agenda. It is different from the previous studies’ findings [9], [14]. One of the possible explanations for the result is that the local media agenda in this event lost the ownership of the issue while the events became national or international issue. The other explanation is that the limited sampling of local media agenda created deflated frequency and issues of news coverage about the event. Rivaling with the online public media and social media agenda that have more diverse views and sources, the local media agenda, particularly newspaper, only mirrored the agenda of city council [27]. This view also supported from the framing analysis of the local media news coverage and the tweets, where 19.46% of tweets from local media covered the regional water deal issue compared with only .07% on the Twitter.

In an effort to examine the competing hypotheses between reversed and intermedia agenda setting, this study also extended the previous research on the intermedia agenda setting by using not only one of the online agendas, as the public expressions or actual salience, but employs online search behavior as public agenda and Twitter as a social media agenda. The real problem for claiming that the reversed agenda setting was happened on the Detroit water shutoff is that the news from the AP about water shutoff and from the Al Jazeera about UN interventions, that triggered the peaks in Twitter and Google search. The detailed analysis on the several issues within event on Twitter also showed that the human rights and UN interventions frame as the dominant issue within the Twitter was triggered by the blog posts from activists and institutions. The interconnectedness of agenda in the online sphere [9] also adds consideration for not generalizing the findings from this study to confirm the reversed
agenda setting hypothesis. The other explanation is that searching online and sending the tweets do not need carefule thought and immediate with the benefit of ubiquitous mobile phone or other digital gadgets [19].

The other problem about the competing hypotheses is the definition of the public agenda. The authors of agenda setting theory reject the notion that Twitter is a public agenda while there is no conclusive definition about online search behavior. Therefore, the interpretation of the study that using online search pattern or social media in the issues of intermedia or reversed agenda setting are hard if not possible to be resolved.

5.1. Limitations
The first limitation in this study was the limited sample of the local media agenda. In the event with national or international scale, it is necessary to examine the media agenda from the national and international media or networks to better understand the flow of agenda. From the current study, it found that some of the issues in the event came from national or international media before transferred from the Twitter to the local media. The future research will be conducted with adding more media sources, with the national and international coverage, as the same lower number agenda. By adding national and international media or networks, also can be hoped that the data structure can be constructed into daily lag, which permits the detailed analysis of the lag times.

The dynamic transfer of agenda in the online and social media sphere are also limiting this study to confidently support one of the competing hypotheses. From the detailed analysis of the Twitter, it was found that several important issues as frames were originated from the blog posts. The agenda building in the Twitter also needs to be scrutinized to determine whether Twitter is a public agenda or only slice of it or even the different agenda entity. The further examination of the intermedia agenda setting in the online and social media sphere can be done for the advancement of the agenda setting theory and paradigm in the digital age or in the era of democratization of news.

References
[1] Chaffee SH, Metzger MJ. The End of Mass Communication? Mass Commun Soc. 2001 Nov;4(4):365–79.
[2] Jiang Y. ‘Reversed agenda-setting effects’ in China: Case studies of Weibo trending topics and the effects on state-owned media. China J Int Commun. Routledge; 2014 Jul 3;20(2):168–83.
[3] Kim S-T, Lee Y-H. New Functions of Internet Mediated Agenda-Setting: Agenda-Rippling and Reversed Agenda Setting. Asia Journal Rev. 2007;1(2):3–29.
[4] McCombs ME, Shaw DL, Weaver DH. New Directions in Agenda-Setting Theory and Research. Mass Commun Soc. 2014;17(6):781–802.
[5] Murphy J, Link MW, Childs JH, Tesfaye CL, Dean E, Stern M, et al. Social Media in Public Opinion Research: Executive Summary of the Aapor Task Force on Emerging Technologies in Public Opinion Research. Public Opin Q. 2014 Dec 1;78(4):788–94.
[6] Groshek J, Clough Groshek M. Agenda Trending: Reciprocity and the Predictive Capacity of Social Networking Sites in Intermedia Agenda Setting across Topics over Time. Vol. 1, Media and Communication. 2013 Aug.
[7] Lee B, Lancendorfer KM, Lee KJ. Agenda-setting and the internet: The intermedia influence of internet bulletin boards on newspaper coverage of the 2000 general election in South Korea. Asian J Commun. Taylor & Francis Group; 2005 Mar;15(1):57–71.
[8] Torrez S. Using Time Series Analysis to Measure Intermedia Agenda-Setting Influence in Traditional Media and Political Blog Networks. Journal Mass Commun Q. 2011 Mar;88(1):176–94.
[9] Russell Neuman W, Guggenheim L, Mo Jang S, Bae SY. The Dynamics of Public Attention: Agenda-Setting Theory Meets Big Data. J Commun. 2014 Apr;64(2):193–214.
[10] Sayre B, Bode L, Shah D, Wilcox D, Shah C. Agenda Setting in a Digital Age: Tracking Attention to California Proposition 8 in Social Media, Online News and Conventional News. Policy & Internet. 2010 Jan 18;2(2):7–32.

Retracted
[11] McCombs M. Setting the Agenda: Mass Media and Public Opinion. John Wiley & Sons; 2014. 208 p.
[12] Iyengar S, Hahn KS. Red media, blue media: Evidence of ideological selectivity in media use. J Commun. Wiley/Blackwell (10.1111); 2009 Mar;59(1):19–39.
[13] Takeshita T. Current Critical Problems in Agenda-Setting Research. Int J Public Opinions. 2006 Sep 1;18(3):275–96.
[14] Ragas MW, Tran HL, Martin JA. Media-Induced Or Search-Driven? Journal Stud. 2014 Jul 2;15(1):48–63.
[15] McCombs M. A Look at Agenda-setting: Past, present and future. Journal Stud. 2005;6(4):543–57.
[16] Meraz S. Is there an elite hold? traditional media to social media agenda setting influence in blog networks. J Comput Commun. 2009;14(3):682–707.
[17] Meraz S. The fight for “how to think”: Traditional media, social networks, and issue interpretation. Journalism. 2011;12(1):107–27.
[18] Parmelee JH. The agenda-building function of political tweets. New Media Soc. 2014 May 22;16(3):434–50.
[19] Vargo CJ, Basilia E, Shaw DL. Event versus Issue: Twitter reactions to Major News, A Case Study. In 2015. p. 215–39.
[20] Wu Y, Atkin D, Mou Y, Lin CA, Lau TY. Agenda setting and micro blog use: An analysis of the relationship between Sina Weibo and newspaper agenda in China. Media Soc. 2013;2(2).
[21] Hester JB, Gibson R. The Agenda-Setting Function of National Versus Local Media: A Time-Series Analysis for the Issue of Same-Sex Marriage. Mass Commun Soc. Lawrence Erlbaum Associates, Inc.; 2007 Aug;10(3):299–317.
[22] Ripberger JT. Capturing Curiosity: Using Internet Search Trends to Measure Public Attentiveness. Policy Stud J. 2011;39(3):239–63.
[23] Weeks B, Southwell B. The Symbiosis of News Coverage and Aggregate Online Search Behavior: Obama, Rumors, and Presidential Politics. Mass Commun Soc. 2010 Aug 23;13(4):341–60.
[24] Scharkow M, Vliegenthart R. Measuring the public agenda using search engine queries. Int J Public Opin Res. 2013;23(1):101–3.
[25] Gottfried Jeffrey S. News Use Across Social Media Platforms 2016 | Pew Research Center [Internet]. Pew Research Center. 2016 [cited 2018 May 29]. Available from: http://www.journalism.org/2013/11/14/news-use-across-social-media-platforms/
[26] Vliegenthart R. Moving up. Applying aggregate level time series analysis in the study of media coverage. Qual Quant. 2014;48(5):2427–45.
[27] Weaver D, Elliott SN. Who Sets the Agenda for the Media? a Study of Local Agenda-Building. Journal Qual Stud 2003 Mar 29;38(2):87–94.