Policy Transfer in 140 Characters: Mapping the Arctic Development Network of the Twitterverse[1]

Third International Conference of Public Policy
June 28-30, 2017
Singapore

Jennifer Spence
School of Public Policy and Administration
Carleton University
Ottawa, Canada

Introduction

The world of policymaking has undergone many drastic changes since the early 1990s when the concepts of lesson drawing and policy transfer first gained scholarly attention (Dolowitz & Marsh, 1996; Rose, 1991). The direct transmission of policy ideas from one government to another still remains an important mechanism for policy transfer; however, this traditional method of knowledge exchange now exists within a myriad of other mechanisms. In particular, processes of globalization and the rapid advancement of information and communication technologies (ICTs) have had implications for how policy ideas are transferred and who is involved. A rich network of states, Non-governmental organizations (NGOs), Intergovernmental Organizations (IGOs), corporations, associations and citizens now actively engage in sharing and transferring policy ideas on a global scale (Pal, 2014) and the transmission of policy ideas are increasingly fast (even instantaneous) and easy.

[1] This is a working draft. Please do not cite without the permission of the author, who can be contacted at Jennifer.spence@carleton.ca.

As the network of actors that support policy transfer become more complex and diverse, scholars have developed sophisticated approaches to empirically map distinct policy networks that exchange and discuss ideas (McGann & Sabatini, 2011; Mcnutt & Pal, 2011; Oatley, Winecoff, Pennock, & Danzman, 2013; Taylor, 2005). This research has provided new insights about how policy transfer occurs and broken down conventional understandings of the actors involved in policy transfer. However, the literature about these global public policy networks has not yet dedicated attention to studying the role or potential impacts of social media tools for policy transfer. This paper contributes to filling this gap by examining to what extent Twitter provides new mechanisms for policy transfer.

To support this study, I begin by introducing social media as a Fifth Estate (Dutton, 2009) that serves to transform the relationship between policymakers and the many actors that inform, influence and comment on policy. I then introduce the case study that is the focus of in depth analysis – the network of Twitter users exchanging information and ideas about Arctic development between March 1, 2016 and March 1, 2017. By containing this research project to a specific policy area and timeframe, I am able to undertake a detailed exploration of who used Twitter to share information and ideas about Arctic development, what specific policy issues were discussed and how the network of Twitter users discussing Arctic development was structured. This paper demonstrates that Twitter is transforming both who is involved in policy transfer and how policy transfer takes place; however, the full potential of this communication tool has not yet been fully realized.

The Fifth Estate and Twitter

Edmond Burke is credited with coining the term “Fourth Estate” back in 1787 to acknowledge the power and influence of the news media (or press) in politics and society (Carlyle, 1840). Since then, the concept of the Fourth Estate has broadened to include radio, television and other actors that provide independent perspectives on government. Furthermore, over two centuries later, Yochai Benkler examined how the introduction of the internet has fundamentally transformed the Fourth Estate – in particular, how information and knowledge are produced (2006). However, while scholars are still working to understand the implications of the Internet for policymaking, ICTs continue to evolve and fundamentally alter how people communicate and share ideas. In particular, the emergence and rapid adoption of social media tools, such as Facebook, Twitter, and Instagram, are not only changing the rules of the game for policymakers and those trying to influence policymaking, but potentially creating a completely new game.

In fact, Dutton (2009) proposes that the distinctive characteristics of the networks of individuals that use social media warrants recognition as a “Fifth Estate” because they “reconfigure access to alternative sources of information, people and resources.” He proposes that the Fifth Estate:

> enable the networked individuals to move across, undermine and go beyond the boundaries of existing institutions, thereby opening new ways of increasing the accountability of politicians, press, experts and other loci of power and influence (2009, p. 2).

Dutton proposes that the networks that comprise the Fifth Estate have two distinctive characteristics: 1) they enhance the communicative power of institutions and individuals and 2) enable the creation of networks that "have a public, social benefit" (2009, p. 3). Ultimately, social media tools fundamentally transform how we communicate, who we communicate with and what we communicate about.

Twitter is perhaps the most prominent example of a social media tool that has transformed how organizations and individuals communicate and the structure of networks that produce information and knowledge. Twitter was launched in 2006 to supports real-time "micro-blogging." While there was initial scepticism about its value and purpose (Thompson, 2007), in a little over 10 years, Twitter has gone from being an obscure tech start up to a global phenomenon. Twitter hosted 328 million monthly active Tweeter users in the first quarter of 2017 (Statista, 2017) and facilitated an average of 500 million Tweets per day in January 2017 (Internet Live Stats, 2017).

While Twitter has become known as a forum where celebrities share uncomfortably personal details about their love lives and consumer can get a sneak peak at the latest "must have" gadget, a focus on its more frivolous features detracts from a deeper understanding of its transformative power and its current and potential role in policy transfer. For example, research has shown that Twitter has rapidly become a favourite tool for political leaders at all levels to communicate directly with the public (Gainous, 2014; Parmelee & Birchard, 2012) – Twitter is now actively used by state leaders, such as Trump and Trudeau, city mayors, most prominently Stephanie Rawlings-Blake of

Baltimore and even royalty, including the Royal family of Great Britain and Queen Rania of Jordon. Moreover, Twitter has been studied for it power to connect and mobilize social movements in real-time with dramatic examples including the Arab Spring and the Occupy movement (Gerbaudo, 2012). Scholars have also examined the increasing power of consumers as Twitter is used as a forum to praise and shame public and private organizations (Jansen, Zhang, Sobel, & Chowdury, 2009). And finally, Lovejoy and Saxton (2012) have examined how Twitter is breaking down barriers to participation that previously marginalized certain types of actors.

Against this backdrop, we can intuitively appreciate that Twitter has implications for policy transfer; however, no empirical research has been undertaken to examine its role or impact on the policymaking process. This paper takes a step toward filling this gap by examining the individuals and organizations using Twitter to discuss and exchange ideas about Arctic development policy. The paper focuses specifically on analyzing who is involved, what issues related to Arctic policy are discussed and the structure of the network of actors that discuss and exchange ideas about Arctic development. This paper considers the implications of this study for our understanding of the role of Twitter in the policy process and I place particular attention on what this analysis means for our understanding of the role of Twitter as a mechanism for policy transfer and how this new mechanism may in fact be transforming the very nature of policy transfer.

Arctic Development and Twitter

The Arctic is a region that has gained increasing scholarly and popular attention over the last decade. This region has gained prominence as both the harbinger of global climate change and a new frontier for resource development. It is a region that has gained the attention of states in the region (Russia, United States, Canada, Denmark, Iceland, Norway, Sweden, Finland) and a growing number of states outside the region (e.g. China, Japan, South Korea, Singapore, India, Germany, United Kingdom, France, etc.). It is also a region that has seen the active involvement of many non-state actors, including Indigenous groups, NGOs, IGOs, business and academia. As a result, the network of actors using Twitter to discuss Arctic development provides a timely and salient case study to examine to what extent Twitter has become a mechanism for policy transfer. At the same time, the communities of people and organizations interested and involved in this specific area of policy is smaller and more contained than many broader global policy issues (such as climate change, terrorism or migration), which makes this a manageable case study for a preliminary examination of the role of Twitter in policy transfer.

To support this study, English language tweets that included the keywords "Arctic" and "Development" were collected.[2] Data was gathered over a one-year period (March 1, 2016 to March 1, 2017) to support an examination of patterns and trends over time. The

[2] Twitter data was collect through two on-line social media collection services: Followthehashtag (http://www.followthehashtag.com) and Netlytic (https://netlytic.org). These services each provide different analytical tools to analyze the data collected. Followthehashtag provides tools to support an analysis of users and content and netlytic provides tools that support an analysis of network structures and content.

data collected with each tweet included: the tweet id (a unique identifier assigned to each tweet), date, time, Twitter user, Twitter user biography (where available), Twitter user follower count, Twitter user following count, location of Twitter user (where available) and contents of tweet. This process generated a dataset of 7,130 tweets and 4660 Twitter users. Data was subsequently inductively coded to identify specific actor types (e.g. NGO, politician, business) and types of Twitter users (individuals or organizations) where appropriate data was available. Similarly, the contents of tweets was coded by themes (e.g. Russia, oil, energy) and sentiment (positive and negative) using both Nvivo and Netlytic analytic tools. The resulting Arctic Development Twitter dataset (ADT dataset) provides a rich data source that provides fascinating insights about how Twitter is used and the types of information and commentary exchanged through Twitter. This paper will focus on the role and impact of Twitter on the policymaking process generally and more specifically on Twitter's observed and potential roles in policy transfer.

The findings for this case study are organized into 3 sections. The first section examines the Twitter users in the ADT dataset to understand who was exchanged in sharing information and ideas about Arctic development. The next section focuses on the most prominent topics being discussed through Twitter and how these issues evolve and change over time. And the final section, explores the structure and features of the network of Twitter users in the ADT dataset to better understanding the relationships between different actors and how this supported (or not) policy transfer.

Twitter users

Policy related to Arctic development is a relatively specialized issue that, based on the authorities and sovereignty claims of states, could be portrayed as a primarily domestic concern of Arctic states. Having said that, in recent years, Arctic states have joined together under the auspices of the Arctic Council and the 2008 Ilulissat Declaration[3] to establish a number of regional agreements that support the governance and development of the region, including agreements related to oil pollution preparedness and response, scientific cooperation and unregulated fishing in the Arctic Ocean. Furthermore, over the last decade, Arctic development has attracted the attention of a growing number of non-Arctic states, businesses, NGOs, researchers and other actors. The ADT dataset confirms that a diversity of actors interested in Arctic development are now taking to Twitter to exchange information, ideas and perspectives about Arctic development. This is demonstrated by the diverse locations, actor types (e.g. NGO, politician, business) and types of twitter users (individual or organization).

[3] The Ilulissat Declaration was entered into by the 5 Arctic coastal states (Canada, Denmark, Norway, Russia and the United States) in 2008 to signal their sovereign rights and responsibilities over the Arctic Ocean.

Country	% of Total Tweets**	Contributors per million inhabitants
1. United States*	40.80%	4.06 (8)
2. Canada*	15.50%	14.22 (4)
3. United Kingdom	8.30%	4.04 (9)
4. Norway*	5.80%	29.75 (2)
5. Finland*	4.20%	24.6 (3)
6. Russia*	2.00%	0.45 (13)
7. Belgium	1.90%	5.58 (6)
8. France	1.80%	0.83 (11)
9. Denmark*	1.60%	8.94 (5)
10. Australia	1.60%	2.23 (10)
11. Iceland*	1.50%	152.15 (1)
12. Sweden*	1.50%	4.71 (7)
13. India	1.40%	0.04 (15)
14. Germany	1.20%	0.55 (12)
15. Netherlands	1.00%	0.44 (14)

Table 1: Top 15 states based on the location of where Twitter users sending out tweets about Arctic Development

* Arctic state

** Where location of Twitter user is known (3087 Tweets of 7,130 Tweets in ADT dataset)

Of the 7,130 tweets included in the ADT dataset, close to half (3087 tweets) included the location of the Twitter user. Table 1 confirms that Twitter users from the 8 Arctic states are include on the list of top 15 states; however, Twitter users from the Arctic states are not equally active and there are active Twitter users from other states. For example, The tweeter activity related to Arctic development was by far the most abundant in the United States at 40.8% of the total geolocated tweets and Canadian Twitter activity came in second with 15.5% of total Twitter tweets. Contributions from both Arctic and non-Arctic states quickly drops off after that. However, this approach to ranking states presents the absolute contributions of Twitter users, which does not

factor in the size of each states population. Using analytical tools provided by #Followthehashtag, I compared the contributions of Twitter users from each state relative to the total population of the state. Using this approach, we observe that states such as Iceland, Norway and Finland are in fact relatively active and the contributions of users from the United States can be interpreted as a more moderate level of Twitter activity.[4] Using either measure, we also observe that Twitter users from several non-Arctic states are actively engaged, in particular the United Kingdom, Belgium (read European Union), Australia and France.

Furthermore, an analysis of the ADT dataset confirms that there were in fact Twitter users from a total of 89 different states. Figure 1 demonstrates that Twitter users participating in discussions about Arctic development was by no means limited to Arctic states with tweets being sent from as far afield as New Zealand, Chile and South Africa. Overall, Figure 1 graphically illustrates that, even for a relatively remote and specialized issue such as Arctic development, there are no geographical boundaries to participation. A global policy advisory network exists that is using Twitter, at very least, to exchange information and opinions about Arctic development in real-time.

[4] It is worth reiterating that the ADT dataset only includes English language tweets; therefore, it is not unreasonable to expect lower participation from states where English is not commonly used – in particular, Russia.

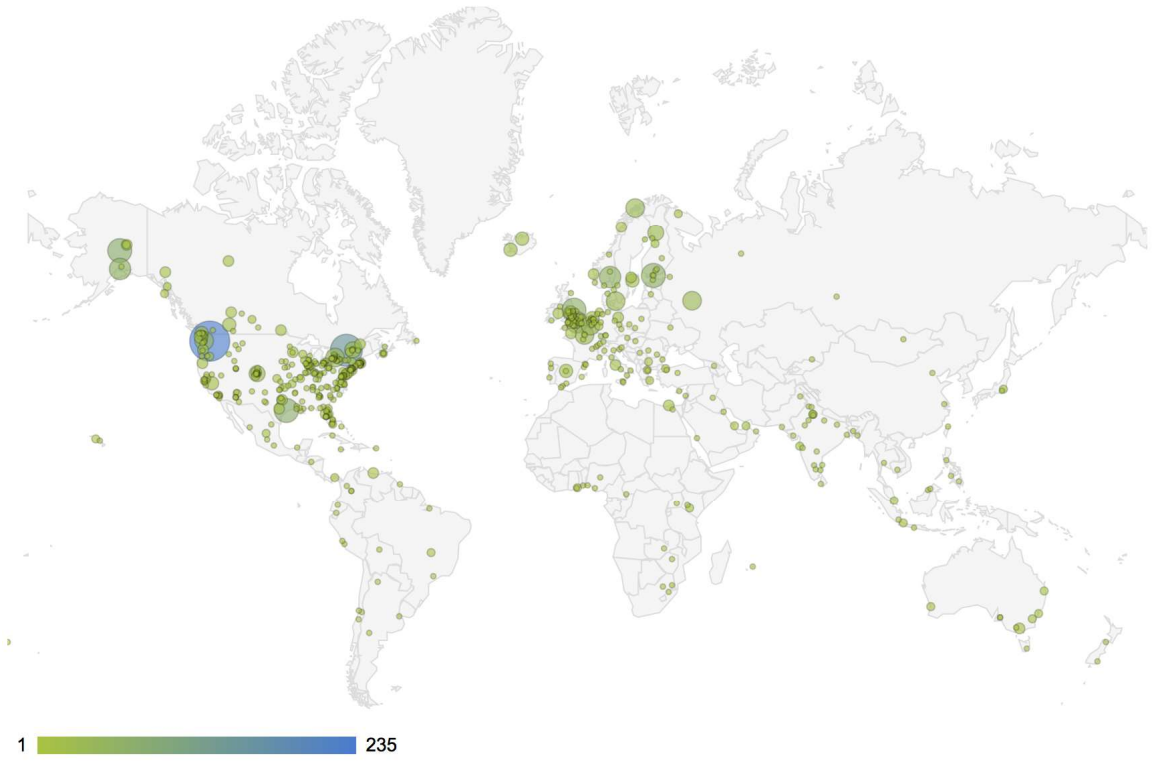

Figure 1: Location of Tweeter users identified in ADT data where the location of the user is known (source: followthehashtag.com)

To understand how the dynamics of policy transfer may be changing, it is also useful to examine the types of actors involved in Twitter exchanges related to Arctic development. Examining the biographies of Twitter users included in the ADT dataset, I confirmed participation from both the "supply" and "demands" side of the policy transfer process. On the demand side, there were a total 251 Twitter users that self-identified as politicians, civil servants[5] or representatives of intergovernmental organization (IGOs).[6]

[5] The number of civil servants using Twitter is likely higher than indicated by an analysis of user biographies because they are often interested in sharing personal views and/or they do not have the authority to represent ideas or opinions in their official capacity.

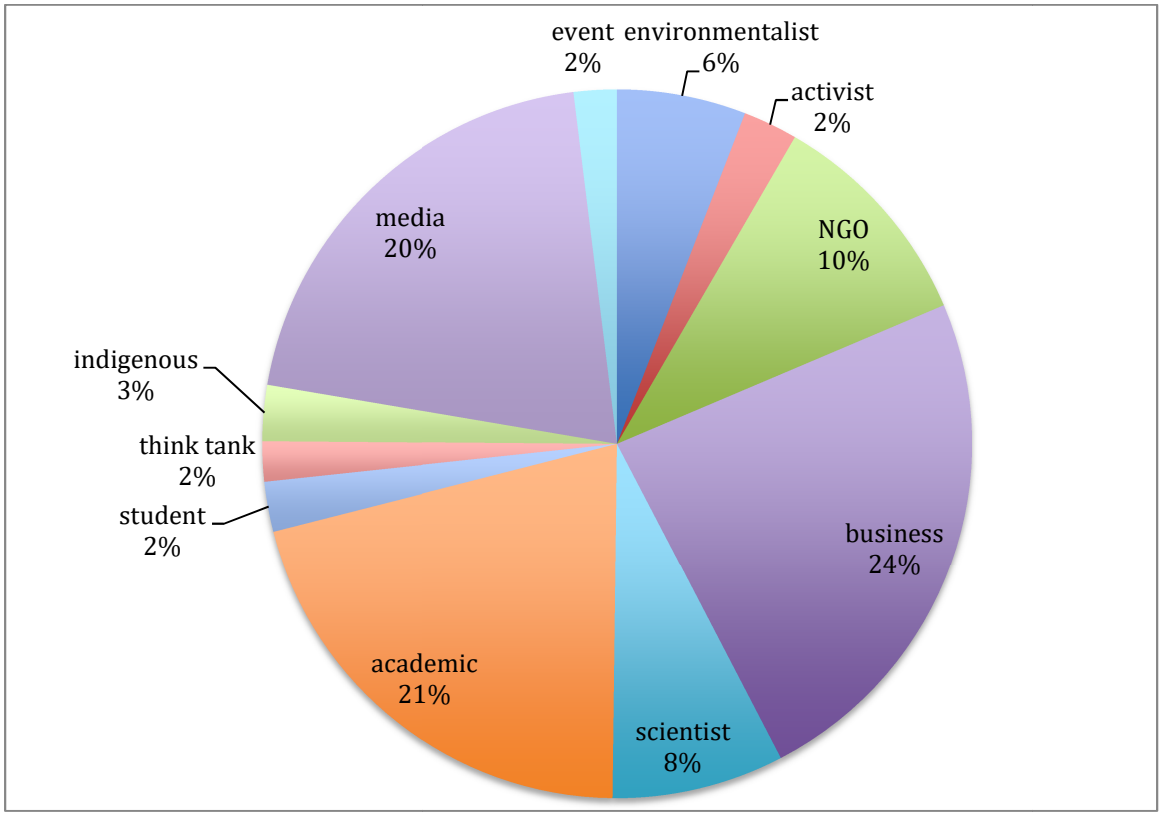

Figure 2: Types of actors using Twitter to communicate about Arctic development.

On the supply side, I identified 1,532 Twitter users that I organized into 11 different actor types (Figure 2).[7] This analysis of the dataset confirms that the media and business are strong users of Twitter representing 20% and 24% of classified users respectively; however, this analysis also indicates that a diverse range of other actors are using this tool to exchange information and ideas about Arctic development. In particular, communities of experts (scientists, academics, think tanks and students) make up 33% of actors using Twitter. Furthermore, Twitter users that self-identified as

[6] This distinction is made for the purposes of simplification – recognizing that politicians, civil servants and representatives of IGOs can also be on the supply-side of the policy transfer process.

[7] The identified categories are not mutually exclusive. Twitter users were assigned to a particular actor category based on how they self-identified in their Twitter biography.

Indigenous, environmentalists or activists also hold a notable presence.

In a similar vein, I also coded the data to distinguish between Twitter accounts that represented organizations and individuals where appropriate data was available. I undertook this analysis to dispel any notion that either organizations or individuals were dominating discussions about Arctic development. This analysis found that 70%(1974) of Twitter users in the ADT dataset were individuals and 30% (835) were organizations. Overall, this analysis of the types of actors reinforces that Twitter, as a mechanism for communicating and discussion policy ideas, provides an open forum that is being used by a diversity of actor with different interests and perspectives.

Of course, this finding could also lead to the conclusion that Twitter is so open and chaotic to be of little or no value to policymakers and the policymaking process. However, this overlooks the fact that Twitter, as a social media tool, has several features that help to inform participants understanding of the importance of different Twitter users. For example, #followthehashtag identifies the most influential Twitter users with an algorithm that that combines the followers-following ratio. In addition, the importance of a user in the ADT dataset could be measured by the user who sends out the most tweets related to Arctic development or how frequently a Twitter user is referenced in tweets related to Arctic development. Analyses using each of these measures produce different results that provide important insights about the users who were most active and influential in Twitter discussions about Arctic development during the period being analyzed.

Table 2 summarizes the top five users based on each of these measures. The top Twitter influencers include three political Twitter accounts (2 official accounts of the Russian government and 1 former Canadian candidate for the leadership of the federal Conservative party) all with a positive perspective on non-renewable resource development in the Arctic. The two remaining Tweeter users that are identified as influential include two well-established media organizations – Forbes and RT.com. Forbes is included on this list because 81 different Twitter users shared a link to a Forbes article entitled *Arctic Development Can Help Ensure National and Energy Security* (McCown, 2016) and RT.com is included because it tweeted information released by the Russian government about its Arctic development strategy that was shared 66 times. While this measure of influence is interesting and provides a means to guide further analysis, it is worth noting that the influence of these Twitter users is measured based on their reach in the broader community of Twitter users rather than providing insight on the level of influence that these users have with policymakers, policy influencers or the community of Twitter users interested specifically in Arctic development.

Methods for identifying important Twitter users	User	Biography	# of followers	# following
Top influencers (Followthehashtag algorithm that combines followers-following ratio and use of keywords)	KremlinRussia_E	President of Russia - Official Kremlin news	484,603	22
	Forbes	Official Twitter account of http://Forbes.com , homepage for the world's business leaders.	11.6M	5,472
	RT_com	RT, the global news network, broadcasts from Moscow, London and Washington studios to over 100 countries.	2,563,951	598
	Russia	The official Twitter feed for Russia. Powered by @MFA_Russia, inspired by Russian people. Russia is closer and warmer than it seems!	181,235	466
	kevinolearytv	Chairman O\'Shares ETFs, 3 time Emmy Award winning Shark Tank\'s Mr. Wonderful, bestselling author, photographer, and CPC Leader candidate.	653,000	930
Top contributors (measured by number of Tweets that reference Arctic development)	ArcticEnergyUS	Joint initiative of @AOGA & @IPAAaccess, serving to enlighten the discussion about America's Arctic future.	1,808	407
	a_yeung	Energy public affairs, skilled bus taker, opinions my own.	890	480
	Energy21	U.S. Chamber of Commerce's Institute for 21st Century Energy	5,458	1,472
	madinuk	Arctic indigenous business woman, Ajungi Group, LLB, clerked SCC. Cultural & socio-economic benefits through business development, good governance & high-tech (Mayor of Iqaluit, Nunavut).	5,082	1,462
	energy_window	no bio – account now suspended	505	63
Most important actors (measured by number of references in tweets)	pewenvironment	We work globally to establish pragmatic, science-based policies that protect our oceans, preserve our wildlands, and promote the clean energy economy.	1338	1176
	ErikSolheim	Head of UN Environment. Let's join hands for planet & people. Together we can change the world! Follow @UNEP to join the environmental conversation.	41,800	6,093
	ArcticEnergyUS	Joint initiative of @AOGA & @IPAAaccess, serving to enlighten the discussion about America's Arctic future.	1,808	407
	justintrudeau	Account run by the 23rd Prime Minister of Canada and staff… Compte géré par le 23e premier ministre du Canada et personnel.	3,310,000	962
	kevinolearytv	Chairman O\'Shares ETFs, 3 time Emmy Award winning Shark Tank\'s Mr. Wonderful, bestselling author, photographer, and CPC Leader candidate.	653,000	930

Table 2: Important Twitter users in the ADT dataset based on different measures of influence and importance

By contrast, top contributors, measured by the number of tweets sent related to Arctic development, is a measure that is solely relevant for those Twitter users specifically interested in Arctic development. The findings generated by this measure include Twitter users that represent a mix of organizations and individuals based in North America with a notable emphasis on issues related to energy. There is only one policymaker (madinuk, who is the Mayor of Iqaluit, Nunavut) included in the list of top contributors and two Twitter users with direct links to the U.S. oil and gas industry. These Twitter users are here because of their sustained interest in Arctic development over the time period being analyzed, which suggests that they are important actors to study in further analysis of the ADT dataset.

Finally, the most important *actors* in the ADT dataset are measured by those Tweeter users that are most frequently referenced in the body of tweets. Based on this measure, Kevinolearytv (a former Canadian candidate for the leadership of the federal Conservative party) and ArcticEnergyUS (an US-based initiative supporting two well-established oil and gas industry associations) make another appearance. Kevinolearytv is on this list because his tweet criticizing the US-Canada moratorium on oil and gas development was heavily retweeted; whereas, ArcticEnergyUS is included on this list because of regular participation in Twitter discussions about Arctic development. In contrast, ErikSolheim, Head of the United Nation Environment Programme, is included on this list because of extensive retweets of his praise of the same moratorium and justintrudeu, Prime Minister of Canada, is included on this list because of a mix of praise and criticism directed at him on Twitter for his decision to institute this oil and gas

development ban in Canada. Finally, pewenvironment tops the list of most frequently referenced actors because of an online social media campaign encouraging users to demand that the US government protect the Arctic Ocean. This initiative will be examined in more detail in the next section that looks at prominent topics in the ADT dataset. This measure of Twitter user importance shows a bias towards those users that are referenced in Tweets that are heavily retweeted. However, these examples may tell us something about the tweets that attract attention from a broader audience of users; although it is unclear what value it offers for identifying and understanding the most important Twitter users.

The data presented about top Twitter influencers and contributors leave the impression the most important Twitter users are predominantly supportive of non-renewable resource development in the Arctic; whereas, the interests of the actors most frequently referenced in tweets, provides a more mixed picture. However, perhaps the most pertinent overall finding of this analysis is that none of these measures provide a foolproof method for identifying those Twitter users that are most important and, by extension, those actors that might play a leadership role in managing and advancing Twitter discussions about Arctic development.

As a result, Twitter, as a mechanism for policy transfer, should not be confused with a open town hall meeting or an online consultation. Instead, this section is best concluded with a reminder that this analysis focuses on 13 Twitter users out of a total of 4660 users identified in the ADT dataset. In fact, despite a very rich analysis informed by

available data about the location of Twitter users and their biographies, it is important to highlight that no location data was available for 1,573 Twitter users in the ADT dataset, the biographies of 2,879 Twitter users provide no or insufficient information to classify them based on their expertise, experience or responsibilities and 1,851 Twitter users could not be identified by their user type (individual or organization). Ultimately, Twitter users are not required to provide information about themselves in order to use this tool. And yet, these "unknown" users can be active and engaged participants in sharing information and expertise about Arctic development. For example, the user @a_yeung, referenced in Table 2, is one of the highest contributors in the ADT dataset with 29 tweets specifically related to Arctic development during the period being analyzed; however, her biography simply states "Energy public affairs, skilled bus taker, opinions my own." This biography provides no guideance about her expertise, experience or responsibilities that might help us to understand her biases or assess her credibility as a potential policy influencer and yet this is not a barrier to her using Twitter to share information and opinions about Arctic development. As a result, perhaps the most significant finding of the analysis presented in this section is that it confirms Dutton's (2009) proposition that a defining characteristics of the Fifth Estate is its ability to enhance the communicative power of all individuals and organizations. The following section shifts to a focus on examining the prominent Arctic development issues and themes in the dataset to develop a deeper understanding of Twitter's potential role in policy transfer.

Twitter issues

Similar to an analysis of the Twitter actors, there are multiple approaches that can be

used to analyze the issues and themes related to Arctic development in the ADT dataset. A popular approach used in previous research about Twitter is to undertake a text analysis of tweets to identify prominent themes, issues and narratives (Bartlett & Norrie, 2015; Guggenheim, Jang, Bae, & Neuman, 2015; Gupta, Ripberger, & Wehde, 2016). Using a Netlytic visualization tool, Figure 3 goes a step beyond an overarching text analysis of the ACT dataset by mapping the most prominent keywords identified in tweets over time. This visual representation of the most frequently used words highlights that there was notable variation in the issues and topics referenced in tweets over time. Moreover, a consequence of this visualization is that it provides guidance about specific time periods that can be systematically analyzed in more depth.

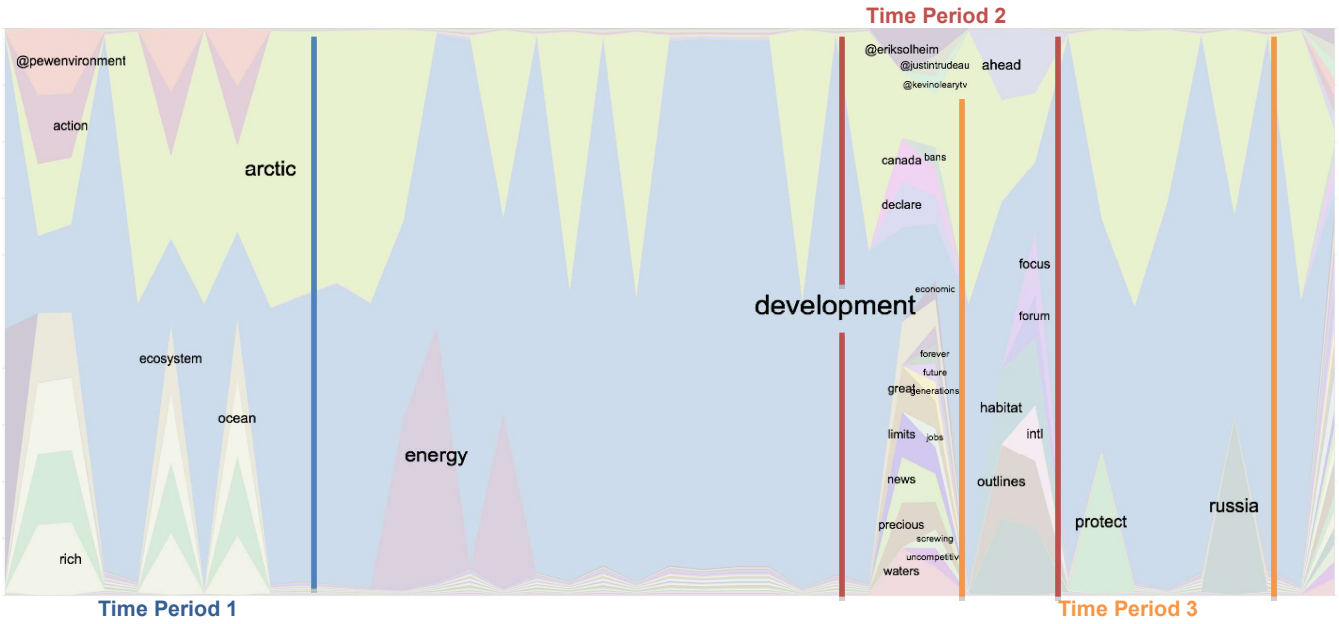

Figure 3: Analysis of tweet contents overtime (March 1, 2016 to March 1, 2017) using a Netlytic keyword visualization tool.

For the purposes of this analysis, I have identified three time periods that illustrate a relationship between policymaking and the discussions taking place on Twitter. Time

Period 1 runs from April 11, 2016 until July 28, 2016. As briefly referenced in the previous section, this period saw the heavy use of the keywords @pewenvironment, action, rich, protect, ocean and ecosystem in tweets. The prominence of these words was a result of a social media campaign started by @pewenvironment on April 11,2016 in response to a call for comments by the Obama administration on March 15, 2016 regarding a proposed 2017-2022 oil and gas leasing program that considered opening parts of the Arctic Ocean for development. This petition generated 615 tweets over the 90-period that the program was open for public comment. This example illustrates how Twitter can be used as a tool to mobilize actors to respond to a particular policy proposal or action; however, it also suggests that attention toward specific policy issue or topic has a finite shelf-life if there is not an individual or organization feeding the interest or concern of the Twitter community.

Time period 2 runs from December 20, 2016 to January 17, 2017 and corresponds with the release of the United States-Canada Joint Arctic Leadership Statement (December 20, 2016) that gained the most attention for establishing a moratorium on oil and gas drilling in Arctic waters. As mentioned in the previous section, subsequent Twitter activity included retweeting of both praise from @eriksolheim (Erik Solheim, Head of the United Nations Environment Programme) and criticism from @kevinolearytv (Kevin O'Leary (then candidate for the leadership of the Conservative Party of Canada). This example once again demonstrates that Twitter users can be mobilized in response to policy decisions taken by governments; however, the example during this time period demonstrates how Twitter users can be easily polarized into overly simplified camps of "for" and "against" specific policies. This example highlights the limitations of twitter as

a tool for meaningful advice and commentary regarding specific policy option – it is extremely difficult to provide nuanced commentary in 140 characters. Instead, this suggests that Twitter maybe a better tool to get a sense of the real-time impressions of Twitter users of a particular policy issue or decision and an effective means for actors to direct people to relevant information or knowledge that informs policy.

Finally, the theme of Russian development in the Arctic also deserves attention (Time Period 3). This topic received regular, if intermittent, attention over the year under analysis; however, there was a notable spike in Twitter activity related to this theme beginning on January 17, 2017 that continued until close to the end of the time period being analyzed. This increased activity was initially the result of the retweeting of an article about increased military and development activity in the Russian Arctic published by the Barents Observer, an online newspaper reporting on the Barents region. However, beginning on February 21 this theme received renewed attention as a result of Twitter users retweeting links to various English-language Russian news websites that signaled active discussion and further investment by the Russian government in Arctic economic development. Interesting, unlike the tweets associated with the U.S.-Canada Arctic statement, these tweets mostly shared this information without context or commentary. It is also interesting to note that the spike in Twitter activity around this theme aligns with the January 20, 2017 inauguration of Donald Trump as President of the United States.

Overall, these examples illustrate is that Twitter exchanges related to Arctic development have been primarily reactive to policy decisions, actions or events initiated by Arctic states. However, the prominence of these issues in Twitter exchanges largely

depends on the efforts of a third party (e.g. NGO, business association, or media) to raise awareness of the issue and generate reactions or further attention. Despite the analysis of previous scholars about how politicians are using Twitter to connect directly with the public (Parmelee & Birchard, 2012), these examples do not provide evidence of any active effort by policymakers to use Twitter to solicit input, feedback or reactions to particular policy ideas or decisions.

A complementary approach to identifying topics or issues that attract attention or gain momentum on Twitter is to examine those Tweets that are retweeted or identified as favorites by Twitter users. Interestingly, the top tweets using these measures (Table 3) further substantiate the theory that non-government Twitter users are the most active promulgators of information and opinions via Twitter. This table also confirms the prominence of the negative and positive attention generated by kevinolearytv and ErikSolheim around the US-Canada Arctic Leadership Statement (Time Period 2 in Figure 3) and highlights further efforts by Patagonia and PracticalPols to raise awareness and stimulate reactions from Twitter users regarding potential oil and gas development in the Arctic (the US in particular).

Methods for identifying important Twitter topics	User	Twitter Biography	# of followers	# following	Tweet	# of RTs	# of Favs
Top tweets measured by number of retweets and favorites	tagaq	noise provider. pith protector. sound eater. life giver. tooth and marrow. song and saliva.	18,600	1,602	If you are against the seal hunt you are against the survival of Inuit and are promoting non-renewable resource development in the arctic. (20/11/16)	245	432
	kevinolearytv	Chairman O\'Shares ETFs, 3 time Emmy Award winning Shark Tank\'s Mr. Wonderful, bestselling author, photographer, and CPC Leader candidate.	653,000	930	Chairman O\'Shares ETFs, 3 time Emmy Award winning Shark Tank\'s Mr. Wonderful, bestselling author, photographer, and CPC Leader candidate. (21/12/16)	215	455
	ErikSolheim	Head of UN Environment. Let's join hands for planet & people. Together we can change the world! Follow @UNEP to join the environmental conversation.	41,800	6,093	Canada & US declare Arctic waters off limits for new oil & gas development. Great news for a precious ecosystem! http://ow.ly/SN7j307jHLj (20/12/16)	272	314
	Patagonia	no bio, but link provided to Patagonia.com. Patagonia is an outdoor recreation apparel business.	355,000	2,229	Protect the coastal plain of the Arctic Refuge from oil drilling & industrial development. Sign the petition:… https://t.co/xyqCDCSr9w (19/01/17)	71	143
	PracticalPols	We're outside the echo chambers, come join us for some intelligent conversation where politics is personal, not partisan.	11,600	322	Obama Admin Officials Express Support for Arctic Oil & Gas Development https://t.co/3OsgDnXr8t (26/10/16)	96	95

Table 3: Top Tweets based on number of retweets and favorites.

However, it is interesting to note that the top tweet during this period is from a Tweeter user whose biography does not provide any insights about her expertise or responsibilities - tagaq. The issue that she raises, which received both significant retweeting and was designation as a favorite by Twitter users, is European Union's ban on seal products, which has been a contentious issue with Inuit and other Northerners throughout the Arctic since it was implemented in 2010. This tweet and this topic are significant for several reasons. First, although this issue clearly resonated with a broader network of Twitter users, it was not captured through an analysis of the most prominent keywords presented in Figure 3, which reinforces that Twitter is a complex social media tool and more work is needed to identify appropriate methods for understanding and track this dynamic tool and its users. Second, unlike the previous examples, tagaq's tweet about the seal ban was not a reaction to an immediate government action or decision, which suggests that Twitter has the potential to be more than real-time tool to react to policy actions or decisions. And finally, as I will discuss in more detail in the following section, this example demonstrates that Twitter is a forum where users can develop credibility and a community of followers as a result of what they say and share rather than who they are or who they represent. In other words, this last example is important because it signals that social media tools, such as Twitter, are changing which actors have the credibility and legitimacy to identify, development and comment on policy ideas and actions – by extension, these tools transform who might be involved in policy transfer and how policymakers interact with a broader array of actors. The following section examines this in more detail by focusing on the network of Twitter users in the ADT dataset.

The Arctic development network

The final component of this analysis examines the network of actors using Twitter to exchange information and ideas about Arctic development. This analysis is supported through the use of social network analysis (SNA), which is a relational methodology that focuses on the structure, features and dynamics of the network using Twitter to exchange information and commentary about Arctic development (Borgatti, Everett, & Johnson, 2013; Scott, 2013). SNA maps visualize a network by using nodes to represent the person or item of interest and ties (or edges) to link or show a relationship between nodes.

SNA is a powerful tool to examine the network of Twitter users in the ADT dataset in order to better understand Twitter as a mechanism for policy transfer. In Figure 4, nodes are Twitter users and the ties link a Twitter user sending the tweet with the Twitter users referenced in the tweet. This visualization graphically illustrates that the network of Twitter users exchanging tweets during the period being analyzed was highly decentralized, which is represented by the size of the nodes. This means that there were no specific Twitter users (nodes) that dominated or had the ability to control the flow of information or discussion throughout the network. Furthermore, we observe that the overall density of the network of Twitter users was also very low, which is represented by the number of ties between Twitter users and the length of the ties. This means that network of Twitter users is loosely-knit – in fact, the periphery of the network is made of up of completely disaggregated clusters. The low density of the network has implications for how quickly information flows through the network or, in this particular case, whether information can flow through the entire network at all.

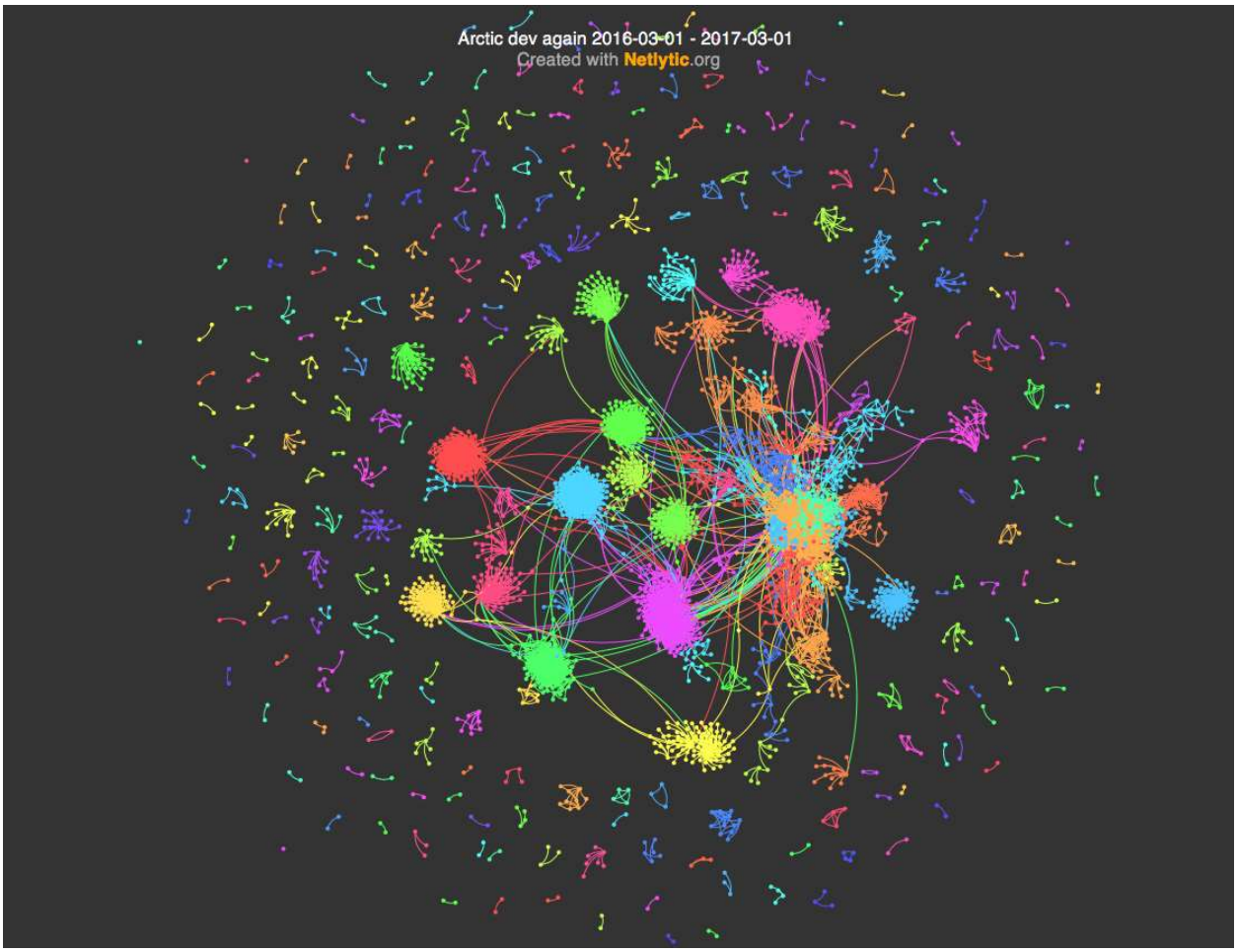

Figure 4: Network of Twitter users in ADT dataset (March 1, 2016 to March 1, 2017) generated with a Netlytic network visualization tool. Nodes are Twitter users and ties link the Twitter user sending the tweet with the Twitter users referenced in the tweet.

Focusing in on the core of the ADT network provides us with more food for thought. In particular, Figure 5 illustrates that much of the core was made up of clusters that are joined by a limited number of ties. For example, the pewenvironment social media campaign that took place in the first time period discussed in the previous section is a relatively contained cluster of Twitter users (blue cluster). Similarly, the twitter commentary provided by Kevenolearytv (red cluster) and ErikSolheim (green cluster) about the US-Canada moratorium on oil and gas drilling in the Arctic was contained to equally small clusters of Twitter users. Twitter exchanges related to Russian

development produced a slightly more dispersed cluster (pink cluster); however, its position at the periphery of the core suggests that this particular cluster included a community of Twitter user that was less central to the overall network of Twitter users discussing Arctic development.

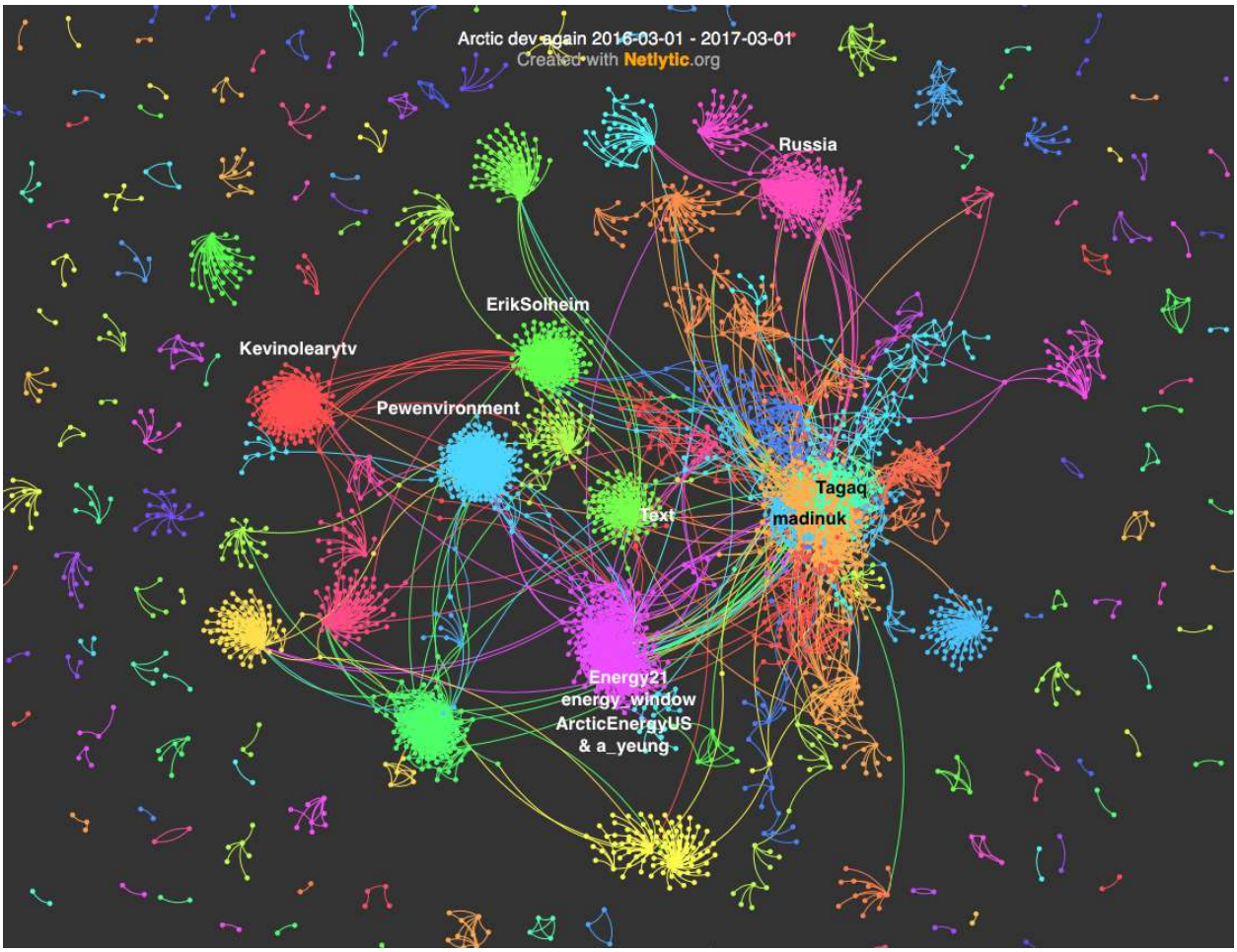

Figure 5: Core of the network of Twitter users in the ADT dataset generated with a Netlytic network visualization tool. Nodes are Twitter users and ties link the Twitter user sending the tweet with the Twitter users referenced in the tweet.

Furthermore, recalling the analysis of Twitter users presented in the first section (Table 1), we observe that 4 of the 5 top contributors were part of the same cluster (purple cluster), including ArcticenergyUS, a_yeung, Energy21 and energy_window. This

cluster was placed more centrally in the core of the ADT network, which reinforces that this cluster of Twitter users had sustained interest in Arctic development and a high level of Twitter activity. Based on an analysis of the tweets from the users in this cluster, we know that this is a strongly pro-development group with a particular interest in U.S. policies related to the Arctic. This cluster also includes a mix of actor types, including business, politicians, NGOs and academia; therefore, further research to understand this cluster and its Twitter activity could produce important insights about Twitter as a mechanism for policy transfer both specifically related to Arctic development and more generally.

The analysis presented to this point about the network of Twitter users exchanging information and ideas about Arctic policy aligns with previous research conducted by Williams et al. (2015), who studied social media discussions about climate change. They conclude that overall Twitter provides an open forum for a variety of actors with a diversity of interests and perspectives to share information and ideas; however, Twitter also has a tendency to create polarizing echo chambers. Furthermore, as a result of the observed structure of the network, it is important to realize that the users that connect distinct clusters within the network become increasingly important because of their ability to link different clusters and enable the flow of information and ideas. This would suggest that policymakers looking to Twitter as a potential mechanisms for identifying policy ideas or discussing policy options may want to be careful to ensure that they know and understand the structure of the Twitter network they are tapping into and the potential risks of limiting engagement to a specific echo chamber within a network.

The final component of the network core that deserves attention is the multi-coloured constellation on the right-side of Figure 5. This part of the core, as a sub-set of the network, presents a much higher density of users that are joined by an increased number of ties and a mix of colours, which represents distinct twitter exchanges. This suggests that this constellation was a more interconnected community of Twitter users that interacted over time and exchanged information and ideas about multiple topics related to Arctic development. This constellation of Twitter users also includes madinuk (identified as a top contributor in Table 1) and tagaq (identified as issuing the top tweet in Table 2). Interestingly, both these Twitter users take a particular interest in Artic Indigenous issues and local development needs. This constellation provides signs that a more mature Twitter community can developed and be sustained in the Twitterverse.

Although the analysis presented in this paper does indicate that Twitter is fundamentally altering how we communicate, whom we communicate with and what we communicate about. Overall, the analysis presented about the Arctic development network using Twitter leaves some doubt that Twitter, based on its current usage, exhibits the second distinctive characteristic of the Fifth Estate identified by Dutton – to enable the creation of networks that “have a public, social benefit” (2009, p. 3). However, the larger constellation visible within the core (Figure 5) provides sings that the networks within Twitter are still evolving and may still demonstrate their capacity to fundamentally alter the relationship between policymakers and their citizens and provide a powerful mechanism for policy transfer,

Conclusion

This study of actors using Twitter to share information and ideas about Arctic development has taken a small step toward better understanding the role that Twitter has played and can play in policy transfer. This analysis emphasizes that the barriers that have limited the participation of different types of actors in different locations are being broken down and the rulebook regarding who are a credible or legitimate contributors to policy discussions or conveyors of policy ideas is being completely rewritten by retweets, favorites and followers. However, this case study provides no concrete signs that policymakers are actively or consciously using Twitter as a mechanism for policy transfer.

This paper also demonstrates that the issues and topics discussed via Twitter are primarily short-lived and reactive. The interest and engagement regarding particular policy issues by Twitter users depends on the direct efforts of Twitter users – and even then there is no guarantee that a broader network of Twitter users will feel compelled to participate. This analysis also highlights that not every important issue or topic being discussed on Twitter will necessarily be captured through an analysis of the most prominent keywords or an examination of top tweets; however, through a triangulation of methods, critical issues and key trends can be identified.

Moreover, this paper provides important insights about the structure and dynamics within the network of Twitter users discussing Arctic development. This analysis emphasizes the highly decentralized and loose nature of the Arctic development network, which has direct implications for how information flows in the network. This

analysis also highlights the distinct clusters exist within the network, which demonstrates the existence of echo chambers and enhances the importance of those actors that facilitate the flow of information across clusters. Finally, the existence of one larger more densely connected constellation of Twitter users provides initial indications that Twitter has the potential to live up to the transformative role envisioned for it as tool of the Fifth Estate.

Overall, that this paper has only scratched the surface of Twitter's role in policy transfer. Ultimately, one of its greatest contributions is to demonstrate that this is an area that requires more scholarly attention to understand both how Twitter is being used by different policymakers and in different policy areas. However, it is important to keep in mind that Twitter is a dynamic tool that will continue to evolve. In fact, it is possible (and perhaps even likely) that a new social media tool will preempt Twitter and provide people and organizations with new ways to communicate and discuss their policy needs and interest. Therefore, it is important to continue to link this research back to a broader conception of the role of social media, its distinctive characteristic and its implications for policymaking.

References

Bartlett, J., & Norrie, R. (2015). Immigration on Twitter: Understanding Public Attitudes Online. *Demos*, (April).

Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven: Yale University Press.

Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2013). *Analyzing Social Networks*. Los Angeles: Sage Publications.

Carlyle, T. (1840). *On Heroes: Hero Worship and the Heroic in History*. London: Chapman and Hall.

Dolowitz, D., & Marsh, D. (1996). Who Learns What from Whom: A Review of the Policy Transfer Literature. *Political Studies*, *44*(2), 343–357. http://doi.org/10.1111/j.1467-9248.1996.tb00334.x

Dutton, W. H. (2009). The Fifth Estate Emerging through the Network of Networks. *Prometheus*, *27*(1), 1–15. http://doi.org/10.1080/08109020802657453

Gainous, J. (2014). *Tweeting to power: The Social Media Revolution in American Politics*. New York: Oxford University Press.

Gerbaudo, P. (2012). *Tweets and the Streets: Social Media and Contemporary Activism*. London: Pluto Press.

Guggenheim, L., Jang, S. M., Bae, S. Y., & Neuman, W. R. (2015). The Dynamics of Issue Frame Competition in Traditional and Social Media. *The ANNALS of the American Academy of Political and Social Science*, *659*(1), 207–224. http://doi.org/10.1177/0002716215570549

Gupta, K., Ripberger, J., & Wehde, W. (2016). Advocacy Group Messaging on Social Media: Using the Narrative Policy Framework to Study Twitter Messages about Nuclear Energy Policy in the United States. *Policy Studies Journal*, *0*(0). http://doi.org/10.1111/psj.12176

Internet Live Stats. (2017). Twitter Usage Statistics. Retrieved from http://www.internetlivestats.com/twitter-statistics/

Jansen, B. J., Zhang, M., Sobel, K., & Chowdury, A. (2009). Twitter Power: Tweets as Electronic Word of Mouth. *Journal of American Society for Information Science and Technology*, *60*(11), 2169–2188. http://doi.org/10.1002/asi

Lovejoy, K., & Saxton, G. D. (2012). Information, Community, and Action: How Nonprofit Organizations Use Social Media. *Journal of Computer-Mediated Communication*, *17*(3), 337–353. http://doi.org/10.1111/j.1083-6101.2012.01576.x

McCown, B. A. (2016, July 26). Arctic Development Can Help Ensure National and Energy Security. *Forbes.com*. New York.

McGann, J., & Sabatini, R. (2011). *Global Think Tanks: Policy Networks and Governance*. London: Routledge.

Mcnutt, K., & Pal, L. a. (2011). " Modernizing Government ": Mapping Global Public Policy Networks. *Governance: An International Journal of Policy, Administration, and Institutions*, *24*(3), 439–467. http://doi.org/10.1111/j.1468-0491.2011.01532.x

Oatley, T., Winecoff, W. K., Pennock, A., & Danzman, S. B. (2013). The Political Economy of Global Finance: A Network Model. *Perspectives on Politics*, *11*(1), 133–153. http://doi.org/10.1017/S1537592712003593

Pal, L. a. (2014). Introduction: The OECD and Policy Transfer: Comparative Case Studies. *Journal of Comparative Policy Analysis: Research and Practice*, *16*(3), 195–200. http://doi.org/10.1080/13876988.2014.910910

Parmelee, J. H., & Birchard, S. L. (2012). *Politics and the Twitter Revolution: How Tweets Influence the Relationship Between Political Leaders and the Public*. Plymouth: Lexington Books.

Rose, R. (1991). What Is Lesson-Drawing? *Journal of Public Policy*, *11*(1), 3–30.

Scott, J. (2013). *Social Network Analysis* (Third). Los Angeles: Sage Publications.

Statista. (2017). Twitter: Number of monthly active users 2010-2017. Retrieved from https://www.statista.com/statistics/282087/number-of-monthly-active-twitter-users/

Taylor, P. J. (2005). New Political Geographies: Global Civil Society and Global Governance through World City Networks. *Political Geography*, *24*(6), 703–730. http://doi.org/10.1016/j.polgeo.2005.01.009

The Ilulissat Declaration. (2008). In *Arctic Ocean Conference*. Ilulissat. Retrieved from http://www.arcticgovernance.org/the-ilulissat-declaration.4872424.html

Thompson, C. (2007, June 26). Clive Thompson on How Twitter Creates a Social Sixth Sense. *Wired*. Boone. Retrieved from https://www.wired.com/2007/06/st-thompson-4/

Williams, H. T. P., McMurray, J. R., Kurz, T., & Hugo Lambert, F. (2015). Network analysis reveals open forums and echo chambers in social media discussions of climate change. *Global Environmental Change*, *32*, 126–138. http://doi.org/10.1016/j.gloenvcha.2015.03.006