

IJACT18-2-9

## Network Analysis on Communication of Welfare Policy Using Twitter Data

Bojun Seo<sup>1</sup> and Soochang Lee<sup>2\*</sup>

*Faculty of Social Welfare Counseling, International University of Korea*

*Department of Police Administration, Kyungwoon University*

*bjseo0912@hanmail.net, eesc@ikw.ac.kr\**

### **Abstract**

*This main purpose of the study is to identify social network of communicators sharing information on Bokjiro for publicizing welfare policy. This study employs NodeXL pro to understand networks and their role in the social network. The data for social network analysis was collected from Twitter for a week. The result of the analysis shows that the social network of communicators on Bokjiro does not have many nodes. It also has an independent network with high possibility of information distortion. Little communicators have controlling power in information flow in one way of communication. According to the result, it is not effective for marketing strategy of welfare policy in providing online information through Bokjiro. The study suggests that the government should use the transactional approach to marketing based on agent-oriented activity focusing on the exchange relationship between information providers and demanders in an age of networked intelligence.*

**Keywords:** *Network Analysis, Communicator, Welfare Policy, Bokjiro, Twitter*

### **1. Introduction**

Social welfare is keeping or providing a minimal level of well-being and social support for people without sufficient means to enjoy basic living needs. It is natural that governments are responsible for social welfare, so a modern nation is called a welfare state which is a concept of government in which the state plays a key role in protecting and promoting the social and economic well-being of its eligible citizens. It is based on the principles of equality of opportunity, equitable distribution of wealth, and public responsibility for those unable to avail themselves of the minimal provisions for a good life. The general term may cover a variety of forms of economic and social organization[1].

Comparing with market logic based on principles of economic gain, competition, and selection, the logic behind social welfare is focused on shared benefit, equality, and coexistence. Due to this different thing, social welfare is important part of nations' role and responsibility that have to protect and keep quality of life of the

---

Manuscript received: June 19, 2018 / revised: June 21, 2018 / Accepted: June 22, 2018

Corresponding Author: leesc@ikw.ac.kr

Tel:+82-54-479-4067, Fax:+82-54-479-1382

Department of Police Administration, Kyungwoon University, Korea

people who are excluded in purchasing wealth in market and second-class citizens like children, senior people, patients, handicapped, etc. For the characteristic of social welfare, it is the most preferable field for politicians to raise their support, making decision on resource allocation called a kind of welfare policy. In the past, the field of welfare policy was weakly politicized[2], but these days, orientation to improving the level of welfare has been one of politicians' major public commitments.

In most developing and developed countries, social welfare is mainly provided by governments from tax revenue which is the most representative resource for welfare policies. Developing countries just depend on governments as a delivery agency of social welfare, but developed ones have various delivery organizations like NGOs, charities, informal social groups, religious groups, and governmental organizations. In particular, governmental organizations play the most important role in delivering welfare service because they make decisions and concrete plans about welfare policy including target selection, distribution of budget, detailed plans for the provision, marketing or public relation, performance evaluation, etc.

Social welfare belongs to public service or good that is a product that one individual can consume without reducing its availability to another individual and from which no one is excluded[3]. We call them non-excludable and non-rivalrous respectively. These two cause a free-rider problem that can lead to inefficiency of production and provision of welfare service. Most importantly, recipients of social welfare do not have appropriate information on welfare policy and are indifferent to welfare programs because of poor access to the delivery system of social welfare. It is quite important to note that those who need welfare programs have to be able to take welfare service with enough information on welfare policy that can play an important role in finding or getting welfare service needed for them. Welfare policy has the detailed rule and legal provision which give recipients something difficult in accessing to welfare programs.

Governments should lead clients of welfare service to get better access to welfare programs from welfare policies by providing useful and valuable information. They need to get knowledge about marketing or public relation to make delivery of welfare programs successful. The purpose of marketing is not to just communicate the contents of welfare policies but to find and choose welfare service that clients of welfare policy want to use through effective information system.

These days, due to the rapid development of information technology, the methods of marketing are varying in terms of both offline and online, but online marketing is likely to be more popular and preferable to offline because of the effectiveness of marketing. The Ministry of Health and Welfare, which is in charge of welfare policy in Korea, prefers online marketing to offline marketing. It uses Bokjiro as a website to improve information provision and enforce delivery system of welfare service. The website includes most of information on welfare service provided by the government.

There are a variety of communicators who hold control of information flow on Bokjiro. These communicators give and take much information on welfare policies on social network service like YouTube, Twitter, Facebook, etc. They can play an important mediator between the Ministry of Health and Welfare and citizens in sharing information and farther expanding interest targets. They also tend to build a certain pattern of network for sharing information, which can contribute in publicizing welfare policies.

This study is to identify social network of communicators sharing information on Bokjiro. The network includes implications for improving marketing of welfare service. We find better marketing strategies by analyzing network structure and communicators' relationships. We employ keyword analysis to conform what kind of information is frequently shared on social network service. Lastly, we find who main communicators controlling information flow are.

## 2. Research Method

The purpose of this study is to examine social network of communicators on the website, Bokjiro, for marketing of welfare policy from the Ministry of Health and Welfare by employing social network analysis. Evaluators have explored the body of methods known as social network analysis to understand networks and their role in social communications[3]. The method uses a variety of tools – network diagrams, network matrices and mathematical measures – to depict and aid understanding of social networks[4]. Social network analysis derives from network theory[5][6][7][8] and the use of graphs as representations of symmetric and asymmetric relations between what can be regarded as discrete objects. The key distinctive feature of social network analysis is a focus on relationships between actors, rather than their individual characteristics[9].

The two most common sociometric properties of networks are network density and network centrality. Social scientists have long contended that networks with higher densities, specifically greater interconnectivity among group members, are more homogenous in terms of the network members' behavior[10].

Density is typically calculated as a proportion with a value ranging from 0 to 1, which shows the actual number of direct ties as a function of the possible number of ties within a network of a given size. Centrality assesses the prominence of certain members in a network, including degree centrality, betweenness, and Bonacich centrality[11]. Degree centrality is a measure of the number of ties within a network to a particular node, or the number of edges adjacent to a node[12]. As a measure of centrality, betweenness is a count of the number of pairs of nodes between which a given node lies. This measure of centrality assesses how effectively one node bridges the gaps between other nodes[13]. In our study, these density and centrality are represented to explain the feature of the network of communicators who are sharing information on welfare policy.

This study employs NodeXL pro as visualization software package for social network analysis. This has access to social media network data importers, advanced network metrics, and automation. Considering the purpose and process of our research, NodeXL pro is the most appropriate toolkit for examining social network of Bokjiro.

## 3. Analyzing Social Network

We collected Twitter data for communicators visiting Bokjiro and sharing information of welfare policy for a week. The table 1 shows overall statistical values on social network of communication of welfare policy. The number of node is 146 and the number of link is 150, but there are 21 links duplicated, so total links are 171. This means that there are less Twitter accounts in the social network but they have a little bit of close relationships by sharing information with each other. The number of connected component (66) is more than one of single-vertex connected components (43), which means that nodes with more than 2 communicators have close information-exchanging relationships among each other, but there are independent communicators who have a relationship with just one communicator. This represents that information flow of welfare policy does not have a good circulation. Average Geodesic Distance is 1.492958, which means that the distance between node and node is very close.

**Table 1. Overall Graph Metrics**

Vertices	146
Unique Edges	150
Edges With Duplicates	21
Total Edges	171
Self-Loops	67
Connected Components	66
Single-Vertex Connected Components	43
Maximum Vertices in a Connected Component	19
Maximum Edges in a Connected Component	24
Maximum Geodesic Distance (Diameter)	4
Average Geodesic Distance	1.492958
Graph Density	0.004865376

As we can see from table 2, In-Degree and Out-Degree is 1,068 on average respectively that shows that main nodes do not have many networks with other nodes both inside and outside. This means that nodes do not have more opportunities to get information on welfare policy. Average Betweenness Centrality is 3.877, which represents that nodes take about 4 steps to get the information through a mediator without a direct linkage, so mediators can distract or exclude nodes who need the information. The value of Average Closeness Centrality is 0.223, which means that main nodes are closely located in other nodes with a strong power of information provision.

**Table 2. Overall Centrality**

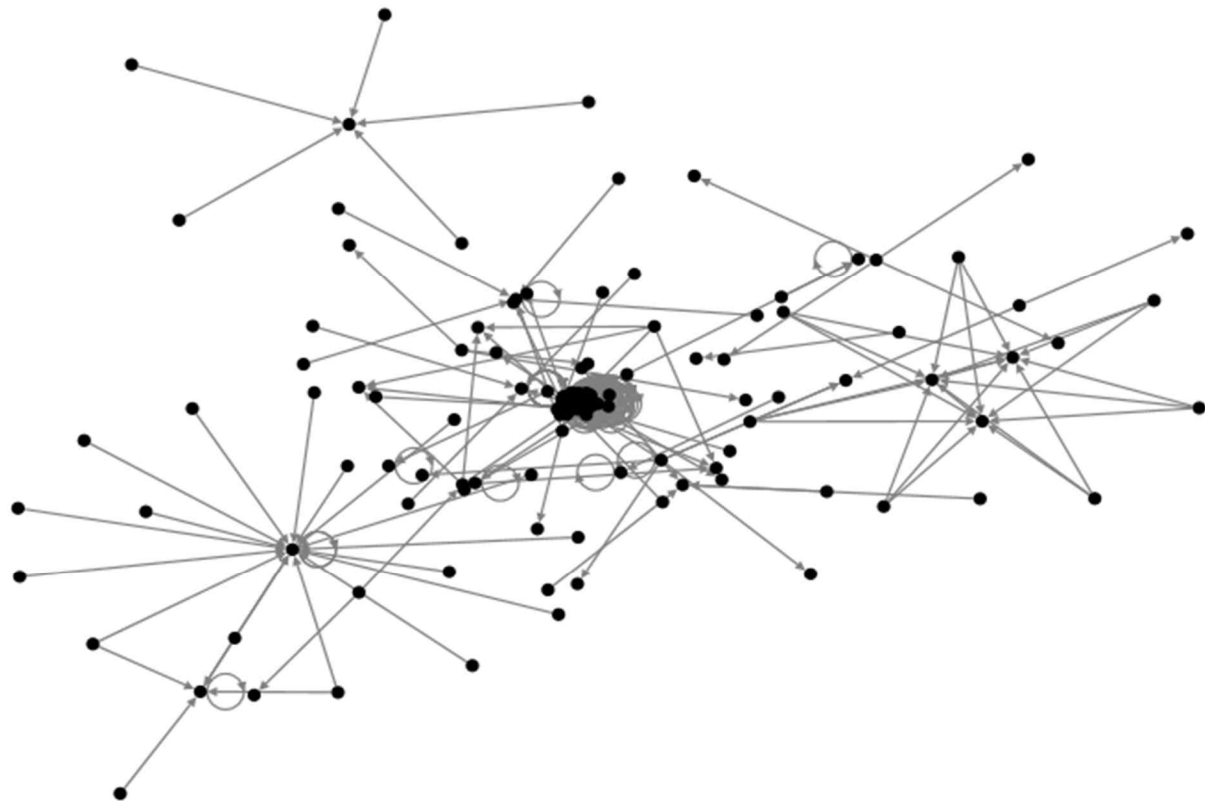
Average In-Degree	1.068
Average Out-Degree	1.068
Average Betweenness Centrality	3.877
Average Closeness Centrality	0.223

Top URLs in tweet in entire graph include [newsrep.co.kr](http://newsrep.co.kr), [kr.pairsonnalites.org](http://kr.pairsonnalites.org), [feeds.feedburner.com](http://feeds.feedburner.com), [blog.libertykoreaparty.kr](http://blog.libertykoreaparty.kr), [news.khan.co.kr](http://news.khan.co.kr), [Twitter.com](http://Twitter.com), and [blog.naver.com](http://blog.naver.com). There are 2 newspaper organizations, 3 blogs, including a political party, and a public organization. Among them, [feeds.feedburner.com](http://feeds.feedburner.com) plays the most important role in social network of communication of welfare policy offering information to communicators. It is more interesting to show that Liberty Korea Party, an opposition party in Korean politics, takes part in delivery system of welfare service, but the bog focuses on more marketing of its public pledge for welfare policy than welfare policy of the present government, Moon administration.

On the other hand, top tweeters in entire graph are [pairsonnalitesu](https://twitter.com/pairsonnalitesu), [pairsonnalitesa](https://twitter.com/pairsonnalitesa), [soyoungmoon86](https://twitter.com/soyoungmoon86), [kittyt515](https://twitter.com/kittyt515), [sunyoungoh92](https://twitter.com/sunyoungoh92), [joro45](https://twitter.com/joro45), [whion58](https://twitter.com/whion58), [sanyacho211](https://twitter.com/sanyacho211), [dancewomanfly](https://twitter.com/dancewomanfly), and [kjk36780](https://twitter.com/kjk36780). In particular, [pairsonnalitesu](https://twitter.com/pairsonnalitesu) and [pairsonnalitesa](https://twitter.com/pairsonnalitesa) have a strong influence on information flow of welfare policy on Bokjoro, these tweeters are the same organization for publicizing welfare programs made by the government with structure of a kind of blog.

We can map social network of communicators of welfare policy using Twitter data (figure 1). The network has a very complicated pattern including one independent network and some connected networks. There are some mediators who connect each network and can control information flow of welfare policy. There are more communicators getting the information than ones providing it, which means that there is likely to be dependence of information among communicators that can cause an obstacle and distortion of information flow system especially in independent network.

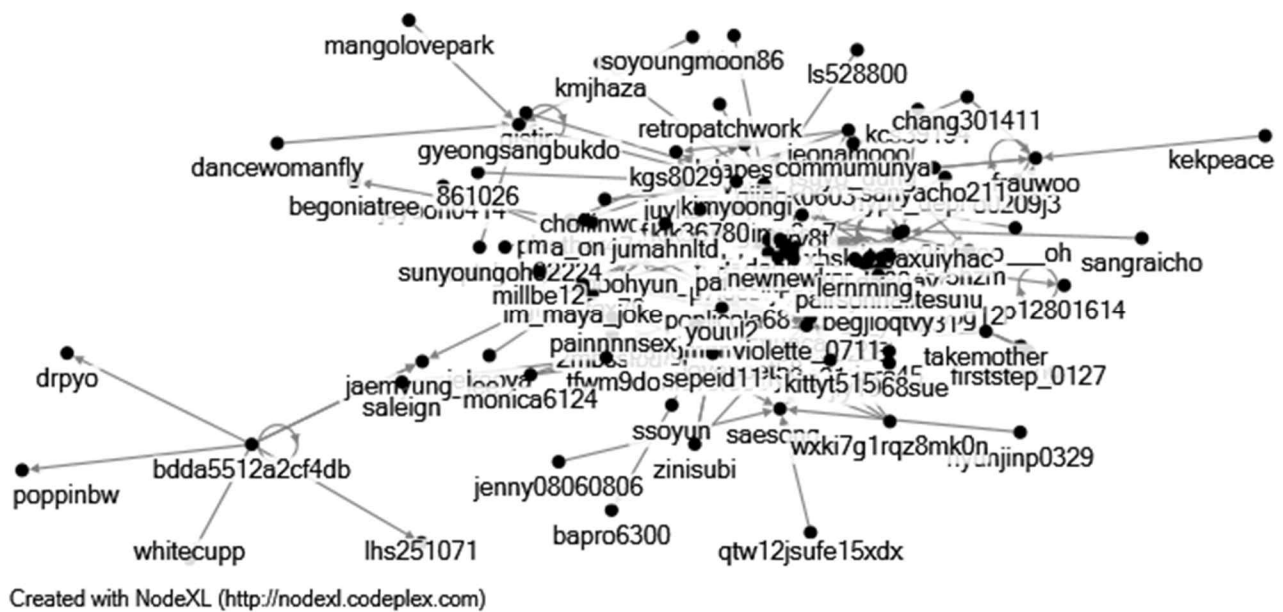
**Figure 1. Mapping Network of Communication of Welfare Policy**



Created with NodeXL (<http://nodexl.codeplex.com>)

Figure 2 shows social network of communicators of welfare policy with accounts used on Twitter. In independent network, gyeongsangbukdo is a main node with controlling power of information flow. Gyeongsangbukdo has information-sharing relationship with 5 nodes. In the network, 5 nodes significantly depend on a main node with high possibility of information distortion, so it is important to identify what kind of information and how gyeongsangbukdo shares with them. On the other hand, 5512a2cf4 has an influence on some nodes as an information provider with a mediator. In counterpoint to gyeongsangbukdo in the independent network, 5512a2cf4 has a good flow of information input and output by linking with the main resources of information, so there is unlikely to be information distortion.

Figure 2. Social Network of Communication of Welfare Policy with Accounts on Twitter



#### 4. Discussion

The main purpose of the research is to examine social network of communicators sharing information on Bokjiro and then search for implications for improving marketing of welfare service. This study shows that the social network of communicators on Bokjiro does not have many nodes, which means that there is little attention to information on welfare policy. It also has an independent network with high possibility of information distortion. More importantly, little communicators have controlling power of information flow in one way of communication.

The key finding of this study is that we can identify that it is not effective for marketing of welfare policy in providing online information through Bokjiro. Proceeding from this fact, Ministry of Health and Welfare should find effective ways of improving marketing of welfare policy by building better social network of communicators sharing information on welfare policy. It is very important to recognize that communicators can play a big role in improving and expanding marketing of welfare policy in an age of networked intelligence.

The government should use the transactional approach to marketing based on agent-oriented activity which highlights the exchange relationship between information providers and demanders. It firstly selects main messengers who can have controlling ability of information flow in a network relating to delivery of welfare service. These messengers can have more opportunities to receive information from the government and share it with others in the network through the government's support for marketing. The government should offer information to main communicators in a direct way like using building a communication pathway with targeting groups that can play a direct role to improve information flow. The government can immediately provide appropriate information to main communicators, if not, communicators can lose controlling and expanding information in the network.

One conclusion we can draw from this discussion is that it is quite important for the government to be able to analyze social network of communicators and find strategies for enhancing marketing of welfare policy in an age of networked intelligence that requires more networked activities online.

## References

- [1] <https://www.britannica.com/topic/welfare-state>
- [2] H. A., Elin, A. Bay and J. Saglie, “The New Politics of the welfare State? A Case Study of Extra-Parliamentary Party Politics in Norway”, *European Journal of Social Security*, Vol. 15, No. 3, pp. 249-272, 2013.
- [3] <https://www.investopedia.com/terms/p/public-good.asp>.
- [4] M. M, Durland and K. A., Bricks, “ Social Network Analysis in Program Evaluation. New Directions in Evaluation”, No. 107, *American Evaluation Association*, 2016.
- [5] M. Newman, *Networks: An Introduction*, Oxford: Oxford University Press, 2010.
- [6] M. Newman, A-L, Barabási and D. J., Watts, *The Structure and Dynamics of Networks*, Princeton, NJ: Princeton University Press, 2006.
- [7] S. Wasserman and K. Faust, *Social Network Analysis: Methods and Applications*, Cambridge: Cambridge University Press, 1994.
- [8] B.J. Seo and S.C, Lee, Network Analysis on Ageing Problems: Identifying Network Differences between Types of Cities, *The International Journal of Advanced Culture Technology*, Vol. 5, No. 2, pp. 19-25, 2017.
- [9] R. Drew and P. Aggleton, “Using Social Network Analysis to Evaluate a Complex Policy Network”, *Evaluation*, Vol. 17, No. 4, pp. 383–394, 2011.
- [10] P. M., Blau, *Exchange and Power in Social Life*, New York, NY: John Wiley & Sons, 1964.
- [11] E. Rice and Y-M. Amanda, “Social Network Analysis as a Toolkit for the Science of Social Work”, *Journal of the Society for Social Work and Research*, Vol. 6, No. 3, pp. 369-383, 2015.
- [12] E. Otte & R. Rousseau, “Social Network Analysis: A Powerful Strategy, also for the Information Sciences”, *Journal of Information Science*, Vol. 28, pp. 441–453, 2002.
- [13] K. S., Cook, R. M., Emerson, M. R., Gillmore, & T. Yamagishi, “The Distribution of Power in Exchange Networks: Theory and Experimental Results”, *American Journal of Sociology*, 275–305, 1983.