

Analysis on Characteristics of Communication Policy and its Transmission Dynamics

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Abstract

On the basis of in-depth analysis of the political activities, demonstrated the network topology of the communication policy, and researched its characteristics of transmission dynamics. The results show that the communication policy possess complex network characteristics of small-world and scale-free, as well as self-organizing, self-similar, modularity, and vulnerability; Its dissemination process presents the dynamic characteristics of wide audiences range, rapid dissemination speed, obviously group polarization and hysteresis, as well as the characteristics of random network. Finally, several views on guide policy and government management for information dissemination of the communication policy were proposed.

Keywords: *Communication policy, Complex network, Transmission dynamics*

1. Introduction

With the development of information technology, information dissemination is no longer limited by people's living environment, identity, and status; therefore, people can receive much more extensive information. The links between people have broken through the limitations of geographical environment. The outbreak of some political events and political turmoil was triggered on the basis of the information dissemination. The importance of "connection" is reflected in political system, political process, political power, government management, and international relations[1]. Communication policy is the basic feature of political activities. In-depth analysis on the characteristics of communication policy using complex network theory is conducive to detect and control

the adverse political events timely, to guide people's political orientation, and to affect political opinion effectively.

2. The characteristics of communication policy

Politics is the strategy, means and organization forms taken by each class of the society to maintain and develop the interests of the class itself, and to process the relationship inside the class and with other classes, races and nations. In modern times, politics is a huge social force affecting the interests of all members of society and governing their behavior, and will exist for a long time in human society. The realization of the political system, the political process, political power, government management, and the international relation requires the close contact and coordination between individuals involved in political behavior. The formulation and implementation of policy demand timely information exchange between various departments and members to make plans, instructions, decisions are arrangements. Politics cannot be achieved without "connection"(information transmission), and the characteristics analysis on political activity is from the perspective of "connection".

The communication policy permeates all aspects of political activities. The nature of "connection" is reflected in both Macro-aspects (a nation's political system) and

micro-aspects (work allocation and execution of a power organ) of political activities[2]. Political activity, as a complex network system composed by various levels of complex relation networks, is an opencomplex communication policy system[3],[4]. In the language of graph theory, the communication policy can be expressed as the network with complex topology and dynamic behavior, composed by the interactions between a large numbers of political members (related to political activities).

3. Analyses on the characteristics of communication policy

A complex network is a system containing a lot of individuals and interactions between the individuals, which is ubiquitous in nature and human society. These networks are very complex, their nature cannot be seized simply through the study of the nature of its constituent elements, and their overall behavior is not equivalent to the sum of the behavior of each constituent element. From the point of complex network theory, the statistics and analysis of communication policy can reveal some of the characteristics of the complex network and provide theoretical support for government's political decision.

The communication policy is a typical complex network possessing characteristics of small-world and scale-free, as well as self-organizing, self-similar, modularity, and vulnerability.

3.1 The topology of communication policy

The communication policy consists of a number of interdependent and interactional nodes, which can be individuals involved in political activities or authority departments. The structural integrity of the political system is highlighted by the interaction and coordination between these nodes; the nodes composing the political network are active nodes, which mean the nodes have the function of adaptive, self-organizing and self-regulatory, rather than relying entirely on the external regulation.

In the political network, the relationship between the subjects is multi-level, which can be a top-down power restriction relation in the political system, or coordinated relation between departments with the same level. The political network is a system with the nature of emanative, dynamic, self-adaptive and orderly, which is maintained and developed through the exchange of knowledge, information and energy.

3.2 The small word characteristics of communication policy

The small-world characteristics of the communication policy means that, in political system, member nodes can establish connections with each other through very few nodes, even the number of nodes participating in political activities is huge[6]. Because of the small-world characteristics of communication policy, government management is able to be implemented efficiently and orderly, and management layer can be linked closely, which have improved the efficiency of the information exchange. China's political organization form is embodied as the people's congress system, which is the fundamental political system of China. People's political aspirations are reflected through the election of representatives, and the National People's Congress is generated through the election at all levels of People's Congress. Ordinary people's political aspirations will reach the National People's Congress through the People's Congress at all levels. People's representatives participates in the management of state affairs by proposing motions. The timely information exchange greatly improves the efficiency of the political management, and the views of all parties can be considered in political decision making. China's political system fully reflects the small-world characteristics of communication policy; according to preliminary calculation, the average path length of China's communication policy is about 2 or 3.

3.3 The scale-free characteristics of communication policy

The scale-free characteristics of communication policy means the fact that a power-law distribution is met by the structure and characteristics of the network composed by member nodes participating in political behaviors[7]. In political systems, the member nodes, in very small quantities, but a high concentration degree, play central roles in the interaction regulating other nodes. Communication policy shows a very complex network structure, but only a small number of nodes play a core function, while most of the other nodes only have minimal interaction.

In a political system, its supreme leaders and the main functional departments are undoubtedly the key nodes of the political system, playing a key role in implementing government management, maintaining political stability, political decision-making, handling foreign relations and other political activities, and directly influencing the development of the political system as a whole. Secondly, the guiding ideology, laws and regulations, political

regime, power constitution of a state and government have a significant impact on political system, and is key nodes of complex network in another level. The scale-free characteristics of the communication policy are the key for a political system being maintained and developed.

At the same time, with taking advantage of the scale-free characteristics of communication policy, the US government has successfully applied the theory of complex network into anti-terrorism. On the basis of the linkages between known suspects of terrorist organizations, as well as their participation of a known terrorist conspiracy, Sankar and Sinensky successfully locked a terrorist leader of a terrorist organization in Iraq through calculating his importance. After that, through the analysis on the relation network of terrorist organizations using complex network, the US government successfully launched the military actions against Osama Bin Laden and Omar Mouammer al Gaddafi[8],[9]. It can be seen, the research and analysis on the scale-free characteristics of communication policy have become the focus of all nations.

3.4 The self-organization of communication policy

The self-organization of communication policy means the political system can coordinate optimization of its structure on the basis of its internal structure, and make the system to be perfected and developed^[10]. In the development process of politics, to meet the requirements of different times and environments, the development and progress of political systems can be achieved through the coordinated optimization of its structure. The theory of sinicization of Marxism and socialist road with Chinese characteristics is the witness of the self-organization of communication policy. The development of communication policy presents the nature of chaotic system due to the self-organization. Therefore, in the process of political management, the effect of political programs, political decisions and their implementation is unpredictable. On March 11, 2011, a Richter 9.0 earthquake occurred in Japan, and triggered a massive tsunami, resulting in the explosion of Fukushima nuclear power plant and the nuclear accident. Starting from March 17, a nonsensical rumor triggered the "Rob Salt Tide" involving hundred million people in 30 provinces of China in a very short period of time.

3.5 The self-similarity of communication policy

The self-similarity of communication policy means a local part of the political structure is similar to the whole in a sense. For different political systems, the organization

regime is not the same, but the part is similar with the whole in a certain extent from the viewpoint of organizational structure. For different levels of government agencies, the power allocation and the division of function exhibit similar network structure, which is identical with the organization of the whole regime. The main leaders, main sectors, and the major political events of different levels of government are consistent with the overall political system network structure. The self-similarity of communication policy simplifies the complexity of the government management; the consistency of various departments with the overall system ensures the smooth implementation of political programs and management policies; meanwhile, makes it possible for government managing the entire political system.

3.6 The modularity of communication policy

The modularity of communication policy means that the complex political network system can be divided into different modules in function and structure, to complete different functions, and these political member nodes are connected together in physical or functional to accomplish a relatively independent function. The National People's Congress is the highest authority of China, but in order to achieve the government's requirements, the State Council, the Central Military Commission, the Supreme People's Court, the Supreme People's Procuratorate and other state organs have been established according to the function in political activities. Local people's congresses and people's governments are also divided into many departments according to different functions. The modularity of communication policy exhibits the diversity of the political complex network functions. All the state organs are independent of each other in function, but they are affiliated to the management of the National People's Congress, under which, they work together to maintain the smooth implementation of political activities.

3.7 The vulnerability and robustness of the communication policy

Because of the scale-free characteristics of communication policy, some nodes of the political complex network have high degree of agglomeration, while the others have little connection with each other. The node degree distribution of the political network is extremely uneven, making the network political system exhibit vulnerability on deliberate attacks and robustness on random attacks[11]. Scale-free network has high robustness on random nodes attacks due to the extreme non-uniform distribution degree, the vast majority of the nodes have relatively small

degrees, while a small amount of the nodes have relatively large degrees. Scale-free network exhibits high degree of vulnerability on deliberate attacks due to the non-uniformity: it will generate significant impact on the connectivity of the entire network to attack nodes with large degrees intentionally. The collapse of the Soviet Union in 1991 had a significant impact on the world political situation. Valery Ivanovich Boldin believes "the Soviet Union was defeated from within, was ruined by a handful of influential leaders of the party and the state, and was undermined by the opposition". Chinese scholars proposed a so-called "traitor theory", they consider Gorbachev is the main culprit for the perishment of the Soviet Communist Party and the Soviet Union, and the traitor of socialism. Therefore, compared with minor political network nodes, political events on key nodes play a key role in the development and progress of the entire political network. If timely and effective measures cannot be adopted under attacks, the stability and security of the entire political network will be affected.

4. The dynamic characteristics of communication policy

The complex network characteristics of communication policy are the basic characteristics of the political network. It is conducive for the improvement of the analysis of the internal dynamic process of the political system to deepen the understanding and study of communication policy. With the development of network technology in recent years, the rapid development of the Internet has provided a new platform for political network exchange. Some political events are from information dissemination and exhibit significant transmission dynamic characteristics. The dynamic characteristics of information dissemination will affect the evolution of the communication policy.

4.1 Wide audience ranges

With the increase of approaches of getting information, people gradually pay more attention on network events, as well as various perspectives. Any individual in society are likely to be the object of information dissemination because of the diversity of transmission route of communication policy. Besides the coexistence of modern transmission routes, such as telephone, short message, QQ, MSN, Internet forums, and micro-blog, the traditional information dissemination pathways also occupy an important position in the spread of communication policy. Communication policy presents a radioactive network structure, with extremely broad coverage in geography, professions and age stage.

4.2 Rapid dissemination of information

As a complex network with a large number of nodes (society members participating in political activities), the information dissemination process of communication policy is a typical dynamic process. Some hot events spread on the Internet in small-scale, will become the focus of attention through the traditional media, and the sphere of influence will expand rapidly. As the key nodes in the entire information dissemination process, traditional media play a key role in the rapid spread of information. In addition to traditional news media, various news portal, celebrity micro-blog, and BBS have also become key nodes of the network information dissemination. The explosive spread of information has attracted the attention of people on political events; at the same time, the audiences can express and exchange their views and opinions, which means stronger interaction. The explosive spread of information promotes the evolution and development of communication policy to some extent; but if the dissemination of information cannot be guided effectively, it will seriously affect the stability of the political system.

The "7.5 event" of Urumqi Xinjiang China in 2009, causing more than 1,700 injured and 197 killed, was the biggest violent crime event with the most casualties and property damage since the founding of People's Republic of China. Using 21 Uighur websites and over 100 QQ groups, as well as mobile phone text messages and other ways, the organizers released the rioting information. Because of the absence of timely attention and clarification of the rumors and false news diffused by the organizers spread, the event occurred eventually, seriously affecting national unity and social stability.

4.3 Evident group polarization trends

Group polarization refers to the fact that audiences of network information have biased view on certain events, leading to extreme views, which is more likely to appear the phenomenon of group polarization in the virtual world. In the process of mass communication, the audiences are always looking for a consistency or harmony. If their opinions disagree with most people, or their opinions are uncertain, they will feel uneasy and tense. Therefore, in order to avoid this cognitive mismatch, people will form groups with those with similar viewpoints. At the same time, people often have a negative incompatible view on some political events. In network group events, due to the impact of group polarization and groupthink, the function of arousing and diffusing, or the effect of fueling and laches, mainly functions in evoking people's instinct and

contributing to the impulse of emotions venting. This is the direct cause of some of the network violence. In the evolution process of communication policy, group polarization may become a direct cause of political unrests.

4.4 The random network characteristics of communication policy in dissemination

As a kind of social network, communication policy has typical characteristics of scale-free network; meanwhile, it exhibits random network characteristics in dissemination. For some political events, no obvious key nodes exist in the network. These events do not have main leaders, guiding ideologies, political programs, unified organization and aims, and group polarization is the main cause of this kind of political events. Because the participants of these events are discontented with society and government management long time, a small political event will be amplified infinitely to vent their discontent, leading to the occurrence of vicious violence events ultimately.

Weng'an riot in Guizhou Province, China in 2008 resulted in more than 150 injured, as well as significant property damage. The real problem behind Weng'an riot is that the local government has lost people's trust, and a case of suspected criminal ultimately lead to a major social group event.

In 2011, London riots caused 200 million pounds economic loss at least. The local media and analysts believe that, the high unemployment, fiscal cuts, economic downturn, racial and cultural conflict, as well as the contradiction between young people and the police, are reasons causing the riot. In the occasion of the forthcoming opening of London Olympic Games, London riots shamed the United Kingdom on the international community.

4.5 The hysteretic nature of the dissemination of communication policy

Due to historical reasons and its time background and other factors, the dissemination of communication policy exhibits the nature of hysteresis. The process of information dissemination is hindered because it does not meet the interests and needs of those in power. Politics is the activities of seizing power and consolidating the regime executed by a certain class or group to achieve its economic requirements, and all the internal and external policies and strategies implemented. Class struggle is the essential nature of politics. The dissemination of political views representing different classes' interests exhibits the

characteristics of shift. The political views of a class will be able to be widely disseminated only when it wins the leadership. The Communist Manifesto, published in February 1848, systematically represented the ideological system of proletariat, which marked the birth of the Marxism. Because it does not meet the interests of those in power, its spread was hindered at first; over a long period of class struggle, Marxism has become popular gradually as the representative of the ideology system of proletariat.

5. Suggestion on communication policy in information dissemination and government management

The online media with growing influence not only are playing an important leading role in the development of network public opinion events, but also are very prominent in promoting political events being resolved satisfactorily. Therefore, it is an urgent problem to ensure the stability and development of communication policy using online media effectively.

5.1 Communication policy is the basic characteristics of politics, the network structure exerts an important impact on the stability and development of political systems

In the development and implementation of political decisions, attention should be paid on the importance of communication policy, combined with the structure and the features of the political network, in-depth analysis of the impact of political decisions on the entire political network should be executed. Meanwhile, combined with the dynamic characteristics, timely detect and guide the factors of instability in the political network, prevent the occurrence of adverse political events, and maintain the stability and healthy development of political systems.

5.2 Strengthen the legal system. According to China's laws, the contents of network information will be examined and traced before and after issuing

The information dissemination subjects have been set strict thresholds, such as the implementation of business license, interview and insert right configuration, which plays a positive role in ordering the existing communication policies. However, due to the wide range of audiences, rapid dissemination velocity, obvious network characteristics, diverse transmission routes, the legislation is still not perfect, and need to be further strengthened.

5.3 Strengthen government regulation

Government and social management departments should always pay attention to the trends of online and offline life and public opinions; for the questions of Internet users and the false information, they should respond timely and positively to announce correlative official information. To deal with the group polarization effect of communication policy, they should timely clear communication channels, arrange the Internet public opinions, and carefully deal with practical problems.

5.4 Strengthen the information communication

Release information timely through official mainstream websites and micro-blogs, and issue or respond to hot topics at BBS, so the masses can learn the status of the government, and achieve efficient information communication with the government. In this way, the information gap between the government and the people can be eliminated, and the political rumors can be proved unfounded in front of the facts, and the political opinions will not deviate from the normal track.

5.5 Establish a unified network platform; strengthen the popular participation in the construction of communication policy

People's aspirations for participation rights, information rights, supervision rights, and expression rights are getting more and more intense, and they are thirsty for an environment where they can express freely. People's opinions are worthy of the rulers' attention. The interaction between the government and the people will improve the administrative efficiency, and will help to improve the stability and development of communication policy.

5.6 Give full play to the role of the network opinion leaders

Government can develop its own opinion leaders, using the scale-free nature of communication policy, to organize forum moderators to guide the hotspot of online public opinions, to form positive and inclusive atmosphere of online public opinion. And also can invite authorities, relevant officials, well-known experts and scholars, media persons and grassroots celebrities to set agendas on the micro-blog, to actively publish authoritative speech and guide the online public opinion.

5.7 Clear the division of government functions and improve management efficiency

Modularity is the guarantee for government functions being achieved. Various government departments and agencies should clarify their own functions and responsibilities in achieving government management, to maintain the smooth conduct of various political activities. Avoid the embarrassing situation that some events have no one in charge, or the same event is managed by several departments.

6. Conclusions

As an important part of human civilization, politics exhibits the nature of typical complex network. Communication policy permeates in all aspects of political systems, and exerts a significant impact on the stability and evolution of political systems. In this work, we examined the communication policy and its dynamic characteristics in dissemination, and obtained the following conclusions: in the context of the rapid development of Internet, to achieve the stability and healthy development of political systems, we must regard the importance of the communication policy (and its dynamic characteristics), strengthen the legal system and government regulation, regard the exchange of information, and clear the division of government functions.

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