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What were residents' petitions in Beijing- based on text mining

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ABSTRACT

Understanding the petition of citizens is the basis for improving urban governance and citizen satisfaction during urbanization. Given Beijing's rapid growth and large scale in urbanization, it represents an interesting case study to explore the petitions of citizens. In this paper, we analyze nearly five thousand petitions through automated text analysis in order to summarize and explore the prevalent concerns voiced by Beijing citizens. We found that citizens' petition issues are regarding household registration (30.3%), illegal construction (22.6%), education (13.4%), demolition (11.8%), city management (9.8%), housing (7.7%), and traffic (4.4%). Petition Network Platform in Chinese cities has accumulated information resources, but the development and utilization is lagging behind. Text Mining of the public letters has been intricate; yet, it may serve as a novel technique to analyze and improve urban governance in China. The public should be encouraged to express their demands through the network platform for enriching information resources. Moreover, the response mechanism should be established for the public opinions derived from Text Mining, to improve public satisfaction.

1. Introduction

With global urbanization, a new urban era has been established, and the global urbanization level will reach 70% by 2050 (Birch & Wachter, 2011). Creating a higher standard of living for people is not only the goal but also the driving force of urban development. Citizens are the most important referees on whether to achieve this goal. Thus, understanding the petition and opinion of citizens is the basis for improving urban governance and citizen satisfaction during the growth process.

China with its large scale and rapid velocity is the vanguard in the wave of urbanization. According to the latest data released by the National Bureau of Statistics of the People's Republic of China, as of the end of 2017, the urban resident population in China was 813.47 million, with an urbanization rate of 58.52%.¹ In the recent 10 years, China's urban population has increased by about 20 million annually, more than the population of most countries in the world. There is no doubt that from now on, the vast majority of Chinese will live in cities. In order to continuously raise the level of urban governance, the government places great emphasis on soliciting citizens' suggestions and complaints. There are many channels for people to express their opinions and complaints, such as letters, calls, interviews, the Internet (including the Internet and the mobile Internet). At present, the most important approach of expressing petitions is the Internet, since the government's business is increasingly being implemented by means of information technology. Each city has its own Petition Network Platform, also called the Government-Civilian Interaction Platform in some cities. Most of them have developed a mobile APP, for the convenience of citizens. The online petition has taken up to 40.1% of the total

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¹ http://www.stats.gov.cn/tjsj/zxfb/201801/t20180118_1574917.html.

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amount of petition letters in 2015 in China,² and its proportion keeps rising, with the increasing popularity of the Internet. Facing a large number of petition letters, the text analysis has been intricate. However, Automated Text Analysis in R can be used as it has been proven useful in various disciplines, such as business informatics.

There are over 600 cities in China, with uneven development levels. As the capital of China, Beijing has achieved rapid development in recent years and is an intricate mega-city. To carry out research on it can provide a good reference for other cities. Therefore, this paper will analyze public letters of Beijing Petition Network Platform. In order to do so, we use R to identify the main demands of Chinese citizens. We believe that our results may have a positive impact on other developing cities.

Questions the paper wants to answer are as follows. What are the main issues that residents are particularly concerned about in all the complaints and suggestions in Beijing in 2015? What aspects of Chinese cities' Petition Network Platform need to be improved? How text mining technology is applied to serve urban governance and promotion of citizen satisfaction through the case analysis of Beijing?

The paper first presents a literature review built upon the revised related work in Section 2, followed by a briefing on data and methodology in Section 3. Section 4 is the main data analytical section that including basic statistics, word segmentation, and topic models refining. Based on the topic models package of R, Section 5 transforms it into the petitions of the public opinion expression. The last part is the conclusion and discussion of the research.

2. Literatures

2.1. Online petitions

Petitions have always been a classic topic in politics and policy research. Given the background of the internet, the current studies mainly focus on the following aspects.

- (1) The influence of the network on the expression of petitions. Researchers usually consider the Internet as a major source of re-engaging young people, and hence, revitalizing civic life, see. (Banaji & Buckingham, 2010). The Internet often has greater appeal and relevance for young people rather than performing “old” and “classical” forms of civic participation. Also, the Internet has the potential for creating new, and networked-based communication to maintain democratic political culture (Kann, Berry, Grant, & Zager, 2007). For the general public, the Internet can promote the dissemination of political knowledge and their petitions in political life (Mossberger, Tolbert, & McNeal, 2008).
- (2) The relation between the online and offline petitions. The data of political groups based on Facebook indicates that political online groups are closely related to offline political participation. Political online groups have similar function compared to one of the offline groups (Conroy, Feezell, & Guerrero, 2012). Comparing offline and online petition signing by analyzing the data from the 2010 Australian Election Study, evidence the Internet can mobilise traditionally underrepresented groups to participate in political activity (Sheppard, 2015).
- (3) The impact of the citizen's voice to improve public service online. Cases suggest that while information and communications technology platforms have been relevant in increasing policymakers' and senior managers' capacity to respond, most of them have yet to influence their willingness to do so (Peixoto & Fox, 2016). Darren Halpin studied the development of the Change.org platform in Australia on a data set covering over 17,000 petitions during a five year period and found that majority of petitions are targeted at government and most complainant are not serial participants (Halpin, Vromen, Vaughan, & Raissi, 2018).

2.2. Citizens' petitions

The existing body of literature mainly focuses on specific areas of civil complaint behaviour including the following four areas.

- (1) Complaints about public security service. There are some papers on this point. As an example, Terrill examined citizen complaint data from eight U.S. cities to analysis which types of police and police stations are more susceptible, as well as the main contents of the complaint (Terrill & Ingram, 2016).
- (2) Complaints about health service. Dowding found that there was widespread dissatisfaction in public health services in the UK, but there were few collective complaints, based on the online survey data of 5 years. Because people in good economic conditions would often prefer private health service, only a few scattered personal complaints from vulnerable groups (Dowding & John, 2011).
- (3) Environmental petitions. Using China's environmental statistical data, Dong et al. present an extensive empirical analysis of the relationships among citizens' environmental complaints, pollution intensities, and socio-economic characteristics. Household income has significant positive impacts on the likelihood of citizens lodging environmental complaints. Citizens in the municipality and coastal regions tend to complain more than those in interior regions. It may be helpful to strengthen basic education in poorer regions and to encourage environmental information disclosure for attracting more people's attention to pollution problems. In addition, regular inspection capabilities in poor and seriously polluted regions must be enhanced for investigating regulatory violation (Dong, Ishikawa, Liu, & Hamori, 2011).

² http://news.xinhuanet.com/politics/2016-05/05/c_128960081.htm.

- (4) Petitions analysis in a specific country. Al-Rubaian analyzed complaint letters of The National Assembly in Kuwait and divided them into Labor employment, economic disputes, education, public service, public security, environmental protection, national security and so on (Al-Rubaian, 2000). Moreover, citizens' demand for government information was classified into the environment, security, budgets, and government procurement and employees in Mexico (Berliner, Bagozzi, & Palmer-Rubin, 2018).

2.3. Chinese citizens' petitions

In a representative government, petitions usually can be discussed with members of parliament and, thus, influence national policies. However, the number of petitions to be able to enter the discussion session is, after all, a small part. Petition Network Platforms became an important channel for Chinese citizens to exercise the right to participate, to express and to supervise. Thus, all kinds of information and data on the Platform have become important resources for the research dealing with public demands. The online petition is an important innovation in the governance of Chinese society, which has become a major channel of the petition recently. Relative study on petitions includes the following aspects.

- (1) The role of network petition. The online petition is easy to achieve, which is also interactive and can exert great influence at low cost (Yang, 2014). The petition system helps to alleviate the information deficiencies under Chinese Communist Party's authoritarian regime (Chen, 2016). The Chinese government promotes its change from “keeping stable” to “safeguarding rights” with the concept of “governance” instead of “supervision”, in which network petition would play an important role (Yang, 2009). Local authorities are also interested in online public opinions, because they often think that specialized websites can indeed promote mutual trust between the Party and the people (Lagerkvist, 2005).
- (2) The responsiveness of network petition. The general way of the government to accept online public opinions is “citizens Petition-government confirmation-institutional solution” (Paik, 2012). Faced with increasing online political participation, the local government has strengthened the construction of response system and chooses new strategies to respond to citizens' petitions. However, the government has not been good at adopting online public opinions (Su & Meng, 2016). Meanwhile, someone found a paradoxical outcome of China's petition system: while it may help reduce the national authority's use of repression, it has caused an explosion of repression within the authoritarian system as a whole (Hok, Wong, & Peng, 2016).
- (3) Content analysis of petitions. Luehrmann analyzed complaint letters of 22 counties in 15 provinces in China from 1951 to 1996, and divided them into categories like community relations, public services, economic livelihood, political affairs, Petitions (including Petitions of decisions made by lower-level complaint bureaus or other organizations and attempts to overturn past political judgments, primarily related to the Cultural Revolution) (Luehrmann, 2003). Meng et al. found that the most concern issues are economic development, people's livelihood and welfare, land and construction, rural issues, corruption, through sampling analysis of the messages in people.com.cn (Meng & Li, 2015).

2.4. Review

The abovementioned studies analyzed concepts of online petitions, citizens' petitions on specific areas, and conducted some content analysis of Chinese Citizens' petitions in general; these studies have some fundamental limitations. First, current research is mainly confined to perform theoretical studies, and strict methods such as quantitative analysis of large samples and experimental research are seldom used. Second, current studies lack research on citizens with an integrated model that can systematically describe the response system to network petition based on big data methods. In this paper, big data techniques will be employed to analyze the letters of Beijing Network Petition Platform. Also, we investigate the structure of citizens' petitions and their reasons and come up with possible suggestions.

3. Data and method

3.1. Data sources

The data comes from public information of Interaction Platform between Government and Public³ (IPGP). It is hosted by the Beijing Municipal People's Government, and Beijing Official Portal Management Center is responsible for the operation and management. As an important part of e-government in Beijing, it is a window for the government to face the public, as well as a platform for municipal government departments and district governments to publish government information and provide online integrated service. It was officially opened on July 1, 1998, while it accepted network petitions as the first provincial platform⁴ in 2005.

The IPGP is designed to provide one-stop service. First of all, it can accept inquiry, complaints and suggestions from any aspect of the public. Then, the staff will carry out the artificial classification of all the letters. Some of them are able to be answered and solved, will be dealt with as soon as possible; others which cannot answer or deal with will be transferred to the relevant government

³ When the study was conducted, the URL was <http://rexian.beijing.gov.cn/>. However, due to the revision of the website, the current URL has changed to <http://www.beijing.gov.cn/hudong/> (access date: November 6, 2019).

⁴ Previously, there was a second platform called the “Mayor's Mailbox” used in Beijing. However, after several cyber security attacks, the platform's credibility has dropped resulting in less use by citizens.

departments. Next, the relevant departments will handle under the supervision of the government. The results will be included in the annual performance evaluation of the departments. Finally, the public can evaluate the results of their petitions.

Statistically, the platform has received an accumulative total of 307,474 letters from 2006 to 2015. In 2015, more than 20,000 letters were successfully dealt with by different government departments, which accounted for more than 80% of the letters received from citizens that year. A kind of stimulating cooperation between the platform and government ensures the active response of various government departments. As the platform is highly connected with the government and citizens, it can reflect the variety of online petitions as well as the response to them. Besides, data of the platform is transparent and available. The platform does not merely can explore network petition in China, it also provides a large number of materials for relative academic research.

3.2. Method

In this paper, online petitions in Beijing will be analyzed through Text Mining. Text Mining, also referred to as Text Data Mining, roughly equivalent to Automated Text Analytics, is the process of deriving high-quality information from text.⁵ It describes a set of linguistic, statistical, and machine learning techniques that model and structure the information content of textual sources for business intelligence, exploratory data analysis, research, or investigation. Text Mining has been widely applied in policy analysis, news and advertisement, etc.(Feldman & Sanger, 2007).

After collecting the text sources, about 5000 letters from the platform have been imported. The fields of imported letters include letter number, letter type, letter source, letter title, letter content, date and time of writing, reply content, reply time and reply organization. During the pre-processing stage, repeated and absent records are deleted. When applying text mining, words are divided, stop words are confirmed and synonyms are combined before performing word frequency analysis. Then, cluster analysis is used to explore the subject structure of letters and select the appropriate number of categories. Based on these results, topic models will be applied to conduct in-depth analysis. Topic models are algorithms for discovering the main themes that pervade a large and otherwise unstructured collection of documents (Blei, 2012). Finally, visualized figures will be given.

4. Result

4.1. Basic statistics

The letters include three categories: consultations, suggestions and complaints. We do not carry out analysis on the consultations, which mainly consulting some processes, policies and regulations. The suggestions and complaints will be treated as petition letters, except that some are been repeatedly or incompletely or wrongly submitted. Wrong submitted letters mean that some letters should be sent to the central government. The complainant doesn't make it clear that Beijing is a local government and not the central government. The total number of letters is 22,176 in 2015. After removing those invalid letters, we obtained 4,756 letters. The total number of Chinese characters in these letters is 901,517.

4.2. Word segmentation

The Chinese text uses Chinese vocabulary, while Chinese vocabulary consists of Chinese characters. First of all, there is no space between the Chinese vocabularies, thus, word segmentation is needed. Additionally, Chinese vocabulary can be divided into single-character, bi-character and multiple-character vocabulary, according to the quantity of the character. The single-character vocabulary mainly consists of functional words, like prepositions, conjunctions, and expressing tense. Furthermore, Chinese vocabulary does not have the root, so that the synonyms require artificial classification. The processing flow is as follows.

- (1) Word division. The words in letters are divided by using R and word frequency is recorded. The total number of words is 16,582.
- (2) Automatic stop word. Firstly, single words are removed, which are usually have no substantive connotation in Chinese. Then, words are removed whose frequency is less than 10. Low frequency means, that the words are not important and provide little information.
- (3) Manual stop word. Some of the left words should be removed, including those cannot express petitions such as “leader” “Beijing” and “government” etc.
- (4) Synonyms combination. Words with close meaning are combined.

4.3. Topic models refining

In machine learning and natural language processing, a topic model is a type of statistical model for discovering the abstract “topics” that occur in a collection of documents. Topic modelling is a frequently used text-mining tool for the discovery of hidden semantic structures in a text body. The justification for the number of topics has been a tricky problem. There have been currently no effective statistical method to assess the quality of the classification. By using topic models package of R, the topic number was set to 5–15 in turn, and top 10 words with the highest frequency under each topic were extracted, in order to compare the classification

⁵ https://en.wikipedia.org/wiki/Topic_model.

Table 1
Topic refining and word frequency top 10 list.

Sort	Topic1	Topic2	Topic3	Topic4	Topic5	Topic6	Topic7
1	"community"	"department"	"voice"	"salary"	"community"	"public transport"	"transaction"
2	"property"	"city management"	"synthesizer"	"street"	"resident"	"children"	"household registration"
3	"proprietor"	"illegality"	"play"	"personnel"	"safety"	"driver"	"job"
4	"demolition"	"complaint"	"driver"	"government"	"road"	"time"	"residence"
5	"company"	"conduction"	"passenger"	"plan"	"environment"	"kindergarten"	"unit"
6	"charge"	"personnel"	"motorcade"	"construction"	"traffic"	"school"	"certification"
7	"residents"	"law enforcement"	"direction"	"housing"	"vehicles"	"teacher"	"application"
8	"department"	"reflection"	"pulling in"	"solution"	"solution"	"primary school"	"children"
9	"management"	"report"	"service"	"provident fund"	"green land"	"route"	"archive"
10	"house"	"police station"	"public transport"	"homestead"	"potential danger"	"school district"	"temporary residence permit"
Topic refining	demolition	city management	traffic	housing	Illegal construction	education	household register

effect. After repeated comparison, we found 7 to be the best. Then the letters are divided by 7 topics and the top 10 words with the highest frequency under each topic are extracted in Table 1. The seven topics are named based on the meaning of these highly frequent words.

Topic1 is named as "demolition", for most of the high-frequency words has a relative on demolition, such as "community", "property" and "proprietor". With the rapid economic development and accelerated process of urbanization, a large amount of land should be developed, and demolition becomes a key issue (Xin, 2014). As demolition concerns a lot of practical problems such as the protection of personal interests of citizens, urban-rural integration, social stability and development of regional economy, etc., it involves complicated relationships when it comes to interests. Conflicts caused by housing demolition and relocation have been a major threat to social stability in China (Han, Shu, & Ye, 2018).

Topic2 can be called as "city management", which has a relationship with both top 10 high-frequency words. The importance of urban management in achieving sustainable urban development is increasingly recognised as being significant by urban managers and the general public in China (Wong, Tang, & Horen, 2006). On the macro point of view, there are many problems in city management as high management cost, extensive management, and single management, backward access to information and inadequate supervision and evaluation system. On the citizen's view, it includes the city infrastructure construction and management cannot meet the needs, and the development of the city is not synchronized, improve the appearance of the city's comprehensive law enforcement capacity is weak. The appeal of the content of city administration diversity, theme scattered.

Topic3 is defined as "traffic", for highly frequent words are related to this. Road traffic in Beijing is extremely congested (Sun, Zheng, & Wang, 2014). In general, the current transportation system is inadequate. For example, Beijing public traffic system is set only according to a different distance from the downtown centre, which results in the serious inconvenience of public traffic. The public traffic requirement of the residents live around areas such as railway station where large population move around is not sufficiently. The public transition system is not so sufficient around subway, and such insufficient public traffic transition system decreases the utility efficiency of the public transportation source. There are also many problems with imperfect details in traffic services, for example, "Voice", "synthesizer", and "broadcast" refer to the bus or subway broadcast to remind the station, and these may be a nuisance to the people.

Topic4 is named as "housing". High frequency words "construction", "housing", "solution", "provident fund", "homestead" have a close relationship to it. Meanwhile, other highly frequent words also have something with it. Most people in Beijing live in apartments, so there are many complaints about property management and community relations (Luehrmann, 2003). The main complaints include property management charges too high or unreasonable, poor quality of property services, inadequate facilities, developers late for property rights certificates, housing construction quality problems, unauthorized rental basements, unreasonable ground and underground garage parking fees.

Topic5 is considered "illegal construction". It does not look so intuitive. As a part of the urbanization process, illegal construction did not represent danger to basic social goals in terms of the way and the manner of urban development and construction of houses and settlements at the beginning (Zegarac, 1999). By looking at the letters, many members of the public complained that someone had built illegal buildings in residential areas or roads or public green spaces for commercial operation or renting. At present, illegal construction has become a major obstacle to the development of Beijing and damage the authority of the legislation.

Topic6 is labelled as "education". There is no objection to relate the high-frequency words with education except "public transport". By checking those letters, we found that the public mainly reflects the bus station settings affecting student safety. However, in the "household registration" and "housing" and other topics, we can find high-frequency words of education, such as schools, enrolment and so on. Education is more related to the right to education. Given taking a non-balanced development strategy in education, the policy of "key schools" has improved educational quality of some schools while widened the gap between different levels of schools in resource allocation and educational quality (Wang, 2008). The competition for education resources in Beijing is fierce.

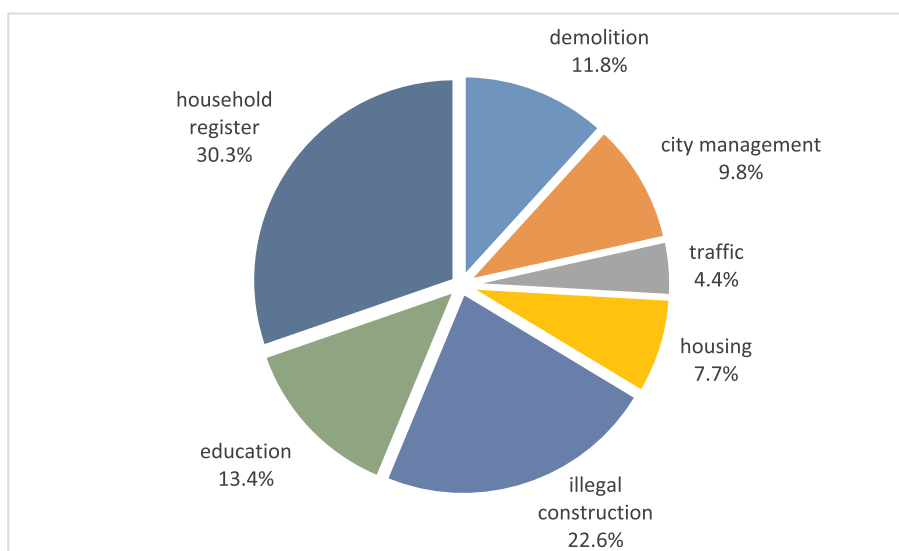


Fig. 1. Proportion of topics.

Topic7 is summarized by “household register”, since highly frequent words are related to this. Household register management (the Hukou system) is an important social management system used by various countries (Higgs, 2004). It's also called “civil registration”, “vital registration” or “registration of persons” (Mahapatra et al., 2007). Despite the difference in names, family register management in other countries is similar to that in China with a slight change in management methods. Compared with other countries, the most obvious feature of China's household registration system consists in the division of “agriculture account” and “non-agriculture account”, implementing the binary structure of urban and rural segmentation in family register management. The system dates back to early days after the foundation of China when the government strengthened social control making sure that enough farmers can be engaged in grain production to meet the needs of the industrial development of China (Chan & Zhang, 1999).

As there are too many letter numbers under each topic, they will not be listed here. The proportion of the number of letters in each topic is shown in Fig. 1.

5. Analysis of petitions

According to the proportion of citizens' petitions, the roots of these petitions will be analyzed in descending order, so that we can be a better understanding of Chinese cities in rapid urbanization.

5.1. Household register

Until now, household registration has become a significant condition that determines whether somebody can enjoy public service such as education, medical treatment and social security, etc. of the city (Wang, 2015). Petitions reflected in the letters often describe settlements of one's spouse or children, that is, the person changes his/her job and his/her spouse or children accompanies him/her to the city.

From the highly frequent words of household registration, we find serial relations: (1) Education. Regarding the highly frequent words “children”, why people actively help children settle down in Beijing? Household registration is a must to participate in the college entrance examination in Beijing. As we know, Beijing's college entrance examination admission rate is much higher than the ones from other provinces. (2) Employment. With regard to the highly frequent words “job”, some of the popular jobs are just for household-registered residents, such as government civil servants and state-owned enterprises, which result in an employment priority for them. (3) Medical care. The vast majority of well-known hospitals are in Beijing. It is difficult to get any reimbursement from medical insurance without household registration. (4) Housing purchase. Housing purchase is prohibited without household registration unless one pays personal income tax or social insurance for five consecutive years in Beijing. From 2006 to 2016, Beijing pure commodity housing prices rose from 7,877 yuan per square meter to 35,218 yuan per square meter. Housing prices increased to more than 4 times in the past ten years. Even without considering the needs of living, it is but also a very attractive investment opportunity.

5.2. Illegal construction

Illegal construction refers to those buildings that are in violation of the building permit, or that are built without a government permit, or which are newly built, expandable built or rebuilt with approval obtained by way of deception in the planning area of the

city (Zegarac, 1999). These buildings violate relative laws and regulations such as Land Management Law, Urban and Rural Planning Law, Regulations of Village and Town Planning and Construction Management, etc.

Based on the analysis of letters, we find that there are the following kinds of illegal buildings: (1) Buildings that are built to gain more economic benefits for estate companies or individuals without application of approval, which also fail to obtain land use permit and building permit. Such as the highly frequent words "community" mainly related to the public complaints about real estate companies. (2) Estate companies unauthorized changes the building permit regulations, as well as the alternative statutory use of the building. The highly frequent words "potential danger" usually refers to the harm that may bring to the public. (3) Buildings that are expandable rebuilt or illegally built in rural-urban fringe zone or areas to be demolished, so as to obtain more compensation. (4) Buildings built for rent or business in public space occupied by individuals or stores, such as a green belt (highly frequent words "green land") and urban road (highly frequent words "road").

Those buildings which are built illegally in the country using collective land⁶ or farmland through private agreement and land renting instead of expropriating. These illegal buildings are rent to perform a private business, which involves greater economic interests and a large number of people. However, the weak law enforcement of relevant departments results in many longstanding problems (Feingoldlink, Edwards, Jones, Hartmann, & Edwards, 2014);

5.3. Education

Beijing possesses the best education resources and has more advantages than other provinces and cities in enrollment rate of college entrance examination and admission scores of well-known colleges. But imbalanced resources in Beijing cause many complaints. According to the highly frequent words, the main are as follows: (1) Transportation. Highly frequent words "public transport" mainly refers to the parent's complaints that there is no bus station near the school, hence students can not conveniently go to school. (2) Students from other provinces cannot take part in the college entrance examination in Beijing. Some students from other provinces who studied in Beijing for many years want to take part in college entrance examination here, unwillingly to return to their own registering province; however, they cannot. (3) Admission based on the residential address (school district). After the recent educational reform, students who are entering primary school and who are entering junior high school must attend the neighbourhood school strictly according to the official designation of School Districts. Other schools are forbidden. However, some parents have complaints about this rule concerning School Districts. For example, according to the regulations, only one child can attend the designated elementary school of the house in 6 years if which are rented or borrowed. It's really a problem for families with children a small difference in age. (4) The school management. Some citizens are not satisfied with the school management and complain that some teachers are not responsible.

5.4. Housing

The shortage of housing is one of the most serious problems facing many big cities in China, especially in Beijing (Paik, 2012). The main problems concerning housing are as follows: (1) Community public space is occupied, sundries and combustibles are piled up in the passageway, and fire control passageway is occupied for parking and private lock affect transit of emergency vehicles and emergency evacuation; (2) Community public facilities are destroyed, involving road potholes and breakage, no street lights or broken lights, etc. There are defections of firefighting facilities and the supplementation as well as a replacement is not timely; (3) Housing Security. As public rental housing is a protection scheme putting forward for the low-income currently in Beijing, many people complain that they can't enjoy the welfare. (4) House in multiple occupations (many people rent houses together). In order to live more people and make more money, those housing always changes the structure of the house, the transformation of waterways and circuits. In addition, there are some owners separate the room by wood or other non-refractory boards, performance wire distribution of random, which are easy to cause a fire. There is a big security risk in a house in multiple occupations. As a matter of fact, there were many fire accidents in the suburbs in Beijing, and some even caused serious loss of life and property.

5.5. City management

There are more petitions concerning the topic of city management, including the following aspects: (1) Air pollution. The "air" is a highly frequent word. The relevant letters mentioned industrial emissions affect the normal life of surrounding residents; the smelly water in Liangshui River, Qinghe River, Xiaoyue River and Wenyu River, etc. is repeatedly polluted; outdoor barbecues are the main reason for environmental pollution. (2) Garbage management. The "garbage" is a highly frequent word. Garbage burning still exists despite repeated prohibitions, which makes the hazy weather worse; some large landfills such as Asuwei, Gao'antun, Liulitun, etc. are producing smells and there is no radical solution.

5.6. Traffic

The problems reflected by citizens are as follows: (1) Traffic behaviour. Such as illegal parking on the road, setting up the private

⁶ The constitution of China provides that land ownership is divided into two categories, namely the state ownership and collective ownership. Land in the rural and suburban areas is owned by collectives except for those portions which belong to the state in accordance with the law.

lock as well as illegal taxi and motorcycle taxi etc. has disturbed traffic order. Some bazaars originally intended to facilitate members of the public to buy food, seriously affect traffic, because roads are occupied by traders and lots of customers. (2) Public transport system. It has been difficult to take a bus or subway during the rush hours in the morning and evening because it's too crowded. In particular, residents form two large living community, Tiantongyuan and Huilongguan, complained a lot about it. Some traffic facilities are unreasonable, such as road line on a particular section, camera installation and traffic lights, etc. (3) Vehicles. As the number of mobility scooter for the old is sharply increasing, citizens increasingly hope that regulatory policies and measures can be made by relative departments to strengthen regulation in the production, marketing, access, useable range and management of driving area etc. of scooters.

5.7. Demolition

With the rapid economic development and accelerated process of urbanization, a large amount of land is to be developed, and demolition becomes a key issue (Xin, 2014). As demolition concerns a lot of practical problems such as the protection of personal interests of citizens, urban-rural integration, social stability and development of regional economy, etc., it is difficult to conciliate the interests of parties concerned with it. The main problems during demolition are as follows: (1) Compulsory demolition. As regulated by article 17 in Regulations on the Management of Urban House Demolition: if the household to be resettled or the house tenant can't move out within the time limit regulated by the rule, the people's government of the city or county where the house is located has the right to urge relevant departments to demolish the house compulsorily, or the demolition management department can submit legal application to the people's court for compulsory demolition. According to article 19 of Regulations on the Procedure of Administrative Adjudication of Urban House Demolition, if the remover doesn't provide compensation, house for resettlement that meets the national quality safety standard or turnover house for the household to be resettled, demolition shall not be implemented. According to the regulations, the remover should provide a house for resettlement or turnover house before compulsory demolition. However, in practice, the remover sometimes begins to demolish the house before providing a house for resettlement or turnover house for the household to be resettled. (2) Unreasonable resident placement. Although the remover offers the house for resettlement or turnover house, the house can't make the household to be resettled satisfied, for some houses provided by the remover lower their housing standard. (3) Low compensation standard. The household to be resettled think that the compensation standard is too low to maintain their previous living standard.

6. Conclusion and discussion

6.1. Conclusion

Beijing citizen's network petitions show that under the current system of China, with the rapid process of urbanization, the main contradiction consists between the serviceability of the government and citizens' petitions. To meet the demands of citizens, the above problems should be solved fundamentally. The following measures are suggested.

- (1) Encourage more citizens to express their demands through the network platform. Compared to the 22 million people living in Beijing, about 22,000 letters a year are not so much. Some letters are concerned about trivial matters, such as potholes and waste on the street. In some developed countries, these matters can be reflected and solved quickly by members of parliament in the area without being sent to the mayor. However, in China, the subordinate has no right to supervise the superior, but the superior can supervise the subordinate (Manion, 1985). Therefore, only if the problems are given to the mayor or secretary of the municipal Party committee they can be solved. The petition and repression paradox (Hok et al., 2016) did exist before but has been basically solved, with a series of institutional reforms to encourage a responsible attitude (dan-dang).

Strengthen and optimize the existing network of petition channels, so as to release of public demand, to ease the network public opinion, to improve public participation in public management initiative, to create a harmonious urban management environment. Firstly, we should increase the publicity for government and public interactive platform, widely disseminate it by television, the Internet, newspapers and other media, in order that more people know the platform. Secondly, various free training courses should be organized in the community, as well as handbooks should be sent to every family. Through these measures, we can improve the skills of the user of the public platform, especially for people with low education levels or the elderly. In the end, we should actively respond to and reward the public complaints, so that more people will express their demands through the platform. For example, the top ten letters could be selected each year, and some honours or material rewards could be given to writers.

- (2) Reform the system of taking household registration as a threshold for public service access. As the most complaint topic, household registration is bound by public services access, which is the root cause. Education, social security, medical and other public services are linked with the household registration. Moreover, employment, housing purchase is also related. Too many people want the general citizenship, while do not want to be second-class citizens. Thus, Beijing should speed up the reform of the household registration system. Everyone or each family who work and pay taxes here should enjoy the basic public service, rather than accessed by the household registration.
- (3) Improve public space protection legislation. Illegal construction, if infringing personal interests, individuals will report or accuse. Facing the violation of public space, many people may choose to silence. Therefore, the vast majority of illegal buildings will

occupy public space. Fortunately, there are also some people reflect in letters that those illegal constructions cause damage to public space. Beijing has no special laws to protect public space. Thus, legislative measures should be taken to punish those behaviours to protect public space.

- (4) Establish a multi-level rail transit system, including trunk railway, intercity railway, suburban railway, and subway. Beijing did not build a real sense of the suburban railway, during the construction of satellite cities and new towns. Due to the lack of efficient and convenient traffic support, Beijing's traffic jam is very serious. Therefore, Beijing should put the suburban railway construction on an important strategic position. Through accelerating the development of the suburban railway, to create "1-h commute circle" between Beijing and the surrounding area.

6.2. Discussion

Although the analysis is based on data obtained in 2015, problems bothered the Beijing Municipal Government for many years, which cannot be solved in a short time. These problems may also plague other developing cities in the world. As a matter of fact, there is a paradox of urban public service. Better public service in the city can attract more people outside the city. Meanwhile, the increasing population will impose fiscal burdens on established residents in the form of lower public service levels (Ladd & Helen, 1992). That's the fundamental cause of the household registration restrictions in Beijing to prevent the population from increasing. Automated Text Analysis can give a useful reference for urban governance. If the city uses this technology, some supporting systems will be needed.

- (1) Early warning management. Although there are a large number of public letters in most cities, there is a lack of in-depth analysis. Public complaints play a large role in policymaking and are at the heart of political science such as representation and policy responsiveness (Lax & Phillips, 2009). Through the Automated Text Analysis of the public complaints, we can draw the public complaints map, to carry out urban public opinion monitoring, timely detection of urban governance problems. By changing afterwards control to advance prevention, we can achieve early warning management, effective prevention and control of significant risks, to ensure the healthy development of society.
- (2) Problems with response mechanism. For major problems found in Automated Text Analysis, a response mechanism should be established, as well as the speed and intensity of response to major problems should be enhanced to improve public satisfaction. For example, the household registration system is the most concentrated problem of Beijing public demand; what's more, education is bound with the household registration. Thus, household registration system reform should be the key task of urban reform in Beijing.

References

- Al-Rubaian, E. S. (2000). A study of citizens' complaints submitted to the National Assembly in Kuwait. *International Review of Administrative Sciences*, 66(3), 513–526. <https://doi.org/10.1177/0020852300663009>.
- Banaji, S., & Buckingham, D. (2010). *Young people, the Internet, and civic participation: An overview of key findings from the CivicWeb project*.
- Berliner, D., Bagozzi, B. E., & Palmer-Rubin, B. (2018). What information do citizens want? Evidence from one million information requests in Mexico. *World Development*, 109, 222–235.
- Birch, E. L., & Wachter, S. M. (2011). *Global urbanization*. University of Pennsylvania Press.
- Blei, M. D. (2012). Probabilistic topic models. *Communications of the ACM*, 55(4), 77.
- Chan, K. W., & Zhang, L. (1999). The hukou system and rural-urban migration in China: Processes and changes. *The China Quarterly*, 160, 818–855.
- Chen, J. (2016). *Useful complaints: How petitions assist decentralized authoritarianism in China*. Rowman & Littlefield.
- Conroy, M., Feezell, J. T., & Guerrero, M. (2012). Facebook and political engagement: A study of online political group membership and offline political engagement. *Computers in Human Behavior*, 28(5), 1535–1546.
- Dong, Y., Ishikawa, M., Liu, X., & Hamori, S. (2011). The determinants of citizen complaints on environmental pollution: An empirical study from China. *Journal of Cleaner Production*, 19(12), 1306–1314. <https://doi.org/10.1016/j.jclepro.2011.03.015>.
- Dowding, K., & John, P. (2011). Voice and choice in health care in England: Understanding citizen responses to dissatisfaction. *Public Administration*, 89(4), 1403–1418. <https://doi.org/10.1111/j.1467-9299.2011.01960.x>.
- Feingoldlink, L., Edwards, T. L., Jones, S., Hartmann, K. E., & Edwards, D. R. V. (2014). Enhancing uterine fibroid research through utilization of biorepositories linked to electronic medical record data. *Journal of Women's Health*, 23(12), 1027–1032.
- Feldman, R., & Sanger, J. (2007). *The text mining handbook: Advanced approaches in analyzing unstructured data*. Cambridge University Press.
- Halpin, D., Vromen, A., Vaughan, M., & Raissi, M. (2018). Online petitioning and politics: The development of Change.org in Australia. *Australian Journal of Political Science*, (2), 1–18.
- Han, H., Shu, X., & Ye, X. (2018). Conflicts and regional culture: The general features and cultural background of illegitimate housing demolition in China. *Habitat International*, 75, 67–77.
- Higgs, E. (2004). *Life, death and statistics: Civil registration, censuses and the work of the general register office, 1836–1952*. University of Hertfordshire Press.
- Hok, S., Wong, W., & Peng, M. (2016). Petition and repression in China's authoritarian regime: Evidence from a natural experiment. *Journal of East Asian Studies*, 15(1), 27–67.
- Kann, M. E., Berry, J., Grant, C., & Zager, P. (2007). The Internet and youth political participation. *First Monday*, 12(8).
- Ladd, & Helen (1992). Population growth, density and the costs of providing public services. *Urban Studies*, 29(2), 273–295.
- Lagerkvist, J. (2005). The rise of online public opinion in the People's Republic of China. *China: An International Journal*, 3(01), 119–130.
- Lax, J. R., & Phillips, J. H. (2009). How should we estimate public opinion in the states? *American Journal of Political Science*, 53(1), 107–121.
- Luehrmann, L. M. (2003). Facing citizen complaints in China, 1951–1996. *Asian Survey*, 43(5), 845–866.
- Mahapatra, P., Shibuya, K., Lopez, A. D., Coullare, F., Notzon, F. C., Rao, C., et al. (2007). Civil registration systems and vital statistics: Successes and missed opportunities. *The Lancet*, 370(9599), 1653–1663.
- Manion, M. (1985). The cadre management system, post-Mao: The appointment, promotion, transfer and removal of party and state leaders. *The China Quarterly*, 102, 203–233.
- Meng, T., & Li, F. (2015). Political interaction in cyberspace: Citizen appeals and government responsiveness – a big data analysis based on the national network politics platform. *Journal of Tsinghua University*, 3, 17–29 (in Chinese).

- Mossberger, K., Tolbert, C. J., & McNeal, R. S. (2008). *Digital citizenship: The internet. Society and participation*. Cambridge: MIT Press.
- Paik, W. (2012). Economic development and mass political participation in contemporary China: Determinants of provincial petition (Xinfang) activism 1994–2002. *International Political Science Review*, 33(1), 99–120.
- Peixoto, T., & Fox, J. (2016). When does ICT-enabled citizen voice lead to government responsiveness? *IDS Bulletin*, 47(1).
- Sheppard, J. (2015). Online petitions in Australia: Information, opportunity and gender. *Australian Journal of Political Science*, 50(3), 480–495.
- Su, Z., & Meng, T. (2016). Selective responsiveness: Online public demands and government responsiveness in authoritarian China. *Social Science Research*, 59, 52–67.
- Sun, C., Zheng, S., & Wang, R. (2014). Restricting driving for better traffic and clearer skies: Did it work in Beijing? *Transport Policy*, 32(1), 34–41.
- Terrill, W., & Ingram, J. R. (2016). Citizen complaints against the police: An eight city examination. *Police Quarterly*, 19(2), 150–179. <https://doi.org/10.1177/1098611115613320>.
- Wang, S. (2008). Analysis on the policy of “key schools” in Chinese basic education. *Education Research*, 30(3), 64–66.
- Wang, F. L. (2015). Brewing tensions while maintaining stabilities: The dual role of the Hukou system in contemporary China. *Asian Perspective*, 29(4), 85–124.
- Wong, S. W., Tang, B. S., & Horen, B. V. (2006). Strategic urban management in China: A case study of Guangzhou development district. *Habitat International*, 30(3), 645–667.
- Xin, H. (2014). Maintaining stability by law: Protest-supported housing demolition litigation and social change in China. *Law & Social Inquiry*, 39(4), 849–873.
- Yang, G. (2009). *The power of the Internet in China: Citizen activism online*. Columbia University Press.
- Yang, Y. (2014). The status and promotion of the network petition. *Archives*, (4), 461–462.
- Zegarac, Z. (1999). Illegal construction in Belgrade and the prospects for urban development planning. *Cities*, 16(5), 365–370.