Evolution of Provincial Economic and Social Development Plan for Pandemic Prevention since SARS to COVID-19

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Abstract

After the SARS outbreak of 2003, what had changed in China's economic and social development plan? Moving into the COVID-19 era, has any innovation taken place in the latest development plan covering the period from 2021 to 2025? This paper attempts to explore answers to the above questions. This study looks at the 31 provinces, municipalities, and autonomous regions in mainland China. 114 files of the 10th (2001-2005), 11th (2006-2010), 12th (2011-2015), 13th (2016-2020), and 14th (2021-2025) Five-Year Plan for provincial Economic and Social Development were collected. Totally, more than 6 million words. Text analysis was applied as the research method in the study. Specifically, it is the term frequency analysis. Firstly, the vocabulary about pandemic prevention was based on 114 files; then compared the changes of term frequency over years to summarise the evolution of Provincial Economic and Social Development Plan. Main findings: the system of China's modern public health emergency management started since SARS with a leapfrog development while became comprehensive during the COVID-19 outbreak; The economic policies released during COVID-19 proposed various financial and banking supports and aid. It is likely to have a profound effect on the future.

Keywords

Provincial Economic and Social Development Plan, Content analysis, Pandemic Prevention

1. Introduction

The 2002–2003 outbreak of severe acute respiratory syndrome (SARS) have challenged China's public health emergency management system (PHEMS) critically (Sun et al., 2018). 17 years have passed, COVID-19 has been challenging the PHEMS once again (Wang et al., 2020).

Over the past nearly two decades, Chinese government has taken forceful actions to build PHEMS (Sun et al., 2018), urban and rural space with health service function was getting more and more attentions (Songlin et al., 2020, Yun and Yu, 2011, Yin et al., 2010), the country has experienced rapid economic growth (Zhang et al., 2021); on the other hand, the rapid economic growth and progress has not been matched by progress in health care (Wang, 2017), the development level of medical and health services is uneven among regions (Pan and Zhu, 2020, LIANG et al., 2019), and the characteristics of the two outbreaks are different (Hu et al., 2021, Yang et al., 2020). So that such a difficult situation is not unexpected. Different anti-epidemic situations must give rise to new anti-epidemic strategies, no matter long-term or emergency, whether at the macro or micro level. This study aims to figure out what's new of the long-term pandemic prevention measures at the macro level.

Outline of Five-Year Plan for provincial economic and social development is one of the most important upper-level plans for city comprehensive planning. It also can reflect the overall situation in the country in a more comprehensive way. It is released every five years by local governments of the Communist Party of China. It is a series of social and economic development initiatives and often referred to as Five-year Plan. Based on Five-year Plans of the past 20 years and the next 5 years of 31 provinces, municipalities, and autonomous regions apply text analysis to explore the evolution of long-term pandemic prevention measures at the macro level is feasible and valuable.

The introduction is followed by a brief literature review summarised two types of related research; the next section is to state the methodology and data processing; then it is the core of this study, including the main analysis results; in the last part, the main findings were summarised, the flaws and the future improvement strategies were proposed.

2. Literature review

Recently, many studies have emerged on emergency anti-epidemic measures. Wu et al. (2021) applied Bibliometric methods on 366 policies of epidemic prevention during COVID-19 to reveal and characterize the patterns of China's anti-pandemic policy and the evolution over time. Chinazzi et al. (2020) aimed to figure out the impact of travel restrictions in Wuhan City on the national and international spread of the epidemic by using quantitative analysis method. Evenett (2020) used qualitative analysis method to characterize and assess current trade policy stance towards the imported goods used by hospitals and front-line medical professionals to tackle COVID-19 in multiple countries.

Related to long-term pandemic prevention measures, there are significant portion of the research has focused on healthy cities. Ran et al. (2021) compared several subjective and objective methods to find out an appropriate evaluation method for evaluating the level of healthy city by taking cities in Central China as study cases. Li et al. (2020) used Experts Grading Method to develop a scientific and appropriate indicator system for the evaluation of a healthy city in Chongqing, China. Webster and Sanderson (2013) provided an important insight into the interpretation, availability, and feasibility of collecting data, resulting in the development of a revised set of 32 indicators with improved definitions. Besides, there are also articles about urban and rural green space with health service function. Wolch et al. (2014) reviewed the Anglo-American literature on urban green space, especially parks, and compares efforts to green US and Chinese cities and proposed that urban planners, designers, and ecologists need to focus on urban green space strategies that are "just green enough" and that explicitly protect social as well as ecological sustainability.

Above mentioned related research have important reference value for building the vocabulary applied in this study.

3. Methodology and data processing

3.1 Methodology and text analysis tool

Word frequency, which refers to the number of times a given word appears in that document. It is a common weighting technique used in intelligence retrieval and text mining to evaluate the degree of repetition of a word for a document or a set of domain documents in a corpus. The importance of a word increases proportionally with the number of times it appears in a document. Higher frequency means higher concern. Changes in frequency mean shifts in focus. Differences among different period Five-year Plans can reveal the policy trends.

Gooseeker is a text analysis tool with word frequency analysis function. The tool is based on machine learning algorithms for Chinese word segmentation. And it allows user to combine words with the same

meaning into one term for analysis. To compare with other text analysis tools, it has been proven to be effective in word frequency analysis (Tao et al., 2019, Tao et al., 2021).

3.2. Data processing

The 2002-2003 outbreak of SARS occurred during Tenth Plan (2001–2005) and Covid-19 occurred during Thirteenth Plan (2016–2020). To figure out how the public health emergencies effect the policy decision, this study used the text of Tenth Plan (2001–2005), Eleventh Plan (2006–2010), Twelfth Plan (2011–2015), Thirteenth Plan (2016–2020) and Fourteenth Plan (2021–2025) as the data basis for content mining.

There are 31 Provincial administrative units in mainland China. Finally, 31 files of Tenth Plan, 16 files of Eleventh Plan, 17 of Twelfth Plan, 21 of Thirteenth Plan, 29 of Fourteenth Plan are collected. All of them are downloaded from government official website. Totally, there are 114 files, more than 6 million words. As shown in Table.1.

		Tenth Plan (2001–2005)	Eleventh Plan (2006–2010)	Twelfth Plan (2011–2015)	Thirteenth Plan (2016–2020)	Fourteenth Plan (2021–2025)
	Files	31	16	17	21	29
Total	Words					
Number	in text	865, 139	661, 876	935, 025	1, 473, 008	2, 182, 096

Table 1. Total Number of Files and Words. Source: Author.

To conduct the content analysis on files of Five-year Plans by using Gooseker, it is necessary to pre-process the files as following: convert file format to adapt the analysis tool; delete the pictures and non-text content. Then, import the pre-processed files into the analysis tool. Based on the word segmentation result of the tool and its function of merging synonyms, referring to related studies, establish a vocabulary with the theme of anti-epidemic measures. As shown in Table 2. Then export the term frequency statistics of selected words for further analysis

Health care	Infectious disease	Interest discount and tax benefits
Emergency	Mental health	Physical condition
Sports	Sports facilities	Maternal
Children	Disease Control and Prevention	Medical industrial
Public health	COVID-19	Medium or long-term loans
Disable people	Living space	Reduce rent and interest
Pandemic	Wastes treatment	Fever clinics
Park	Vaccine	Emergency transportation
Online	Non-motorized traffic	Stabilize posts
Medical supplies	Public transportation	Service in foreign languages
The elderly	Health education	SARS

Table 2. vocabulary with the theme of anti-epidemic measures

4. Analysis results and discussion

4.1. Analysis results

Rank -ing	Tenth Plan (2001–2005)		Eleventh Plan (2006–2010)		Twelfth Plan (2011–2015)		Thirteenth Plan (2016–2020)		Fourteenth Plan (2021–2025)	
1	Health care	2.65	Health care	5.44	Health care	4.37	Health care	5.66	Health care	5.15
2	Sports	2.14	Emergency	2.83	Emergency	3.33	Emergency	3.27	Emergency	4.98
3	Living space	1.01	Sports	2.01	Sports	1.84	Sports	1.91	Sports	2.18
4	Online	0.86	Public health	1.84	Public health	1.37	Disable people	1.07	Children	1.88
5	Disable people	0.81	Disable people	0.82	Disable people	1.35	Children	0.96	Public health	1.60
6	Sports facilities	0.74	Children	0.77	Children	1.27	Online	0.88	Disable people	1.38
7	The elderly	0.47	Online	0.76	Medical supplies	0.95	Park	0.83	Pandemic	1.06
8	Medical supplies	0.40	Living space	0.73	The elderly	0.81	Public health	0.80	Park	1.02
9	Children	0.38	Medical supplies	0.73	Living space	0.68	The elderly	0.79	Online	0.92
10	Public transportation	0.31	Sports facilities	0.59	Public transportation	0.62	Medical supplies	0.59	Medical supplies	0.82

Table 3. The Ten Most Frequent Terms and Their Frequency (‰). Source: Author.

NOTE: Frequency (‰) = Term frequency/ Total number of words in text

Figure 1. Four Terms with Stable Rankings and Their Frequency. Source: Drawn by author.

NOTE: Frequency (‰) = Term frequency/ Total number of words in text

	Tenth Plan (2001–2005)	Eleventh Plan (2006–2010)	Twelfth Plan (2011–2015)	Thirteenth Plan (2016–2020)	Fourteenth Plan (2021–2025)
COVID-19	----	----	----	----	0.36
Emergency transportation	----	----	----	----	0.01
Fever clinics	----	----	----	----	0.02
Medium or long- term loans	0.05	0.03	----	0.01	0.04
Reduce rent and interest	----	----	----	----	0.03
SARS	----	0.18	----	----	----
Service in foreign languages	----	----	----	----	0.01
Stabilize posts	----	----	----	----	0.01

Table 4. Frequency (‰) of Special terms. Source: Author.

NOTE: Frequency= Term frequency/ Total number of words in text

Table 3 shows the ten most frequent terms and their frequency in Five-year plans of various periods. Combined with Figure 1 that shows four terms with stable rankings and their frequency, we can see that although the term “Health care” always comes in the first place, its frequency has become significantly larger after outbreak of SARS.

Comes to the second place, “Emergency” has been occupying this position except in Tenth Plan (2001–2005). In Figure 2 that shows five terms with unstable rankings and their frequency, we can see that the ranking of “emergency” is 14th in Tenth Plan (2001–2005). It is way below the second place. And its frequency is also far smaller than other years. Meanwhile, the frequency of “Emergency” in fourteenth Plan (2021–2025) is even significantly larger than Eleventh Plan (2006–2010), Twelfth Plan (2011–2015), and Thirteenth Plan (2016–2020).

Talking of the third place, according to Figure 1, there is no remarkable change of “Sports” neither in its ranking nor frequency. For the fourth and the fifth place, depending on Figure 2, we can see that both the ranking and frequency of “public health” has undergone a major increase after SARS and obvious growth after the occurrence of COVID-19.

Comes to the bottom five places: the situation of “Pandemic” is similar with “public health”. While there is no obvious turning point of “Park”. It’s ranking and frequency have been growing steadily. About “medical supplies”, its frequency slightly increased after both occurrence of SARS and COVID-19.

Among those terms ranked after the tenth place, both ranking and frequency of “Disease control and prevention” experienced significant growth after the occurrence of SARS and COVID-19. It can be seen In Figure 2. Finally, as Figure 1 shown, the frequency of “infection disease” slightly increased at the timing of both two outbreaks. Moreover, its growth of ranking after the occurrence of COVID-19 is more obvious than SARS.

4.2. Discussion

Based on the mentioned above, some conclusions can be drawn:

Firstly, after the occurrence of SARS and COVID-19, health care is taken more seriously. Depends on the transformation of word frequency of related terms, the development plan of pandemic prevention and control, public health emergency has been significantly affected. The differences between SARS and

COVID-19 are mainly in the following aspects: 1) It can be said that China's modern emergency management system started since SARS, and it promoted the leap-forward development and transformation of China's emergency management system in public health emergencies. It especially can be concluded based on the change of term frequency of "health care" and "public health" after SARS outbreak. 2) While the ongoing COVID-19 is having a more profound and wider impact on China's public health emergency management system. It can be seen from the significant growth of word frequency of "emergency" in the Fourteenth Plan (2021-2025). As shown in Table 4, the uniqueness of "Emergency transportation", "Fever clinics", and "Service in foreign languages" which only appear in Fourteenth Plan (2021-2025) means that COVID-19 has been spreading more widely and reaching out to the community. It promoted the development plan of public health emergency management system with more details must be more thoughtful, and more comprehensive.

Secondly, the social and economic development plan relating to "infectious disease" and "medical supplies" is slightly affected by pandemic. The attention increased after two outbreak with a similar degree, but not by much. These two aspects are always be taken seriously as they are closely related to the daily life of civilians.

Thirdly, building Green Spaces and promotion of physical activity are also closely associated with everyday life. They have never been taken lightly. So, it is hard to say the stable increasing is caused by outbreak.

Fourthly, the COVID-19 outbreak has been going on for a long time and it's still lasting, and it's hard to tell when it will end. Hence, its impact on economy is much stronger than SARS. As shown in Table 4, the terms only appear in Fourteenth Plan (2021-2025) such as "Reduce rent and interest" and "Stabilize posts" illustrate the stronger impact. This is an important difference between SARS and COVID-19.

Figure 2. Five Terms with Unstable Rankings and Their Frequency. Source: Drawn by author.

NOTE: Frequency (‰) = Term frequency/ Total number of words in text

5. Conclusion

To sum it up, the system of China's modern public health emergency management started since SARS with a leapfrog development while has been promoting to more detailed and comprehensive during the COVID-19 outbreak. While the evolution of development plan relating to prevention and control of infectious diseases, medical supplies, building Green Spaces, and promotion of physical activity is not obviously. In addition, the economic policies released during the COVID-19 outbreak proposed various financial and banking supports and aid, such as "Interest discount and tax benefits" "Defer payment of taxes temporarily" "Return social security contributions appropriately" "Reduce loan interest rates" "Stabilize posts" "Increase credit loans and medium or long-term loans" "Extend or renew due loans" "Encouraged no or fewer layoffs" "Arrange working hours of workers flexibly" "Pay wages for employees staying at home"(Wu et al., 2021). All in all, the evolution of development plan about public health emergency management system and economic policy are more significant and is likely to have a profound effect on the future.

The accuracy of content analysis strongly relies on the method of word segmentation, vocabulary and stop words. In this study, there is still a lot of room for improvement regard to the above-mentioned. What's more, research based on "Outline of Five-Year Plan for Provincial Economic and Social Development" can provide a macro perspective. While city-level and specialized plan contain more details and specific information. For the further study, other text analysis will be applied; the vocabulary and stop list will be improved; and city-level and specialized plan will be considered as database.

6. References

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