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Regional Comparative Research on China's Big Data Industry Policy

-- Empirical Analysis based on 39 Policy Texts

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Abstract

The evaluation of the big data industry policy is helpful for policy optimization and improvement. This paper adopts the quantitative research method of policy content and uses the PMC index model to quantitatively evaluate my country's provincial big data industry policy by region. Based on NVivo's node coding and 39 high-frequency words in my country's big data industry policy texts, three dimensions of big data industry policies, policy attributes, policy concepts, and policy implementation, are used as the policy analysis framework to construct a big data industry policy evaluation index model. Including 11 primary indicator variables and 50 secondary indicator variables. The study found that the eastern region is better than the central region and the western region in big data industrial policy design. However, on the whole, there are problems such as the lack of long-term development goals, the incomplete use of policy tools, and the imperfect nature of policies. Corresponding research recommendations are provided for this.

Keywords

Big Data Industry Policy; PMC Index Model; Grounded Theory; Policy Text.

1. Introduction

With the exponential growth of global data, big data has attracted much attention from the policy level. Since the concept of "big data" was put forward in 2008, countries and regions such as the United States, the United Kingdom, Germany, Japan, and the European Union have successively formulated their own macro-strategic plans for the development of big data. McKinsey Consulting once pointed out in the report that the "big data era" has arrived.

In 2014, big data was included in the government work report for the first time. In 2015, the State Council of my country issued the "Outline of Action to Promote the Development of Big Data", which defines big data as: a massive collection of data that can be used after processing is generated in the process of modern informatization in my country. It includes the integration of all data resources in the information age. Big data includes Internet data, government and industry data. Compared with traditional data warehouses, big data has the characteristics of large data volume and complex search and analysis. The big data industry refers to big data industrial clusters and industrial parks.

During the "Thirteenth Five-Year Plan" period, my country's big data industry has achieved breakthrough development, with an average annual growth rate of more than 25% in the industrial scale, reaching about 800 billion yuan in 2020, and the industrial value has continued to increase. Big data is widely integrated with various industries. Industrial big data, financial big data, medical big data, agricultural big data, etc. are gradually maturing, supporting the optimization and upgrading of various industries; big data companies are growing rapidly, nurturing and developing a number of competitive innovations Large-scale open and shared

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government data, which effectively enhances government service capabilities and promotes the construction of digital government. All in all, as an emerging industrial form, the big data industry can not only effectively drive economic development, but also promote the upgrading of traditional industrial structures. In order to better improve the competitiveness of my country's regional big data industry and give full play to the role of big data industry in promoting social progress, this paper conducts a regional comparison and evaluation research on big data industry policies in accordance with my country's three major economic zones, with a view to suggesting Appropriate development path.

2. Literature References

Mattew A. Waller, Sam M (2013) [1] studied the value of big data and data science from the application of supply chain management, and proposed big data analysis capabilities and knowledge that are important for supply chain management, and big data in supply chain management Possible applications in the future. Later, David Feinleib (2014) [2] conducted an in-depth exploration on how to use appropriate tools to improve a richer enterprise model and how to use the right tools to build a richer enterprise model in the era of big data. Later, Zuiderwijk et al. (2015) [3] tried to develop a comparative analysis framework for open government data, which included environmental factors, policy content, performance indicators and public values, and then used the framework to compare seven openness of government agencies at different levels in the Netherlands. Similarities and differences between government data policies. Mahrenbach, Mayer and others (2018) [4] analyzed the content of big data government documents in Brazil, India, and China, and found that the three most important big data policy goals in these three countries are: as a management force and improvement the means of government services and the means of promoting social and economic development. Anke Joubert et al. (2021) [5] developed the "Big Data Readiness Index" (BDRI) by observing the big data situation in developing countries and designed a scientific method, and applied it in Africa;

He Jiahong et al. (2012) [6] made a comprehensive summary and summary of the domestic information industry development level indicator system, and constructed 18 secondary indicators of the Internet of Things industry in terms of the development level of the Internet of Things network, the level of equipment, the research and development capabilities, and the level of market application. The development level indicator system, and the AHP method is used to determine the weight of all indicators. Li Xiulin et al. (2016) [7] analyzed the formation and mechanism of the big data industry chain in Zhejiang Province, and pointed out that the joint efforts of scientific research institutions, industry associations, technology centers and enterprises are conducive to the formation of the big data industry chain. The government must do a good job in infrastructure construction. And policy planning. Hu Feng, Wen Zhiqiang and other scholars (2020) [8] used the central level big data policy as a sample from 2015 to 2019 to evaluate the pros and cons of the policy through the PMC model and propose an optimization path.

3. Research Methods and Data Foundation

3.1. Research Method

The Policy Modeling Research Consistency Index (PMC Index) is defined as the ability to evaluate the advantages and disadvantages of any policy. In the construction of the PMC index, there are four basic steps: (1) the classification of variables and parameters; (2) the use of multiple Input-output tables; (3) the measurement of the PMC index; (4) the drawing of the PMC surface.

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3.2. Source of Policy Text

With the help of Peking University Fabao.com and government official websites in different regions, to search for big data-related documents, in order to improve the accuracy and representativeness of the policy, the criteria for selecting the sample policy are as follows: (1) The policy issuing agency is the provincial government and related departments directly under Level and prefecture-level policy documents are not included in the scope of text analysis; (2) This article selects policies directly related to the big data industry, and does not involve big data policies for specific development industries, such as medical care. In the end, 39 policy texts surrounding the big data industry were obtained, of which 20, 19, and 18 documents were obtained in the eastern, central and western regions, covering 26 provinces in total.

4. Policy Evaluation Indicators and Model Construction

4.1. Classification of Variables and Parameters

First of all, this article uses the QSR company to design and develop NVivo12. First, perform the three-level coding (open coding, spindle coding and selective coding) developed by Anselm Strauss and Barney Glaser on the literature information, and then integrate it after forming several nodes (see Table 1), thus Provide qualitative basis and reference for the determination of primary and secondary variables

Table 1. Big data industry policy NVivo node coding analysis results

The primary nodes	The secondary nodes	Encode reference points
Policy-making Bodies	Local people's congresses	5
	Local people's governments	18
	Functional department of local government	11
	Constituent departments of local government	5
The form of the policy document	Working papers of local government	5
	Local regulations	34
Policy Content	Data management	56
	Data application	78
	Data security	34
	Data transactions	37
	Open exchange and sharing of data	59
Policy Instrument	Tax policy	43
	Legal protection	71
	Talents construction	82
	Financial procurement	31
	Technical support	38
	Special funds	55
	International cooperation	14

Secondly, in order to evaluate and analyze the big data industry in a more targeted manner, based on the PMC model index variables of Estrada [9] and domestic scholars, and based on the results of the big data industry policy NVivo rooted coding, the big data industry based on the PMC index model is determined. Policy evaluation system. According to the core categories of policy attributes, policy concepts and policy implementation, 11 primary indicator variables and 50 secondary indicator variables are divided. As shown in Table 2.

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Table 2. Big data industry policy PMC evaluation index variables and standards

Evaluation Content	Serial number	The primary indicator variable	Serial number	The secondary indicator variable	Evaluation criteria of the secondary indicator variable
Policy attributes	Z1	Policy-making Bodies	Z1:1	Local people's congresses	To judge whether the enacting body of the policy is the local People's Congress, if so, it is represented as 1, if not, as 0.
			Z1:2	Local people's governments	To judge whether the enacting body of the policy is the local people's government, if so, it is represented as 1, if not, as 0.
			Z1:3	Functional department of local government	To judge whether the enacting body of the policy is functional department of local government, if so, it is represented as 1, if not, as 0.
			Z1:4	Constituent departments of local government	To judge whether the enacting body of the policy is constituent departments of local government, if so, it is represented as 1, if not, as 0.
	Z2	Policy time limits	Z2:1	Long-term	To judge whether the policy lasts more than ten years, if so, it is represented as 1, if not, as 0.
			Z2:2	Mid-term	To judge whether the policy lasts from 6 to 10 years, if so, it is represented as 1, if not, as 0.
			Z2:3	Short term	To judge whether the policy lasts from 1 to 5 years, if so, it is represented as 1, if not, as 0.
			Z2:4	By the end of This year	To judge whether the policy covers the content within current year, if so, it is represented as 1, if not, as 0.
	Z3	Policy publicity	——	——	Determine whether the policy is public, if so, it is represented as 1, if not, as 0.
Policy philosophy	Z4	Nature of the policy	Z4:1	Forecast	Determine whether a policy is predictive, if so, it is represented as 1, if not, as 0.
			Z4:2	Supervision	Determine whether policies are regulated, if so, it is represented as 1, if not, as 0.
			Z4:3	Suggestion	Determine whether the policy has the content of recommendation, if so, it is represented as 1, if not, as 0.
			Z4:4	Guidance	Determine whether the policy has the content of guidance, if so, it is represented as 1, if not, as 0.
			Z4:5	Description	Determine whether the policy has the content of description, if so, it is represented as 1, if not, as 0.
			Z4:6	Others	Determine whether the policy has the content about other things, if so, it is represented as 1, if not, as 0.
	Z5	Policy perspective	Z5:1	Macro	Determine whether the perspective of policy is macroscopical, if so, it is represented as 1, if not, as 0.
			Z5:2	Middle	Determine whether the perspective of policy is intermediate, if so, it is represented as 1, if not, as 0.
			Z5:3	Micro	Determine whether the perspective of policy is microcosmic, if so, it is represented as 1, if not, as 0.
	Z6	Policy function	Z6:1	Economic benefits	Determine whether the policy can produce economic benefits, if so, it is represented as 1, if not, as 0.
			Z6:2	Social benefits	Determine whether the policy can produce social benefits, if so, it is represented as 1, if not, as 0.
			Z6:3	Political benefits	Determine whether the policy can produce political benefits, if so, it is represented as 1, if not, as 0.

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			Z6:4	Environmental benefits	Determine whether the policy can produce environmental benefits, if so, it is represented as 1, if not, as 0.
Policy implement-ation	Z7	Policy audience	Z7:1	Interprovincial	Determine whether the policy audience is interprovincial, if so, it is represented as 1, if not, as 0.
			Z7:2	Inside the province	Determine whether the policy audience is inside the province, if so, it is represented as 1, if not, as 0.
			Z7:3	Industry	Determine whether the policy audience is industries, if so, it is represented as 1, if not, as 0.
			Z7:4	Zone	Determine whether the policy audience is Zone, if so, it is represented as 1, if not, as 0.
			Z7:5	Enterprise	Determine whether the policy audience is enterprise, if so, it is represented as 1, if not, as 0.
	Z8	Policy areas	Z8:1	Economy	Determine whether policies involve the economic sector, if so, it is represented as 1, if not, as 0.
			Z8:2	Politics	Determine whether policies involve the politics sector, if so, it is represented as 1, if not, as 0.
			Z8:3	Society	Determine whether policies involve the society sector, if so, it is represented as 1, if not, as 0.
			Z8:4	Ecology	Determine whether policies involve the ecology sector, if so, it is represented as 1, if not, as 0.
			Z8:5	Technology	Determine whether policies involve the technology sector, if so, it is represented as 1, if not, as 0.
	Z9	Policy Content	Z9:1	Data management	Determine whether policies content includes data management, if so, it is represented as 1, if not, as 0.
			Z9:2	Data application	Determine whether policies content includes data application, if so, it is represented as 1, if not, as 0.
			Z9:3	Data security	Determine whether policies content includes data security, if so, it is represented as 1, if not, as 0.
			Z9:4	Data transactions	Determine whether policies content includes data transactions, if so, it is represented as 1, if not, as 0.
			Z9:5	Open exchange and sharing of data	Determine whether policies content includes open exchange and sharing of data, if so, it is represented as 1, if not, as 0.
	Z10	Policy Instrument	Z10:1	Technical assistance	Determine whether policy Instrument involves the technical assistance, if so, it is represented as 1, if not, as 0.
			Z10:2	Financial support	Determine whether policy Instrument involves the financial support if so, it is represented as 1, if not, as 0.
			Z10:3	Finance and taxation	Determine whether policy Instrument involves the finance and taxation, if so, it is represented as 1, if not, as 0.
			Z10:4	International cooperation	Determine whether policy Instrument involves the international cooperation if so, it is represented as 1, if not, as 0.
			Z10:5	Land concessions	Determine whether policy Instrument involves the land concessions, if so, it is represented as 1, if not, as 0.
			Z10:6	Talent construction	Determine whether policy Instrument involves the talent construction, if so, it is represented as 1, if not, as 0.
			Z10:7	Legal protection	Determine whether policy Instrument involves the legal protection, if so, it is represented as 1, if not, as 0.
			Z10:8	Public utilities	Determine whether policy Instrument involves the public utilities, if so, it is represented as 1, if not, as 0.

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			Z10:9	Government procurement	Determine whether policy Instrument involves the government procurement, if so, it is represented as 1, if not, as 0.
	Z11	Policy evaluation	Z11:1	The goal is clear	Determine whether the objectives of the policy are clear, if so, it is represented as 1, if not, as 0.
			Z11:2	The plan is detailed	Determine whether the plan of the policy is detailed, if so, it is represented as 1, if not, as 0.
			Z11:3	Well-founded	Determine whether the gist of the policy is Well-founded, if so, it is represented as 1, if not, as 0.
			Z11:4	Practical	Determine whether the plan of the policy is practical, if so, it is represented as 1, if not, as 0.

4.2. The Establishment of Multiple Input-output Tables

The multi-Input-output table (Table 3) is another style of database analysis that allows the storage of large amounts of data to measure a single variable. It is necessary to use the binary system to give all sub-variables the same weight. Binary (0, 1) helps to maintain the balance between all variables in each sub-variable.

Table 3. Multi-Input-output table

Primary variable	Secondary variable
Z1	Z1:1 Z1:2 Z1:3 Z1:4
Z2	Z2:1 Z2:2 Z2:3 Z2:4
Z3	Z3
Z4	Z4:1 Z4:2 Z4:3 Z4:4 Z4:5 Z4:6
Z5	Z5:1 Z5:2 Z5:3
Z6	Z6:1 Z6:2 Z6:3 Z6:4
Z7	Z7:1 Z7:2 Z7:3 Z7:4 Z7:5
Z8	Z8:1 Z8:2 Z8:3 Z8:4 Z8:5 Z8:6
Z9	Z9:1 Z9:2 Z9:3 Z9:4 Z9:5
Z10	Z10:1 Z10:2 Z10:3 Z10:4 Z10:5 Z10:6 Z10:7 Z10:8 Z10:9
Z11	Z11:1 Z11:2 Z11:3 Z11:4

4.3. PMC Index Measurement

4.3.1. Assignment of Secondary Variables

As shown in formula (1)(2), if the policy description matches the secondary variable, it is equal to 1; if it does not, it is equal to 0.

$$Z \sim N\,[0,\ 1] \tag{1}$$

$$Z = \{\ ZR:\ [0 \sim 1]\ \} \tag{2}$$

In order to avoid the imprecision of artificial subjective scoring, the ROSTCM software is used to perform word segmentation and word frequency statistics on each policy text as an auxiliary scoring judgment standard. Using this as a corpus, the semantic network of big data industrial policies was drawn (Figure 1), and the WordCloud library of Python was used to draw a word cloud map (Figure 2) to visualize policy topics and keywords.

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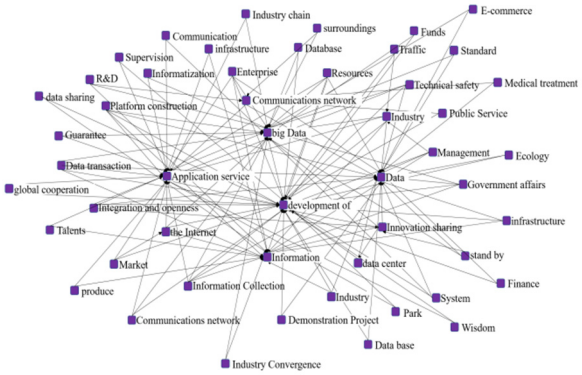

Figure 1. Social network map of China's big data industry policy

Figure 2. Word cloud diagram of China's big data industry policy

4.3.2. Calculation of Primary Variables

After the secondary variables are assigned, the primary variable values of the big data industrial policy are calculated according to formula (3).

$$X_{\mathrm{t}}\left(\sum_{i=1}^{n}\frac{X_{tj}}{T\left(X_{\mathrm{tj}}\right)}\right)\ \mathrm{t}=1,2,3,\ldots,\infty \tag{3}$$

Among them, t is a primary variable; j is a secondary variable.

4.3.3. PMC Index Score

As shown in formula (4), the score of PMC index is calculated, and the value range is between [0-10]. The results are shown in Table 4.

$$PMC=\left[\begin{array}{l} Z_1\left(\sum_{i=1}^{4}\frac{Z_{1\mathrm{i}}}{4}\right)+Z_2\left(\sum_{j=1}^{4}\frac{Z_{2\mathrm{j}}}{4}\right)+Z_3+Z_4\left(\sum_{k=1}^{6}\frac{Z_{4\mathrm{k}}}{6}\right)+ \\ Z_5\left(\sum_{l=1}^{3}\frac{Z_{5\mathrm{l}}}{3}\right)+Z_6\left(\sum_{\mathrm{m}=1}^{4}\frac{Z_{6\mathrm{m}}}{4}\right)+Z_7\left(\sum_{n=1}^{5}\frac{Z_{7n}}{5}\right)+Z_8\left(\sum_{o=1}^{5}\frac{Z_{8\mathrm{o}}}{5}\right)+ \\ Z_9\left(\sum_{p=1}^{5}\frac{Z_{9\mathrm{p}}}{5}\right)+Z_{10}\left(\sum_{q=1}^{9}\frac{Z_{10\mathrm{q}}}{9}\right)+Z_{11}\left(\sum_{r=1}^{4}\frac{Z_{11r}}{4}\right) \end{array}\right] \tag{4}$$

If the PMC index is between [9,10], then the policy rating is A, indicating that the policy is complete and reasonable.

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If the PMC index is between [7,8.99], then the policy rating is B, indicating that the policy is basically in line with expectations.

If the PMC index is between [5,6.99], then the policy rating is C, indicating that the policy is acceptable.

If the PMC index is between [0,4.99], then the policy rating is D, indicating that the policy effect is not good.

Table 4. China's big data industry policy PMC index and rating

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	Z11	PMC	Grade
P1	0.25	0.25	1.00	0.83	1.00	1.00	1.00	1.00	0.60	0.67	1.00	8.60	B
P2	0.25	0.25	1.00	0.67	1.00	1.00	0.60	1.00	1.00	0.67	1.00	8.43	B
P3	0.25	0.25	1.00	0.50	1.00	0.50	0.80	0.80	1.00	0.44	1.00	7.54	B
P4	0.25	0.25	1.00	0.50	1.00	0.75	0.40	0.60	0.60	0.22	1.00	6.57	C
P5	0.25	0.25	1.00	1.00	0.67	0.75	0.40	0.60	1.00	0.56	1.00	7.47	B
P6	0.25	0.25	1.00	0.67	0.67	1.00	0.60	0.80	0.80	0.67	1.00	7.70	B
P7	0.25	0.25	1.00	0.67	0.67	0.75	0.40	0.80	1.00	0.67	1.00	7.45	B
P8	0.25	0.25	1.00	0.50	0.67	0.75	0.80	0.80	0.40	0.22	1.00	6.64	C
P9	0.25	0.25	1.00	0.67	1.00	1.00	0.80	1.00	0.80	0.67	1.00	8.43	B
P10	0.25	0.25	1.00	0.67	1.00	0.75	0.60	0.80	1.00	0.67	1.00	7.98	B
P11	0.25	0.25	1.00	0.67	0.33	0.75	0.80	0.80	0.60	0.44	1.00	6.89	C
P12	0.25	0.25	1.00	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.33	A
P13	0.25	0.25	1.00	0.83	0.67	1.00	1.00	1.00	1.00	0.56	1.00	8.56	B
P14	0.25	0.25	1.00	0.67	0.33	0.75	0.40	0.80	0.80	0.56	1.00	6.81	C
P15	0.25	0.25	1.00	0.67	0.67	0.75	0.80	0.80	1.00	0.33	1.00	7.52	B
P16	0.25	0.25	1.00	0.67	0.33	0.75	0.60	0.60	1.00	0.44	1.00	6.89	C
P17	0.25	0.25	1.00	0.33	0.33	0.75	0.80	0.80	0.60	0.78	1.00	6.89	C
P18	0.25	0.25	1.00	0.50	1.00	0.75	0.80	0.80	1.00	0.78	1.00	8.13	B
P19	0.25	0.25	1.00	0.83	0.67	0.75	0.80	0.80	1.00	0.67	1.00	8.02	B
P20	0.25	0.25	1.00	0.67	1.00	0.75	0.80	0.80	1.00	0.67	1.00	8.18	B
P21	0.25	0.25	1.00	0.67	1.00	0.75	0.60	0.80	0.80	0.56	1.00	7.67	B
P22	0.25	0.25	1.00	1.00	1.00	1.00	0.80	1.00	1.00	0.78	1.00	9.08	A
P23	0.25	0.25	1.00	0.50	0.67	0.75	0.60	0.80	0.60	0.78	1.00	7.19	B
P24	0.25	0.25	1.00	0.67	1.00	0.75	0.80	0.80	1.00	0.44	1.00	7.96	B
P25	0.25	0.25	1.00	0.67	0.67	0.50	0.80	0.60	0.40	0.67	1.00	6.80	C
P26	0.25	0.25	1.00	0.83	1.00	0.75	0.80	0.80	1.00	0.78	1.00	8.46	B
P27	0.25	0.25	1.00	0.50	0.67	0.75	0.60	0.80	0.60	0.44	1.00	6.86	C
P28	0.25	0.25	1.00	0.50	1.00	0.75	0.80	0.80	1.00	0.89	1.00	8.24	B
P29	0.25	0.25	1.00	0.83	0.67	0.75	0.80	0.80	1.00	0.78	1.00	8.13	B
P30	0.25	0.25	1.00	0.67	1.00	1.00	0.80	1.00	1.00	1.00	1.00	8.97	B
P31	0.25	0.25	1.00	0.83	0.67	0.75	0.60	0.80	1.00	0.67	1.00	7.82	B
P32	0.25	0.25	1.00	0.83	0.67	0.75	0.60	0.80	1.00	0.67	1.00	7.82	B
P33	0.25	0.25	1.00	0.67	1.00	0.75	0.80	0.80	1.00	0.89	1.00	8.41	B
P34	0.25	0.25	1.00	0.67	0.67	0.75	0.80	1.00	1.00	1.00	1.00	8.38	B
P35	0.25	0.25	1.00	0.83	1.00	0.50	0.80	0.60	0.60	0.78	1.00	7.61	B
P36	0.25	0.25	1.00	0.50	1.00	0.50	0.80	0.60	0.60	0.44	1.00	6.94	C
P37	0.25	0.25	1.00	0.83	1.00	0.75	0.80	0.80	0.60	0.78	1.00	8.06	B
P38	0.25	0.25	1.00	0.50	0.33	0.50	0.40	0.60	0.60	0.78	1.00	6.21	C
P39	0.25	0.25	1.00	0.50	0.67	0.50	0.40	0.40	0.80	0.56	1.00	6.32	C
average	0.25	0.25	1.00	0.68	0.79	0.76	0.71	0.79	0.84	0.65	1	7.72	B

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4.4. Drawing of PMC Surface

The overall goal of creating a PMC surface is to display the PMC matrix graphically. The PMC surface can visualize strengths or weaknesses. Since the values of Z3 and Z11 in the 39 big data industrial policies are both 1, and considering the symmetry and balance of the matrix, they are eliminated, and the PMC surface is drawn according to formula (5).

$$PMC = \begin{bmatrix} Z1 & Z2 & Z4 \\ Z5 & Z6 & Z7 \\ Z8 & Z9 & Z10 \end{bmatrix} \tag{5}$$

Due to the large number of policy samples, in order to better show the regional differences of big data industry policies in the east, middle and west through the PMC model, this paper selects representative big data industry policies in three regions (Table 5) to draw the surface map (Figure 4) .

Table 5. Selected big data industry policies in each region

Number	Region	Policy	Issuing Authority
P12	East	Guangdong Province Action Plan for Promoting the Development of Big Data (2016-2020)	General Office of the People's Government of Guangdong Province
P22	Central	Jiangxi Province Big Data Development Action Plan	General Office of the People's Government of Jiangxi Province
P30	West	Guizhou Province Big Data Industry Development Leading Group Office's Implementation Opinions on Accelerating the Development of Big Data Industry	Guizhou Province Big Data Industry Development Leading Group Office

The sag index is inversely proportional to the PMC index. That is, the higher the score of the PMC index, the deeper the depression shown in the Debra chart. It can be clearly seen from Figure 3 that compared to the average level, these three policies have not a large degree of depression, indicating that the quality of the policies is better. From the perspective of the east, middle and west, the east is also better than the middle than the west. Especially in the policy audience (Z7), the audience in the east is the widest, while the audience in the central and western regions needs to be improved. But at the same time, it can be seen that in terms of policy issuing agency (Z1) and policy nature (Z2), the degree of depression of these three policies is very obvious, which shows that these two indicators need to be improved in the future.

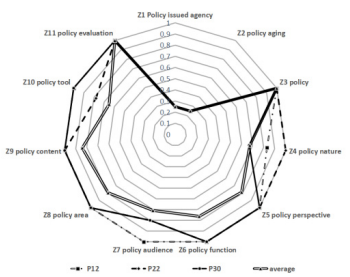

Figure 3. Radar chart of the three policies (Debra diagram, spider web diagram)

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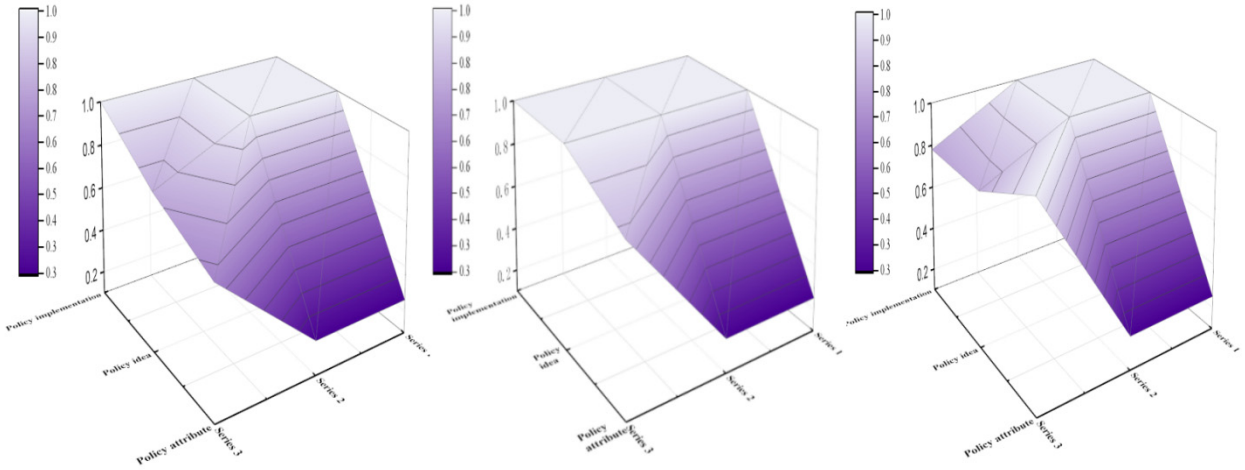

Figure 4. Survey of P12, P22, P30 from left to right

5. Research Conclusions and Recommendations

5.1. Analysis Conclusion

5.1.1. From the Overall Results

According to the results of the PMC index, the big data industry policy is in line with expectations and is relatively reasonable. The average PMC index for 39 policies is 7.72, and the average value of the big data industry policy for the three major regions in the east, middle and west is 7.68, 7.84, and 7.67, respectively. Two policies are rated A as complete and reasonable, namely Guangdong Province and Jiangxi Province; 29 policies rated as B are basically in line with expectations; 8 policies rated as C are generally acceptable, and no policy is rated as ineffective. The highest scoring appeared in Guangdong Province (P12), with a PMC index of 9.33. The lowest score appeared in the Inner Mongolia Autonomous Region (P38), with a PMC index of 6.21.

Among the specific indicators, each policy in the two indicators of policy disclosure (Z3) and policy evaluation (Z11) is assigned a score of 1, which is a full score. On the policy issuing agency (Z1), all policies are issued separately, and there is no joint issue of multiple agencies; on the policy timeliness (Z2), most of the policies are short-term oriented (1-5 years), and there are few medium and long-term The policy of the policy may only be issued for a certain year; in terms of the nature of the policy (Z4), only P5 and P22 have both prediction, supervision, recommendation, guidance, description and other properties; in the perspective of policy (Z5), only 19 This policy has received full marks and can formulate policies from the macro, meso and micro perspectives; in terms of policy functions (Z6), only a few policies can cover various functions, and most of the policies are limited to individual functions; In the policy audience (Z7), only the three policies P1, P12, and P13 get full marks, which indicates that the scope of the policy audience needs to be further expanded; in the policy area (Z8), most of the policies are higher than the average, indicating that big data Industrial policies are relatively extensive in terms of field coverage; in terms of policy content (Z9), a considerable part of the policies do not involve data transaction and data security content, resulting in their scores below the average; in terms of policy tools (Z10), Only three policies were rated as full marks, namely P12, P30, and P34. Generally speaking, the reason for the lower scores is that land concession, financial taxation and international cooperation lose more points.

5.1.2. Viewed from the Three Regions of East, Middle and West

This paper conducts an empirical analysis of 39 big data industry policies through the PMC index model, and finally finds that the top 10 policies in the PMC index are 5 in the eastern

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region, 3 in the central region, and 2 in the eastern region. Based on the policy relationships and differences in the three regions, this article believes that there are several reasons:

First, the development strength of big data technology innovation and industrial growth in the eastern region is strong, and the perspective and quality of policy design are higher than those in the central and western regions. And because of the sound economic development foundation of the eastern region and the close connection between finance and technological innovation, the eastern region has a developed financial market, complete systems, diversified products and services, and a high degree of openness in the country. The market benefits are good, and the technological innovation market has always been maintained. Sufficient vitality, thus fully driving the optimization and improvement of regional policy design. Therefore, the eastern big data industry policy design scores the highest.

Second, the overall strength of financial development, big data technology innovation, and industrial growth in the central region has a certain gap compared with that of the east, but it will be slightly stronger than that of the west. Overall, there is still a lot of room for development. The development of technology and finance in the central region is relatively outstanding. On the one hand, because its economic development has a late-comer advantage, through learning from the good development experience of the east, it can make better use of resources to develop big data and improve its own technology. On the other hand, the financial resources in the central region are also relatively rich. While gradually expanding the scale of the financial market, the number of financial institutions, and improving its own development capabilities, it can also fully drive the economic growth of the application of big data.

Third, the overall strength of big data technology innovation and industrial growth in the western region is the weakest among the three regions, but the gap between it and the central region is not large, so overall there is also a lot of room for development. The financial and innovative industries in the western region have limited capacity, mainly because the financial system is not yet developed, financing channels are limited, and the scope of big data applications is not wide enough. It is only limited to the region's advantageous industries, and the region's infrastructure construction is still underdeveloped. Incompleteness, it is difficult to provide sufficient support for the innovation and application development of the big data industry.

The following article analyzes the policies with the highest and lowest PMC index scores in each region based on the three major regions in the east, middle and west regions divided by economic belts, and proposes corresponding improvement paths.

Eastern Region: P12 has a PMC index of 9.33, ranking first overall, and Eastern Region ranking first, with a rating of A. As the highest ranked policy, except for the policy issuing agency (Z1), the timeliness of the policy (Z2) and the nature of the policy (Z3), all other indicators are full marks. In general, the P12 policy design is relatively complete, but due to the degree of collaboration and cooperation for the big data industry, there is no joint publishing situation, and the policy does not have a mid-to-long-term development goal. Therefore, P12 can be improved from the two indicators Z1 and Z2. The policy improvement path that can be referred to in the future is X5-X6. P4 has a PMC index of 6.57, ranking 37th overall, and 16th in the eastern region, with a rating of C. The policy has a total of 6 indicators below the average. Since the use of policy tools is only human resource construction and legal protection, Z10 has become the biggest loss point. At the same time, the policy nature (Z4), policy audience (Z7), policy field (Z8) and policy content (Z9) are quite different from the average value, which is also the main point. Therefore, the policy improvement path that can be referred to in the future is Z10-Z8-Z9-Z7-Z4.

The central region: P22 has a PMC index of 9.08, ranking second overall, and the central region ranking first, with a rating of A. Policy audience (Z7) and policy tools (Z10) still need

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improvement. The current audience does not focus on inter-provincial cooperation, and the design of policy tools ignores the content of international cooperation and government procurement. The reference policy improvement path is Z10-Z7. P25 has a PMC index of 6.8, ranking 35th overall, and 10th in the central region, with a rating of C. A total of 6 of the 11 primary variables need to be improved. Among them, the policy content (Z9) has the largest deviation from the average value, which only involves data management and data openness for sharing, while the content of data application, data security and data transaction is missing, and the difference between it and the average value is 0.44. In addition, the nature of policy (Z4), policy perspective (Z5), policy function (Z6), policy area (Z8), and policy tools (Z10) are also below the average. Therefore, the policy improvement path that can be referred to in the future is Z5-Z8-Z9-Z10-Z7-Z4.

Western Region: P30 has a PMC index of 8.97, ranking 3rd overall, and Western Region ranking 1st with a rating of B. Since the nature of supervision was not considered in the policy design, the policy nature (Z4) loses more points. In addition, as long as the policy audience (Z7) is in the province, inter-provincial cooperation is not considered, so it does not get full marks. The policy improvement path that can be referred to in the future is Z4-Z7. P38 has a PMC index of 6.21, ranking 39th overall, and 13th in the western region, with a rating of C. Excluding policy disclosure (Z3) and policy evaluation (Z11), the rest of the indicators are equal to or lower than the average, so it ranks last in the 39 policy rankings. The development focus of the policy design is less, the policy audience and policy field are narrow, and the comprehensive use of policy tools is lacking. The proposed policy improvement path is Z5-Z8-Z9-Z6-Z10-Z7-Z4.

5.2. Research Recommendations

In response to the problems in the policy design of China's big data industry reflected in the PMC index model, this article proposes the following countermeasures:

First of all, in terms of policy attributes, the issue of policy timeliness is worthy of attention. China only put forward “big data” in the government work report in 2014, and the policy measures on the long-term development plan of big data in China's big data industry special policy are basically lacking. Therefore, in the future, we should pay attention to the timeliness of diversified policies and divide them into phases. Formulate big data industry development policy goals and policy measures, appropriately extend the timeliness of big data policies, refine the development steps of the big data industry, and enhance the specificity of policy measures.

Second, in terms of policy concepts, the nature of the policy is more prominent. The policy nature of the existing big data industry policy text is mainly forecasting, description and guidance, and lacks supervision and suggestion. Scientific advice and effective supervision are an important basis for reflecting the scientificity and rationality of the big data industry policy design, as well as a strong guarantee for supporting the high-quality development of the big data industry. In the future my country’s big data industry policy design process, while emphasizing the guiding, constructive, and predictive nature of the policy, it should not ignore the regulatory and suggestive nature of the policy. Through the extensive participation and cooperation of the government, industry, academia, and users Feedback, the introduction of industrial policy supervision and suggestion mechanisms, and better play to the incremental effects of policies on big data technologies, products and markets.

Finally, in terms of policy implementation, it is necessary to make up for the shortcomings of policy tools. Insufficient use of demand-side tools is a common problem in domestic big data industry policies, especially the use of government procurement tools is relatively small. This is also one of the factors restricting the further development and growth of my country's big data market. Therefore, it is necessary to comprehensively use government procurement to support the development of the big data industry. Regional governments should explore the establishment and improvement of government procurement rules and mechanisms for the big

data industry, actively attract big data industry institutions to participate in the process of government project construction, give full play to the pulling effect of market demand, and use the government to purchase social services to support the development of the big data industry , Broaden the support channels for the big data industry to promote the sustainable development of the big data industry.

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