Quantitative Evaluation of China's Digital Economy Regulation Texts based on PMC Index Modeling

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Abstract: The regulation landscape of the digital economy plays a pivotal role in guiding its evolution, garnering significant attention from nations globally. Leveraging text mining techniques and the PMC index model, this study conducts a quantitative assessment and analysis of China's digital economy regulation documents. By constructing a comprehensive digital economy regulation index system encompassing nine primary variables and 41 secondary variables, and integrating the PMC index with the PMC surface, we gain insights into the regulations effectiveness. Our findings reveal that among the 18 selected Chinese digital economy regulations' samples, six are exceptional, eight are commendable, and four are satisfactory. This signifies that China's regulations for digital economy development possess a considerable level of scientific rigor and feasibility, along with a high degree of regulation coherence. Through text mining, this research establishes a more scientific regulation evaluation index and employs the PMC index model to quantitatively assess China's digital economy regulations, thereby minimizing subjectivity in regulation evaluation.

Keywords: PMC Index Model; Digital Economy Regulation; Digital Economy; Text Mining; Regulation Evaluation

1. Introduction

Policies serve as guidelines for actions, task requirements, and working methodologies, which countries or organizations establish within a specific timeframe to achieve their interests or goals. Policies are crucial in supporting all aspects of a country, having a profound impact on economic development and social stability. In terms of economic development, ecological governance policies significantly enhance the rationalization of the economic structure in pilot cities and foster ecological environment improvement. By employing time series techniques and rigorous empirical models, research has confirmed that fiscal policy positively impacts Ethiopia's economy. Furthermore, using a multi-period double-difference model, studies reveal that local policies encourage urban green technology innovation. Regarding social stability, in the backdrop of China's aging population, short-term considerations show that the delayed retirement policy exerts a greater economic influence than the two-child policy. The poverty amelioration policy is widely effective and exerts varying impacts on different income groups. Additionally, from a neo-materialist perspective, studies suggest a negative association exists between income disparity, policy liberalism, and life expectancy.

Despite the abundance of current policy types, research on digital economy policies remains relatively scarce. Practice has proven that such policies are a pivotal support in fostering the advancement of the digital economy. To better harness the regulatory role of policy tools, this paper examines China's digital economy policies released in recent years. Through text mining, we identify and choose representative policies at the national level, employing the PMC index model to devise an evaluation framework or system. This framework enables us to objectively assess the overall quality of existing digital economy policies, thereby revealing the overarching characteristics of China's policies and providing valuable insights for optimizing future digital economy policies.

The state-advocated policies on digital economy strive to comprehensively execute the development strategy for a robust digital economy, with the intention of fostering its

rapid expansion. These policies encompass diverse aspects, including economic development, political security, social governance, environmental protection, etc., providing comprehensive support for the advancement of the digital economy. Digital economy policies can foster green development from macro, meso, and micro perspectives. Specifically, the implementation of digital policies in cities adopting strict measures can boost the production of green patents [1]. Furthermore, digital economy policies facilitate industrial structure upgrading and positively influence green innovations within heavily polluting industries [2]. Lastly, these policies catalyze green technology innovation in state-owned enterprises (SOEs), low-tech companies, as well as high-tech firms led by CEOs [3].

Digital economy policy encompasses numerous dimensions, including policy content, objectives, and focus. The question of how to objectively evaluate it is crucial, as a sound evaluation method can not only scientifically analyze the policy's content but also gauge its actual implementation effect. By selecting policy texts issued in China and utilizing content analysis and text mining methods to construct a quantitative evaluation model, the policies were comprehensively analyzed and evaluated [4]. The findings revealed that enhancing utilization, regulating growth, enabling collaboration were the key themes underpinning the development of China's digital economy. Similarly, local policies can be assessed using this evaluation approach. For instance, by constructing the PMC-AE indicator model, one can quantitatively assess and analyze digital economy policy texts in Heilongjiang Province, China, thereby offering tailored policy recommendations to specific government departments [5]. The PMC model utilizes a multidimensional PMC index to analyze a policy's internal heterogeneity and positives and negatives, visualizing each aspect's strengths and weaknesses through a PMC surface diagram. This model facilitates comprehensive and in-depth policy analysis and evaluation.

The PMC index model has found increasingly broad application in policy evaluation, spanning various fields such as economics, politics, and social security. Utilizing the PMC index model, various policies, including China's social responsibility policy [6], green development policy [7], and firefighting education policy [8], undergo quantitative evaluation. This assessment aims to examine the implementation effectiveness of these policies and offer recommendations for their optimization. During the course of specific research, the PMC can also be integrated with LDA and other methodologies to conduct a deeper analysis of policy content [9].

2. PMC Index Modeling

PMC index modeling entails four fundamental steps: compiling multi-input-output tables, categorizing variables and identifying parameters, calculating the PMC Index, and drawing a PMC surface plot [10]. Consequently, it is imperative to establish a digital economy policy text database, wherein representative digital economy development plans and policy documents are curated as analytical samples. This database serves as the foundation for conducting in-depth analyses of digital economy policies and strategies.

2.1 Policy Selection and Text Extraction

To guarantee the precision and comprehensiveness of digital economy policies, this paper employs the following search strategy for policy collection: Initially, a search was conducted in the China Knowledge Network (CNN) across 325 government documents using keywords such as "Big Data", "Artificial Intelligence", "Internet+", "Digital Economy", "Digital Transformation", and "Digital Industry". Subsequently, the search was expanded by accessing professional databases like "Beida Faber". After eliminating notices, public announcements, and replies, 185 valid policy texts were retrieved. Finally, utilizing ROSTCM software, the gathered policy texts were introduced into the system for analysis of word frequency. Following data preprocessing, irrelevant and general terms that lacked significant relevance to this study were filtered out, paving the way for the construction of a semantic network map.

The co-occurrence analysis serves as a crucial reference for variable classification and parameter setting during the construction of the PMC index model. In the semantic network mapping, the high-frequency subject

words pertaining to digital economy development policies are interconnected in a network format. The structural relationships between these high-frequency subject words are visually depicted in the form of an image, where the words are represented by nodes. The more connections a node has with other nodes, the higher its degree centrality, indicating its greater significance. The outcomes of this semantic network analysis are presented in Figure 1.

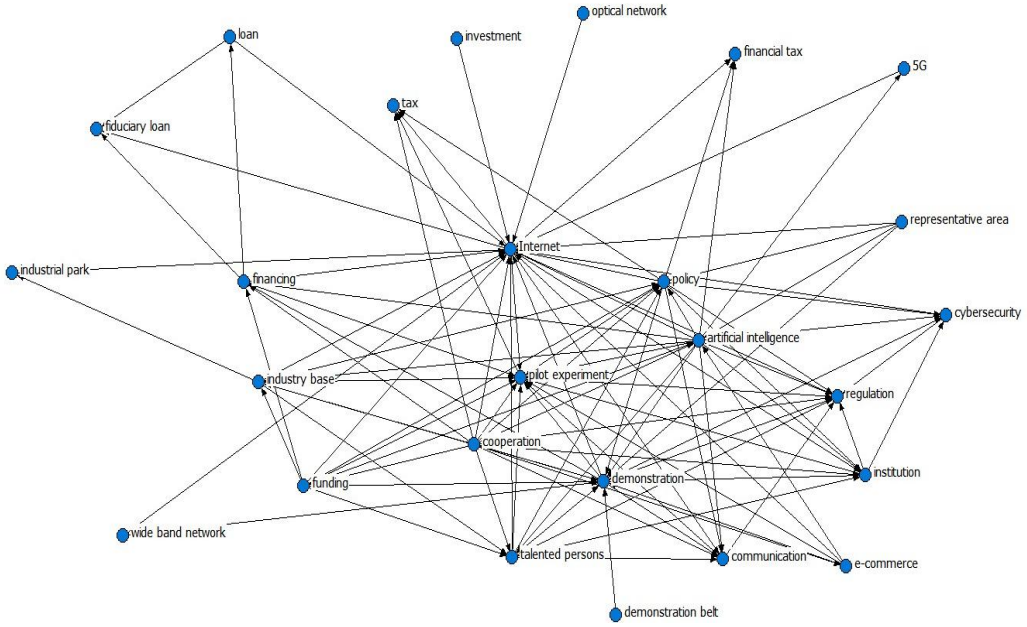

Figure 1. Semantic Network of Subject Terms

Figure 1 highlights that "Internet", "artificial intelligence", "pilot experiment", "demonstration", "policy", and "regulation" possess the most connections and exhibit the highest degree of centrality among the subject words, thereby emerging as the core topics. This indicates that the collected digital economy policies primarily revolve around the Internet and AI. In the process of implementation, the policies undergo pilot demonstrations to test their rationality and enhance their generalizability, while policies serve as a crucial safeguard. Conversely, "tax", "industry base", "talented persons", "cooperation", and "communication" occupy a less central position, suggesting that China's digital economy policies offer robust support measures in terms of resources and emphasize promoting exchanges and cooperation among various stakeholders to further optimize resource allocation. Themes such as "wideband network", "5G", "cybersecurity", and "optical network" reflect China's emphasis on strengthening technical support and focusing on cybersecurity in its digital economy development.

Subsequently, this paper identifies 18 comprehensive and representative national-level digital economy policies for quantitative assessment, as outlined in Table 1. These policies were sourced from the official websites of their respective issuing departments. By analyzing the interconnectedness and comparing these policies, we aim to discern their respective strengths and weaknesses in the policy formulation process, thus laying the groundwork for future policy development and refinement.

2.2 Policy Indicator System Setting

Drawing from the modeling principles of the PMC index model, integrating the actual traits of digital economy development and the analytical insights from prior policy text mining, and taking into account the PMC parameter settings established by Kuang and other scholars in relevant studies [11], this paper excludes broad or insubstantial evaluation indicators to ultimately establish 9 first-level variables and 41 second-level variables, as detailed in Table 2. The first-level variables encompass Policy Nature (X1), Policy Currency (X2), Issuing Body (X3), Policy Evaluation (X4), Policy Field (X5), Policy Guarantee (X6), Policy Focus (X7), Policy

Object (X8), and Policy Perspective (X9).

Table 1. Digital Economy Policy Texts

Code	Policy Name	Date issued
P1	Circular of the Ministry of Industry and Information Technology, the Ministry of Commerce, the State Administration for Market Regulation, the Food and Drug Administration, and the Intellectual Property Office on Printing and Issuing the " Three Products " Action Plan (2022 - 2025) for Digitization of Consumer Goods Industry	2022
P2	Notification on Printing and Issuing the Big Data Industry Development Plan from the Ministry of Industry and Information Technology	2021
P3	Notification from the Ministry of Industry and Information Technology regarding the publication and distribution of the three-year action plan (2018–2020) intended to foster the growth of the new artificial intelligence industry	2017
P4	Guidelines for creating a digital economy to stabilize and increase employment can be found at the National Development and Reform Commission, Department of Education, Office of Science and Technology, and other places	2018
P5	Guiding views on expediting the development of a cooperative innovation framework for China's integrated big data centers from the National Development and Reform Commission, the Department of Information Technology and Industry, and the National Energy Administration	2020
P6	The State Patent and Registration Office's Notice Regarding the Printing and Distribution of the "Internet +" Intellectual Property Protection Project	2018
P7	Government on Activating 'Internet +' Initiatives	2015
P8	The Government on strengthening the construction of digital government	2022
P9	The guiding opinions of Government officials about the development of the Internet of Industries and the advancement of "Internet + Advanced Manufacturing"	2017
P10	Guiding Opinions of the Government on Strengthening the Integrated Development of Manufacture and the Internet	2016
P11	Government notification regarding the printing and distribution of the development plan for the digital economy	2021
P12	Notification of the Government Regarding the Release of the Action Plan to Encourage the Growth of Big Data	2015
P13	Notification of the Government Regarding the Printing and Publication of a New AI Development Plan Generation	2017
P14	Notification of the "Guiding Opinions on Accelerating Scene Innovation and Promoting High-quality Economic Development with High-level Application of Artificial Intelligence" released by the Ministry of Science and Technology and the other six departments	2022
P15	Circular on Printing and Issuing the "Guidelines for the Construction of the National New Generation Artificial Intelligence Innovation and Development Pilot Zone (Revised Edition)" from the People's Republic of China's Ministry of Science and Technology	2020
P16	Notice from the Ministry of Commerce's General Office on Building a Fresh Development Model and Quickening the Development of Internet-Based Commerce Services	2021
P17	Guiding views on boosting the electronic empowerment of life services from the Ministry of Economics and other 12 sectors	2023
P18	The Action Plan for Encouraging the Wider Implementation of the Sixth Version of the Worldwide Internet Protocol (IPv6) issued by the Government.	2017

2.3 Establishment of Multi-Variable Input-Output Table

Based on the multidimensional measurement of variables, the PMC index model's multi-variable input-output table provides a thorough framework for analyzing data. This framework comprises both primary and secondary variables. In the context of this paper, all secondary variables are assigned equal weights, and their parameter values are binary. Specifically, if a policy text incorporates the meaning of a particular secondary variable, the corresponding parameter value is designated as 1; otherwise, it is set to 0. As an example, the multi-variable input-output table for select Chinese digital economic policies is presented in Table 3.

Table 2. Policy Evaluation Indicators and Secondary Variables

First-Level Index	Second-Level Index	Number	Evaluation Content
Policy nature X1	Anticipate	X1.1	Does the policy reflect predictability
	Supervisory	X1.2	If the policy is in line with regulatory
	Suggestion	X1.3	Whether or not the policy is advisory
	Descriptive	X1.4	Does the regulation include definitions?
	Guidance	X1.5	If the guidelines are followed
Policy currency X2	Long term	X2.1	Does the policy relates to planning beyond 5 years
	Mid-term	X2.2	Does the policy address 3-5 year planning
	Short-term	X2.3	Does the policy address 1-3 year planning
Issuing body X3	The Government and its General Office	X3.1	Whether the government and its General Office issued the policy
	State ministries and commissions	X3.2	Whether the policy is issued by a national ministry
	Other agencies or departments	X3.3	Whether the policy is issued by another agency or department
	Multi-Agency Joint Release	X3.4	Whether the policy is issued jointly by multiple agencies
Policy evaluation X4	Well-founded	X4.1	Whether the policy is well founded
	Clear-cut	X4.2	Clarity of policy objectives
	Programmatic Science	X4.3	Is the policy design program scientific
	Well planned	X4.4	Reasonableness of policy planning
Policy field X5	Economics	X5.1	Whether the policy covers the economic sphere
	Social security (pensions etc.)	X5.2	Whether the policy covers social services
	Politic	X5.3	Whether the policy covers the political sphere
	Environment	X5.4	Does the policy address environmental aspects
	System (e.g. political, adminstrative etc.)	X5.5	Does the policy address institutional areas
	Skill	X5.6	Whether the policy covers technical areas
Policy guarantee X6	Policy subsidies	X6.1	Whether there will be government subsidies for the policy
	Technical support	X6.2	Whether the policy address technical support
	Special fund	X6.3	Whether the policy involves dedicated fund support
	Policies and regulations	X6.4	To what extent supporting policies and regulations protect the policy
	Talent incentives	X6.5	Whether talent rewards are part of the policy
	Tax incentives	X6.6	Does the policy involves tax incentives
	Pilot demonstration projects	X6.7	Does the policy involve the establishment of a pilot
	Publicize and educate	X6.8	Whether the policy is guaranteed by public education
Policy focus X7	Social governance	X7.1	Does the policy address social governance
	Digital governance	X7.2	Whether applications for public service are included in the policy
	Network infrastructure development	X7.3	Whether the policy address network infrastructure development
	Data value	X7.4	Does the policy include how data is used and protected
	Network security	X7.5	Whether cybersecurity is a factor in the policy
	Digital industrialization	X7.6	Does the plan deal with industrialization that is digital?
	Industrial digitization	X7.7	Whether the policy involves digitization of industries
Policy object X8	Corporations	X8.1	If the policy is unique to a certain firm
	Government branch	X8.2	Whether government agencies are the focus of the policy
Policy perspective X9	Macroeconomics	X9.1	If there is a macro dimension to the policy
	Sub-atomic	X9.2	Whether the policy is micro-aspect

Table 3. Multi-Variable Input-Output Table for Various Digital Economy Policies

First-Level Index	Second-Level Index	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
X1	X1.1	1	1	1	1	1	1	1	1	1	1

	X1.2	0	1	0	1	1	1	1	1	1	1
	X1.3	1	1	1	1	1	1	1	1	1	1
	X1.4	0	1	1	1	1	0	1	1	1	1
	X1.5	1	1	1	1	1	1	1	1	1	1
X2	X2.1	0	0	0	1	0	0	1	1	1	1
	X2.2	1	1	1	0	1	0	1	1	1	0
	X2.3	0	0	0	0	0	1	0	0	1	1
X3	X3.1	0	0	0	0	0	0	1	1	1	1
	X3.2	0	1	1	0	0	0	0	0	0	0
	X3.3	0	0	0	0	0	1	0	0	0	0
	X3.4	1	0	0	1	1	0	0	0	0	0
X4	X4.1	1	1	1	1	1	1	1	1	1	1
	X4.2	1	1	1	1	1	1	1	1	1	1
	X4.3	1	1	1	1	1	1	1	1	1	1
	X4.4	1	1	1	1	1	1	1	1	1	1
X5	X5.1	1	1	1	1	1	1	1	1	1	1
	X5.2	1	1	1	1	1	0	1	1	0	0
	X5.3	0	1	0	0	1	1	1	1	0	1
	X5.4	1	0	0	0	1	0	1	1	0	0
	X5.5	0	0	0	1	1	1	1	1	1	1
	X5.6	1	1	1	1	1	1	1	1	1	1
X6	X6.1	0	1	0	0	1	0	1	0	1	0
	X6.2	1	1	1	1	1	1	1	1	1	1
	X6.3	0	1	1	1	0	0	1	0	1	1
	X6.4	1	0	1	1	1	1	1	1	1	1
	X6.5	1	1	1	1	0	0	1	1	1	1
	X6.6	0	0	0	0	0	0	1	0	1	1
	X6.7	0	1	1	1	0	1	1	1	1	1
	X6.8	1	0	0	0	0	1	1	0	0	0
X7	X7.1	0	1	0	1	1	0	1	1	0	0
	X7.2	1	1	1	1	1	0	1	1	0	0
	X7.3	1	1	1	0	1	0	1	1	1	1
	X7.4	1	1	1	1	1	1	1	1	1	1
	X7.5	0	0	1	0	1	1	1	1	1	0
	X7.6	1	1	1	1	1	0	1	1	1	1
	X7.7	1	1	1	1	1	0	1	0	1	1
X8	X8.1	1	1	1	1	1	1	1	1	1	1
	X8.2	1	1	1	1	1	1	1	1	1	1
X9	X9.1	1	1	1	1	1	1	1	1	1	1
	X9.2	1	1	1	1	0	1	1	0	1	1

2.4 PMC Index Calculation

The calculation of the PMC index encompasses four principal stages [12]:

(1) Create the major and secondary variables in equation based on the text (1);

$$\boldsymbol{X} \sim \mathbf{N}[\mathbf{0}, \mathbf{1}] \quad (1)$$

(2) Using the text mining method and binary method, multi-variable input-output table is constructed and the secondary variables are assigned as in equation (2);

$$\boldsymbol{X} = \mathbf{XR}: [\mathbf{0}, \mathbf{1}] \quad (2)$$

(3) Based on the secondary variable assignment, the corresponding primary variable score is calculated as in equation (3);

$$\boldsymbol{X_t}\left(\sum_{\boldsymbol{i=1}}^{\mathbf{n}} \frac{\boldsymbol{X_{ti}}}{\boldsymbol{T(X_{ti})}}\right), \boldsymbol{t} = \mathbf{1}, \mathbf{2}, \mathbf{3}, \cdots \quad (3)$$

(4) The level 1 variable scores are aggregated to produce a PMC index for each digital economy policy as in equation (4).

$$\begin{aligned} \boldsymbol{PMC} = {} & \boldsymbol{X_1}\left(\sum_{i=1}^{5} \frac{X_{1i}}{5}\right) + \boldsymbol{X_2}\left(\sum_{j=1}^{3} \frac{X_{2j}}{3}\right) + \boldsymbol{X_3}\left(\sum_{k=1}^{4} \frac{X_{3k}}{4}\right) \\ & + \boldsymbol{X_4}\left(\sum_{l=1}^{4} \frac{X_{4l}}{4}\right) + \boldsymbol{X_5}\left(\sum_{m=1}^{6} \frac{X_{5m}}{6}\right) + \boldsymbol{X_6}\left(\sum_{n=1}^{8} \frac{X_{6n}}{8}\right) \\ & + \boldsymbol{X_7}\left(\sum_{o=1}^{7} \frac{X_{7o}}{7}\right) + \boldsymbol{X_8}\left(\sum_{p=1}^{2} \frac{X_{8p}}{2}\right) + \boldsymbol{X_9}\left(\sum_{q=1}^{2} \frac{X_{9q}}{2}\right) \end{aligned} \quad (4)$$

Consequently, the PMC index for each digital economy policy has been determined, and a selection of these calculation results is presented in Table 4. To assess the consistency of these policies, the total index score for each policy is set at 9 points. Based on Ruize's perspective, the grading criteria are as follows: 7.2-9 points (Perfect), 6.3-7.19 points (Good), 5.4-6.29 points (Pass), and 0-5.39 points (Poor). Table 5 presents the evaluation outcomes.

Table 4. PMC Index of Policies

First-Level Index	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
X1	0.60	1.00	0.80	1.00	1.00	0.80	1.00	1.00	1.00	1.00
X2	0.33	0.33	0.33	0.33	0.33	0.33	0.67	0.67	1.00	0.67
X3	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
X4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
X5	0.67	0.67	0.50	0.67	1.00	0.67	1.00	1.00	0.50	0.67
X6	0.50	0.63	0.63	0.63	0.38	0.50	1.00	0.50	0.88	0.75
X7	0.71	0.86	0.86	0.71	1.00	0.29	1.00	0.86	0.71	0.57
X8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
X9	1.00	1.00	1.00	1.00	0.50	1.00	1.00	0.50	1.00	1.00

Table 5. Hierarchical Assessment of Policies

Policy	PMC index	Rankings	Hierarchy
P1	6.06	15	Pass
P2	6.73	10	Good
P3	6.37	14	Good
P4	6.59	12	Good
P5	6.46	13	Good
P6	5.84	16	Pass
P7	7.92	2	Perfect
P8	6.77	9	Good
P9	7.34	5	Perfect
P10	6.90	8	Good
P11	7.63	4	Perfect
P12	7.88	3	Perfect
P13	8.13	1	Perfect
P14	6.62	11	Good
P15	5.81	17	Pass
P16	5.71	18	Pass
P17	7.33	6	Perfect
P18	6.92	7	Good

2.5 PMC Surface Diagram Construction

A PMC surface plot serves as a powerful data visualization tool, especially in scenarios encompassing multiple variables and indicator systems. This tool excels at illustrating the intricate relationships between multidimensional data. Typically, such surface maps are crafted by calculating the average of secondary variables within each primary variable and subsequently presenting these averages in a three-dimensional format. This approach enables the identification of patterns and trends within the data. PMC surfaces typically assume concave or convex three-dimensional shapes, where the convex portions signify a higher score for the corresponding evaluation indicator, while the concave portions indicate a lower score.

Compute the PMC matrix, which yields a 3*3 matrix with nine values for the first-order variables, before building a PMC surface. PMC matrices are necessary for drawing PMC surfaces, because creating square matrices preserves the exact symmetry of PMC surfaces.

$$\boldsymbol{PMC} = \begin{bmatrix} \mathbf{X_1} & \mathbf{X_2} & \mathbf{X_3} \\ \mathbf{X_4} & \mathbf{X_5} & \mathbf{X_6} \\ \mathbf{X_7} & \mathbf{X_8} & \mathbf{X_9} \end{bmatrix} \quad (5)$$

Ultimately, the PMC surface is built using the PMC matrix, as seen by the policies P13 and P16, which have the greatest and lowest PMC indices, respectively, as shown in Figure 2 and

Figure 3:

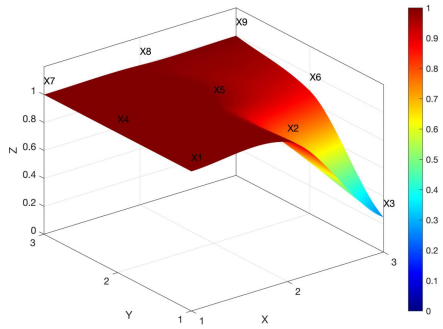

Figure 2. PMC Surface Diagram for P13

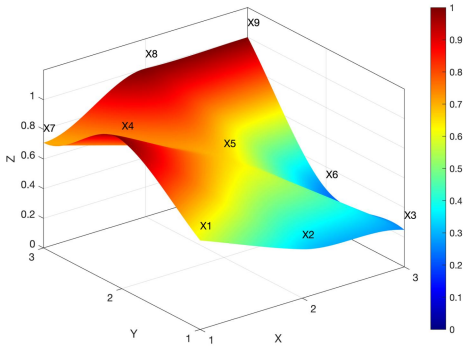

Figure 3. PMC Surface Diagram for P16

3. Quantitative Evaluation of Policy Texts

Considering the PMC index findings, six out of the 18 selected national-level digital economy policies obtained a Prefect assessment score, eight were rated as Good, and four received a Pass grade. Most policies received ratings of Perfect or Good, suggesting that the state-issued digital economy policies from 2015 to the present demonstrate a certain degree of rationality and scientific rigor. These policies' contents are in line with how the digital economy is growing, and efforts have been made to cultivate new drivers for development.

Furthermore, the scientific nature of China's digital economy policies and their current deficiencies can be clearly shown by averaging the scores of the first-level indicators of the 18 policies and generating a radar chart. As seen in Figure 4, this serves as a guide for the future evolution of Chinese policy pertaining to the digital economy.

The Policy nature's average value (X1) stands at 0.90, signifying that China's digital economy policies comprehensively advise, predict, guide, and regulate. Meanwhile, Policy currency's (X2) mean value is 0.52, reflecting a focus on single-period planning. Moreover, these strategies are timely over short-, medium-, and long-term periods, indicating a relatively comprehensive approach, as evidenced by the multiple-input-output table values. The Issuing body's (X3) mean value of 0.25 highlights the design of four secondary variables, including whether policies are jointly issued by multiple organizations. There are five policies jointly issued by multiple organizations and six policies originating from the Government and its General Office, suggesting a diversified issuing landscape that enhances policy rationality and authority. The Policy evaluation's (X4) mean value of 1.00 indicates the effectiveness and feasibility of China's digital economy policies, characterized by scientific design schemes and reasonable planning. The Policy field's (X5) mean value of 0.81 signifies a comprehensive coverage of areas. However, the Policy guarantee's (X6) mean value of 0.63 implies a lack of sufficient guarantee measures, indicating room for improvement. The Policy focus's (X7) mean value of 0.82 underscores the comprehensive and specific development focus of China's digital economy policy. Additionally, the Policy object's (X8) mean value of 0.97 highlights the clarity of the policy's targeted role. Finally, the Policy perspective's (X9) mean value of 0.94 shows that China's digital economy policy is clearly understood on both a macro and micro level.

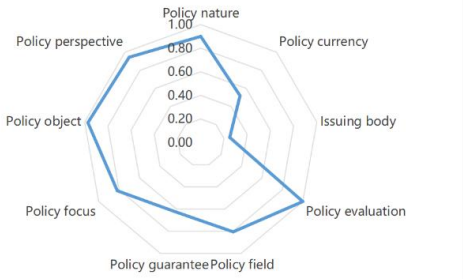

Figure 4. Radar Chart of the Mean of Digital Economy Policies

In terms of PMC index scores and policy ratings for China's digital economy policies, " Government on Activating 'Internet +' Initiatives " (P7),"Notification on Printing and Issuing the Big Data Industry Development Plan from the Ministry of Industry and Information Technology" (P20), " Government notification regarding the printing and distribution of the development

plan for the digital economy" (P11), " Notification of the Government Regarding the Release of the Action Plan to Encourage the Growth of Big Data" (P12), "Notification of the Government Regarding the Printing and Publication of a New AI Development Plan Generation" (P13), "Guiding views on boosting the electronic empowerment of life services from the Ministry of Economics and other 12 sectors" (P17),the six policies have been rated as exemplary, focusing primarily on AI, "Internet+" initiatives, and big data, all of which are intricately intertwined with the progress of the digital economy. This shows that China has carefully taken into account both macro and micro elements that support the growth of the digital economy. Additionally, China has presented pertinent programs in significant gatherings, providing sufficient policy support for these programs' application and guaranteeing their reasonable and empirical foundation.

"Notification on Printing and Issuing the Big Data Industry Development Plan from the Ministry of Industry and Information Technology" (P2), "Notification from the Ministry of Industry and Information Technology regarding the publication and distribution of the three-year action plan (2018–2020) intended to foster the growth of the new artificial intelligence industry" (P3), " Guidelines for creating a digital economy to stabilize and increase employment can be found at the National Development and Reform Commission, Department of Education, Office of Science and Technology, and other places" (P4), "Guiding views on expediting the development of a cooperative innovation framework for China's integrated big data centers from the National Development and Reform Commission, the Department of Information Technology and Industry, and the National Energy Administration" (P5), "The Government on strengthening the construction of digital government" (P8), " Guiding Opinions of the Government on Strengthening the Integrated Development of Manufacture and the Internet " (P10), " Notification of the "Guiding Opinions on Accelerating Scene Innovation and Promoting High-quality Economic Development with High-level Application of Artificial Intelligence" released by the Ministry of Science and Technology and the other six departments" (P14), " The Action Plan for Encouraging the Wider Implementation of the Sixth Version of the Worldwide Internet Protocol (IPv6) issued by the Government" (P18) , all eight policies have an good grade, policies P2, P3, and P4 have PMC indexes of 6.73, 6.37, and 6.59, in that order. Notably, the PMC indexes of these three policies within Policy currency X2 and Policy field X5 are below the average, suggesting a need to strengthen the alignment of medium- to long-term goals with short-term objectives, while also enriching the content within their respective policy areas. Consequently, the recommended optimization path is X2-X5. Policy P5, ranks 13th with a PMC index of 6.46. Its PMC index in Policy currency X2, Policy guarantee X6, and Policy perspective X9 is also below the average, indicating a need to prioritize the integration of macro and micro perspectives, as well as policy currency. Additionally, it requires enhancing the policy's safeguard measures. Consequently, X9-X2-X6 is the recommended optimization path. Policy P8, which ranks ninth and has a PMC index of 6.77, has lower PMC indexes than average in Policy guarantee X6 and Policy perspective X9. This indicates a lack of attention to the micro perspective within the policy's scope. There is also a need to intensify policy publicity and education. The recommended optimization path is X9-X6. Policy P10's PMC index of 6.90 places it in the 8th position. Its PMC index in Policy field X5 and Policy focus X7 is below the average. Given that "Internet+" is a crucial factor in the development of the digital economy, emphasis must be placed on cybersecurity while promoting "Internet+". Consequently, X7-X5 is the recommended optimization path. The PMC index of Policy P14 stands at 6.62, ranking 11th. The PMC index of this policy in Policy nature X1, Policy currency X2, and Policy guarantee X6 is below the average. To accelerate paradigm development and promote superior economic growth by utilizing cutting-edge artificial intelligence applications, it is imperative for relevant departments to oversee and establish adequate safeguards. Consequently, X6-X2-X1 is the suggested optimization path. Meanwhile, Policy P18 ranks seventh with a PMC index of 6.92. Its PMC index in Policy currency X2 and Policy guarantee X6 is lower than the average,

suggesting that this policy could be enhanced by integrating medium- to long-term planning with short-term improvements, while providing appropriate guarantees for the promotion of widespread implementation of IPv6 (Internet Protocol Version 6). Therefore, the suggested optimization path is X2-X6.

"Circular of the Ministry of Industry and Information Technology, the Ministry of Commerce, the State Administration for Market Policy, the Food and Drug Administration, and the Intellectual Property Office on Printing and Issuing the " Three Products " Action Plan (2022 - 2025) for Digitization of Consumer Goods Industry" (P1), " The State Patent and Registration Office's Notice Regarding the Printing and Distribution of the "Internet +" Intellectual Property Protection Project " (P6), " Circular on Printing and Issuing the "Guidelines for the Construction of the National New Generation Artificial Intelligence Innovation and Development Pilot Zone (Revised Edition)" from the People's Republic of China's Ministry of Science and Technology" (P15), " Notice from the Ministry of Commerce's General Office on Building a Fresh Development Model and Quickening the Development of Internet-Based Commerce Services " (P16) . With a PMC value of 6.06, Policy P1 is ranked 14th. Policy nature (X1), Policy currency (X2), Policy field (X5), Policy guarantee (X6), and Policy focus (X7) indexes for this policy are all below average. This is primarily attributed to the lack of a regulatory nature in the policy. It is, therefore, advisable to implement this policy in the context of digitalization promotion, aiming to assist the consumer goods industry in developing "three products". Additionally, it is recommended to incorporate pilot demonstrations, tax incentives, and other safeguard measures into the action plan for digitalization to support the consumer goods industry. The suggested optimization path is X1-X2-X5-X6-X7. With a PMC value of 5.84, Policy P6 is ranked 16th. The PMC indices for this policy are all below the mean value, with the exception of Policy nature X1, Policy currency X2, Policy field X5, Policy guarantee X6, and Policy focus X7. Focusing on defending rights to intellectual property in the "Internet +" domain, this policy could be incorporated into medium- and long-term planning. Furthermore, government subsidies and special funds should be allocated to facilitate its implementation. The optimization path should go as follows: X7-X2-X5-X6-X1. Policy P15's PMC index is 5.81, ranking 17th. Its PMC indices in Policy nature X1, Policy field X5, Policy guarantee X6, and Policy focus X7 are all lower than the average, indicating a concentrated focus but insufficient guarantee measures. Therefore, Policy P16's PMC index is 5.71, placing it in the 18th position. Its PMC index is lower than the mean value in the following categories: Policy nature X1, Policy currency X2, Policy focus X7, and Policy object X8, according to the degree of the first-level index below the mean value, Policy object X8 has the largest deviation from the mean, while Policy currency X2 has the smallest. Thus, X8-X1-X7-X2 is the recommended optimization strategy. We find that the majority of digital economy policies fall under Policy nature X1, Policy currency X2, Policy guarantee X6, and Policy focus X7, after observing policies with passing ratings, yet their PMC indices are still below the mean. This highlights the importance of considering these aspects more thoroughly to enhance the feasibility of policies during their formulation.

4. Conclusions and Implications

In order to do a quantitative assessment of China's policy texts for the digital economy, this article integrates the PMC index model with text mining techniques. This analysis leads to the following findings.

Firstly, based on a literary standpoint, China's policies on the digital economy are framed and developed in a way that is largely reasonable and extremely feasible, closely matching the country's present course of economic growth in this area. Among the 18 policies assessed, six were deemed perfect, eight were classified as good, and four were considered satisfactory, with no policies falling below the satisfactory threshold. This further underscores the overall strong performance of China's digital economy policies, characterized by a high level of scientific rigor and practical applicability, which can effectively catalyze the growth of China's digital economy.

Secondly, from an index-based evaluation standpoint, the indices falling below the average throughout the 18 chosen policy samples are mostly concentrated in the

following areas: Policy currency (X2), Policy field (X5), Policy guarantee (X6), and Policy focus (X7). This implies that China's policies pertaining to the digital economy should use some strengthening. More specifically, there is a need to improve how short-term and medium- and long-term plans are integrated. Furthermore, within specialized policies, apart from the core policy content, additional aspects can be incorporated to enhance the integration of multiple domains, broadening the scope and scalability of policy content. This, in turn, will provide comprehensive safeguards to ensure the effective promotion and implementation of policies.

With regard to policy currency, this term refers to the duration it takes for a policy to be formulated, implemented, and produce its intended effects. The lifespan of policy objectives serves as a tangible reflection of policy currency, encompassing long-term, medium-term, and short-term goals. Among the 18 selected policies, all three types of objectives are present, yet the interplay and transition between different durations of objectives is not adequately addressed. Long-term objectives serve as the guiding principles and action plans for policies, while short-term objectives provide specific, actionable measures. Medium-term objectives bridge the gap between the two. Therefore, in crafting future policies, it is crucial to have forward-thinking planning, coupled with the breakdown and refinement of long-term objectives. Adjustments and optimizations should be made throughout the implementation process. Similarly, if policies are solely focused on the short term, it is essential to consider their potential long-term implications.

Regarding policy field, China's digital economy policies span a diverse range of areas, primarily encompassing economic, social services, institutional, and technological domains. However, they lack integration with environmental aspects. In formulating specific policies, more emphasis is placed on economic benefits and social impacts, often overlooking the environmental problems that often accompany economic development. Unlike traditional production methods, the digital economy can enhance efficiency through advanced production technology. Similarly, advanced production equipment can be leveraged to reduce pollution and promote environmental protection. Therefore, the digital economy and green production are closely linked, and the integration of factors such as digital technology and the environmental field can be further enhanced.

Regarding policy guarantee, it is crucial to ensure the smooth and effective implementation of policies. This is reflected in the provision of legal and regulatory support, assistance in terms of talents, funds, and other resources, optimization of resource inputs, and publicity and education to enhance policy implementation effectiveness. China's digital economy policy in terms of subsidies, funds, taxes, and other aspects of the PMC index is low. This indicates that China focuses more on the policy implementation of macro-guidance, aiming to encourage independence and autonomy in policy implementation. Of course, providing appropriate resources is essential to enhance the responsiveness of the policy object. For example, increasing support for small and medium-sized enterprises, offering loan preferences, tax reductions, fee reductions, and other support can help enterprises overcome financing difficulties, thus boosting their enthusiasm for transformation and upgrading.

In terms of policy focus, China's digital economy policies cover a wide range of areas due to differences in policy implementation targets and objectives. These areas include social governance, public services, network infrastructure, and cybersecurity. Among the 18 selected policies, seven have PMC indices below the mean in terms of policy focus, with a primary focus on public services and cybersecurity. This suggests that China should increase investment in public services, leverage digital resources effectively, enhance the efficiency of public resource utilization, and prevent wasteful duplication in construction projects. Additionally, as China advances its digital economy, it must prioritize cybersecurity by imposing stricter penalties for cybercrimes, enhancing supervision measures, and intensifying cybersecurity awareness and education efforts.

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