Article

Exploring Business Environment Policy Changes in China Using Quantitative Text Analysis

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Abstract: A conducive business environment is crucial for establishing a sustainable market economy. This paper aims to quantitatively analyze the evolution of China's business environment policy, offering valuable insights for future optimization. Focusing on 1335 national-level business environment policies from 2006 to 2023, this study employed a social network analysis (SNA) and the latent Dirichlet allocation (LDA) model to investigate policy changes in terms of the issuing rhythm, collaborating departments, and policy attention. The findings reveal: (1) China has established a mature policy system for its business environment, with both an increasing number and improving impact of related policies. (2) A governance network of the business environment has gradually formed, with the participation of differentiated departments and the domination of one central unit, ensuring efficient collaboration and clear instruction. (3) The attention of the business environment policy has shifted from attracting foreign investment and developing the industrial chain to simplifying bureaucratic approval procedures, smoothing trade circulation, and ensuring legal reliability. This paper's results serve as an empirical contribution to the field of business environment policy research.

Keywords: business environment; policy change; text analysis; network analysis; latent Dirichlet allocation (LDA); sustainable market economy

1. Introduction

The term "business environment", deriving from the World Bank's *Doing Business* survey, refers to the regulatory environment connected to business operation, covering the entire life cycle of enterprises. This environment is provided jointly by the government, market, and society [1,2]. The importance of a conducive business environment in creating a sustainable market economy is now widely accepted. A well-functioning regulatory system promotes new firms' creation and is crucial for the continued dynamism of the modern market [3]. After all, ineffectiveness in the regulatory system creates frictions that inhibit the performance of firms, consequently leading to knock-on effects on investments, productivity, employment, and living standards.

The sustainability and dynamism of the market economy are also vital concerns for policymakers, who, in country after country, are trying to set policies that will optimize the business environment. In China, this issue entered the policy agenda of the central government when the World Bank initiated the *Doing Business* survey into its two major metropolises, Beijing and Shanghai, in 2004. The earliest national-level policy explicitly mentioning the "business environment" emerged in 2006. When we zoom out and examine the global economy, we observe the years from 2006 to 2023 as an eventful period. Advanced economies suffered their most serious economic and financial crisis, known as the Great Recession [4]. Additionally, the debt crisis in Greece and other parts of Europe threatened the survival of the euro area, while emerging markets, from Argentina to Turkey, experienced strains due to interest rate hikes from the US Federal Reserve. In response to the changing global economic landscape and the corresponding challenges in domestic

dynamics, China's central government has systematically implemented a series of policies to reinforce the stability of the internal business environment for the last two decades.

In general, a policy is a government-sponsored plan characterized by specific targets, measures, and underlying values [5]. The evolution of business environment policy in China, typically occurring in small and discrete increments rather than in abrupt strokes [6], is intricately tied to the shifting landscape of government attention and the dynamic interplay of socio-economic circumstances over time [7]. This nuanced evolution necessitates a comprehensive analysis of the policy change process. Specifically, an examination of how China's business environment policy is evolving and the underlying logic driving these changes is imperative. Such systematic research holds the potential to provide policymakers with meaningful insights into optimizing the policy system for the future, ensuring the long-term sustainability of the domestic market economy.

The existing literature on business environment policies and their change can be broadly categorized into three main types. Firstly, earlier studies focus on the impact of business environment policies on the sustainable development of the market economy. For instance, Ciccone and Papaioannou [8] associate countries with less burdensome regulations with an increased entry into industries, and those countries benefit more from expansionary global demand and technological shifts. Demirguc-Kunt et al. [9] examine the connection between the higher growth of incorporated businesses in countries with good financial and legal institutions. Secondly, scholars are conducting research on evaluating the effectiveness of business environment policies. Jiang et al. [10], for example, set an evaluation index system for the business environment and empirically analyzed the effectiveness of policy implementation. Babatunde et al. [11] investigate the extent of policy continuity using the ease of doing business index. Vokoun and Aramayo [12] develop a business environment index with indicators that are broadly available for developing countries. Thirdly, our paper is most closely related to the literature examining policy change. For instance, Bernatzki et al. [13] explore how changes in policies impact the business environment and identify their driving causes. Tien and Hung Anh [14] discuss the competitive advantage gained from policy change in the case of foreign corporations. Hrechyshkina and Samakhavets [15] analyze the business environment in the context of socio-economic development and forecast the future path, such as improving property relations.

While many scholars have begun to explore changes in business environment policy, few have thoroughly examined the policy texts themselves. The objective of this paper is to fill this gap by addressing the evolving path of the business environment policies in China based on policy text data. Policies are strategies or plans executed by the government over a given period for specific political, economic, or social targets. This information is conveyed through policy texts [16]. The increasing availability of digitalized policy text data provides scholars with a foundation to examine policy texts quantitatively [17]. Various techniques can be employed to quantify text, each with its strengths, weaknesses, and trade-offs [18]. Our research utilizes an integrated approach involving a social network analysis (SNA) and the latent Dirichlet allocation (LDA) model to conduct a deeper analysis of business environment policy texts.

To provide a more calculable approach to understanding the evolution of China's business environment policies, a policy text database will be constructed using the precise search term "business environment". Utilizing SNA, the policy issuing numbers and rhythm, policy issuing entities, and collaborative networks over time will be calculated. This process will facilitate the identification of core policy actors at different times and track their appearance and disappearance. Additionally, the relationships between actors and their changing trends will be scrutinized [19,20]. Furthermore, the LDA model will be employed to uncover policy topics within the texts. These topics will be interpreted and clustered into categories [21–23], with policy content provided as supplementary evidence in the Appendix A. The changing path of topics and their categories will then be examined to reveal the evolving trend in policy attention over time. Given the conceptual spread of

the business environment beyond business-related policy, the LDA model is recommended to address this issue and ensure a high level of substantive interpretability [24].

The research results are anticipated to offer a comprehensive understanding of how China's business environment policies are evolving. This paper will provide an in-depth analysis of China's business environment policy evolution and development trends from various perspectives, employing a quantitative text-based analysis approach. Additionally, it will aid policymakers in identifying suitable policies or measures and serve as a decision-making basis for the sustainable development of the market economy.

The structure of this paper is organized as follows: Section 2 outlines our proposed methods, including the SNA and the LDA topic model for policy evolution analysis, along with the policy text database. Section 3 reports the quantitative analysis results of China's business environment policy changes using the methods described in the preceding section. Section 4 provides a discussion of the findings within a broader context. Finally, Section 5 concludes our research, noting its limitations, and proposes potential avenues for future investigation.

2. Methodology

2.1. Data Collection

Policy texts subject to the business environment are selected as the data basis for analysis. All the policy texts are collected from the "China Legal Retrieval System" database (https://www.pkulaw.com/, accessed on 2 December 2023) using the search term "business environment" for precision. To ensure accuracy and streamline the analysis, only national-level policy texts are selected, considering the significant socio-economic variations among the provinces and cities in China. All policies were formulated by China's central government, including the State Council and all relevant functional departments. The policy formats include regulations, decisions, announcements, opinions, and other normative forms of administrative documents. Each policy text undergoes manual verification. After excluding texts of low relevance and removing informal text forms such as letters and replies, 1335 pieces remain. The earliest policy in the dataset was issued on 21 June 2006, while the most recent one is dated 2 December 2023. The remaining policy texts reflect trends in national regulation within the business environment, thereby forming the foundation for subsequent quantitative analysis. The process of the research covers three main steps, including data collection, policy exploration through joint policy-issuing networks, and policy change identification using latent Dirichlet allocation topic model, as shown in Figure 1.

2.2. Exploring Policy Change through Joint Policy-Issuing Networks

A social network analysis is a scientific method rooted in mathematics and graph theory, employed to investigate actors and their relationships through quantitative indicators [25–27]. A primary objective of this research is to elucidate policy change trends by revealing the departments issuing policies and exploring their relationships. After nearly two decades of evolution, a mature system of business environment policies has emerged, with numerous policies jointly formulated by pertinent central departments. This system forms the basis for analyzing collaboration among departments. In comparison to other methods, SNA proves more applicable due to its emphasis on departmental interactions, revealed through clear visualized mapping [28–30]. Issuers are listed completely in each of China's policy documents. More than one issuer means the behavior of joint policy-issuing.

We conduct our analyses in two main steps using Uninet 6.0: (1) Create multiple joint policy-issuing networks using data on joint policy issuance in the business environment area during various time periods. In each network, nodes represent central departments, and the lines between nodes symbolize connections. Larger nodes indicate a higher absolute number of policies issued by that specific department. (2) Calculate the values of degree and density to illustrate the characteristics of each network. Through a comparative analysis

of the joint policy-issuing network with core policymaking departments, we scrutinize changes in the statuses of policymaking bodies and their relationships over time [31,32].
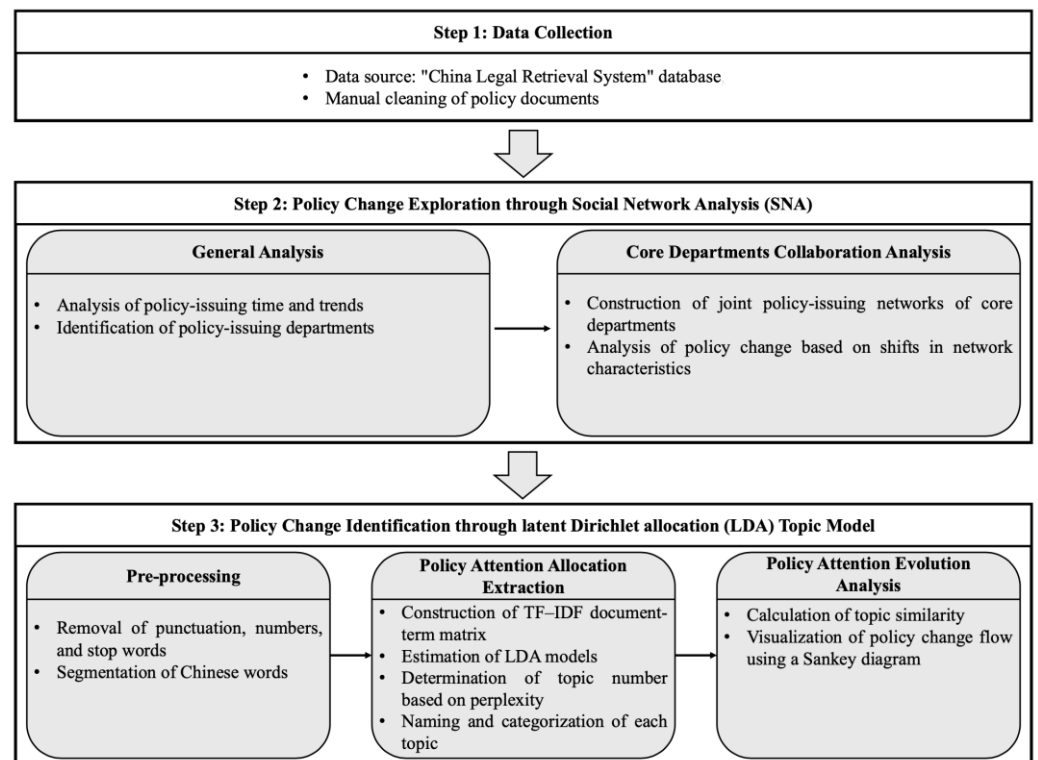
Figure 1. Flow chart of the research.

2.3. Identifying Policy Change through the Latent Dirichlet Allocation Topic Model

The latent Dirichlet allocation topic model stands as an unsupervised machine learning technique adept at automatically identifying latent topics concealed within extensive textual data [33]. In this research, the LDA topic model is chosen for content analysis to discern patterns of policy attention. In the LDA framework, each policy document is treated as a "bag of words", where frequently co-occurring words indicate abstract topics [22]. By employing the LDA topic model algorithm, clusters of words can be distinguished based on their co-occurrence frequencies [34,35]. The semantic meaning of high-frequency words within relatively important clusters is then interpreted and labeled to analyze the topics within the policy documents.

Our LDA topic analysis involves six steps using python programming language: (1) Preprocess text. After collecting policy documents, we remove punctuation, numbers and stopwords. Stopwords, encompassing common stopwords and those unique to the policy areas, are words that frequently occur but carry no substantial meaning. Given the distinctive feature of the Chinese language, where characters lack natural separation, each document's text is segmented into meaningful words using the Jieba module in Python. (2) Construct a document-term matrix of different time phases. The document-term matrix, a format amenable to LDA modeling, is obtained from policy text using a TF–IDF weight calculation. Rows correspond to documents, while columns represent all words appearing in the corpora. (3) Estimate the model. Combining Blei et al.'s [36] explanation with the features of our targeted policy text corpus, we utilize the Gensim module to estimate LDA models, employing default parameters. The LDA model is solved using the Gibbs sampling technique to group similar words into topics, and to calculate word distributions for each topic. (4) Determine the topic number of each time phase. The number of topics is determined through perplexity index computation. (5) Name and classify each topic. Topics are named based on word distribution and policy content. After interpretation,

topics are classified into groups. (6) Draw a Sankey diagram based on the topic similarity calculation. Sankey diagrams are drawn based on the similarity values between topics across different time phases, illustrating the flow of policy changes.

3. Results

3.1. Policy Issuance Trends over Time

3.1.1. Trend and Rhythm of Policy Issuance

We conducted a statistical analysis of 1335 central-level policy documents related to China's business environment to delineate the temporal dynamics of policy releases. This analysis encompasses the timeline of policy releases, the quantity of releases, and specific policies as examples. The x-axis represents the policy-issuing time, while the y-axis denotes the number of policy documents. Overall, there has been a consistent increase in policy issuance within this specific domain. Notably, 2021 witnessed the highest number of policy publications, totaling 249 documents. However, a discernible downward trend was observed in more recent years. It is worth noting that although the data in 2023 is incomplete (with policy documents released between 1 January 2023 and 2 December 2023), it has not been excluded from Figure 2. Further analysis is based on the trends in policy issuance and representative policies, covering the period from 2006 to 2023. To facilitate a clear presentation of temporal changes, the analysis is segmented into three phases: 2006 to 2011, 2011 to 2017, and 2017 to 2023. The details are outlined as follows:

From 2006 to 2011, amidst the global economic challenges of the Great Recession, China largely avoided significant impacts. During this period, China's business environment policies showed minimal fluctuations and were relatively few in number. An inadequate understanding of the business environment led to overall policy instability. The first policy related to the business environment emerged on 21 July 2006, issued jointly by the Ministry of Commerce and the Ministry of Land and Resources, titled "The Outline of the 11th Five-Year Plan for State-level Economic and Technological Development Zone". During this phase, the business environment was primarily addressed within the context of developing plans for special economic zones. Related policies primarily concentrated on regional economic cooperation and the extension of industry chains. The scarcity of policy documents categorizable as comprehensive or specific plans for business environmental development indicated a limited governmental awareness of the potential and significance of the business environment.
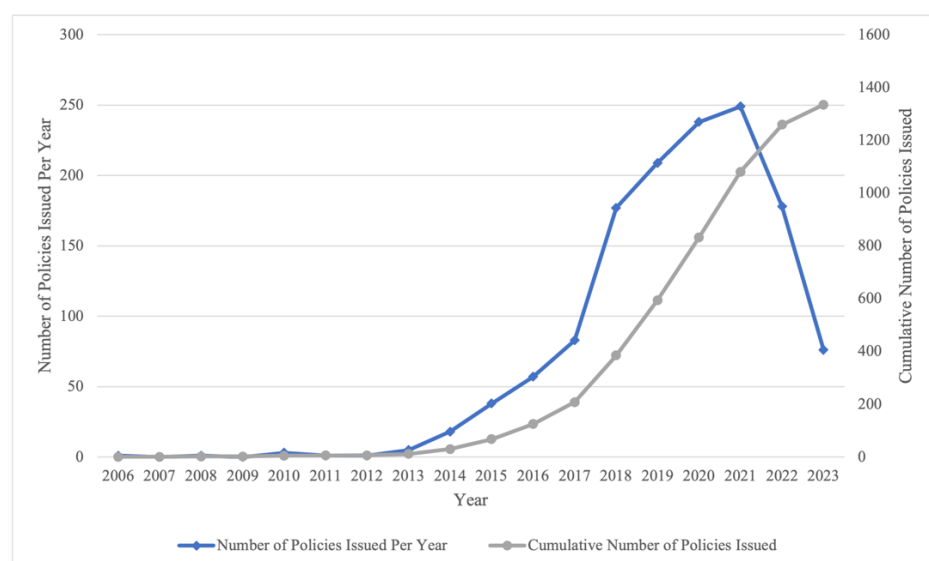
Figure 2. Statistics on the issuance of business environment policies, including the annual count and cumulative count, from 2006 to 2023.

A discernible upswing in policies related to business environmental development occurred during the period of 2011 to 2017, indicating a heightened interest from the Chinese government in the business environment. "Business environment" was officially recognized as a proper noun in the policies of the guiding principle of the central government for the first time. The central government displayed a heightened awareness of the importance of business environment development, and actively made efforts to facilitate a conducive trading environment, particularly for small and medium-sized businesses. Two representative policies, namely "The Reform Plan of the Registered Capital Registration System (2014)" and "The Opinion on the Implementation of the Negative List System for Market Access (2015)", were issued by the State Council during this phase. Meanwhile, the global market witnessed an anti-globalization trend with events such as the Brexit referendum, the election of Donald Trump, and the rise of nationalists in various European countries, largely due to the slow recovery of advanced countries [37].
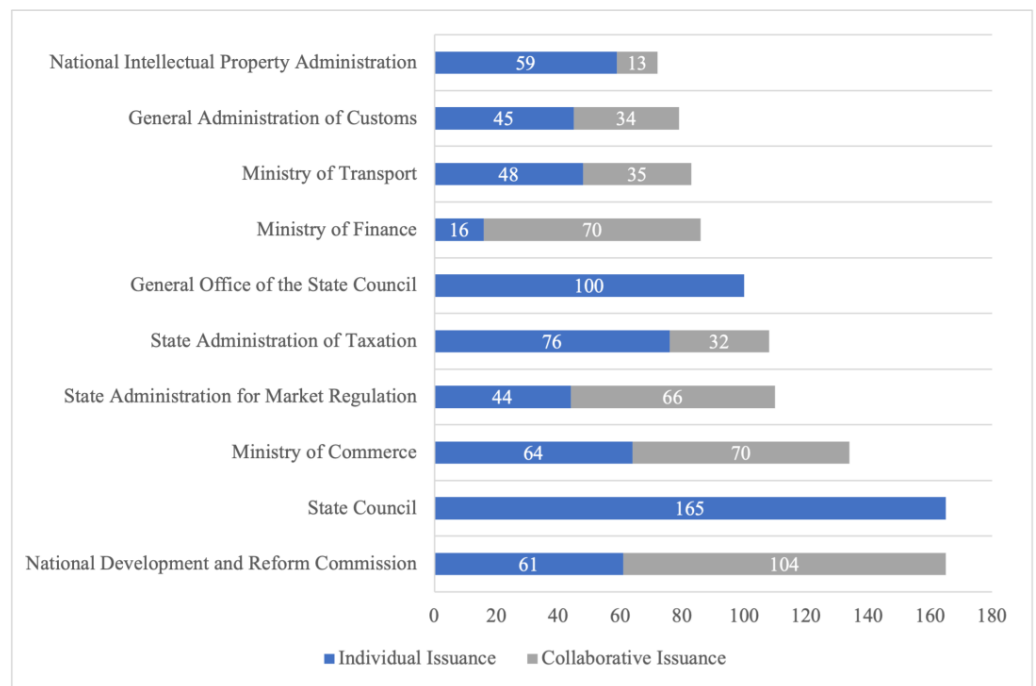
After 2017, the number of business environment policies experienced an upward trend followed by a subsequent decline in the following years. In March 2020, the global economy came to a halt due to the coronavirus pandemic, leading to significant shifts in worldwide business policies. In terms of domestic business environment policy, a landmark event was the promulgation of the "Regulations on Optimizing the Business Environment" in January 2020, representing the culmination of extensive exploration and policy accumulation in shaping China's business environment policy system. Key national planning and management ministries issued impactful documents supporting business environment reforms, such as the "Opinions on Optimizing the Business Environment and Reducing the Systemic Transaction Costs of Market Entities (2022)" by the State Council and the "Notice on Improving Government's Integrity and Compliance to Optimize the Private Economic Developmental Environment (2023)" by the National Development and Reform Commission (NDRC). Additionally, this period witnessed the emergence of numerous business environment pilot projects, indicating a shift towards a more practical, on-the-ground phase in the development of business environment policies.

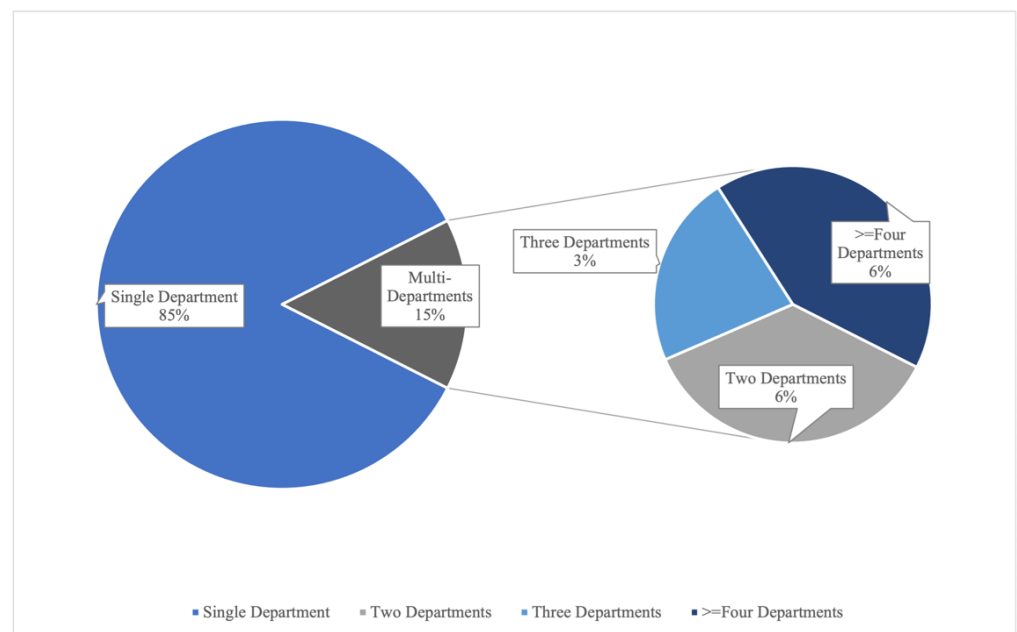### 3.1.2. Composition of Policy Issuance

Figure 3 lists the top ten Chinese ministries that have issued the highest number of business environment policies. The State Council ranks first (N = 165), and the General Office of the State Council is in sixth place (N = 100), both established to assist leading officials in the day-to-day administrative operations of the central government. Among functional departments, the National Development and Reform Commission emerges as the most prolific (N = 165). Given NDRC's primary function to formulate and implement strategies for national economic and social reformation, this suggests a critical focus of China's business environment policies is the establishment of a modern economic system.

Other key ministries contributing significantly include the Ministry of Commerce, the State Administration for Market Regulation, and the State Administration of Taxation, ranking third to fifth (N = 134, 110, 108). This ranking implies that in-depth international economic cooperation, restrained governmental market regulation, and business tax burden reduction are three other main targets. Additional ministries playing vital roles in shaping business environment policies include the Ministry of Finance (ranked seventh, N = 86), the Ministry of Transport (ranked eighth, N = 83), the General Administration of China Customs (ranked ninth, N = 79), and the State Intellectual Property Office (ranked tenth, N = 72).

When policies address multiple targets, both the policy-setting and implementation phases become complex, necessitating collaboration among ministries with diverse functions. Since 2006, 1335 business environment policies have been issued. While 85.02% of these policies originate from a single department, inter-departmental cooperation is a notable phenomenon (see Figure 4). Of these, 72 policies involve collaboration between two departments, constituting 36% of joint issuances, while 45 policies are the result of collaboration among three departments, representing 22.5% of joint issuances.

Figure 3. The top ten Chinese departments with the highest number of issued business environment policies, indicating both individual and collaborative issuances.

Figure 4. Composition of business environment policy issuances, illustrating the proportions issued by one, two, three, or more than four departments.

It is noteworthy that two policies involve the cooperation of 27 ministries, encompassing not only core business-related departments such as the NDRC, and the Ministry of Commerce, but also less business-related departments like the Ministry of Culture and Tourism, the Ministry of Human Resources and Social Security, the Ministry of Science and Technology, and the Ministry of Education. It reflects that for China's central government, constructing a better business environment extends beyond narrowly improving trade and market conditions. Elements such as well-educated human resources with appropri-

ate social security, a robust manufacturing capacity based on sophisticated scientific and technological capabilities, are considered equally indispensable, if not more so.
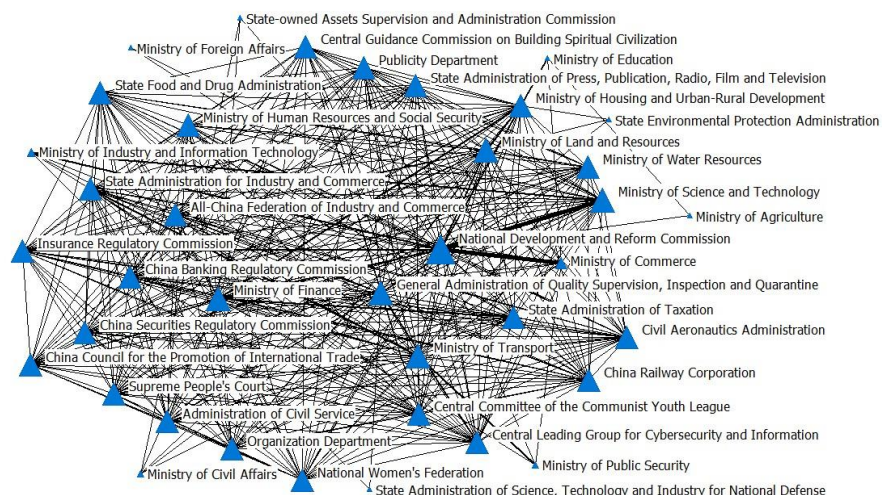
3.1.3. Collaboration of Core Departments

The complex intersection among departmental collaborations provides the analytical needs for social network analysis, which, as noted before, is a research method focused on quantitatively examining actors' interactive relationships, as demonstrated graphically. In this study, the actors are the departments, and the interactive relationships are the joint issuances of policies between or among departments. The network characteristics are analyzed using UCINET 6.0 (see Table 1), and graphs are generated by Netdraw 2.1 (see Figures 5–7). The data include all 1335 policy documents, with nodes representing departmental units. Node size indicates policy issuance frequency, while line thickness reflects the frequency of collaboration. Nodes with high centrality degrees are centrally located in the graph.

Table 1. Network characteristics during three time phases: 2006–2011, 2011–2017, and 2017–2023.

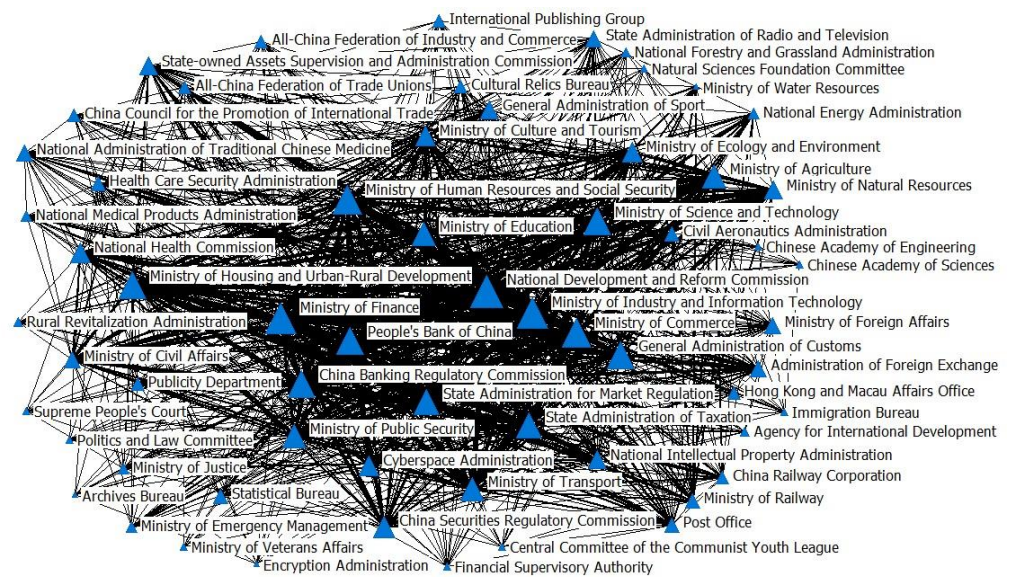| Time Phases	2006–2011	2011–2017	2017–2023
Number of Nodes	4	49	103
Number of Nies	2	828	2100
Network Density	0.167	0.352	0.200
Average Degree	0.500	16.898	20.388
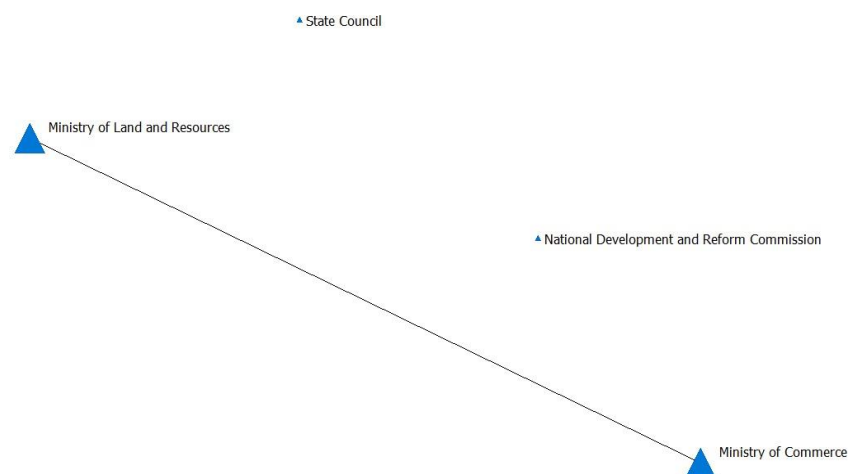
Figure 5. Network of core departmental collaboration from 2006 to 2011.

Figure 6. Network of core departmental collaboration from 2011 to 2017.

Figure 7. Network of core departmental collaboration from 2017 to 2023.

The analysis is divided into three phases: 2006–2011, 2011–2017, and 2018–2023. During the period of 2006–2011, the NDRC takes the lead in contributing to business environment policies, issuing 66.67% of the total documents. Most of its publications pertain to regional economic cooperation and industry chain extension, concerning areas like the Yangtze River Delta, the Pearl River Delta, and the Cheng-Yu Economic Zone. Additionally, the Ministry of Commerce (degree = 1), in collaboration with the Ministry of Land and Resources (degree = 1), formulates a policy on planning emerging economic and technological development zones.

From 2011 to 2017, the number of governmental departments involved in business environment construction significantly increases. Each department produces more related policy documents, and inter-departmental collaboration becomes more frequent. Collaboration among ten departments, including the National Development and Reform Commission (degree = 49), the Ministry of Finance (degree = 33), the Ministry of Science and Technology (degree = 33), the Ministry of Transport (degree = 32), the Ministry of Land and Resources (degree = 32), the Ministry of Housing and Urban-Rural Development (degree = 31), the State Administration of Quality Supervision, Inspection and Quarantine (degree = 31), the General Administration for Industry and Commerce (degree = 29), and the Central Leading Group for Cybersecurity and Information (degree = 29), strengthens during this period. Among them, the National Development and Reform Commission, the Ministry of Finance, and the Ministry of Science and Technology constitute the core entities of the joint policy-issuing network. These three agencies guide the development of the overall business environment in China, highlighting its importance as a national strategy.

In the period of 2017–2023, inter-departmental collaboration for business environment policy-setting becomes more systematic. The National Development and Reform Commission (degree = 552) and the Ministry of Finance (degree = 463) continue to be leading cooperating departments. The Ministry of Commerce (degree = 423) becomes a core body, and the State Administration for Market Regulation (degree = 412) emerges as a crucial department for optimizing the business environment. It issues policies related to regulating illegal enterprise-related fees, standardizing intellectual property rights enforcement, and streamlining the bureaucratic process of business start-ups. Ministries not directly related to the business environment in the previous periods also play a role in this phase, such as the People's Bank of China, the Health Commission, the National Energy Administration, the Ministry of Natural Resources, and the Forestry and Grassland Administration. This expansion is because the business environment covers the entire life cycle of an enterprise, spanning from its inception to withdrawal. While led by the NDRC, business environment

policy involves a diverse array of sectors, accelerating the diffusion of the policy among different functional departments.

3.2. Allocation and Evolution of Policy Attention across Time

3.2.1. Identification of Policy Attention

Fifteen topics were extracted in the preferred LDA model. To enhance result reporting, each topic is assigned a label reflecting its essence. Based on our field of knowledge, we categorized the topics into five groups: the (1) foreign trade environment, (2) industrial environment, (3) administrative approval environment, (4) legal environment, and (5) trade circulating environment. The following is an elaboration of these five categories of topics. Refer to Figure 8 for the topics assigned to each category and Table 2 for the corresponding terms of each topic. For corresponding policy text content in detail, see Appendix A.
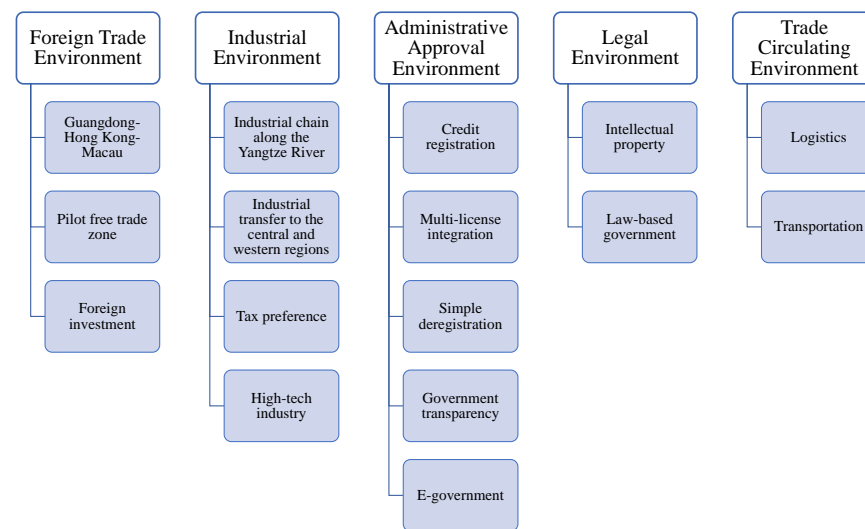
Figure 8. Five categories with fifteen topics extracted from business environment policies.

Table 2. Topics with the corresponding terms of their business environment policies.

No.	Topic Name	Topic Terms
1	Guangdong-Hong Kong-Macau	Shenzhen-Hong Kong, Pearl River Delta, transnational company, Guangdong-Hong Kong-Macao, domestic capital, special economic zone, new zone, extensive Pearl River Delta region, greater bay area
2	Pilot free trade zone	free trade, pilot zone, tax-protected, customs, aviation
3	Foreign investment	foreign investment, foreign trade, trade mark, adjudication, alteration, recordation system, value-added tax
4	Industrial chain along the Yangtze River	Yangtze River Delta, Yangtze River, chemical industry, deep processing, key enterprises, shoreline, division and cooperation of labor, along the river, the central region
5	Industrial transfer to the central and western regions	central and western region, Chengdu-Chongqing, Yangtze River, upper Yangzi River, commerce and trade, economic zone, border area
6	Tax preference	taxpayer, tax service, business license, overseas Chinese, tax preference, recordation system, patents, foreign trade, trade, pilot zone, invoice, value-added tax, tax authority, tax service
7	High-tech industry	development zone, high-tech, industry, import
8	Credit registration	circulation, pilot zone, e-commerce, development, commerce, trade, foreign investment, industry, credit, registration

Table 2. *Cont.*

| No.	Topic Name	Topic Terms
9	Multi-license integration	port, account open, economic development zone, new area, cancellation, multi-license, tax, simple
10	Simple deregistration	free trade, free trade pilot zone, intellectual property office, deregistration, simple, franchise
11	Government transparency	publicity, approval, government service, supervision, division of responsibility, law enforcement, permission
12	E-government	registration certificate, set-up, demonstration county, e-service
13	Intellectual property	counterfeit, infringement, strike, intellectual property, market supervision, protection, patent, publicity, demonstration area
14	Law-based government	law-based, legal-awareness campaign
15	Logistics	express delivery, postal service, fast freight, dependability, demonstration area, terminal, home-return, yacht, logistics
16	Transportation	watercraft, human resources, transport, registration

(1)　Foreign trade environment. This category concentrates on measures aimed at attracting foreign investment for deeper participation in international economic cooperation. Three key topics emerge: Guangdong-Hong Kong-Macau, pilot free trade zone, and foreign investment. Each topic is examined with its relevant terms and representative measures. The first topic is Guangdong-Hong Kong-Macau. The keywords include the geographical components of this region (e.g., "extensive Pearl River Delta region") as well as specific policy objects, such as "transnational company" and "domestic capital". Notably, Hong Kong and Macau function as pivotal gateways for both foreign and overseas Chinese investors into mainland China. The pilot free trade zone is another topic, emphasizing "free trade" as a prominent term, coupled with related policy measures like "customs" and "tax-protected" arrangements. In Topic 3, we see a cluster of terms related to foreign trade procedures, such as "recordation system", "alteration", "foreign trade", along with trade preference terms containing "value-added tax" and "foreign investment". The formulation of business environment policies in China significantly aims to attract foreign investment.

(2)　Industrial environment. Topics in this category reflect the diversity of policies on the industrial environment, offering valuable insights into China's industrial environmental strategy. Four key topics are identified: the industrial chain along the Yangtze River, industrial transfer to the central and western regions, tax preference, and high-tech industry. The first topic in this category is the industrial chain along the Yangtze River, with policies primarily focusing on the collaboration among "key enterprises" along the "Yangtze River". These policies extend beyond the Yangtze River Delta to include the central regions of China, which are relatively underdeveloped. Following a similar logic, topic 5, which deals with industrial transfer to the central and western regions, includes terms such as "central and western regions", "border area", and "Chengdu-Chongqing" to represent areas capable of absorbing factories and enterprises from the relatively developed eastern China. Topic 6, tax preference, is primarily concerned with reducing taxes for specific business types (e.g., firms with high-quality "patents"), entities (e.g., "overseas Chinese"), or in special administrative zones (e.g., "pilot zone"). This topic also involves the "tax service" provided by the "tax authority" to the "taxpayer". Topic 7, high-tech industry, exhibits some overlaps with tax preference, as certain types of tax reduction are designed for emerging firms in high technology.

(3)　Administrative approval environment. The third thematic category, centering on the administrative approval environment, explores five focal topics elucidated by our analytical model. Primary among these is the investigation into credit registration

(topic 8), involving the establishment of a corporate credit system aimed at assessing the trustworthiness of business entities registered in China. Entities not featured on the blacklist gain various advantages, including streamlined administrative approval procedures and reduced supervision. Subsequent topics, namely multi-license integration (topic 9) and simple deregistration (topic 10), are interrelated and address the bureaucratic procedures businesses must navigate for unimpeded operational conduct. Topic 9, encompassing lexemes such as "account open", "multi-license", and "simple", denotes a discernible reduction in the requisite number of certificates for businesses. Meanwhile, topic 10, featuring terminologies like "deregistration" and "simple," accentuates the facile bureaucratic process associated with business closure. Furthermore, government transparency (topic 11) emerges as a foundational element within a robust administrative approval milieu, with associated terms comprising "publicity", "government service", "approval", and "permission". Pertinent information pivotal to enterprise operations is conveniently accessible on official government platforms. E-government is the main interest of the topic 12, the last topic of the administrative approval environment category. Topic 12 in some extent shares the same feature with the topic of government transparency, with featuring terms such as "e-service", "set-up" and "registration certificate". In essence, these analytically derived topics collectively contribute substantively to the delineation and refinement of an efficacious and transparent administrative approval framework.

(4) Legal environment. The legal environment category centers on two pivotal topics: intellectual property and law-based government. Intellectual property protection stands as a major focal point for business environment policies in contemporary China, with a particular emphasis on combatting infringement, such as the sale of counterfeit products. Enforcement actions are occasionally carried out under the market supervision purview of each city's local governments. Law-based government, addressed in the topic 14, is a prominent aspect in the effort to shape a better legal environment, encompassing terms such as "legal-awareness campaign". Meanwhile, under the umbrella of this topic, the behavior of the "law-based" government is stable and predictable. It is an emerging yet critically important element for ensuring the sustainability of the market.

(5) Trade circulating environment. The fifth category, focused on trade circulation perspectives, identifies two key topics: logistics and transportation. These topics have entered the view of business environment policymakers in recent years. Topic 15, focused on "Logistics", encompasses a variety of terms such as "express delivery", "postal service", "fast freight" and the broader concept of logistics. The notion that a conducive business environment is intricately tied to seamless and efficient logistics presupposes a crucial prerequisite—an advanced transport infrastructure and a sophisticated national transport network. Topic 16, foundational to the logistics theme, emphasizes terms like "transport" and "watercraft," offering a comprehensive view of the evolving landscape. This category sheds light on crucial aspects shaping the trade circulation environment and reflects policymakers' recent attention to the dynamics of logistics and transportation.

3.2.2. Evolution of Policy Attention

As a final analysis, we examine the temporal evolution of our 16 topics, visualized in Figure 9 through a Sankey diagram depicting the distribution of topics from 2006 to 2023. The three columns correspond to the distinct analysis periods (2006–2011, 2011–2017, 2017–2023). Each block within the diagram represents a unique topic, and topics aligned within the same column share the same time period. The size of each block indicates the degree of similarity between topics in different phases, while the width of connecting lines represents the corresponding similarity values. The threshold for the similarity value is set at 0.8.
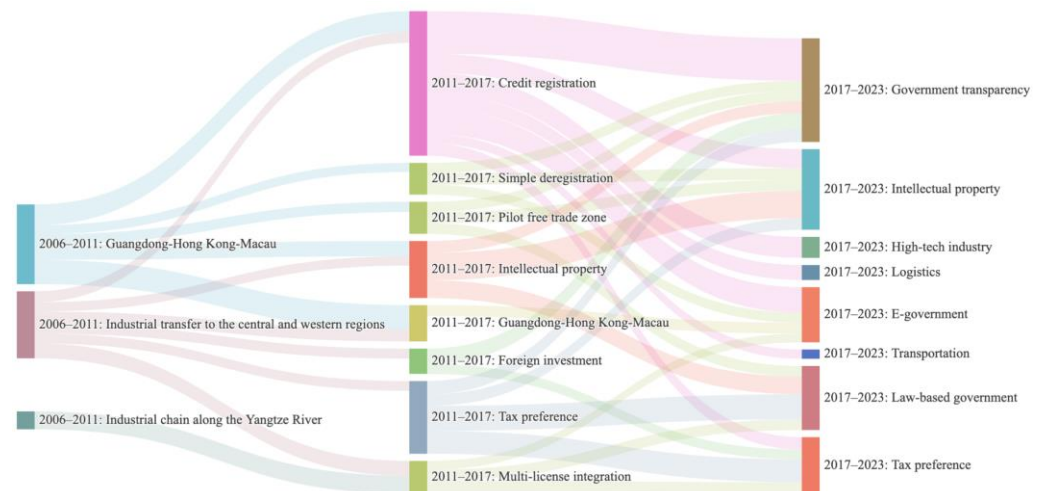
Figure 9. Evolution of topics over three time phases: 2006–2011, 2011–2017, and 2017–2023.

We observe that the topics at the beginning of the time period were focused on elements traditionally considered as the classic business environment, such as attracting foreign investment ("Guangdong-Hong Kong-Macau") and developing industrial chains ("industrial transfer to the central and western regions" and "industrial chain development along the Yangtze River"). The recently emerging hotspots have a broader scope, encompassing areas such as an administrative approval environment (e.g., "government transparency", "multi-license integration" and "simple integration"), legal environment (e.g., "law-based government" and "intellectual property"), and trade circulating environment (e.g., "logistics" and "transportation"). Furthermore, attention shifts when examining specific topic categories. For example, in the industrial environment, topics shift towards "tax preference" and "high-tech industry", reflecting the industry's upgrading.

4. Discussion

Examining 1335 national-level policies aimed at optimizing China's business environment from 2006 to 2023, this study adopts quantitative content analysis to form an interpretation of how China's business environment policy has been changing. The findings reveal different policy characteristics with an underlying logic evolving over the years.

Narrowly, in terms of the economic development, the world in the early twenty-first century was still in a golden age that had lasted for six decades. For the world as a whole, per capita income has multiplied by a factor of four since the end of World War II. China, in the meantime, has been absorbing foreign capital for industrialization, especially since the 1970s. In 2001, China joined the WTO [38]. Following this, China embarked on a series of economic reform programs aimed at recalibrating market rules and deepening its engagement in international economic cooperation. Triggered by the World Bank's *Doing Business* survey, China integrated survey standards into measures regulated by the market and guided by the industry. The initial policy specifically referring to the business environment was issued in 2006, and its main objective was to facilitate reginal economic cooperation and industry chain development. During this period from 2006 to 2011, measures aimed at optimizing the business environment were incorporated into the plans for constructing special economic zones. Among all the special economic zones in China, the Pearl River Delta served as a pioneer for economic reform. In the Pearl River Delta, Hong Kong and Macau acted as bridges linking foreign capital to domestic industry, while mainland cities such as Guangzhou and Shenzhen harbored multiple mature manufacturing chains. It is worth noting that the concept of the business environment was still novel at this time, originating from the international organization, namely the World Bank. Although it entered the central government's view and agenda, a stable policy framework was yet to be established.

Despite the turbulence buffeting the world starting in 2008, growth and globalization persevered [39]. G20 countries reaffirmed their commitment to free and open trade and avoided adopting beggar-thy-neighbor policies. Governments sought to coordinate their fiscal policies to meet the challenges of the financial crisis. In China, the significance of a favorable business environment gained increasing recognition by the government. A favorable business environment could attract foreign investment and nurture start-ups consistently. Positioned as a crucial component of the national strategy, the NDRC played a leading role in formulating business environment policies. This period witnessed a surge in policy numbers, heightened inter-departmental cooperation, and resulted in the formal acknowledgment of the "business environment" concept. During these years, the policy attention of the business environment shifted towards a convenient administrative approval process, coinciding with two decades of administrative approval reform [40]. Measures such as streamlining procedures, compressing time, and reducing costs were implemented, particularly benefiting small and medium-sized firms [41]. This period saw the emergence of topics related to administrative approval, such as "credit registration", "multi-license integration", and "simple deregistration", in the content of business environment policies.

Moreover, a favorable business environment entails not only opening up to international trade but also fostering favorable conditions for industrial development. Regarding market opening-up, the Pearl River Delta continues to play a crucial role in facilitating the flow of international capital to domestic businesses. Meanwhile, for foreign enterprises, administrative approval procedures are streamlined to facilitate their operations. Another aspect of market opening-up involves implementing new business environment measures, such as streamlining trade procedures, reducing barriers, and enhancing efficiency in pilot free trade zones. These measures, if proven effective in pilot zones, will then be extended beyond pilot free trade zones to other provinces and cities [42]. Regarding the industrial environment after 2011, the central government's measures shifted from solely strengthening cooperation among enterprises to offering special tax preferences for specific industries. Additionally, intellectual property protection became an essential part of the policy agenda in this period.

From 2017 to 2023 was the period when the business environment policy system comprehensively took shape. The number of policies involving various departments increased sharply. Two major events significantly impacted the economic situation in China: the trade tensions with the US and the global outbreak of the coronavirus. Consequently, the significance of business environment policies evolved in response to these challenges. In 2018, the US imposed tariffs sequentially on "lists" of goods from China, and then in 2019, the tariffs were raised. As China imposed retaliatory tariffs, trade tensions between the two nations escalated. As a result, imports to the US from China declined quite sharply, and exports from the US also declined [43]. Producers of goods affected by the tariffs, as well as those using these goods as intermediate inputs, faced adverse effects [44]. This is one of the main reasons why China's central government adopted the strategy of enhancing internal circulation, aiming to reorient the country's economy toward prioritizing domestic consumption. In fact, as a delayed reaction to the Great Recession, de-globalization was a worldwide trend at this time. High-profile government interventions discouraged cross-border investment flows. The Trump administration declined to confirm the appointment of new members to the WTO's dispute settlement panel, while Berlin thwarted China's acquisition of the German electricity transmission firm 50 Hertz. In China, the government's attention shifted from foreign trade to building an internal domestic logistics and transport system. Another important change related to China–US trade tensions is in the high-tech industry. During this time, with the establishment of a relatively integrated industry chain and the technological competition with the US, the essential issue concerning domestic industry shifted to the unbalanced manufacturing structure and the lack of high-tech products. Consequently, the focus of special tax preferences narrowed down to benefit high-tech enterprises specifically.

Furthermore, the outbreak of the pandemic at the end of 2019 precipitated a sharp contraction of economic activity from 2020 to 2022, hindering consumer demand, investment, production, and international trade [45]. The measures taken by the government during the pandemic included restrictions on both international and domestic travelers. International flights largely declined, and freight transport drivers crossing provincial borders were required to declare their health status [46]. As of December 2022, China lifted COVID-era bans. Restrictions for travelers were removed, and the national borders were reopened. This marks the period when China is reconstructing its trade circulation and placing significant emphasis on logistics and transportation. The recovery subsequent to the reopening of China's economy also demands a more predictable and law-based government. Building a better law-based and stable business environment is an emerging issue, especially crucial for the government [47]. This shift reflects the government's attention expanding beyond the narrow focus of simplifying administrative approval procedures to the construction of a law-based and transparent governance system.

5. Conclusions, Limitations, and Suggestions for Future Research

In conclusion, firstly, after extensive practice, China has developed a mature policy system for the business environment with distinctive characteristics. During this period, both the number and the impact of policies increased. Secondly, as the scope of business environment matters extends to span various practical areas, a governance network has gradually formed with increasing departmental participation, wherein the NDRC plays a central role. On the one hand, through the cooperation of departments with differentiated functions, the strengths of each department are leveraged toward achieving common policy targets; on the other, through the domination of one specific department, clear instructions and efficient collaboration are ensured [48], avoiding the so-called problem of "nine dragons ruling the water" [49]. Thirdly, the attention of the central government, although generally focused on five areas—the foreign trade environment, industrial environment, administrative approval environment, legal environment, and trade circulating environment—has been evolving. As the connotation of the business environment adjusts and the international or domestic socio-economic circumstances change, the attention of business environment policy is shifting from attracting foreign investment and developing the industrial chain towards simplifying bureaucratic approval procedures, smoothing trade circulation, and ensuring legal reliability. However, based on the current realistic issues, the policy system still requires re-examination and adjustments. The first policy limitation is the lack of attention to opening up in recent years. The so-called "economic miracle" of China in recent decades largely results from the incorporation of international economic activities [50], and naturally, the construction of a first-class business environment needs the embrace of the international market. Secondly, the restriction of government power and the establishment of a predictable, law-based government require not only policies from the government's perspective but also supervision from the market and citizens.

There are still some limitations in this study. Firstly, this study focuses on policy content to analyze the Chinese government's attitude toward the business environment. Whether the policies would be implemented genuinely or superficially in practice is another issue. It might involve complex negotiations between the central government and a large number of local governments. These potential obstacles have not been included in the main body of this paper, but the real implementation is an extremely important issue that needs to be deeply analyzed and explored in further study. Additionally, conducting an international comparative study on government policies-oriented business environment development is significant. Finally, in terms of methodology, the primary analytical approach of this paper is quantitative, with qualitative policy textual content provided as supplementary evidence in the Appendix A. A prospective avenue for future research involves conducting a qualitative content analysis of business environment policies and making comparisons.

Appendix A

All materials analyzed in this article are in quantitative approaches. This appendix contains the policy statements, served as the qualitative evidential content of fifteen topics illustrated in the main body. The original policy statements are in Chinese. To improve readability, we have chosen only to show the English translation.

Table A1. Policy statements, as a qualitative validation of each topics.

Representative Original Statements (with Document Name, Issuing Departments, and Issuing Time)	Topic Name
• Strengthen Hong Kong's status as an international hub for finance, trade, shipping, logistics, and high-value-added services, while bolstering Macao's position as a global center for tourism and leisure. (The Plan for the Reform and Development of the Pearl River Delta, National Development and Reform Commission, December 2008) • Establish the Guangdong-Hong Kong-Macao Greater Bay Area and develop a world-class city cluster. Create a vital economic support zone with the Greater Bay Area as the focal point and the Pearl River-West River Economic Belt as its hinterland, extending influence to Southeast Asia and South Asia. (Guiding Opinions on Deepening Pan-Pearl River Delta Regional Cooperation, State Council, 3 March 2016)	Topic 1. Guangdong-Hong Kong-Macau
• Adhere to the principle of fair competition and actively promote cross-border e-commerce. Enhance support systems for customs supervision, inspection and quarantine, tax rebate and logistics. Accelerate the development of supporting platforms for cross-border trade e-commerce. (Framework Plan for Zhejiang Pilot Free Trade Zone, State Council, 15 March 2017)	Topic 2. Pilot free trade zone
• Accelerate the construction of foreign trade production bases; facilitate the transformation of the mode of foreign trade development. Support the development of foreign trade service enterprises; offer specialized services for the export activities of small and micro-enterprises. (Several Opinions on Supporting the Steady Growth of Foreign Trade, General Office of the State Council, 4 May 2014) • Centralize the information generated in the processes of foreign investment approval and management, filing reports, joint annual reports, and integrity files. Implement hierarchical and classified management of information resources to ensure the safe, efficient, and credible application of information. (Notice on Further Strengthening the Building of the Foreign Investment Information Reporting System and the Information Publicity Platform, Ministry of Commerce, 20 June 2017)	Topic 3. Foreign investment

Table A1. *Cont.*

Representative Original Statements (with Document Name, Issuing Departments, and Issuing Time)	Topic Name
• Leveraging the existing industrial base, the location, and the resource advantages, establish a "one axis, dual cores, and two wings" industrial distribution pattern. "One axis" represents along the Yangtze River; "Dual cores" represents Hefei and Wuhu; and "Two wings" represents Chuzhou and Xuancheng. (Plan for the Demonstration Zone for Undertaking Industrial Transfer in the Wanjiang City Belt, National Development and Reform Commission, 20 January 2010)	Topic 4. Industrial chain along the Yangtze River
• Strengthen economic and technological exchanges and cooperation between Sichuan and Chongqing, particularly in the relatively underdeveloped neighboring regions. Create distinctive industrial parks and actively facilitate the transfer of industries. (Circular of the Chengdu-Chongqing Economic Zone Regional Plan, National Development and Reform Commission, 30 May 2011)	Topic 5. Industrial transfer to the central and western regions
• Support textile enterprises that meet the criteria for high-tech designation to benefit from preferential tax policies reserved for high-tech enterprises. Implement tax reduction and fee clearance policies aimed at alleviating enterprise costs. (Implementation Plan for the Reform to Reduce the Handling Time of Fiscal and Taxation Preferences, Ministry of Industry and Information Technology, 20 September 2016)	Topic 6. Tax preference
• Supporting the development and growth of high-tech enterprises involves guiding enterprises in national high-tech zones to increase their R&D investment, and to strengthen trademark- and brand-building efforts. The objective is to continuously expand the number of high-tech enterprises, and to cultivate innovative enterprises with international competitiveness. (Several Opinions on Promoting High-quality Development of National High-tech Industrial Development Zones, State Council, 13 July 2020)	Topic 7. High-tech industry
• Study and formulate a system for collecting and sharing the credit information of enterprises involved in commerce and trade circulation. Enhance the basic rules and index system for evaluating the creditworthiness of enterprises in this sector. (Outline of the Plan for the Construction of a Social Credit System, State Council, 14 June 2014)	Topic 8. Credit registration
• It is imperative to enhance communication and coordination with departments responsible for license integration and to encourage them to clarify that enterprises holding 'multiple licenses in one' business licenses will no longer need to provide additional permits or certificates for related affairs. (Guiding Opinions on Effectively Making the Reform of "Integrating Certificates into One", State Administration for Industry & Commerce, 29 August 2017)	Topic 9. Multi-license integration
• Simplify deregistration procedures. simplify the application materials by allowing enterprises applying for simplified write-off registration to forego the submission of liquidation reports and instead submit only the application form. (Circular on Further Promoting the Relevant Work of the Pilot Reform of Simple Enterprise Deregistration, State Administration for Industry & Commerce, 2 September 2015)	Topic 10. Simple deregistration
• Strengthening the disclosure of information involving market players, enhancing the transparency and predictability of policy formulation and implementation to boost the confidence of market players. (Circular of the Highlights of the Work on Transparent Government, General Office of the State Council, 11 April 2022)	Topic 11. Government transparency
• Enhancing the depth of online services involves deepening the integration of government services into a unified online platform. It aims to provide comprehensive online services, covering the entire process from application acceptance, decision-making review to result delivery. (Guiding Opinions on Accelerating the Standardization, Regulation, and Facilitation of Government Services, State Council, 7 February 2022)	Topic 12. E-government
• Strengthen efforts to combat intellectual property crimes by severely cracking down on instances of intellectual property infringement in accordance with the law. Focus on dismantling chained and industrialized networks involved in intellectual property crime. (Several Opinions on Accelerating the Building of an Intellectual Property Right Power under New Conditions, State Council, 18 December 2015)	Topic 13. Intellectual property

Table A1. *Cont.*

Representative Original Statements (with Document Name, Issuing Departments, and Issuing Time)	Topic Name
• Formulate administrative normative documents in accordance with the law, strictly prohibiting the issuance of documents beyond the scope of authority, controlling the number of documents issued, and adhering to strict procedures for formulation and issuance. (Opinions on Further Deepening the Construction of the Rule of Law Government Departments in Transportation, Ministry of Transport, 2021)	Topic 14. Law-based government
• Accelerate digital transformation, intelligent upgrading, and service innovation in transportation, warehousing, distribution, circulation processing, packaging, loading, and unloading. Extend modern logistics to the upstream and downstream of the supply chain. (Plan of the "14th Five-Year Plan" for modern logistics development, General Office of the State Council, 17 May 2022)	Topic 15. Logistics
• Fully promote differential tolls on expressways and decisively rectify the illegal installation of road height and width limitations and checkpoints that obstruct truck passage. (Opinions on Several Issues Concerning the Modernization of the Transportation Governance System and Governance Capability, Ministry of Transport, 17 October 2020)	Topic 16. Transportation

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