Research on Entrepreneurship Policy of College Students Based on Quantitative Analysis of Text Data Mining

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Abstract. Encouraging college students to become entrepreneurs has become the policy orientation of many countries including China and entrepreneurship policy is an important macro environment for college students to innovate and engage in entrepreneurial activities. This paper focuses on the entrepreneurial policy of college students in Changzhou. Based on text data mining and big data, it analyzes the quantity, form, subject, theme and use of policy tools in Changzhou and discusses the macroscopic development trend and logical path of Changzhou college students' entrepreneurial policies. Provide theoretical guidance for the analysis of policies in the future through the construction of, the check of, and the classification of text big database.

1. Introduction

Since the "Twelfth Five-Year Plan", especially since the 18th National Congress of the Communist Party of China, in the face of a series of profound changes such as the weak recovery of the world economy and the new normal of China's economic development, a new round of innovation is needed to drive economic development. Innovative entrepreneurship can not only increase the economic volume, but also promote the transformation of the economic structure. According to statistics, for every 1% increase in innovative entrepreneurship, the economic growth rate is increased by 0.388%, and the unemployment rate is reduced by 0.0235%[1]. The Central Committee of the Communist of China and the State Council have made major decision-making arrangements for the in-depth implementation of the innovation-driven development strategy to adapt and lead the new normal of China's economic development. In accordance with this, since the 18th National Congress, President Xi Jinping proposed to support and help science and technology personnel to innovate and start a business. UNESCO has clearly stated that college students are not only job seekers, but also creators of jobs. Therefore, encouraging university students to become entrepreneurs has become the policy orientation of many countries including China.

Public policy is the government's reflection and behavioral imprint of public affairs. It contains important policy ideas and is a crucial clue to study policy systems, policy processes and government behavior [2]. A research found that college students are satisfied with China's current entrepreneurial policies, but there are still insufficient publicity policies and insufficient coverage [2]. Therefore, comprehensively sorting out the government's policy of support for innovation and entrepreneurship of college students, summing up the macroscopic development trend and logical path of policies and in-depth analysis of policy implications have also become an indispensable research field.
2. Literature review
With regard to the study of college students' entrepreneurial policies, Shi found the college students' bias towards entrepreneurial policies, and explored the logic of college students' entrepreneurship [4]. Xue summarized the main contents of China's youth entrepreneurship support policy and found that the youth entrepreneurship support policy has certain guiding, regulating and guarantee functions [5]. Wen proved that the government can promote college students' entrepreneurship and improve their entrepreneurial success rate through the construction of college students' entrepreneurial policy system [6]. Tan constructed a theoretical framework for two-dimensional analysis using text content analysis. From the dimension of policy tools and development stage, this paper analyzes the changes of college students' innovation and entrepreneurship policies [7].

In the field of policy text quantification, scholars mainly use the method of co-word network analysis. Katsurai innovatively used the dynamic co-word network to achieve full-time tracking of text features [8]; Su et al. obtained the overall structure and internal relationship by analyzing the common word network of the central and local typical technological innovation policy texts from 2000 to 2010[9][9]. In the application of grounded theory to the extraction and classification of policy text keywords, Claser et al. proposed a grounded theory in 1967, which can derive the development law of a certain problem through systematic analysis and summarization, thus a new quantitative analysis method of text was opened[9]; Du et al. used the grounded theory to analyze China's science and technology innovation policy[11]. This is the first time that grounded theory is applied to policy text analysis, which provides a theoretical basis for this paper. In the application of text mining research methods, the existing research analyzes the structural characteristics, internal relations, macroscopic characteristics and evolution trends of policy texts in detail. For example, Zhang (2015) achieved the classification of regional science and technology innovation policy through the common word network and the text mining method [12].

The existing research on college students' entrepreneurial policies mainly focuses on macro-level analysis, lacking specific big data support, and neglecting the problems of unsmooth policy operation mechanism, as well as the continuity, operability and insufficient follow-up evaluation. At the same time, traditional policy analysis focuses on the concept and characteristics, mainly use qualitative technologies and methods. This paper aims to discover the main characteristics and problems that Changzhou has in promoting the entrepreneurial process of college students and provide a systematic reference for policy makers.

3. Materials and methods

3.1. Research methodology
In policy research, grounded theory is widely used in traditional policy text analysis, and text mining is an emerging research field. In recent years, it has been widely used in the field of Chinese information analysis, which has promoted the improvement of information analysis methods and the improvement of analysis efficiency[13]; text data mining (TDM), refers to the process of extracting implicit, previously unknown, potentially useful patterns from large-scale text libraries in order to discover knowledge[14]. In this paper, the classification and extraction of keywords in the policy texts are carried out based on the policy code table. Secondly, ensure the credibility of the study by coding, labeling and categorizing the use of policy text keywords and policy tools. Finally, use the word frequency and semantic network to analysis the number, form, main body, theme and policy tools of Changzhou's entrepreneurial policy text, which will explore the macro development trend of Changzhou's college students' entrepreneurial policies and discover the main characteristics and problems on the basis of analyzing big data.
Table 1 policy code table

| Primary classification elements | Secondary classification elements |
|-------------------------------|----------------------------------|
| Basic elements 1             | Name 1-1                         |
|                               | Year 1-2                         |
|                               | Type 1-3                         |
| Publisher 2                  | Number of separate publisher 2-1 |
|                               | Number of joint publisher 2-2    |
| Topic 3                      | Key words 3-1                    |
| Tool 4                       | Supply 4-1                       |
|                               | Demand 4-2                       |
|                               | Environment 4-3                  |

3.2. Data and Sources

Since the 12th Five-Year Plan, Jiangsu Province has insisted on putting science and technology innovation in a strategic position of priority development, implementing an innovation-driven strategy, and advancing science and technology innovation projects. Thus innovation capability ranks first in the country for seven consecutive years. This study will study policy texts related to the theme of “college students’ entrepreneurship” from 2011 to 2019, which collected from the official website of the State Council, the Jiangsu Provincial Government, the “Peking University Magic” and other institutions. 106 policy texts were collected. In the selection process of the policy texts, the research group follows the principles of authority, openness, validity and uniqueness. In the end, this study sorted out 60 articles with a high degree of fit with the theme “Changzhou University Students Entrepreneurship”.

4. Analysis of policy texts

Based on the research of relevant scholars, this study uses Excel, Ucinet, Netdraw to analysis the 60 policy texts from the four dimensions, which are the text type, the authoritative subject and number of issues, the relevance of the topic, and the policy tools. After statistically analyzed, the following results are obtained.

4.1. The text types

| Text type | Notice | Suggestion | Method | Plan | Program |
|-----------|--------|------------|--------|------|---------|
| Number of texts | 43     | 6          | 4      | 5    | 2       |
| Proportion (%) | 71.67% | 10.00%     | 6.67%  | 8.33%| 3.33%   |

Through the statistics and analysis of the subject words in the 60 policy texts, it is found that the text types of college students' entrepreneurial policies can be divided into notices, suggestions, methods, plans and programs.

Table 1 shows the distribution of the number of text types of entrepreneurial policies for college students in Changzhou. As can be seen from Table 1, in the 60 texts on entrepreneurial policies for college students, the number of policy texts entitled “Notice” is the largest, at 43 items, accounting for 71.67% of the total, while others are as forms of “suggestions”, “plans”, “method” and ” program”. Among them, the "notice" and "suggestions" policy texts mostly focus on specific areas of guidance, supervision and implementation of work points. The contents of the “Method” policy texts are more detailed and specific, mainly to standardize work initiatives, moreover the texts containing the words “temporary/trial” indicate that such texts are more flexible. In addition to the specific content of these
five types of policy texts, there are five “plan” that focus on the formulation of work plans and planning and guiding directions, accounting for 8.33% of the total number of policies.

Through statistical analysis of the types of policy texts, it can be found that the types of Changzhou university students’ entrepreneurial policies are rich and varied, ranging from macro-standard management and guidance documents to detailed micro-operational documents. Among them, there are many policy texts to guide the implementation of work points and normative management work initiatives, whereas it is rare to have a strong and authoritative regulatory policy text based on clear legal status.

In the period of vigorous development of innovation, it is more flexible in policy formulation. There are fewer policies on systemic macro-planning and mandatory laws and regulations at the institutional level, and it has not been set up excessive restrictions for innovation and entrepreneurship, which is also in line with the practice of continuing to promote the development of innovation and entrepreneurship since the reform and opening up. Overall, this policy process is basically in line with the public policy process and can better support college students’ entrepreneurship.

4.2. The composition of the policy publisher and the number of texts

From the perspective of the policy publisher, the Education Department and the Office of Human Resources and Social Security have issued the highest number of documents since 2011, accounting for 60%. The number of separate publications of entrepreneurial policies is 56, accounting for 93.33%, and the number of joint publications is 4 (6.67%), of which 3 texts were jointly issued by 2 entities, accounting for 5% of the total policy texts. Another project was jointly promulgated by three entities, accounting for 1.67%; However, after the General Office of the State Council issued the “Comment on the Establishment of the Inter-Ministerial Joint Conference System for Public Entrepreneurship and Innovation” in 2015, the coordination between the departments was closer.

From the year of policy promulgation, the years in which the authoritative bodies separately issued policy texts were concentrated in 2014 and 2015, and most departments were in the policy “empty window period” in 2011-2013 and 2016-2019. This development process basically coincides with the Communist Party of China and the central government's emphasis on innovation and entrepreneurship: the report of the 18th National Congress of the Communist Party of China clearly pointed out that “promoting entrepreneurship to drive employment” and “implementing innovation-driven development strategies” in 2012; At the Summer Davos Forum, Prime Li Keqiang first proposed that China should
adopt the "Dongfeng" of reform and innovation, as well as set off a new wave of "mass entrepreneurship and innovation" in the country to promote China's economic and scientific development; In 2015, Premier Li Keqiang mentioned in the government work report that government will build “mass entrepreneurship and innovation” into one of the “double engines” that will push the Chinese economy forward. Overall, the policy texts issued by the authoritative bodies in the year correspond the functional responsibilities of various departments. In terms of formulation time, it is in line with the party and the central government's emphasis and promotion of "mass entrepreneurship and innovation".

4.3. The relevance of the topic

| Key word                  | Degree |
|---------------------------|--------|
| Carrier construction      | 33     |
| Tax incentives            | 27     |
| Entrepreneurship training | 21     |
| Entrepreneurship education| 17     |
| Financial support         | 14     |
| Financial subsidy         | 12     |

From the perspective of entrepreneurial policy keywords, Changzhou focuses on supporting college students to start a business in terms of carrier construction, demonstration base, entrepreneurship education and training, tax incentives, entrepreneurship mentors, broadening channels for capital financing, selection of excellent entrepreneurial projects, and entrepreneurial incubator chains.

The Semantic Network Diagram connects the high-frequency words of college students' entrepreneurial policies into a whole in the form of network, and depicts the internal relationship and distribution of high-frequency words in Changzhou's college students' entrepreneurial policy structure. The degree indicates the frequency of the policy keyword and other words in one file. This value is obtained by applying UCINET 6. As shown in the figure, the higher the degree of point centrality, the more connections in the network, the larger the area in the figure, indicating the higher position of the corresponding policy high-frequency words in the network. For example, the “carrier construction” has
a degree of 33 in the semantic network, indicating that it has the highest position in the network and the most common collinear frequency with other keywords; while the “resource sharing” has a lower degree of centrality of 2. It shows that its degree of association with other high-frequency keywords is not high. Therefore, from the perspective of Changzhou University's entrepreneurial policy network as a whole, the status of “resource sharing” is relatively low.

4.4. The policy tools
The policy has to rely on various policy tools from concept to reality. The policy is formed by the government through the design and organization of various policy tools. Based on the theoretical cornerstone of Rothwell and Zegveld policy tools combined with functional categories, the relevant policy tools in the entrepreneurial policy system are divided into three categories, including supply, demand and environment[14].

| Table 4 Proportion of political policy tools |
|--------------------------------------------|
| **Policy tool type** | **Policy tool** | **Frequency** | **Total** | **Proportion** |
| Supply 4-1 | Entrepreneurship education 4-1-1 | 25 | 66 | 37.88% | 60.55% |
| | Personnel training 4-1-2 | 11 | | 16.67% | |
| | Funding support 4-1-3 | 7 | | 10.61% | |
| | Infrastructure support 4-1-4 | 23 | | 34.85% | |
| Demand 4-2 | Government procurement 4-2-1 | 1 | 2 | 50.00% | 1.83% |
| | Overseas exchange 4-2-2 | 1 | | 50.00% | |
| Environment 4-3 | Goal programming 4-3-1 | 4 | | 9.76% | |
| | Financial support 4-3-2 | 9 | | 21.95% | |
| | Tax incentives 4-3-3 | 9 | | 21.95% | |
| | Streamline administration and delegate powers 4-3-4 | 6 | 41 | 14.63% | 37.61% |
| | Public service support 4-3-5 | 9 | | 21.95% | |
| | Supervision and management 4-3-6 | 1 | | 2.44% | |
| | Standard management 4-3-7 | 3 | | 7.32% | |

Through the deconstruction of the policy content and the statistical analysis of the policy tool categories in the entrepreneurial policy analysis, the use of the basic policy tools for the 60 policy texts is shown in Table 3. The total number of use of the three types of policy tools is about 109 times. Among them, supply-oriented policy tools are the most used, accounting for about 60.55% of the total; environmental and demand-based policy tools are used at about 37.61% and 1.83% respectively. It can be seen that the use of supply-oriented policy tools exceeds half of the total, which is dominant in Changzhou's college students' entrepreneurial policies, and the use frequency of the three types of policy tools is quite different. The supply-oriented policy tools and environmental-based policy tools are slightly over-exploited. The serious shortage of demand-based policy tools indicates that entrepreneurial activities mainly rely on the top-down promotion of the state, and the lack of motivation and demand from the market and the private sector. This is mainly because in the face of the recent slowdown in economic growth and the pressure of economic restructuring and upgrading, the government is eager to stimulate social vitality through “mass entrepreneurship and innovation” activities, and to drive economic and social development through innovation and entrepreneurship.

There are large differences in use of sub-tools under the same type of policy tool. Among the environmental policy tools, financial policy, fiscal policies and public service support are used at a very
high frequency, accounting for 65.85% in total; supervision, management and target planning are used less, accounting for only 19.51%. It shows that the entrepreneurial policy of college students is still in its infancy, and the policies are mainly based on incentives, support and guarantees, and have not yet entered the stage of mature institutional policies. In the supply-oriented policy tools, the use of each sub-tool is relatively balanced, entrepreneurship education and infrastructure support is slightly more, indicating that the government attaches great importance to the prior personnel training and resource input. In the demand-based policy tools, the use of each sub-tool is very small, involving only government procurement and overseas exchange.

5. Suggestions
In general, the entrepreneurial policy of Changzhou college students has been continuously matured and improved, and a rich policy system has been formed. However, there are still shortcomings, and future strategies need to be further adjusted and optimized. The main conclusions and recommendations of this paper are as follows:

First, the types of policy texts are diverse and instructional. The policy documents promulgated by the government cover five categories of notices, suggestions, methods, plans and programs, and the forms are rich and varied. However, the macro-guided policies formulated by the provincial government are the main ones, the supporting implementation policies are insufficient. Facing the vigorous development and emerging challenges of college students' entrepreneurial activities, the government should adjust its policy strategies, change the practice of intensively issuing a large number of policy documents in a short period of time, and pay more attention to formulating mature institutionalized policies in the existing guidance and implementation. On the basis of policy types such as opinions, action plans, development plans, and management methods, government need to refine the core content and formulate institutional policies such as rules and regulations, administrative regulations, and legal norms. Relevant departments should timely issue corresponding supporting policies and implementation rules from the micro level to promote the implementation of policies as soon as possible.

Second, The subject of the policy is weakly coordinated. The vast majority of policy texts are issued separately, and there are only four policy texts that are jointly issued by multiple departments. The government should speed up the construction of multi-party cooperation mechanisms and strengthen communication between the administrative departments so as to avoid the complexity, conflict and instability of policies. Give play to the role of the lead department, promote the participation of broader departments in the formulation and implementation and form a joint force to comprehensively promote the development of “mass entrepreneurship and innovation”.

Third, the relevance of policy text topics is comprehensive and rational. The coverage of high-frequency related keywords is high, indicating that the subject content of the college students' entrepreneurial support policy text is more comprehensive. The government should pay attention to policy formulation in the core areas of innovation and entrepreneurship, enhance the pertinence and effectiveness of policies, and improve the continuity and stability of the policy system.

Last, the use of policy tools in policy texts is straightforward and uneven. The supply-oriented policy tools that directly support the development of innovation and entrepreneurship are slightly over-exploited, while the demand-based policy tools are seriously inadequate. The government should improve the system of policy tools. In the early stage, the role of supply-oriented policy tools was fully utilized to stimulate the vitality and potential of social innovation and entrepreneurship; in the medium term, through the indirect role of environmental policy tools, it provides strong fiscal and financial support for the innovation and entrepreneurship process; in the latter stage, we will focus on the pulling effect of demand-based policy tools, relaxing market access standards, expanding the scale of government procurement and service outsourcing, to ensure the industrialization of achievements.
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