

# Research on the Differential Patterns and Spatial Linkages of Entrepreneurial Vitality in Old Revolutionary Areas

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**Abstract.** "Entrepreneurship" is a buzzword in today's society, entrepreneurial activities are the endogenous driving force of regional development, and entrepreneurial vitality has become an indicator to measure the development level of entrepreneurial activities, economic development vitality, and development potential of a region. Due to its historical reasons and special geographical location, the old revolutionary areas are lagging behind in development and their entrepreneurial activities are not active enough. Our government has launched various policies to support entrepreneurship in old revolutionary areas in order to achieve revitalization and coordinated development. Based on the panel data of 52 prefecture-level cities in China's key old revolutionary areas from 2010-2018, this study investigates the spatial linkage of entrepreneurial vitality in key old revolutionary areas and its evolution and proposes a series of countermeasures for the revitalization and development of old revolutionary areas.

**Keywords:** Old Revolutionary Areas; entrepreneurial vitality; spatial differences; revitalization and development

## 1. Introduction

"Innovation" and "entrepreneurship" have become important driving forces for the sustainable development of China's economy. Since 2012, the State Council has approved a series of policy documents to support the revitalization and development of key Old Revolutionary Areas. It is clearly pointed out that we should "encourage independent entrepreneurship and promote full employment" to help the old revolutionary areas win the battle against poverty and achieve the goal of rural revitalization on schedule. Entrepreneurship is the most direct and effective way to get rid of poverty in the current economy, and it promotes the deeper development of China's market economy and alleviates the serious employment problem. The level of entrepreneurial vitality reflects a certain extent the level of economic development of a region. In fact, there are spatial differences in the level of entrepreneurial vitality in old revolutionary areas due to the differences in economic, political, cultural, geographic location, and business environment among regions. In recent years, there are few studies on the spatial differences of entrepreneurial vitality focusing on specific economic regions such as old revolutionary areas, and lacking empirical analysis. Therefore, it is important to study the spatial pattern and evolution of entrepreneurial vitality differences in key old revolutionary areas to enrich and improve the study of entrepreneurial activities in old revolutionary areas.

## 2. Reviews

At present, there is a lack of relevant studies on entrepreneurial activities in old revolutionary areas in China, and most of them focus on poverty alleviation and revitalization of development. Although the old revolutionary areas are currently facing difficult situations such as an underdeveloped economy, insufficient innovation capacity, and lack of innovative talents, they still have many unique advantages, such as the advantages of ecological resources [3]. The national emphasis on the development of old revolutionary areas in recent years has brought many development opportunities. To get rid of the backwardness, it is necessary to change from "blood

transfusion" poverty alleviation to "blood creation" poverty alleviation, focusing on stimulating the endogenous power [5]. In the current economic situation, the national entrepreneurship policy has been promoted, and the old revolutionary areas should follow the national situation, seize the opportunities, build an ecological system of innovation and entrepreneurship [6], combine the unique advantages, stimulate entrepreneurial vitality, and realize innovation-driven development.

The entrepreneurial vitality index can be understood as a measure of the extent to which entrepreneurial activities are carried out in a region [7], and is an indicator reflecting the entrepreneurial activity. Liu et al. (2017) [8] considered the entrepreneurship index as an important indicator of regional innovation and industrialization capacity from the mechanism of entrepreneurial activities, covering four dimensions: demand, talent, service, and output. Yuan et al. (2016) [9] used cities as a granularity to explain that the entrepreneurship index should be evaluated in four dimensions: policy environment, market environment, cultural environment, and entrepreneurial activities. Li (2009) [12] and others used the ratio of the number of employees employed by individual and private enterprises to the total employed population to reflect the entrepreneurial dynamism of the region. Foreign scholars often consider entrepreneurial dynamism as a measure of entrepreneurship, Georgellis et al. (2000) [13], Glaeser (2007) [14], and others evaluate indicators such as self-employment ratio, business ownership ratio, business entry rate, and business exit rate to measure entrepreneurial dynamism.

Based on the perspective of spatial level entrepreneurship theory, Fan and Peng (2018)[15] found that market intensity has a positive promotion effect on entrepreneurial activities and the agglomeration effect also has a positive impact on entrepreneurial activities in regions. Considering the dynamic characteristics of entrepreneurship, Peng and Zhang (2007)[16] showed that the regions with more active entrepreneurial and technological innovation activities are mostly the regions with better economic development and faster growth in China. Fossen (2018)[18] used panel data of 402 counties in Germany from 1996 to 2011 and found that entrepreneurial activities have significant spatial dependence and time persistence. This suggests that local entrepreneurial activity has positive externalities and that entrepreneurship policies can play a role in improving efficiency.

### 3. Method and Data

#### 3.1 Method

##### 2.1.1 The coefficient of variation

The coefficient of variation (CV), also called the coefficient of dispersion or the standard deviation rate, is the ratio of the standard deviation to the mean, and it reflects the relative balance of regional economic dynamics. It is calculated as follows:

$$CV = \frac{\sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N}}}{\bar{x}} \quad (1)$$

$x_i$  is the entrepreneurial vitality index of the  $i$ th region;  $N$  is the sample size;  $\bar{x}$  is the average of the entrepreneurial vitality of the  $N$  regions. The larger the coefficient of variation, the greater the degree of variation of entrepreneurial vitality among the study regions; conversely, the more balanced the entrepreneurial vitality.

##### 2.1.1 Cold-Hotspot Analysis

Cold-hot spot analysis reflects the spatial aggregation or dispersion state of a local region, usually measured by the Getis-Ord  $G_i^*$  index, which identifies the more significant high-value clusters (hot spot areas) and low-value clusters (cold spot areas) in space, calculated as follows:

$$G_i^*(d) = \frac{\sum_{j=1}^n W_{ij}(d) X_j}{\sum_{i=1}^n \sum_{j=1}^n X_j} \quad (2)$$

$X_j$  is the sample value of each region;  $W_{ij}(d)$  is the spatial weight matrix;  $n$  is the total number of regions. When the value of  $G_i^*(d)$  is significant and positive, it indicates that the region and the neighboring regions present hot spot areas, i.e. high-value aggregation areas; when the value of  $G_i^*(d)$  is significant and negative, it indicates that the region and the neighboring regions present cold spot areas, i.e. low-value aggregation areas

### 3.2 Data

Considering the availability of data, this paper adopts the proportion of the number of employees in regional urban private units and self-employed economy to the total number employment of the regional as a measure to analyze the entrepreneurial vitality of the old revolutionary areas, within the time span of 2010-2018. The selected study areas are a total of 52 prefecture-level cities in the revitalization and development planning scope of five key old revolutionary areas (Jiangxi-Fujian-Guangdong Revolutionary Old Areas, Shaanxi-Gansu-Ningxia Revolutionary Old Areas, Dabie Mountain Revolutionary Old Areas, Left, and Right River Revolutionary Old Areas and Sichuan-Shaanxi Revolutionary Old Areas).

## 4. Experiment and analysis

### 4.1 Temporal evolution of differences in entrepreneurial dynamics in old revolutionary areas

The coefficient of variation of entrepreneurial vitality in old revolutionary areas from 2010-2018 was calculated, and on the whole, the coefficient of variation of entrepreneurial vitality in China's key old revolutionary areas from 2010-2018 showed a decreasing trend. There are clearly two stages: ① The stage of increasing differences (2010-2012). The coefficient of variation of entrepreneurial vitality in this stage increased from 0.2683 in 2010 to 0.2935 in 2012, and reached its peak during the study period, indicating that the interregional differences in entrepreneurial vitality in old revolutionary areas in China gradually increased during 2010-2012, and the differentiation reached its highest value in 2012. ② The stage of narrowing differences (2013-2018). The coefficient of variation of entrepreneurial vitality in this phase is significantly lower than the value of the previous phase, and the coefficient of variation decreased significantly in 2013. The reason is that after the National Conference in 2012, many places issued policies to support small and medium-sized enterprises, and the entrepreneurial activities in the old revolutionary areas were affected, and the coefficient of variation of entrepreneurial vitality showed an obvious inflection point in 2013, and the differences in entrepreneurial vitality across the old revolutionary areas in China narrowed significantly. From 2013 until 2018, the coefficient of variation showed a slowly decreasing trend, indicating that the inter-regional differences in entrepreneurial vitality in the old revolutionary regions in China gradually narrowed.

### 4.2 Spatial association and evolution of entrepreneurial vitality in old revolutionary areas

Using the entrepreneurial vitality index as a variable, the Getis-Ord  $G_i^*$  index of each region in the old revolutionary areas in 2010, 2014, and 2018 were calculated, and the Z-value was divided into four categories from high to low using the natural interruption point grading method: hot spot area, sub-hot spot area, sub-cold spot area, and cold spot area, and the ArcMap software was used to draw the evolution of the cold-hot spot of entrepreneurial vitality in the old revolutionary area (Figure 1).

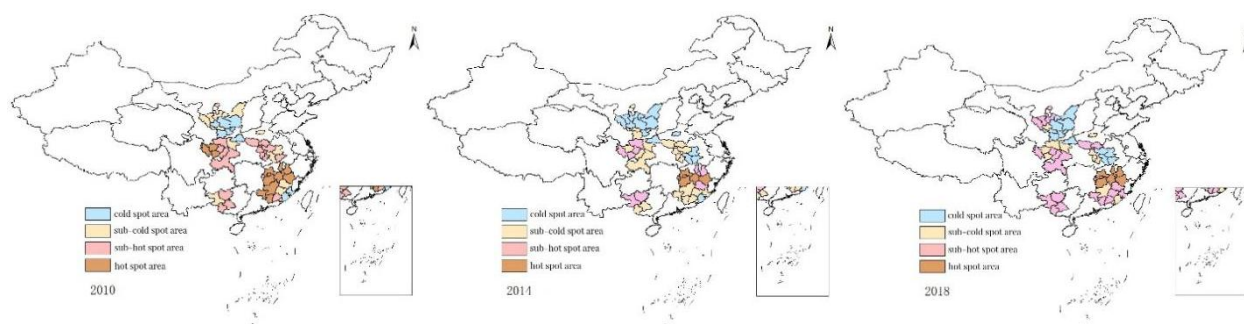


Fig. 1 Revolutionary old area entrepreneurial vitality cold-hot pattern changes

Figure 1 shows that, firstly, the hot spot areas are mainly distributed in the Jiangxi-Fujian-Guangdong Revolutionary Old Areas, large areas of cold spot areas are concentrated in the Shaanxi-Gansu-Ningxia Revolutionary Old Areas, and Dabie Mountain Revolutionary Old Areas. Secondly, from 2014 to 2018, the number of cold spot areas and sub-cold spot areas have a significant trend reduction. Among them, the cold spot area decreased from 15 to 12, and the sub-cold spot area decreased from 22 to 12; the hot spot area and sub-hot spot area increased significantly, and the scope of the sub-hot spot area began to expand gradually. Finally, in terms of spatial changes in the distribution of hot spot areas, Ji'an, Yichun, Fuzhou, Xinyu, Pingxiang, and Nanping, which are located in the Jiangxi-Fujian-Guangdong Revolutionary Old Areas, have been in hot spot areas in 2010, 2014 and 2018; Shangrao has experienced the fluctuation of "hot spot area-sub-hot spot area-hot spot area". In 2010, Nanchong, Guangyuan, and Mianyang were hotspot areas, and the surrounding areas were all sub-hotspot areas, indicating that the entrepreneurial vitality of Nanchong, Guangyuan, and Mianyang were not too different from the surrounding areas and the level was relatively high, and these areas together formed a better entrepreneurial atmosphere, so they became one of the high entrepreneurial vitality clusters in the old revolutionary areas in 2010. In 2014, the spatial aggregation of entrepreneurial vitality in the old revolutionary region changed significantly, with hotspot areas decreasing significantly, Nanchong and Mianyang becoming secondary hotspot areas, and Guangyuan becoming secondary coldspot areas, which remained in this state in 2018, while coldspot areas continued to spread. From 2010 to 2014 and then to 2018, Ji'an, Yichun, Fuzhou, Xinyu, Pingxiang, and Nanping are stable gathering areas of high entrepreneurial vitality, indicating that geographically, the entrepreneurial vitality in the Jiangxi-Fujian-Guangdong Revolutionary Old Areas is at a high level and becomes the core area of high entrepreneurial vitality in the old revolutionary areas of China.

## 5. Conclusions and Recommendations

Primarily, from 2010 to 2018, the coefficient of variation of entrepreneurial vitality in China's key old revolutionary areas showed an overall decreasing trend, and the relative differences experienced a development trajectory of "first increasing and then decreasing". 2012 saw the largest difference in entrepreneurial vitality between regions, and 2013 saw an obvious inflection point, and the differences in entrepreneurial vitality narrowed significantly. And next, the hot spots of entrepreneurial vitality in the old revolutionary areas are mainly located in the Jiangxi-Fujian-Guangdong Revolutionary Old Areas, and a few areas in the Sichuan-Shaanxi Revolutionary Old Areas are hot spots, while the cold spots are concentrated in the Shaanxi-Gansu-Ningxia Revolutionary Old Areas and Dabie Mountain Revolutionary Old Areas. Ji'an, Yichun, Fuzhou, Xinyu, Pingxiang, and Nanping are stable gathering areas of high entrepreneurial vitality, indicating that Jiangxi-Fujian-Guangdong Revolutionary Old Areas are the core areas of high entrepreneurial vitality in old revolutionary areas in China.

Firstly, optimize the entrepreneurial environment in the old revolutionary areas to stimulate the vitality of market players and achieve innovation-driven development. The business environment is productivity and competitiveness, and the optimization of the entrepreneurial environment can improve the entrepreneurial enthusiasm of market players. To accelerate the release of

entrepreneurial vitality in the old revolutionary areas, we must first further optimize the entrepreneurial environment in a planned and targeted manner. Secondly, the development of core areas of entrepreneurship strengthens the development of inter-regional ties and drives the surrounding areas to improve entrepreneurial vitality. It is necessary to strengthen the development of regional industrial clusters, effectively concentrate production factors, optimize resource allocation, promote enterprise clustering, industry integration, and industrial concentration, create a good regional innovation and entrepreneurship center, and drive the surrounding areas to develop in concert. Thirdly, enhance the level of regional openness in the old revolutionary areas and seize the development opportunity of "One Belt, One Road". The old revolutionary regions should strengthen the development of regional industries, find their own positioning, overcome the obstacles to development caused by geographical location, culture, and political factors, and strive to improve the core competitiveness of their own development. Fourthly, promote innovation and entrepreneurship education, and cultivate and introduce innovative and entrepreneurial talents. Only by continuously promoting entrepreneurship education, raising people's entrepreneurial awareness, solving the problem of motivation for entrepreneurial activities at the source, and actively establishing a long-term mechanism for entrepreneurial talent training, resource sharing, and cooperation and exchange in the old revolutionary regions will the development of the old revolutionary regions have a constant impetus.

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