Research on the Influence of Cultural Creativity Industries on Regional Economic Development in China Based on Moderating Effects

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Abstract. Cultural creativity industries are new driving force of regional economic development. Based on 10 specific evaluation index systems, this paper constructs cultural creativity industries variable, and uses factor analysis, multiple linear regression and hierarchical regression analysis to analyze 31 provinces (municipalities and autonomous regions) in China. The research shows that: cultural creativity industries have a significant role in promoting regional economic development, economic environment has a positive role in moderating effects, the better economic environment, the more obvious role of regional cultural creativity industries in promoting regional economic development, cultural creativity industries and educational environment have a positive role in promoting regional economic development, education environment has a positive moderating effects, science-technological environment has a positive moderating effects, and the better regional science-technological environment is more conducive to the promotion of cultural creativity industries to regional economic development.

Keywords. Cultural creativity industries; regional economic development; moderating effects.

1. Preface
Since the reform and opening up, Chinese economy had a period of rapid development, especially from 1991 to 2014, Chinese GDP maintained a growth rate of more than 7%. At the same time, Chinese cultural creativity industries are also developing rapidly. There were 1398300 legal entities of culture and related industries in China in 2017, with added value of 3472.2 billion yuan, which accounted for 4.2% of GDP. Chinese education and entertainment of urban residents accounted for 5.5% of the cash consumption, 19803 cultural manufacturing enterprises above designated size, 9739 cultural wholesale and retail enterprises above designated size, 30709 cultural service enterprises above designated size in 2017. Chinese major cultural industries are developing prosperously. In 2017, the net sales volume of publications was 90935.3 million yuan, the export value of audio-visual products, electronic publications and digital publications was $1633400, the total number of books published was 9243.99 million, the comprehensive population coverage rate of TV programs was 99.07%, the number of Internet and related service enterprises was 31470, and Internet and related services revenue was 790.19 billion yuan. Cultural creativity industries have the characteristics of High added-value and knowledge-based [1], it has made more and more contributions to regional economy.

Promoting the sustainable development of cultural creativity industries is an important way to enhance the national cultural soft power [2]. However, the international competitiveness of Chinese cultural creativity industries is not strong, and the structure of cultural creativity industries is inadequate. How to further develop cultural creativity industries and give full play to the role of
cultural creativity industries in promoting regional economy? Whether the regional economic environment, educational environment and science-technological environment have moderating effects? This is the key point of this paper.

2. Research Index Design and Data Sources

2.1. Research Index Design
Cultural creativity industry is an industry type that covers radio, television, image, publishing, computer network, advertising communication, animation, cultural relics, art performance and other contents [3-5], the measurement of cultural creativity industries also needs to cover these aspects. This research adopts a multi index system for the measurement of cultural creativity industries, economic environment [6], educational environment and science-technological environment [7-10], as shown in table 1.

2.2. Data Sources
31 provinces (autonomous regions and municipalities directly under the central government) are taken as the research objects in 2017, and the data of each measurement index mainly come from the China Culture Database (2018), the statistical yearbook of each province in China (2018) and the statistical bulletin of each province of 2017.

3. Empirical Analysis

3.1. Factor Analysis
In order to analyze the influence model of cultural creativity industries and regional economic development, it is necessary to reduce the dimension of cultural creativity industries, economic environment, educational environment and science-technological environment. The test results of KMO and Bartlett are shown in table 2. It shows that the KMOs of CCI and KJE are all above 0.8, KMO of JJE is 0.610, KMO of JYE is 0.568, Bartlett shows the results are credible by means of statistical testing. The explanatory variances’ initial eigenvalues of the four multiple index variables are greater than 1 by factor analysis, and the total explanatory variance is more than 70%, as shown in table 3. Then calculate the comprehensive factor score of each multi index variable by the variance contribution rate of each component and the score of each component.

3.2. The Direct Effect of Cultural Creativity Industries on Regional Economic Development
First of all, we standardized the scores of variables’ original data and multi index variables’ comprehensive factors. Z-score method is used for data standardization. In order to investigate the impact of cultural creativity industries on regional economic development, this paper constructs a multiple linear regression model: 

\[ RE_i = \alpha_0 + \beta_1 CV_1 + \beta_2 CV_2 + \gamma CCI_i + \mu, \quad i = 1,2,3...31 \]

Here, \( CV_1 \) is total fixed asset investment of the whole society, \( CV_2 \) is total population, \( CV_1 \) and \( CV_2 \) are Control Variables, the regression analysis results are shown in table 4 by empirical analysis basing on data of 31 provinces. The regression coefficient of cultural creativity industries is 0.578, passing the significance test at 0.01 level. Adjusted determinable coefficient is 0.935, and the overall explanatory ability of the regression model is strong, which shows that cultural creativity industries have a significant role in promoting regional economic development.

3.3. Moderating Effects of Cultural Creativity Industries on Regional Economic Development
This paper considers that economic environment, educational environment and science-technological environment are important moderating variables, different economic environment, educational environment and science-technological environment will have different effect, and better environment will be more conducive to moderate cultural creativity industries and regional economic development.
| First Level Index                      | Second Level Index                                      | Code  |
|---------------------------------------|--------------------------------------------------------|-------|
| Cultural Creativity Industries (CCI)  | cultural undertaking fee (RMB 10 Thousand yuan)         | CCI1  |
|                                       | total circulation person time of Libraries (10 thousand| CCI2  |
|                                       | person time)                                           |       |
|                                       | People’s cultural institutions organized literary and   | CCI3  |
|                                       | art activities (10 thousand person time)                |       |
|                                       | Operating revenue of cultural market operation         | CCI4  |
|                                       | organization (RMB 1000 yuan)                           |       |
|                                       | Cultural property exhibition                           | CCI5  |
|                                       | operating income of animation enterprises (RMB 1000    | CCI6  |
|                                       | yuan)                                                 |       |
|                                       | total number of books published (RMB 10 Thousand       | CCI7  |
|                                       | copies)                                               |       |
|                                       | comprehensive population coverage of radio programs (%) | CCI8  |
|                                       | Comprehensive population coverage of TV programs (%)    | CCI9  |
|                                       | operating income of Advertising (RMB 10 Thousand yuan) | CCI10 |
|                                       | import and export (10 Thousand dollars)                | JJE1  |
|                                       | financial budget income (RMB 100 million yuan)         | JJE2  |
| Economic Environment (JJE)            | Per capita disposable income of urban residents (RMB  | JJE3  |
|                                       | yuan)                                                 |       |
|                                       | Total retail sales of consumer goods (RMB 100 million  | JJE4  |
|                                       | yuan)                                                 |       |
|                                       | Per capita disposable income of rural residents (RMB  | JJE5  |
|                                       | yuan)                                                 |       |
|                                       | number of graduates (graduates) of Colleges and        | JYE1  |
|                                       | Universities(persons)                                 |       |
| Educational Environment (JYE)         | number of graduates (graduates) of general and junior  | JYE2  |
|                                       | college students(persons)                             |       |
|                                       | number of graduates (graduates) of adult and junior    | JYE3  |
|                                       | college students(persons)                             |       |
|                                       | full time equivalent of research and test development  | KJE1  |
|                                       | personnel (person years)                              |       |
|                                       | internal expenditure of research and test development  | KJE2  |
|                                       | funds (RMB 10 Thousand yuan)                          |       |
|                                       | external expenditure for research and test development | KJE3  |
|                                       | (RMB 10 thousand yuan)                                |       |
|                                       | investment intensity of research and test development  | KJE4  |
|                                       | funds (%)                                              |       |
|                                       | number of R & D projects                               | KJE5  |
|                                       | R&D project participants equivalent to full-time        | KJE6  |
|                                       | equivalent (person year)                              |       |
|                                       | total number of domestic three patent applications     | KJE7  |
| Science-technological Environment (KJE)| authorized                                             |       |
| Regional Economic Development (RE)    | GDP (RMB 100 million yuan)                             | GDP   |
| Control Variables (CV)               | total fixed asset investment of the whole society      | CV1   |
|                                       | (RMB 100 million yuan)                                 |       |
|                                       | total population (10 thousand persons)                 | CV2   |
Table 2. Test results of KMO and Bartlett.

| Statistical Variable | CCI   | JJE   | JYE   | KJE   |
|----------------------|-------|-------|-------|-------|
| KMO                  | 0.811 | 0.610 | 0.568 | 0.802 |
| Chi Square           | 299.333 | 202.406 | 56.658 | 603.44 |
| Bartlett             | df    | Sig.  |
|                      | 45    | 0.00  |
|                      | 10    | 0.00  |
|                      | 3     | 0.00  |
|                      | 21    | 0.00  |

Table 3. Total variance explained.

| Component | Initial Eigenvalues | Extraction Sums of Squared loadings | Rotation Sums of Squared loadings |
|-----------|---------------------|-------------------------------------|----------------------------------|
|           | Total               | % of Variance | Cumulative% | Total | % of Variance | Cumulative% | Total | % of Variance | Cumulative% |
| 1         | 5.867               | 58.668       | 58.668      | 5.867 | 58.668       | 58.668      | 3.732 | 37.319        | 37.319 |
| 2         | 1.460               | 14.596       | 73.264      | 1.460 | 14.596       | 73.264      | 2.639 | 63.710        |         |
| 3         | 1.268               | 12.676       | 85.940      | 1.268 | 12.676       | 85.940      | 2.223 | 85.940        |         |
| JJE       | 1                   | 3.757        | 75.143      | 3.757 | 75.143       | 75.143      | 0     | 0             |         |
| JYE       | 1                   | 2.143        | 71.435      | 2.143 | 71.435       | 71.435      | 0     | 0             |         |
| KJE       | 1                   | 6.188        | 88.404      | 6.188 | 88.404       | 88.404      | 0     | 0             |         |

Table 4. Regression analysis results of cultural creativity industries on regional economic development.

| Constant | ZCV1   | ZCV2   | ZCCI  | △R²      | F       |
|----------|--------|--------|-------|----------|---------|
| (0.000)  | 0.366 *** | 0.128 | 0.578 *** | 0.935 | 145.845 *** |

Note: * means the significance level is less than 0.1, ** means the significance level is less than 0.05, *** means the significance level is less than 0.01, t value is in brackets, Z means the standardized value.

A good economic environment is generally characterized by active market demand, effective element allocation, high-speed resource circulation, high income level and strong consumption ability, cultural creativity industries can develop well. Education environment and local culture have close relationship. Good education environment is generally based on profound cultural accumulation. The development of culture is also conducive to promoting the development of cultural creativity industries. They influence and promote each other. The development of cultural creativity industries reflects deep integration of culture and scientific technology. Modern science and technology are more conducive to improving the quality of cultural creativity industries, and modern media technology can highlight cultural creativity industries features better.

Economic environment, educational environment and science-technological environment are used as moderating variables to make a hierarchical regression analysis of cultural creativity industries and regional economic development, and the analysis results are shown in table 5. Model 1 and model 2 show the moderating effect of economic environment. In model 1, economic environment has a significant positive impact on regional economic development, model 2 shows that the cross-variable coefficient of economic environment and cultural creativity industries is 0.192. This passes the significant test at 0.01 levels, F value changes significantly, this indicates that economic environment has a positive moderating effect, this means the better economic environment, more conducive to cultural creativity industries to promote regional economic development.

Model 3 and model 4 show moderating effect of educational environment. In model 3, the coefficients of cultural creativity industries and educational environment pass the significance test, which means that both cultural creativity industries and educational environment have a positive role
in promoting regional economic development. In model 4, the cross-variable coefficient of education environment and cultural creativity industries is 0.202, which passes the significance test at 0.01 levels. This means education environment has a positive moderating effect. For the same reason, science-technological environment has a positive moderating effect in model 5 and Model 6, which shows that the better science-technological environment is more conducive to cultural creativity industries to promote regional economic development.

Table 5. Moderating effects analysis results.

| Index       | Model 1       | Model 2       | Model 3       | Model 4       | Model 5       | Model 6       |
|-------------|---------------|---------------|---------------|---------------|---------------|---------------|
| ZCV1        | 0.361***      | 0.443***      | 0.319***      | 0.336***      | 0.327***      | 0.386***      |
|             | (3.946)       | (5.642)       | (2.960)       | (4.650)       | (3.720)       | (4.565)       |
| ZCV2        | 0.218**       | 0.198**       | 0.014         | -0.031        | 0.203**       | 0.170*        |
|             | (2.234)       | (2.458)       | (0.116)       | (-0.372)      | (2.205)       | (1.989)       |
| ZCCI        | 0.156         | 0.025         | 0.512***      | 0.395***      | 0.095         | 0.057         |
|             | (1.182)       | (0.207)       | (7.227)       | (7.648)       | (0.724)       | (0.469)       |
| ZJJE        | 0.394***      | 0.393***      | 0.222*        | 0.264***      |               |               |
|             | (3.483)       | (4.225)       | (1.788)       | (3.160)       |               |               |
| ZJYE        |               |               | 0.482***      | 0.399***      |               |               |
|             |               |               | (3.968)       | (3.411)       |               |               |
| ZKJE        |               |               | 0.192***      |               |               |               |
|             |               |               | (3.665)       |               |               |               |
| ZCCI*ZJJE   |               |               |               |               | 0.202***      |               |
|             |               |               |               |               | (5.745)       |               |
| ZCCI*ZKJE   |               |               |               |               |               | 0.135**       |
|             |               |               |               |               |               | (2.390)       |
| R²          | 0.960         | 0.974         | 0.948         | 0.978         | 0.964         | 0.971         |
| ΔR²         | 0.954         | 0.969         | 0.940         | 0.973         | 0.958         | 0.965         |
| F           | 157.516       | 188.949       | 119.082       | 219.146       | 173.044       | 164.660       |
| Sig F       | 0.000         | 0.000         | 0.000         | 0.000         | 0.000         | 0.000         |

Note: * means the significance level is less than 0.1, ** means the significance level is less than 0.05, *** means the significance level is less than 0.01, t value is in brackets, Z means the standardized value.

4. Conclusions and Suggestions
The research finds that cultural creativity industries have a significant role in promoting regional economic development, economic environment has a positive moderating effect when cultural creativity industries influence regional economic development through the empirical analysis of the data of 31 provinces in China. The better economic environment, cultural creativity industries promotes regional economic development better. Cultural creativity industries and educational environment have a positive impact on regional economic development, and education environment has a positive moderating effect, science-technological environment has a positive moderating effect, the better science-technological environment is more conducive to cultural creativity industries to promote regional economic development.

The paper put forward the following suggestions based on the above research. (1) Each province develops cultural creativity industries actively according own conditions, promotes cultural creativity industries to become the new driving force of regional economic development, to form more efficient, better quality and larger output of cultural products and services through the market mechanism, so as to realize the development of regional culture and region economic. (2) We should improve the regional economic environment, improve the degree of opening, welcome industries relocated from
other province or parts of the country, encourage enterprises to go abroad, attract foreign investment, strengthen communication and exchange with surrounding provinces or foreign countries, cultivate regional advantageous industries and characteristic industries, improve the level of employment, and increase the income level of workers through multiple channels. (3) Improve the level of regional education, increases investment in education, focus on the integration of industry and education, broaden the field of Education, and optimize the layout of education. The provinces with lower education level need to strengthen cooperation with the provinces with strong education level, and adopt cooperative education, educational resources circulation and sharing, talents flow and other ways to balance the development of education. For some rural areas with poor educational resources, we need to strengthen educational assistance measures. (4) Science and technology is an important measure to develop economy and culture, as well as an important driving force for economic development. We should vigorously improve the ability and level of regional science and technology innovation, create innovative atmosphere, provide conditions for innovation, formulate innovation incentive policies, vigorously encourage enterprise innovation, strengthen regional innovation cooperation, and promote the effective transformation of high-level scientific and technological achievements into productivity.

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