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Analysis on the Influencing Factors of Green Intellectual Property Development in Anhui, China

Shanqi Wang* Chong Ren
School of Public Affairs, University of Science and Technology of China, 96 Jinzhai Road, Hefei 230026, China
* E-mail of the corresponding author: ustcwsq@mail.ustc.edu.cn

Abstract
Green technology is considered to be an effective tool to realize the long-term development of low-carbon in the future. The green intellectual property system is regarded as an effective system to promote green science and technology innovation and technological progress. It is regarded as the effective mean to response the climate change and energy crisis. At present, scholars on green intellectual property research focused on the discussion of green patents. And the research perspective and methods are also more inclined to the qualitative research in the field of law, the research level is mainly concentrated on the national level. Therefore, it is necessary to explore the influencing factors of regional green intellectual property development. This paper takes China's Anhui province as the research object to study the influencing factors of the development of Anhui green intellectual property rights, starting from the severe climate environment in Anhui province at present, using regression analysis, analytic hierarchy process and expert consultation method. Finally, the paper puts forward the reasonable countermeasures to promote the development of green intellectual property rights in Anhui province.
Keywords: green intellectual property, influencing factors, principal component analysis, regression analysis, analytic hierarchy process

1. Introduction

Climate change, as the most serious global environmental problem faced by mankind, has become the most important theme for the world. In the course of the discussion, green technology is considered an effective tool for addressing climate change issues (Pérez, 2012; Hall, 2012). Green technology is also known as clean energy technology, low-carbon environmental technology and environment-friendly technology, including: solar energy technology, wind energy technology, green transportation, energy-saving buildings and other technologies, green technology applications can significantly reduce carbon dioxide emissions (IPCC, 2014). At present, scholars generally believe that the intellectual property system will have an important role in promoting technological innovation, in order to promote the widespread dissemination and use of green technology, "green intellectual property" concept was put forward (y Soto et al, 2012; Lane, 2012). "Green intellectual property" refers to all intellectual property that has a positive impact on environmental friendliness and resource conservation (Nitta I, 2006). It links environmental protection with intellectual property and infiltrates the principles of science and ecology into the whole process of intellectual property.

Anhui Province, as an important province of China, industrial development has become the main driving force of economic growth in Anhui, but with the economic growth in Anhui, environmental pollution and climate change caused by high energy consumption and high carbon emissions is becoming increasingly serious. In order to solve the dual constraints of resources and environment, Anhui must strengthen the technological innovation of green industry. Intellectual property is a strategic resource for promoting green technological innovation (Abdel-Latif A, 2012). Effective use of intellectual property rights, not only to ease the environmental pressures, but also to improve the competitiveness of low-carbon economy (Henry et al, 2010). However, in the field of green technology, Anhui's innovation ability is not strong; in the field of intellectual property, Anhui lack of green intellectual property research and planning, green intellectual property development is still a long way to go. Therefore, Anhui Province should pay attention to the impact of public policy on green intellectual property rights, according to the actual situation to design green intellectual property strategy, in order to make the green technology industry in Anhui province to gain advantage in market competition at home and abroad.

This paper systematically analyzes the influencing factors of green intellectual property rights development in Anhui Province, and puts forward the countermeasures of green intellectual property development, to promote the rapid development of Anhui green technology industry.

2. Qualitative Analysis of Influencing Factors

At present, the influencing factors of the development of intellectual property rights are rare, and the influencing factors of intellectual property development are not clearly defined. Scholars' researches were based on their own purpose to set the influencing factors. Moreover, the current research on the influencing factors of green intellectual property development is more lacking. However, theoretically, the main factors affecting the development of intellectual property rights will certainly affect the development of green intellectual property rights, so this paper first summarized the preliminary factors based on the literature, and then consulted the views of experts to adjust the factors. Finally, the following main factors were summarized:

(1) Intellectual property creation factors: including R&D Expenditure, Local Financial Allocation for Science and Technology (S&T).

In theory, green technology innovation requires a lot of financial support, so R&D Expenditure is generally considered to be able to directly promote the development and protection of intellectual property (Zhao, 2006). The government's support for green intellectual property rights is often expressed as Local Financial Allocation for S&T, and in recent years, Anhui provincial government has increased investment in science and technology, green intellectual property development can reflect the input effect (Hagedoorn et al, 2005).

(2) Intellectual property talents factors: including R&D Staff, R&D Institution.

The number of R&D staff and R&D institution of a region is a direct measure of the level of regional science and technology development, and intellectual property talent factors play an important role in both intellectual property creation and management. In general, the more R&D staff and institution in a region, the stronger the awareness of intellectual property in the region. Awareness enhancement will lead to an increase in the capacity to innovate, thus contributing to the development of green intellectual property (Bosworth et al, 2001; Spithoven, 2013; Yan, 2008).

(3) Economic development factors: including Per Capita National Income, Local Financial Revenue, the Number of High-tech Enterprises, the Development Level of Hi-tech Industry.

People's consumption structure will change with the income level changes, this change will have a direct impact on people's consuming ability of green products, people's consumption of green products can stimulate the development of green intellectual property. Local Financial Revenue will directly affect the government's support for green intellectual property rights. The high-tech industry provides a solid foundation for the development of green technology, which is conducive to the development of green intellectual property rights (Horii et al, 2007; Maskus, 2000; Greenhalgh, 2010; Meeker, 2010).

(4) Policies and regulations factors: including Intellectual Property Policies and Regulations, Environmental Policies and Regulations.

Green intellectual property rights from the creation of technology to the use of intellectual property rights must be supported and protected by the law. Therefore, the ecological adjustment of laws and regulations has a strong role in promoting the development of green intellectual property rights. The environmental policy can effectively improve the awareness of environmental protection, and then guide the research of green technology and promote the development of green intellectual property (Dechezleprêtre, 2013; Fair, 2009; Lu, 2013; Nanda, 2008).

3. Quantitative Analysis of Influencing Factors

3.1 Sample Selection and Data Sources

According to the above 10 factors influencing the development of green intellectual property rights in Anhui Province, this paper select 10 indicators (R&D Expenditure, Local Financial Allocation for Science and Technology, R&D Staff, R&D Institution, Per Capita National Income, Local Financial Revenue, the Number of High-tech Enterprises, the Development Level of Hi-tech Industry, Intellectual Property Policies and Regulations, Environmental Policies and Regulations) as explanatory variables X, and select the level of green intellectual property development (represented by the number of green patent applications) in Anhui Province as the explanatory variable Y.

In this paper, Anhui Province was selected as the research object, 16 cities of Anhui Province were selected as the study sample, the original data consists of 16 cities from 2010 to 2016 related data.

The data of this article were obtained from Anhui Statistics Annual, Anhui Statistical Communiqué of Science and Technology and Anhui Intellectual Property Office directly or indirectly. The green patent application data were obtained from Anhui intellectual property comprehensive service platform according to the IPC Green Inventory. The Development Level of Hi-tech Industry is represented by the proportion of high - tech industry added value to GDP, the data of Intellectual Property Policies and Regulations were quantified according to the research methods of Shi & Yang (2010), the data of Environmental Policies and Regulations were quantified according to the calculation formula proposed by Chinese Academy of Sciences (2007).

The model is set to:

$$Y_t = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 \\ + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} \tag{1}$$

Among them, t represents the year (2011-2016); Y represents the number of green patent applications; X_1 represents R&D Expenditure; X_2 represents Local Financial Allocation for Science and Technology; X_3 represents R&D Staff; X_4 represents R&D Institution; X_5 represents Per Capita National Income; X_6 represents

Local Financial Revenue; X_7 represents the Number of High-tech Enterprises; X_8 represents the Development Level of Hi-tech Industry; X_9 represents Intellectual Property Policies and Regulations; X_{10} represents Environmental Policies and Regulations.

As the output of intellectual property has a certain time lag (Pingfang, 2005)， so this article uses a lag model to study the impact of various factors on green intellectual property rights. The dependent variable is delayed by one period, meaning that the 2010-2015 factor indicator data were selected to correspond to the 2011-2016 green patent application data.

3.2 Data Processing and Collinearity Diagnosis

3.2.1 Data Processing

Because there are large differences between the variables selected in this paper, and the measurement units of different indicators are different, in order to ensure the accuracy of the analysis results, it is necessary to standardize the index data. In this paper, the Z-score normalization method in SPSS 23.0 software was used. The data descriptive statistical results are shown in Table 1.

3.2.2 Collinearity Diagnosis

The collinearity diagnostics confirm that there are serious problems with multicollinearity. If there is multicollinearity between the independent variables, it is highly correlated with each other, and the model results are distorted, which leads to inaccurate analysis. The method of collinear diagnosis can be judged by the following values: conditional index, tolerance or variance inflation factor (VIF), eigenvalue. When the condition index is greater than 10, it is suggested that there may be multicollinearity. If the tolerance is less than 0.1 or VIF≥10, it is proved that there is serious collinearity, and multiple dimensionality eigenvalue of about 0 prove that there are multicollinearity.

Table 2 and Table 3 are the results of collinear diagnosis. It can be seen that there are many eigenvalue of 0, which proves that there is serious multicollinearity among these indexes. It can be seen from Table 3 that the tolerances of X_3, X_6 and X_7 are less than 0.1, VIF values are greater than 10, to prove that there are several collinearities between indexes. The above results show that there are some correlations between the influencing factors of green intellectual property rights, and it is necessary to take new ways to eliminate the interference between the various factors.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Y	96	3.00	771.00	89.0104	137.68022	18955.842
X_1	96	0.81	174.87	18.9942	31.55309	995.598
X_2	96	0.36	37.27	5.8757	7.92443	62.797
X_3	96	0.04	5.07	0.6525	0.96015	0.922
X_4	96	35.00	1190.00	204.5208	220.36214	48559.473
X_5	96	9528.00	97193.00	34452.4583	19347.89424	374341011.535
X_6	96	23.30	571.54	102.7389	94.92400	9010.566
X_7	96	7.00	1056.00	123.8125	165.88070	27516.407
X_8	96	0.02	0.44	0.1247	0.08560	.007
X_9	96	1.00	17.00	5.5625	3.91975	15.364
X_{10}	96	0.42	1.72	1.0922	.26936	0.073

Table 2. Collinearity Diagnostics

n	ue	Index	(Constant)	ZX_1	ZX_2	ZX_5	ZX_9
1	2.887	1.000	0.00	0.02	0.02	0.04	0.04
2	1.000	1.699	1.00	0.00	0.00	0.00	0.00
3	.684	2.054	0.00	0.00	0.00	0.64	0.21
4	0.304	3.084	0.00	0.19	0.09	0.31	0.72
5	0.125	4.801	0.00	0.78	0.89	0.00	0.03

Table 3. Collinearity Statistics

Model	Tolerance	VIF	Minimum Tolerance
ZX_3	0.027	36.855	0.023
ZX_4	0.118	8.509	0.103
ZX_6	0.040	24.815	0.040
ZX_7	0.039	25.615	0.039
ZX_8	0.293	3.407	0.173

3.3 Principal Component Analysis（PCA）

3.3.1 Principles and Methods

By reducing the dimension of the factors, PCA can transform a number of high correlation indicators into few non-correlation indicators, at the same time to ensure that these few indicators can contain most of the original information. This method can effectively reduce the mutual interference between factors, and help to find the main factors in multiple factors, to provide accurate results for the follow-up study.

3.3.2 Correlation Test

It is necessary to use some tests to verify that there is a strong correlation between the original variables, including the standardization of variables, KOM test and Bartlett's test. KMO statistic determine the correlation by the correlation coefficient between the variables. The larger the value of KMO test, the stronger the correlation of each variable. In order to get good results, the principal component analysis is usually performed in the case of KMO>0.8. Bartlett's test is mainly test statistically significant P value is less than 0.05, if it is less than 0.05, then there is a common factor between the original variables, which is suitable for follow-up principal component analysis, otherwise, it is not suitable.

The correlation coefficient matrix of the normalized data is shown in Table 4 below. It can be seen that the absolute value of the correlation coefficient between the explanatory variables is greater than 0.3, and there is a strong correlation between the visible variables. As can be seen from Table 5, the KOM test statistic value exceeds 0.86, Bartlett's test significance P value of 0.00, which is less than 0.05, indicating that there is a strong correlation between the original variables, and it is suitable for principal component analysis.

Table 4. Correlation Matrix

	ZX_1	ZX_2	ZX_3	ZX_4	ZX_5	ZX_6	ZX_7	ZX_8	ZX_9	ZX_{10}
ZX_1	1.000	0.872	0.985	0.926	0.560	0.972	0.971	0.508	0.672	0.631
ZX_2	0.872	1.000	0.850	0.851	0.566	0.882	0.914	0.614	0.708	0.662
ZX_3	0.985	0.850	1.000	0.943	0.516	0.966	0.956	0.492	0.667	0.642
ZX_4	0.926	0.851	0.943	1.000	0.436	0.952	0.938	0.486	0.695	0.680
ZX_5	0.560	0.566	0.516	0.436	1.000	0.476	0.573	0.804	0.329	0.498
ZX_6	0.972	0.882	0.966	0.952	0.476	1.000	0.964	0.437	0.682	0.632
ZX_7	0.971	0.914	0.956	0.938	0.573	0.964	1.000	0.554	0.676	0.655
ZX_8	0.508	0.614	0.492	0.486	0.804	0.437	0.554	1.000	0.374	0.582
ZX_9	0.672	0.708	0.667	0.695	0.329	0.682	0.676	0.374	1.000	0.725
ZX_{10}	0.631	0.662	0.642	0.680	0.498	0.632	0.655	0.582	0.725	1.000

Table 5. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.865
Bartlett's Test of Sphericity	Approx. Chi-Square	1656.556
	df	45
	Sig.	0.000

3.3.3 Extraction of Principal Components

The main factor is to extract the principal component factors according to the following three principles: First, according to the eigenvalue is greater than 1 to select the factor variable as the main component factor; Second, the number of factors with the cumulative contribution rate of more than 85% is selected as the principal component factor. Third, through the scree plot to determine the main component, because eigenvalues in the scree plot are arranged from large to small, when the scree plot appears obvious inflection point, we can select the number of elements before the inflection as the main component. In order to ensure the accuracy of the results and the completeness of the original information, this paper selected the factor variables that meet these three principles as the main components. Table 6 shows the results of using SPSS 23.0 software to extract principal components:

Table 6. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.431	74.307	74.307	7.431	74.307	74.307
2	1.174	11.736	86.043	1.174	11.736	86.043
3	0.675	6.747	92.791			
4	0.257	2.567	95.358			
5	0.218	2.184	97.541			
6	0.129	1.294	98.835			
7	0.058	0.582	99.417			
8	0.029	0.292	99.709			
9	0.021	0.213	99.922			
10	0.008	0.078	100.000			

In Table 6, the contribution rate of principal component factors is arranged from large to small. According to the principle of principal component selection, the first two principal components in the table not only meet the eigenvalue are more than 1, but also the cumulative contribution rate of the two components is more than 85%, which indicates that the loss of the original information is less. Considering the scree plot (Fig. 1), the eigenvalue change polyline is particularly steep in the first two factors, and the change is larger after the second factor, indicating that the extraction of the 2 common factors as the principal component is ideal, and it is possible to summarize most of the information.

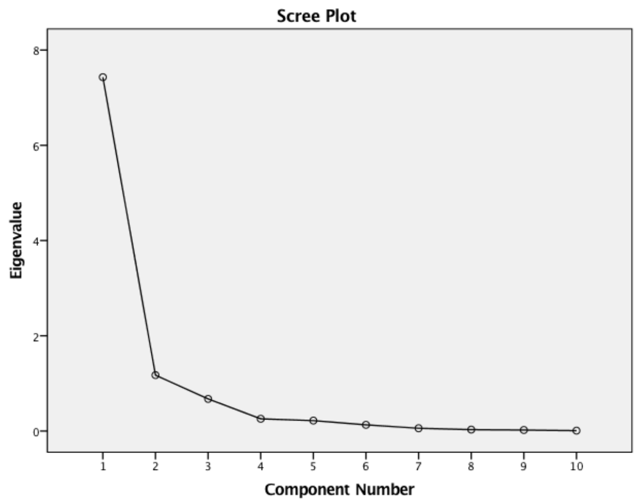

Fig. 1 Scree Plot

Therefore, we can determine that it is appropriate to replace the 10 original variables with the first 2 principal components, that is, these two principal components are sufficient to explain the change of the development of the green intellectual property rights in Anhui province.

Table 7. Component Matrix

	Component	
	F_1	F_2
ZX_1	0.960	-0.148
ZX_2	0.930	-0.009
ZX_3	0.952	-0.182
ZX_4	0.940	-0.221
ZX_5	0.642	0.680
ZX_6	0.949	-0.244
ZX_7	0.970	-0.107
ZX_8	0.651	0.696
ZX_9	0.763	-0.176
ZX_{10}	0.771	0.145

Table 7 shows the results of the component matrix, which can be seen from the correlation between the principal component and the original variable. Table 7 indicates that the first principal component F_1 contains more than 60% of all the original variables, and except for the four indicators of X_5, X_8, X_9, X_{10}, F_1 contains other indicators variable more than 90% of the information, the second principal component F_2 mainly covers X_5, X_8 of information.

Using the data output from the component matrix of Table 7 divided by the square root of the two principal component eigenvalues selected in Table 6, we can get analysis models of the principal component F_1 and F_2, that is:

$$F_1 = \frac{1}{\sqrt{7.431}}(0.96ZX_1 + 0.93ZX_2 + 0.952ZX_3 + 0.94ZX_4 + 0.642ZX_5 + 0.949ZX_6 + 0.97ZX_7 \quad (2)$$

$$F_2 = \frac{1}{\sqrt{1.174}}(-0.148ZX_1 - 0.009ZX_2 - 0.182ZX_3 - 0.221ZX_4 + 0.68ZX_5 - 0.244ZX_6 - 0.107ZX_7 + 0.696ZX_8 - 0.176ZX_9 + 0.145ZX_{10}) \quad (3)$$

3.4 Multiple Linear Regression Analysis

3.4.1 Variable Selection

In reality, the change of things is often influenced by many factors, that is, a dependent variable is affected by multiple independent variables. Therefore, it is obvious that the simple regression model considering single factor is not suitable for the analysis of such problems. The use of multiple linear regression analysis is necessary, which can explain and analyze the relationship between a dependent variable and multiple independent variables. In the multivariate regression, the method of selecting the variables has the following methods: the backward elimination and the forward elimination. In this paper, we use stepwise regression to combine the two methods to find out the influencing factors.

3.4.2 Principal Component Multiple Regression Analysis

In order to reflect the influencing factors of green intellectual property on the development of green intellectual property in Anhui Province, in this paper, the value of standardized application of green intellectual property rights in 16 cities in Anhui Province was chosen as the explanatory variable Y, and the two principal components F1 and F2 extracted from the previous principal component analysis were chosen as explanatory variables.

The results of the principal component regression operation are shown in Table 8. F1 and F2 passed the t test, and the significance statistic was all 0, which indicated that the effect of F1 and F2 on Y was significant.

Table 8. Component Matrix

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. Tolerance	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-4.536E-18	0.023		0.000	1.000		
F_1	0.958	0.023	0.958	42.348	0.000	1.000	1.000
F_2	-0.185	0.023	-0.185	-8.192	0.000	1.000	1.000

In addition to the coefficient test, the model needs to be tested more, including Goodness-of-fit test, Autocorrelation test, Collinearity test, F test and Outliers test, to demonstrate that the independent variables have sufficient significance for the dependent variable.

(1) Goodness-of-fit test

The degree of fitting of the regression is generally tested with the determination factor R_2. The value of R_2 is [0,1], which represents the proportion of the variation explained by the independent variables to total variation explained by the dependent variables. The larger the R_2 value, the better the fit of the model. Since the value of R_2 will lose a certain degree of freedom with the increase in the number of independent variables, the adjusted R_2 can more accurately reflect the degree of fit. As can be seen from Table 9, the model of R_2 is 0.952, adjusted R_2 is 0.951, indicating that the model fit well.

Table 9. Goodness-of-fit Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.976[b]	0.952	0.951	0.22052315	1.818

(2) Autocorrelation test and collinearity test

Autocorrelation means that there is a correlation between error terms. The more accurate detection of autocorrelation is Durbin-Watson test, the closer the DW value is to 2, the less the autocorrelation is. Table 9 shows that the DW value of Model 1 is 1.818, which is very close to 2, so the autocorrelation can be excluded. Since the principal component analysis has been carried out before the regression, the collinearity is eliminated. As can be seen from Table 8, the tolerance and VIF are both 1, so the collinearity test is passed.

(3) F test

The F test is to test the overall influence of all the independent variables on the dependent variable and to compensate for the deficiency of the goodness test. From Table 10, the regression equation has a F value of 930.254 and a significance P of 0.000, so it can be said that this regression equation is significant in the whole.

Table 10. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	90.477	2	45.239	930.254	0.000
Residual	4.523	93	0.049		
Total	95.000	95			

(4) Outliers test

By observing the values and plots of standardized residuals, the outliers of the data can be very intuitively understood. In general, if the absolute value of the standardized residual is greater than 3, it can be considered that there is an outlier, and that the standardized residual without outliers should be distributed in a normal state. Table 11 and Figure 2 show that the absolute value of the standardized residual is less than 3, and into a standard normal distribution, so outliers test was passed.

Table 11. Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-0.7452385	4.6503839	0.0000000	0.97590642	96
Residual	-0.58325607	0.64772075	0.0000000	0.21818951	96
Std. Predicted Value	-0.764	4.765	0.000	1.000	96
Std. Residual	-2.645	2.937	0.000	0.989	96

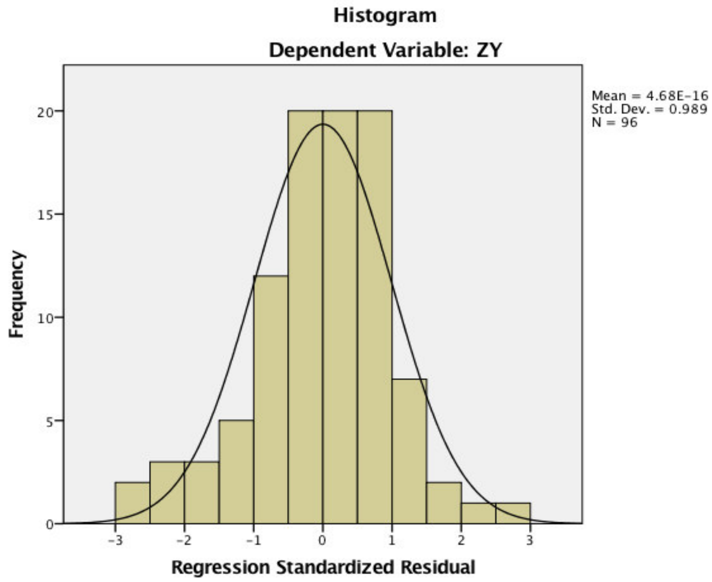

Fig. 2 Standardized Residual Plot

3.4.3 Analysis of regression results

From the regression analysis of principal component analysis, the regression model of this paper is significant, and the regression equation of the dependent variable and the principal component can be written as:

$$Y=0.958F_1-0.185F_2-4.536E(-18) \quad (4)$$

The principal component regression can be transformed into the regression between the dependent variable and the original independent variable：

$$Y = 0.31X_1 + 0.33X_2 + 0.30X_3 + 0.29X_4 + 0.34X_5 + 0.29X_6 + 0.32X_7 + 0.35X_8 + 0.24X_9 + 0.30X_{10} \quad (5)$$

Therefore, the level of green intellectual property development in Anhui Province is positively correlated with the following 10 variables: R&D Expenditure, Local Financial Allocation for Science and Technology, R&D Staff, R&D Institution, Per Capita National Income, Local Financial Revenue, the Number of High-tech Enterprises, the Development Level of Hi-tech Industry, Intellectual Property Policies and Regulations, Environmental Policies and Regulations.

3.5 Analytic Hierarchy Process

In this paper, the correlation analysis of the influencing factors of green intellectual property rights in Anhui Province is analyzed by principal component regression analysis. It can be seen from the final regression equation that the influence degree of each factor is difficult to discharge the order of importance. Therefore, this study used AHP to analyze the weight of the impact of specific factors, thus ordering the importance of sequencing as a research supplement.

3.5.1 Principles and Methods

Analytic Hierarchy Process is a practical analysis method that is mainly used to divide the interrelationships among multiple factors. It is a kind of method which can analyze the qualitative problem quantitatively. It is a kind of method which can decompose complex problems and combine quantitative analysis with qualitative analysis, and has the advantage of orderly analysis of the relationship between factors.

The steps of the Analytic Hierarchy Process are as follows:

(1) Summarize all the factors that affect the actual problem and classify the factors according to certain criteria;

(2) The influencing factors of different categories are divided into hierarchies, including the target layer, the standard layer, the scheme layer;

(3) Constructing the judgment matrix of the influencing factors in each level, and comparing the importance of the two factors with the same level by the expert consultation method, and calculating the relative weights by the statistical software;

(4) Finally, calculating the importance of the impact factors at all levels on the overall goal, and come to the key factors that have a greater impact on the overall goal.

3.5.2. Hierarchical Model

In this paper, the development of green intellectual property in Anhui Province is defined as the target layer. The standard layer includes intellectual property creation factors, intellectual property talents factors, economic development factors, policies and regulations factors, and the scheme layer includes the 10 influencing factors of the previous regression. As shown in Table 11：

Table 12. Hierarchical Model

Target Layer	Standard Layer	Scheme Layer
The Development of Green Intellectual Property in Anhui Province	Intellectual Property Creation Factors	R&D Expenditure
		Local Financial Allocation for Science and Technology
	Intellectual Property Talents Factors	R&D Staff
		R&D Institution
	Economic Development Factors	Per Capita National Income
		Local Financial Revenue
		the Number of High-tech Enterprises
		the Development Level of Hi-tech Industry
	Policies and Regulations Factors	Intellectual Property Policies and Regulations
		Environmental Policies and Regulations

3.5.3 Judgment Matrix

The judgment matrix is a comparison of the two elements of each layer based on the analytic hierarchy model, which shows the comparison of the relative importance of the hierarchical factors. For example, there are m elements, the importance value of factor i and factor j can be expressed by C_{ij}, and the judgment matrix can be expressed as $C = (C_{ij})$ m*m. The matrix C has the following characteristics: $C_{ij}>0$， $C_{ij}=1/C_{ij}(i\neq j)$ $C_{ij}=1(i,j=1,2,\ldots n)$，the matrix has the characteristics of positive and negative matrix. Refer to T.L. Saaty's 1-9 scale method using 1,2 ... 9 and its reciprocal 1,1 / 2, ..., 1/9 to quantify the judgment matrix (Table 12).

Table 13. Matrix Scale Method

Scale (C_{ij})	Meaning
1	i is as important as j
3	i is slightly more important than j
5	i is significantly more important than j
7	i is intensely more important than j
9	i is absolutely important than j
2，4，6，8	i is more important than j in the median value of the adjacent judgment
Reciprocal	The importance of the ratio of i and j is $1/C_{ij}$

In order to make the index in the judgment matrix more objective and accurate, it is necessary to invite experts to compare the influencing factors in the two pairs. This article concluded with the different opinions of the experts, made a judgment on the importance of each factor. The following five judgment matrices, Table 14 is the judgment matrix between the scheme layer factors under the standard layer B1 class (Intellectual Property Creation Factors); Table 15 is the judgment matrix between the scheme layer factors under the standard layer B2 class (Intellectual Property Talents Factors); Table 16 is the judgment matrix between the scheme layer factors in the standard layer B3 class (Economic Development Factors); Table 17 is the judgment matrix between the scheme layer factors in the standard layer B4 (Policies and Regulations Factors); Table 18 is the judgment matrix between the standard layer factors under the target layer A (The Development of Green Intellectual Property in

Anhui Province).

Table 14. B1 Matrix

B1	C1 (R&D Expenditure)	C2 (Local Financial Allocation for Science and Technology)	Relative Weight
C1 (R&D Expenditure)	1	5	0.8333
C2 (Local Financial Allocation for Science and Technology)	1/5	1	0.1667

Table 15. B2 Matrix

B2	C3 (R&D Staff)	C4 (R&D Institution)	Relative Weight
C3 (R&D Staff)	1	6	0.8571
C4 (R&D Institution)	0.1667	1	0.1429

Table 16. B3 Matrix

B3	C5 (Per Capita National Income)	C6 (Local Financial Revenue)	C7 (the Number of High-tech Enterprises)	C8 (the Development Level of Hi-tech Industry)	Relative Weight
C5 (Per Capita National Income)	1	1/3	1/2	1/3	0.1135
C6 (Local Financial Revenue)	3	1	1	1	0.3048
C7 (the Number of High-tech Enterprises)	2	1	1	1	0.2770
C8 (the Development Level of Hi-tech Industry)	3	1	1	1	0.3048

Table 17. B4 Matrix

B4	C9 (Intellectual Property Policies and Regulations)	C10 (Environmental Policies and Regulations)	Relative Weight
C9 (Intellectual Property Policies and Regulations)	1	4	0.8000
C10 (Environmental Policies and Regulations)	1/4	1	0.2000

Table 18. A Matrix

A	B1	B2	B3	B4	Relative Weight
B1	1	1/2	2	1	0.2166
B2	2	1	4	3	0.4786
B3	1/2	1/4	1	1/2	0.1083
B4	1	1/3	1/3	1	0.1966

Then, in order to verify the rationality of the calculation results and to weaken the human subjective deviation, it is necessary to carry on the consistency test to the judgment matrix by calculating the consistency ratio CR. If $CR \leq 0.1$, the matrix conforms to the consistency; otherwise, we must adjust the matrix to re-compare.

3.5.4 Calculation Results

According to the calculation result of yaahp 10.4 software, it is concluded that the CR value of the judgment matrix is less than 0.1, indicating that the weight obtained by using the judgment matrix is reliable. The final weight of the 10 factors can be obtained by multiplying the relative weights of scheme layer factors (Table 14, Table 15, Table 16, Table 17) by the weight of the standard layer factors (Table 18).

Table 19 shows the results. From the table, we can see that R&D Staff, R&D Expenditure, Intellectual Property Policies and Regulations are the three key influencing factors of green intellectual property development in Anhui Province, which is helpful to the subsequent analysis of Anhui green intellectual property strategy.

Table 19. The Ranking of Influencing Factors

Influencing Factors	Final weight value	Ranking
R&D Staff	0.4102	1
R&D Expenditure	0.1805	2
Intellectual Property Policies and Regulations	0.1573	3
R&D Institution	0.0684	4
Environmental Policies and Regulations	0.0393	5
Local Financial Allocation for Science and Technology	0.0361	6
Local Financial Revenue	0.0330	7
the Development Level of Hi-tech Industry	0.0330	7
the Number of High-tech Enterprises	0.0330	7
Per Capita National Income	0.0123	10

4. Discussion and Conclusion

This paper analyzed and ranked the influencing factors of green intellectual property rights in Anhui Province. The research result shows that R&D Staff, R&D Expenditure and Intellectual Property Policies and Regulations are the three most important factors influencing the development of green intellectual property in Anhui Province. Therefore, the Anhui provincial government should focus on strengthening R&D Staff Construction and capital investment, improve the policies and regulations of intellectual property, to promote the development of green intellectual property in Anhui Province.

In view of the lack of R&D staff, Anhui Province should establish a green intellectual property talents training system. Focus on the following areas: 1. raise the awareness of intellectual property rights of R&D staff; 2. strengthen the cultivation and exchange of compound high-level green intellectual property talents; 3. encourage enterprises and universities to strengthen the training of intellectual property talents.

R&D Expenditure has a positive impact on the development of green intellectual property in Anhui Province. However, the current green technology enterprises in Anhui Province is facing financing difficulties, therefore, Anhui Province should increase the green intellectual property investment, mainly including the following aspects: 1. increase the financial capital investment of green technology research and application; 2. establish a green intellectual property reward system; 3. formulate a special aid financially system for the application of green technology intellectual property rights; 4. establish and improve the investment and financing mechanism of green intellectual property.

Green intellectual property policies and regulations run through every link of the green intellectual property system, and the improvement of policies and regulations in the field of green intellectual property rights is conducive to creating a healthy and stable environment for the development of green technology. Anhui Province should focus on the following aspects: 1. realize the “green” of existing intellectual property laws and regulations; 2. reasonable to implement green patent compulsory license system; 3. strengthen the protection of green intellectual property; 4. strengthen the coordination of various green policies.

This article is an exploratory study that tries to find out main factors having impact on green intellectual property in Anhui Province. There are still many problems in this study, the research combined the qualitative and quantitative analysis methods to find out the factors, and reference to the expert opinion in the process to determine the weights of factors, the conclusions were influenced by the subjective influence. Future research can explore more in detail on the evaluation criteria of the development level of regional green intellectual property rights and the choice of indicators, so as to achieve better guidance for the development of regional green intellectual property.

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