

Factor Analysis Application in the Comprehensive Evaluation of Chinese Tourism Academic Journals

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Abstract: Tourism subject has the characteristics of comprehensiveness and interdisciplinarity, so that a single index evaluation method is not fully applicable to its journals' evaluation. Obtaining 11 evaluation indexes data reflecting periodical academic quality from the 2014 edition of China Science and Technology Journal Citation Reports (expanded version), this research, after a few missing values imputation, adopted the factor analysis method to evaluate the 74 core tourism subject journals in a comprehensive way and to rank them. This study showed that the comprehensive evaluation method were more objective and reasonable than the two most popular single evaluation index methods for ranking the tourism academic journals.

Keywords: journal valuation, factor analysis, tourism journals, comprehensive evaluation

1. Introduction

There are many Chinese academic journals, but the quality of articles published in these journals varies greatly. In order to distinguish the journals, some institutions in China have specially evaluated the journals regularly, and only those meeting their requirements will be included in their publications. *Chinese S&T Journal Citation Reports*, *A Guide of the Core Journal of China* and *Chinese Social Sciences Citation Index* are among the three most recognized journal evaluation publications in China, however, none of them provides a specific ranking of the evaluated journal. Using a single evaluation index to rank academic journals is prone to bias, especially for the Chinese journals which usually have short history under a more complex operational background. In recent years, the multi-index comprehensive ranking method for the Chinese academic journals has received more attention and application.

Xin (2012) [1] analyzed and ranked 13 mechanical Chinese journals based on 15 evaluation indexes and principal component analysis. Zhou and He (2015) [2] analyzed and evaluated 19 core management journals from CNKI literature data and proposed their ranking for the journals using 10 evaluation indexes and principal component analysis. Xin and Han (2014) [3] adopted a factor analysis method to comprehensively evaluate 21

Chinese physics core journals, and compared the results with the results stemmed from the single index evaluation method such as the total cites and impact factor and concluded that the comprehensive ranking method was more objective and accurate than the single index evaluation method. Due to the ambiguity in the classification and attribution of tourism subjects, scholars have relatively few studies on the evaluation and ranking of tourism academic journals. The main relevant research results in the near future are that Lan and Zhang (2013) [4] firstly took the number of tourism related papers published in academic journals as the basis, then used Law of Bradford to select the core journals for tourism subjects, and finally calculated the five-year cumulative impact factor, a single index evaluation method, for those selected core journals during 2005-2010 periods to rank them.

Tourism subject has the characteristics of comprehensiveness and interdisciplinarity, which means tourism relevant paper can be published in many academic journals in different fields. So far, its literature has no standardized, scientific and recognized evaluation system. This paper used a factor analysis method to comprehensively evaluate and to rank the core journals of tourism subject in order to provide relevant journal quality information [5-7].

2. Data Sources

China's academic journal evaluation indexes could be grouped into 4 categories based on the previous studies by scholars: I. influential indexes, including total cites, impact factor, cited rate, number of journal citing, subject impact index, and subject diffusion index; II. timeliness indexes, including immediacy index, cited half-life, H index, citing half-life, etc.; III. journal feature indexes, including source literature quantity, literature selected rate, average citation number, average author number, regional distribution number, institutional distribution number, funded paper ratio, overseas paper ratio, etc. IV. management indexes, including total sales, standardization of layout, error rate, and quality of binding. For the evaluation of academic quality of journals, the first three categories of indexes are generally selected.

The evaluation index information in this paper was obtained from the *Citation Report of Chinese Science*

and Technology 2014 periodicals (Expansion Edition), which provided information for 18 evaluation indexes. In order to select appropriate indexes for this study, three requirements were considered: the indexes were not subject to subjective judgments, feasible for interdisciplinary comparison, and retained as many as possible. In this paper, total cites, impact factor, number of journal citing, cited rate, immediacy index, citing half-life, cited half-life, H index, regional distribution number, institutional distribution number, and funded paper ratio were finally selected.

The tourism academic journals used for evaluation and ranking were taken from the paper, *Assessing the Influence and Impact of China's Tourism Research Journals*, by Lan and Zhang (2013) [4], which provided information for 89 core tourism academic journals. However, 15 of the journals were not included in the *Citation Report of Chinese Science and Technology 2014 periodicals (Expansion Edition)*, thus, this paper only considered the 74 common journals in both sources to be the research target, as shown in table 1.

Table1 Evaluation indexes information for 74 core chinese tourism academic journals

Journal Name	Total Cites	Impact Factor	Number of Journal Citing	Cited Rate	Immediacy Index	Citing Half-life	Cited Half-life	H Index	Regional Distribution Number	Institutional Distribution Number	Funded Paper Ratio
Tourism Tribune	5599	2.016	887	0.93	0.218	7.98	6.66	14	25	136	0.465
Human Geography	2964	1.244	754	0.93	0.138	9.06	7.11	11	22	79	0.888
Geography and Geo-Information Science	2229	0.972	719	0.95	0.187	7.36	7.07	10	24	76	0.935
Economic Geography	6594	2.124	1121	0.87	0.355	6.19	5.28	14	28	149	0.876
Tourism Science	1062	1.333	368	0.98		8.79	6.26	7	17	36	0.755
Areal Research and Development	2382	1.425	674	0.85	0.183	6.60	5.47	10	26	126	0.802
Journal of Beijing International Studies University	1355	0.479	539	0.98	0.066	9.26	7.47	9	23	82	0.480
Inquiry into Economic Issues	3001	0.965	935	0.98	0.212	7.34	4.54	9	25	163	0.680
Journal of Arid Land Resources and Environment	4121	1.303	782	0.82	0.239	7.80	4.85	8	27	158	0.869
Commercial Research	4715	0.933	1112	0.98	0.266	9.02	6.34	8	27	189	0.705
Tourism Forum	487	0.477	212	0.99	0.027	6.68	3.76	4	22	79	0.562
Social Scientist	1689	0.390	791	0.99	0.051	9.94	5.13	6	29	230	0.465
Yunnan geographic environment research	629	0.342	342	0.94	0.048	6.90	6.56	4	21	51	0.705
Sports Culture Guide	4080	0.747	536	0.95	0.145	7.05	5.79	8	29	264	0.359
Economy Forum	2589	0.416	803	0.99	0.095	6.03	4.77	5	28	252	0.354
Tropical Geography	1094	0.977	463	0.92	0.185	7.77	6.17	6	16	62	0.824
Resource Development & Market	1448	0.520	650	0.94	0.074	6.27	4.98	5	27	132	0.820
Enterprise Economy	2947	0.803	806	0.98	0.158	6.06	4.65	8	27	303	0.615
Reformation & Strategy	2157	0.583	804	0.97	0.098	6.13	4.08	6	28	224	0.507
Territory & Natural Resources Study	960	0.432	459	0.97	0.075	7.81	6.25	5	27	125	0.789
Jiangxi Science & Technology Normal University Magazine	424	0.232	272	1.00	0.029	10	6.05	4	19	68	0.650
Statistics and Decision	5776	0.53	1366	0.94	0.083	6.73	4.62	8	30	412	0.705
Productivity Research	3887	0.472	1065	0.99	0.059	6.18	4.57	7	27	242	0.333
Journal of Huangshan University	454	0.241	286	0.98	0.032	7.64	4.83	4	12	68	0.512
Commercial Times	4832	0.353	1110	0.96	0.082	6.14	3.73	7	30	815	0.370
China Economist	6564	0.384	1164	0.98	0.119	5.55	4.59	8	31	1043	0.108
Special Zone Economy	3009	0.346	876	0.99	0.065	6.26	4.29	6	31	347	0.235
Coastal Enterprises and Science & Technology	1653	0.319	497	1.00	0.032	5.51	4.77	6	19	96	0.167
Education and Vocation	13858	0.810	1327	0.97	0.224	5.29	4.17	13	29	824	0.390
Journal of Leshan Normal University	788	0.179	439	0.98	0.045	9.33	5.63	4	27	149	0.270
Ecological Economy	2940	0.745	958	0.96	0.130	6.74	4.32	7	30	292	0.703
Journal of Anhui Agricultural Sciences	23429	0.468	2467	0.92	0.070	7.03	4.09	10	31	2207	0.471
The Border Economy and Culture	1573	0.219	578	0.99	0.053	7.40	4.22	4	30	308	0.308
Sci-Tech Information Development & Economy	9298	0.357	1600	0.96	0.061	4.38	5.15	9	30	769	0.104

Acta Agriculture Jiangxi	3370	0.663	753	0.94	0.087	7.76	4.21	9	29	238	0.643
Business Economy	3268	0.441	714	0.99	0.138	4.52	3.41	7	30	560	0.204
CO-Operative Economy & Science	3276	0.325	761	0.99	0.108	5.00	3.49	7	30	652	0.179
Northern Economy and Trade	1795	0.263	560	0.99	0.064	4.92	3.81	5	30	602	0.231
Gansu Agriculture	1073	0.176	455	0.99	0.020	7.35	7.05	4	24	513	0.035
Development of Small Cities and Towns	615	0.210	278	0.91	0.061	5.05	6.51	4	25	111	0.131
China Science and Technology Information	9175	0.291	1624	0.99	0.075	6.31	5.16	9	31	1634	0.100
Market Forum	955	0.298	364	0.95	0.039	4.58	4.28	5	26	228	0.233
Journal of Southwest University for Nationalities(Humanities and Social Science)	2937	0.431	1065	0.97	0.061	10	6.71	6	30	182	0.548
Tourism Research	338	0.431	208	0.95	0.051	6.74	5.58	4	20	40	0.492
Pioneering with Science & Technology Monthly	1878	0.229	615	0.99	0.048	5.62	4.28	8	30	441	0.169
Modern Agricultural Sciences and Technology	10952	0.338	1210	0.78	0.119	4.98	3.39	8	31	3511	0.104
Technology & Market	2554	0.369	492	0.98	0.064	4.45	2.59	9	31	1085	0.035
Inner Mongolia Science technology & Economy	3822	0.245	891	0.98	0.043	5.88	4.57	7	30	935	0.045
Northern Economy	1618	0.206	568	0.99	0.020	5.02	4.55	5	28	394	0.116
Rural Economy and Science	1261	0.287	509	0.96	0.046	4.93	3.40	5	30	505	0.233
Value Engineering	12392	0.412	1567	0.96	0.101	5.81	2.76	13	31	3074	0.138
Journal of Hubei University of Economics:Humanities and Social Sciences	1827	0.254	652	0.98	0.075	6.92	3.76	4	30	505	0.212
Shanxi Architecture	16031	0.334	1213	0.93	0.096	7.62	4.44	14	31	2339	0.039
Science & Technology Information	15844	0.348	1632	0.98	0.057	5.50	3.72	14	31	4104	0.041
Economic Research Guide	7364	0.348	1487	0.98	0.092	5.77	2.94	7	31	1942	0.219
Modern Business Trade Industry	6504	0.315	1199	0.99	0.089	5.08	3.33	8	31	1332	0.104
Industrial & Science Tribune	3056	0.217	812	0.99	0.034	5.80	2.81	8	31	1710	0.152
Science Technology Economy Market	1398	0.227	462	1.00	0.033	5.26	4.70	7	29	299	0.185
Contemporary Economics	3852	0.377	836	0.99	0.102	4.80	3.75	8	31	846	0.140
China Collective Economy	3462	0.291	766	0.99	0.038	4.66	3.17	7	31	1160	0.111
Neijiang Technology	2418	0.186	729	1.00	0.036	8.44	3.83	6	28	614	0.063
Modern Business	7751	0.306	888	0.96	0.074	4.42	3.18	9	31	3644	0.043
Science and Technology Innovation Herald	13414	0.306	1682	0.98	0.032	5.49	3.74	14	31	4154	0.066
Career Horizon	1605	0.251	510	0.98	0.037	5.16	3.66	5	31	344	0.438
Heilongjiang Science and Technology Information	18304	0.311	1418	0.98	0.106	6.12	3.25	16	31	4561	0.029
Knowledge Economy	2926	0.225	746	0.99	0.039	5.82	2.80	8	31	1382	0.053
Management Observer	2794	0.078	664	0.98	0.022	5.14	3.93	6	31	2412	0.047
Intelligence	5515	0.141	767	0.98	0.011	5.53	2.71	7	31	4638	0.047
Jiangsu Commercial Forum	1418	0.327	525	0.99	0.068	5.83	4.69	5	24	159	0.416
Modern Economic Information	6888	0.292	763	0.96	0.071	4.40	2.79	10	31	5058	0.032
China Business & Trade	3798	0.309	699	0.96	0.057	4.98	2.51	7	31	1052	0.171
Journal of Hebei Tourism Vocational College	271	0.180	161	0.99	0.061	6.00	6.06	4	23	74	0.288
Journal of Sichuan Tourism College	220	0.227	127	0.9	0.063	5.85	3.65	3	17	77	0.282
Tourism World Tourism Development Research	13	0.060	10	0.92		6.53		2	20	62	0.333

3. Missing Value Solution

Since some journals had a small amount of missing information, this paper imputed these missing values. The specific citing half-life for *Jiangxi Science & Technology Normal University Magazine* and *Journal of Southwest University for Nationalities (Humanities and Social Science)* was unknown, but was known to be greater than the maximum observed value of 10 that was used as the citing half-life for these two journal in this study.

In addition, the immediacy index and the cited half-life for the *Tourism World Tourism Development*

Research were missing, and the immediacy index for the *Tourism Science* was missing. For these three missing values, this paper first found the correlation coefficient between the 11 evaluation indexes, then selected the appropriate linear regression models for the evaluation indexes with missing values, and then applied the selected models to estimate the missing values.

Before solving the Pearson correlation coefficients between 11 evaluation indexes, two journals with missing values should be excluded. Therefore, a total of 72 journals participated in the correlation coefficient calculation. For details, see table 2.

Table 2 Pearson correlation coefficient table between 11 evaluation indexes through 72 journals

	Total Cites	Impact Factor	Number of Journal Citing	Cited Rate	Immediacy Index	Citing Half-life	Cited Half-life	H Index	Regional Distribution Number	Institutional Distribution Number	Funded Paper Ratio
Total Cites	1.00	0.05	0.87	-0.18	0.17	-0.16	-0.30	0.76	0.46	0.69	-0.28
Impact Factor	0.05	1.00	0.12	-0.51	0.87	0.29	0.39	0.46	-0.18	-0.28	0.66
Number of Journal Citing	0.87	0.12	1.00	-0.10	0.23	-0.10	-0.25	0.67	0.56	0.52	-0.16
Cited Rate	-0.18	-0.51	-0.10	1.00	-0.48	-0.04	-0.14	-0.21	0.10	-0.03	-0.37
Immediacy Index	0.17	0.87	0.23	-0.48	1.00	0.17	0.26	0.48	-0.04	-0.18	0.55
Citing Half-life	-0.16	0.29	-0.10	-0.04	0.17	1.00	0.65	-0.07	-0.39	-0.38	0.56
Cited Half-life	-0.30	0.39	-0.25	-0.14	0.26	0.65	1.00	-0.13	-0.55	-0.55	0.57
H Index	0.76	0.46	0.67	-0.21	0.48	-0.07	-0.13	1.00	0.37	0.52	-0.06
Regional Distribution Number	0.46	-0.18	0.56	0.10	-0.04	-0.39	-0.55	0.37	1.00	0.49	-0.47
Institutional Distribution Number	0.69	-0.28	0.52	-0.03	-0.18	-0.38	-0.55	0.52	0.49	1.00	-0.56
Funded Paper Ratio	-0.28	0.66	-0.16	-0.37	0.55	0.56	0.57	-0.06	-0.47	-0.56	1.00

3.1 Immediacy Index

The evaluation indexes having the absolute values of the correlation coefficient with immediacy index greater than 0.45, impact factor, fund paper ratio, cited rate and H index, were first selected for the initial linear regression model. Then, the adjusted R-squared was adopted as the model selection criterion. The regression model with influence factor, cited rate and H index as predictors had largest adjusted R-squared at 0.7505, so the model was chosen as the interpolation model for immediacy index.

$$\text{Immediacy Index} = 0.098446 + 0.132997 \text{Impact Factor} - 0.093226 \text{Cited Rate} + 0.002153 \text{H Index}$$

By the model, immediacy index for *Tourism World Tourism Development Research* was 0.025 and for *Tourism Science* was 0.200.

3.2. Cited Half-life

Similarly, the evaluation indexes having the absolute values of the correlation coefficient with cited half-life greater than 0.45, citing half-life, regional distribution number, institutional distribution number and fund paper ratio, were first selected for the initial linear regression model. Then, the adjusted R-squared was adopted as the model selection criterion. The regression model with citing half-life, regional distribution number and institutional distribution number as predictors had largest

adjusted R-squared at 0.5616, so the model was chosen as the interpolation model for cited half-life.

$$\text{Cited Half-life} = 4.241 + 0.3877 \text{Citing Half-life} - 0.06967 \text{Regional Distribution Number} - 0.0002615 \text{Institutional Distribution Number}$$

By the model, cited half-life for *Tourism World Tourism Development Research* was 5.363.

4. Factor Analysis

4.1. Basic information

The magnitudes of the 11 evaluation indexes are different as showed in table 1. In order to eliminate the differences, the raw data were standardized before the factor analysis. The software, SPSS19.0, was used for factor analysis, which automatically performed data standardization steps, and the information obtained afterwards was thus based on standardized data. The KMO value of the data was 0.706, which was greater than 0.5, indicating that the sample size was sufficient. The approximate chi-square value of the Bartlett's test of sphericity was 643.179, the degree of freedom was 55, and the significance level was less than 0.05, so the null hypothesis, the 11 evaluation indexes were independent each other, could be rejected. Both results showed that the data was suitable for factor analysis.

4.2 Selection of common factors

In this paper, the factor eigenvalue greater than 1 and the cumulative variance contribution rate greater than

75% were employed as the factor selection criterion. As shown in table 3, the first three factors extracted 77.757% information of the original data, so the first three factors were selected as common factors.

Table3 Eigenvalues and variance contribution rates before and after rotation

Factor				Unrotated			Rotated		
	eigenvalue	variance contribution rate%	cumulative variance contribution rate%	eigenvalue	variance contribution rate%	cumulative variance contribution rate%	eigenvalue	variance contribution rate%	cumulative variance contribution rate%
1	4.265	38.775	38.775	4.265	38.775	38.775	3.378	30.710	30.710
2	3.239	29.448	68.223	3.239	29.448	68.223	2.619	23.805	54.515
3	1.049	9.535	77.757	1.049	9.535	77.757	2.557	23.242	77.757
4	.751	6.826	84.583						
5	.517	4.704	89.288						
6	.360	3.273	92.561						
7	.333	3.026	95.587						
8	.192	1.750	97.337						
9	.157	1.427	98.764						
10	.091	.825	99.589						
11	.045	.411	100.000						

The relationship between the original evaluation index and the three common factors can be expressed by the factor loading matrix. The factor loading of an evaluation index on one common factor close to 1 and on other common factors close to 0 means that the evaluation

index should be attributed into the common factor. The structure of a unrotated factor loading matrix usually is not concise, and it is difficult to interpret and name the common factor. This paper adopted the classical varimax rotation method and the results were shown in table 4.

Table 4 Unrotated and rotated factor loading matrix and factor score coefficient matrix

Index Name	Unrotated Factor Loading Matrix			Rotated Factor Loading Matrix			Factor Score Coefficient Matrix		
	Factor1	Factor2	Factor3	Factor1	Factor2	Factor3	Factor1	Factor2	Factor3
Total Cites	.722	.551	.232	.923	.066	-.149	.308	-.049	.095
Impact Factor	-.420	.821	-.181	.114	.857	.369	.010	.322	.011
Number of Journal Citing	.656	.571	.293	.914	.066	-.058	.325	-.073	.148
Cited Rate	.155	-.542	.530	.007	-.763	.128	.133	-.428	.291
Immediacy Index	-.273	.838	-.233	.205	.854	.242	.016	.344	-.045
Citing Half-life	-.614	.247	.619	-.032	.021	.905	.185	-.236	.534
Cited Half-life	-.758	.218	.370	-.252	.186	.813	.059	-.096	.384
H Index	.485	.764	.132	.841	.358	-.009	.269	.073	.081
Regional Distribution Number	.767	.100	-.034	.581	-.139	-.492	.131	-.013	-.131
Institutional Distribution Number	.835	.131	.048	.681	-.183	-.469	.180	-.055	-.082
Funded Paper Ratio	-.753	.470	-.001	-.251	.589	.615	-.039	.165	.154

From the results shown in table 4, the factor 1 included total cites, number of journal citing, H index, regional distribution number, and organization distribution number, which had cumulative contribution of variance 30.710%; the factor 2 included impact factor, cited rate and immediacy index, which had cumulative contribution of variance 23.805%; the factor 3 included citing half-life, cited half-life and funded paper ratio, which had cumulative contribution of variance 23.242%.

Due to the comprehensiveness and interdisciplinarity characteristics of the tourism subject, the three factors had close the cumulative contribution rates, which is different from highly specialized subjects, for which the impact factor and the total cites are usually the obvious dominant factors.

4.3 Score calculation for the comprehensive index ranking method

The comprehensive index ranking score (CIRS) was defined as a weighted summation of three factor scores (FSs) in equation 1, where the weights were the rotated

cumulative variance contribution rates for the factors in table 3.

$$CIRS = \frac{0.3071 * FS1 + 0.23805 * FS2 + 0.2342 * FS3}{0.77757} \quad (1)$$

The FSs could be calculated with the information from factor score coefficient matrix in table 4, defined as: FS1=0.308Total Cites+0.01Impact Factor+0.325Number of Journal Citing+0.133Cited Rate+0.016Immediacy Index+0.185Citing Half-life+0.059Cited Half-life+0.269H Index+0.131Regional Distribution Number+0.18Institutional Distribution Number-0.039Funded Paper Ratio

$$FS2=-0.049Total Cites+0.322Impact Factor-0.073Number of Journal Citing-0.428Cited Rate+0.344Immediacy Index-0.236Citing Half-life-0.096Cited Half-life+0.073H Index-0.013Regional Distribution Number-0.055Institutional Distribution Number+0.165Funded Paper Ratio \quad (2)$$

$$FS3=0.3071Total Cites+0.23805Impact Factor+0.2342Number of Journal Citing-0.039Cited Rate+0.165Immediacy Index-0.039Cited Half-life+0.165H Index-0.039Regional Distribution Number+0.165Institutional Distribution Number-0.039Funded Paper Ratio \quad (3)$$

$FS3=0.095Total\ Cites+0.011Impact$
 $Factor+0.148Number\ of\ Journal\ Citing+0.291Cited$
 $Rate-0.045Immediacy\ Index+0.534Citing$
 $Half-life+0.384Cited\ Half-life+0.081H$
 $Index-0.131Regional\ Distribution$
 $Number-0.082Institutional\ Distribution$
 $Number+0.154Funded\ Paper\ Ratio$ (4)

The standardized values for the 11 evaluation indexes could be obtained directly from SPSS, or be calculated by Z-score (SPSS default method).

According to the above methods, the comprehensive index ranking scores were finally obtained and shown in table 5. Table 5 also included information for the three factor scores, the comprehensive index ranking and, the two most popular single evaluation index ranking, the impact factor ranking and the total cites ranking. The last column in table 5 showed whether the journal was included in *A Guide of the Core Journal of China* (AGCJC) published by Peking University Press in 2015.

Table 5. Factor scores and rankings for 74 core Chinese tourism academic journals

Journal Name	FS1	FS2	FS3	CIRS	Impact Factor Ranking	Total Cites Ranking	Comprehensive Index Ranking	AGCJC
Economic Geography	0.622	4.115	-0.004	1.169	1	14	1	yes
Tourism Tribune	0.802	2.091	1.353	1.059	2	18	2	yes
Journal of Anhui Agricultural Sciences	2.936	-0.133	0.691	1.031	22	1	3	
Commercial Research	0.674	0.755	1.904	0.829	10	21	4	yes
Human Geography	0.221	1.085	2.072	0.808	6	35	5	yes
Heilongjiang Science and Technology Information	2.793	-0.492	-0.201	0.694	45	2	6	
Education and Vocation	1.464	1.076	-0.058	0.692	11	5	7	yes
Shanxi Architecture	2.072	-0.217	0.340	0.664	40	3	8	
Geography and Geo-Information Science	-0.038	1.200	1.454	0.612	8	45	9	yes
Journal of Arid Land Resources and Environment	-0.389	3.083	-0.152	0.579	5	22	10	yes
Science & Technology Information	2.476	-0.684	-0.245	0.541	35	4	11	
Tourism Science	-0.579	0.984	1.830	0.482	4	62	12	yes
Areal Research and Development	-0.467	2.767	-0.170	0.476	3	44	13	yes
Science and Technology Innovation Herald	2.347	-0.818	-0.248	0.468	48	6	14	
Inquiry into Economic Issues	0.147	0.973	0.753	0.452	9	34	15	yes
Value Engineering	1.888	-0.041	-0.596	0.432	28	7	16	
Journal of Southwest University for Nationalities(Humanities and Social Science)	0.498	-0.928	2.146	0.431	25	38	17	yes
Journal of Beijing International Studies University	0.033	-0.746	2.222	0.349	19	58	18	
China Science and Technology Information	1.425	-0.890	0.471	0.335	51	10	19	
Statistics and Decision	0.497	0.328	0.368	0.316	17	17	20	yes
Tropical Geography	-0.975	1.428	1.071	0.289	7	60	21	
Acta Agriculture Jiangxi	0.038	0.447	0.396	0.210	15	29	22	
Sports Culture Guide	-0.088	0.536	0.405	0.195	13	23	23	yes
Ecological Economy	-0.033	0.635	0.181	0.183	14	37	24	yes
Social Scientist	0.180	-1.084	1.650	0.181	29	50	25	yes
Enterprise Economy	-0.128	0.706	0.173	0.169	12	36	26	yes
Sci-Tech Information Development & Economy	0.916	-0.233	-0.362	0.142	33	9	27	
China Economist	0.589	-0.201	-0.276	0.069	30	15	28	
Modern Agricultural Sciences and Technology	0.480	1.900	-2.350	0.053	39	8	29	
Economic Research Guide	0.850	-0.339	-0.579	0.046	36	12	30	
Territory & Natural Resources Study	-0.603	-0.207	1.149	0.032	24	63	31	
Productivity Research	0.082	-0.445	0.247	-0.023	21	24	32	
Commercial Times	0.203	-0.061	-0.331	-0.029	34	20	33	yes
Jiangxi Science & Technology Normal University Magazine	-0.742	-1.312	2.192	-0.031	59	70	34	
Modern Business Trade Industry	0.558	-0.367	-0.754	-0.091	44	16	35	
Reformation & Strategy	-0.398	0.248	-0.170	-0.103	16	46	36	yes
Resource Development & Market	-0.784	0.504	0.075	-0.103	18	55	37	
Journal of Leshan Normal University	-0.458	-1.209	1.268	-0.134	70	65	38	
Economy Forum	-0.353	-0.275	0.039	-0.165	27	41	39	
Modern Business	0.643	-0.091	-1.486	-0.169	47	11	40	
Special Zone Economy	-0.064	-0.566	-0.108	-0.179	37	33	41	
Neijiang Technology	0.038	-1.347	0.549	-0.181	68	43	42	
Yunnan geographic environment research	-1.187	-0.011	0.772	-0.188	38	66	43	
Modern Economic Information	0.762	-0.099	-1.742	-0.194	50	13	44	
Inner Mongolia Science technology & Economy	0.097	-0.742	-0.289	-0.214	57	26	45	
Contemporary Economics	0.025	-0.104	-0.861	-0.217	31	25	46	
Gansu Agriculture	-0.588	-1.392	1.009	-0.277	71	61	47	
Business Economy	-0.315	0.264	-1.087	-0.286	23	31	48	
CO-Operative Economy & Science	-0.208	-0.097	-0.873	-0.290	42	30	49	
The Border Economy and Culture	-0.471	-0.845	0.182	-0.304	64	54	50	
Pioneering with Science & Technology Monthly	-0.251	-0.582	-0.409	-0.311	60	47	51	
Industrial & Science Tribune	0.137	-0.696	-0.815	-0.313	65	32	52	
Jiangsu Commercial Forum	-0.817	-0.336	-0.002	-0.331	41	56	53	
Journal of Hubei University of Economics: Humanities and	-0.466	-0.565	-0.258	-0.338	55	48	54	

Social Sciences								
Tourism Research	-1.337	-0.029	0.343	-0.338	26	71	55	
Journal of Huangshan University	-1.339	-0.668	0.942	-0.351	58	69	56	
Intelligence	0.531	-0.954	-1.244	-0.353	72	19	57	
Knowledge Economy	0.050	-0.699	-0.874	-0.354	63	39	58	
Science Technology Economy Market	-0.536	-0.716	-0.371	-0.421	61	57	59	
China Business & Trade	-0.292	-0.001	-1.433	-0.423	46	27	60	
Coastal Enterprises and Science & Technology	-0.867	-0.699	0.035	-0.425	43	51	61	
China Collective Economy	-0.157	-0.480	-1.145	-0.428	52	28	62	
Tourism Forum	-1.236	-0.359	0.051	-0.453	20	68	63	
Journal of Hebei Tourism Vocational College	-1.197	-0.647	0.269	-0.459	69	72	64	
Management Observer	-0.125	-0.859	-0.996	-0.474	73	40	65	
Technology & Market	-0.322	-0.035	-1.583	-0.475	32	42	66	
Career Horizon	-0.761	-0.281	-0.824	-0.492	56	53	67	
Northern Economy and Trade	-0.658	-0.354	-0.896	-0.494	54	49	68	
Development of Small Cities and Towns	-1.362	0.218	-0.620	-0.511	66	67	69	
Northern Economy	-0.701	-0.757	-0.598	-0.534	67	52	70	
Rural Economy and Science	-0.866	-0.061	-1.242	-0.569	53	59	71	
Market Forum	-1.190	0.058	-1.086	-0.604	49	64	72	
Tourism World Tourism Development Research	-1.811	-0.206	-0.229	-0.658	74	74	73	
Journal of Sichuan Tourism College	-1.919	0.560	-1.038	-0.697	62	73	74	

5. Discussion and Conclusion

As shown in table 5, the top two rankings by the comprehensive indexes ranking are *Economic Geography* and *Tourism Tribune*, which are consistent with the results by impact factor ranking, while the last two by the comprehensive indexes ranking are close to the results by total cites ranking.

By comparing whether these journals were selected in *A Guide of the Core Journal of China* published by Peking University Press in 2015, we found that:

1. A total of 18 journals were selected;
2. The results by the comprehensive indexes ranking are relatively close to the results by the impact factor ranking, but both of them have large difference with the total cites ranking. Among the top 25 journals from the comprehensive indexes ranking, 15 are selected, and 16 of the top 25 journals in the impact factor ranking are selected;
3. The journals, high ranked by the comprehensive indexes ranking but not selected, generally have large total cites, for example, *Journal of Anhui Agricultural Sciences* and *Heilongjiang Science and Technology Information*, the two journals have the largest total cites in their respective fields according to the *Citation Report of Chinese Science and Technology 2014 periodicals (Expansion Edition)*;
4. The journals, high ranked by the impact factor ranking but not selected, generally have small total cites, for example, *Tropical Geography* and *Resource Development & Market*.

The 74 core Chinese tourism academic journals can be classified into 24 subjects according to the *Citation Report of Chinese Science and Technology 2014 periodicals (Expansion Edition)*, 18 of which belong to the economics subject, 15 belong to the business and trade subject, 6 belong to the business management

subject, 5 belong to the geography subject, 5 belong to the natural science, and the rest belong to other subjects. Due to the comprehensiveness and interdisciplinarity characteristics of the tourism subject, the commonly used single index evaluation methods such as impact factor and total cites are not fully applicable to the subject. The above analysis and information indicate that the comprehensive indexes ranking method is objective and reasonable for evaluating and ranking of tourism journals.

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