1、英语基础评估证明材料

成 绩 证 明

兹证明考生　刘芳　，

身份证件号码为　　，

于　2016 年 12月参加 全国大学英语四级考试。成绩　信息如下：

笔试

总分	听力 (35%)	阅读 (35%)	写作和翻译 (30%)
544	176	186	182

口试

等级
--

学校名称：山东协和学院

准考证号：370330162101804

成绩单编号：162137033002181

教育部考试中心

2019 年 03 月 15 日

No.2019019968

2、硕士阶段学习成绩单

西南林业大学研究生成绩单

姓名	司万	性别	女	出生年月	1996-11-17	学号	20201107009
学科专业	农林经济管理(1203)				指导教师	邹再进	
入学年月	2020-09-23		毕业年月		2023-06-15	学制	3

类别	课程名称	学时数	学分	开课学期	成绩	备注
学位课	自然辩证法概论		1.0	1	92.00	
	中级微观经济学		3.0	1	66.00	
	现代管理理论与实践		3.0	1	87.00	
	农林经济管理理论与实践		3.0	1	87.00	
	英语听力		0.5	1	88.00	
	英语口语		0.0	1	89.00	
	中级应用统计		3.0	2	92.00	
	英语精读		1.5	1	85.00	
	英语精读		1.5	2	78.00	
	英语写作		0.0	2	79.00	
	学位英语		0.0	2	71.00	
	英语听力		0.5	2	99.00	
	中国特色社会主义理论与实践研究		2.0	2	89.00	
	中级宏观经济学		2.0	2	78.00	
	专业英语		2.0	2	68.00	
	学位课小计		23.0			
非学位课	学科前沿专题讲座		3.0	2	80.00	
	气候变化经济学		2.0	2	87.00	
	管理研究方法与论文导读		2.0	2	89.00	
	非学位课小计		7.0			

学位（毕业）论文题目	"两山"理论下云南省森林康养产业竞争力测度及提升路径研究		
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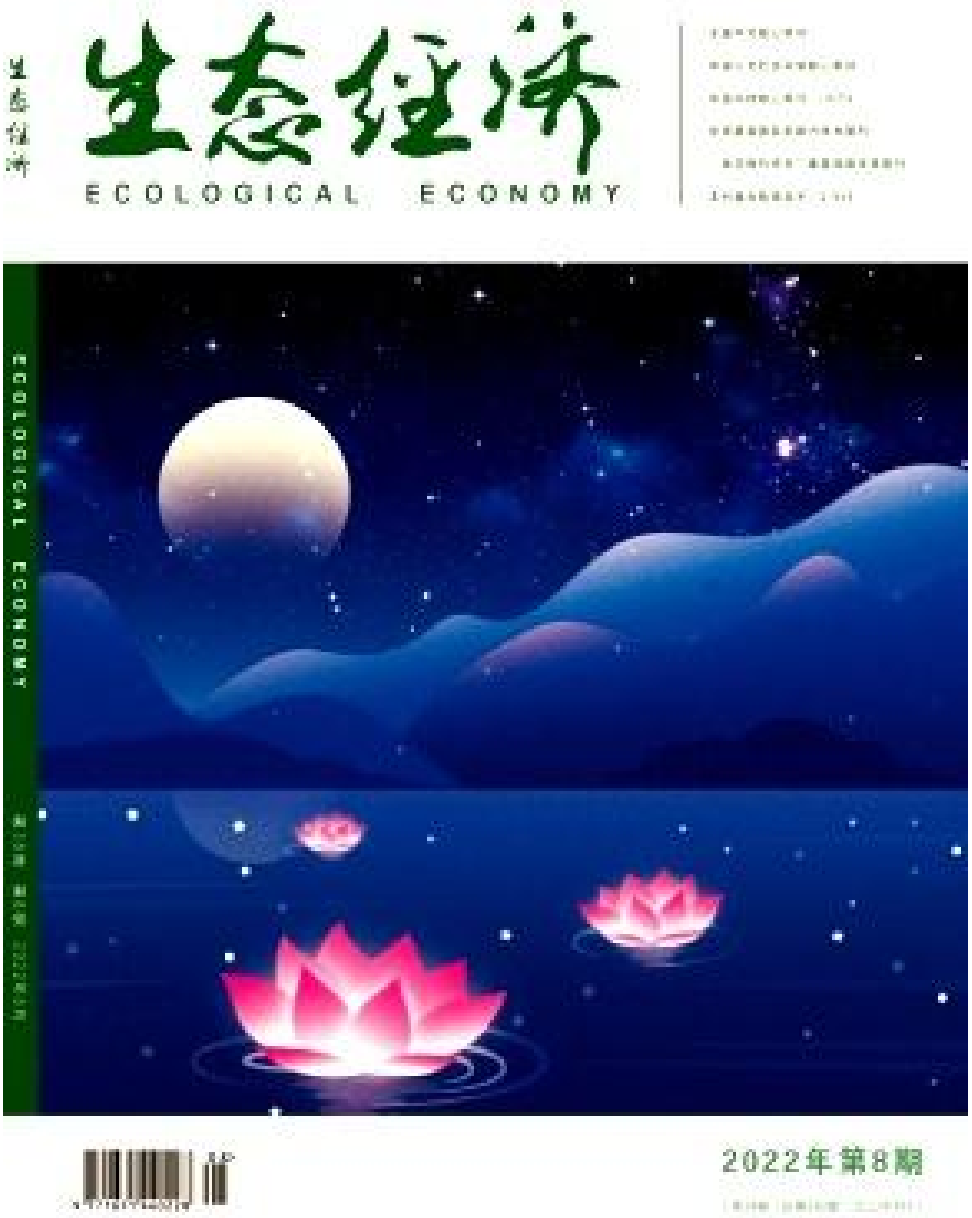
备注			

西南林业大学 经济管理学院

西南林业大学研究生部 成绩专用章

3、专业素质与研究水平评估支撑材料



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云南省域森林康养产业竞争力组合评价模型与实证研究

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摘要：森林康养作为国内新兴产业，在践行“两山”理论以及建设美丽中国等方面将发挥至关重要的作用。以森林资源丰富、发展森林康养产业具有较大潜力的云南省为例，从资源、市场、基础条件以及环境四个方面构建森林康养产业竞争力评价指标体系。通过模糊Borda组合模型对四种单一方法的评价结果进行组合分析。结果表明：相较于其他四种评价模型，模糊Borda组合评价模型效果更优，对于省域森林康养产业竞争力评价具有较强适用性；云南省森林康养产业竞争力总体上呈现“西部及南部地区较高、东部地区较弱”的空间特征：滇西南、滇西北、滇中等区域森林康养产业竞争力较强；滇西森林康养产业竞争力相对较弱；滇东北、滇东、滇东南、滇南等区域的森林康养产业竞争力最弱，且与竞争力最强的昆明市差距悬殊。

关键词：森林康养；模糊Borda组合模型；产业竞争力
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Combination Evaluation Model and an Empirical Study on the Competitiveness of Forest Health Industry in Yunnan Province

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Abstract: As a domestic emerging industry, forest health care will play a vital role in practicing the "two mountains" theory and building a beautiful China. Taking Yunnan Province, which is rich in forest resources and has great potential to develop forest health care industry, as an example, the competitiveness evaluation index system of forest health care industry is constructed from four aspects: Resources, market, basic conditions and environment. The evaluation results of four single methods are combined and analyzed through the fuzzy Border combination model. The results show that the fuzzy Border combination evaluation model is more effective than the other four evaluation models, It has strong applicability for the competitiveness evaluation of provincial forest health industry; The competitiveness of forest health care industry in Yunnan Province generally presents the spatial characteristics of "higher in the western and southern regions and weaker in the eastern region"; The competitiveness of forest health industry in southwest, northwest and middle regions of Yunnan is strong; The competitiveness of forest health care industry in western Yunnan is relatively weak; The competitiveness of forest health care industry in northeast, east, southeast and south Yunnan is the weakest, and there is a wide gap with Kunming, which is the most competitive.
Key words: forest health; fuzzy Borda combination; industrial competitiveness

森林康养作为一项新兴产业正在全国各地如火如荼地展开，其发展不仅能促进新时代生态文明观的确立和普及，也可助推实现碳达峰碳中和的目标。2015年1月，习近平总书记对云南提出努力成为“生态文明建设排头兵”的战略定位，要求云南把生态环境保护放在更加突出的位置；《云南省国民经济和社会发展第十四个五年规划和二〇三五年远景目标》把碳达峰碳中和纳入全省生态文明建设整体布局，均与森林康养产业发展具有密切联系；2019年，国内出台了第一部关于促进森林康养产业发展的专门而系统的政策《关于促进森林康养产业发展的意见》，在全国掀起了森林康养产业发展的高潮。对云南省森林康养产业竞争力进行评价，可明晰其发展

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优势及不足，有利于后续森林康养产业的科学有序发展，也可为后续其他省份进行森林康养产业竞争力评价提供借鉴与参考。

1 文献综述

森林康养概念于19世纪40年代起源于德国，随着工业革命持续推进，欧洲城市环境状况急速恶化，由于工作压力过大以及缺乏锻炼，很多人患上了"城市文明病"，因此德国人开始注意到森林环境的保健作用，自然疗法开始在欧洲盛行。之后"欧洲水疗之父"塞巴斯蒂安·克奈圖在巴特·威利斯赫恩镇创立了至今闻名世界的克奈圖疗法，利用森林和水进行保健和疾病的预防[1]。1982年，日本前林野厅长官前田直登倡导引进了森林疗法，提出了森林浴的概念，成为森林康养的开端[2]。

目前学界对于森林康养产业发展十分关注，对其进行大量的调查与研究，内容不限于森林康养对于人体健康的有效性研究[3-6]、森林康养与"两山"理论转化通道研究[7]、森林康养模式划分[8]等多个方面，相关研究已经基本成熟；对于产业竞争力，以往学者从不同维度分析了多个行业产业竞争力的影响因素[9-12]。另外在竞争力评价的研究方法上，常见采用主成分分析、灰色关联分析、模糊综合评价以及模糊层次分析方法进行竞争力实证分析[13-17]；近年开始出现AHP-熵权法进行组合权重、熵权TOPSIS法进行竞争力测度，以及利用熵值法与层次分析法综合确定指标权重，利用TOPSIS法建立评价模型的方法[18-20]。尽管国内外学者对于森林康养以及产业竞争力相关研究已经成果丰硕，然而目前研究森林康养产业竞争力的文献却极少，对于森林康养产业竞争力评价没有合适的指标体系和方法可以运用，但现有的关于产业竞争力评价模型及方法的研究为省域森林康养产业竞争力的评价提供了一定的借鉴[21-22]。目前关于竞争力评价大多采用单一模型进行分析，但在采用不同评价模型时所得出的结论往往存在较大差异，为了克服这一缺陷，拟采用组合评价模型将多种方法评价结果进行组合分析，提升评价结果的科学性与可靠性，本研究将以森林资源丰富的云南省为例，采用组合评价模型对云南省16个州市的森林康养产业竞争力进行评价，验证组合评价模型的科学性与合理性，并根据评价结果精准施策。

2 评价指标体系构建

已有研究所运用的竞争力评价指标体系大多基于迈克尔·波特的钻石模型[23]或中国人民大学的国际竞争力模型[24]进行构建。钻石模型由四个关键因素和两个辅助因素构成，其中，四个关键因素分别为生产要素、需求条件、相关与支持产业、企业战略与企业结构、竞争对手；机遇和政府是两个辅助要素。而国际竞争力模型包括核心竞争力、基础竞争力和环境竞争力三个层次。由于钻石模型中的企业战略与企业结构、竞争对手、机遇和政府等多个因素在本研究中均难以量化，因此选用中国人民大学的国际竞争力模型加以修正构建云南省森林康养产业竞争力评价指标体系。其中模型中的核心竞争力即能为森林康养产业带来比较竞争优势的特有资源，其内容可能涵盖基础竞争力及环境竞争力中的部分指标，考虑到指标体系中的各层指标均要保持相对独立性，尽可能不相互重叠，因此修正模型拟选取资源竞争力、市场竞争力、基础条件竞争力、环境竞争力四个维度来构建评价指标体系。

考虑到指标体系的系统性、科学性以及数据可行性，从资源竞争力、市场竞争力、基础条件竞争力、环境竞争力四个维度构建评价指标体系(表1)，对不同要素的观测指标说明如下。

表1 云南省森林康养竞争力评价指标体系

一级指标	二级指标	三级指标	单位	指标属性
森林康养产业竞争力	资源竞争力	森林覆盖率	%	+
		森林蓄积量	万立方米	+
		森林面积	万公顷	+
		森林康养基地试点建设单位	个	+
		森林康养基地试点建设乡镇	个	+
	市场竞争力	城镇人口	万人	+
		城镇居民人均可支配收入	元	+
		每万人接待国内外游客人次	万人	+
		人均旅游消费	万元/人	+
		森林康养基地知名度	分	+
	基础条件竞争力	单位面积公路通车里程	千米/万公顷	+
		单位面积载客汽车拥有量	万辆/万公顷	+
		单位面积载货汽车拥有量	万辆/万公顷	+
		单位面积机场数	处/万公顷	+
		单位面积航线数	条/万公顷	+
	环境竞争力	单位面积工业废气治理设施套数	套/万公顷	+
		单位面积工业废气排放量	亿立方米/万公顷	-
		单位面积工业废水排放量	亿吨/万公顷	-
		单位面积农药使用量	万吨/万公顷	-

(1)资源竞争力。资源竞争力主要选取对于森林康养产业发展发挥关键影响作用的物质资源，应当包括：①森林资源状况：包括森林覆盖率、森林蓄积量、森林面积；②森林康养试点单位现状：森林康养基地试点建设单位数量以及森林康养基地试点建设乡镇数量。

(2)市场竞争力。市场竞争力通常围绕消费者数量以及消费水平来进行，且参与森林康养活动的群体以城镇人群居多，因此首先选用城镇人口数以及城镇居民人均可支配收入两项指标；由于森林康养服务需求与旅游业发展具有强关联性，此处加入每万人接待国内外游客人次以及人均旅游消费两项指标；知名度在一定程度上也可以反映出本产业的市场竞争力状况，因此加入森林

康养基地知名度指标。

（3）基础条件竞争力。基础条件竞争力主要选取了支撑森林康养产业发展的基础设施建设情况，反映其交通运输条件，此处均选用相对指标，以此反映各个州市的基础条件优劣，具体包括单位面积公路通车里程、单位面积载客汽车拥有量、单位面积载货汽车拥有量、单位面积机场数以及单位面积航线数量。

（4）环境竞争力。环境竞争力主要选取单位面积工业废气治理设施套数、单位面积工业废气排放量、单位面积工业废水排放量、单位面积农药使用量四项相对指标，其中单位面积工业废气治理设施套数为正向指标，其余均为负向指标。

由于云南省各个州市的人口数量和土地面积存在较大差异，为了削减在评价时因此可能导致的误差，在市场竞争力、基础条件竞争力以及环境竞争力三个层面的绝大部分指标均采用平均指标；而丰富的物质资源基础是森林康养产业发展壮大的先决条件，其对于森林康养产业竞争力发挥着关键性作用，重要性不容小觑，因此资源竞争力指标选用总量指标。

3 数据来源

研究数据主要来源于《2021 云南统计年鉴》以及云南省各州市国民经济与社会发展统计公报；森林康养基地试点建设单位以及试点建设乡镇数据源于中国林业产业联合会 2015—2020 年发布的《全国森林康养基地试点建设单位名单》；各州市机场及航线数量源于中国民用航空局发展计划司发布的《2021 年全国民用运输机场生产统计公报》；森林康养基地知名度由选取课题组成员打分取均值得来。其中森林资源数据较难获取，数据来源难以统一，所用数据为各州市统计公报、政府门户网站、各地日报等途径汇总整理而来，因此时间不相统一，但不影响整体评价结果。

4 云南省森林康养产业竞争力组合评价模型

目前，有关竞争力评价模型的研究已经相对成熟，但在采用不同的评价模型进行研究时得出的结论往往都存在一定的差异，由于运用单一的模型进行评价分析时，对决策的科学性与可靠性会有所限制，为了克服这一缺陷，本文将采用组合评价模型，运用 Kendall 协同系数法检验不同方法评价结果的一致性，继而采用模糊 Borda 法组合不同评价方法的结论[28]。

首先，为了消除量纲影响，对指标值进行规范化处理。常用的方法有建立评价等级表、简单归一化法、向量归一化法、线性比例变换法以及极差变换法。

此处采用极差变换法对原始数据进行标准化处理。

设有 m 个被评价对象，n 个评价指标，X_{ij} 为第 i 个被评价对象的第 j 个指标的数值（$i=1, 2, \cdots, m$; $j=1, 2, \cdots, n$）。若 $X_j^+ = \max\limits_{1\leqslant i\leqslant m} X_{ij}$，$X_j^0 = \min\limits_{1\leqslant i\leqslant m} X_{ij}$，则对于正向指标：

$$V_{ij} = \frac{X_{ij} - X_j^0}{X_j^+ - X_j^0} (1 \leqslant i \leqslant m, 1 \leqslant j \leqslant n) \tag{1}$$

对于负向指标：

$$V_{ij} = \frac{X_j^+ - X_{ij}}{X_j^+ - X_j^0} (1 \leqslant i \leqslant m, 1 \leqslant j \leqslant n) \tag{2}$$

4.1 熵值法

熵值法即通过熵值的计算来判断某个指标的离散程度，离散程度越大说明其影响程度越大，具体步骤为：

（1）计算第 i 个评价对象第 j 个指标值在所有方案中占的比重 P_{ij}：

$$P_{ij} = \frac{V_{ij}}{\sum_{i=1}^{m} V_{ij}} \tag{3}$$

（2）计算各指标的信息熵 E_j：

$$E_j = -k \sum_{i=1}^{m} P_{ij} \ln P_{ij} (k = 1/\ln m) \tag{4}$$

（3）计算各指标的差异系数 G_j：

$$G_j = 1 - E_j \tag{5}$$

（4）计算各指标的权重 W_j：

$$W_j = \frac{G_j}{\sum_{j=1}^{n} G_j} \tag{6}$$

（5）计算各个评价对象的森林康养产业竞争力：

$$S_i = \sum_{j=1}^{n} W_j V_{ij} \tag{7}$$

4.2 熵权-TOPSIS法

熵权 TOPSIS 法是指在运用熵值法确定指标权重 W_j 后，再通过 TOPSIS 法（优劣解距离法）计算各评价对象与最优解之间的相对接近度[29]，相对接近度越大，说明竞争力水平越高，其基本步骤为：

（1）将通过熵权法得出的指标权重代入公式，得到加权矩阵：

$$Z = [z_{ij}]_{m\times n} = [W_j \times V_{ij}]_{m\times n} \tag{8}$$

（2）确定理想解 S^+ 和负理想解 S^-：

$$\begin{cases} S^+ = \max(z_{1j}, z_{2j}, \cdots, z_{nj}) \\ S^- = \min(z_{1j}, z_{2j}, \cdots, z_{nj}) \end{cases} \tag{9}$$

（3）计算各评价对象与理想解、负理想解之间的欧氏距离 D_i^+、D_i^-：

$$\begin{cases} D_i^+ = \sqrt{\sum_{j=1}^{n}(S^+ - z_{ij})^2} \\ D_i^- = \sqrt{\sum_{j=1}^{n}(S^- - z_{ij})^2} \end{cases} \tag{10}$$

（4）计算各评价对象与最优解之间的相对接近度 C_i：

$$C_i = \frac{D_i^-}{D_i^+ + D_i^-} \tag{11}$$

式中：$C_i \in [0, 1]$，C_i 值越大表明省份 i 的森林康养产业竞争力水平最优。

4.3 灰色关联度法

灰色关联度法是将各州市情况与最优解相比较，得出与最优解关联度排序，其基本步骤如下：

（1）确定参考序列与比较序列。设参考序列为 $X_0=\{X_{01}, X_{02}, \cdots, X_{0m}\}$，取值为各评价指标的最优值；第 i 个评价对象的比较序列为 $X_i=\{X_{i1}, X_{i2}, \cdots, X_{im}\}$。

（2）对参考序列与比较序列进行无量纲化处理，转换后参考序列为 $Y_0=\{Y_{01}, Y_{02}, \cdots, Y_{0m}\}$，比较序列为 $Y_i=\{Y_{i1}, Y_{i2}, \cdots, Y_{im}\}$。

（3）计算第 i 个评价对象第 j 个指标的关联系数：

$$\xi_{ij} = \frac{\min_i \min_j |Y_{0j} - Y_{ij}| + \rho \max_i \max_j |Y_{0j} - Y_{ij}|}{|Y_{0j} - Y_{ij}| + \rho \max_i \max_j |Y_{0j} - Y_{ij}|} \tag{12}$$

式中：ξ_{ij} 为灰色关联系数；$|Y_{0j}-Y_{ij}|$ 为参考序列与比较序列的绝对差；ρ 为灰色分辨系数，通常取 0.5。

（4）计算灰色关联度。对各个州市分别计算其各指标与最优解对应元素的关联系数的均值，以反映各州市与最优解的关联关系，并称其为关联度：

$$\gamma_{0i} = \frac{1}{n}\sum_{j=1}^{n}\xi_{ij}(i=1,2,\cdots,m;\ j=1,2,\cdots,n) \tag{13}$$

（5）根据各评价对象的关联度，进行排序，得出综合评价结果。

4.4 熵权-灰色关联度法

熵权－灰色关联度法是指在完成关联系数计算之后，运用熵值法求出的各指标权重与关联系数构建成加权矩阵，进行关联度计算：

$$\tau_{0i} = \sum_{j=1}^{n}\xi_{ij}W_j \tag{14}$$

4.5 模糊Borda组合模型

模糊 Borda 法可以同时考虑不同方法所得结果的得分差异以及排名差异，可以很好地利用已有的评价信息，将各种方法的结论进行组合，使评价结果具有较高的合理性和优越性，其具体步骤为：

（1）计算隶属优度：

$$u_{ij} = \frac{x_{ij} - \min_j\{x_{ij}\}}{\max_j\{x_{ij}\} - \min_j\{x_{ij}\}}(i=1,2,\cdots,16;\ j=1,2,3,4) \tag{15}$$

式中：x_{ij} 表示第 i 个州市第 j 个评价方法的结果，u_{ij} 表示第 i 个州市在第 j 种评价方法下属“优”的程度，即隶属度。在运算过程中，趋于 0 的值可能会导致其结果为 0，可能会影响最终结果，因此将上式改为：

$$u_{ij} = \frac{x_{ij} - \min_j\{x_{ij}\}}{\max_j\{x_{ij}\} - \min_j\{x_{ij}\}} \times 0.9 + 0.1 \tag{16}$$

（2）计算模糊频数：

$$P_{hi} = \sum_{j=1}^{4}\delta_{hi}\widehat{u_{ij}}(h=1,2,\cdots,16) \tag{17}$$

式中：$\delta_{hi} = \begin{cases} 1, & \text{城市}i\text{排在第}h\text{位} \\ 0, & \text{其他} \end{cases}$，$\widehat{u_{ij}} = diag(u_{i1}, u_{i2}, \cdots, u_{im})$。

（3）计算模糊频率：

$$w_{hi} = \frac{P_{hi}}{\sum_h P_{hi}} \tag{18}$$

（4）将排序转化为得分：

$$Q_{hi} = \frac{1}{2}(n-h)(n-h+1) \tag{19}$$

（5）计算模糊 Borda 分，FB_i 值越大，名次越靠前：

$$FB_i = \sum_{h=1}^{n} w_{hi}Q_{hi} \tag{20}$$

5 组合评价实证分析

5.1 各评价模型综合评价结果

熵值法、熵权 TOPSIS 法、灰色关联度法、熵权-灰色关联度法评价结果，分别见表 2～表 5。

5.2 评价的一致性检验及组合评价

5.2.1 Kendall协同系数法进行相容性检验

采用 Kendall 协和系数法检验多种综合评价结果是否兼容，Kendall 协和系数是用于确定两组或多组数字序列之间相关性大小的一个描述工具，能够反映出数字序列之间的内在关联度。因此，应用在多种评价方法对同

表2 熵值法评价结果

地区	综合竞争力		资源竞争力		市场竞争力		基础条件竞争力		环境竞争力	
	得分	排名	得分	排名	得分	排名	得分	排名	得分	排名
昆明	0.725 2	1	0.130 0	5	0.168 8	1	0.355 4	1	0.071 0	1
曲靖	0.221 8	13	0.037 4	14	0.062 9	12	0.062 5	10	0.059 0	2
玉溪	0.252 2	11	0.038 9	13	0.076 0	7	0.088 7	8	0.048 7	13
保山	0.391 3	3	0.120 0	6	0.080 8	6	0.147 6	2	0.042 9	15
昭通	0.183 0	14	0.020 3	15	0.025 3	16	0.096 2	6	0.041 1	16
丽江	0.516 2	2	0.195 2	2	0.146 3	2	0.123 2	4	0.051 5	10
普洱	0.380 6	4	0.203 8	1	0.072 6	8	0.054 7	11	0.049 5	12
临沧	0.222 7	12	0.045 3	11	0.028 0	15	0.095 1	7	0.054 3	7
楚雄	0.332 9	6	0.178 8	3	0.070 4	9	0.028 8	15	0.054 9	5
红河	0.273 7	10	0.117 0	7	0.067 4	10	0.043 9	13	0.045 3	14
文山	0.167 6	15	0.014 8	16	0.0477	13	0.051 8	12	0.053 3	8
西双版纳	0.363 1	5	0.079 0	8	0.126 0	3	0.103 3	5	0.054 7	6
大理	0.305 2	8	0.049 2	10	0.121 2	4	0.079 0	9	0.055 8	4
德宏	0.304 3	9	0.041 3	12	0.063 6	11	0.146 3	3	0.053 1	9
怒江	0.1556	16	0.061 4	9	0.033 2	14	0.003 9	16	0.057 2	3
迪庆	0.311 0	7	0.148 0	4	0.082 2	5	0.031 2	14	0.049 7	11

表3 熵权-TOPSIS法评价结果

地区	综合		资源		市场		基础条件		环境	
	C_i	排名	C_i	排名	C_i	排名	C_i	排名	C_i	排名
昆明	0.707	1	0.505	4	0.721	1	0.835	1	0.718	1
曲靖	0.217	13	0.128	13	0.308	10	0.167	10	0.624	2
玉溪	0.248	11	0.126	14	0.332	8	0.225	7	0.586	3
保山	0.373	4	0.462	6	0.372	5	0.338	3	0.331	16
昭通	0.191	14	0.069	15	0.176	15	0.218	8	0.346	15
丽江	0.498	2	0.752	1	0.548	2	0.339	2	0.363	12
普洱	0.351	5	0.605	3	0.356	7	0.151	11	0.358	14
临沧	0.225	12	0.156	11	0.135	16	0.251	6	0.397	9
楚雄	0.394	3	0.712	2	0.324	9	0.089	15	0.400	7
红河	0.276	9	0.457	7	0.295	11	0.121	14	0.386	10
文山	0.152	16	0.068	16	0.209	13	0.125	13	0.382	11
西双版纳	0.330	6	0.234	8	0.511	3	0.300	5	0.401	6
大理	0.259	10	0.158	10	0.506	4	0.176	9	0.409	5
德宏	0.285	8	0.137	12	0.284	12	0.338	4	0.434	4
怒江	0.168	15	0.204	9	0.209	14	0.019	16	0.398	8
迪庆	0.310	7	0.503	5	0.370	6	0.128	12	0.359	13

表4 灰色关联度法评价结果

地区	综合竞争力		资源竞争力		市场竞争力		基础条件竞争力		环境竞争力	
	γ_{0i}	排名	γ_{0i}	排名	γ_{0i}	排名	γ_{0i}	排名	γ_{0i}	排名
昆明	0.666 1	1	0.494 3	7	0.729 7	2	0.836 6	1	0.588 3	11
曲靖	0.433 5	16	0.392 6	14	0.422 4	12	0.424 8	8	0.509 2	15
玉溪	0.469 1	12	0.408 8	13	0.472 8	7	0.526 9	3	0.467 4	16
保山	0.532 9	6	0.487 8	8	0.470 4	8	0.594 7	2	0.589 9	10
昭通	0.438 1	15	0.367 4	15	0.359 9	16	0.495 4	5	0.552 4	14
丽江	0.642 5	2	0.613 5	3	0.745 7	1	0.474 6	6	0.759 6	2
普洱	0.584 5	3	0.849 5	1	0.449 2	9	0.386 4	12	0.670 1	8
临沧	0.479 2	10	0.451 8	10	0.367 6	15	0.468 1	7	0.667 0	9
楚雄	0.524 3	8	0.596 2	4	0.479 4	6	0.373 6	14	0.679 2	7
红河	0.456 7	13	0.478 0	9	0.425 6	10	0.389 9	11	0.552 6	13
文山	0.439 2	14	0.348 9	16	0.395 1	13	0.377 7	13	0.684 3	6
西双版纳	0.573 9	4	0.566 3	5	0.641 9	3	0.403 2	10	0.711 6	4
大理	0.528 2	7	0.448 4	11	0.591 8	4	0.419 3	9	0.684 4	5
德宏	0.477 0	11	0.433 7	12	0.423 0	11	0.509 6	4	0.557 7	12
怒江	0.488 5	9	0.517 6	6	0.374 0	14	0.338 7	16	0.782 5	1
迪庆	0.563 6	5	0.634 3	2	0.540 2	5	0.359 8	15	0.759 3	3

表5 熵权-灰色关联度法评价结果

地区	综合竞争力		资源竞争力		市场竞争力		基础条件竞争力		环境竞争力	
	r_{0i}	排名	r_{0i}	排名	r_{0i}	排名	r_{0i}	排名	r_{0i}	排名
昆明	0.734 7	1	0.168 7	5	0.164 1	1	0.354 0	1	0.076 0	1
曲靖	0.406 4	13	0.121 2	14	0.093 5	11	0.153 8	10	0.058 1	11
玉溪	0.434 1	10	0.122 5	13	0.100 5	9	0.174 0	5	0.057 5	12
保山	0.495 4	6	0.156 6	6	0.104 3	6	0.207 1	2	0.053 6	15
昭通	0.400 5	15	0.115 0	15	0.081 3	16	0.169 7	7	0.053 6	14
丽江	0.612 9	2	0.239 2	2	0.163 4	2	0.185 5	4	0.064 7	4
普洱	0.511 2	3	0.242 2	1	0.101 2	8	0.148 5	11	0.059 7	10
临沧	0.4203	12	0.128 2	11	0.081 6	15	0.171 3	6	0.060 5	8
楚雄	0.501 1	4	0.236 4	3	0.102 3	7	0.141 3	15	0.060 6	7
红河	0.421 1	11	0.155 0	7	0.093 7	10	0.145 8	13	0.052 4	16
文山	0.388 4	16	0.113 2	16	0.087 3	13	0.146 4	12	0.060 4	9
西双版纳	0.495 5	5	0.150 5	8	0.143 6	3	0.163 8	8	0.062 7	5
大理	0.455 8	8	0.128 6	10	0.132 0	4	0.155 9	9	0.060 8	6
德宏	0.441 5	9	0.125 7	12	0.093 4	12	0.188 7	3	0.054 6	13
怒江	0.403 9	14	0.140 9	9	0.084 4	14	0.133 9	16	0.068 2	2
迪庆	0.478 2	7	0.186 8	4	0.114 3	5	0.142 2	14	0.066 1	3

一组对象评价中，能够在一定程度上体现出评价方法的内在属性。其过程为：(1)假设H0：四种方法的评价结论不存在显著的一致性；H1：四种方法的评价结论存在显著的一致性。(2)运用IBM SPSS Statistics进行Kendall协同系数检验，观察其渐进显著性P以及Kendall协同系数值。(3)若$P<0.05$，则拒绝原假设，说明四种方法的评价结论具有相容性；Kendall系数取值位于0～1之间，越接近于1，说明其结论一致性程度越高。进行Kendall协同系数检验结果显示P值为0.000 001，$P<0.05$，因此拒绝H0，接受H1，即四种方法的评价结论存在显著的一致性；Kendall系数值为0.932，说明四种方法所得综合评价结果的一致程度高达93.2%，通过一致性检验。接下来对各个二级指标层评价结果进行Kendall协同系数检验，由表6所示的结果可知，综合排名以及资源、市场、基础、环境排名均通过一致性检验，且一致程度极高，可以将四种评价结果进行组合。

表6 一致性检验

检验对象	综合排名	资源排名	市场排名	基础排名	环境排名
P值	0.000 001	0.000 000 4	0.000 000 4	0.000 000 8	0.005
Kendall系数	0.932	0.971	0.982	0.953	0.549

5.2.2 模糊Borda法进行综合分析

由于各个方法的计分方式不尽相同，因此在利用模糊Borda法进行综合分析前，需先用简单归一化法对各方法评价结果进行标准化处理。将各种方法评价结果进行标准化处理后，运用模糊Borda法进行对各种方法评价结果进行组合，结果如表7所示。

表7 Borda法组合评价结果

地区	综合		资源		市场		基础条件		环境	
	得分	排名	得分	排名	得分	排名	得分	排名	得分	排名
昆明	120.00	1	68.36	5	115.61	1	120.00	1	86.31	2
曲靖	3.62	14	3.14	14	12.77	12	25.23	10	54.34	6
玉溪	16.24	11	5.86	13	32.81	9	69.54	5	29.08	11
保山	73.28	4	49.08	7	49.72	6	104.21	2	3.57	15
昭通	1.75	15	1.00	15	0.27	16	50.18	7	1.45	16
丽江	105.00	2	105.32	2	105.72	2	80.76	4	68.86	3
普洱	85.06	3	117.66	1	36.32	8	14.63	11	17.51	13
临沧	14.16	12	15.44	11	0.87	15	50.32	6	34.34	10
楚雄	50.70	7	91.08	3	36.78	7	1.20	15	46.09	7
红河	16.52	10	44.00	8	20.77	10	7.92	12	8.00	14
文山	0.79	16	0.00	16	6.00	13	7.77	13	40.77	9
版纳	61.67	5	50.57	6	91.00	3	40.58	8	68.33	4
大理	31.72	8	19.00	10	78.00	4	28.00	9	64.58	5
德宏	21.15	9	10.00	12	13.07	11	82.23	3	18.31	12
怒江	5.15	13	29.18	9	3.00	14	0.00	16	93.13	1
迪庆	53.10	6	90.67	4	64.90	5	4.67	14	43.63	8

5.2.3 事后检验

为了检验模糊Borda法所得结果的合理性，选用综合竞争力组合评价结果与其他模型评价结果进行比较分析。由表8可知，模糊Borda法组合评价结果与其他四种方法评价结果的最大序差为4，四种单一方法评价结

果的最大序差为 7，说明模糊 Borda 法组合评价结果与其他方法评价结果存在的差异更小。

表8 云南省森林康养产业综合竞争力（五种方法分析表）

地区	模糊 Borda 法		熵值法		熵权 TOPSIS 法		灰色关联度法		熵权－灰色关联度法	
	得分	排名	得分	排名	得分	排名	得分	排名	得分	排名
昆明	120.00	1	0.725 2	1	0.707	1	0.666 1	1	0.734 7	1
曲靖	3.62	14	0.221 8	13	0.217	13	0.433 5	16	0.406 4	13
玉溪	16.24	11	0.252 2	11	0.248	11	0.469 1	12	0.434 1	10
保山	73.28	4	0.391 3	3	0.373	4	0.532 9	6	0.495 4	6
昭通	1.75	15	0.183 0	14	0.191	14	0.438 1	15	0.400 5	15
丽江	105.00	2	0.516 2	2	0.498	2	0.642 5	2	0.612 9	2
普洱	85.06	3	0.380 6	4	0.351	5	0.584 5	3	0.511 2	3
临沧	14.16	12	0.222 7	12	0.225	12	0.479 2	10	0.420 3	12
楚雄	50.70	7	0.332 9	6	0.394	3	0.524 3	8	0.501 1	4
红河	16.52	10	0.273 7	10	0.276	9	0.456 7	13	0.421 1	11
文山	0.79	16	0.167 6	15	0.152	16	0.439 2	14	0.388 4	16
版纳	61.67	5	0.363 1	5	0.33	6	0.573 9	4	0.495 5	5
大理	31.72	8	0.305 2	8	0.259	10	0.528 2	7	0.455 8	8
德宏	21.15	9	0.304 3	9	0.285	8	0.477 0	11	0.441 5	9
怒江	5.15	13	0.155 6	16	0.168	15	0.488 5	9	0.403 9	14
迪庆	53.10	6	0.311 0	7	0.31	7	0.563 6	5	0.478 2	7

由表 9 可知，前四种评价模型与模糊 Borda 组合评价的 Spearman 相关系数检验值都在 0.809 以上，均通过 1% 显著性水平下的双尾检验。每一种评价模型与其他评价模型的检验系数平均值分别为 0.943、0.925、0.870、0.950、0.957，其中模糊 Borda 组合评价模型与其他模型的检验系数均值最大，直接显示组合评价比前四种方法评价效果更优(表 10)。通过观察各种方法结果所得排名的序差以及各种方法两两之间的检验系数，模糊 Borda 法组合评价结果都优于其余四种模型评价结果，且所得结果较切合实际发展状况，证实其对于省域森林康养产业竞争力评价具有较强适用性。

表9 Spearman相关系数检验

模型	熵值法	熵权－TOPSIS 法	灰色关联度法	熵权－灰色关联度法	模糊 Borda 法
熵值法	1	0.971**	0.856**	0.968**	0.976**
熵权－TOPSIS 法	0.971**	1	0.809**	0.968**	0.950**
灰色关联度法	0.856**	0.809**	1	0.888**	0.926**
熵权－灰色关联度法	0.968**	0.968**	0.888**	1	0.974**
模糊 Borda 法	0.976**	0.950**	0.926**	0.974**	1

注：上角标 ** 表示在 0.01 级别(双尾)相关性显著。

表10 检验系数均值

模型	熵值法	熵权－TOPSIS 法	灰色关联度法	熵权－灰色关联度法	模糊 Borda 法
均值	0.943	0.925	0.870	0.950	0.957

5.2.4 组合评价结果分析

从模糊 Borda 法组合评价结果可知：云南省森林康养产业综合竞争力最强的昆明(得分 120 分)与竞争力最弱的文山(得分 0.79 分)模糊 Borda 分相差悬殊，综合竞争力差异显著。云南省 16 个州市综合竞争力的平均得分为 41.24，其中 7 个州市综合得分高于平均得分，即森林康养产业竞争力水平高于平均水平的州市约占 44%；综合得分低于平均得分的州市有 9 个，约占 56%，说明一多半的州市森林康养产业竞争力水平仍然较弱。

根据模糊 Borda 法组合评价结果，运用 ArcGIS 10.8 win 软件绘制各州市综合得分示意图，用自然间断点分级法将 16 个州市根据森林康养产业竞争力综合得分分成五类，颜色由深到浅分别代表竞争力综合水平高低，绘制结果如图 1 所示。

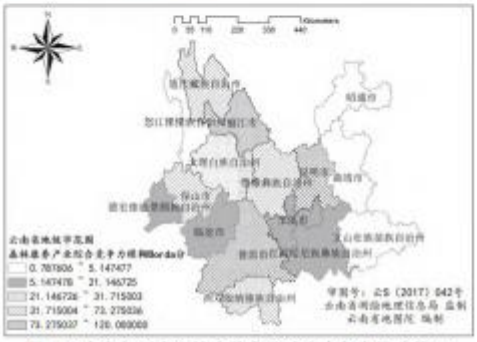

图1 云南省各州市森林康养产业综合竞争力得分状况

从整体来看，云南省森林康养产业竞争力总体上呈现“西部及南部地区较高，东部地区较弱”的空间特征。滇西南(普洱、西双版纳、临沧)、滇西北(丽江、迪庆)、滇中(昆明、玉溪)等区域森林康养产业竞争力较强；滇西(楚雄、大理、怒江、保山、德宏)森林康养产业竞争力相对较弱；滇东北(昭通)、滇东(曲靖)、滇东南(文山)、滇南(红河)等区域的森林康养产业竞争力最弱，且与竞争力最强的昆明市差距悬殊。

根据评价结果可以看出，云南省森林康养产业竞争力较强的州市(昆明、丽江、普洱、保山、西双版纳、迪庆)均为森林资源优势明显且旅游业发展态势较好的地区。其中昆明、丽江、西双版纳各层面竞争力发展状况较为均衡；而普洱资源竞争力排名第一，但其基础条件及环境竞争力较弱；保山基础条件竞争力排名第二，但其环境竞争力排名位于 15 位，近乎垫底；迪庆基础条件竞争力排名居 14 位，发展状况也极不均衡。楚雄、大理、德宏、红河、玉溪、临沧 6 个州市的综合得分介于 14 到 51 之间，森林康养产业竞争力相对较弱。其中楚雄的资源竞争力排名第三，市场及环境竞争力排名第七，而基础条件竞争力居于 15 位，其基础条件发展状况严重阻碍了森

林康养产业发展进程：怒江、曲靖、昭通、文山 4 个州市的综合得分不足 6 分，森林康养产业竞争力水平极低，且其资源竞争力水平不高，不宜发展森林康养产业。

6 结论及建议

研究以云南省森林康养产业竞争力为切入点，从资源竞争力、市场竞争力、基础条件竞争力以及环境竞争力四个维度构建评价指标体系，运用熵值法、熵权 TOPSIS 法、灰色关联度法以及熵权－灰色关联度法分别对云南省各州市森林康养产业综合竞争力以及各二级指标竞争力进行评价，而后采用 Kendall 协和系数法检验四种方法评价结果的一致程度，检验发现综合竞争力、资源竞争力、市场竞争力、基础条件竞争力以及环境竞争力均通过一致性检验检验，且一致程度极高，可以进行组合分析。利用模糊 Borda 组合模型将四种方法评价结果进行组合分析，结果表明：从各方法所得序差以及两两方法结果之间的检验系数均值来看，模糊 Borda 法组合评价结果远远优于其余四种评价模型所得评价结果，且评价结果更加贴近现实情况，其对于省域森林康养产业竞争力评价具有较强适用性，实现了单一评价模型的优势互补，可为省域森林康养产业竞争力评价提供一定的借鉴。

根据模糊 Borda 法所得结果可以看出云南省森林康养产业竞争力总体上呈现“西部及南部地区较高，东部地区较弱”的空间特征：滇西南（普洱、西双版纳、临沧）、滇西北（丽江、迪庆）、滇中（昆明、玉溪）等区域森林康养产业竞争力较强；滇西（楚雄、大理、怒江、保山、德宏）森林康养产业竞争力相对较弱；滇东北（昭通）、滇东（曲靖）、滇东南（文山）、滇南（红河）等区域的森林康养产业竞争力最弱；昆明、丽江、普洱、保山、西双版纳、迪庆为综合竞争力排名前六位的州市，模糊 Borda 分均高于 50 分，发展态势及发展潜力最为乐观，是云南省森林康养产业发展的先锋队，而曲靖、昭通、文山等地的模糊 Borda 分不足 4 分，与昆明等地差异悬殊。结合各层面竞争力得分情况来看，昆明、丽江、西双版纳发展状况较为均衡，各方面发展态势良好；普洱、保山、迪庆、楚雄虽然综合得分较高，但发展不均衡现象较为突出；而怒江、曲靖、昭通、文山在四个准则层排名几乎全部垫底，不适宜发展森林康养产业。根据以上研究结果，针对各个州市在森林康养产业发展中的不足之处，建议如下：

（1）各州市应注重各方面竞争力的均衡发展。森林康养产业发展壮大需要多方面因素支撑，任何一层条件的欠缺都将阻碍森林康养产业的发展进程。各州市应针对自己的不足向竞争优势区域借鉴经验，补齐森林康养产业发展的短板。对于森林康养各层竞争力发展不均衡的州市（如普洱、保山、迪庆、楚雄），应针对其弱势采取相应提升举措：普洱、迪庆、楚雄应保持其资源竞争力优势，同时当地政府应提升基础设施建设水平，改善交通条件，为森林康养产业发展提供强有力的支撑；普洱、保山环境竞争力的提升则需要注重环境保护，加大节能减排宣传力度，为森林康养发展营造良好的环境。

（2）政府应加大其政策扶持力度，制定相应的帮扶措施，助力各州市的森林康养产业发展。一要加大基础设施建设资金投入力度，改善公共交通设施，提升运输服务水平，提高安全保障能力，加强医护人员力量，提升医疗环境，为森林康养产业发展保驾护航；二要不断加强综合服务设施建设，合理规划现有的服务设施，并逐步加强星级酒店、餐厅、游步道、公共厕所以及游客集散中心的建设，且加强对旅行社的规范化管理；三要加强校企合作，加大林业专业人才的培养力度，同时对相关专业人才就业提供一定的补助或采取相应的激励措施。

（3）森林康养产业竞争力较强的昆明、丽江、普洱、保山、西双版纳、迪庆均为森林资源优势明显且旅游业发展态势较好的地区，说明森林康养产业发展与旅游业兴衰有着紧密的联系，应注重各区域森林康养与旅游业及相关产业的融合发展，同时周边地区的医疗、养老、娱乐等多个产业的互动共融也会与森林康养产业形成强大合力，成为一个优质产业群；同时对于资源竞争力排名垫底的州市，如玉溪等，在推动森林康养产业发展过程中不宜用力过猛，由于其基础资源状况相对较差，因而其森林康养产业只宜适度规模和特色化发展。

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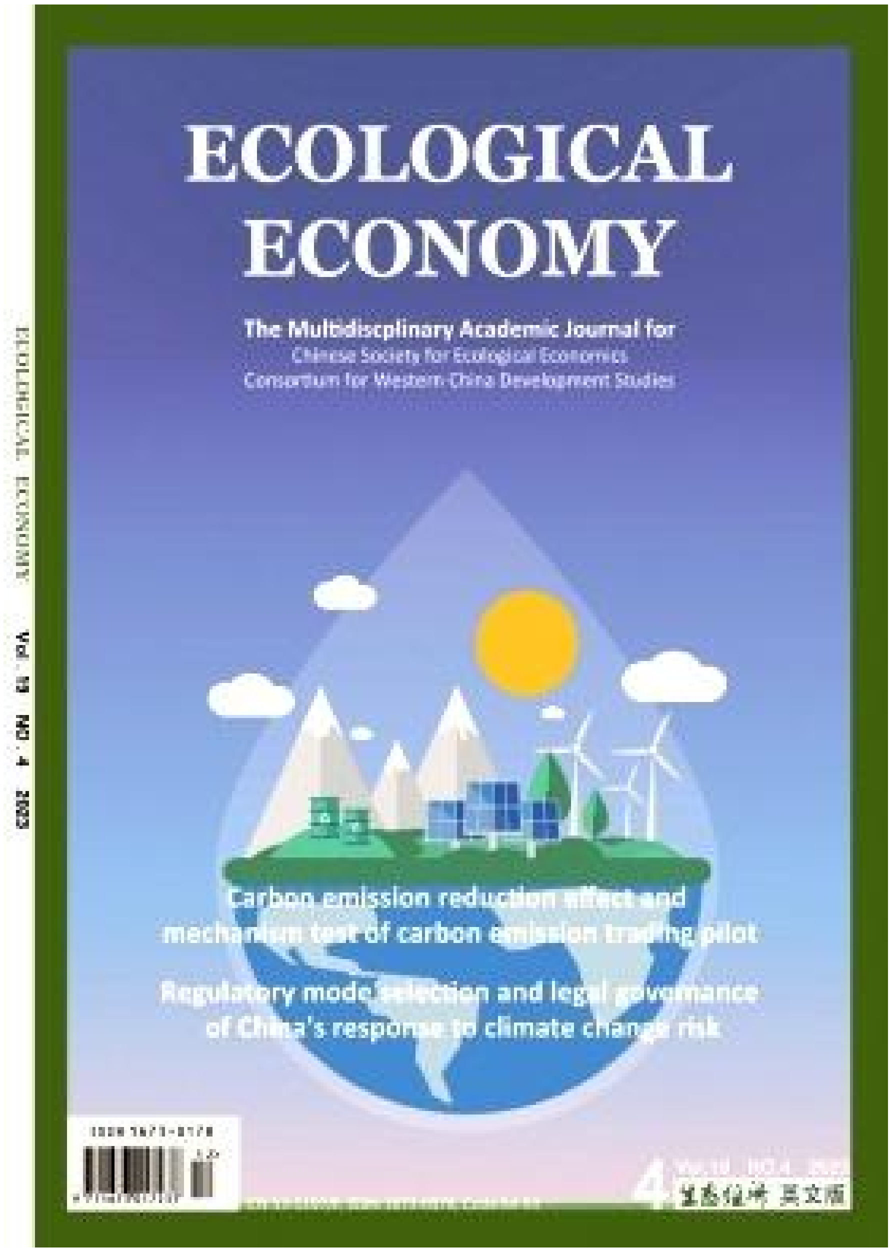
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2017

2016

2015

2014

2010

2009

2008

2007

2006

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Empirical Research

Determinates of the competitiveness of provincial forest health care industry in China

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Abstract: Due to the late start of China's forest health industry, related research is lagging behind, which results in the inability to propose a corresponding path to enhance competitiveness. Based on this, the evaluation index system of provincial forest health industry competitiveness was constructed by using the Porter diamond model, and the Entropy-TOPSIS model is used to evaluate the competitiveness of China's provincial forest health industry, and the key influencing factors of the forest health industry competitiveness are identified by using the grey correlation analysis method, and the specific promotion path was designed. The empirical results show that the grey correlation degree between related and supporting industries and the competitiveness score of the forest health industry is the highest, which confirms that it is the key influencing factor of the competitiveness of the forest health industry. Therefore, government departments should vigorously promote the integration of cultural tourism, medical care, pension and other related industries with the forest health care industry; enterprises should strengthen the construction of forest health infrastructure and supporting facilities to improve the level of forest health services.

Key words: industrial competitiveness; forest health; influencing factors; promotion path

1 Introduction

At the beginning of this century, due to the frequent occurrence of ecological and environmental problems, the construction of ecological civilization was put on the agenda, and the physical and mental health of the people was highlighted. China gradually discovered and began to build the relationship between forest resources and the economy and society. In 2012, Beijing took the lead in introducing the concept of forest health care, and then this concept began to be promoted in other regions of China. For example, Zhejiang, Fujian, Guizhou, Jiangxi, Henan and other provincial administrative regions have successively issued documents such as forest health industry development planning and implementation opinions to promote forest health industry development and facility construction. Nowadays, forest health is getting more and more attention from local governments and the public. As a blue ocean for the development of rural tourism and leisure agriculture in China, forest health is showing a booming trend and has a broad market prospect. And the key to the development of the forest health industry is to explore the influencing factors of forest health industry competitiveness and design the path to enhance competitiveness. The completion of this study will fill the gap in the research on the influencing factors of the

competitiveness of the forest health care industry, supplement and improve the research system of the competitiveness of the forest health care industry, put forward the path suggestions to promote the competitiveness of China's forest health care industry and provide references for the improvement of the competitiveness of China's forest health care industry.

As an emerging industry in China, the development of the forest health industry is in its infancy. At present, academic research on forest health mainly focuses on forest health base planning, development model (Yao et al., 2021) environmental conditions (Cui et al., 2022), and the impact of forest health activities on the human body (Morita et al., 2011; Lee et al., 2014; Bang et al., 2018; Kim et al., 2019), while the quantitative analysis of forest health industry competitiveness is mostly carried out at the provincial level (Zou et al., 2022). At the same time, the research on the evolution of the spatial and temporal pattern of forest health industry competitiveness distribution is almost blank. However, many domestic scholars have analyzed the influencing factors of industrial competitiveness in other industries according to the characteristics of different industries. Some scholars have drawn on Porter's "diamond model" to sort out the factors influencing the development of China's new energy automobile industry and to identify the focus points for improving the international competitiveness of China's new energy automobile industry (Gong et al., 2022). CMS models have also been used to analyze the heterogeneous factors affecting the export of edible mushrooms (Liu et al., 2022). More scholars are based on the diamond model to construct the index system of influencing factors, and then evaluate the influence degree of each factor by grey correlation analysis (Zhu et al., 2022). Li et al. (2022) took the marine chemical industry of Shandong province as the research object and constructed the evaluation index system of the competitiveness of the marine chemical industry from four aspects: industrial foundation, output, structure, and scientific research. The entropy method was used to calculate the competitiveness of the marine chemical industry, and the grey correlation analysis method was used to analyze the influence of various factors on the competitiveness of the marine chemical industry in Shandong province. Huang (2018) constructed the tourism industry competitiveness index system of 31 provincial administrative regions in China and used quantile regression to study the influencing factors of spatial differences in the competitiveness of the forest park tourism industry. The study confirmed that the economic foundation, capital investment, policy support, and resource advantages all have an impact on the competitiveness of the forest park tourism industry. Based on Porter's diamond model, Lan et al. (2019) analyzed the influencing factors of the international competitiveness of China's digital culture industry from six aspects: production factors, demand conditions, related and supporting industries, enterprise organizations, strategies and competition, and government and opportunities. Seven indicators were selected for quantitative analysis through stepwise regression, and it was confirmed that the openness of the digital culture industry had the greatest impact on the international competitiveness of China's digital culture industry. Liu (2018) takes the Yangtze River Delta region as a sample and uses Eviews6 cross-sectional model to analyze the influencing factors of the competitiveness of the commercial circulation industry in the Yangtze River region. The results show that the per capita disposable income has the closest relationship with the competitiveness of the commercial circulation industry in the Yangtze River region. Yao (2007) divided the influencing factors of industrial competitiveness into basic factors, core factors, and environmental factors, using system

analysis to determine the key factor affecting the competitiveness of China's construction industry. Gan et al. (2017) systematically analyzed the influencing factors of the competitiveness of the Sichuan-Xizang tourism industry from the three dimensions of regional tourism products, tourism support conditions, and regional tourism management, and applied the DEMATEL method to quantitatively analyze the interaction between the factors. According to the quantitative results, the causal classification and importance analysis were carried out, and the factors such as policy support, market demand, tourism service quality and market order, and infrastructure capacity played a key role in the competitiveness of the Sichuan-Xizang tourism industry. Wang et al. (2014) evaluated the competitiveness of the tourism industry by establishing an evaluation index system for the competitiveness of the tourism industry, analyzed the rankings of the competitiveness of the tourism industry in Heilongjiang province, and proposed targeted strategies to enhance the competitiveness of the tourism industry in Heilongjiang province. Xue (2014) obtained the main influencing factors of Shandong sports industry competitiveness by constructing the index system of sports industry competitiveness and using principal component analysis. According to the theory of industrial competitiveness and the characteristics of the industry, Hu et al. (2014) divided the influencing factors affecting the competitiveness of high-tech industries into four categories: technological innovation competitiveness, economic development competitiveness, financial benefit competitiveness and industrial cluster competitiveness, and then used the grey correlation analysis method for empirical analysis to identify the key influencing factor. Based on understanding the development status of the wine industry in Gansu province, Li et al. (2014) used Porter's diamond model and eliminated opportunity factors to analyze the factors affecting the competitiveness of the wine industry in Gansu province, and put forward corresponding countermeasures and suggestions.

Based on the previous results, this study will use Porter's diamond model as the theoretical basis to construct an evaluation index system from the dimensions of production factors, demand conditions, related and supporting industries, government factors, and ecological factors. Taking 31 provincial administrative regions in China as the research object, based on the cross-sectional data of relevant indicators of forest health industry competitiveness in each provincial administrative regions in 2020, the Entropy-TOPSIS model is used to analyze the competitiveness level of forest health industry and its regional differences, and the key factors affecting the competitiveness of forest health industry are analyzed by grey correlation analysis. Based on the results, we further explore how to scientifically guide the development of China's forest health industry and clarify the key work of improving the competitiveness of the forest health industry.

2 Research method

Forest health care is a new form of forestry industry developed based on the attributes of forest ecological protection. It explores the transformation channel of "lucid waters and lush mountains into golden mountains and silver mountains" (Sun et al., 2021). Therefore, the competitiveness evaluation of the forest health care industry should also combine and implement the "two mountains" theory. Based on the "two mountains" theory and the "diamond" theory, the evaluation index system of forest health care industry competitiveness should be constructed. Then, the Entropy-TOPSIS method is used to evaluate, and the grey correlation model is used to identify

the key influencing factors of the competitiveness of China's provincial forest health industry, so as to provide a basis for the analysis of the development status of the forest health industry in each provincial administrative regions and the design of promotion path.

2.1 The evaluation index system

By comprehensively considering the representativeness of the indicators and the collectability of the data, the index system is designed from the five dimensions of production factors, demand conditions, related and supporting industries, government factors and ecological factors (Table 1). The observation indicators of different elements are as follows:

The main selection of production factors is the material resources that play a key role in the development of the forest health industry, which should include forest resources status: including forest coverage, forest volume, and forest area; status of forest health resources: number of pilot construction units of national forest parks, national nature reserves and forest health bases.

The analysis of demand conditions is usually carried out around the number of consumers and the level of consumption, and the groups participating in forest rehabilitation activities are mostly urban elderly people. Therefore, the three indicators of urbanization rate, aging rate, and per capita disposable income of urban residents are selected first. Due to the strong correlation between the demand for forest health services and the development of tourism, two indicators are added here: the number of visitors per 10000 people receive and the per capita consumption of forest and grass tourism. In addition, the academic attention of forest health care can also reflect the market situation of the industry to a certain extent, so the academic attention index of forest health care is added.

The related and supporting industries mainly selected the infrastructure and human resources that support the development of the forest health industry. Here, the relative indicators were selected to reflect the basic conditions and reception capacity of each provincial administrative regions, including the density of grade highways, the density of railways, the number of airports per unit area, the proportion of health technicians per thousand population, the proportion of employees in catering and accommodation industries, the number of employees per unit area of forest parks and the density of trails.

The ecological environment competitiveness needs to reflect the ecological environment condition of each provincial administrative regions, so we mainly select the excellent and good rate of air, the COD of main pollutant discharge per unit area of wastewater, the SO_2 discharge per unit area of waste gas, the environmental emergencies per unit area as the ecological environment index.

Government behavior plays a vital role in the development of the forest health care industry. In order to quantify the impact of the government in the development of the forest health care industry, the number of forest health care special policies issued by each province and the business environment index are selected to reflect the government support.

Table 1 Evaluation index system of the competitiveness of China's provincial forest health industry

Target layer A	Criteria layer B	Indicator layer C	Attribute
Competitiveness of the forest health industry	Factors of production	Forest coverage	+
		Forest volume	+
		Forest area	+
		Forest health base pilot units	+
		National forest parks	+
		National nature reserves	+
	Demand conditions	Urbanization rate	+
		Aging rate	+
		Per capita disposable income of urban residents	+
		Number of visitors per 10000 people receive	+
		Per capita consumption of forest and grass Tourism	+
		Academic attention of forest health care	+
	Related and supporting industries	Density of grade highways	+
		Density of railways	+
		Number of airports per unit area	+
		Proportion of health technicians per thousand Population	+
		Proportion of employees in the catering and Accommodation industries	+
		Number of employees per unit area of forest Parks	+
		Density of trails	+
	Ecological elements	Environmental emergencies per unit area	-
		SO_2 discharge per unit area of waste Gas	-
		COD of main pollutant Discharge per unit area of wastewater	-
		Excellent and good rate of air	+
	Government factors	Number of forest health care special policies	+
		Business environment index	+

2.2 Data sources

The data in this paper mainly come from the 2021 *China Statistical Yearbook* and the 2020 *China Forestry and Grassland Statistical Yearbook* issued by the National Bureau of Statistics. The number of pilot construction units of the national forest rehabilitation base was counted through the list of pilot construction units of the national forest rehabilitation base issued by the China Forestry Industry Federation from 2015 to 2020. The number of China's civil aviation airports is derived from the 2021 *National Civil Transport Airport Production Statistics Bulletin* issued by the Development Planning Department of China Civil Aviation Administration; the number of provincial special policies is derived from the collation of public information on the official government website; the business environment index is derived from the 2020 *China Provincial Business Environment Research Report*; the data of academic attention of forest health care comes from China National Knowledge Infrastructure (CNKI), which is quantified as the number of

academic journals retrieved with the theme of "forest health care" and various provinces in advanced retrieval. Due to the long publication period of the paper, the publication time is pushed forward by one year as the academic attention index data of the year, that is, the number of papers published in 2021 is used as the academic attention data of forest health care in 2020. Due to the lack of data in Taiwan Province, Hong Kong SAR, and Macao SAR, the sample data of 31 provincial administrative regions were obtained.

2.3 Analysis of competitiveness and influencing factors

Based on the principles of objectivity and feasibility, the Entropy-TOPSIS model is selected to evaluate the competitiveness of China's provincial forest health industry, and the comprehensive competitiveness level of the provincial forest health industry is evaluated and ranked. Finally, the calculated competitiveness score is used as a reference sequence, and the grey correlation analysis method is used to analyze the influencing factors, so as to put forward targeted suggestions.

2.3.1 Entropy-TOPSIS model

Entropy-TOPSIS method refers to the use of the entropy weight method to determine the index weight and then calculate the relative proximity between each evaluation object and the optimal solution by TOPSIS method. The greater the relative proximity, the higher the level of competitiveness. The normalized index value is represented by V_{ij}, first, calculate the proportion of index value P_{ij}:

$$P_{ij} = V_{ij} \Big/ \sum_{i=1}^{m} V_{ij} \tag{1}$$

Then calculate the information entropy of each index E_j:

$$E_j = -k \sum_{i=1}^{m} P_{ij} \ln P_{ij} \tag{2}$$

where k is a positive constant, usually $k = 1/\ln m$, where m=31.
The difference coefficient of each index G_j:

$$G_j = 1 - E_j \tag{3}$$

The weight of each index W_j:

$$W_j = G_j \Big/ \sum_{j=1}^{m} G_j \tag{4}$$

Substitute the index weight obtained by the entropy weight method into the formula, the weighting matrix is obtained:

$$Z = [Z_{ij}]_{m\times n} = [W_j \times V_{ij}]_{m\times n} \tag{5}$$

Then determine the ideal solution S^+ and the negative ideal solution S^-:

$$S^+ = max(Z_{1j}, Z_{2j}, \cdots, Z_{nj}) \tag{6}$$
$$S^- = min(Z_{1j}, Z_{2j}, \cdots, Z_{nj}) \tag{7}$$

And calculate the Euclidean distance between each evaluated object and ideal solution, negative ideal solution D_i^+, D_i^-:

$$D_i^+ = \sqrt{\sum_{j=1}^{n} (S^+ - Z_{ij})^2} \tag{8}$$

$$D_i^- = \sqrt{\sum_{j=1}^{n} (S^- - Z_{ij})^2} \tag{9}$$

Finally, the relative proximity C_i between each evaluation object and the optimal solution is calculated:

$$C_i = D_i^- / (D_i^- + D_i^+) \tag{10}$$

Where $C_i \in [0,1]$, the greater the C_i value, the higher the competitiveness of the forest health industry.

2.3.2 Grey relational analysis

In order to further determine the contribution of various factors to the competitiveness of the forest health industry, the grey correlation analysis method was used to determine the key influencing factors of the competitiveness of the forest health industry. Grey correlation analysis is a method of set comparison of data sequences that reflect the changing characteristics of various factors. The basic steps are as follows.

First, we need to determine the reference sequence. Because it is necessary to examine the relationship between the competitiveness of the forest health industry and the indicators, the comprehensive score of the competitiveness of the forest health industry obtained above is selected as the reference sequence, and the selected index data after dimensionless processing is the comparison sequence. The reference sequence is x_0 and the comparison sequence is x_i.

Next, we can calculate the correlation coefficient $\xi_i(k)$:

$$\xi_i(k) = \frac{\min\limits_i \min\limits_k |x_0(k) - x_i(k)| + \rho \max\limits_i \max\limits_k |x_0(k) - x_i(k)|}{|x_0(k) - x_i(k)| + \rho \max\limits_i \max\limits_k |x_0(k) - x_i(k)|} \tag{11}$$

$\xi_i(k)$ is the grey correlation coefficient; $x_i(k)$ is the k^{th} evaluation object of i^{th} index; $|x_0(k) - x_i(k)|$ is the absolute difference between the reference sequence and comparison sequence; ρ is the grey resolution coefficient, usually 0.5.

Next, we can calculate the correlation of the indicators γ_{0i}:

$$\gamma_{0i} = \frac{1}{m}\sum_{k=1}^{m} \xi_i(k) \tag{12}$$

$i = 1,2,\cdots,m$; $k = 1,2,\cdots,n$, γ_{0i} represents the correlation degree between the comparison sequence and the reference sequence. The closer γ_{0i} is to 1, the greater the correlation between the influencing factors and the competitiveness of the forest health industry; where m is the number of indicators.

3 Analysis of empirical results

According to the evaluation, the comprehensive score of the competitiveness of the forest health industry in each provincial administrative region is obtained, and the grey correlation degree between each index and the competitiveness of the forest health industry is calculated based on the comprehensive score, and then the influencing factors of the competitiveness of forest health industry are analyzed concretely.

3.1 Analysis of comprehensive evaluation results

The comprehensive evaluation results are shown in Table 2. It can be seen from the evaluation results that the comprehensive competitiveness of China's provincial forest health industry is the strongest in Guizhou (comprehensive score of 0.508), which is quite different from the relative proximity of Qinghai (comprehensive score of 0.115) with the weakest comprehensive competitiveness.

The average score of the comprehensive competitiveness of 31 provincial administrative regions is 0.255, of which the comprehensive score of 15 provincial administrative regions is higher than the average score, that is, 48% of the provincial administrative regions have a higher level of competitiveness than the average level, and 16 provincial administrative regions have a lower score than the average score, accounting for 52%, indicating that the competitiveness of forest health industry in most provincial administrative regions is at a low level.

Table 2 Evaluation results of TOPSIS method

Subject	D_i^+	D_i^-	C_i	Rank
Beijing	0.204	0.103	0.335	4
Tianjin	0.222	0.05	0.184	25
Hebei	0.221	0.036	0.141	27
Shanxi	0.185	0.09	0.328	8
Inner Mongolia	0.21	0.076	0.266	14
Liaoning	0.217	0.042	0.16	26
Jilin	0.208	0.065	0.238	16
Heilongjiang	0.203	0.096	0.322	9
Shanghai	0.186	0.15	0.447	2
Jiangsu	0.196	0.07	0.262	15
Zhejiang	0.186	0.077	0.292	10
Anhui	0.206	0.051	0.199	22
Fujian	0.173	0.086	0.332	7
Jiangxi	0.186	0.07	0.274	12
Shandong	0.214	0.049	0.187	24
Henan	0.208	0.053	0.203	21
Hubei	0.206	0.063	0.235	17
Hunan	0.178	0.089	0.332	6
Guangdong	0.203	0.062	0.233	19
Guangxi	0.189	0.077	0.288	11
Hainan	0.214	0.052	0.194	23
Chongqing	0.197	0.06	0.233	18
Sichuan	0.164	0.114	0.41	3
Guizhou	0.155	0.16	0.508	1
Yunnan	0.19	0.095	0.333	5
Xizang	0.221	0.081	0.267	13
Shanxi	0.201	0.057	0.22	20
Gansu	0.229	0.032	0.123	30
Qinghai	0.233	0.03	0.115	31
Ningxia	0.224	0.031	0.123	29
Xinjiang	0.226	0.035	0.135	28

The average level of comprehensive competitiveness in southwest China (Guizhou, Chongqing, Sichuan, Yunnan, Xizang) (based on the arithmetic average of relative proximity) is the strongest. The average level of comprehensive competitiveness in East China (Shandong, Jiangsu, Zhejiang, Shanghai, Anhui, Jiangxi, Fujian) is relatively stronger. The average level of comprehensive competitiveness of Central China (Henan, Hubei, Hunan) and North China (Inner Mongolia, Hebei, Beijing, Tianjin, Shanxi) is medium and almost the same. The average level of comprehensive competitiveness of Northeast (Heilongjiang, Jilin, Liaoning), South China (Guangdong, Guangxi, Hainan) is relatively weaker. The average level of comprehensive competitiveness in the northwest

(Shanxi, Gansu, Ningxia, Qinghai, and Xinjiang) is the weakest, and the gap with South China is wide (Table 3).

Table 3 Average score and ranking of comprehensive competitiveness of forest health care industry in various regions

Region	East China	Central China	North China	South China	Southwest	Northwest	Northeast
Average score	0.2847	0.2567	0.2508	0.2383	0.3502	0.1432	0.2400
Rank	2	3	4	6	1	7	5

It can be seen from Figure 1 that the comprehensive competitiveness of the forest health care industry in Guizhou, Shanghai, and Sichuan is far ahead and located in the first echelon. Followed by Beijing, Yunnan, Fujian, Hunan, Shanxi, Heilongjiang, Zhejiang, and Guangxi, its comprehensive competitiveness is relatively stronger, in the second echelon; the third echelon includes Jiangxi, Xizang, Inner Mongolia, Jiangsu, Jilin, Hubei, Guangdong, and Chongqing, whose comprehensive competitiveness is at a medium level. Shanxi, Henan, Anhui, Hainan, Shandong, and Tianjin are located in the fourth echelon, and the comprehensive competitiveness of the forest health industry is weaker. Liaoning, Hebei, Xinjiang, Gansu, Ningxia, and Qinghai are in the fifth echelon, and the comprehensive competitiveness of the forest health industry is the weakest. Overall, the comprehensive competitiveness of the forest health industry in southwest China is the strongest, with the extension to the central region, the comprehensive competitiveness of the forest health industry gradually weakened, and the northwest region is the weakest.

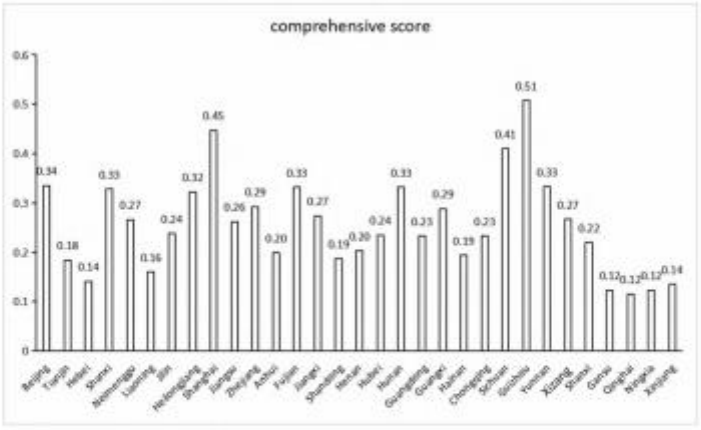

Figure 1 Schematic diagram of comprehensive score of forest health care industry competitiveness in each provincial administrative region

3.2 *Analysis of influencing factors*

Based on the grey correlation analysis method, the correlation degree between the competitiveness of China's provincial forest health industry and various influencing factors is obtained (Table 4).

Table 4 Grey correlation degree between each index and the competitiveness of the forest health care industry

Indicators	Grey correlation degree	Indicators	Grey correlation degree
Forest area	0.7489	Density of grade highways	0.7637
Forest coverage	0.6635	Number of airports per unit area	0.7756
Forest volume	0.7392	Proportion of health technicians per thousand population	0.7881
National forest parks	0.6851	Proportion of employees in the catering and accommodation industries	0.7504
National nature reserves	0.7543	Number of employees per unit area of forest parks	0.7305
Forest health base pilot units	0.7371	Density of trails	0.7415
Urbanization rate	0.6238	Excellent and good rate of air	0.5770
Aging rate	0.5762	COD of main pollutant discharge per unit area of wastewater	0.5811
Per capita disposable income of urban residents	0.7736	SO_2 discharge per unit area of waste gas	0.5898
Number of visitors per 10000 people receive	0.7585	Environmental emergencies per unit area	0.4149
Per capita consumption of forest and grass tourism	0.7645	Number of forest health care special policies	0.7336
Academic attention of forest health care	0.7609	Business environment index	0.7079
Density of grade highways	0.6738		

Among the 25 selected indexes, the correlation degree between 16 indicators and the competitiveness of the provincial forest health industry are above 0.7, indicating that more than 64% of the independent variables have a greater impact on the competitiveness of China's provincial forest health industry. Among them, the number of health technicians per 1000 population, the number of airports per unit area, the per capita disposable income of urban residents, the per capita consumption of forest and grass tourism, the density of railways, the academic attention of forest health care, the number of forest and grass tourists per 10000 people receive, the number of national nature reserves, and the number of employees in the catering and lodging industry have a grey correlation degree of more than 0.75 with the competitiveness of the forest health care industry, which plays a key role in the development of the forest health care industry.

Because of the different roles of each index in the comprehensive evaluation, the mean value of the correlation coefficient of each criterion layer can be figured out by Eq.(13). The calculation results are shown in Table 5.

$$\dot{\gamma}_{0i} = \frac{1}{m}\sum_{k=1}^{m} \xi_i(k) \tag{13}$$

Table 5 Grey correlation between the criterion level indicators of the competitiveness of China's provincial forest health care industry and the competitiveness of the forest health care industry

Criteria layer	Factors of production	Demand conditions	Related and supporting industries	Government factors	Ecological elements
γ_{0i}'	0.7214	0.7096	0.7462	0.7207	0.5407

The grey correlation coefficient of each criterion layer index from large to small is related and supporting industries, factors of production, government factors, demand conditions, and ecological factors. The grey correlation degree between the related and supporting industries and the competitiveness of the forest health industry is above 0.74, which indicates that the related and supporting industries are the key influencing factors of the competitiveness of the forest health industry and play an important role in promoting the competitiveness of forest health industry. The grey correlation degree between factors of production, government factors, demand conditions and the competitiveness of the forest health industry is above 0.7, and the gap is not large, indicating that these three factors also have a significant impact on the competitiveness of forest health industry; The correlation degree of ecological factors is about 0.5, and its impact on the competitiveness of forest health industry is far lower than other factors. This shows that although ecological factors are crucial to the environment of the forest health care base, it's not the decisive factors to enhance the competitiveness of the forest health care industry. Enhancing the competitiveness of the forest health care industry is more dependent on related and supporting industries, factors of production, government factors, and demand conditions.

4 Conclusions, discussions and policy implications

Based on the revised Porter's "diamond model", the evaluation index system of the competitiveness of China's provincial forest health industry is constructed. The Entropy-TOPSIS method is used to calculate the comprehensive evaluation results of each provincial administrative region, and the grey correlation analysis method is used to identify the key influencing factors of the competitiveness of the forest health industry. It can clearly show the current development status of the forest health industry in each provincial administrative region, make the relevant departments clear about the direction of their efforts, and also provide some reference and inspiration for the follow-up research on the competitiveness of the provincial forest health industry and the precise implementation of the government.

4.1 Conclusions

Through the evaluation of the competitiveness of China's provincial forest health industry, it is found that the level of competitiveness of China's provincial forest health industry varies greatly, and generally presents the spatial characteristics of "higher in the southwest and southern regions and weakest in the northwest region"; among them, Guizhou, Shanghai, Sichuan and other regions among the best comprehensive competitiveness, shows a good momentum of development; Xinjiang, Gansu, Ningxia, Qinghai and other regions ranked bottom in the comprehensive competitiveness, who have the weakest comprehensive competitiveness.

Guizhou, Shanghai, Sichuan, Beijing and Yunnan are the top five provincial administrative

tourists. To further improve the construction of catering, accommodation, transportation, sightseeing, shopping, entertainment and other supporting facilities, so as to ensure the basic tourism needs of tourists and improve the satisfaction of tourists.

4.3 Limitation and future research

Although this study is valuable in constructing competitiveness evaluation index system of forest health industry, it also has some potential bias that need to be improved by future studies. First of all, this study only evaluated the competitiveness of forest health industry in 31 provincial administrative regions of China, without considering the impact of industry competition on the competitiveness of forest health industry. Secondly, due to the difficulty of data acquisition, this study only statically measures the competitiveness of China 's forest health industry in 2020. Therefore, the dynamic evolution characteristics of China 's forest health industry competitiveness can be analyzed in the future.

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目　录

云南省森林康养基地建设对策探究

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摘　要：随着社会不断发展，亚健康人群持续增加，医疗水平的提升也致使老年人群比例增加，康养产业的需求越来越大。云南省具有天然的气候优势，且森林资源丰富，发展森林康养产业具有显著优势，而现今众多的森林康养基地还存在产品结构单一、无法充分利用有效资源等问题，引起众多学者的关注。根据云南省森林康养基地建设现状及存在的问题，寻求推进云南省森林康养产业高质量发展的解决方案，为提升云南省森林康养产业的发展水平提供有力借鉴。

关键词：云南省；森林康养；基地建设

Construction countermeasures on forest health base in Yunnan Province

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Abstract: With the continuous development of society, the sub-health population continues to increase, the improvement of medical level also increases the proportion of the elderly population, and the demand for the health care industry is increasing. Yunnan Province has natural climate advantages and rich forest resources. It has significant advantages in developing forest health care industry. However, many forest health care bases still have problems such as single product structure and unable to make full use of effective resources, which has attracted the attention of many scholars. According to the current situation and existing problems of forest health care base construction in Yunnan Province, seek solutions to promote the high-quality development of forest health care industry in Yunnan Province, so as to provide a powerful reference for improving the development level of forest health care industry in Yunnan Province.

Key words: Yunnan Province; forest health; base construction

生态优势是云南最大的优势。2018 年的云南省政府工作报告中提出要全力打造世界一流三张牌，其中打造“健康生活目的地”这张牌需聚焦以“文、游、医、养、体、学、智”为主要内容的全产业链，推动建设国际型康养旅游示范区，将云南建设为真正的“健康生活目的地”。其中康养产业是建设“健康生活目的地”的重要基础和中坚力量。云南省大力推进森林康养产业发展可将本省生态资源优势转化为巨大的产业优势，也可为周边相关产业带来全新的发展机遇。

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1 云南省发展森林康养基地的优势条件

1.1 区位优势明显，自然资源丰富

云南省东南地区地势低，西北地区地势高，地势差异叠加纬度影响，导致其立体气候特征明显，同一省区内同时具有热带、温带、寒带气候，景象别具特色，为发展森林康养及旅游产业提供了优质的外部基础。同时，2019 年云南省森林覆盖率达到 62.4%，森林蓄积量达 20.2 亿立方米，且林草产业快速发展，经济林面积达 6610 万亩，林下经营面积达 6800 万亩，云南省丰富的森林资源与森林产业的发展都给森林康养基地建设奠定了良好的外部条件。

1.2 文化旅游资源的加持

云南受多变的历史因素以及复杂的自然环境所影响，再加上与邻国相接壤的特殊地理位置，致使其民族文化呈现多元化，其结合自身的文化发展优势在文化产业发展中取得了举世瞩目的成绩。云南省文化旅游资源丰富，文化旅游产业可极大地带动周边区域森林康养产业的发展，在森林康养产品中，可融入民族文化因素，将民族风情元素打造为森林康养产品的一大亮点。

1.3 云南省发展森林康养产业具有庞大的市场需求

随着社会的快速发展，尽管人们享受了现代文明成果，但却承受了环境恶化以及压力过大带来的不良影响，如亚健康、慢性病等。而现今人们已经有能力追求高质量的生活方式，因此森林康养产业在这一社会背景下的需求市场十分庞大。森林康养基地可以开展适合青少年群体的森林体验项目以及科普教育活动，不仅可以缓解青少年群体的学习压力，还可以在实践过程中培养他们的团体协作意识以及野外生存能力。老年人群记忆力减退，新陈代谢缓慢，慢性病增多，开展森林康养活动可以对其身体状况及心理状态起到很好的改善与调节作用。在森林中开展康养疗法，配合医生指导进行适当的运动并辅以科学的饮食，可以使老年人慢性病症状得到明显缓解。且亲近大自然可以使老年人身心愉悦，有益于其身心健康，因此老年群体对森林康养的需求也十分迫切。

2 云南省森林康养基地发展现状

2015 年，中国林业产业联合会确定并公布了第一批全国森林康养基地试点建设单位，共 36 个，其中还并无云南省试点单位。到 2016 年，云南省有 6 个森林康养基地试点建设单位入选，分别是天宁矿业森林康养基地、万马林场森林康养基地、景洪市大黑山林场（嘎洒森林公园）森林康养基地、卧云山景区森林康养基地、普洱三国庄园森林康养基地、百草园森林庄园康养基地，这也是云南省最早的一批森林康养基地试点建设单位。2017 年，云南省森林康养基地试点建设单位 12 个单位入选；2018 年 5 个单位入选；2019 年，云南省森林康养基地试点建设单位 17 个入选，且开始有森林康养试点市（县）、森林康养乡（镇）及森林康养人家；2020 年，云南省森林康养基地试点建设单位增加 22 个，且多个森林康养试点市（县）、森林康养试点乡（镇）及森林康养人家入选，森林康养基地试点在云南省各地如火如荼地展开。（见表 1）

表 1 云南省森林康养基地试点建设单位数量

年份 / 数量	2015 年	2016 年	2017 年	2018 年	2019 年	2020 年
森林康养基地试点建设单位	0	6	12	5	17	22
森林康养试点市	0	0	0	0	1	1
森林康养试点县	0	0	0	0	5	2
森林康养试点乡（镇）	0	0	0	0	3	6
森林康养人家	0	0	0	0	4	1

在 2020 年 6 月 5 日公布的首批国家森林康养基地名单中，云南省有 3 地 2 单位入选，分别为腾冲市、普洱市思茅区、墨江哈尼自治县、昆明潘茂野趣庄园、红河州龙韵养生谷森林康养基地。其中腾冲市森林覆盖率高达 73.9%，在推行试点建设单位后，出台了本市森林康养产业发展规划，并开发了医养科技类、农林种养殖类、自然教育类、生态康养类等八大类康养项目；普洱市思茅区森林、矿产、水能资源优势明显，负有“林中之城”的美誉，且位于世界茶叶原产地中心；墨江哈尼族自治县当地的森林树种以思茅松为主，并有柏树、椿树等众

多适宜康养基地种植的树种，更有众多国家级保护植物。

3 云南省森林康养基地建设存在的问题

3.1 森林康养的市场认知度低

目前我国对于森林康养产业的研究尚处于初步探索阶段，大众对于森林康养的了解甚微，对于其基本理念及养生作用更是缺乏认识[1]。更是有小部分人群认为森林康养与传统的旅游活动无异，只是打着健康疗养的幌子进行盈利性的森林旅游项目，严重阻碍了森林康养产业推广工作的开展。

3.2 缺乏统一政策引导

四川省、贵州省作为森林康养产业发展较早的省份，都已出台关于大力推进森林康养产业发展的实施意见。而云南省森林康养产业作为新发展格局下的新兴产业，本应得到相关政策的重点支持，但实际却缺乏全省统一的产业发展政策，严重制约了云南省森林康养基地建设的发展进程。目前针对云南省森林康养产业发展的政策仅有两项。其中，《云南省林业和草原局关于促进林草产业高质量发展的实施意见》是针对云南省林草产业发展实际而提出的意见，虽然提出要积极发展森林康养产业，但并无相关的具体举措，无法对云南省森林康养产业发展提供有效的指导；而《云南省普洱市森林康养基地建设总体规划》仅针对普洱市森林康养基地做出明确规划，也无法为云南全省森林康养产业发展提供科学的借鉴。

3.3 未建立相关标准体系

贵州省作为云南省的邻省，极重视森林康养产业的健康发展，出台了本省森林康养基地管理办法、评定办法等一系列标准化文件，建立健全了本省的森林康养产业相关标准体系。而云南省还尚未出台有关森林康养基地认证评定等方面的文件，制约了云南省森林康养基地的有序发展进程。

3.4 专业人才匮乏

森林康养产业的健康发展需要大量具备医疗知识、保健知识、环境保护及教育知识的相关人才[2]。但目前云南省森林康养产业领域的专业人才极度匮乏，无法满足森林康养基地建设的需要，同时森林康养相关专业人才培养体制不健全，云南省高校对此方面的教育及研究不够深入，影响了森林康养产业专业人才的培养效率。

3.5 森林康养产品质量堪忧

云南省森林康养产品并未根据其特有功效及适宜人群进行细致的划分，产品同质化明显。森林康养基地本应根据不同的资源环境状况，结合用户需求和技术条件等因素细分市场，从而给不同消费群体提供各具特色的产品和服务，但云南省森林康养基地却存在产品类型趋同的问题，且云南作为多民族省份，却并未将其丰厚的民族特色及文化底蕴融入森林康养产业之中，缺乏云南省独有的地域特色。此外，云南省森林康养产品存在产品质量良莠不齐的现象。由于森林康养产业刚刚起步，相关的标准体系尚未健全，经营管理体系不成熟，导致其产品及服务质量差别较大。

4 云南省森林康养基地建设对策

4.1 多渠道宣传

森林康养作为新兴产业，绝大多数公众对于其内涵及功能了解并不多，理应重视其相关理念的宣传推广工作。目前新兴网络媒体众多，可以充分利用互联网的渗透力及传播速度进行森林康养知识的宣传与推广，可以在电视广告、微信公众号、微博、抖音等多个渠道进行宣传。此外，相关部门可以建立本省森林康养产业官方网站，及时发布本省森林康养基地各类信息，为消费者提供全方位、系统性的森林康养认知渠道，提升大众对森林康养产业的认知[4]。

4.2 出台统一政策指导

目前，云南省森林康养产业刚刚起步，亟需政府出台统一政策对其进行科学引导。多省已经出台了关于加快推进森林康养产业发展的意见。云南省作为未来森林康养大省，应当合理借鉴其他各省出台的统一政策，结合云南省省情，制定出适宜云南省本省特色的森林康养产业发展政策及指导意见。

4.3 建立相关标准体系

云南省应当加快建立森林康养基地相关标准体系，学习贵州省出台的森林康养基地管理办法及评

定办法，并结合本省实际建立一套云南省省级森林康养基地标准化体系，以用于森林康养基地的申报、推荐、评定与检测评价，推进森林康养基地建设的规范性，促使其可持续发展。

4.4 培养专业化人才

森林康养专业人才的培养会直接影响到云南省森林康养基地建设的进程。一方面政府应加大对此类人才的补助力度，同时可以与云南省各高校联合培养森林康养专业人才，在学生在校培养期间对其进行森林康养专业理论知识传授并定期到森林康养基地进行实践培训，提升其服务水平。另一方面，可以选取一些当地的年轻人或是有能力的人士学习森林康养专业知识，考核通过便可投身于当地的森林康养基地建设，提高云南省就业率，缓解失业情况[5]。相关部门还可以成立云南省森林康养基地研究中心，让业内专家对省内各个森林康养基地进行专业化的指导，与当地一线工作人员进行交流，改善森林康养基地建设存在的不足，提升云南省森林康养产业发展效率。

4.5 产品优化

一是可以进行实地考察，因地制宜，充分根据实际情况和当地市场需求状况细分市场，针对不同类型人群的需求制定各具特色的森林康养项目，诸如森林食疗、森林瑜伽、森林探险等。二是在现有基础上进行基础设施的改进，完善森林康养基地标准体系，提升服务质量，积极借鉴其他地区康养基地的有效做法，提升森林康养产品质量[6]。三是将云南民族特色融入森林康养基地建设之中。积极推进森林康养文化体系建设，挖掘和发展民族文化，在康养产品中加入一些独具特色的民族元素，吸引外地游客了解民族文化与内涵，建设独具特色的森林康养基地，并在发展森林康养产业的同时更好的发扬民族文化。

5 结论与展望

森林康养产业涉及生态效益，经济效益及社会效益，顺应当今时代发展的需求，必然会有很大的发展空间，但在其发展过程中也将面临诸多挑战与难题。立足于云南省森林康养发展现状，在公众认知、人才培养、产品优化以及政策扶持等方面采取相应对策，以期提升云南省森林康养产业发展水平。森林康养产业带来的经济效益会使众多投资者蜂拥而上，若产业发展过快过热，必然会对生态环境产生一定的不良影响，所以在其产业发展过程中对生态环境的保护也显得尤为重要。通过提升大众认知，可以呼吁人们共同保护环境，爱惜森林资源，实现生态保护与产业发展的共赢。

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