学术水平评估与一流大学标准

Evaluation of academic level and first-class university standards

林华 Rev George Hua LIN

Linhua038@aliyun.com

中文摘要：

获取机构 ESI 论文被引次数及篇均被引，获取机构的员工人数及年度开支，根据公式计算获取机构的：加权学术水平指数、加权学术绩效指数、加权学术水平绩效指数。这样能根据客观的学术数据和机构数据来定量评估学术机构的学术水平，减少人为干扰，评估效果大大好过定性评估。一流大学可以有定量的标准。用环球科技指数，来定量评估国家及地区的科技水平。

Abstract:

Access to Essential Science Indicatorsto get the institution's citations and cites per paper, the number of employees and the annual expenditure can be obtained from institution's websites. And the acquisition mechanism was calculated according to the formula: weighted academic level index, weighted academic performance index and weighted academic level performance index. This can be based on objective academic data and institutional data to quantitatively evaluate academic level, reduce human interference, the

evaluation effect is much better than qualitative assessment. First-class universities can have quantitative standards. Use the Global Technology Index to quantitatively assess the level of science and technology in countries and regions.

关键词： 评估 学术 水平 绩效 指数 标准 排行榜 ESI

Key Words: Evaluate,Academic, Level, Performance, Index, Standard, Ranking，ESI

美国 Thomson Reuters 公司提出的 Web of Sciences 是（SCIE/SSCI）所收录的全球 11000 多种学术期刊的 1000 多万条文献记录而建立的计量分析数据库。基本科学指标数据库（Essential Science Indicators，简称 ESI）是由世界著名的学术信息出版机构美国科技信息所(ISI)于 2001 年基于 Web of Sciences 推出的衡量科学研究绩效、跟踪科学发展趋势的基本分析评价工具。

The web of Sciences, published by the American Thomson Reuters, is a database of econometric analysis based on the 10 millionspapers from more than 11,000 academic journals in the World (SCIE/SSCI). The Essential Science Indicators, abbreviated as ESI is a world-renowned academic database published by Information Sciences Institute (ISI) in 2001 based on the web of sciences to measure the performance of scientific research. It is a basic analysis and evaluation tools to track the trend of scientific development.

ESI 每 2 个月发布基于科学家、科研机构（或大学）、国家（或地区）及学术期刊的论文数量和被引次数等数据，除了被引次数外，还提供利用论文总数和篇均被引两个指标的排序。ESI 还提出了 22 个专业里的上述数据。ESI 被广泛使用为评估学术水平的一种客观方

法，并被我国高校和科研机构所重视。

Every 2 months, ESI publishes data on the number of papers and citations based on scientists, institutions, countries (or regions) and academic journals, total number of papers and citations per papers. ESI also offer the above data in 22 fields. ESI is widely used as an objective method to evaluate academic level and is valued by Chinese universities and scientific research institutions.

ESI 提供的论文数量、被引次数、篇均被引等就和机构的学术水平相关。学术机构的论文被引次数可以形象地理解为该学术机构被学术界认可的广泛度，学术机构的学术水平和总被引次数正相关。但是，大型学术机构是一个非常复杂团体，它包括了很多的因数，很难用一个指标去评估学术机构。

The number of papers provided by ESI, citations, and citations per paper as relevant to the academic level of the institutions. The number of citations of the institution can be vividly understood as the broad degree of academic accreditation, and the academic level of the institution is positively correlated with the number of citations. However, large academic institutions are a very complex group that includes many factors, and it is difficult to evaluate the institution with one indicator.

1．针对现有技术中的缺陷，本文提供加权学术绩效考核方法及系统，能够客观、定量地评估学术机构的学术水平。

Aiming at the defects in the existing technology, this paper provides the weighted academic performance appraisal method and system, which can evaluate the academic level of the institution objectively and quantitatively.

一种加权学术绩效考核方法，包括：

The weighted academic performance assessment method, including:

获取基本科学指标数据库中的以下学术数据：待评估学术机构的论文被引次数和篇均被引次数；

Obtain the following academic data in ESI: citations and citations per papers of the institution;

获取待评估学术机构的以下机构数据：待评估学术机构的员工人数和年度开支；

Obtain the data for theinstitution to be evaluated: number of staff and the annual expenditure;

根据待评估学术机构的学术数据和机构数据计算以下绩效指数：

加权学术水平指数、相对加权学术水平指数、加权学术绩效指数和加权学术水平绩效指数；

The following performance indicators are calculated based on academic data and institutional data of the institution to be evaluated: Weighted academic level index, Relative weighted academic level index, Weighted academic performance index and Weighted academic level performance index;

根据得到的绩效指数评估待评估学术机构的学术水平。

Evaluate the academic level of the institution according to the obtained performance index.

所述加权学术水平指数 WALIndex 通过以下公式计算：

The weighted academic level index, abbreviated as WALIndex is calculated by the following formula:

$$\text{加权学术水平指数} = \frac{(\text{论文被引次数}) \times (\text{篇均被引次数})}{\sqrt{(\text{员工人数})}}$$

$$WALIndex = \frac{(Citations) \times (Citations\ per\ Paper)}{\sqrt{the\ number\ of\ employee}}$$

所述相对加权学术水平指数 RWALIndex 通过以下公式计算：

The relative weighted academic level index, abbreviated as RWALIndex is calculated by the following formula:

$$\text{相对加权学术水平指数} = \frac{\text{待评估学术机构的加权学术水平指数}}{\text{标准学术机构的加权学术水平指数}}$$

$$RWALIndex = \frac{WALIndex\ of\ the\ institution\ to\ be\ evaluated}{WALIndex\ of\ the\ standard\ institution}$$

所述加权学术绩效指数 WAPIndex 通过以下公式计算：

The Weighted academic performance index, abbreviated as WAPIndex is calculated by the following formula:

$$\text{加权学术绩效指数} = \frac{(\text{论文被引次数}) \times (\text{篇均被引次数})}{\sqrt{(\text{年度开支})}}$$

$$WAPIndex = \frac{(Citations) \times (Citations\ per\ Paper)}{\sqrt{the\ annual\ expenditure}}$$

所述加权学术水平绩效指数 WALPIndex 通过以下公式计算：

The Weighted academic level performance index, abbreviated as WALPIndex is calculated by the following formula:

$$加权学术水平绩效指数 = \frac{(论文被引次数) \times (篇均被引次数)}{\sqrt{(员工人数) \times (年度开支)}}$$

$$WALPIndex = \frac{(Citations) \times (Citations\ per\ Paper)}{\sqrt{(the\ number\ of\ employee) \times (the\ annual\ expenditure)}}$$

由上述技术方案可知，本文提供的加权学术绩效考核方法及系统，Web of Sciences 所收录的全球 11000 多种学术期刊，包括了全世界大部分重要的科技学术期刊。大部分学术机构的大部分学者会将其学术成果发表在各种杂志上，高水平的论文主要就是发表在 Web of Sciences 所收录的全球 11000 多种学术期刊。本方案直接从基本科学指标数据库中获取学术数据，能够根据客观的学术数据和机构数据来定量地评估学术机构的学术水平，减少人为的判断和干扰，评估效果远远好过定性评估。

From the above-mentioned technical scheme, the paper provides the weighted academic performance appraisal method and system, the Web of Sciences, which contains more than 11,000 kinds of academic periodicals worldwide, including most important scientific and technical periodicals. Most researchers in most institutions will publish their academic results in a variety of magazines, and a high level of paper is published inperiodicals quoted by the web of sciences, which includes more than 11,000 academic journals worldwide. This program obtains the academic data directly from the ESI, and can evaluate the academic level quantitatively according to the objective academic data and the organization data, reduces the artificial judgment and the disturbance, the appraisal effect is far better than the qualitative appraisal.

ESI 提供的论文数量、论文被引次数、篇均被引次数等和学术机构的学术水平相关。这样研究 ESI 提供的论文数量、论文被引次数、篇均被引次数等可以相对客观地评价学术机构的学术水平。

The number of papers provided by ESI, the citations, citations per paper,are related to the academic level of the institution. In this way, the academic level of the institution can be evaluated objectively by studying the number of papers provided by ESI, the citations and the citations per paper.

员工人数可以是待评估学术机构的总员工数，也可以是教师及科

研人员数量，只要在评估时保持一致就可以了，具体要在评估时注明。年度开支可以是机构的年度预算，也可以是年度实际开支，只要在评估时保持一致就可以了，具体要在评估时注明。

The number of employees can be the total number of staff in the institution to be assessed, as well as the number of teachers and researchers, as long as they are consistent in the assessment, as specified in the assessment. Annual expenditure can be an organization's annual budget, or it can be an annual actual expenditure, as long as the evaluation is consistent on the right, specifically in the assessment of the note.

学术机构的论文被引次数可以形象地理解为该学术机构被学术界认可的广泛度，学术机构的学术水平和总被引次数正相关。篇均被引次数则可以被形象地理解为该学术机构论文的水平高度，学术机构的学术水平和篇均被引次数正相关。在同样的论文被引次数和篇均被引次数的情况下，学术机构的人数越少，则学术水平越高，学术机构的学术水平和机构的人数反相关。同样，在同样的论文被引次数、篇均被引次数的情况下，学术机构的所耗费的经费越少，则学术机构的绩效越高，学术机构的绩效和机构的经费总额反相关。

The number of citations of the institution can be vividly understood as the broad degree of academic accreditation, and the academic level of academic institutions is positively correlated with the number of citations. The number of citations per paper can be visualized as the level of the academic papers, the academic level of academic institutions and the number of citations per paper are positively correlated. When the number of citations and citations per paper are same, the fewer people in the institution, the higher the academic level is, the academic level of the institution is negative correlated to the number employee of institutionSimilarly, in the case of same number of citations andcitations per paper, the less funds are spent on the institution, the higher the performance of the institution is, the performance of academic institutions are negatively correlated to the total amount of funding of the   institution.

相对加权学术水平指数中，标准学术机构可以选一个重点的学术机构。相对加权学术水平指数得到该待评估的学术机构的加权学术水平与相对于所选重点学术机构的比值。同样也可以列出机构相对加权

学术水平指数表。相对加权学术水平指数的分母也可以是待评估的学术机构的历史加权学术水平指数，从而得出机构的历史相对加权学术水平表。

In the relative weighted academic level index RWALIndex, the standard academic institution can choose a famous institution. The relative weighted academic level index obtains the weighted academic level of the academic institution to be evaluated and the ratio to the selected famous institution. It is also possible to list the relative weighted academic level indices of institutions. The denominator of the relative weighted academic level index can also be the historical weighted academic level index of the institution to be evaluated, thus resulting in the institution's historical relative weighted academic level table.

同理可以通过以下公式计算相对加权学术绩效指数和相对加权学术水平绩效指数：

Similarly, the relative weighted academic performance index,abbreviated as RWAPIndex and the relative weighted academic level performance index,abbreviated as RWALPIndex can be calculated by the following formula:

$$相对加权学术绩效指数 = \frac{待评估学术机构的加权学术绩效指数}{标准学术机构的加权学术绩效指数}$$

$$RWAPIndex = \frac{WAPIndex \ of \ the \ intitution \ to \ be \ evaluated}{WAPIndex \ of \ the \ standard \ institution}$$

$$相对加权学术水平绩效指数 = \frac{待评估学术机构的加权学术水平绩效指数}{标准学术机构的加权学术水平绩效指数}$$

$$RWALPIndex = \frac{WALPIndex \ of \ the \ institution \ to \ be \ evaluated}{WALPIndex \ of \ the \ standard \ institution}$$

2. 类似的原理，可以评估国家（地区）、非学术类机构的科技水平。

Similar principles can be used to assess the level of science and technology in the country (region) and non-academic institutions.

同样的，国家（地区）、非学术类机构的论文被引次数可以形象地理解为该国家（地区）、非学术类机构被学术界认可的广泛度，国家（地区）、非学术类机构的学术水平和总被引次数正相关。篇均被

引次数则可以被形象地理解为该国家（地区）、非学术类机构论文的水平高度，国家（地区）、非学术类机构的学术水平和篇均被引次数正相关。考虑到国家（地区）、非学术类机构主要事务不是从事科研研究，这样就不适宜采用人数、开支作为评估的考量因数。

Similarly, the citations of the country (region) and non-academic institutions can be visualized as being widely recognized by the academics world, and the academic level of the country (region) and non-academic institutions is positively correlated with the total number of citations. The citations per paper can be vividly interpreted as the level of the papers of the country (region), non-academic institutions, the academic level of the country (region) and non-academic institutions, and the number of citations are positively correlated. Considering that the main issues of the country (region) and non-academic institutions are not engaged in scientific research, it is not appropriate to use people numbers and expenditures as a factor of assessment.

为此作者提出环球科技指数（科技指数）GSIndex 及相对环球科技指数（科技指数）RGSIndex，作为对国家（地区）、非学术类机构的科技水平评估方法，

To this end, the authors put forward the Global ScientificIndex(SCI-Tech index),abbreviated as GSIndexand relative Global Technology index (SCI-Tech index),abbreviated as RGSIndex as the science and technology level assessment method for the country(regional) and non-academic institutions.

环球科技指数=(论文被引次数)×(篇均被引)

$$GSIndex = (citations) \times (citations\ per\ paper)$$

相对环球科技指数=$\dfrac{待评估对象的加权科技指数}{标准对象的加权科技指数}$

$$RGSIndex = \dfrac{GSIndex\ of\ institution\ to\ be\ evaluated}{GSIndex\ of\ the\ standard\ institution}$$

标准对象可以选定一个重点国家（地区）、机构。相对环球科技指数得到该待评估的对象的环球科技指数与标准对象的比值。同样也可以列出国家（地区）、机构相对加权学术水平指数表。相对加权学术水平指数的分母也可以是待评估对象的历史环球科技指数，从而得

出机构的历史相对环球科技指数表。

Standard institution can be selected as afamous country (region), institution. The ratio of global science and technology index to standard institution is obtained by relative global scientific index. It is also possible to list the relative weighted academic level indices of countries (regions) and institutions. The denominator of the relative weighted academic level index can also be the historical global scientific index of the institution to be evaluated, thus drawing the institutional history relative to the Global Scientific Index table.

环球科技指数（科技指数）及相对环球科技指数（科技指数）同样也可以用来作为评估学术机构的一个工具，与加权学术绩效考核方法配合使用。

The Global Scientific Index (SCI-Tech index) and the relative Global Scientific Index (SCI-Tech index) can also be used as a tool for evaluating academic institutions, in conjunction with the weighted academic performance review method.

3．下面举例说明，

The following examples show that

1）有机地利用加权学术水平指数、加权学术绩效指数、加权学术水平绩效指数三个指标，能够比较全面地分析学术机构的情况。

By using the Weighted academic level index, the Weighted academic performance index, and the weighted academic level performance index three indexes, the situation of academic institutions can be analyzed comprehensively.

表格 1 给出学术机构的加权学术水平指数和相对加权学术水平指数（论文被引次数、篇均被引次数均采用 ESI2017 年 6 月的数据，员工人数采自网络）。

Table 1 gives institutions a weighted academic level index and a relatively weighted academic level index (the number of citations and citation per paperare cited in the ESI June 2017 data, with the number of employees from the network).

表格 1 学术机构的加权学术水平指数和相对加权学术水平指数

Table 1 weighted academic level index and relatively weighted academic level index

机构名称 Institutions	论文被引次数 Citations	篇均被引次数 Citations per paper	员工人数 The number of emplyee	加权学术水平指数 WALIndex	相对加权学术水平指数 RWALIndex (哈佛大学 HARVARD UNIVERSITY100)

美国哈佛大学 HARVARD UNIVERSITY	5494704	29.56	16000	1284070	100
美国麻省理工学院 MIT	1856199	33.25	12109	560870	43.6791
美国斯坦福大学 STANFORD UNIVERSITY	1972636	27.19	14328	448088	34.8959
美国加州理工学院 CALTECH	917322	29.78	3900	437436	34.0663
法国国家科学研究院 CNRS	4602249	15.88	31944	408908	31.8447
英国牛津大学 UNIVERSITY OXFORD	1869563	24.52	13000	402058	31.3112
英国剑桥大学 UNIVERSITY CAMBRIDGE	1687171	24.35	11147	389116	30.3033
日本东京大学 UNIVERSITY TOKYO	1285423	16.36	10618	204084	15.8935
中国科学院 CHINESE ACADEMY SCIENCE	3661805	12.99	68000	182411	14.2057
新加坡国立大学 NATIONAL UNIVERSITY SINGAPORE	874312	16.79	11300	138095	10.7545
中国科学技术大学 UNIVERSITY SCIENCE & TECHNOLOGY CHINA	449341	13.2	3216	104590	8.1452
韩国科学技术院 KAIST	281773	13.5	1462	99485	7.7477
新加坡南洋理工大学 NANYANG TECHNOL UNIVERSITY	551756	15.49	7829	96593	7.5224
复旦大学 FUDAN UNIVERSITY	553645	12.83	5585	95049	7.4021
北京大学 PEKING UNIVERSITY	747588	13.12	10699	94825	7.3848
香港大学 UNIVERSITY HONG KONG	472877	15.79	7480	86334	6.7234
南京大学 NANJING UNIVERSITY	445759	11.99	4600	78803	6.1369
浙江大学 ZHEJIANG UNIVERSITY	682851	10.44	8423	77677	6.0493
上海交通大学	629425	10.12	7180	75173	5.8543

SHANGHAI JIAO TONG UNIVERSITY					
清华大学 TSING HUA UNIVERSITY	677703	11.88	12252	72736	5.6645
台湾大学 NATIONAL TAIWAN UNIVERSITY	584100	12.48	10849	69985	5.4503
中央研究院 ACADEMY SINICA	317203	15.5	5800	64559	5.0277
香港科技大学 HONG KONG UNIVERSITY SCIENCE & TECHNOLOGY	224392	15.56	3000	63746	4.9644

表格 2 是中国部分高校的相对加权学术水平绩效指数和相对加权学术绩效指数（论文被引次数、篇均被引次数采用 ESI2017 年 6 月的数据，员工人数、年度开支采自网络，年度开支大多采用的是 2017 预算）。

Table 2 is the relative weighted academic level performance index and the relative weighted academic performance index of some universities in China (the number of citations and citation per paper are cited in the ESI2017 year June data, the number of employees, annual expenditure from the network, the annual expenditure is mostly adopted 2017 budget).

有关部门可以增加对绩效高的学校的经费及人才等方面支持，以提高资源使用效率。

The government concerned can increase the funds and talents of high performance universities, so as to improve the efficiency of resource use.

表格 2 学术机构的相对加权学术水平绩效指数和相对加权学术绩效指数

Table 2 the relative weighted academic level performance index and the relative weighted academic performance index

机构名称 institutions	经费（百万美元） Budget (million dollars)	加权学术水平绩效指数 WALPIndex	相对加权学术水平绩效指数 RWALPIndex （北京大学 PEKING UNIVERSITY100）	加权学术绩效指数 WAPIndex	相对加权学术绩效指数 RWAPIndex （北京大学 PEKING UNIVERSITY 100）

中国科学技术大学 UNIVERSITY SCIENCE & TECHNOLOGY CHINA	515	4609	260.24	261364	142.66
香港大学 UNIVERSITY HONG KONG	987	2748	155.17	237669	129.72
复旦大学 FUDAN UNIVERSITY	1486	2466	139.23	184267	100.57
北京大学 PEKING UNIVERSITY	2866	1771	100	183214	100
香港中文大学 CHINESE UNIVERSITY HONG KONG	939	1953	110.30	173322	94.60
南京大学 NANJING UNIVERSITY	1027	2459	138.85	166776	91.03
浙江大学 ZHEJIANG UNIVERSITY	2219	1649	93.11	151338	82.60
上海交通大学 SHANGHAI JIAO TONG UNIVERSITY	2085	1646	92.96	139499	76.14
清华大学 TSING HUA UNIVERSITY	3457	1237	69.85	136932	74.74
南开大学 NANKAI UNIVERSITY	990	1887	106.55	117771	64.28
中山大学 SUN YAT SEN UNIVERSITY	1725	930	52.50	117048	63.89
兰州大学 LANZHOU UNIVERSITY	461	1780	100.52	106288	58.01

表 3 是与部分学校的历史数据的比较（2017 论文被引次数、篇均被引次数采用 ESI2017 年 6 月的数据，2012 年 6 月数据取自网络，

其中哈佛大学和东京大学数据为 2011 年 4 月数据，机构员工数采自网络，统一用 2017 年 6 月员工数）。由表 3 可以看出，大陆的高校的学术水平有了巨大的进步，香港和台湾则相对进步不大，大陆大学已与台湾、香港的大学水平相当，部分学校已超越。

Table 3 is a comparison of historical data from some universities (2017 papers, citations per paper were cited on ESI June 2017 data, June 2012 data from the network, Harvard University and the University of Tokyo data are April 2011 data, the number of employees from the network, Unify the number of employees in June 2017). It can be seen from table 3 that the academic level of mainland universities has made great progress, and that Hong Kong and Taiwan have relatively little progress, and that the mainland China universities have been comparable with those of Taiwan and Hong Kong, and some universities have surpassed them.

表格 3　学术机构的历史相对加权学术水平指数

Table 3A comparison of historical Relative Weighted Academic Level Index

机构名称 Institutions	2012 年 6 月 June 2012			2017 年 6 月 June 2017		
	被引论文数 Web of Science	篇均被引 Citation per paper	相对加权学术水平指数 RWALIndex (哈佛大学 HARVARD UNIVERSITY100)	被引论文数	篇均被引	相对加权学术水平指数 RWALIndex (哈佛大学 HARVARD UNIVERSITY100)
美国哈佛大学 HARVARD UNIVERSITY	104103	29.99	100	185906	29.56	100
日本东京大学 UNIVERSITY TOKYO	71762	15.05	21.32	78569	16.36	15.89
中国科学技术大学 UNIVERSITY SCIENCE & TECHNOLOGY CHINA	21646	8.97	4.15	34052	13.2	8.15
复旦大学 FUDAN UNIVERSITY	23375	8.37	2.96	43155	12.83	7.40
北京大学 PEKING UNIVERSITY	33487	8.96	3.51	56983	13.12	7.38
香港大学 UNIVERSITY HONG KONG	22320	12.95	5.85	29957	15.79	6.72

南京大学 NANJING UNIVERSITY	22628	7.71	2.68	37173	11.99	6.14
浙江大学 ZHEJIANG UNIVERSITY	37381	6.53	2.35	65387	10.44	6.05
上海交通大学 SHANGHAI JIAO TONG UNIVERSITY	31282	6.3	1.98	62180	10.12	5.85
清华大学 TSING HUA UNIVERSITY	36538	6.98	2.17	57054	11.88	5.66
台湾大学 NATIONAL TAIWAN UNIVERSITY	35370	8.82	3.61	46806	12.48	5.45

2）一流大学的标准。

Standards for first-class universities.

一流大学的标准应该数值化，学术水平应该成为重要指标之一。世界一流大学的学术标准可以有 2 个：加权学术水平指数达到哈佛大学的 20%，ESI 篇均被引达到 22，目前全世界符合这个标准的有 21 间大学；世界高水平大学的学术标准也可以有 2 个：加权学术水平指数达到哈佛大学的 10%，ESI 篇均被引达到 16，目前全世界符合这个标准的有 117 间大学。按照以上标准，可以估算出我国高校最快何时可以出现世界一流大学和高水平大学。下面的估算，假设我国高校的学术水平按照以往 5 年的速度提升；假设各校的员工数维持不变。

The standard of first-class universities should be numerical, and the academic level should be one of the important indexes. The academic standards of world-class universities can be 2: The weighted academic Level index reached Harvard University's 20%, with ESI citations per paper at 22 or above.Now 21 universities in the world meet this standard.And 2 in academic standards at the highest level of universities: a weighted academic level index of 10% of Harvard University,the ESI citations per paper at 16or above, and there are 117 universities in the world that meet this standard. According to the above criteria, it can be estimated that the most advanced universities and high level universities can be found in China. The following

estimates assume that the academic level of Chinese universities has been upgraded at the rate of past 5 years, assuming that the number of employees in each school remains unchanged.

表格 4

Table 4

机构名称 institution	2017 年 6 月篇均被引次数 Citations per paper on June 2017	过去五年篇均被引年均增长 The increase rate of citation per paper on past 5 years	篇均被引达到高水平大学被引指标 16 的时间（年）The time citation per paper meet 16 (years)	篇均被引达到世界一流大学被引指标 22 的时间（年）The time citation per paper meet 22 (years)
中国科学技术大学 UNIVERSITY SCIENCE & TECHNOLOGY CHINA	13.2	0.85	3.3	10.4
复旦大学 FUDAN UNIVERSITY	12.83	0.89	3.6	10.3
北京大学 PEKING UNIVERSITY	13.12	0.83	3.5	10.7
香港大学 UNIVERSITY HONG KONG	15.79	0.57	0.4	10.9
南京大学 NANJING UNIVERSITY	11.99	0.86	4.7	11.7
浙江大学 ZHEJIANG UNIVERSITY	10.44	0.78	7.1	14.8
上海交通大学 SHANGHAI JIAO TONG UNIVERSITY	10.12	0.76	7.7	15.5
清华大学 TSING HUA UNIVERSITY	11.88	0.98	4.2	10.3
台湾大学 NATIONAL TAIWAN UNIVERSITY	12.48	0.73	4.8	13.0

表格 5 是估算 2022 年 6 月时，一些大学的加权学术水平指数数

值，这里假设各校的篇均被引次数和被引论文数按照过去 5 年的速度增长，假设各校的员工数保持不变。

Table 5 is an estimate of the weighted academic level indices of some universities in June 2022, where it is assumed that the web of science and citations per paper for each universities are increasing at the rate of the past 5 years, assuming that the numbers of employees in each universities remain unchanged.

表格 5
Table 5

机构名称 Institutions	2017 年 6 月被引论文数 Web of science on June 2017	过去五年被引论文数年均增长 Web of science increase rate on past 5 years	过去五年篇均被引年均增长 Citations per paper incraese rate on past 5 years	估算 2022 年 6 月加权学术水平指数 Estimate WALIndex on June 2022	估算 2022 年 6 月相对加权学术水平指数 Estimate RWALIndex on June 2022 (哈佛大学 HARVARD UNIVERSITY100)
美国哈佛大学 HARVARD UNIVERSITY	185906	13634	−0.07	1712843	100
复旦大学 FUDAN UNIVERSITY	43155	3956	0.89	251751	14.70
中国科学技术大学 UNIVERSITY SCIENCE & TECHNOLOGY CHINA	34052	2481	0.85	248884	14.53
北京大学 PEKING UNIVERSITY	56983	4699	0.83	232326	13.56
上海交通大学 SHANGHAI JIAO TONG UNIVERSITY	62180	6180	0.76	213457	12.46
浙江大学 ZHEJIANG UNIVERSITY	65387	5601	0.78	209549	12.23
南京大学 NANJING UNIVERSITY	37173	2909	0.86	201854	11.78
清华大学 TSING HUA UNIVERSITY	57054	4103	0.98	197321	11.52
香港大学 UNIVERSITY HONG	29957	1527	0.57	150867	8.81

KONG					
台湾大学 NATIONAL TAIWAN UNIVERSITY	46806	2287	0.73	145663	8.50

从表格 5 可以看出到 2022 年，我国将有多所大学达到高水平大学的标准。但若未来几年不能保持过去几年的增长速度，则数值就会减低。

From table 5, it can be seen that in 2022, China will have many universities to meet the standards of a high level university. But if the next few years cannot sustain the growth of the past few years, the value will be reduced.

3）与其他大学排行榜的比较

Comparison with other universityranking systems

表格 6 是加权学术水平指数前 10 名，在其他 4 个比较有影响的大学排行榜上的排位，可以看出其中 7-8 个学校也基本排在各排行榜前 10 名中。英国伦敦大学学院排位也很高。（数据 2017 年 8 月采自各排行榜的官方网站）。

Table 6 is the top 10 of the weighted academic level index, and in the rankings of the other 4 more influential universities ranking system, it can be seen that 7-8 of the universities are ranked in the top 10 of the rankings. London University College is also high ranking. (Data on August 2017 from the official website of the rankingsystems)

这些都是公认的世界一流大学，教职员工都在 2000 人以上。这说明，我们的加权学术水平指数和现在主要的排行榜，尽管采用了不同的评估方式，对于大、中型的大学可以有类似的结果。

These are recognized world-class universities, with staff of more than 2000 people. This shows that our weighted academic level index and now the main rankings, despite the different assessment methods, for large and medium-sized universities can have similar results.

意大利圣拉斐尔生命健康大学，由于教师只有 151 人，管理人员

只有 68 人，论文被引用数达到 213958，篇均引用 24。这样一家学术水平一流的大学，由于规模很小，在其他的排行榜，名落孙山，在加权学术水平指数排行榜里高居第 10 位。

VITA-SALUTE SAN RAFFAELE UNIVERSITY, because the teacher only 151 people, management staffs only 68 people, the citations reach 213958, citations per paper 24. Such an academic level-top university, with its small size, is on low end of other ranking systems. It is ranked 10th in the rankings of the weighted academic level index.

可见加权学术水平指数可以科学地平衡机构规模和学术水平的关系。

It is shown that the weighted academic level index can scientifically balance the relationship between institutional size and academic level.

表格 6

Table 6

机构名称 institutions	加权学术 水平指数 WALIndex	QS 排行榜	THE 排行榜	US News 排行榜	软科排 行 ARWU
美国哈佛大学 HARVARD UNIVERSITY	1	3	6	1	1
美国麻省理工学院 MIT	2	1	5	2	4
美国斯坦福大学 STANFORD UNIVERSITY	3	2	3	3	2
美国加州理工学院 CALTECH	4	4	2	5	9
美国加州大学伯克利分校 UNIVERSITY CALIFORNIA BERKELEY	5	27	10	4	5
英国牛津大学 UNIVERSITY OXFORD	6	5	1	6	7
英国剑桥大学 UNIVERSITY CAMBRIDGE	7	6	4	7	3
美国普林斯敦大学 PRINCETON UNIVERSITY	8	13	7	8	6
英国伦敦大学学院 UNIVERSITY COLLEGE LONDON	9	7	15	23	16
意大利圣拉斐尔生命健康大学 VITA-SALUTE SAN RAFFAELE UNIVERSITY	10			295	401-500

4）对国家（地区），对非学术机构的科技水平评估

Assessment of science and technology level for non-academic institutions and the country (region)

表格 7 列出部分国家和地区的环球科技指数（论文被引次数、篇均被引次数均采用 ESI2017 年 8 月的数据）。

Table 7 lists the global scientific index in some countries and regions (citations and citations per paper are cited in ESI August 2017 data).

表格 7

Table 7

国家及地区 country (region)	论文被引次数 citations	篇均被引 Citations per paper	环球科技指数 GSIndex	相对环球科技指数 RGSIndex （美国 USA 100）
美国 USA	64163165	17.17	1101681543	100
英格兰 England	15588784	17.28	269374188	24.4512
德国 Germany	15674676	15.88	248913855	22.5940
中国大陆 Mainland China	17580469	9.09	159806463	14.5057
法国 France	10492228	15.15	158957254	14.4286
加拿大 Canada	9599371	15.69	150614131	13.6713
荷兰 Netherland	6654710	18.78	124975454	11.3441
意大利 Italy	8509268	14.33	121937810	11.0683
日本 Japan	9396535	11.77	110597217	10.0389
丹麦 Denmark	2682648	18.1	48555929	4.4074
韩国 Korea	4620634	9.66	44635324	4.0516
印度 India	4104021	8.08	33160490	3.0100
以色列	1939534	14.81	28724499	2.6073

Israel				
新加坡 Singapore	1753150	16.24	28471156	2.5843
芬兰 Finland	1810583	15.69	28408047	2.5786
挪威 Norway	1694312	15.15	25668827	2.3300
中国台湾 Taiwan	2561827	9.86	25259614	2.2928
巴西 Brazil	2900927	7.74	22453175	2.0381
中国香港 Hong Kong	1582798	13.77	21795128	1.9784
南非 South Africa	1045095	10.59	11067556	1.0046
俄国 Russia	1842343	5.99	11035635	1.0017
菲律宾 Philippines	124311	12.31	1530268	0.1389
越南 Vietnam	149893	7.6	1139187	0.1034
利比亚 Lybia	11395	6.91	78739	0.0071
中国澳门 Macau	16369	4.52	73988	0.0067
梵蒂冈 Vatican	3301	20.76	68529	0.0062
多米尼克 Domenek	1212	9.25	11211	0.0010

从表格 7 可以看出美国科技水平仍大大领先于世界其他国家和地区。

From table 7 we can see that American technology is still far ahead of the rest of the world.

表格 8 列出部分非学术机构的环球科技指数（论文被引次数、篇均被引次数均采用 ESI2017 年 6 月的数据）

Table 8 lists the global scientific index of some non-academic institutions (citations and citations per paper are cited in ESI June 2017 data)

表格 8

Table 8

机构名称 Institutions	论文被引次数 Citations	篇均被引次数 Citations per paper	环球科技指数 GSIndex	相对环球科技指数 RGSIndex （葛兰素史克 GLAXOSMITHKLINE100）
葛兰素史克 GLAXOSMITHKLINE	301726	27.68	8351776	100.00
美国环保署 US EPA	191634	21.22	4066473	48.69
美国海军 US NAVY	243349	15.47	3764609	45.08
瑞士诺华集团 NOVARTIS SWITZERLAND	128770	28.19	3630026	43.46
美国陆军 US ARMY	251157	13.77	3458432	41.41
美国安进公司 AMGEN	110699	27.24	3015441	36.11
丹麦诺和诺德公司 NOVO NORDISK	104021	25.75	2678541	32.07
美国林业局 US FOREST SERVICE	156815	15.98	2505904	30.00
德国拜耳公司 BAYER AG	100687	23.02	2317815	27.75
韩国三星公司 SAMSUNG	140040	11.49	1609060	19.27
美国空军 US AIR FORCE	114453	13.02	1490178	17.84

对比表格 7 和表格 8，可以看出部分非学术机构的科技实力非常强大，超过了部分国家（地区）的科技水平。

In contrast to table 7 and table 8, it can be seen that some non-academic institutions have a very strong scientific and technological strength, surpassing the technological level in some countries.

4．结束语

Conclution

1） 加权学术绩效考核方法及系统，能够客观、定量地评估学术机构的学术水平，可以科学地平衡机构规模和学术水平的关系。

The weighted academic performance appraisal method and system can evaluate the academic level of academic institutions objectively and quantitatively, and can balance the relationship of institution scale and academic level scientifically.

2）加权学术绩效考核方法及系统可以对学术机构的学术水平与历史水平比较，并预测未来的发展。

The weighted academic performance appraisal method and system can compare the academic level and historical level of academic institutions and predict the future development.

3）环球科技指数及相对环球科技指数可以客观、定量地评估非学术机构，国家（地区）的科技水平，同样可以与历史水平比较，及预测未来发展。

The global scientificindex and relative global scientific index can objectively and quantitatively assess the scientific and technological level of the non academic institutions, the country (region), can also compare with the historical level, and predict the future development.

4）以上评估方法，可以对科学规划及资源配置，提供支持。

The above assessment method can provide support for scientific planning and resource allocation.

5．感谢语

Thanks

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