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Countermeasure of Research University Development Based on the Index System Analysis of the Comprehensive Competitiveness Ranking of Chinese Universities

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Abstract

Under new situations and circumstances, more quickly and efficiently resources allocation is a natural advance for higher education development. Its inevitable result is that universities must pay great attention to the construction and the promotion of their competitiveness hand in hand with cultivating talents needed in society. This paper made a comprehensive overview to the Comprehensive Competitiveness Ranking of Chinese Universities (CCRCU) released by RCCSE, and emphasized on analyzing the changing trends of evaluation methods and indicators, and digging the development trends of the connotation and extension of universities competence. Some suggestions and countermeasures are put forward.

Keywords

universities competitiveness, development countermeasure, comprehensive evaluation, CCRCU

1. Introduction

University competition is a manifestation of the higher education marketization that develop to the senior stage. Within the academic circle of higher education, theory bases for effective competition are becoming one of the hot issues. Some scholars gave qualitative explanation to the problems existing in domestic universities and made some suggestions on it (e.g., David, 2016; Liu, 2016). Some others analyzed the concepts and characteristics of the competition between universities before evaluating it (e.g., Poyagotheotoky, 2016; Liu, 2016). Overall, many problems on the index systems, evaluation methods and evaluation perspective have not reach common conclusion yet. Most of the current evaluation reports or rankings are based on the existing competition definition or according to the key courses of education and teaching (e.g., Wang et al., 2012; Yang & Han, 2013). Various results were

obtained with different methodologies and perspectives used. Thus, the guide value to the comprehensive reform practice of colleges and Universities inevitably be inadequate. The Competitiveness Evaluation Report 2004 of Chinese University, which was produced by RCCSE (Research Center of Chinese Science Evaluation) and China Youth Daily, has been approved by education organization both at home and abroad (Louwen, 2011). In the years that followed, the research team of RCCSE has accumulated plenty of experience from the long-term exploration and practice, and continuously improved and reformed the index systems according to the development of higher education as well as the changes of social demands in China. And its annually reports, Comprehensive Competitiveness Ranking of Chinese Universities (CCRCU), from which the situation of Chinese universities and higher education to some extent can be illustrated quantitatively, earned a certain influence and authority both in domestic and overseas. This paper emphasized on analyzing the changing trends of evaluation methods and indicators, and digging the development trends of the connotation and extension of universities competence, to give some certain countermeasure suggestions for enhancing competitiveness.

2. CCRCU Index Systems

Since 2004, the cognition of RCCSE to the connotation of universities competitiveness is not much of a change, as can be witnessed by the general index system of CCRCU which was long-term stable. It evaluates universities from 4 aspects: Educational resources, Teaching level, R&D, reputation, and 14basicpoints: Basic facilities, Educational funds, Faculty, Advantageous disciplines, Quality of students, Students component, Teaching achievements, R&D team and base, The quantity of R&D output, The quality of R&D output, R&D programs and expenditure, R&D efficiency, Academic reputation, Social reputation, take the specific evaluation systems and indicators 2015 as an example (Table 1). Nevertheless, the third-level Indicators and the relevant weights have been gradually adjust as the educational context varies, and the primary observation points has risen from more than 40 in 2004 to 98 in 2015.

Table 1. Index System of CCRCU 2015

Primary Indicators	Secondary Indicators	Third-level Indicators
Educational resources	Basic facilities	Built-up area; Built-up area per student; Educational instruments and equipment; Educational instruments and equipment per student; Library collection; Library collection per student
	Educational funds	Total Educational funds; Educational funds per student

	Faculty	Outstanding talents; Educational experts; Supervisors of PhD candidates; Full-time teachers; The ratio of teachers with senior title; Student/teacher ratio
	Advantageous disciplines	Degree authorization centers; Characteristic majors
Teaching level	Quality of students	Average scores of the entrance exam; The number of students; Employ rate of graduates
	Students component	Graduates/undergraduates rate; exchange students/undergraduates rate
	Teaching achievements	Teaching Award; Teaching Talent training base; Excellent Courses; Planning Teaching Material; National Prize for the Top 100 PHD Dissertations; Awards in the international and national academic race
R&D	R&D team and base	Excellent innovation teams; National research base
	R&D output	Invention patent; Paper publication; National Library of philosophy and Social Sciences
	The quality of R&D output	National rewards; Outstanding scientific research achievements; Paper cited records
	R&D programs and expenditure	Research programs financed by NSFC (Natural Science Foundation of China); Research programs financed by NSSF(National Social Science Fund); The total number of research programs; R&D expenditure in the year
	R&D efficiency	The rate of output per capital; The rate of output per￥1000
Reputation	Academic reputation	Significant academic impact; Influence of academic journals; Misconduct (violation of academic ethics or professional ethics); Violation of law
	Social reputation	Web influence

3. CCRCU Key Changes

The change of the measurement concept mainly embodies in the change of index system structure. In the comparison of the indexes with significant change in 2004 and 2015 (Table 2), the share of subjective index rises with the decline in objective index, and extra weighting coefficient is put on resource index while outcome measure gets less emphasis relatively.

Table 2. Indexes Comparison

Primary Indicators	Secondary Indicators 2004	Secondary Indicators 2015	Third-level Indicators 2004	Third-level Indicators 2015	Changes
Educational resources	Basic facilities	Basic facilities	School house area; School house area per student	Built-up area; Built-up area per student	Range extended
	Educational expenditure	Educational funds	Educational expenditure; Educational expenditure per student	Total Educational funds; Educational funds per student	Consider the expansibility
	Faculty	Faculty	The number of members of Chinese Academy of Science or Chinese Academy of Engineering; The number of outstanding talents including teachers with the title of Cheung Kong Scholars, cross-century talents and Chinese Excellent Teachers)	Outstanding talents; Educational experts; Supervisors of PhD candidates; Full-time teachers	More concerned about the structure of teaching staff instead of titles
	Advantageous disciplines	Advantageous disciplines	The number of institutes authorized to grant Ph.D. Degree; The number of institutes authorized to grant Master Degree; The number of national key disciplines; The number of characteristic majors	Degree authorization centers; Characteristic majors	Remove the index of "The number of national key disciplines"
Teaching level	Students and graduates	Quality of students	The number of PhD graduates per year; The number of Master graduates per year; The number of Bachelor graduates per year	The number of students	More concerned about internal students
	Quality of teaching	Teaching achievements	The number of excellent Teaching Award granted by the ministry of education; National Excellent Courses granted by the Ministry of Education; The number of teachers with the title of National Distinguished Lecturer; National Prize for the Top 100 PHD Dissertations; The number of awards in the international and national academic race	The number of Teaching Award; Teaching talent training base; Excellent Courses; Planning Teaching Material; National Prize for the Top 100 PHD Dissertations; The number of awards in the international and national academic race	Expand the scope of recognized awards, and outstanding the student outcomes
R&D	R&D team and base	R&D team and base	The number of national excellent innovation teams; The number of national key labs or research centers or research base; The ratio of teachers in full-time R&D	The number of excellent innovation teams; The number of national research base	Range extended, and the ratio of full-time R&D teachers is no longer required
	The quantity of R&D output	R&D output	The number of patents; The number of papers recorded by SCI/SSCI/A&HCI; The number of papers recorded by EI/ISTP/ ISSHP; The number of papers recorded by CSTPC/CSSCI; The number of social science monographs	Invention patent; Paper publication; National Library of philosophy and Social Sciences	From quantity comparison to a combination of quantity and quality
	The quality of R&D output	The quality of R&D output	The number of National Top Science and Technology Awards, National Natural Science Award, National Technology Invention	National rewards; Outstanding scientific research achievements;	Expand the scope of recognized awards, and no

			Award, National Science and Technology Progress Award; The number of papers published on Science or Nature or ESI; The number of outstanding scientific research achievements; Citations in SCI/SSCI/A&HCICitations in CSTPC/CSSCI	Paper cited records	longer compare the number of publications
Reputation	Reputation	Academic reputation	Academic reputation; Social reputation	Significant academic impact; Influence of academic journals; Misconduct (violation of academic ethics or professional ethics); Violation of law	The peer experts evaluation
		Social impact		Web influence	More comprehensive and objective

Specific changes are as follows:

(1) More concern about the quality. Mainly includes 4 aspects: firstly, Some indicators represent quality were set up, such as Characteristic majors, Excellent Courses, Outstanding scientific research achievements, el at., and it grants the quality indicators with higher weight than quantity indicators. Secondly, a student quality evaluation mode was constructed from enrolling student dimension, internal student dimension and graduate student dimension. Thirdly, emphasis on scientific research and effectiveness appropriately, combining qualitative analysis with quantitative evaluation, and dealing with the relationship of inputs, outputs and benefits correctly. Fourthly, more concerned about the structure and level of teaching staff as 4 groups of outstanding talents, educational experts, supervisors of PhD candidates and full-time teachers instead of just titles.

(2) More highlight the achievements. Firstly, most optimization efforts are emphasized on R&D output, from quantity comparison to a combination of quantity and quality. Secondly, a more comprehensive and scientific database with Basic information database and National Library of philosophy and Social Sciences. Thirdly, the second classification was made on research papers, especially interdisciplinary outputs, since a trend of interdisciplinary research and diversified international cooperation has emerged and encouraged.

(3) More focus on discipline characteristics. Universities often have key or advantageous disciplines to support their competitiveness. Through the comparison of Advantageous disciplines, reflecting the discipline construction of the universities and colleges in different areas and different levels, overcome the tendency of homogenization, and encourage colleges and universities to adhere to the characteristics of their own development (Yang, 2010).

(4) Enhanced classification. The evaluation divided all of these universities into 8 types according to their nature: Synthetical, Polytechnic, Normal, Medical, Literature/Economics/Politics/law, Sports and

Arts, Ethnic, Agricultural and Forest; and three types: key universities, average universities and private colleges. Thus, the evaluation results are more scientific and reasonable by using different evaluation systems for different types. For example, generally speaking key/average universities and private colleges these three types have obvious difference about their size, objective, role, and competiveness. Key universities and average universities share the same indicators but with different weights. Key universities and average universities have different tasks. The primary task of the former is R&D while the average universities are mainly responsible for teaching. So for key universities, indicators about R&D have higher weights, 6:4 (R&D: teaching). For average universities, indicators about teaching have higher weights, 4:6 (R&D: teaching).

(5) More value the contribution and reputation. In the index system of the Comprehensive Competitiveness Ranking of Chinese Key Universities 2004, despite the setting of primary Indicator of Reputation, observation points are few since with no next level indicator. Given this, Reputation was divided into two indicators of Academic reputation and Social impact in 2015. Academic reputation evaluates universities from 4 aspects: Significant academic impact; Influence of academic journals; Misconduct (violation of academic ethics or professional ethics); Violation of law. Social impact is a critical indicator to evaluate the competitiveness, which is represent mainly via web influence. Academic reputation is derived from the survey covering 1000 experts and scholars in the relevant fields. And the web influence is derived from the statistic taken by five famous search engines, including Google Scholar and Yahoo! etc.

4. Countermeasure Analysis

As we can see from the Table 1 and Table 2, comprehensive competitiveness of one university represents its overall appearance integrated by quantity, quality, level and impact. Accordingly, based on the evaluation philosophy of quantity, effectiveness, characteristics, classification, from a global perspective, several proposals on how the research universities to go forward with times in new situations are put forward as follows:

Firstly, catching hold of the headwaters, optimize the faculty structure. Universities human resource is a top priority in education resource, the rationality of teaching faculty management and structure is related to the development of teachers' potential, education quality and benefit to the maximum. In recent years, despite the full-time teachers structure of age, educational background, professional title and knowledge in Chinese key universities has been improved gradually, the current situation is still not optimal. Take the rate of full-time teachers with a PhD as an example, it has substantial risen from pyramid to rugby even an inverted pyramid (i.e., teachers with a PhD are in majority, with a master's degree come next, the others are much less) in many domestic key universities, is still low compared with the general proportion of more than 90% in key universities of United States and western nations (e.g., the rate of California Institute of Technology even up to 99.7%). In view of this situation, we suggest: first, abolish teacher tenure and construct a set of Employment and Excellent effect test

regulations, combine the performance appraisal with the pay system properly to strengthen the incentive function of compensation, optimize the rewarding excellence and punishing inferior mechanism through dynamic management of the Innovation funds, training and incentive system. Second, establish a special talent zone, accelerate talents to gather, put in place scientific research and investment and circulating funds system, implement special protection mechanism for talented persons, and eventually converting the human resources into human capital. Third, reinforce infrastructure for discipline and scientific research, strengthen the development of key disciplines, construct superior subject groups, and encourage multi-disciplinary integration which is the growing point of emerging discipline, set up a platform for talents to put to good use of their ability.

Secondly, controlling the process, promote a disciplinary-centered comprehensive reform. Discipline decides the direction and characteristics, quality and level, role and reputation of university. This requires the coordinated reforms of human affairs, scientific research, educational administration, student management and party-masses relations must take the discipline construction as the center, which give full play to the improvement of various disciplines. The disciplinary-centered comprehensive reform should lay stress on three aspects: First, to link work at selected spots with that in entire areas, especially on the highlight. Distinguish the advantage and peculiarity of discipline construction and construct disciplines with peculiarity according to local economic construction and the traditions of the university. Second, focus on the systematic construction and standardization with incentive system as main part, optimize the environment for disciplines construction, to promote its regular cycle and development efficiently. Third, emphasize connotative development on the basis of accurate orientation, and diversified entire harmony development concerning with the connotation.

Thirdly, guarantee the products quality, elevate students' employment competence and transformation of scientific research achievements. Graduates are the products of the college personnel training beltline, while scientific research achievements are another output of university knowledge innovation. Excellent professional skills, good vocational abilities, necessary qualities of science and culture and fine interpersonal interaction has been one of important parameters measured talent quality of modern society. Therefore, a long-term mechanism shall be established integrating the expertise education and career guidance, helping students to cultivate a scientific career concept. Concrete work requires both the specialization of employment guiding staff and the multidimensional goal and content comprehensive of the career guidance, the forms diversification, personalized guidance to the target. On the other hand, the quantity of Chinese universities' scientific output increases at a high speed while the transformation and application has not obvious improvement. As a need of serving the community, the importance of quickening the transfer of existing scientific and technological achievements into productivity is self-evident. The way to proceed are: first of it, to build a scientific, systematic and perfect index system of the transformation of achievements. Second, to draw support from University Spin-off Company and University-Industry Cooperative Innovation as an important role for the promotion of the university technology into real productive forces. Third, to innovate the consulting

support system and concrete measures to encourage commercialization.

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