

Guidelines for Improving the Management Efficiency of Guangxi Universities

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Abstract

The purposes of this research were to: 1) In order to study the management efficiency of local undergraduate colleges and universities in Guangxi. 2) In order to explore the different factors that affect the management efficiency of local undergraduate colleges and universities in Guangxi. 3) In order to study the guidelines developed to improve the management efficiency of local undergraduate institutions in Guangxi. Sample of this research adopt the stratified sampling method, take the school running orientation as its sampling standard. Then select 10 local undergraduate colleges of the same type as the sample, namely Hezhou University, Guangxi University of Finance and Economics, Wuzhou University, Nanning University, Liuzhou Institute of Technology, Guilin University of Aerospace Technology, Guangxi University of Foreign Languages, Guangxi. The results showed that the distribution of technical efficiency values of local undergraduate colleges and universities in Guangxi from 2016 to 2020. From the calculation results, it shows that the technical efficiency of 6 local undergraduate colleges and universities in the five years is all 1. It means that the DEA of these 6 local undergraduate colleges and universities is effective, accounting for 60% of all evaluated schools. In addition, the technical efficiency of these 10 local undergraduate colleges and universities is relatively high, with an average of 98.3%, It shows that the management efficiency of local undergraduate colleges in Guangxi is good in general.

Keywords: Guidelines, Efficiency, Improving the Management of Guangxi Universities.

Introduction

Undergraduate education, as the main body of national education, takes a central position in the structure of higher education and has long been responsible for the important task of cultivating high-quality applied, compound and innovative talents and scientific and technological innovation. The success or failure of undergraduate education, to a certain extent, determines the survival and development of the country. Wang Chen (2010) believed that Higher education is fundamental to the revitalization of the country and the nation and to the development of society. It is the fundamental choice of the improvement on the overall quality of the nation and the all-round development of human beings. It is the key to the improvement on the soft power and comprehensive national strength of the country and the enhancement of its international discourse.

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China has implemented the strategy of developing the country through science and education, for which the government has invested a large amount of human, material and financial resources to make unprecedented development of higher education in China. In 2004, the gross enrollment rate of higher education in China was 17%, which has entered the stage of mass education in advance. 2020, the gross enrollment rate of higher education in China is 54.4%, which has entered the stage of mass higher education, but this is far from the people's expectation of the level of higher education in China. Compared with the higher education level of developed countries in the world, the development level of higher education in China is still at a low level in the world. Wu Feng (2007).

In order to form guidelines to improve the management efficiency of Guangxi colleges and universities, and to provide theoretical basis and decision-making reference for the managers of Guangxi colleges and universities to consider how to reduce costs and improve management efficiency while ensuring the quality of education.

Research Questions

- 2.1 What is the current management efficiency of local undergraduate colleges and universities in Guangxi?
- 2.2 What are the main factors that affect the management efficiency of local undergraduate colleges and universities in Guangxi?
- 2.3 What are the guidelines for improving the management efficiency of local undergraduate colleges and universities in Guangxi?

Literature Review

3.1 Concept of higher education management

Zhao Zhongjian (1997, p.81-82) mentioned that the management of higher education mainly refers to the control, coordination, organization, planning and other management behaviors of a country's government or educational institutions over the education system. According to the difference of higher education management process and management function, higher education management is generally divided into administrative management and school management.

Ding Li (2012, p19) mentioned that the management of higher education is that the participants in higher education seek to achieve the specific objectives of the national plan by purposefully adjusting a series of resources in the higher education system. The management of higher education is the specific management of higher education by the state and its education authorities, in order to realize the better development of higher education in China.

Deng Huan (2013) mentioned that higher education management refers to the rational allocation of human, material and financial resources in the educational environment, and the planning, organization, coordination, supervision and evaluation of various educational activities of the school, under the guidance of certain educational ideas, educational policies and educational management concepts, in order to achieve the educational objectives of the school, so as to achieve the coordinated operation of the entire educational activities.

3.2 The concept of higher education management efficiency

Jill Johnes (2006, p.25) mentioned that school management is a teaching management activity that managers organize and utilize various educational resources to achieve school

management objectives. In a broad sense, the efficiency of higher education management refers to the relationship between the total input and output of higher education resources, and its input and output indicators are difficult to accurately measure.

Dong Zefang (2014, p.36) mentioned that the management efficiency of higher education can be divided into two aspects: social efficiency and personal efficiency. Social efficiency includes economic and spiritual aspects. The so-called "economic input" refers to the ratio of input and output of higher education. The "input" here, in addition to human, financial and material inputs, should also include the spiritual input of participants, Because the essence of higher education is also an activity of interpersonal communication, its main participants are teachers and students, and there are ideological exchanges and collisions between them.

The importance of higher education management efficiency

Wang Jingtao (2010, p.3) mentioned that in educational economics, the management efficiency of higher education can not only reflect the contribution rate of higher education to personal development and national progress, but also reflect the effective utilization rate of educational resources, providing a basis for improving the management system of colleges and universities in the future, fully exploring the potential of educational resources utilization and efficient use of educational resources, Therefore, countries all over the world attach great importance to the evaluation of higher education management efficiency.

Fu Minghui (2011, p.12) mentioned that studying the management efficiency of colleges and universities is to seek the best state of running schools in the process of evaluation practice, and provide a theoretical guidance and practical plan for the construction and development of colleges and universities. Through the research on the evaluation of the management efficiency of colleges and universities, we can improve the theoretical system of education evaluation in China, develop education evaluation methods and enrich education evaluation practice, and promote the sustainable and stable development of education in China.

3.3 Concept of guidelines (development strategy)

Meaning of guidelines (development strategies)

An Wenzhu (1991, p.430-431) mentioned that education development strategy refers to the research and planning of guiding the long-term, overall and major issues in the process of education development. The specific contents include: (1) to study the development trend of education in the future for a period of time, and find its common characteristics and laws; (2) Study the relationship between education and social and economic development, and explore how education can meet the needs of social politics, economy, culture and science; (3) Research the development goals of education in the future, and formulate the basic guidelines, guiding ideology and specific measures for the development of education on how to achieve the goals. (4) Research the problems existing in the implementation of the education development strategy, and modify and improve the meta-strategy based on this research.

Jiang Jiawei (2021, p.15) mentioned that the education development strategy refers to the planning and decision-making of a country or region to achieve the overall goal of social development in a certain historical period, with overall, fundamental and long-term issues, including education development planning, strategy formulation, strategy implementation, etc.

Chen Chuannan (2020, p.14) mentioned that the education development strategy is a major macro-level overall plan for the future development of education made by the national

high-level decision-makers based on the comprehensive judgment of the internal and external environment of education in a certain period, starting from the need for coordinated economic and social development. Compared with similar concepts such as education policy and education reform, education development strategy is a relatively superior concept.

The importance of guidelines (development strategies)

Zhang Wei (2021, p.12) mentioned that the guiding principles of higher education will help improve the competitive strength of China's higher education, build a world-class higher education system with Chinese characteristics, realize the integration of higher education popularization with developed countries, and gradually find a more suitable development path for the modernization of higher education with the characteristics of China's national conditions, so as to improve the opportunities for the Chinese people to accept high-quality and optional higher education.

Bai Lu (2012, p.28) mentioned that the significance of education development strategy for the economic and social development of a country or region lies in that it is conducive to a country or region to maximize its wisdom and strength, allocate resources more reasonably in the operation of education, respond more effectively to the opportunities and challenges brought by the competition of comprehensive national strength to the education development of the country or region, and promote the sustainable, stable and healthy development of education.

3.4 Related research

Arthur Oken (1978, p.75) mentioned that increasing national spending on education can promote efficiency and fair coordination, which can not only improve the quality of workers, social, cultural level and social and economic efficiency, but also increase the income of low-income people and narrow the social income gap. Based on this, he proposed that although equalization of income cannot be achieved. The development of education can still promote the coordination of efficiency and fairness.

Research Conceptual Framework

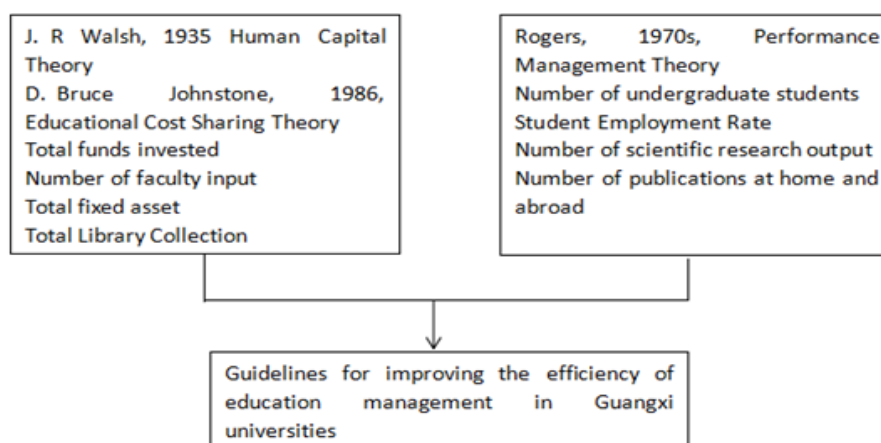


Figure 1. *Research framework diagram*

Objectives of the Research

1. In order to study the management efficiency of local undergraduate colleges and universities in Guangxi.

2. In order to explore the different factors that affect the management efficiency of local undergraduate colleges and universities in Guangxi.
3. In order to study the guidelines developed to improve the management efficiency of local undergraduate institutions in Guangxi.

Research Methodology

6.1 Population and sample

Population: This study group includes 26 undergraduate colleges and universities in Guangxi, which are distributed in Nanning, Liuzhou, Guilin, Hezhou, Chongzuo, Laibin, Wuzhou, Yulin and other cities. On this basis, these colleges and universities are classified according to their different orientations, and the management efficiency of the same type of local undergraduate colleges and universities in Guangxi is mainly studied.

Sample: Using stratified sampling method, the school's orientation is taken as its classification standard, and 10 local undergraduate colleges and universities are selected as samples, namely, Hezhou University, Guangxi University of Finance and Economics, Wuzhou University, Nanning University, Liuzhou Institute of Technology, Guilin University of Aerospace Technology, Guangxi University of Foreign Languages, Guangxi Minzu Normal University, Guilin Tourism University, Yulin Normal University. The data from 2016 to 2020 of these undergraduate colleges and universities are required as sample data for the study.

6.2 Interview

Interviewee : The interviewees in this study include managers and full-time teachers who belong to local undergraduate colleges and universities in Guangxi. They are required to have the following qualifications: they have been in the school for at least 8 years, and are familiar with the specific conditions of the school's development plan, daily teaching, student management, input-output and scientific research. Six people are interviewed in each school, totaling 60 people.

The evaluation team to promote the suitability of the guidelines: under the guidance of the relevant theories of economics, it evaluates the suitability of the guidelines to improve the management efficiency of Guangxi universities, including experts, full-time teachers, university administrators, higher education management institutions, graduates and students, a total of 15 people.

6.3 Research methods and research steps

The first step: setting research ideas. Comb through relevant domestic and foreign literature, get familiar with domestic and foreign research on marketization of higher education, efficiency of higher education (connotation of management efficiency of higher education, assessment, fairness of school operation, etc.), factors affecting management efficiency of higher education and about data envelopment analysis (DEA) applied to the field of education, etc.

The second step: this study is based on the input-output data of 10 local undergraduate institutions in Guangxi, and a detailed analysis of the current situation of input-output management efficiency of local undergraduate institutions in Guangxi is conducted. The data of this study mainly come from the Guangxi Education Yearbook 2016-2020, the Undergraduate Teaching Quality Report of Guangxi Universities 2016-2020, and the Performance Evaluation Report of Chinese Higher Institutions.

The third step is exploring the factors affecting the efficiency of input-output management in local undergraduate colleges and universities in Guangxi. Based on the data obtained in the second step and combined with the situation grasped by the structured interview.

The fourth step is formulating guidelines for improving the management efficiency of local undergraduate institutions in Guangxi. Based on the basis of the research and analysis results of the second and third steps, combined with the national plan of revitalizing western higher education in the National Medium and Long-term Education Reform and Development Plan (2010-2020), and rooted in the actual situation of local undergraduate colleges and universities in Guangxi, the guidelines for improving the management efficiency.

Research Results

The first part is about the input and output of local universities in Guangxi during the five-year period from 2016 to 2020.

This paper collects relevant input index data (total investment in teaching funds, total investment in faculty and staff, total value of fixed assets, total amount of library collections) of 10 local colleges and universities in Guangxi from 2016 to 2020 by searching the Guangxi Education Yearbook from 2016 to 2020, the Guangxi Undergraduate Teaching Quality Report from 2016 to 2020, and the Performance Evaluation Report of Chinese Colleges and Universities from 2016 to 2020 Output index data (number of undergraduate students, student employment rate, number of scientific research output).

The second part is the analysis results of the current situation of management efficiency of local universities in Guangxi during the five-year period from 2016 to 2020.

This paper uses DEAP software to solve DEA model. DEAP is a software specially used for model calculation, which can solve many DEA models such as C2R and BC2. The software is simple to operate, convenient to use, and reliable in calculation results, and has been widely used in academia. The solution results of the model using DEAP in this paper are shown in Table 1

Table 1: Results of the DEA model solution for decision units

Year DMU	Technical efficiency					Pure technical efficiency					Scale efficiency analysis					Returns to scale				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
DMU ₁	1	1	0.90	1	1	1	1	1	1	1	1	1	0.90	1	1	--	--	IRS	--	--
DMU ₂	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	--	--	--	--
DMU ₃	1	1	0.94	1	1	1	1	0.99	1	1	1	1	0.94	1	1	--	--	IRS	--	--
DMU ₄	0.85	1	0.86	0.97	1	1	1	0.99	0.99	1	0.85	1	0.87	0.97	1	IRS	--	IRS	IRS	--
DMU ₅	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	--	--	--	--
DMU ₆	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	--	--	--	--
DMU ₇	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	--	--	--	--
DMU ₈	0.73	1	1	0.89	1	1	1	1	0.94	1	0.73	1	1	0.94	1	IRS	--	--	IRS	--
DMU ₉	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	--	--	--	--
DMU ₁₀	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	--	--	--	--

Overall efficiency analysis

The distribution of technical efficiency values of local undergraduate colleges and universities in Guangxi from 2016 to 2020 is shown in Table 1. From the calculation results in the table, it shows that the technical efficiency of 6 local undergraduate colleges and universities in the five years is all 1. It means that the DEA of these 6 local undergraduate colleges and universities is effective, accounting for 60% of all evaluated schools. In addition, the technical efficiency of these 10 local undergraduate colleges and universities is relatively high, with an average of 98.3%. It shows that the management efficiency of local undergraduate colleges in Guangxi is good in general. The overall management efficiency of local colleges and universities in Guangxi increased significantly from 2016 to 2017, decreased slightly in 2018, and continued to maintain a steady upward trend in 2019 to 2020.

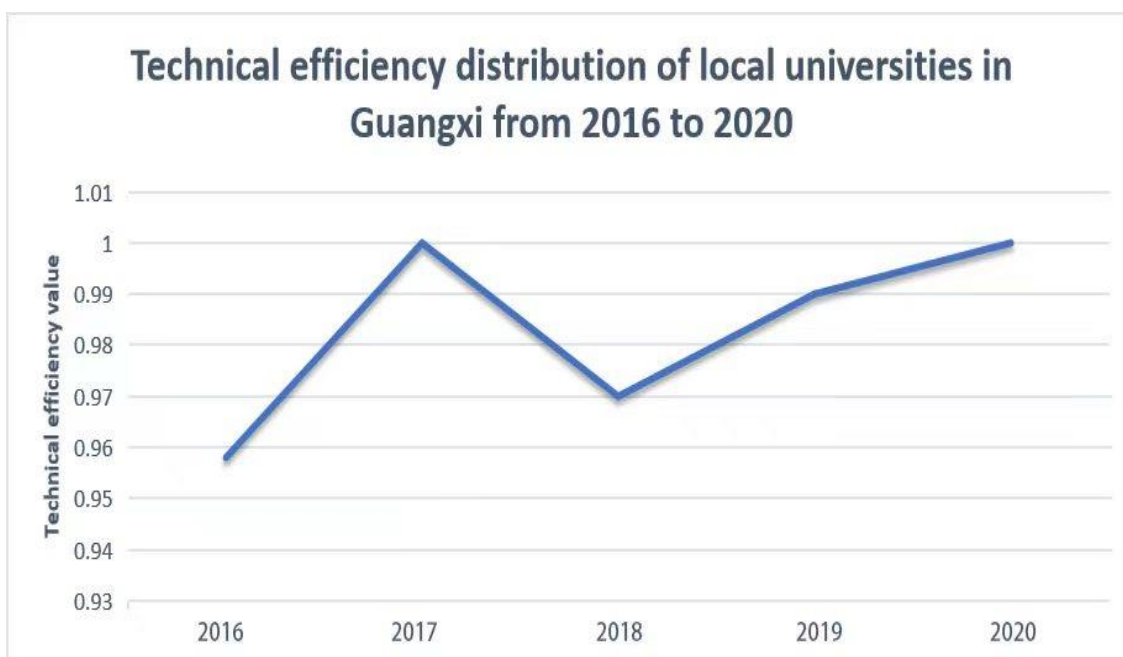


Figure 2 *Technical efficiency distribution of local universities in Guangxi (2016-2020)*

Analysis of pure technical efficiency solution

The overall efficiency of each decision unit in the above is obtained by the C2R model under the assumption of constant scale efficiency. In order to obtain the scale efficiency, it is necessary to assume the constant scale reward as the variable scale reward, so that the technical efficiency can be divided into pure technical efficiency and scale efficiency. The pure technical efficiency of colleges and universities reflects whether the teaching resource input of colleges and universities has got the maximum output. The larger the value of pure technical efficiency, the more effective the colleges and universities use the educational resources and the higher the management efficiency of colleges and universities.

The third part is the main factors affecting the management efficiency of local undergraduate colleges in Guangxi from 2016 to 2020 and the analysis results of specific reasons.

From the results of the above empirical analysis, it can be concluded that among the 10 local undergraduate institutions in Guangxi evaluated, the DEA efficiency of 4 local undergraduate institutions is invalid. For these institutions, how to propose countermeasures and suggestions for improvement is the ultimate purpose of DEA evaluation, not just a simple division of advantages and disadvantages. Therefore, in this section, the projection analysis of ineffective decision units on the production frontier is carried out, which is to analyze the

improvement space of each ineffective decision unit through the input-output slack variables, to understand the utilization of its resources and the magnitude of improvement of each decision unit, so as to provide countermeasures and suggestions to the non-DEA effective decision units.

The fourth part is the analysis results of the interview according to the evaluation index system of the Guidelines for Improving the Management Efficiency of Guangxi Universities.

The first respondent says:

“Our school is a local undergraduate university. Especially after the expansion of enrollment in recent years, the number of teaching staff is obviously insufficient. There are relatively few teachers with high academic qualifications and high professional titles. Our school is located in the western region of China, and the construction funds are relatively scarce. Therefore, compared with other provinces in terms of material and financial resources, we are seriously inadequate. The school management team generally has low academic qualifications and certain redundancy. The school has the phenomenon of repeated construction and procurement in the construction of practice and training sites and equipment procurement, and the overall utilization rate is not high. The library collection is relatively sufficient, but the borrowing rate is not high.”

The fifth part is based on the above research results to develop guidelines for improving the management efficiency of colleges and universities in Guangxi and its suitability analysis results.

According to the research results in the above chapters, Guangxi local undergraduate colleges and universities are facing problems such as insufficient investment in human, material and financial resources, uncoordinated internal resource allocation, and some local undergraduate colleges and universities in Guangxi have certain resource investment surplus. In this paper, the data envelopment analysis method is used to analyze the input-output management efficiency of Guangxi local undergraduate colleges and universities, and the projection analysis of these colleges and universities can further analyze the causes of the problems and the measures to solve them.

In order to solve the problem of low management efficiency of local undergraduate colleges in Guangxi, it is necessary to improve the investment in human, material and financial resources and the efficiency of resource utilization of local undergraduate colleges in Guangxi in the short term, strengthen the cooperation of various departments, and control the blind enrollment expansion of local undergraduate colleges in Guangxi in the long term.

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