



# Research on the Path of Enhancing Core Competitiveness of Postgraduate Education in Shaanxi Universities Based on Excellent Performance

## --The Intermediary Effect of Industry-University-Research Integration

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**Abstract.** As the backbone of China's higher education system in the northwestern region, Shaanxi universities play a very important role in the coordinated development of the national and regional economy, and improving the quality of their postgraduate education to meet the social demand for high-level talents is a problem that needs to be solved urgently at present. Taking Shaanxi universities as the research object, this paper comprehensively applies the questionnaire survey method and structural equation modelling, and introduces the integration of Industry-University-Research as a mediating variable to explain the specific path of the role of the excellence performance model on the enhancement of the core competitiveness of postgraduate education. The results of the study showed that the integration of Industry-University-Research promoted the core competitiveness of postgraduate education and played a significant mediating role between the model of excellent performance and the core competitiveness of postgraduate education. The government and universities should play a key role in leadership by increasing research funding, optimizing the education and research environment, and attracting and nurturing talent to improve the core competitiveness of postgraduate education.

**Keywords:** Excellent performance, Shaanxi universities, Postgraduate education, Core competitiveness, Industry-University-Research integration.

## 1 Introduction

"Building a high-quality education system and comprehensively improving the quality of education" are the strategic tasks and main objectives of China's education development during the Fourteenth Five-Year Plan period. As the highest level of higher edu-

cation, postgraduate education bears the important mission of providing human resources support and intellectual support for economic and social development. As the backbone of the higher education system in the northwestern region of China, Shaanxi universities play a very important role in the coordinated development of the national and regional economy. Therefore, exploring the path to enhance the core competitiveness of postgraduate education in Shaanxi universities is an important part of building a high-quality education system, and it is an inevitable choice to promote the economic and social development of the western region.

The core competitiveness of postgraduate education is an important part of the core competitiveness of universities, which is based on human resources, financial resources, disciplinary resources, and intangible resources, etc., and forms a unique and difficult-to-imitate ability through their effective integration. As a systematic organizational performance management model, excellent performance is highly compatible with the core values of high-quality development of postgraduate education and plays an important role in comprehensively improving the level of postgraduate quality management. Therefore, exploring the intrinsic connection between excellent performance and the core competitiveness of postgraduate education in Shaanxi universities plays an enriching role in the theory of high-quality development of higher education, and has important theoretical and practical significance for the improvement of the core competitiveness of postgraduate education in Shaanxi universities.

## 2 Principal Component Analysis of Key Elements of Excellent Performance

This paper aims to improve the fitness of performance excellence and the core competitiveness of graduate education in Shaanxi universities, based on the U.S. excellent performance standard scoring system, combined with the development status quo of universities in Shaanxi, forming a questionnaire from seven elements of excellent performance, and 30 experts in the relevant fields were interviewed. The reliability coefficient alpha values for each element of the excellent performance model are more than 0.7, indicating that the designed questionnaire has high reliability.

This paper uses SPSS 26.0 to test the question items of the key elements of the excellent performance model, after calculation, a total of 4 factors with characteristic root greater than 1 were analyzed, and their cumulative explanation of the variance contribution rate is 88.288%, which indicates that the excellent performance model can be measured by these 4 factors. The load matrix of the key elements of the excellent performance model is shown in Table 1, in this paper, the four factors are named leadership, resources and environment, customers and markets, and performance results.

**Table 1.** Load Matrix of key elements of excellent performance.

Items	Factor1	Factor2	Factor3	Factor4
Q1	<b>0.933</b>	-0.057	0.241	-0.118
Q3	<b>0.884</b>	-0.32	0.021	0.212
Q2	<b>0.877</b>	-0.199	0.052	-0.099

Q11	0.133	<b>0.882</b>	-0.245	0.145
Q10	0.323	<b>0.879</b>	-0.038	-0.045
Q12	-0.281	<b>0.861</b>	-0.196	-0.294
Q8	-0.51	0.022	<b>0.827</b>	0.103
Q9	-0.186	-0.271	<b>0.821</b>	0.437
Q7	0.264	-0.136	<b>0.816</b>	-0.396
Q21	0.096	-0.056	-0.073	<b>0.865</b>
Q19	0.022	0.385	0.285	<b>0.81</b>
Q20	-0.125	-0.435	-0.118	<b>0.81</b>

### 3 Model Assumptions

Based on the relevant literature, this paper focuses on the dimensions of the excellent performance model, specifies, and proposes hypotheses for the four elements of leadership, resources and environment, customers and markets, and performance results:

#### 3.1 Excellent Performance and Core Competitiveness of Postgraduate Education

The role of leadership in a university's quality management system is straightforward. From the point of view of external leadership, the state and the government can establish a sound incentive mechanism for talent and improve the level of teacher resources and teacher strength in colleges and universities. From the point of view of internal leadership, university leaders can ensure the high-quality development of teaching and learning by improving the teaching quality monitoring and evaluation system, which is conducive to improving student satisfaction [1].

The resources invested by universities in postgraduate education can have a direct effect on the level of research and development of universities and has a significant impact on the development of universities [2]. In addition, teachers are one of the important internal resources of universities. By creating a harmonious working environment and a favorable humanistic atmosphere, universities can improve their motivation and satisfaction with their work, so that they can improve their performance [3].

In the case of universities, the customers are the students, the staff of the educational institution, social employers, educational and research co-operation units, etc. Paying attention to students' opinions and understanding their actual needs can promote the improvement of teaching quality improvement strategy and the quality of the teaching force. Stakeholders' involvement provides organizations with more comprehensive information, diverse ideas, and richer resources, to enhance performance [4].

In the "double first-class" construction effectiveness evaluation methods (for trial implementation), the document explicitly combined the evaluation of first-class university construction with performance results, which indicates that the level of performance has a positive impact on the core competitiveness of postgraduate education.

Based on the above theoretical foundation the following hypotheses are proposed:

H1: Leadership positively contributes to the improvement of core competitiveness of postgraduate education

H2: Resources and environment positively contribute to the improvement of core competitiveness of postgraduate education

H3: Customers and Markets positively contribute to the improvement of core competitiveness of postgraduate education

H4: Performance results positively contribute to the improvement of core competitiveness of postgraduate education

### **3.2 The Mediating Effect of Industry-University-Research Integration**

College leaders can communicate with the relevant business leaders, and according to the needs of enterprises to carry out education and teaching work, to maintain the depth of the integration of university education and business needs [5]. The funds, technology, information, and talents are the basis for the development of Industry-University-Research (hereinafter referred to as IUR) cooperation, which plays an important role in mobilizing the enthusiasm of all parties involved in the cooperation between IUR and promoting the development of the cooperation between IUR [6]. University-enterprise co-operation broadens students' access to academic resources, and offers more opportunities for students, and enterprises can also find talents that meet their needs during this period [7]. Through signing IUR agreements with enterprises, local governments, research institutes, establishing achievement transformation platforms, so that the scientific research achievements of universities can be truly transformed into real-life productive forces, and enhancing the influence of universities in the society.

Based on the above theoretical foundation the following hypotheses are proposed:

H5: IUR integration has a mediating effect in leadership and core competitiveness of postgraduate education

H6: IUR integration has a mediating effect in resources and environment and core competitiveness of postgraduate education

H7: IUR integration has a mediating effect in customers and markets and core competitiveness of postgraduate education

H8: IUR integration has a mediating effect in performance results and core competitiveness of postgraduate education

H9: IUR integration positively contribute to the improvement of core competitiveness of postgraduate education

Finally, based on the above nine assumptions, the theoretical model of this paper is constructed.

## **4 Methodology and Results**

### **4.1 Questionnaire Design and Data Collection**

This paper refers to several mature educational excellent performance questionnaires and scales, the questionnaire was designed with 27 items for six latent variables, and was distributed to including university leadership, teaching staff, students, and related

business personnel. A total of 300 questionnaires were distributed, 293 questionnaires were collected, 5 invalid samples containing outliers and missing values were deleted, and 288 valid samples were obtained. The reliability of the collected data was analyzed, and the Cronbach's Alpha value of 0.927 was obtained for this study, indicating a high level of reliability.

## 4.2 Model Goodness-of-Fit Test

The result of model goodness of fit test is shown in Table 2. By comparing the experimental values with the reference values, it was found that the model goodness-of-fit indices were in accordance with the standard level, indicating that the model was well fitted.

**Table 2.** Model fitting indicators.

Indicators	Model indicator values	Standard	Conclusion
CMIN	408.134		
DF	309		
CMID/DF	1.321	<3 Good fit; <5 Acceptable	Good fit
GFI	0.915	>0.8 Acceptable; >0.9 Good fit	Good fit
AGFI	0.896	>0.8 Acceptable; >0.9 Good fit	Acceptable
CFI	0.976	>0.9 Good fit	Good fit
TLI	0.973	>0.9 Good fit	Good fit
RMSEA	0.033	<0.08 Good fit; <0.1 Acceptable	Good fit

## 4.3 Structural Model Validation

This paper applies the Bootstrap method to test the mediating effect of IUR integration between the key elements of the excellent performance model and the core competitiveness of postgraduate education. The samples are repeated 5,000 times, and the 95% confidence interval is calculated, the final structural equation diagram is shown in Figure 1.

As can be seen from Figure 1, leadership, resources and environment, customers and markets, performance results have a more significant positive impact on the integration of IUR and core competitiveness of postgraduate education; the integration of IUR has a significant positive impact on the core competitiveness of postgraduate education, with a direct impact coefficient of 0.26, which indicates that the integration of IUR can promote the enhancement of the core competitiveness of postgraduate education. The results show that the path coefficients between the variables are less than 0.05, reaching the level of significance, the mediating effect of the integration of IUR is significant, so the original hypotheses H1-H9 are verified, and the test of the mediating effect is shown in Table 3.

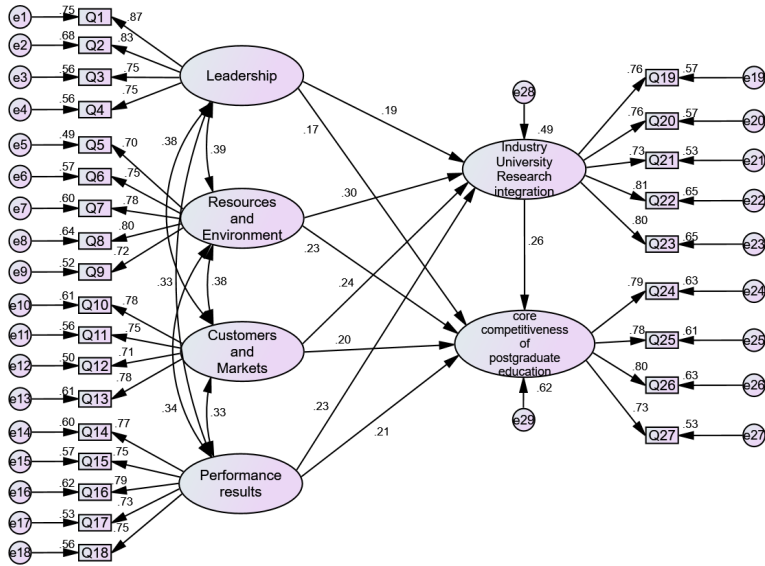


Fig. 1. Structural equation model diagram.

Table 3. Mediation effect test results.

		Bootstrapping		BC95%CI		Percentage
		Est.	Std. Error	Lower Boun ds	Upper Boun ds	
Indirect effect	Leadership	0.051	0.022	0.019	0.109	23.29%
	Resources & Environment	0.078	0.029	0.03	0.146	25.66%
	Customers & Markets	0.063	0.024	0.024	0.122	24.05%
	Performance results	0.062	0.026	0.022	0.127	22.63%
Direct effect	Leadership	0.168	0.061	0.041	0.289	76.71%
	Resources & Environment	0.226	0.064	0.106	0.354	74.34%
	Customers & Markets	0.198	0.067	0.07	0.328	75.57%
Total effect	Performance results	0.212	0.061	0.089	0.331	77.37%
	Leadership	0.219	0.061	0.098	0.34	100%
	Resources & Environment	0.304	0.063	0.179	0.423	100%
Total effect	Customers & Markets	0.262	0.067	0.132	0.394	100%
	Performance results	0.274	0.059	0.156	0.386	100%

#### 4.4 Results Analysis

As can be seen from Table 3, the 95% confidence interval does not contain the number 0, indicating that the integration of IUR plays an important role between the key elements of excellent performance and the core competitiveness of postgraduate education, with the highest proportion of the mediating effect in the pathway of resources and environment and the core competitiveness of postgraduate education, and the mediating effect in the total effect is 25.66%. This is because the investment of educational resources and the optimization of the environment are the basis for the implementation of IUR integration, and the joint establishment of an IUR integration platform by universities and enterprises can provide both sides with opportunities for communication and the sharing of information and resources. At the same time, human resources have an important impact on the performance of the organization, and universities can provide a talent base for the integration of IUR by strengthening the efforts of the construction of practical teaching faculty.

IUR integration plays a partial mediating role between leadership, customers and markets, performance outcomes and core competitiveness of postgraduate education, with mediating effects accounting for 23.29%, 24.05% and 22.63% of the total effect, respectively. In terms of external leadership, the local government plays a crucial role in the IUR integration, and effectively participates in all stages of the IUR institute cooperation through the support of policies and funding, which can implicate and deploy resources in many aspects to ensure the smooth development of the IUR integration cooperation. In terms of internal leadership, university leaders can clarify the market demand through communication and cooperation with enterprises, and encourage students to further condense their research results, so that they can better meet the market demand by transforming their research results into practical products or services, to achieve the coordinated development of IUR.

### 5 Conclusions and Recommendations

This paper combines the concept of excellent performance, which has matured in the field of enterprise management, with postgraduate education, and takes the integration of industry, university and research as the intermediary element, and through investigation and analysis and empirical testing, it is found that the integration of industry, university and research plays a significant intermediary role in the enhancement of the core competitiveness of four key elements of excellent performance in the areas of leadership, resources and the environment, customers and the market, and the performance results of the postgraduate education in Shaanxi universities. Based on the above research results, this study puts forward the following suggestions.

1. The key role of leadership must be fully utilized. The leadership of the government and universities plays a key role in formulating policies. Local governments should coordinate the relationship between enterprises, universities, research institutions and governments, to ensure the smooth development of IUR cooperation, speed up the transformation of scientific and technological achievements into direct productivity and enhance the ability of research results to serve society.

2. Attracting and cultivating talents. Talent cultivation is the core indicator for evaluating the situation of educational excellent performance, and it is also the primary task for universities to improve the core competitiveness of postgraduate education. Universities should take first-class talent cultivation as the basis, to improve students' practical operation and problem-solving ability, and accurately and effectively meet the needs of local industries and the local economy for human resources in universities.

3. Building IUR platforms and optimizing the educational and research environment. Universities can cooperate with enterprises to deeply understand the needs of enterprises and adjust the curriculum and research direction in a targeted way. By building IUR research platforms, providing advanced experimental equipment and technical support, promoting in-depth co-operation with enterprises, promoting the transformation of scientific research results into practical applications, and better serving social and economic development.

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