



# Research on the Promotion of Integration Impetus Management to Integration Performance in Project of Integration Between Industry and Education

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**Abstract.** China has made fruitful achievements in the theoretical research on the integration of industry and education, but many problems have been exposed in practice. Taking universities and cooperative enterprises as research samples, this paper analyses how to effectively manage the integration impetus of industry education integration to improve its performance. Through the research on the “power-performance” of the integration of industry and education in universities and enterprises, this paper reveals the operation mechanism of the integration of industry and education, and enriches the research results of the integration of industry and education. It also provides theoretical basis and practical reference for the government, enterprises and universities to formulate scientific and reasonable support policies and operational guarantees for the integration of production and education.

**Keywords:** Industry and Education Integration · Integration Motivation · Integration Performance · Reliability Analysis · Validity Analysis

## 1 Introduction

### 1.1 Research Background

Governments at all levels and universities have realized the importance and urgency of the integration of industry and education, but the current situation of school enterprise cooperation is not very ideal. From the perspective of the breadth of industry education integration cooperation, the vast majority of colleges and universities still stay in a small number of professional pilot projects; From the depth perspective, The integration of industry and education in most universities is still in the surface form; From the practice of industry education integration, the vast majority of university industry education integration cooperation is unilateral enthusiasm of colleges and universities, lack of stable long-term mechanism of industry education integration, it is difficult to maintain sustainable development. In view of the problems existing in the integration of industry and education, the following reasons are analysed that the management system is rigid.

The cost of integration and coordination is high [1, 2]. The core interests of the school and enterprise are not consistent, and the enthusiasm of cooperation decreases [3]. Lack of conflict resolution mechanism and project execution.

## 1.2 Direction

Based on the research framework of “impetus and performance” [1], this paper puts forward the core issues of this study: why they choose to cooperate with enterprises and how about the integration performance. [2] How to improve the integration performance through cooperative behaviour. [3] How to achieve the integration with enterprises and promote the integration of performance maximization, and ultimately achieve the goal of “educating people”.

## 2 Theoretical Research

There have been some in-depth studies on the motivation of industry university research cooperation in the academic circle. From the initial inclusion of cooperation motivation in other studies, then some scholars began to analyse the motivation of industry university research cooperation from different levels from psychological theory and Inter Organizational cooperation theory.

### 2.1 Motivation

There are three main driving forces for colleges and universities to participate in the integration of production and education: funding driving force, knowledge application driving force and mission driving force. The main manifestations of funding motivation are: obtaining financial support and platform construction. The main manifestations of knowledge application power are: talent training, ability improvement of teachers and students, ability improvement of enterprise employees, etc. The main manifestations of mission power are: to achieve the improvement of the level of running schools and the quality of personnel training, the transformation of scientific research achievements, and the service of regional economic development and industrial upgrading.

#### 2.1.1 Funding Motivation

Universities and enterprises establish a cooperative relationship of production and education integration, which is mainly based on the following points in terms of funding motivation.

Platform construction. For example, under the guidance of national policies, Shanghai Jianqiao University has established cooperation with ZTE Corporation, a major company in the field of communications, and reached an agreement to jointly apply for the national-level production-education integration base construction project “ZTE ICT Industry-Education Integration Innovation Base”, etc.

Obtain expenses. Funding sources include government funding and corporate funding. The school and the enterprise have reached an agreement that if the declared national-level production-education integration construction project is approved, the enterprise

must invest a certain proportion of funds to build the platform. For example, in the construction of the “ZTE ICT Industry-Education Integration Innovation Base” project, the two parties invested 10 million yuan; by 2021, the total equipment assets of the industry-education integration base have reached 80 million yuan.

Dual-qualified teachers. Every year, the company sends a certain number of key engineers to the school to give lectures, enriching the double-qualified teaching staff in colleges and universities.

### 2.1.2 Knowledge Application Motivation

The establishment of a cooperative relationship of production and education integration between universities and enterprises is mainly based on the following points in terms of the power of knowledge application.

To jointly build a double-qualified teaching team. Through the school-enterprise mixed professional construction management team [4], the dynamic management mode of the professional construction mixed team has been created, and the “organic connection between the professional chain and the industrial chain” has been realized; “Organic docking of the job chain”; creating a dynamic management model for teaching materials construction mixed teams, forming a school-enterprise joint development of functional modular textbooks with production cases as the core, and realizing “organic docking between teaching content and production practice content”.

R&D and innovation [5]. Through the school-enterprise mixed scientific research and innovation team, the school-enterprise jointly carries out applied scientific research innovation and development for industries and enterprises.

Professional construction. Starting from three dimensions, namely strong industry correlation, strong corporate correlation and strong regional correlation, around the development strategy of “Made in China 2025” and the development needs of the country’s “One Belt and One Road”, it focuses on the information and communication technology industry, and is student-centred and production-oriented. Out-oriented, establish a “dual matrix” talent training plan and curriculum system in which talent training goals correspond to job requirements, and job requirements correspond to the curriculum system.

Improve students’ ability. The organic integration of the teaching of school teachers and enterprise engineers enables students to have a deeper grasp of knowledge and skills. Taking advantage of the in-depth integration of production and education, and relying on the rich engineering experience of professional engineers in enterprises, a set of vocational skills training camp system is tailored for students of industrial colleges. Through the “integrated teaching of theory and practice” platform, theoretical teaching and practical teaching are effectively connected. In the process of class, students can directly operate the equipment, and the teaching content is completed in the form of projects, so that the students’ knowledge mastery and skill training effect are better.

### **2.1.3 Mission Power**

The establishment of a cooperative relationship of production and education integration between colleges and enterprises is mainly based on the following points in terms of mission motivation.

**Collaborative education.** The core of the university's mission is to cultivate talents; for example, guided by the OBE education concept, facing the development and needs of the industry, it explores and builds a new mechanism for talent cultivation that meets the requirements of the industry and enterprises. Enterprises can provide colleges and universities with a real working environment for talent training, and colleges and universities can provide enterprises with a "talent pool" for enterprise employee echelon construction. The in-depth integration of production and education, school-enterprise cooperation and collaborative education focus on the reform and improvement of the teaching mode, which includes teaching objectives, teaching content, teaching design, teaching methods and teaching evaluation.

**Serve regional economic development.** Taking the leading industrial clusters urgently needed in the region as the service object, based on the original characteristic professional foundation and advantages of universities, we will build professional clusters that are consistent with the needs of industrial clusters and industrial chains. Focusing on the strategic emerging industries that are mainly developed by the country and the Lingang New Area, relying on the Ministry of Education's industry-education integration platform and the regional school-enterprise cooperation platform that has been built and operated by the school, it adopts the mutual employment and mutual assistance of teachers and engineers, and the dual acceptance of students and prospective employees. The "dual nature" model of the teacher's identity carries out practical teaching and professional research and development in its production-education integration base.

## **2.2 Evaluation Standard**

On the basis of the existing research, this study adopts the subjective measurement method to measure the performance of the integration of production and education, mainly focusing on three aspects: goal achievement, cooperation satisfaction and integration contribution.

### **2.2.1 The Degree of Goal Achievement**

The goal achievement column is an important indicator to reflect the performance of the integration of production and education. A well-functioning fusion of production and education can ensure that the expected goals of the partners are achieved. This is because the evaluation of the performance of the integration of industry and education is based on the expectations of the partners. If the integration of industry and education achieves the initial goals of the partners, it can be considered that the integration of industry and education is running well. Conversely, if the goal of the partner cannot be achieved, this is a manifestation of the inefficiency of the fusion of production and education.

### 2.2.2 Cooperation Satisfaction

Cooperation satisfaction refers to the degree of satisfaction of partners with the operation process, operation results and operation efficiency of the integration of production and education. The integration of production and education is not a simple project cooperation, but a strategic fusion formed by the government, enterprises and universities based on the purpose of knowledge creation and marketization. Cooperation satisfaction is closely related to all aspects of fusion power and cooperation behaviour. Cooperation satisfaction will ultimately be manifested through fusion performance. Therefore, cooperation satisfaction is an important indicator to measure the performance of industry-education integration.

### 2.2.3 Contribution of Fusion

Contribution of integration refers to the contribution of industry-education integration to the market competitiveness of partners, which is also an important aspect of industry-education integration performance. As an important way for colleges and universities to improve the level of running schools and the quality of personnel training, and for enterprises to improve their technological innovation capabilities and enhance their market competitiveness, the performance of industry-education integration and cooperation is ultimately reflected in the contribution to the comprehensive competitiveness of colleges and enterprises. The greater the contribution of the fusion to the comprehensive competitiveness of partners, the higher the performance of the fusion of industry and education; and vice versa.

## 3 Questionnaire Design

The core variables that need to be measured in this study are difficult to measure by point quantitative indicators, so the subjective scoring method of the Likert seven-point scale is used for evaluation. Numbers 1–7 represent 7 grades from “strongly disagree” to “strongly agree”.

This study defines the power of integration as the power of industry-education integration participants to carry out the integration of industry and education, and divides the power of industry-education integration into three categories: funding motivation, knowledge application motivation, and mission motivation. Combined with domestic and foreign research literature, scale reference and actual interviews, 13 initial questionnaire items were designed, as shown in Table 1.

**Table 1.** Initial scale of integration impetus

variable	dimension	Measurement items	Item source or basis
integration impetus	Funding motivation	M1 in response to the policy needs of the government	Spyros arvanitis et al. (2008), Deng Yingxiang et al. (2009), Ramos vielba et al. (2016), Iorio et al. (2017), Huang (2018), Yang Xiaowan (2019), Xiao Lin (2019), expert opinions and interview feedback
		M2 in order to obtain more funds	
		M3 in order to obtain more experimental conditions and data	
		M4 for higher income	
	motivation of knowledge application	M5 in order to improve teachers' professional ability	
		M6 in order to obtain advanced scientific research equipment and outstanding personnel training quality	
		M7 is to help enterprises solve practical problems in the industry	
		M8 for students to better employment, in order to be able to better application of knowledge	
		M9 in order to help enterprises improve the rate of return on investment	
	Mission motivation	M10 in order to help upgrade the regional industrial structure	
		M11 in order to cultivate applied talents for local economic development	
		M12 in order to popularize and transform the research results	
		M13 to enhance its image and reputation	

## 4 Reliability and Validity Analysis

Reliability analysis lies in whether the research data are true and reliable, also known as “reliability analysis”. It mainly studies the authenticity of the samples and tests whether the respondents answer the questions well. Specifically, it refers to the consistency of the results obtained when the survey objects are repeatedly measured with the questionnaire. Generally, reliability analysis can only be carried out on the scale questions.

Validity analysis lies in whether the research items effectively express the conceptual information of the research variables or dimensions, and whether the design of the main research items is appropriate, that is, whether the investigators scientifically design the questions, or whether the items represent the appropriateness of a variable.

A total of 50 questionnaires were distributed through the “questionnaire star” platform and 48 were recovered. One questionnaire with the same answer and two questionnaires with more than 25% missing items were deleted. Finally, 45 valid questionnaires were received, with an effective recovery rate of 90%.

In this study, the driving force of industry education integration is divided into three dimensions: knowledge application motivation, funding motivation and mission motivation. By using SPSS analysis tools, the reliability and validity of the integration impetus are analysed respectively. The results are shown in Tables 2 and 3.

**Table 2.** Reliability test results of integration impetus (n = 45)

dimension	Item	mean value	standard deviation	CICT	Cronbach's with item deleted $\alpha$ coefficient	Cronbach's $\alpha$ coefficient
Funding motivation	M1	6.156	1.205	0.551	0.610	0.724
	M2	5.400	1.629	0.590	0.570	
	M3	6.000	1.148	0.593	0.593	
	M4	5.244	1.240	0.445	0.765	
Motivation of knowledge application	M5	6.222	0.997	0.699	0.819	0.861
	M6	5.933	1.176	0.785	0.791	
	M7	5.978	1.118	0.766	0.798	
	M8	6.022	1.158	0.751	0.801	
	M9	5.200	1.272	0.397	0.898	
Mission motivation	M10	5.444	1.289	0.492	0.813	0.803
	M11	6.178	1.007	0.565	0.772	
	M12	5.889	1.191	0.724	0.689	
	M13	5.800	1.179	0.689	0.708	

**Table 3.** Results of exploratory factor analysis of integration impetus (n = 45)

Item	Factor 1	Factor 2	Factor 3	Factor 4
M1	0.880	0.035	0.173	0.187
M2	0.611	0.606	-0.328	-0.110
M3	0.817	0.126	0.246	0.084
M4	-0.046	0.851	0.106	0.222
M5	0.839	-0.039	0.370	0.048
M6	0.747	0.325	0.255	0.260
M7	0.506	0.191	0.702	0.240
M8	0.568	0.258	0.707	-0.221
M9	0.127	0.905	0.151	0.078
M10	0.129	0.866	0.314	0.045
M11	0.812	0.070	0.310	0.167
M12	0.336	0.276	0.798	0.257
M13	0.449	0.350	0.205	0.763
Kmo value	0.829			
The approximate chi square value of Barrett's test	498.897			
df	78			
Sig.	< 0.01			
Explained variance ratio (%)	84.75%			

## 5 Conclusion

According to the reliability test results, the Cronbach's  $\alpha$  coefficient of each item analyzed was greater than 0.70, and the initial CICT coefficient was greater than 0.35. From the exploratory factor test results, when 13 items are added, the load of all factors is greater than 0.50, the total variance is 84.75%, the KMO value is 0.829, greater than 0.70, Bartlett's test approximate chi square value is 498.897, and the probability of significance is 0.00, This indicates that the scale of integration of industry and education can be used for exploratory factor analysis.

The factor analysis results show that this three-dimensional dimension is the key dimension of the integration of production and education. Through the analysis of sample data, the empirical results show that two fusion power dimensions have a significant impact on fusion performance, among which funding motivation has a positive impact on fusion performance, and knowledge application motivation has a positive impact on fusion performance. Although previous studies have shown that teachers also have the driving factors of mission motivation, their practical effect is not significant. The possible reason is that high-level mission positioning has not been formed, and more practical problems of enterprises are solved in practice. Based on the above analysis, if



the mission motivation is strengthened in the integration impetus management, it will further promote the improvement of fusion performance.

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