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# Research on the Influencing Factors of Foreign Teachers' Scientific Research Efficiency Based on LMDI: A Case Study of Jiangsu University

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**Abstract:** Under the promotion of the internationalization process, foreign intelligence introduction has become an important work of Chinese universities, and the introduction of foreign talents can achieve the goal of "gathering the world talents and using it". This paper qualitatively analyzes the factors that affect the efficiency of foreign teachers' scientific research, including the employment management system, humanistic care and incentive mechanism, resource conditions and scientific research atmosphere. And this paper based on Kaya identity uses the LMDI model in stages to study the influencing factors of Jiangsu university foreign postdoctoral scientific research output in 2014-2021, the empirical results show that the total funding, scientific research enthusiasm, funding efforts and project cost have a positive effect on scientific research output, and the capital introduction efficiency, population structure and paper quality hindered the foreign postdoctoral scientific research output. Based on this, this paper gives the corresponding policy suggestions that Jiangsu University should strengthen the allocation for foreign teachers, rationally use funds to fund foreign teachers' scientific research projects and build a soft environment for scientific research, introduce talents in various aspects, accelerate the internationalization of higher education, build a harmonious environment to improve the enthusiasm, formulate appropriate funding plans and improve the relevant management measures, so as to provide theoretical support for Jiangsu University to strengthen the scientific research efficiency of foreign teachers.

**Keywords:** Foreign Teachers, Scientific Research Efficiency, Foreign Intelligence Introduction

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## 1. Background

Globalization of economy and world integration have contributed to the unstoppable trend of internationalization in higher education. The recruitment of foreign teachers is an important strategy to improve the output and efficiency of scientific research in universities, as well as promote international cooperation and exchange. It was announced by the Ministry of Education in China on February 8, 2022, that the annual work points and the implementation of foreign teacher appointment and management measures (practice) are in place, enabling foreign teachers to access comprehensive information services, standardizing foreign teacher management, and promoting a high level of education that is open to the outside world, through the formulation of specific

measures regarding management services, supervision responsibilities, qualification requirements, etc. Therefore, bringing high-level talents to Chinese colleges and universities is the only way to develop these institutions internationally.

International exchanges of education have become increasingly common as education has developed and educational reform has progressed. We have a long history of foreign exchange, since China opened the process of internationalizing education in the middle of the 19th century. Over the past century, numerous educational reforms have allowed China to acquire a great deal of foreign-related wisdom, and universities are now committed to the internationalization of higher education and the introduction of talent. At present, China is one of the world's largest exporters of international students and one of the world's

largest destinations for international students. In order to cultivate talent and recruit high-level foreign talent, colleges and universities are responsible for bringing up talents. Therefore, college education plays an essential role in cultivating talent and recruiting foreign high-level talent. In colleges and universities we have a strong international atmosphere due to strong Sino-foreign cooperation and the rapid growth of foreign teachers.

The introduction of high-level talents plays an essential role in improving the scientific research output of foreign teachers and in promoting the development of international education in China. Currently, colleges and universities are actively responding to the government's call to introduce high-level talent and strengthen the training and management of foreign teachers. Jiangsu University also issued the Jiangsu University international cooperation and communication policy; Jiangsu University's foreign postdoctoral research management policy (Jiangsu University, 2021, no. 313); Jiangsu University's university foreign staff employment and management measures (test run) (Jiangsu University 2021, 243); and related policies, and has a basic basis for foreign affairs, but certain defects remain in improving foreign teachers' scientific research efficiency.

Jiangsu University, as the cradle of breeding for high-level scientific research talents, has always been focused on the development of scientific research projects, and has provided the corresponding financial support. Foreign teachers have also made some contributions to scientific research, but there are still a number of deficiencies. According to the output ratio and the proportion of scientific research autonomy, foreign teachers at Jiangsu University contribute only a small portion of their scientific research achievements. Although they have published a large number of papers, they do not have the opportunity to publish internationally. Similarly, the proportion of scientific research funding was lower than expected, and insufficient funding, poor enthusiasm for scientific research, excessive attention to paper quality and other problems also contributed to foreign teachers' low scientific research efficiency. Efforts must be made to improve the work efficiency of foreign talent on an urgent basis.

## 2. Literature Review

In China, the introduction of talents has been ongoing for over a century. Bai Yan (2001), based on the centennial process of hiring foreign teachers at Peking University, analyzed the characteristics of the times of hiring foreign teachers across all stages of China, and concluded that it has many advantages [1]. Zhang Yichuan (2017) suggests that the introduction of talents plays a positive role in promoting the ranks of world-class universities, and is conducive to improving the internationalization degree of universities [2]. According to Sun Yutao (2021), foreign teachers can significantly enhance the quality of scientific research output at universities by using the dual difference analysis method [3]. Using the historical institutionalism paradigm, Zhang Hanwen (2022) examined the internal logic of China's talent

introduction policy and suggested the most effective path for building China's international talent team [4].

It has been noted by Xie Yong (2013) that foreign teachers in China have failed to perform scientific research of the desired quality and quantity [5]. According to Wu Dianlong (2015), foreign teachers in colleges and universities generally lack purpose and systematization, which is manifested in great randomness, leading to a low degree of scientific efficiency [6]. As for the factors affecting the scientific research efficiency of foreign teachers, the following conclusions are found by domestic and foreign scholars:

### 2.1. Influence of the Employment Management System on the Scientific Research Efficiency of Foreign Teachers

Krishna (2015) took Singapore's overseas talent introduction policy as an example, and pointed out that the systematic introduction policy and the authoritative management system are an effective means to attract foreign teachers [7]. Zhang Lihui (2018) applied the competency model of foreign teachers through the establishment of the selection and selection of foreign teachers [8]. Liu Lu (2019) pointed out that the global search for talents and the introduction and improvement of the management mode are conducive to accelerating the improvement of China's talent internationalization and modernization system [9]. According to Wang (2022), based on the current situation of foreign teachers in colleges and universities, a goal-oriented method of management and supervision of teacher training is essential in ensuring the modernization and internationalization of education [10].

Jiang Ying (2014), based on the special research on foreign teachers, found that the traditional management system of colleges and universities is closed and backward, and it needs to be reformed urgently [11]. Li Guanghai (2015) and Shi Wanbing (2015), based on the Robbins work pressure model, found that the traditional management system is easy to negatively affect the work pressure of foreign teachers, thus leading to the decline of their work efficiency [12, 13]. Gao Yan (2019) used Bicom and SPSS softwares to visually analyze the knowledge graph of foreign teachers, and found that optimizing the optimal management system is an important guarantee to stimulate the internal vitality of the construction of foreign teachers [14]. CAI Lianyu (2021) believed that the "heavy bottom" problem in Chinese universities leads to the poor research performance of some teachers [15]. According to Huang Kan (2021), universities are lacking in scientific research management, and improving the effectiveness of scientific research in universities will require transforming scientific research management ideas and taking effective measures [16].

### 2.2. Influence of Humanistic Care and Incentive Mechanism on the Scientific Research Efficiency of Foreign Teachers

Marcus (2017) argued that sound evaluation and incentive measures were important in improving the efficiency and reliability of scientific research innovation [17]. It has been

found by Yan (2018) that the establishment of an incentive mechanism can significantly improve the efficiency of scientific research at universities [18]. Chen Jie (2020) conducted a research based on the dynamic change of psychological contract theory, pointing out that the exchange and incentive system of colleges and universities did not meet the psychological expectations of foreign teachers, and the spiritual care and support of foreign teachers were insufficient [19]. Zhang Liwei (2020) drew lessons from the two-factor theory of "incentive--health care", and analyzed the work and life needs of scientific research talents of all ages and fielded to explore their internal needs [20]. Hu Juan (2021) found that the continuous output of high-quality academic achievements in universities benefits from the combination mode of "high threshold + weak incentive", and the income of scientific research in universities is expected to maximize [21]. Li Tianyu (2022) pointed out that the salary system that combines constraints and incentives enables researchers to improve their performance while avoiding irrational loss [22]. Dzie z yc (2022), based on a new scientometric measure, discussed the impact of incentive grant support on scientific research output, and demonstrated that the subsidy system is one of the factors affecting the effectiveness of scientific research [23].

In Wang Wanzhi (2015), he summarized the cross-cultural management methods used by foreign teachers in colleges and universities, and pointed out that the most effective way to improve foreign teachers' work efficiency is to implement an innovative incentive mechanism combining internal and external factors [24]. Huang Jianguo (2018), based on the Super-SBM static analysis method and the Malmquist index model, found that the improvement of incentive measures and incentive system has played a positive role in stimulating teachers' initiative in scientific research work [25]. Li Xiaoyan (2018) pointed out that the institutional guarantee for building a first-class scientific research team is the combination of institutional norms and institutional incentives, supplemented by humanistic care [26]. According to Pan Qingzhong (2021), international talent evaluation and incentive mechanisms should be strengthened in order to stimulate the innovative spirit and enthusiasm of international talents, improve China's international talent incentive mechanism, and ultimately improve the benefits of scientific research [27]. In Yang Rongbin's (2022) article, he emphasized the necessity of a comprehensive incentive mechanism in order to stimulate overseas talent's motivation and academic potential for scientific research [28].

### **2.3. Influence of Resource Conditions and Scientific Research Atmosphere on the Scientific Research Efficiency of Foreign Teachers**

Yu Qiuya (2013) makes the claim that universities should develop disciplines and provide scientific research conditions so that overseas talents can be attracted. Chinese universities, however, suffer from a number of issues, including a weak scientific research environment, a backward scientific research platform, and a lack of resources [29]. Qiu Jiayi

(2019) pointed out that there is a "Matthew effect" in scientific research resources in universities, which causes a waste of resources to some extent [30]. Su Hui (2020) established DEA-BCC model and Tobit model, and found that human capital is scarce but redundancy research funds is the biggest obstacle to the full development of scientific research in domestic universities [31]. Chen Zhuo (2021) pointed out that the imbalance of scientific research resources is the main reason for the reduction of scientific research efficiency in domestic universities in recent years [32]. Xu Xiaodong (2021), based on the super-efficiency and Malmquist index decomposition, found that the mismatch between funding investment and personnel investment will lead to the reduction of scientific research efficiency [33]. Li Kang (2022) based on the DEA model research found that the supply of university teacher resources and internationalization in China is insufficient, and the redundancy of student resources is not conducive to the improvement of scientific research efficiency in universities [34].

A study conducted by Wu (2020) has found that improvements in scientific research investment and teacher innovation efficiency are partially responsible for an increase in student resources [35]. Zong Xiaohua (2020) applied the DEA-BCC model and the DEA window analysis method to measure the scientific research efficiency of the universities, and found that improving the utilization rate of scientific research funds can effectively improve the scientific research efficiency of the first-class universities in China [36]. Cao (2021) studied the relationship between consumer price and resource allocation in universities in order to improve the scientific research efficiency of university teachers [37]. Fu Qiong (2021), based on the DEA-fsQCA model, found that optimizing the path of scientific research funding in China is an effective means to improve the efficiency of scientific research in universities [38]. Based on the rooted theoretical analysis of interview data of university researchers, Xia Qing (2022) developed a model of factors affecting the enthusiasm for scientific research in universities, and found that external factors such as resources and scientific research atmosphere affected university researchers' scientific research passion to some degree [39]. Using the three-stage DEA method, Zhang (2022) constructed reasonable resource allocation plans by analyzing the effectiveness of teachers' scientific research and innovation while controlling variables such as economic growth, innovation, infrastructure, and natural environment [40].

To sum up, there are many research results on the scientific research efficiency of foreign teachers. However, few studies can quantify the influencing factors, and put forward corresponding policy suggestions on this basis. In this paper, we construct a LMDI decomposition model, analyze the influencing factors of foreign postdoctoral research efficiency at Jiangsu University, and combine them with the total allocations, the efficiency of capital introduction, foreign postdoctoral population structure, research enthusiasm, funding, project cost, and paper quality to generate policy recommendations.

### 3. Model Building

#### 3.1. The Kaya Identity, Eq

The Kaya identity was proposed by the Japanese professor Yoichi Kaya<sup>1</sup>, mainly through the concise mathematical formula to describe the relationship between the factors. This formula has the advantages of simple form and strong explanatory power. This paper fully understands the analysis results of relevant research, based on the existing theoretical knowledge, and on the basis of the original Kaya identity, constructs the decomposition model of foreign scientific research efficiency of foreign postdoctoral factors, and the scientific research achievements of foreign postdoctoral in the *t*-year of Jiangsu University  $C_t$  the decomposition is as follows:

$$C_t = \sum C_{ij} = M \times \frac{P}{M} \times \frac{P_i}{P} \times \frac{T_i}{P} \times \frac{F_i}{T_i} \times \frac{C_i}{F_i} \times \frac{C_{ij}}{C_i} \quad (1)$$

In formula:  $C_t$  indicates the total amount of foreign postdoctoral research achievements in Jiangsu University in *t* period;  $M$  represents the total allocation in *t* period in (ten thousand yuan);  $P$  indicates the number of foreign postdoctoral achievements in *t* period in (person);  $P_i$  indicates the number of foreign postdocs in *i* area in period *t* in (person), with *i*=1 is Asia and *i*=2 is Africa;  $T_i$  indicates the number of projects approved in *i* period in (item);  $F_i$  indicates the strength of foreign postdoctoral funding in *t* period *i* in (ten thousand yuan);  $C_i$  indicates the total number of papers published by foreign postdocs in region *i* during period *t* in (part);  $C_{ij}$  represents the *j* quality scientific research results published by foreign postdoctoral students in region *i* in (article), where *j* = 1 is SCI and *j* = 2 is non-SCI.

#### 3.2. LMDI Decomposition Method

LMDI decomposition model (log-average Di decomposition method) is an analysis method based on exponential decomposition method. It has the advantages of eliminating residuals, practical and simple, complete decomposition, easy to explain, and has the uniqueness, which is widely applicable to the study of all kinds of influencing factors. In this paper, foreign postdoctoral in Jiangsu University was selected as the research object of the influencing factors of foreign intelligence introduction, and LMDI model was quoted to analyze the scientific research work of foreign postdoctoral in Jiangsu University from 2014 to 2021. The factor decomposition method was proposed by Ang *et al.* to analyze the influence of different factors on the study subjects. According to formula (1), considering the change of foreign postdoctoral scientific research achievements of Jiangsu University from period 0 to period *t*, the addition is decomposed into the following forms:

$$\Delta C_{i,0} = C_t - C_0 = \Delta C_M + \Delta C_P + \Delta C_S + \Delta C_Y + \Delta C_T + \Delta C_K + \Delta C_G \quad (2)$$

In formula (2), assuming  $I = P / M$  is the capital introduction

efficiency in period *t*;  $S = P_i / P$  is the population structure of foreign postdocs in Jiangsu University during period *t*;  $Y = T_i / P_i$  is the scientific research enthusiasm of the foreign postdoctoral fellow in the *i* region;  $A = F_i / T_i$  is the financial support for foreign postdocs in region *i*;  $K = C_i / F_i$  is the cost for foreign postdoctoral papers in *i*;  $G = C_{ij} / C_i$  is the quality of papers published for foreign postdocs in region *i*.<sup>2</sup>

The change in foreign postdoctoral research efficiency from year 0 to year *t* can be expressed as follows:

$$\left\{ \begin{aligned} \Delta C_M &= \sum \frac{C_t - C_0}{\ln C_t - \ln C_0} \ln \left( \frac{M_t}{M_0} \right) \\ \Delta C_P &= \sum \frac{C_{i,t} - C_{i,0}}{\ln C_{i,t} - \ln C_{i,0}} \ln \left( \frac{I_{i,t}}{I_{i,0}} \right) \\ \Delta C_S &= \sum \frac{C_{t,t} - C_{i,0}}{\ln C_{i,t} - \ln C_{i,0}} \ln \left( \frac{S_{i,t}}{S_{i,0}} \right) \\ \Delta C_Y &= \sum \frac{C_{t,t} - C_{i,0}}{\ln C_{i,t} - \ln C_{i,0}} \ln \left( \frac{Y_{i,t}}{Y_{i,0}} \right) \\ \Delta C_A &= \sum \frac{C_{t,t} - C_{i,0}}{\ln C_{i,t} - \ln C_{i,0}} \ln \left( \frac{T_{i,t}}{T_{i,0}} \right) \\ \Delta C_K &= \sum \frac{C_{t,t} - C_{i,0}}{\ln C_{i,t} - \ln C_{i,0}} \ln \left( \frac{K_{i,t}}{K_{i,0}} \right) \\ \Delta C_G &= \sum \frac{C_{t,t} - C_{i,0}}{\ln C_{i,t} - \ln C_{i,0}} \ln \left( \frac{G_{i,t}}{G_{i,0}} \right) \end{aligned} \right. \quad (3)$$

In formula:  $\Delta C_M$  indicates the total amount of change to foreign postdoctoral allocation in (ten thousand yuan);  $\Delta C_P$  reflects the impact of the change of capital introduction efficiency on foreign postdoctoral research work, the unit is (person / ten thousand yuan);  $\Delta C_S$  represents the change in the demographic structure of the foreign postdoctoral fellow in (person);  $\Delta C_Y$  reflects the influence of the change of foreign postdoctoral research enthusiasm on scientific research work, the unit is (item / person);  $\Delta C_A$  represents the change of the intensity of foreign postdoctoral funding, the unit is (ten thousand yuan / item);  $\Delta C_K$  represents the change of the cost of foreign postdoctoral project in (article / ten thousand yuan);  $\Delta C_G$  represents the change in the quality of the papers published by foreign postdocs in (articles). The specific results are shown in Table 1.

Table 1. Conclusion of Foreign Postdoctoral in Jiangsu University.

Chinese name	Variable values	The New Year, 2014-2017	The New Year, 2018-2021
Total allocation	$\Delta C_M = 428.90028$	$M = 386.833$	$M = 3077.0881$
Efficiency of capital introduction	$\Delta C_P = -233.215$	$\frac{P}{M} = 0.085308$	$\frac{P}{M} = 0.027624$
population structure	$\Delta C_S = -45.2514$	$\frac{P_1}{P} = 0.606061$ $\frac{P_2}{P} = 0.393939$	$\frac{P_1}{P} = 0.741176$ $\frac{P_2}{P} = 0.258824$
Scientific research enthusiasm	$\Delta C_Y = 48.82016$	$\frac{T}{P} = 0.738462$	$\frac{T}{P} = 0.746753$
Funding strength	$\Delta C_A = 343.8757$	$\frac{F}{T} = 13.34571$	$\frac{F}{T} = 28.99312$
Cost of project funds	$\Delta C_K = 60.54549$	$\frac{C}{F} = 1.84567$	$\frac{C}{F} = 1.914729$
Paper quality	$\Delta C_G = -149.395$	$\frac{C_{i1}}{C} = 1.315789$	$\frac{C_{i1}}{C} = 1.660984$
		$\frac{C_{i2}}{C} = 0.684211$	$\frac{C_{i2}}{C} = 0.339016$

<sup>1</sup>Reporting by Professor Yoichi Kaya (1990) at I PCC's workshop.

<sup>2</sup>The above data are all obtained from the postdoctoral studio of Jiangsu University.

## 4. Analysis of Empirical Conclusion

### 4.1. Changes in the Total Amount of Funding for Foreign Postdocs

Compared with the allocations from 2014-2017 to 2018-2021, it is obvious that the total allocation of Jiangsu University to foreign postdoctoral fellows has increased significantly, from 3868330 yuan to 30778881 yuan. In recent years, the ministry of education has been updating and revising the "Methods for the appointment and management of foreign teachers" to make the introduction of foreign talents more standardized and definite. In addition, the deepening development of economic globalization has increasingly highlighted the trend of internationalization. As China's economic development booms, exchanges and cooperation with foreign countries are also essential. With the rapid economic development and the practical implementation of the strategy of "talent power", Jiangsu University keeps pace with the times, attaches more importance to the introduction of high-level foreign talents, increases funding to enhance the scientific research ability of foreign postdocs, and builds a high-quality and international research team.

### 4.2. Influencing Factors of Changes in Capital Introduction Efficiency

Jiangsu University's fund introduction efficiency ratio of foreign postdocs decreased from 0.085308 to 0.027624, indicating a negative growth trend, which mitigated the growth of foreign talents' scientific research achievements. From the data analysis, Jiangsu University of foreign postdoctoral funding growth than foreign postdoctoral scientific research output growth speed, reflects the fund use efficiency decline and the shortage of resource allocation, obviously, is suitable for each other form a complete set of international talent and financial support to realize the scientific research activities smoothly, therefore, The article will raise reasonable suggestions on the reasonable use of funds. The scientific research funds of Jiangsu University include government and enterprise funding sources. Recently, the investment of foreign postdoctoral research funds has increased greatly. Since Jiangsu University has a large number of teachers and students, strong government support, and a relatively developed region, it may be redundant and inefficient to use its scientific research funds.

### 4.3. Influencing Factors of Population Structure of Foreign Postdocs

From the perspective of the population structure of foreign postdocs at Jiangsu University, the proportion of foreign postdocs in Asia and Africa from 2014 to 2017 was 0.606061 and 0.393939, respectively. From 2018 to 2021, the proportion of foreign postdocs in Asia was 0.741176, and that in Africa was 0.258824. At Jiangsu University, the population structure coefficient for foreign postdocs is negative, which means that the change in population structure has a negative impact on foreign postdocs' scientific research efficiency. Based on the

results of the analysis, Jiangsu University has gradually introduced more foreign postdocs from Asia in recent years; however, the number of foreign postdocs from Africa has decreased, and the number of foreign postdocs from Africa has decreased more than the number of foreign postdocs from Asia. As a result, the changes in the population structure of foreign postdocs at Jiangsu University have a negative impact on their research efficiency, thereby hindering their development. As part of the introduction of foreign talent, the focus should not only be on the increase in numbers of talents, but also on ensuring that high-level talents are evenly and balanced across the country, enhancing the clustering effect of foreign postdoctoral researchers, strengthening the training and exchange of overseas personnel, and building a world-class scientific research team.

### 4.4. Influencing Factors of Foreign Postdoctoral Research Enthusiasm

Due to the attraction of national policies, social environment, economic conditions, and other factors, foreign postdocs are becoming increasingly enthusiastic about scientific research, which has in turn led to the advancement of foreign postdoctoral scientific research work. Based on the empirical data, the ratio of scientific research enthusiasm increased from 0.738462 to 0.741176. With the growth of reform and opening up in China, the advancement of law construction, scientific and technological innovation, and the emphasis on science and technology knowledge and support, these factors not only make China a more powerful economic and social force, but also allow Jiangsu University to fully implement the policies of foreign countries in their own development. In addition to this, they also have the necessary and relatively comprehensive academic conditions and research platform for robust research. All these measures greatly enhance the enthusiasm of foreign postdocs for scientific research. Overseas talents pay more attention to the psychological harvest. As the political and economic development level has increased, so has the enthusiasm for scientific research, which means that the psychological needs of overseas postdocs are satisfied and the agglomeration effect of overseas talents has been created, thereby enhancing the efficiency of scientific research and making exchanges and cooperation more convenient and efficient.

### 4.5. Decomposition of Influencing Factors of Changes in Funding Intensity

From the analysis of the ratio of funding intensity, the ratio was 13.34571 in 2014-2017 and 28.99312 in 2018-2021. The increase of project funding in Jiangsu University has played an incentive role in the scientific research of foreign postdocs. Foreign talents have their own understanding and expectations in the process of working, and funding often plays an important role. In the early stages of applying for foreign postdocs, there are relatively more economic and material exchanges, which also influence the efficacy of scientific work. By providing adequate financial support,

foreign postdocs can meet most of their needs, live better in China, and be fully accepted and tolerated by Chinese society. As a result of emotional support and material gain, Jiangsu University and foreign talents can achieve long-term stable development, and foreign postdocs can increase their scientific research achievement. Moreover, it facilitates Jiangsu University's development of an international scientific research environment and a higher level of scientific research.

#### **4.6. Influencing Factors of Project Fund Cost Variation**

The project cost ratio increased from 1.84567 to 1.914729. The data analysis about project funding cost shows that the change of funding cost does not have a significant impact on the scientific research efficiency of foreign postdocs, but it still has a certain enhancing effect. The investment of project funds is a rigid and strict method of fund allocation. Taking on project work can provide foreign postdocs with more economic resources. This method is relatively fair and objective, and can make foreign postdocs more free and independent, which is "a reliable ruler". With the help of project funding, foreign postdocs can obtain funds based on their own needs and work abilities, and have their intelligence and labor rewarded with ideal returns and adequate material treatment. Additionally, the amount of funding can also be used to measure the performance of foreign postdocs, which will improve their research efficiency.

#### **4.7. Influence of Quality Change of Foreign Post-Doctoral Papers**

Through factor decomposition analysis, the ratio of SCI papers and non-SCI papers from 2014 to 2017 was 1.315789 and 0.684211 respectively. From 2018 to 2021, the ratio of SCI papers was 1.660984, and the ratio of non-SCI papers was 0.339016. It can be seen that the implementation of relevant policies in Jiangsu University has promoted the quality of foreign post-doctoral papers published, but also caused a decline in the number of papers. The comparison between the two stages shows that the number of SCI papers published by foreign postdocs increases and accounts for the majority of the total number of papers, but the number of non-SCI papers decreases and only accounts for a small part of the total number of published papers. It is found that the publication of international high-quality papers is not conducive to the improvement of the scientific research efficiency of foreign postdocs. The publication of high-quality papers requires authors to invest more time and energy. In the same period, the output quantity of high-quality papers is undoubtedly lower than that of low-quality papers.

## **5. Policy Suggestions**

To explore the influencing factors of foreign intelligence introduction in Jiangsu University, the purpose is to improve

the efficiency of scientific research output of foreign teachers in Jiangsu University, promote the international cooperation and exchange of Jiangsu University, and fully realize the internationalization of higher education. In view of these objectives, the following policy recommendations are put forward:

### **5.1. Strengthen the Allocation of Foreign Teachers**

According to the data contrast, increase the amount of funding to help improve foreign teachers' scientific research ability, in order to promote foreign teachers' scientific research work, we should increase the intensity of appropriations, colleges and universities should give foreign teachers reasonable subsidy support, preferential housing conditions and pay wages, the government should also give foreign teachers housing subsidies, research grants, in order to improve the scientific research ability and efficiency of foreign teachers.

### **5.2. Promote the Rational Use of Scientific Research Funds**

The financial support for foreign teachers has increased significantly as a consequence of government support and the large number of students and teachers, resulting in a situation of fund redundancy. For fund utilization to be efficient, reasonable fund utilization must be the cornerstone. To stimulate the enthusiasm of foreign teachers in various regions, the government should provide greater financial support to provinces with high scientific research efficiency. Additionally, the government should pay attention to universities that have high scientific research efficiency and not blindly provide financial support, which would result in the waste of scientific research funds.

### **5.3. Introduce High-Level Overseas Talents in Various Ways**

In order to alleviate the impact of population structure change on scientific research efficiency, we should adopt a balanced and reasonable introduction method, introduce high-level overseas talents in various directions, and promote the formation of the aggregation effect of foreign teachers. High-level talents, as the cornerstone of the continuous growth of colleges and universities, are an indispensable force to promote the internationalization of higher education. We should devote ourselves to building a group of international teams, promoting overseas exchanges and accelerating the internationalization of higher education.

### **5.4. Enhance the Active Scientific Research of Foreign Teachers**

#### **5.4.1. Construct a Harmonious and Relaxed Soft Environment for Scientific Research**

It is necessary for universities to create a free, relaxed, harmonious and open research working environment in order to further enhance foreign teachers' enthusiasm for scientific research. The survey indicates that foreign teachers choose colleges and universities primarily because of the working environment in which they will be employed. A working

environment that is open and inclusive is therefore the key to retaining high-level talent, as well as establishing the university's unique competitive advantage. As a result of such a soft working environment, foreign teachers are able to adapt to the school's working environment as quickly as possible, which promotes innovation in scientific research methods.

#### **5.4.2. Empower the Foreign Teachers to Enhance Their Work Abilities**

Providing empowerment to foreign teachers may lead to enhanced work performance. If the foreign candidates feel more empowered they feel free to share new ideas with the supervisors and will be more motivated to work hard. In other words, novelty or generating new ideas is based on empowerment. Prior research also showed that those candidates who are more empowered in decision-making can produce more results and innovative ideas. The level of satisfaction is also directly linked to empowerment. The candidate feels more satisfied if they are empowered in making the decision.

#### **5.4.3. Promote the Effective Establishment of Scientific Research Platforms**

Establishing an advanced research platform also enhances the enthusiasm of foreign teachers. Creating an advanced scientific research platform provides foreign teachers with the primary prerequisites for conducting scientific research and is an important content to facilitate high-quality and connotative development of higher education. Chinese universities should attach great importance to the construction and development of scientific research platforms, constantly improve and innovate the laboratory management and service mechanism, increase capital investment and improve the conditions of scientific research platforms. It is also necessary to assess and evaluate the platform so that the defects in its development can be corrected in order to promote a healthy development of the scientific research platform.

#### **5.5. Formulate a Reasonable Project Funding Plan**

In terms of the change in project funding, the increase of research funding has a positive impact on the research work of postdoctoral fellows. For the purpose of promoting the quality of scientific research achievements, we should develop a reasonable assistance scheme, and state agencies should formulate fiscal subsidies and tax breaks to encourage enterprises to support university and college research. Government agencies at all levels should also provide rewards for scientific research and living allowances to foreign teachers.

#### **5.6. Improve the Management of Research Funds**

We should implement scientific, rigorous scientific research funds cost management, avoid funding redundant expenditures, set strict standards for the management of funds, define the scope of scientific research expenditures, and construct a scientific, comprehensive and flexible scientific research funds

management system for foreign teachers, so as to promote their scientific research performance.

#### **5.7. Promote the Double Leap in the Quantity and Quality of Foreign Teachers' Papers**

Taking into account the problem that foreign teachers focus too much on the quality of papers and ignore the improvement of the quantity of papers, advocates should push for a double leap in the quantity and quality of foreign teachers. The quality of papers reflects the level and attitude of foreign teachers' scientific research, but focusing too much on improving quality will result in a decline in the number of scientific publications, which is not conducive to improving the effectiveness of foreign teachers' scientific research. Consequently, we should encourage foreign teachers to take a keen interest in improving the efficiency of scientific research under the premise of grasping the quality of papers.

## **6. Conclusion**

The LMDI model is used to study the influencing factors of foreign postdoctoral research output in Jiangsu University from 2014 to 2021. The research results show that compared with the funding amount of 2018-2021, the total funding amount of foreign postdocs in Jiangsu University increased significantly, from 3,868,330 yuan to 3,077,881 yuan. However, the ratio of fund introduction efficiency of foreign postdocs decreased from 0.085308 to 0.027624, showing a negative growth trend, which significantly inhibited the increase of foreign talents' research achievements. The population structure coefficient of foreign postdocs in Jiangsu University is negative, which means that the change of population structure has a negative impact on the research efficiency of foreign postdocs. From the empirical data, the ratio of scientific research enthusiasm increased from 0.738462 to 0.741176. Due to the national policy, social environment, economic conditions and other aspects of the attraction, so that foreign postdoctoral research enthusiasm is increasing, and then promote the progress of foreign postdoctoral research. From the ratio analysis of funding intensity, the ratio was 13.34571 during 2014-2017 and 28.99312 during 2018-2021. The increase of project funding in Jiangsu University has played an encouraging role in the foreign postdoctoral research. The cost ratio of project funds increased from 1.84567 to 1.914729. According to the data analysis results of the project funding cost, the impact of the change of funding cost on the research efficiency of foreign postdocs is not significant, but it still has a certain promoting effect. Based on factor decomposition analysis, the ratio of SCI papers and non-SCI papers from 2014 to 2017 was 1.315789 and 0.684211 respectively. The ratio of SCI papers and non-SCI papers from 2018 to 2021 was 1.660984 and 0.339016. It can be seen that the implementation of relevant policies in Jiangsu University has promoted the improvement of the quality of foreign postdoc papers, but also caused a decline in the number of papers.

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