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# Challenges and Suggestions in the Teaching of Mechanics of Materials in Vocational Colleges

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**Abstract:** Mechanics of Materials is an important basic course, and its teaching quality directly affects the subsequent professional courses, such as mechanical design, mechanical manufacturing, automation, and testing technology. However, the problem of poor teaching quality of Material Mechanics in vocational colleges persists. In this paper, the research of scholars is first described. Then, the research team analyzed the teaching situation and pointed out the current challenges faced in the teaching of Material Mechanics through questionnaires. In order to improve the teaching quality of Mechanics of Materials, this paper puts forward targeted suggestions such as stimulating students' interest and applying new technologies. The findings of this paper can provide reference for the reform of teaching of Mechanics of Materials.

**Keywords:** Challenges and suggestions; Mechanics of Materials; Teaching; Vocational colleges

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## 1. Introduction

Most engineering majors, such as mechanical engineering, architecture engineering, and electrical engineering, include a compulsory course called Mechanics of Materials. Mechanics of Materials is an important basic course, and its learning effect will directly affect the learning effect of subsequent courses, such as mechanical design, mechanical manufacturing technology, hydraulics and transmission, automatic control, and many more <sup>[1]</sup>. The problem of poor teaching quality of Material Mechanics in vocational colleges has existed for a long time. Material of Mechanics consists of many contents, abstract concepts, and complex formulas. The assignments of this course involve many mathematical calculations, which is precisely the weak point of students <sup>[2]</sup>. In addition, the lack of internship experience in companies leads students to be unaware of the purpose of studying Material Mechanics. Students are not motivated and interested in learning, which leads to poor quality of classroom teaching <sup>[3]</sup>.

In this paper, the studies of the previous scholars are elaborated. Subsequently, the research team analyzed the teaching of Mechanics of Materials in the form of questionnaires. Thirdly, the challenges faced by teaching were identified. Finally, several targeted recommendations are given in this paper.

## 2. Research status

The quality of Mechanics of Materials teaching in vocational institutions has been lacking for many years. Earlier scholars have conducted much research on different aspects. Liu <sup>[4]</sup> studied the application of online and offline hybrid teaching of mechanics laboratory courses. He found that hybrid teaching can increase students' independent learning ability and facilitate their personalized development. In addition, this model improves the quality of classroom teaching and solves the problems of traditional laboratory lessons. Zhu

[5] explored the moral education elements of the Material Mechanics course and proposed a targeted teaching design. He found that the integration of moral education elements into the teaching of mechanics courses can fully integrate “teaching” and “educating people”. Zhao [6] explored the hybrid teaching reform of the Mechanics of Materials course. Zhao found that this model can increase the time and space for students’ learning and is allows a more scientific evaluation of students’ learning effects by the teachers. Zhang [7] studied a student-centered stage-based hybrid teaching model using Mechanics of Materials as an example. He suggested three reform measures to be implemented in stages: the first measure is the phasing and gridding of teaching content; the second measure is the integration of multimedia teaching; the third measure is to build a stage-based assessment and evaluation system. Tao [8] explored the construction of experimental class resources of Material Mechanics. He suggested that practical innovation ability can be improved by enhancing the comprehensiveness of mechanics experiments. Scholar Du [9] studied the reform and practice of Mechanics of Materials teaching in the context of new engineering. He argued that the reform of Mechanics of Materials curriculum resources should strengthen the goal orientation and pay attention to the development of heuristic cases. In addition, he suggested that the assessment mode should increase the weight of process assessment so as to strengthen the usual classroom teaching effect. Liu [10] studied the reform and practice of the teaching method of Mechanics of Materials under the outcome-based education (OBE) concept. He believes that OBE teaching method can make students understand relationship between Mechanics of Materials and their majors, thus stimulating their interest in learning. In addition, he believes that it is very important to cultivate students’ scientific literacy and research-oriented thinking. Dong [11] applied Ansys software in the teaching of Material Mechanics. The results show that Ansys software can concretize and visualize abstract knowledge, which in turn improves students’ learning motivation. The teachers’ research ability also improved to some extent in the process of developing Ansys models. Shao *et al.* [12] investigated the application of real-time 3D digital image related methods in teaching Material Mechanics, in which they found that 3D images increases the motivation of students. This mode of teaching, which combines theory and experiment, also helps to enhance students’ ability to analyze problems. Zhao [13] carried out a reform of teaching Mechanics of Materials experiments in a hierarchical manner. He suggested the introduction of multimedia technology and virtual simulation into the lessons. In terms of experimental content, he suggested developing comprehensive and design mechanics experiments based on the original verification experiments and establishing a set of hierarchical teaching system.

### 3. Investigation of teaching quality

Previous scholars have studied the teaching of Mechanics of Materials from five aspects: teaching content, teaching mode, learning interest, classroom interaction, and experiment teaching. We launched a survey on the teaching quality of Mechanics of Materials from these five aspects. The survey was conducted on 2 classes of an automobile manufacturing major with 66 students. The contents of the survey questionnaire are listed below.

Q1: Are you satisfied with the teaching content of Mechanics of Materials?

Q2: Are you satisfied with the teaching style of the teachers?

Q3: Are you interested in Mechanics of Materials?

Q4: I think the interaction of the class is very good.

Q5: The percentage of lab hours is reasonable.

The results of the survey were tallied, and the results of the teaching evaluation were obtained as shown in **Table 1**. Overall, the students were dissatisfied with the current teaching content and mode. The “Agree” votes for Q1 and Q2 were 8 and 9 respectively. The “Agree” votes for interest in learning is the least, with only 5 votes, accounting for 7.58%. In contrast, the effectiveness of classroom interaction received the highest number of “Agree” votes, with 28 votes or 42.42%; this indicates that teachers are

asking more questions in the classroom to improve interactivity. Q5 received 14 “agree” votes, which is 21.21%; this indicates that the number of lab hours falls short of the students’ expectations. Mechanics laboratory classes are more interesting and motivating than traditional classes, and they should be given more attention. In conclusion, the results of the survey show that the teaching Mechanics of Materials is still lacking in many ways, so the exploration of teaching mode is imperative.

**Table 1.** Investigation on teaching quality of Engineering Mechanics

Question	Total respondents	Strongly agree	Agree	Disagree	Strongly disagree	Invalid votes
Q1	66	1	7	33	21	4
Q2	66	2	7	34	20	3
Q3	66	1	4	35	23	3
Q4	66	10	18	21	14	3
Q5	66	2	12	29	21	2

#### 4. Challenges faced

##### 4.1. Large amount of course content

Mechanics of Materials covers a wide range of content, abstract concepts, and complex formulas. However, the teaching hours are relatively little, causing many teachers to be unable to complete the syllabus while ensuring its quality. As a result, much important knowledge of Mechanics of Materials is explained in insufficient detail, which makes it difficult for many students to understand. Because the classroom knowledge is not firmly grasped, it is challenging for the students to complete the assignments independently after class. The inability to complete the homework independently and the lack of a firm grasp of knowledge will then affect the quality of learning in the next class. This vicious circle causes many students to lose interest in learning and even become bored with learning.

##### 4.2. Lack of practical assessment

Unlike ordinary undergraduate colleges and universities, vocational colleges and universities emphasize the cultivation of skilled talents. Therefore, it is very important to cultivate the practical ability of students in vocational colleges. Mechanics of Materials is a discipline that focuses on knowledge application, so its assessment methods should be focused on practical ability. In this way, students can better apply theoretical knowledge to solve specific mechanical problems. However, the current assessment methods Mechanics of Materials are based on written exams, and practical exams are not emphasized. The examination is the “baton” of education. Under this assessment mode, students generally lack the opportunity to practice their skills. As a result, the students will not have a solid understanding of the course content, which then leads to their learning inefficiency.

##### 4.3. Large amount of mathematical calculations

The teaching content of Mechanics of Materials involves many calculus-based theorems and formulas. The explanation of typical sample questions involves many mathematical calculations, which is the weak point of students in vocational colleges. Teachers need to devote more time to explain formulas or examples in class. Due to the complexity of the calculation process, it is difficult to motivate the students in the classroom. Usually several equations are needed to solve a difficult problem. The frequent inability to complete the after-class assignments independently leads to a further decrease in students’ interest in learning.

## **5. Targeted recommendations**

### **5.1. Combining multimedia and blackboard teaching**

Blackboard teaching and multimedia teaching have their own advantages, and teachers should use them flexibly. Blackboard teaching allows students to see the reasoning process very clearly and immerse into the teaching content very intuitively, and it also keeps the students focused in class. In contrast to blackboard teaching, multimedia teaching makes the teaching convenient, fast, and more efficient. In multimedia teaching, three-dimensional graphics, section diagrams, and animations can be clearly displayed, which helps students understand the content rapidly. Mechanics of Materials has both complex formula derivation and abstract concepts such as stress distribution of beam sections. In order to improve the teaching quality, teachers should combine blackboard teaching with multimedia teaching. For example, when it comes to the derivation of some formulas, the teacher should mainly teach on the blackboard. Similarly, when it comes to some abstract and difficult to understand concepts, the teacher should use multimedia.

### **5.2. Stimulating students' interest in learning**

Interest is a powerful motivation for learning. Interesting and relevant topics can grab the students' attention and stimulate their interest in learning. Teachers should consider the students' interests when preparing the lesson. Using this point of interest as an entry point, teachers should show students an interesting "world of mechanics." Real-life examples of mechanics into the Mechanics of Materials can be introduced in the classroom, so that students understand that the knowledge that they learn is useful, and the examples also allow a deeper understanding of the course content. In short, teachers need to motivate students and develop their interest in learning.

### **5.3. Increasing classroom interaction**

The increasing proportion of multimedia in teaching has led to less and less interaction between teachers and students. The lack of necessary interaction leads to the teacher's inability to grasp the students' learning progress to make necessary adjustments to the teaching schedule and methods. Teachers should ask students more questions in class in order to check their understanding of the topic taught. In addition to student-teacher interactions, there should also be interaction between students like group discussions, cooperative group learning, project-based seminars, and many more.

## **6. Conclusions**

Mechanics of Materials is a very important basic course in vocational colleges and its teaching quality must be highlighted. The learning characteristics of students in vocational colleges should be considered while designing new teaching methods. Based on the results of our analysis and questionnaire statistics, we have identified the challenges faced in the teaching of Mechanics of Materials, and have put forward targeted suggestions such as stimulating students' interest and introducing new technologies in the classroom. The results of this paper provide a reference for the reform of the teaching mode of Mechanics of Materials in vocational colleges.

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## Author contributions

S.W. and F.P. conceived the idea of the study and wrote the first draft of the paper. J.Q. revised the format of the article.

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# Research on the Construction of Electronic Information Professional Groups in Higher Vocational Colleges Serving the Upgrading of Regional Information Industry

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**Abstract:** Through studying the current situation of the construction of electronic information professional groups in higher vocational colleges serving the upgrading of regional information industry, this paper proposes establishing inter-school professional groups from a horizontal perspective, making appropriate adjustments on the professional groups, and actively adapting to the industrial development. On this basis, the integration of industry-education and in-depth cooperation between schools and enterprises can be realized, and the path of realizing “three-sharing, three-integration” professional group service industry upgrading is innovatively proposed.

**Keywords:** Professional groups; Industrial upgrading; Industry-education integration

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## 1. Introduction

Many foreign researchers mainly focus on the vocational education talent training mode and the influence of professionals on the industrial development throughout the economic development. There is also some research on the construction of professional groups, which mainly includes the type of profession, the direction of development of the profession, industrial training, and personal training<sup>[1]</sup>. However, there are some deficiencies in the study of adapting professional groups to regional industrial upgrading.

Chinese scholars have made a targeted study on the characteristics and influencing factors of the evolution and upgrading of the industrial structure, including a historical analysis of the development and evolution of China's overall industrial structure and the development and adjustment measures based on local regional industrial structure, and so on<sup>[2]</sup>.

In the context of economic transformation and development, more and more studies have shown that the construction of vocational education professional groups is closely related to regional industrial upgrading, and vocational education has become a barometer of local economic development<sup>[3]</sup>. The setting of vocational education majors, the adjustment of the course structures, the development of professional knowledge, and the duration of personnel training greatly affect the speed and scale of regional industrial upgrading. The structural adjustment, transformation and upgrading of regional industries also affect and drive the construction of professional groups of vocational education. The positive interaction and coordinated development will promote the upgrading and development of regional economy<sup>[4]</sup>.

## **2. Construction of electronic information professional groups in higher vocational colleges serves the upgrading of regional information industry in the aspect of “three-sharing and three-integration”**

### **2.1. Inter-school dynamic adjustment and cooperation mechanism for electronic information professional groups should be established**

The information industry of China is rapidly developing, which enhances the core competitiveness of the information industry, strengthens innovation and integrated development, and increases the room for industrial development. Higher vocational education deepens the industry-education integration<sup>[5]</sup>, actively adapts to the needs of industrial upgrading and development and builds professional groups on the industrial and demand chains. The dynamic adjustment and cooperation of inter-school professional groups are a process of actively serving regional industrial clusters and actively adapting to them. In the process of dynamic adjustment, professional groups follow the principle of being oriented to information industry clusters and vocational professions. The construction of professional groups supplies talents for regional industrial upgrading and promotes regional industrial upgrading and development.

The electronic information professional groups of vocational colleges have different emphasis and development strengths. In order to maximize the advantage of every profession in the professional groups and their technical and R&D strengths, an inter-school professional group can be formed, and a cooperation mechanism for the professional groups can be established. In this way, the strong advantages of the electronic information professional groups of vocational colleges can be mutually beneficial. Besides, the needs of regional information industry upgrading and development can be met, and the stable development of disadvantaged majors can be driven, and better connect with the industrial chain.

### **2.2. Deepening the industry-education integration, studying the “three-sharing” mechanism, and improving the quality of talent training**

New requirements for talent quality, knowledge, and ability are inevitable in the process of regional information industry upgrading. Therefore, we should strengthen the coordination of vocational education with industrial clusters, adhere to the combination of working and learning, promote the industry-education integration and the cooperation between schools and enterprises, so as to realize “the sharing of resources, skills, knowledge.” To promote the effective connection of education, talent, industry, and innovation is the path for the electronic information professional groups of higher vocational colleges to adapt to the upgrading of regional information industry.

The industry-education integration should be deepened; the advanced resources, skills, and knowledge of enterprises should be utilized; training bases should be built in vocational colleges; technical service platforms should be created to enable enterprises to participate in the industry education integration, and cultivate talents needed for the upgrading of information industry.

### **2.3. Helping teachers grow, establishing the “three-integration” mechanism, and enhancing the capacity of industrial upgrading in serving regions.**

With professional groups serving regional economy, the teaching staff is important for the construction of professional groups in vocational colleges, and also as a support for the development of talent training in vocational colleges. Therefore, it is important to strengthen the professional groups to serve the regional industry to establish a “skilled, full-time and part-time” vocational college teacher team, reform the recruitment and evaluation mechanism of scientific research talents, and stimulate the enthusiasm of these talents.

The mechanism of “talent-scientific research-cultural integration” between schools and enterprises should be applied. On the platform of the Industrial College, enterprise experts can enter the school, teachers can participate in the project development of enterprises, accept enterprise management, collaborate with

the enterprise research team, and carry out technology upgrading and product research and development for information industry related enterprises. At the same time, in combination with the service projects for enterprises, scientific and technological research achievements and declare scientific research projects to promote the transformation of technological achievements. The research achievements and application cases can then be incorporated into teaching materials and project resources of vocational education to achieve “three -integration.”

### **3. Promoting the deep integration of resources of schools and enterprises through the “three-sharing and three-integration” mechanism**

#### **3.1. Deepening the industry education-integration through resource, skill, and knowledge sharing, and making enterprises “move.”**

“Industry” in industry-education integration refers to the production and operation of enterprises and industries, and “education” refers to the educational activities in vocational colleges. The production and operation of enterprises and industries are integrated into vocational education to cultivate talents for specific posts in the industry. Industrial colleges are high-level organizations that collaborates with enterprises while providing vocational education, and deeply participates in the whole process of training vocational talents. Therefore, industrial colleges are the epitome of industry-education integration. Under this framework, enterprises will be encouraged to participate in teaching activities deeply, and close cooperation is carried out in the form of “resource, skill, and knowledge sharing,” such as talent training mode and program, curriculum system, practical training, so as to improve the students’ professional skills and literacy, and to cultivate outstanding talents for industrial upgrading.

#### **3.2. Strengthening the integration of talents, scientific research, and culture to make the specialty “strong.”**

A “school-enterprise” teaching team should be created through a two-way staff recruitment, with a two-way flow of school-enterprise personnel, to achieve “professional pair, co-construction of courses; collaboration of specialties, co-administration of colleges; professional interaction, co-education of talents,” and the establishment of “combination of professionals, mutual integration, professional excellence” of the dual teaching team, and achieve the integration of talents.

Rely on the industrial college to build a research and development platform for the information industry. Besides, the management and interest mechanisms should be defined; a research and development team can be set up, where the enterprise research team will work closely with the university research team. Moreover, a management system and operation mechanism for school-enterprise collaboration and industry-education can be established. A “group warming” mechanism can be established to form a school-enterprise research team with good scientific research level and operation and achieve integration of scientific research.

The integration of enterprise culture in campuses can cultivate the culture of vocational colleges, so that students can not only experience the essence of corporate culture such as teamwork, project management, market expansion, technology research and development, but their confidence in learning their majors and the sense of urgency to improve their professional quality and ethics can also be enhanced. In this way, high-quality skilled personnel needed for regional information industry upgrading can be cultivated <sup>[6]</sup>.

#### **3.3. Build a dynamic adjustment and cooperation mechanism between professional groups across schools, and achieving a mutually beneficial relationship**

Professional groups across schools that complement each other can be created. The formation of these

group should be based on to the direction of “region-based, connecting the industry, serving the locals,” by relying on the information industry chain, closely connecting the job requirements, and achieving an effective connection between the industrial, innovation and education chains. A system of professional groups serving regional industrial upgrading that integrates the functions of personnel training, scientific research, technological innovation, enterprise service, and student entrepreneurship can then be established.

#### **4. Innovating the mode of industry-education integration providing effective solutions for upgrading the service industry of higher vocational specialty groups.**

##### **4.1. Solution for the integration of professional groups and regional industries**

Vocational colleges should collaborate with enterprises based on the “three sharing and three integration” mechanism to achieve close integration of vocational college professional groups into the industrial chain, forming a healthy talent chain. The combination of rich knowledge and technological capabilities of professional teachers and engineers can support, guide, and serve the upgrading of regional industries, and lead the development of regional industries.

##### **4.2. Solving the problem of insufficient information industry platforms by supporting the construction of professional groups and serving the region**

After nearly a decade of reform, the construction of electronic information professional groups in vocational colleges has formed many unique professional group construction models. Through the effective integration of industry and education, the training model, and the service of the regional information industry, an effective platform support has been formed, solving many bottleneck problems and meeting the talent needs of the information industry upgrading. Through the deep collaboration between schools and enterprises, the content and form of collaborative training are diversified, achieving true transformation of professional groups, and effectively connecting the education chain with the industrial and innovation chains.

##### **4.3. Effectively improving the ability of professional group construction in serving the regional information industry**

Collaboration with enterprises, especially leading companies in the industry to establish a research and development platform in the form of “three sharing and three integration” enabled teachers to build professional skills in electronic information and helped engineers to build teaching skills. Therefore, the transformation of engineers into school lecturers and lecturers into engineers could be achieved, and a “school-enterprise” mixed research service team could be created, which solved the problems of difficulty in improving the “double-qualifications” of school teachers and the incapability of upgrading the information industry.

#### **5. Conclusions**

Through the reform, the ability of the electronic information professional groups of vocational colleges to serve the upgrading needs of the regional information industry has been improved, and technical professionals and skilled talents have been trained to be more in line with the needs of enterprises. The establishment of professional groups has become a reform practice of the integration of industry-education, school and enterprise sports personnel, and apprenticeship in China. It is of practical significance to further promote the research on school-enterprise collaboration, industry-education integration, and combination of work and learning. In this way, the ability of professional groups of vocational colleges in China to serve regional industrial upgrading can be improved, and the research on vocational type education can be enriched. Besides, school-enterprise collaboration, industry-education, and the combination of working and learning in vocational education can be improved.

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# Research on the Problems and Countermeasures of Chinese Enterprises' Outward Foreign Direct Investment in the Context of Global Economic Uncertainty

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**Abstract:** Outward foreign direct investment (OFDI) is an important way to promote China's economic transformation and achieve high-quality economic development, and it plays an important role in building a new development pattern that focuses on the domestic systemic circulation as the main body, with domestic and international double circulations promoting each other. In the context of the uncertainty of the current global economic environment, investment protectionism is arising in various countries, and there is an obvious trend of anti-globalization. The sudden outbreak of COVID-19, the Russian Ukrainian war, and other conflicts have severely damaged the global economy and investment, significantly increased the risk of overseas investment, and reduced the confidence in outward foreign direct investment. Chinese enterprises face serious challenges and problems in OFDI. This article starts from explaining the current situation of Chinese enterprises' OFDI and continues with an analysis on the existing problems and puts forward suggestions to increase foreign investment in China.

**Keywords:** Outward foreign direct investment; Location choice; Investment and trade

**Online publication:** April 25, 2023

## 1. Introduction

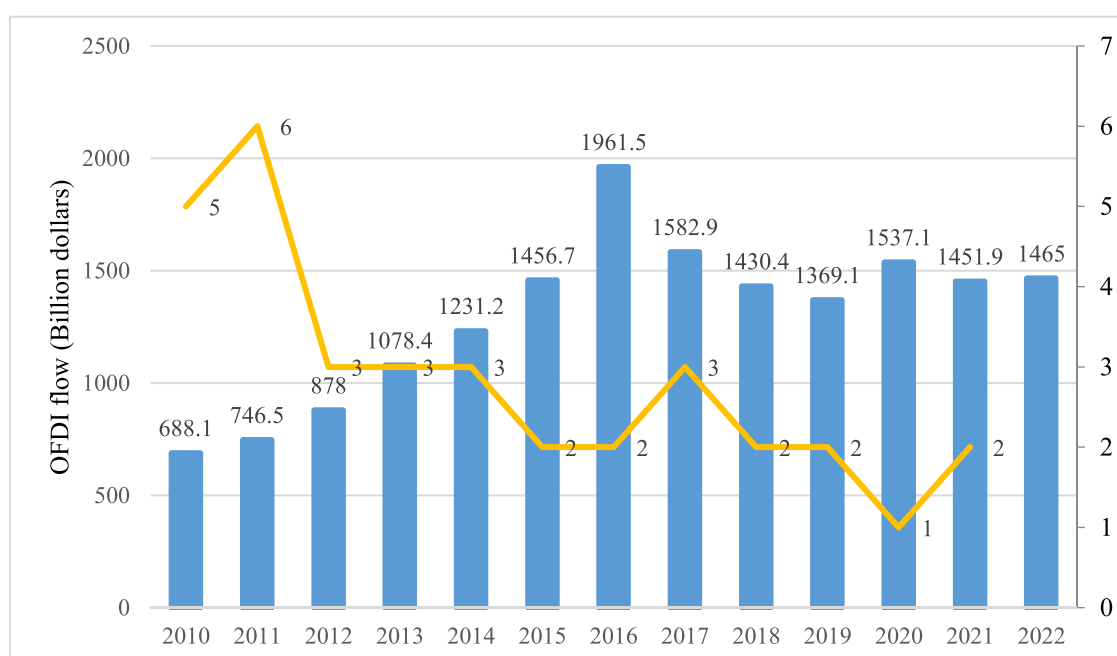
Since the reform and opening up, driven by globalization, China's economy has developed rapidly. China has actively integrated into the global market to encourage enterprises to conduct outward foreign direct investment (OFDI), which has become an important component of its international investment. However, with the increasingly complex global economic situation, OFDI by Chinese enterprises has also become difficult. In view of the anti-globalization trend, the Sino-US trade, the COVID-19 pandemic, the Russia-Ukraine war, and other uncertainties, China's OFDI has faced a significant increase in uncertainty. The repeated COVID-19 outbreaks in the past three years have impacted the global economy and trade, and the reconstruction of the world economic and political pattern has made Chinese enterprises face more risks and challenges when going global. The outbreak of the Russia-Ukraine conflict has further contributed to the complicated and confusing world economic situation. The occurrence of this incident has also affected China's OFDI in many ways. As China enters the post-pandemic era, Chinese enterprises have been revitalized, and the overseas business and supply chain layout of Chinese enterprises has also been kickstarted. China's OFDI still has great potential for due to its active participation in global economic governance and cooperation. However, there are still many uncertainties in the current global

macroeconomy. Therefore, it is important to better guide Chinese enterprises to “go global.”

## 2. The development progress and problems of China’s OFDI

### 2.1. Development status of China’s OFDI

Affected by internal and external factors such as domestic investment policies and changes in the foreign investment environment, China’s outward direct investment (OFDI) is developing in stages, and overall, the scale of China’s outward foreign direct investment is increasing. Despite the significant decline in global OFDI due to the pandemic in 2020, China’s OFDI remained resilient, and ranked first in the world for the first time. By the end of 2021, Chinese domestic investors had established a total of 46000 outward foreign direct investment enterprises, covering 190 regions worldwide. In 2022, the COVID-19 pandemic prolonged, the geopolitical tensions and the evolution of the economic pattern overlapped, and the world economy faced downward pressure. However, China effectively responded to the impact of unexpected factors <sup>[1]</sup> and achieved a total of \$146.5 billion in OFDI. Foreign investment developed steadily and by the end of 2022, China’s total OFDI had reached \$2.94 trillion, ranking among the top three in the world for 10 consecutive years in terms of OFDI flows, as shown in **Figure 1**.



**Figure 1.** China’s OFDI flow (US \$100 million) and global ranking from 2010 to 2022. Source: Ministry of Commerce

With the promotion and implementation of the “going global” strategy, more space and opportunities have been provided for Chinese enterprises to go international. China’s investment in countries along the “Silk Road Economic Belt” has also continued to grow. In 2022, Chinese enterprises will directly invest \$20.97 billion in non-financial industries in countries along the “Silk Road Economic Belt.” With the high growth rate of the global economy, the economy on track, and the implementation of pandemic prevention policies in various countries, enterprises are highly encouraged to “go global.” In the future, there will be more opportunities for China’s OFDI, and there is still room for Chinese enterprises to go international.

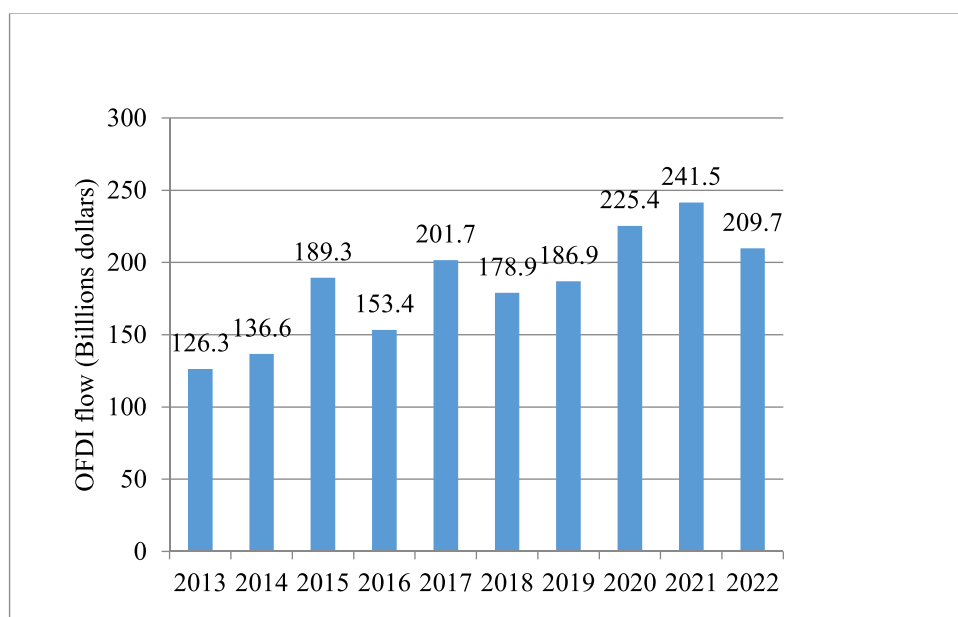
### 2.2. Problems in the OFDI of Chinese Enterprises

#### 2.2.1. Relatively concentrated destinations for outward foreign direct investment by enterprises

With the increasingly close economic relations among countries around the world, China’s outward foreign direct investment has gradually diversified and widely distributed. However, according to the statistics in



the commune, there is still a high concentration of outbound investment destinations. 90% of China’s outbound direct investment is distributed in developing economies. Currently, the investment regions and regions are mainly concentrated in Asia <sup>[2]</sup>. In 2021, the investment flowing to Asia was 128.1 billion US dollars, accounting for 71.6% of the current year's outbound direct investment flow, which is far higher than Europe (6.1%), Africa (2.8%), North America (3.7%), and other regions. Since the implementation of the “Silk Road Economic Belt” strategy, China's investment in countries along the “Silk Road Economic Belt” has been expanding. As a result, its foreign investment flow has increased from 12.63 billion US dollars in 2013 to 20.97 billion US dollars in 2022, as shown in **Figure 2**.



**Figure 2.** China’s OFDI in countries along the “Silk Road Economic Belt” from 2013 to 2022. Source: Ministry of Commerce

In addition, the number of overseas enterprises set up by Chinese domestic investors in countries along “Silk Road Economic Belt” has exceeded 11000. These enterprises involve 18 industrial categories of the national economy, and the amount of OFDI also reached the highest level in eight years at 24.15 billion US dollars, accounting for 13.5% of China’s OFDI flow in the same period. The high-quality development of “Silk Road Economic Belt” has allowed Chinese enterprises to invest abroad. However, in view of the uncertain global economy and political situation, the laws and policies of countries along the line have not been improved, and some enterprises lack risk awareness, which also brings great challenges and risks to foreign investment.

### 2.2.2. Insufficient awareness of corporate compliance risk

Compliance is a prerequisite for enterprises to “go global” and achieve stability and prosperity. Today, with increasingly stringent national regulations, more and more entrepreneurs are beginning to recognize the importance of compliance. However, overall, the compliance awareness of small and medium-sized enterprises in China is still relatively weak. Some small and medium-sized enterprises have impure motives for foreign investment and actively or unintentionally violate intellectual property rights, evade national taxes, damage the ecological environment, violate data security regulations, and engage in commercial bribery. According to the World Bank, last year, there were still more than 200 and hundreds of enterprises in China that were blacklisted, resulting in significant losses in the image of foreign investment enterprises, and seriously affecting its foreign investment activities <sup>[3]</sup>.



### **2.2.3. Incomplete legal system for foreign investment**

Although China has actively promoted the concept of “going global,” relevant laws and regulations are still incomplete and backward, therefore failing to protect the rights and interests of small and medium-sized enterprises <sup>[4]</sup>. The current economic environment is complex, with low global economic recovery, frequent local conflicts and turbulence, and intensifying global problems. Chinese enterprises lack awareness towards these issues, and the national legal system is lacking, which cannot ensure the security of foreign-invested enterprises. In the future, China is likely to face more uncertain factors, causing serious negative impacts on the normal production and operation activities and asset safety of Chinese foreign-invested enterprises. Without appropriate legislative measures, these enterprises may face significant risks such as forced withdrawal from the market, asset seizure, and increased investment disputes.

### **2.2.4. Protectionism restricts foreign trade and investment**

The uncertainty of the global economy has led to continuous changes in the economic situation and market environment of many countries, and changes in national policies are inevitable. The sudden outbreak of the COVID-19 virus has caused huge losses to the world economy and investment, and international direct investment has been greatly affected. In order to control the pandemic, many countries have implemented strict restrictive measures, including closing borders, restricting or prohibiting entry, domestic blockade, and shutdown and production suspension, which have hindered a series of links such as overseas investment investigation, negotiation, contract signing, and enterprise commencement. This directly affects the changes in China’s enterprises’ direct foreign policy, which has brought great challenges to the operation and management of enterprises. Many countries and regions have implemented investment restrictions or regulatory upgrades on the grounds of national security in order to protect their own markets. When conducting OFDI, Chinese enterprises need to deal with the sharp increase in risks of different political investments, and the investment behavior of multinational companies will also be subject to various constraints <sup>[5]</sup>, which means that there will be more challenges in OFDI.

## **3. Countermeasures and suggestions for promoting OFDI by Chinese Enterprises**

### **3.1. Attach importance to the layout of global industrial chains**

Although China is currently loosening its pandemic prevention and control policies, the social impact caused by the pandemic cannot be dissipated in the short term. In view of anti-globalization trend caused by the superposition of the pandemic and trade protectionism, it will also lead to the regionalization and shortening of value chains. The global layout is a strategic way for enterprises to respond to complex changes in the world economy and the challenges of new trade protectionism <sup>[6]</sup>. Emphasizing a diversified regional layout and diversifying the location of outward foreign direct investment regions is not only conducive to diversifying investment risks, but also improving the elasticity of the supply chain industry chain, maintaining the stability of the supply chain industry, and responding to uncertain risks that may arise from time to time. In the future, the investment of Chinese enterprises should be combined with the construction of global industrial chains and supply chains led by Chinese enterprises. This not only helps China in the upgrading of the industrial chain by building its own industrial chains, which changes the status of China being at the lower and middle ends of the industrial chain, but also can promote and coordinate domestic industrial upgrading to achieve high-quality development.

### **3.2. Improving the strength of foreign-invested enterprises and strengthening risk prevention awareness**

In order to cope with various investment risks, multinational enterprises need to cooperate with the government. Enterprises should actively develop their enterprises and strengthen their research and

development capabilities. The government should continue to increase policy support for the manufacturing industry, encourage and promote enterprises to invest in overseas high-tech industries, continue to break through core technologies <sup>[7]</sup>, and achieve independent development, thereby enhancing the competitiveness of enterprises and displaying advantages in foreign investment activities. As the world economy becomes increasingly sensitive and uncertain, multinational enterprises must also have a sense of crisis and innovative thinking to adapt to the overall environment. The government should strengthen supervision, guidance, and legislation; companies should effectively reduce negative impacts on their operations. Enterprises should take a proactive approach to establish a risk prevention and detection management to make predictions in advance, enhance their awareness of prevention, understand and comply with relevant international laws and regulations, comply with local regulatory requirements overseas, and supervise and manage overseas companies. In this way, the risks of non-compliance issues, such as huge government fines, factory closures, prohibition of local market access, and significant personal injuries can be preventing, thereby preventing a series of impacts such as economic losses and damage to the company's reputation <sup>[8]</sup>.

### **3.3. Establishing and improving the legal system for foreign investment**

China must establish legislation that is conducive to its foreign trade operations, establish a law that is conducive to its overseas capital protection as soon as possible, make specific regulations on its service trade taxes, export standards, foreign investment policies, and other provisions, avoid unnecessary international trade disputes, and improve the domestic financing guarantee system. Besides, enterprise oriented, clear investment goals, and reasonable guidance for enterprise trade and investment should also be established <sup>[9]</sup>. After investing in foreign-invested enterprises, the government must prioritize and protect their legitimate rights, fully understand the trade risks and preferential measures of the host country, and urge them to implement preferential policies for trade and investment on the basis of a mutual agreement. Specialized legal consulting firms for outward foreign direct investment should be set up, establishing and improving a comprehensive service system, and the public information service platform for foreign investment should be improved to aid the development of small and medium-sized enterprises. In addition, by establishing and improving the relevant foreign investment regulatory system, protecting the rights and interests of China's overseas investment projects, and reducing financing losses, it will be easier for domestic small and medium-sized enterprises to go global, thus promoting stable growth of the national economy.

### **3.4. Breaking through trade barriers and encouraging enterprises to go global**

China has always adhered to a high level of opening-up and promoted the establishment of multilateral cooperation mechanisms. Governments should strengthen negotiations with investment and trade countries, strive to resolve differences between the two sides, and reduce the uncertainty faced by enterprises <sup>[10]</sup>. At the same time, relevant government departments should also formulate more incentives to promote foreign investment, encourage and support outstanding enterprises to "go global," continue to promote economic cooperation with countries and regions along the "Silk Road Economic Belt," speed up the improvement of the rules and mechanisms of the "Silk Road Economic Belt" initiative, fill the institutional gaps in the current "Silk Road Economic Belt" construction and regional economic cooperation <sup>[1]</sup>, and drive Chinese enterprises to increase foreign investment. To achieve win-win cooperation with the host country of investment, both or more parties should achieve a two-way investment, timely convey industrial information to companies with capital and strength, and alleviate information asymmetry. Enterprises should also create information channels, understand relevant policies, seize opportunities, and seek new investment channels <sup>[11]</sup>.

## Disclosure statement

The authors declare no conflict of interest.

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# Analysis of Intelligent Logistics and Supply Chain Management Reform in the Digital Era

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**Abstract:** Owing to the constant progress and application of information technology, the digital transformation of intelligent logistics and supply chain management has become an inevitable trend. In the digital era, enterprises need to rely on various technical means to build intelligent logistics and supply chain management systems, improve operational efficiency and management level, to adapt to market changes and customer needs.

**Keywords:** Digital era; Intelligent logistics; Supply chain management

**Online publication:** April 27, 2023

## 1. Introduction

Intelligent logistics and supply chain management in the digital era is a comprehensive upgrade and transformation in the field of logistics and supply chain management, using information technology, big data, and other technical means. Owing to the constant innovation and progress of logistics technology, supply chain management models, and business models, intelligent logistics and supply chain management have become a vital strategy for enterprise competition. The digital transformation of intelligent logistics and supply chain management is crucial for the competitiveness and progress of enterprises <sup>[1]</sup>. Through the application of digital technology, enterprises can achieve visualization and transparency of logistics and supply chains, improve management efficiency and accuracy, optimize processes and reduce costs, and achieve sustained business growth and progress <sup>[2]</sup>.

## 2. Transformation of resource allocation capability in the digital era

### 2.1. Data sharing

In the digital era, data sources have become more abundant and available, while technological advances have also made data collection and analysis easier and more efficient. This sharing and utilization of data improves the efficiency of resource utilization and also brings new business models and opportunities <sup>[3]</sup>.

### 2.2. Virtualization and cloud computing

In the digital era, cloud computing and virtualization technologies have been widely used, making resource utilization more flexible and efficient. For instance, cloud computing allows enterprises to rent computing resources on demand based on their own needs, without having to purchase, configure, and maintain a large number of servers and network devices <sup>[4]</sup>.

### **2.3. Artificial intelligence and big data**

In the digital era, the progress of artificial intelligence and big data technology has enabled enterprises to predict market demand more accurately, optimize production and operational processes, and make better strategic decisions <sup>[5]</sup>. The application of this technology makes the allocation of resources more intelligent and efficient <sup>[6]</sup>.

### **2.4. Distributed systems and blockchains**

In the digital era, distributed systems and blockchain technology have been widely used, making resource allocation more decentralized and secure. For instance, blockchain technology can provide more secure and trusted data exchange and sharing, thereby achieving more efficient and transparent resource allocation <sup>[7]</sup>.

## **3. Strategies for building a smart supply chain system in the digital era**

The intelligent supply chain in the digital era refers to the use of information technology and data analysis technology to achieve comprehensive coordination, transparency, and optimization from the production and procurement links to the sales and after-sales service links of the supply chain. Below are some strategies for building a smart supply chain system in the digital era <sup>[8]</sup>.

### **3.1. Data-based management**

Establishing a data-based management system and adopting technologies such as the Internet of Things, cloud computing, big data, and artificial intelligence can achieve data sharing and optimization in all aspects of the supply chain. A detailed introduction to the system is given below <sup>[9]</sup>.

#### **3.1.1. Internet of Things**

Through the Internet of Things, intelligent management and monitoring of items and equipment can be achieved. Collecting and transmitting logistics information, production information, and other data through sensors, labels, and other devices can achieve real-time monitoring and management of all aspects of the supply chain <sup>[10]</sup>. Data analysis and forecasting can improve the responsiveness and flexibility of the supply chain, reduce costs, and improve efficiency <sup>[11]</sup>.

#### **3.1.2. Cloud computing**

Through cloud computing, centralized storage and processing of supply chain data can be achieved, while providing high availability, elastic scaling, and flexible computing resources <sup>[12]</sup>. Therefore, supply chain data sharing and collaboration can be achieved, and data processing efficiency and security can be improved <sup>[13]</sup>.

#### **3.1.3. Big data analytics**

Through big data analytics, massive supply chain data can be deeply mined and analyzed to provide more accurate data prediction and decision support. By establishing a data model, bottlenecks and problems in the supply chain can be identified and optimized, and the efficiency and profit of the supply chain can be improved <sup>[14]</sup>.

#### **3.1.4. Artificial intelligence**

Through artificial intelligence, automated analysis and decision support of supply chain data can be achieved. For example, machine learning algorithms can classify, predict, and recommend supply chain data, improving the intelligence and automation level of the supply chain <sup>[15]</sup>.

### **3.2. Fine production**

Several measures can be adopted to achieve refined management of the production process, improve production efficiency and quality, reduce costs, and enhance the responsiveness and flexibility of the supply chain <sup>[16]</sup>.

#### **3.2.1. Production automation**

By using various equipment and robots, automation and intelligent control of the production process can be achieved, thus improving production efficiency and quality. For instance, by automating assembly lines, production cycles can be greatly shortened, and production efficiency and accuracy can be enhanced <sup>[17]</sup>.

#### **3.2.2. Digital management**

Through digital management, digital control and management of the production process can be achieved. For instance, through a digital production management system, the production process can be monitored in real time, and precise scheduling and control can be carried out to enhance production efficiency and quality <sup>[18]</sup>.

#### **3.2.3. Supply chain collaboration**

Through supply chain collaboration, it is possible to achieve collaborative coordination among all aspects of the supply chain, enhancing the response speed and flexibility of the supply chain. For instance, through a supply chain management platform, management and collaboration among suppliers, logistics companies, warehousing companies, and other parties can be achieved, thus enhancing the overall efficiency and quality of the supply chain <sup>[19]</sup>.

#### **3.2.4. Data-based analysis**

Data analysis and mining can be carried out on each link in the production process, providing a scientific basis for production decision-making. For instance, through big data analysis and forecasting, it is possible to optimize and adjust the production process, thereby enhancing production efficiency and quality <sup>[20]</sup>.

### **3.3. Supply chain collaboration**

#### **3.3.1. System function and design**

When establishing a supply chain collaboration platform, it is essential to consider its functions needed and usability of the system. The functions of the system should include information exchange, collaboration, and optimization in all aspects of the supply chain, such as order management, inventory management, logistics, and distribution. The system should also be made as simple and easy to use as possible, and it should be able to provide scalability and customizable functions to meet the needs of different enterprises.

#### **3.3.2. Data sharing and security**

Data sharing is crucial in a supply chain collaboration platform. To ensure the security of data, it is essential to adopt secure data transmission protocols and take appropriate measures to protect the confidentiality, integrity, and availability of data. It is also essential to specify the ownership and usage rules of data to avoid data leakage and abuse.

#### **3.3.3. Partner management**

The establishment of a supply chain collaboration platform requires close cooperation between suppliers, customers, and logistics service providers to achieve supply chain information sharing and optimization. A partner management mechanism needs to be established to ensure that partners can use the system normally,

while protecting the security and stability of the system.

### **3.3.4. Personnel training and support**

Training and support should be provided to employees to ensure that they can fully utilize the functions of the system and continuously improve efficiency and quality. In addition, it is also necessary to establish a technical support team to resolve system failures and user feedback issues efficiently.

### **3.4. Customer orientation**

Customer needs and feedback can be understood and obtained through digital technology and data analysis. With the information obtained, targeted marketing and service can be carried out to improve customer satisfaction and loyalty. Besides, supply chain processes can be optimized, thereby increasing efficiency and profit of supply chains.

### **3.5. Risk management**

A supply chain risk management system can be established where supply chain risks can be identified and addressed through data analysis and prediction. In this way, the uncertainties in supply chains can be reduced, thus enhancing the stability and reliability of the supply chain.

## **4. Conclusion**

In short, the transformation of intelligent logistics and supply chain management in the digital era is a comprehensive transformation and upgrade. Enterprises need to strengthen innovation and application of digital technology in logistics management. Besides, it is also important to build intelligent, digital, and sustainable logistics and supply chain management systems. In addition, enterprises should also establish collaborative, efficient, and safe operation modes, to enhance their competitiveness and market influence.

## **Disclosure statement**

The author declares no conflict of interest.

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# Research on the Construction of Social Service System for the Elderly in Urban and Rural Areas

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**Abstract:** At the beginning of 2023, the news of delayed retirement sparked heated discussions. The main reason behind this is that the degree of aging in China has further aggravated, making the construction of the elderly service system an important task for social development. In this context, this paper takes Zibo City, Shandong Province, where the aging phenomenon is prominent, as the research area. The current situation and problems in the construction and development of the social service system for the elderly in the city were compared through on-site investigation and literature review, corresponding countermeasures and suggestions are put forward in response to the aging population to build an aging society where wealth and prosperity are shared.

**Keywords:** Service system for the elderly; Aging society

**Online publication:** April 27, 2023

## 1. Introduction

Aging is a common phenomenon in the entire human society<sup>[1]</sup>. Therefore, elderly care is an important social issue and also a major issue that needs to be studied in social governance.

The 14th Five-Year Plan period is an important window period for the transformation of China's aging society. The Fifth Plenary Session of the 19th Central Committee of the Party made a long-term plan for the pension issue during the 14th Five-Year Plan period, emphasizing the great significance to highlight the importance of "promoting the coordinated development of the pension industry and improving the construction of the basic pension service system."

## 2. Population aging status and development trend

### 2.1. The elderly base population is large, and the growth rate is too fast

Our country is at a critical turning point in population development. Understanding the trend and characteristics of the changes in our population are crucial to improving the elderly care service system and actively responding to the aging population. Taking Zibo City, Shandong Province as an example, Shandong Province is the province with the largest elderly population in the country. The province's elderly population aged 60 and over reached 21.51 million, accounting for 21.15% of the overall population; the elderly population aged 65 and over reached 16.1938 million, accounting for 15.92%; the proportions of the elderly population aged 60 and 65 were 2.25% and 1.72% higher than that of the whole country respectively, showing the characteristics of large base population and fast growth (**Table 1**).

**Table 1.** Population Aging in Shandong Province

Year	Population aged 60 and over	Proportion of population aged 60 and over	Elderly population aged 65 and over	Proportion of population aged 65 and over
2010 Sixth Census	1413.1	14.75%	942.98	9.84%
2020 Seventh Census	2122.1	20.90%	1536.4	15.13%

Note: Data from the sixth and seventh censuses and the “14th Five-Year Plan” development plan for the elderly in Shandong Province.

According to the statistical results of the Seventh Census of Zibo City, the resident population of Zibo City was 4,704,138 in 2020, compared to 4,530,597 in the sixth census in 2010, which is a total increase of 173,541 people in 10 years, or an increase of 3.83%. The average annual growth rate is 0.38%, of which, among the population of Zibo City, the population aged 0–14 is 700,495, accounting for 14.89%; the population aged 15–59 is 2,910,484, accounting for 61.87%; and the population over 60 is 1,093,159, accounting for 23.24%, of which the population of 65 years old and over was 775,957, accounting for 16.50%. Compared with the Sixth Census in 2010, the proportion of the population aged 60 and above increased by 8.24%, and the proportion of the population aged 65 and above increased by 6.84% <sup>[2]</sup> (**Table 2**).

**Table 2.** Age composition of the city’s population in 2020

Age	Population (person)	Proportion (%)
0–14 years old	700,495	14.89
15–59 years old	2,910,484	61.87
60 and over	1,093,159	23.24
65 years old and over	775,957	16.50
<b>Total</b>	<b>4704138</b>	<b>100</b>

Among the 11 districts and counties in Zibo City, there were 9 districts and counties where the proportion of the elderly population aged 65 and above exceeded 14%.

Based on **Table 3**, it is clear that Zibo City has a higher population of elderly than the national average, and the elderly population is growing rapidly. Therefore, the problem of aging has become an important issue affecting the economic and social development of Zibo City. Especially in recent years, the characteristics of a large elderly population, rapid increase of elderly population, and empty nests have become increasingly obvious. The social burden is heavy, and the demand for social services for the elderly is large.

**Table 3.** Population age composition in districts and counties in 2020

District	Proportion of total population (%)			
	0–14 years old	15–59 years old	60 years old and over	65 years old and over
<b>Citywide</b>	<b>14.89</b>	<b>61.87</b>	<b>23.24</b>	<b>16.50</b>
Zichuan District	13.76	61.21	25.03	17.70
Zhangdian District	16.85	65.74	17.41	11.97
Boshan District	11.86	59.12	29.02	20.17
Linzi District	14.55	61.54	23.91	17.47
Zhoucun District	13.49	65.21	21.30	15.04
Huantai County	14.35	60.06	25.60	19.11
Gaoqing County	14.76	58.74	26.49	20.18
Yiyuan County	15.53	58.97	25.50	17.15
High-tech Zone	18.63	64.37	17.00	11.45
Economic Development Zone	15.75	63.48	20.76	14.56
Wenchang Lake District	13.63	57.39	28.98	21.07

## 2.2. Unbalanced development of aging regions

The uneven regional development of aging is not only manifested in the uneven development between regions, but also in the uneven development of urban and rural areas of the same region. Due to differences in economic development conditions and population development policies, the number and aging rate in rural areas is higher than the urban areas of the region, and the phenomenon of urban-rural inversion is serious. In terms of material planning and policy formulation, there are differences between rural and urban areas, which makes the aging problem in rural areas more serious.

## 3. The status of the social service system for the elderly

### 3.1. The government leads, the society participates, and the public cares

As our country's aging problem is getting worse, the state has introduced a series of systems and policies to provide top-level design for the elderly care service system. For example, elderly care service system was included in the 13th Five-Year Plan and 14th Five-Year Plan, providing a strong institutional guarantee for China's effective response to the aging situation [3]. At the same time, the government has also taken elderly care services as an important direction for the development of social undertakings and have continuously incorporated them into the overall plan for national economic and social development and various special plans.

### 3.2. Based on the legal system, a preliminary social service system for the elderly was formed

The law is an important tool for governing a country, and good laws are the prerequisite for good governance. Since the implementation of the "Suggestions of the State Council on Accelerating the Development of the Elderly Care Service Industry", various regions have established or improved local regulations according to local conditions. For example, Beijing, Tianjin, Hebei, Zhejiang, Ningxia, and other places reviewed and passed local regulations to promote the development of the elderly care service industry; Shandong, Hunan, Shaanxi, and other places have formulated or revised their regulations on the protection of the rights and interests of the elderly; Shanghai and Hainan formulated new regulations on the management of elderly care institutions. In our country, the "Law of the People's Republic of China on the Protection of the Rights and Interests of the Elderly" was formed as the fundamental basis, with local laws and regulations as the backbone, and "Suggestions of the State Council on Accelerating the

Development of the Elderly Service Industry” and other normative documents are the regulations and policy systems for the protection of the rights and interests of the elderly and the development of the elderly care service industry. These regulations and policies cover various aspects such as elderly care, medical care, and judicial protection, and have laid a solid institutional foundation for the construction and development of China’s aging social service system.

### **3.3. Promoting community elderly care services**

Our country defines the socialized pension model suitable for the national conditions as community pension. Community pension developed from social pension and family pension. It takes the family as the core and relies on the community. Institutional elderly care services are introduced into the community, including day care, life care, housekeeping services, and mental care for the elderly, with the idea of home-based elderly care service system with community entrustment <sup>[4]</sup>. Local governments have vigorously promoted this elderly care model and modified several preferential policies to support the construction of home-based elderly care, which solved the difficulties of some elderly people. All regions have explored the community elderly care model, carried out pilot exploration, actively summarized the reform experience that can be replicated and promoted, and set an example for the development of the elderly service industry.

## **4. Problems existing in the operation of the social service system for the elderly**

Although various regions have made some achievements in promoting elderly care services, there are still many problems in the elderly care service system in theory and practice.

### **4.1. The construction of the service system for the elderly does not fully meet the needs of the elderly**

The elderly care service system should aim to meet the needs and wishes of the elderly. However, because the elderly are affected by many factors such as economic conditions, health, and family, the current service system can only be constructed based the lifestyle, and communities and institutions are only platforms for providing elderly care services, without considering the service system. The foundation and core of the service system is to provide targeted and high-quality services for the elderly.

At present, China’s demand for elderly care services presents an “olive-shaped” feature, that is, there are few high-end and low-end demands, and more mid-range demands for basic life care. However, in reality, the construction of the elderly care service system presents a “dumbbell-shaped” distribution <sup>[5]</sup>. Most service establishments are either too fancy or too cheap. On one hand, elderly people with ordinary income cannot afford to live in high-end institutions; on the other hand, low-cost institutions have poor service quality. In addition, most areas still have the problem of unequal care in community home-based care services. In communities with good economic conditions, the elderly care services provided is relatively comprehensive; while in areas with poor economic conditions, there are not many community-based elderly care services. This also means that there is a gap in the construction of China’s urban and rural pension service systems, which cannot fulfill the needs and wishes of the elderly.

### **4.2. The operating mechanism is flawed and the service responsibilities are vague**

The construction and development of the service system for the elderly requires not only the efforts of government, but also the participation of social forces. However, the service mechanism led by the government and participated by the society has not yet been fully formed. The elderly service business is a systematic project, where the development of elderly care institutions is inseparable from the cooperation of multiple departments such as finance, medical and health, and environmental protection. However, there is currently a lack of unity and coordination among community elderly care service resources, and there is a disconnection in work <sup>[6]</sup>. Taking the civil affairs department and the health department as examples, the

number and service quality of the existing elderly care institutions in various regions are far from meeting the needs of society. There are not enough beds and nursing staff, while there are many unused beds in many districts and neighborhood clinics and health centers. Professionals with high professional qualifications do not fully utilize their abilities, and there is a lack of synergy among them.

#### **4.3. Uneven distribution of pension resources and unequal access to pension service resources**

The problem of insufficient pension resources and idle resources coexist in China. According to statistics, in 2019, the number of beds per thousand elderly people in Beijing, Guangdong, Zhejiang, Jiangsu, Hubei, Anhui, Inner Mongolia, Guizhou, and Gansu exceeded the national average.

Whether it is from the national level or regional practice, most of the localities are based on the “9073” pension pattern, and as of the end of the fourth quarter of 2021, there are about 877 nursing home beds for 65-year-olds who are in need of institutional care <sup>[7]</sup>. In terms of the number of beds, the results show that 18 of the 31 provinces and cities in the country are below the national average. Therefore, it is clear that the current pension service system fails to achieve fair distribution of resources.

### **5. Improving the social service system for the elderly in urban and rural areas**

Although China’s pension service system has been established, there is still much room for improvement, and below are some countermeasures and suggestions that can be taken.

#### **5.1. Advocating diversified elderly service supply to meet the different needs of the elderly**

The pension service system must meet the comprehensive needs of the elderly, including not only basic pension service, but also diversified other services. The active participation of multiple parties should be encouraged. Diversified elderly care services should be provided according to their age, income status, health status and living conditions. If we only rely on the government, it will be difficult to meet the elderly care service needs of the elderly when there is insufficient government funding. To meet the diverse needs of the elderly, it is necessary to maximize the power of the market and society, and introduce market mechanisms to ensure the quality, quantity, and efficiency of elderly care services. Social services for the elderly are a kind of social welfare, and the government is obliged to be the main body of service supply, but not the only one. The subjects of elderly care services should be diversified, and the government should mainly provide bottom-up services among multiple subjects. The government should encourage the market, the state, and families to work together to improve the elderly care system.

#### **5.2. Strengthening the construction of supporting systems for the elderly service system**

The establishment of proper legislation should be prioritized, the leading and promoting role of legislation should be maximized <sup>[8]</sup>. A proper legal system is needed to actively respond to the aging population and accelerate the development of elderly services in urban and rural areas. Therefore, it is important to create a legal environment that is conducive to the development of the elderly care industry. It is necessary to further improve the laws, regulations, and systems for the development of the elderly care system. Besides, a better environment can be created for the sound operation and development of the elderly care service system by formulating a series of encouraging policies and measures.

The United States has the Older Americans Act, and Japan has the Elderly Welfare Act and Elderly Health Care Act <sup>[9]</sup>. Drawing on the legislative experience of the United States, Japan, the United Kingdom, and other countries, China should also speed up the corresponding legislative process and promote the inclusion of administrative regulations to promote the development of the elderly care service industry in the legislative research plan.

### 5.3. Integrating resources ensure fair distribution of resources in the elderly care service system

The needs of the elderly are quite different from what the elderly care institutions that the government and society can provide, and the services provided by many institutions are insufficient. Therefore, it is necessary to take multiple measures to increase the number of nursing beds. Firstly, we can adjust the proportion of pension resources through the guidance of relevant policies, and so as to maximize the coverage of government pension. Secondly, we can utilize hospital resources to increase the number of beds for the elderly and establish “medical-and-nursing care-type” elderly care institutions to effectively solve the problems of traditional Chinese medical care in elderly care institutions and the lack of resources. Thirdly, we should actively promote the construction of private elderly care institutions and integrate idle resources, such as fast hotels, office buildings, and other idle social resources, for the construction of private elderly care institutions. In accordance with the development idea of “the government leads, the society participates, and the policy supports” and multi-party participation, a new model of elderly care services should be explored and created. We can also use the “Internet+” concept to create a virtual nursing home, actively carry out the construction of “Internet+ elderly care” platform, better leverage the community to provide support for family services, and create an elderly care service model without boundaries.

The future development trend of our country’s elderly service system is mainly to reshape the filial piety culture, to provide professional services for community elderly care with the support of enterprises and non-profit organizations, and to emphasize the social responsibility of elderly care services <sup>[10]</sup>.

The main needs of the elderly are nursing and medical care, and the current nursing service or medical are not capable of meeting those needs. The pension model combining medical care and nursing care will be the future development trend, and with the rapid development of the service system for the elderly, the mid-range demand for institutional elderly care services will be further released. A large-scale, brand-oriented, and independent elderly care service model will be easier to seize the market and have greater room for improvement.

### Disclosure statement

The author declares no conflict of interest.

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5. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines, which is found in About the Journal.
6. If submitting to a peer-reviewed section of the journal, the instructions in Ensuring a Blind Review have been followed.





## Integrated Services Platform of International Scientific Cooperation

Innoscience Research (Malaysia), which is global market oriented, was founded in 2016. Innoscience Research focuses on services based on scientific research. By cooperating with universities and scientific institutes all over the world, it performs medical researches to benefit human beings and promotes the interdisciplinary and international exchanges among researchers.

Innoscience Research covers biology, chemistry, physics and many other disciplines. It mainly focuses on the improvement of human health. It aims to promote the cooperation, exploration and exchange among researchers from different countries. By establishing platforms, Innoscience integrates the demands from different fields to realize the combination of clinical research and basic research and to accelerate and deepen the international scientific cooperation.

### Cooperation Mode



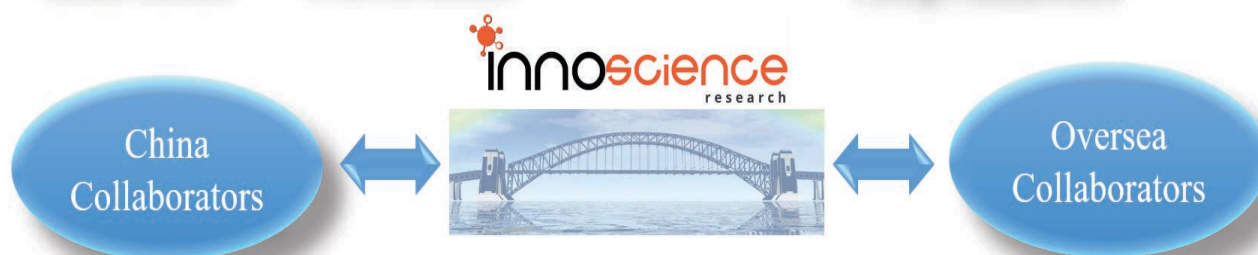
Clinical Workers



In-service Doctors



Foreign Researchers



Hospital



University



Scientific institutions

# OUR JOURNALS



The *Journal of Architectural Research and Development* is an international peer-reviewed and open access journal which is devoted to establish a bridge between theory and practice in the fields of architectural and design research, urban planning and built environment research.

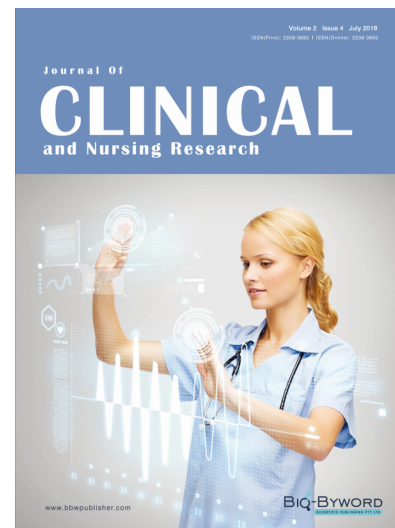
Topics covered but not limited to:

- Architectural design
- Architectural technology, including new technologies and energy saving technologies
- Architectural practice
- Urban planning
- Impacts of architecture on environment

*Journal of Clinical and Nursing Research (JCNr)* is an international, peer reviewed and open access journal that seeks to promote the development and exchange of knowledge which is directly relevant to all clinical and nursing research and practice. Articles which explore the meaning, prevention, treatment, outcome and impact of a high standard clinical and nursing practice and discipline are encouraged to be submitted as original article, review, case report, short communication and letters.

Topics covered by not limited to:

- Development of clinical and nursing research, evaluation, evidence-based practice and scientific enquiry
- Patients and family experiences of health care
- Clinical and nursing research to enhance patient safety and reduce harm to patients
- Ethics
- Clinical and Nursing history
- Medicine



*Journal of Electronic Research and Application* is an international, peer-reviewed and open access journal which publishes original articles, reviews, short communications, case studies and letters in the field of electronic research and application.

Topics covered but not limited to:

- Automation
- Circuit Analysis and Application
- Electric and Electronic Measurement Systems
- Electrical Engineering
- Electronic Materials
- Electronics and Communications Engineering
- Power Systems and Power Electronics
- Signal Processing
- Telecommunications Engineering
- Wireless and Mobile Communication

