Research on the Cultivation Mode of Urgently needed Innovative Talents in the food major Under the Background of New Quality Productive Forces

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Abstract: New quality productive forces are defined as productivity driven by scientific and technological innovation, marked by innovation, and essentially driven by talents. The current state of food science and engineering education in agricultural colleges and universities, as well as the relationship between university talents development and food industry needs was analysed. This study proposes several talent cultivation models to meet the needs of developing new quality productive forces, such as a bidirectional university-enterprise training model based on collaborative projects, a model involving industry alliances and university-enterprise joint innovation institutes, the "Science and Technology Backyard (STB)" model, and an international cooperation model, and so on. These approaches aim to cultivate urgently needed innovative talent in food field to promote the creation of new quality productive forces.

Key words: New Quality Productive Forces; Food Major; Industry-Education Integration; Innovative Talents; Cultivation Mode

1. Introduction

Technological innovation is the core element of new quality productive forces. Currently, these forces primarily manifest as "digital productivity," driven by technologies such as the Internet, big data, cloud computing, artificial intelligence, and blockchain, "green productivity," rooted in green, low-carbon principles and new energy technologies, and "blue productivity," fostered by the synergy between marine and land resources, the interconnectedness of marine and land industries, and the integration of marine and land economies. As China's largest industry, the food industry provides an important platform for developing new quality productive forces. The deep integration of next-generation information technology with manufacturing industry, combined with the adoption of emerging technologies such as big data, cloud computing, and the Internet of Things, is fundamentally reshaping the entire food industry value chain, from research and development to production and sales [1].

Universities serve as the primary force in cultivating talent for the agricultural product and food processing industries. The quality of talent training in food-related disciplines directly impacts the overall quality of talent team in the food industries [2]. Under the background of developing new quality productive forces, exploring effective training models for high-level innovative talent in the food field is of great practical significance. It contribute to graduate education to better provide technological and intellectual support for the transformation and upgrading of the food industry.

2. Analysis of the Development Status of Food Science and Engineering Disciplines in Chinese Agricultural Colleges and Universities

Food science and engineering is a discipline that applies the theories of basic disciplines and engineering to the study of the basic physical, chemical, and biochemical properties of food and the principles of food processing. According to the current catalogue of undergraduate majors of general colleges and universities under the Ministry of Education of the People's Republic of China, Food Science and Engineering was set as a first-level

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discipline (undergraduate majors), with five majors of Food Science and Engineering, Food Quality and Safety, Grain Engineering, Dairy Engineering, and Brewing Engineering, and seven special majors (Grape and Wine Engineering, Food Nutrition and Inspection Education, Culinary and Nutrition Education, Food Safety and Inspection, Food Nutrition and Health, Edible Mushroom Science and Engineering, and Baijiu Brewing Engineering) [3,4]. Based on the rapid development of the national food industry and food disciplines, as well as benefit from the continuous expansion of graduate student enrollment scale, the number of graduate students in the discipline of food science and engineering in China is also increasing. Food science is a key discipline for the development of agricultural universities, and by the end of 2022, the number of higher education institutions with doctoral programs in the first-level discipline of food science and engineering in China has reached 40, the number of master's programs in first-level disciplines was 74, which have become the main force of food disciplines in China.

3. Analysis of the Coupling of University Talent Training and Food Industry Demand

Influenced by history and traditional thought, talent training in colleges and universities remains the typical traditional education model, with students having significant advantages in examinations and scientific research simulations [5]. However, However, problems in knowledge creativity and scientific and technological cooperation are still outstanding [2]. Currently, there are still some problems that need to be solved urgently between talent training in colleges and universities and the demands of food industry.

3.1 Disconnection between Scientific Research in Universities and Technological Innovation in Food Enterprises

Due to the deviation between the scientific research activities of universities and the technological demands and innovations of food enterprises, the motivation of the research achievements of supervisors and postgraduate students to be applied in industry-university-research cooperation is insufficient. As a result, a large number of original scientific research achievements have been shelved, making it difficult to achieve technological promotion and practical transformation. This has led to a serious disconnection between the original scientific and technological innovation chain and the technological innovation demands of the industry, which affected the further extension and development of the food industry chain [1].

3.2 Social Service Function of Universities and the Phenomenon of Barriers to Technological Innovation in Food Enterprises

At present, it has become an international trend to pay attention to guiding and promoting the social service function of universities. Compared with the higher education of developed countries in Europe and America, the role of the social service function of universities in China is seriously insufficient. Talent cultivation and scientific research are the prerequisites and foundation for universities to realize their social service function, and also the source of the continuous improvement of their ability to serve society.

3.3 The Ability of University Professionals to Solve Complex Food Engineering Problems Needs to be Improved

The cultivation of high-level talent and the ability of cutting-edge scientific research and innovation rely heavily on the first-class team of supervisors. In recent years, the proportion of full-time faculty members at Chinese universities with doctorates has climbed by over 30% per year. However, many of these young supervisors lack practical experience in industrial engineering, have limited understanding of the overall development trends in the food industry, demonstrate insufficient capability in innovating or improving traditional technologies, and show a relatively low level of social participation [6]. As a result, it is difficult for them to organically integrate theory with innovative practice. This has led to the graduate students lacking the ability to solve real-world engineering problems, which created significant industrial barriers between the social service function of universities and the technological innovation needs of food enterprises. Consequently, a disconnection has emerged between talent cultivation a disconnection has emerged between talent cultivation in colleges and universities and the actual talent demands of the food industry.

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In conclusion, in the face of the rapid development and transformation of the food industry in the new era, the discipline of food science and engineering must fully seize development opportunities and proactively respond to emerging challenges. Talent cultivation should be guided by industry demand, with a strong emphasis on aligning with the development needs of agricultural product processing within the context of rural revitalization. Greater attention should be paid to the interdisciplinary integration of new agricultural science and new engineering disciplines. It is essential to explore innovative training models for high-level talent that are well-suited to the characteristics of food science and engineering programs in agricultural colleges and universities.

4. Cultivation Mode of Urgently Needed Innovative Talents in the Food Major under the Background of New Quality Productive Forces

4.1 Two-way Talent Cultivation Model between Universities and Enterprises based on Projects

Facing the demand of the frontier field of food industry and social development for high-level talents' innovation ability, an incentive mechanism for teachers to guide postgraduate students to participate in scientific and technological innovation projects and subject competitions should be established.

According to the goal of all-round cultivation of knowledge, ability and quality, we emphasize food specialty education and interdisciplinary innovation, and explore the construction of an organic integration system of innovation, which combines virtual (simulated) with real (practical) elements, school-enterprise collaboration and integrates competitions and courses.

Under the background of new agricultural science and new engineering discipline, a project-driven "dual-mentor system" should be established. Academic supervisors lead postgraduate students in executing industry-sponsored R&D tasks, while enterprise mentors integrate enterprises demands, technologies, and professional attributes into the talent development system [7,8].

Through collaborative education, we can not only cultivate graduate students, but also cultivate the technical backbone of enterprises, and close the professional talent chain of colleges and universities, food enterprises and graduate students, so as to realize the two-way orderly flow of graduate students and scientific research talents of enterprises [5].

4.2 Talent Cultivation Model based on an Industrial Innovation Platform

4.2.1 Cultivation model of industrial alliances and university-enterprise innovation research institutes

Relying on industry alliances and university-enterprise innovation research institutes, innovative models for cultivating high-level innovative talents in the food industry are developed. Accurately focus on the food industry and its demand for scientific and technological innovation and talent cultivation, the contents of industry-university-research were expanded with the industrial technology innovation strategic alliance and the university-enterprise innovation cooperation research institute as the links. An innovative talent cultivation model oriented towards the demands of the entire food industry chain was formed.

The weight of new technologies such as big data, cloud computing, AI artificial intelligence, the Internet of Things, blockchain, intellisense, wireless positioning, remote control, etc. in the training of talents across the entire industry chain of future food production, processing, circulation, and sales is strengthened. Through various new technologies and educational and scientific research platforms, the high-level innovative talent training mode in the food industry was realized [9].

4.2.2 Talent cultivation model of innovative "Science and Technology Backyard"

The Science and Technology Backyard model is defined as the long-term deployment of postgraduate students to STBs for scientific research and production practice, which is recognized as a postgraduate cultivation model in China integrating talent cultivation, scientific and technological innovation, and social service [10].

According to project plans, postgraduate students are dispatched to STBs to conduct productive practice and science and technology services, the latest research results were demonstrated and promoted in the STBs to solve the practice problems, while simultaneously completing their research

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projects or thesis designs.

This model can closely integrate theoretical innovation with practical training, scientific research achievements with technological promotion, talent cultivation with production practice and social demands, and promote agricultural science and technology progress and agricultural and rural modernization [11].

4.3 Talent Cultivation Model of International Cooperation

It is an important form of internationalization of higher education to promote the international training of graduate students by constructing international training system and curriculum resources, innovating international training methods for graduate students, improving the international ability of tutors, expanding international cooperation training channels and building an international training platform for graduate students. This will help to introduce foreign high-quality educational resources from abroad and cultivate innovative talents with international vision, familiar with international rules and ability to participate in international affairs and competition [12].

Through collaborative development of English and bilingual food science course resources, team-teaching by Chinese and international faculty, and research supervision leveraging internationally funded scientific projects, relying on the international scientific and technological cooperation projects undertaken by the team-teaching, short-term visits and exchanges or participate in academic conferences, we continuously broaden the international horizons of postgraduate students, keep abreast of the latest research trends in the food field and the development trends of the food discipline, enhance the capacity for international cooperation and exchange, and cultivate more high-level talents with innovative capabilities and global vision.

5. Conclusion

Under the background of new quality productive forces, high-level innovative talents in food industry have gradually transformed into compound subjects deeply integrating technology, knowledge, intelligence and humanistic spirit, and have taken on the responsibility of promoting the development of new quality productive forces.

The high-level innovative talent cultivation model for the food industry based on the requirements of new quality productive forces includes the two-way talent cultivation model between universities and enterprises with projects as the carrier, the talent cultivation model of industrial innovation platforms, and the talent cultivation model of international cooperation, which can provide more high-level innovative talents in the food field for the development of new quality productive forces.

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