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Impact on Industry and Deep Resource Sharing

-- The Integrated Development of Higher Education in the Hong Kong-Macao Greater Bay Area

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Abstract

At this stage, there are problems such as regional higher education level and resource imbalance in Guangdong, Hong Kong and Macao, so the development of higher education in the Greater Bay Area must make certain breakthroughs and innovations. The starting point of higher education integration is to use the group strength after the allocation of educational resources to break through the shackles of single development, which is a necessary stage of development and also matches the development strategy of the Guangdong-Hong Kong-Macao urban agglomeration itself, and the number of institutions, the scale of talent reserves, and the solid economic and industrial foundation of the Guangdong-Hong Kong-Macao Greater Bay Area also provide the necessary conditions for integrated development. Implemented into the specific development model concept, the overall structure should be carried out in a three-dimensional dynamic circulation structure, through the internal and external dual cycle model and the dislocation of educational resources development model, higher education embedded in the urban construction and industrial development of the Greater Bay Area, so that the two radiate and influence each other. In the future, we should optimize the matching of educational resources and industries at all levels, clarify the logic of internal and external higher education cooperation and competition, and break down barriers to talent flow through the joint establishment of institutional standards in the three places, so as to enhance the influence, competitive advantage and integration efficiency of the Guangdong-Hong Kong-Macao Greater Bay Area.

Keywords

Guangdong-Hong Kong-Macao Greater Bay Area; Higher Education; Integrated Development.

1. Introduction

On February 18, 2019, the Central Committee of the Communist Party of China and the State Council issued the Outline of the Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area, giving critical instructions on the development plan for the Area from 2019 to 2022, as well as the prospect and vision of phased achievements in 2035. It is clearly stated in section 1 “Build the highland of Education and Talents” of Chapter 8 of the outline: We must give the role of the Guangdong-Hong Kong-Macao University Alliance into full play, encourage universities in the three places to explore cooperation and exchanges in such aspects as mutual recognition of specific course credits, implementation of more flexible student exchange arrangements, and sharing and transformation of scientific research achievements. It can be seen from those arrangements that the core content of higher education development in the Guangdong-Hong Kong-Macao Greater Bay Area is to promote teaching and research cooperation among higher education institutions, give full play to geographical location and

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policy advantages to realize full integration and efficient allocation of educational resources. The author believes that the educational development of the Guangdong-Hong Kong-Macao Greater Bay Area must make rational use of its unique geographical advantages to promote its in-depth clustering and integration.

In view of the overall trend of higher education development in Guangdong, Hong Kong and Macao, the imbalance between economic advantages and educational advantages of the three regions has been a consensus among the academic community. If the agglomeration of institutions of higher learning is regarded as an educational ecological group, the size of the population and the number of its members must be adjusted with the external environment and the nature of the population, which is indispensable for its sound development. However, the regional structure of higher education in Guangdong, Hong Kong and Macao registered a seriously unbalanced feature[1]. In addition to the number and specifications of colleges and universities that have a certain scale and can realize a mature educational resource sharing system in Guangzhou and Hong Kong, problems such as weak faculty, insufficient investment in educational resources, limited influence of colleges and universities, and insufficient talent absorption policies exist in many other regions. The level of higher education is of scarcely commensurate with the economic strength, geographical position and development prospect of Guangdong, Hong Kong and Macao, and there is still a huge development potential and space.

Taking Guangdong as an example, according to Professor Nan Junmin of South China Normal University, since the enrollment expansion of higher education by 33% in 1999, the development of higher education in Guangdong has adopted an unsustainable development strategy. Generally speaking, too much attention has been paid to "connotative development" while ignoring "extension development". In other words, by exploiting the development potential of existing colleges and universities and optimizing the allocation of internal resources as the main means of development, the sharing of external resources, the opening of campuses and the upgrading of colleges and universities were neglected [2]. It will inevitably lead to the exhaustion of internal educational resources of existing colleges and universities and intensify the vicious competition among education industries in the long run. The speed of higher education concept change and system innovation in Guangdong province is far behind the speed of university scale expansion and student enrollment expansion. To achieve sustainable and healthy development, higher education in Guangdong, HongKong and Macao must transform from exploiting the internal education resources mining deeply to outside enlarging development in the true sense, at the same time make full use of the geographical advantages brought by the concept of the "Guangdong, HK &Macao Greater Bay Area" , and seek for educational industry agglomeration and efficient resource allocation among colleges and universities, all of which belongs to the foreseeable overall trend.

It can be concluded that the development of higher education in Greater bay area must be distinguished from general regional development of higher education. The reasons are as follows: The highly concentrated and complex production structure of this area decides a large number of talents demand. The integrated development pursued by the Guangdong-Hong Kong-Macao Greater Bay Area in urban construction, economy and other fields can ensure efficient and reasonable use of resources, which is a natural advantage for educational integration. Therefore, the goal of developing higher education must be clear from the start. "Higher education" should not be regarded as an independent entity separated from the concept of the Greater Bay Area to set up schools and recruit students purely on the land of the Greater Bay Area. Instead, education should be embedded in the industrial chain of the Greater Bay Area to make education a mature industry and make the industry serve the urban construction. At present, this concept is highly matched with the urban development strategy of the Greater Bay Area, and the discussion on the relationship between education and industry also has certain innovative value.

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This paper hopes to start with the basic conditions and model conception of the integrated development of higher education in the Guangdong-Hong Kong-Macao Greater Bay Area, and discuss how to carry out benign and sustainable development in a more rational, healthy and more suitable state for the actual situation of the Greater Bay Area in the context of the rapid expansion of the overall enrollment scale and the scale of higher education. Based on the natural advantages and historical opportunities of the Guangdong-Hong Kong-Macao Greater Bay Area, the value of discussing the development situation of higher education is not limited to the education industry itself, but is of great significance to the talent demand, industrial cycle and resource allocation of the greater Bay Area.

2. The Necessity and Feasibility of Integrated Development

2.1. Necesscity Analysis

The influence of the concept of "Greater Bay Area" on higher education is extremely significant. In the author's opinion, a pre-condition must be clarified when discussing the development of the Greater Bay Area, which is to separate the disciplinary significance and social significance of "Greater Bay Area" and discuss it as two different subjects. Although the so-called "Bay Area" is a geographical term, which generally refers to the region jointly formed by multiple connected bays and adjacent islands, from the actual situation at present, the term "Guangdong-Hong Kong-Macao Greater Bay Area" exists based on industry rather than geographical location. In other words, what enforces the "Greater Bay Area" is not that Guangdong, Hong Kong and Macao are in a geographical position matching the academic definition, but that the historical and cultural background and economic volume of the three places provide the necessary conditions for their integrated development[3]. In fact, the so-called "Bay Area" concept is of great significance only when the Bay Area in a certain geographical location is capable of conducting industrial agglomeration, transformation and upgrading and achieving external communication, no matter in economic or cultural level. The industrial convergence was stronger than regional convergence brought by the concept of "Guangdong, HK &macau Greater bay area". This has two implications for the integrated development of higher education. First, the simple regional cooperation between institutions of higher learning can be avoided to some extent. Second, it can alleviate the separation of higher education in the process of industrial development and strengthen its structural relationship with industrial development and urban construction.

The emergence of the "Guangdong, HK &Macau Greater Bay area" and its growth is in fact a typical example of most harbour cities' development. When the city developed to a certain stage and scale, bottlenecks and difficulties will inevitably emerged and prompt it to pursue the industry cluster effect and function coordination, and use of resources integration of complementary advantages to cross the threshold of the individual development. This is true for both the overall economy and higher education. Therefore, emphasizing the integrated development of education is highly compatible with the overall development strategy of the Guangdong-Hong Kong-Macao urban agglomeration. There is no doubt that the starting point to emphasize the concept of integrated development in the present stage is more of a helpless move. As mentioned above, from the perspective of individual institutions, the internal excavation of educational resources is similar to draining water and fishing. For the short-term development of the whole education industry, such non-renewable grab may achieve rapid replenishment of resources and sharp expansion of the scale. However, in the long run, the convolution development of the education system in Guangdong, Hong Kong and Macao consumes a lot of educational resources. In order to realize the healthy and stable operation of the higher education system, it is necessary to seek a kind of innovation and breakthrough, as well as a metamorphosis in concept.

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From the perspective of the advantages of integrating urban resources brought by the concept of "Guangdong-Hong Kong-Macao Greater Bay Area", the integrated development of higher education is the process of integrating originally scattered educational resources into a complete educational industry, in which a mature operation, cooperation and the logic of supply and demand are endowed. This is in accordance with the definition of urban agglomeration development with high quality. According to the existing high-quality economic development index system of urban agglomerations (Zhang Zhen, Qin Chenglin, 2021), which is based on seven dimensions, such as economic development power and new industrial structure, the dimension of "new industrial structure" can reflect the performance of urban agglomerations in the adjustment and upgrading of industrial structure[4]. At the same time, it also represents the transformation and development of the industry, which is one of the important indicators that are included in the overall high-quality development analysis of the city. One of the important significance of the integrated development of higher education in the Guangdong-Hong Kong-Macao Greater Bay Area will be explained below. The independent internal operation of a single university cannot become an industry. Only the integrated group can have enough volume, efficiency and capital to support higher education in the Guangdong-Hong Kong-Macao Greater Bay Area to become a mature industry. Such industrialization is closely related to the development quality of urban agglomeration. We should focus on making the concept of the Greater Bay Area truly radiate to higher education, and not let the existing educational development be separated from the overall industrial structure of the Greater Bay Area. Otherwise, it will not only be a blow to the sustainable development of higher education itself, but also a serious waste of the platform and resources provided by the Guangdong-Hong Kong-Macao Greater Bay Area.

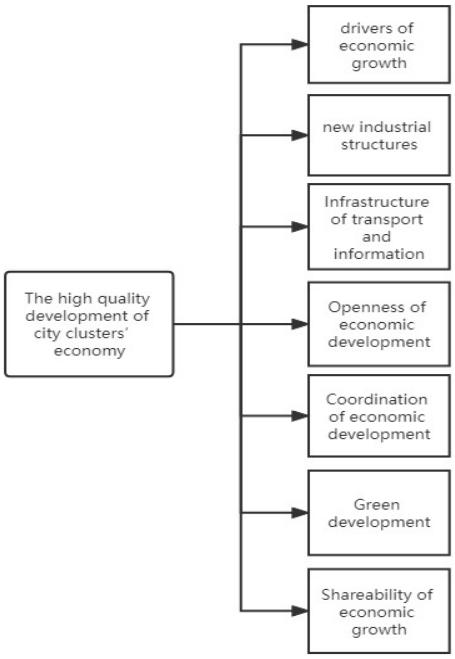

Figure 1. Urban high quality development index system composition (Zhang Zhen, Qin Chenglin)

2.2. Feasibility Analysis

According to the government affairs data disclosure of the 2019-2020 academic year by the Education Department of Guangdong Province and the statistical Bulletin of The Development of Education in Guangdong Province in 2020, there are 154 colleges and universities in the province in 2020, including 67 undergraduate colleges and 30 postgraduate training units, which includes 27 normal colleges and universities and 3 scientific research institutions. The

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total number of students in all kinds of higher education institutions in the province is 3,783,900, including 59,900 graduate students, an increase of nearly 30 percentage points year-on-year. According to the statistics of the number of colleges and universities and students in Guangdong, the overall scale of higher education is expanding and improving steadily. In particular, the expansion of postgraduate-level higher education has provided a stable source of cutting-edge talents for Guangdong, Hong Kong and Macao. On an overall basis, it has the necessary condition to realize the coordinated development of integration in terms of scale. The integrated development of higher education can not only transform the scale of institutions into flexible educational resources that can be used, shared and deployed, but also give full play to the advantages of the Greater Bay Area in terms of geopolitics and historical and cultural background, and achieve close cooperation and exchanges among the education industries of Guangdong, Hong Kong and Macao. In essence, this is the process of transforming the original convolution mining into the outward expansion mode, which can effectively solve the problem of the exhaustion of internal educational resources.

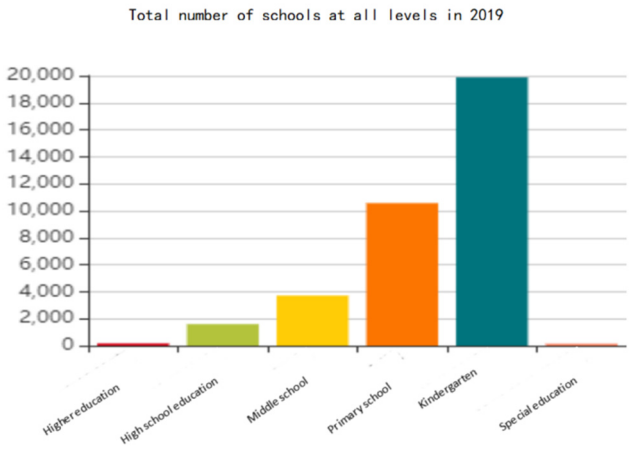

Figure 2. Total number of schools at all levels in 2019
Data Source: Statistical Bulletin on educational Development of Guangdong Province in 2020

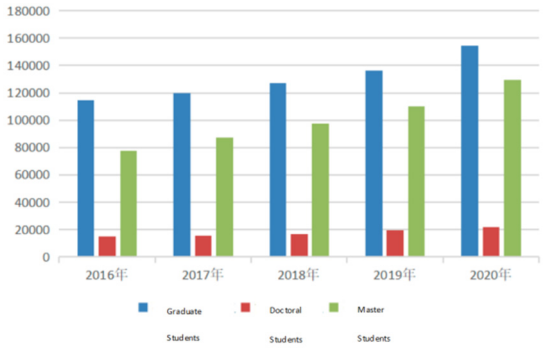

Figure 3. Statistics of postgraduate students in Guangdong province in 2020
Data Source: Statistical Bulletin on educational Development of Guangdong Province in 2020

In June 1999, senior officials in charge of higher education from 29 European countries met at the University of Bologna in Italy and proposed the idea of integrating EU higher education resources and reforming the educational system. The specific implementation plan was called the Bologna Process. This exerts important guiding significance and promoting effect on the integration of European higher education resources. The advanced nature and richness of European higher education system is always worthy of praise and learning. However, in the

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context of the accelerating globalization of higher education, Europe still has to face the difficulties of transnational certification of academic and vocational qualifications brought by the diversity of higher education degree system. Therefore, European Network for Accreditation of Engineering Education is even derived to form an Education Accreditation system that is widely recognized and used in European countries[5]. The experience of Bologna process is not a profound academic principle at present, but as far as the integration and development of educational resources is concerned, the reform process of European higher education system does make a model worthy of reference for us.

Jane Knight, a professor at the Ontario Institute for Education Research at the University of Toronto, cited the implementation of the Bologna process as an important case study of the international level of Higher Education, and published an article based on this study in the Tuning Journal for Higher Education. The author puts forward his own views and thoughts on the regional integration development of higher education. He emphasized that in the process of regional development of higher education, in addition to the higher education department itself as an important catalyst and promoter, there are still many other political departments keen on such regional integrated development as a tool and means of regional integration, and thus drive economic operation or achieve certain political goals[6]. It can be seen that the integrated development of higher education will not only radiate in the field of higher education itself, but also serve as an important medium or channel between education, economy, politics and other fields. In other words, judging from the experience of the Bologna process, there is no doubt that the integration of higher education by multiple countries, regions or nationalities is of great significance to the higher education industry itself, but beyond that, the underlying purpose may not be so pure. Whether it's through the integration of education development to promote steady economic operation, or borrow a common recognition of the education standards to strengthen unity and communication between regions, what we need to admit is that this so-called "impurity" is not a bad thing, but brings a new development model for higher education in the Guangdong-Hong Kong-Macao Greater Bay Area.

It is not a secret in the business field that education industry drives the whole industry, but it is very difficult to implement it. Even if the educational resources in many regions can achieve mature integrated development, they do not have enough volume to form a paired and complementary industrial base with them. That is to say, the author mentioned above, higher education cannot be effectively embedded in the industrial chain. However, the advantages of the Guangdong-Hong Kong-Macao Greater Bay Area in this respect are reflected in its considerable accumulation on the basis of industry and the prerequisite for integrated development.

Guangdong's industrial development direction tends to be diversified and integrated. There are not only the traditional manufacturing industry providing the guarantee of infrastructure construction, but also a considerable number of high-tech industries relying on Internet technology, automation, artificial intelligence and other fields as important economic support to attract cutting-edge research talents. Hong Kong and Macao mainly focus on the development of professional and modern tertiary industry, with mature development plans for service industry, tourism and finance[7]. The core industries of Guangzhou, Hong Kong and Macao can realize a kind of complementarity and resource sharing within the supply cycle. In addition, the internationalization degree and economic size of Guangzhou, Shenzhen, Hong Kong and Macao all rank among the top in China, ensuring the access of resource export and introduction. However, for individual institutions of higher education, the value of such advantages is limited and is almost restrained to one-way talent delivery. Only when higher education in Guangdong, Hong Kong and Macao is truly regarded as a whole structure can the location advantages provided by the Greater Bay Area be fully utilized. The combined effects of the above conditions provide the necessary economic foundation and industrial advantages for the integrated

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development of higher education in the Guangdong-Hong Kong-Macao Greater Bay Area, and the high economic and industrial vitality solves the problems of "jobs", "talent absorption" and "talent use" that are closely related to the field of higher education. It is foreseeable that in the process of integrated development, higher education in the Guangdong-Hong Kong-Macao Greater Bay Area may not simply achieve the fixed model of "education to promote the economy", but enable higher education to enter the normal industrial development and circulation, and become an indispensable part of the complete industrial chain of the Greater Bay Area.

3. Basic Ideas of Integrated Development Model

The author believes that, based on the convenience and advantages provided by the concept of "Guangdong-Hong Kong-Macao Greater Bay Area" for the higher education field in this region, certain breakthroughs and changes must be made in the development direction and development mode. The integrated development of higher education in the Guangdong-Hong Kong-Macao Greater Bay Area should not be a planar behavior, but a process of constructing a dynamic spatial framework, which is systematic and institutionalized and highly unified with the urban development strategy. Generally speaking, the greatest significance of the concept of "Greater Bay Area" is to integrate the originally independent cities in Guangdong, Hong Kong and Macao into a group with close connections and certain economic vitality and strength. Therefore, resource integration and sharing among various industries is an inevitable development trend.

3.1. Dual Cycle Development Model

It is the development mode of the Guangdong-Hong Kong-Macao Greater Bay Area at present and even for a long time in the future to construct a "dual circulation" spatial support system under the premise of rationally utilizing the geographical, economic and political advantages provided by the concept of "Greater Bay Area". The dual-cycle model exists to optimize the spatial layout of regional industries, with the domestic cycle and international cycle acting on the coordinated development of urban agglomeration industries[8], and its basic operation logic and model can be applied to the development of higher education.

3.1.1. Regional Internal Cycle

The regional internal circulation is proposed based on the concept of the geographical location of the Guangdong-Hong Kong-Macao Greater Bay Area, which is also the current circulation mode most suitable for the development direction of the Guangdong-Hong Kong-Macao Greater Bay Area. From an objective perspective, due to sensitive objective factors such as geopolitics and cultural connotation, it is more difficult for Guangdong, Hong Kong and Macao to achieve integrated development than the general geographical location in China, so the development goals of higher education in the Greater Bay Area should be more specific and clear.

The integration process needs to distinguish between academic transactional cooperation and regional integration cooperation. Traditional academic transactional cooperation is composed of some relatively routine cooperation items, such as academic discussion activities between colleges and universities, exchange visits between students and teachers, etc.[9]. We cannot deny its promoting effect on the growth of colleges and universities. However, it is divorced from the special advantages conferred by the concept of "Guangdong-Hong Kong-Macao Greater Bay Area" for higher education. The core of regional integration cooperation lies in the efficient and reasonable allocation of educational resources, and at the same time, the education industry can truly integrate into the industrial development, which is a step-by-step, from the outside to the inside process. For example: the first step, deep sharing of teachers and scientific research achievements; The second step is to set up scientific research institutions with

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colleges and universities as the unit and industry development as the goal, so as to realize professional talent training and supply talent demand within the Greater Bay Area and make industrial development play a role in higher education and provide necessary financial support and employment opportunities. The third step is to build a knowledge base for industrial development based on the scientific research capacity of the group of colleges and universities, and spread outwards with the knowledge base as the center, explore new development models and new science and technology, and broaden the industrial access of the Guangdong-Hong Kong-Macao Greater Bay Area. It can be seen that the regional internal circulation is a dynamic process of value circulation and value interaction, which can give full play to the mutual driving effect between industries. Besides, the internal circulation of higher education is different from the internal circulation of pure economic industry, and it needs to be based on the talent reserve and scientific research strength of sufficient scale, which is the fundamental reason why higher education in the Guangdong-Hong Kong-Macao Greater Bay Area needs to carry out integrated development of education.

Higher education serves the overall industrial construction, industrial development and industrial transformation, which is the core requirement of the internal cycle. Behind this service, there should be a certain number of colleges and universities and high-quality scientific research forces to complete the specific division of talent training projects. In essence, it is a process of transformation from the single cooperative behavior between institutions to the normative cooperative behavior of organizations. Its significance lies in that on the premise of making full use of the existing regional advantages, a standard can be widely used for the integration of educational resources. The communication, exchange and cooperation of colleges and universities can obtain higher efficiency and more detailed resource categories by relying on this standard, and thus form an internal circulation system based on the geographical location of the Guangdong-Hong Kong-Macao Greater Bay Area, which enables higher education to enter the link of industrial development and enable the industry to play a full role in higher education.

3.1.2. Extensive External Circulation

Given the actual situation of universities in the Guangdong-Hong Kong-Macao Greater Bay Area in terms of specifications and international influence, they still need to improve the imbalance of educational resources distribution and allocation in the internal system. Therefore, self-regulation under regional internal circulation is still the mainstream development trend at this stage, while external circulation is more a means to broaden the scope of resource flow. Different from the three-dimensional dynamic process connected with industry in the internal cycle, the author believes that the external cycle of higher education in the Greater Bay Area will be more pure and clear.

Compared with the regional concept of Guangdong-Hong Kong-Macao Greater Bay Area, the pressure on the protection and development of local industries will be relieved to some extent in the process of the integrated development of higher education resources nationwide or internationally. When higher education is separated from the industrial chain and does not need to serve local urban construction and industrial construction as an important goal, the openness of some scientific research projects or educational activities will be released, mainly focusing on pure academic exchange and sharing resources on the whole. For example, traditional student exchange, teacher exchange, lecture, cross-regional borrowing of library electronic resources, etc. It subjectively means that higher education in the Guangdong-Hong Kong-Macao Greater Bay Area will return to "pure academic field", which is undoubtedly a buffer for the replenishment and diversified development of academic resources of institutions of higher learning and of profound significance. In a wide range of external circulation process, each region of the relationship between higher education institutions are simplistic. Because there is almost no need to consider complex social issues such as regional geographical factors

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and common service objects in a small range, the academic relationship between schools and the overall logic of cooperation and competition will be clearer, which is an important advantage of external circulation.

The theory of cooperative competition, which originated from the book Cooperative Competition co-authored by scholars Adam M. Brandenburger and Barry J. Nalebuff, was originally applied to the discussion of cooperation and competition in the field of economic management. However, after the development and extension of the concept, it has been widely used to explain the relationship between the state, the social relationship and the educational relationship. The monograph mentioned that the business relationship between enterprises is not a zero-sum game, but can be a two-way cooperative competition set relationship of value acquisition and value creation. Starting from the subject of enterprises, the idea of parallel competition and upstream and downstream cooperation in business activities of enterprises should be clear [10]. Put the idea into into higher education, the reason why the academic relationship between higher education institutions in a small area is not as pure as that in the external cycle is that there is fierce competition in talent cultivation and transportation within the region, as well as competition in the influence and contribution of institutions to the regional industry. In the process of external circulation, the relationship between institutions is more like the relationship between upstream and downstream in the business activities of enterprises, which does not avoid competition, but can create purely academic value in most cases.

Different from internal cycle as mentioned above, the external cycle of higher education, with its process of returning from industry to academia, reduces the industrial pressure and expands the core goals of institutions of higher learning, thus clarifying the cooperative and competitive relationship between institutions within the Guangdong-Hong Kong-Macao Greater Bay Area and external institutions. However, it is almost unnecessary to consider the impact of the interaction between institutions on the urban construction and industrial construction in the region. The purpose of integration is more pure, and it is more efficient for the development and construction of higher education institutions than the internal cycle [11].

3.2. Hierarchical Management of Higher Education Institutions

The Guangdong-Hong Kong-Macao Greater Bay Area is the fourth largest bay area in the world after the New York Bay Area, San Francisco Bay Area and Tokyo Bay Area. However, different from the industrial structure of the above-mentioned three Bay areas, the overall industrial structure of the Guangdong-Hong Kong-Macao Greater Bay Area is diversified due to the complexity of geographical factors among the three areas. As above mentioned, As mentioned above, Guangdong is dominated by traditional labor-intensive manufacturing and high-tech industries, while Hong Kong and Macao is dominated by tertiary industries. Such mixed industrial structure makes it impossible for the Greater Bay Area to find a specific industry label like San Francisco bay Area's "technology Bay Area" or New York Bay Area's "financial Bay Area"[12]. This means that when higher education plays a role in industrial development, it needs to refine the categories of talent cultivation and delivery, which undoubtedly increases the difficulty of scientific research activities and academic activities of colleges and universities in the Greater Bay Area in the process of regional internal cycle. The San Francisco Bay Area has provided us with valuable experience in integrating educational resources in order to efficiently serve the industry development in the region.

California in the San Francisco Bay Area carries out the integration of educational resources in a pyramidal hierarchical structure, with different positioning, functions and talent training objectives of institutions at different levels, which ultimately makes the service industry objects different and enables efficient sharing and allocation of educational resources among each other:

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Tier 1, the University of California(UC) system. The system consists of 10 research universities. This tier is the most important talent pool for tech r&d in the entire San Francisco Bay Area, which can obtain the largest amount of capital investment and educational resources, and has a considerable number of scientific research projects and institutions, becoming an important basis to ensure that the science and technology content of the entire industry in San Francisco Bay Area always stays at the world's top level.

Tier 2, the California State University system. The system contains 24 teaching universities. Compared with the University of California system, it has a relaxed entry barrier, but it is also strong. There is no lack of California Polytechnic State University and other world-leading universities in the system. Nearly half of California's undergraduate graduates and one-third of its master's graduates come from this system every year. It takes large-scale medium and high-end talents training as the basic training direction, and mainly serves the entity production in the field of commerce, finance and high-tech.

The third tier, the California Community College system. The system is composed of 119 community colleges, which provide basic education for the first two years of undergraduate study. It undertakes the dual responsibilities of higher education and vocational education in the San Francisco Bay Area and even the whole United States, and provides talents for the basic social work field and traditional manufacturing industry in the region.

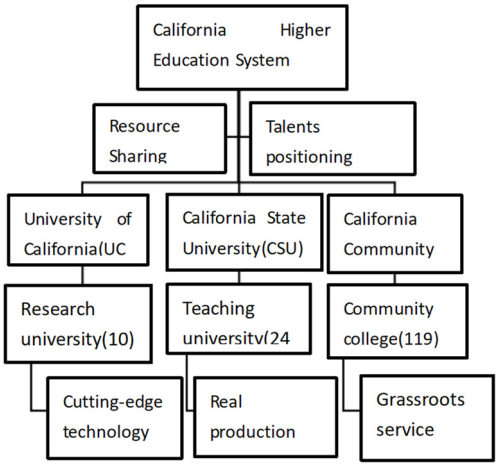

Figure 4. California Higher Education System

The proportion and quantity within each level are reasonable. In addition, students who have completed the basic education within each level or have outstanding qualifications and abilities are provided with a loose transfer window. Students can adjust their learning tasks according to their actual needs[13].In view of the mixed nature of the industrial structure of the Guangdong-Hong Kong-Macao Greater Bay Area, the advantages of such hierarchical system integration are mainly reflected in the following two aspects:

3.2.1. Accurate Matching based on Industry Content

In essence, the level of higher education institutions corresponds to the level of regional industry type, and the type and development goals of each institution have been clearly distinguished in the definition of the type of institutions. A typical name, such as "research university", means far more than giving a high-end title to an institution. It means that the quality of students, faculty and research force of the institution at this level are all at the top level in the region and even in the world. Therefore, this type of university has a clear goal and direction for talent delivery to the regional industry, that is, to carry out cutting-edge research and development projects and always maintain the technological content and high added value

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of the regional industry. The integration of institutions accorded with the level ensures that each level of industry is matched with the right level of higher education, putting professional people in the most appropriate social position, no matter scientific research, production and service areas at the grass-roots level. This is of great significance to urban construction and industrial development, and is worth emulating for the Guangdong-Hong Kong-Macao Greater Bay Area.

3.2.2. Avoid Vicious Competition between Colleges and Universities

As mentioned above, universities in a small area have fierce competition relations in talent cultivation, talent delivery, industrial influence and contribution, leading to unclear logic of cooperation and competition among universities. However, hierarchical resource integration may effectively alleviate this problem.

First, the so-called "hierarchy" has not been fixed for long. California's higher education system has in fact undergone small changes in the number of institutions within each tier since its inception. For example, the founding campus of the University of California system was the University of California, Berkeley. Through continuous development and expansion, it has the University of California, Davis, University of California, Los Angeles and other top colleges and universities in the United States. In addition to the means of external expansion opened by new campuses, each system can also obtain educational capital investment, university scale expansion or university upgrading by completing the teaching tasks or teaching indicators designated by the government, which is relatively loose and free in California's higher education system. Secondly, the hierarchy of institutions ensures that each institution has a clear talent training plan and talent delivery plan in a short period of time, and also ensures that it has a clear understanding of the industry types that its own strength can match. The above measures can clarify the development goals and competitive relations among colleges and universities, effectively relieve the competitive pressure of colleges in talent cultivation and talent delivery, and play an important role in the healthy development of cities and industries in the region[14].

4. Analysis of Integrated Development Problems

The integrated development of higher education is inevitably the basic development direction and predictable development trend of guangdong-Hong Kong-Macao Greater Bay Area. However, in the process of integrated allocation of educational resources, it is indispensable to face some problems caused by regional differentiation, which need to be constantly discovered, overcome and improved in the process of development.

4.1. Institutional Division

As mentioned above, the industrial structure of the Guangdong-Hong Kong-Macao Greater Bay Area determines the complexity of the integration of educational resources. Therefore, it is necessary to follow the example of the higher education system of California in the San Francisco Bay Area and carry out hierarchical gradient management of colleges and universities. However, the difficulty in the implementation of hierarchical management lies in that the terms "985 batch", "211 batch" and "the first batch of undergraduate" and "the second batch of undergraduate" commonly used in China to delimit the specifications of colleges and universities are too common, incapable of forming a relatively systematic scientific indicators. That is to say, the above words can be used to classify the levels of colleges and universities on a basic basis, but the comprehensive strength of colleges and universities can not be assessed effectively and scientifically.

As far as the higher education system serves the industry construction, the talent training required by the industry must be specific and detailed so as to guarantee the reasonable talent

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demand in the region. In particular, due to the particularity of the industrial structure of the Guangdong-Hong Kong-Macao Greater Bay Area, the types of talents needed by multiple industrial blocks require colleges and universities to clarify their own talent training objectives, which makes it necessary to develop a widely accepted, recognized and used value standard for comprehensive evaluation of the strength of refined colleges and universities. There are also many scholars who have conducted in-depth studies on evaluation standards before. For example, Ma Junfeng and Hu Yangguang once took "the number of domestic high-level papers", an indicator that can reflect the level of scientific research innovation of colleges and universities, as an example. Based on the Local Moran's index, colleges and universities in Guangdong are divided into three gradient grades according to the degree of spatial aggregation. The first gradient is the core of spatial aggregation of south China University of Technology, South China Normal University and Jinan University, the second gradient contains Guangzhou University of Traditional Chinese Medicine and Southern Medical University, and the third gradient contains Zhaoqing University and Guangdong Institute of Technology, etc. [15].This calculation method is worth taking as a reference, especially in the calculation of spatial aggregation degree by Moran index, different variables can be changed, such as "frequency of participation in international conferences" or "number of patent grants", etc., and the assessment range is relatively wide. However, calculating the aggregation degree of each variable between institutions can only be used as a reference standard, and it is urgent to integrate more evaluation methods for specific classification of institutions.

4.2. Barriers to Talent Flow

Talent sharing is one of the core purposes of the integrated development of higher education. Teacher sharing, student sharing and graduate resource sharing are of great significance to the development of colleges and universities themselves or cities, and can give full play to the advantages of resource integration and allocation. In terms of regional factors, the barrier of talent flow between Guangdong, Hong Kong and Macao has existed for a long time. In particular, Guangdong and Hong Kong and Macao generally have problems in the sharing of human resources, such as flow difficulties, lack of system and qualification restrictions, which can not be ignored for the integrated development of higher education in Guangdong, Hong Kong and Macao, especially for the sharing of cutting-edge scientific research forces[16].

First of all, guangdong, Hong Kong and Macao do not have an authoritative sharing platform for talent information dissemination. There is serious asymmetry and lag in the release and update of talent information, and the flow of high-quality talents in the three places, as well as the extremely closed channels and channels of talent information exchange, brings about a significant problem that the cutting-edge talents cultivated in Guangdong, Hong Kong and Macao can only serve the local industrial construction and urban development. Secondly, colleges and universities in a small area and a specific region generally make training plans in line with local talent needs according to the discovery status or industrial structure of the city, so the talent cultivated has a high homogeneity. For example, tourism and service industry in Macao account for a very high proportion in the overall industrial structure. Therefore, colleges and universities in Macao generally pay more attention to talent training in the tertiary industry to ensure the talent supply in the region. However, presently, Guangdong is in the process of transformation and upgrading of traditional manufacturing industry, and manufacturing and emerging technology industries have a high proportion in the industrial structure. Therefore, colleges and universities are more inclined to devote educational resources to Internet technology, electronic information engineering, mechanical equipment manufacturing and other fields[17]. Therefore, from the perspective of the integrated development of Guangdong, Hong Kong and Macao, the regional orientation of talent training goals is strong. As a result, the competition caused by homogeneity of talents in the region is more intense. At the same time,

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such a single talent training structure also tends to lead to the shortage of talents outside the local mainstream industry. Therefore, it is necessary to broaden the channels of talent sharing and strengthen information exchange, which is also a good solution to alleviate the problem of uneven talent distribution.

To break down this talent sharing barrier is almost impossible to be achieved by the efforts of universities or the private sector alone. Especially considering the sensitivity and particularity of geographical and political factors in Hong Kong and Macao, it brings a lot of inconvenience to the flow and sharing of talents. Therefore, in the future, talent flow and sharing among Guangdong, Hong Kong and Macao will inevitably require the intervention of the state to take the lead and guide in some projects, rather than a purely academic act.

5. Conclusion and Outlook

In this paper, based on the social significance of the concept of "Guangdong-Hong Kong-Macao Greater Bay Area", the author discusses the radiation effect and influence of higher education in the Greater Bay Area on urban construction and industrial development. From the perspective of specific analysis, the guangdong-Hong Kong-Macao Greater Bay Area reflects the feasibility and necessity of integrated development of education, whether it is the scale of institutions of higher learning or the talent demand of the industry. Obviously, not only in the Guangdong-Hong Kong-Macao Greater Bay Area, but also in the whole country and even the world, the integration and co-creation of higher education resources is a predictable overall trend, which is of great significance to break through the bottleneck of scientific research and teaching. At the same time, the author also puts forward personal views based on the urban development model of the Greater Bay Area and the higher education system adopted by the San Francisco Bay Area, which is also a world-class bay area. The author hopes to provide some reference for the development direction of higher education in the Greater Bay Area and supplement the existing research results in the academic circle.

Of course, this study also has some shortcomings. For example, due to the epidemic, the author was unable to conduct in-depth field interviews and research in universities in Guangdong, Hong Kong and Macao, and was unable to learn their detailed talent training plans and schemes. The ideas mentioned in this paper are partly personal inference and need to be verified by more practical experience. At the same time, due to the complex and tedious problems faced by the integrated development of higher education at the present stage, especially the geographical and political factors of Hong Kong and Macao, a relatively perfect solution has not been proposed. However, the close relationship and development difficulties in the higher education field of Guangdong, Hong Kong and Macao all determine the urgency to realize the integration of educational resources, which is worthy of more resources and energy from all walks of life.

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