



Study on the synergistic development of TCM service trade within the GBA

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ABSTRACT

Objectives: This study analyzed the synergistic development of the Traditional Chinese Medicine (TCM) service trade within the Greater Bay Area (GBA) in China, aiming to provide suggestions and references for the development of TCM service trade around the world.

Methods: Taking the typical and representative Guangdong, Hong Kong and Macao Greater Bay Area as the research object, this paper focused on four modes of “cross-border supply, offshore consumption, commercial presence, and movement of natural persons”, and explored the current situation of TCM service trade from four macroscopic aspects: political, economic, social, and technological, through case studies. The challenges in the development of TCM service trade were analyzed.

Results: Our study found that the degree of synergistic openness of Guangdong, Hong Kong and Macao needs to be improved. The integration of trade in TCM services is the integration of TCM services with tourism. However, there is a relative lack of human resources in TCM in Hong Kong and Macao, with weak competitiveness of service bases. The resources of TCM services are still under-utilized, and the GBA market of TCM services lacks momentum.

Conclusions: We have come to the conclusion that the GBA need to promptly improve the unified standard system of TCM service trade. Actively building cultivating a “Bay Area GBA brand” for TCM service trade, steadily building a social climate in support of TCM service trade and vigorously promote the development of TCM service trade through digital technology, thus promoting the synergistic development of TCM service trade within the GBA.

1. Introduction

Service trade originally expanded from the concept of “service” proposed by Hall and extended by Bhagwati, Sampson, Snape and others in the mid-1980s who divided services into two categories: services requiring physical proximity and services not requiring physical proximity. Since then, scholars have studied service trade from different aspects. William E.B.¹ mentioned the issue of negotiation, Askew Reubin D.² analyzed the world economy, and Karl P.S.³ talked about the flow of data. The concept of trade in services is defined in the General Agreement on Trade in Services (GATS) signed in 1994 the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). Trade in services is a

trade behavior in which a legal person or natural person of a country provides services to a foreign legal person or natural person within its territory or into the territory of another country. Therefore, there are four ways of providing trade services: cross-border delivery, overseas consumption, commercial presence and movement of natural persons. Iqbal B.A.,⁴ Richard S.⁵ and others evaluated and analyzed GATS, while some scholars discussed from different directions such as management methods,⁶ policy formulation and highly skilled immigration.^{7,8} In this process, some scholars discussed service trade of specific countries involving India⁹ and South Korea,¹⁰ and others studied trade between two countries. For example, Rudolf A.¹¹ studied trade from Marrakesh to Seattle.

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The term “trade in health services” was first coined in 2005 by Mattoo A. and Rathindran R.,¹² who found that the price of health care varies greatly between countries, trade in health services is limited, and the willingness of patients going abroad depends on their health insurance coverage. They further raised the question of whether health insurance is a barrier to trade in health services. Arunanondchai J.¹³ argued that Thailand, Malaysia and Singapore are important exporters of ‘health tourism’ services in the ASEAN region. He believed that the labor cost differences and the reputation of local hospitals determined the scale of medical tourism services, which is similar to the views of Suwit W.¹⁴ and Olivier C.¹⁵ More specifically, these countries can offer specialist medical services that are not available in other ASEAN members. Jutamas Arunanondchai and C. Fink also pointed out that Thailand is one of the largest exporters of health tourism. Wongkit M. et al.¹⁶ considered Thailand to be the most acknowledgeable destination of medical tourism, and found the fact that Thailand medical tourism was mainly initiated by private hospitals. Scholars¹⁶ have also looked at the challenges related to trade in health services in Southeast Asia. Several studies investigated the relationships between health service trade and other aspects, such as the exploration of its impact on health,¹⁷ the linkage of language factors,¹⁸ and the correlation of market size.¹⁹ However, there are very few literatures studying the specific region of China.

In recent years, with the increasing influence of TCM on a global scale, scholars around the world have given more attention to “trade in TCM services”. For example, Tang H. et al.²⁰ conducted SWOT analysis of the internationalization of TCM and concluded the necessity of establishing overseas clinical research centers as a business presence model for TCM service trade. Khun Eng Kuah²¹ analyzed the way TCM connecting the service trade in the Southeast Asian through cultural power by sharing traditional Chinese herbal medicine. Scholars have discussed the mechanisms through which technology influences TCM services. For example, Gao Wang²² analyzed the impact of regional informatization on TCM services; Xie Rongjun²³ elaborated the role of digital technology in promoting TCM services from four perspectives: market expansion, health concept shaping, ethnicization and cultural dissemination. Along with the development of medical tourism, new models of medical services have become prominent. Wang Zhiwei²⁴ believed that the development of TCM service trade is a choice of market expansion. Amy Hinsley²⁵ also emphasized that internationalization has created greater demands on the TCM trade. Scholars have also focused on the development of TCM medical tourism. For instance, Jiang Lei et al.²⁶ argued that TCM tourism need to be diversified from the perspective of sustainable development. Meanwhile, many scholars focused on the standardization of TCM: Tom P. Moorhouse et al.²⁷ analyzed the extent to which trade in TCM is hampered by traditional standard systems. Li Jing et al.²⁸ provided a clear analysis of the current opportunities and threats to the standardization of TCM. Wang Xiaodong²⁹ summarized the current status of TCM standardization, pointing out that standardization is the key to cross-border TCM trade. Ye Xiaoming³⁰ offered suggestions for improving TCM tourism from a pharmacological perspective.

There are clear differences in research on TCM between China and other countries. In China, research on TCM services is extensive, covering national,³¹ provincial³² and even individual suppliers.^{33,34} Studies²³ have shown that China's service trade volume is the second largest in the world, despite adverse factors such as declining global demand, increasing trade barriers and difficulties in logistics and transportation. Trade in TCM services is an important part of China's services trade. Research³⁵ showed that Japan was the first country in East Asia to introduce and accept TCM, and is also the largest importer and consumer of TCM products and services. South Korea has been actively promoting the development of trade in TCM services in recent years. Due to market competition and cultural differences, sales of TCM from China have declined in South Korea, citing relatively stricter standards of heavy metal element and pesticide residue. Overall, trade in TCM has grown in East Asia, but with several challenges. In contrast, most of the research in other countries has been from a national and homogenous perspective,

mainly focusing on Eurasian countries such as Singapore,³⁶ Netherlands,³⁷ Switzerland,³⁸ Russia,³⁹ Spain,⁴⁰ the United Arab Emirates,⁴¹ Portuguese-speaking countries,⁴² and Australia etc.⁴³ less from a micro perspective. Current research on trade in TCM services is fragmented and does not consider the four models of service trade in a comprehensive manner.

In brief, the trade in TCM services in the GBA has outstanding advantages, and occupied a certain influential position in the world. In addition, the “Guangdong-Hong Kong-Macao Greater Bay Area Traditional Chinese Medicine Highland Construction Program (2020–2025)” (hereinafter referred to as “the Program”) requires that TCM service trade in the Greater Bay Area should integrate with the “Belt and Road Initiative”. The Program not only planned the future of TCM service trade in the GBA, but also highlighted that the importance of TCM service trade. There are tremendous opportunities for the development of TCM services trade, such as technology-empowered integration of medical tourism with TCM. However, there are also complex challenges in medical tourism. The current markets of GBA are not fully interconnected, and various resources and industrial chains are not fully integrated. So, this paper explored the current situation of the integration and development of TCM services trade in Guangdong, Hong Kong and Macao, analyzed the main difficulties, and further concluded that the GBA should build a TCM highland with high quality TCM services. We further synthesized the suggestions and countermeasures and provided ideas for the development of TCM service trade around the world.

2. Analysis of macro environmental factors

2.1. Political

2.1.1. The political advantages

The Chinese government has introduced policies that are beneficial to the TCM industry in the GBA, promoting high-quality development. In 2020, the “Plan for the Construction of Traditional Chinese Medicine Highlands in the Guangdong Hong Kong Macao Greater Bay Area (2020–2025)” jointly released by the China Administration of Traditional Chinese Medicine, the Leading Group Office of the Guangdong Hong Kong Macao Greater Bay Area Construction, and the People's Government of Guangdong Province proposed the goal of creating five highlands of TCM in the GBA, becoming a leader in TCM service trade, a reformer in TCM education, a demonstration of TCM technology innovation, and a promoter of high-quality development in the TCM industry. In 2021, the Chinese government again proposed relevant policies in the context of the “Belt and Road Initiative”. The “Promoting the high quality integration of TCM into the “Belt and Road Initiative” Development Plan (2021–2025)” aimed to strengthen coordination and docking with regional strategies, which would specifically support the development of TCM industry in the Hengqin Guangdong Macao in-depth Cooperation Zone, and promote a higher level of opening up of TCM in the GBA. The GBA had actively explored cooperation in TCM among the three regions in recent years, such as promoting unified TCM standards, as well as the flow and connectivity of TCM personnel, products, funds, and other factors. Guangdong Province will focus on building the “Five Highlands” of healthcare, innovation, talent, industry, and internationalization by strengthening exchanges and cooperation among the three regions. The Second Five Year Plan for Economic and Social Development of the Macao Special Administrative Region (2021–2025) proposes to actively cultivate the health industry with TCM research and manufacturing as the entry point, and accelerate moderate economic diversification. Meanwhile, Macau had successfully introduced multiple TCM health products from Guangzhou Pharmaceutical Group through the Hengqin Guangdong Macao In-depth Cooperation Zone, and is considering introducing more TCM products; As a transit hub for TCM, Hong Kong has facilitated most TCM companies in mainland China to go global through the 18th Hong Kong Traditional Chinese Medicine Exhibition. Traditional Chinese patent medicines and simple preparations for

external use registered in Hong Kong can also be registered and sold in the GBA by simplifying the approval process.⁴⁴

The Arrangement between the Mainland and Hong Kong on Establishing Closer Economic and Trade Relations (CEPA) is a measure to gradually reduce or eliminate all discriminatory policies in service trade. This agreement laid the institutional foundation for the comprehensive liberalization of service trade between mainland China and Hong Kong and Macau, and a basic framework of cooperation in the TCM industry. Firstly, CEPA promoted the free trade of TCM products within GBA. In 2004, zero tariffs were implemented on TCM products such as TCM wine, TCM tablets, and other products manufactured from chemical or herbal ingredients. Secondly, the CEPA agreement allows permanent residents with legal medical certificate in Hong Kong or Macau to practice medicine in the mainland for a short period of time without further exam. Previously it is restricted for Hong Kong and Macau TCM doctors to engage in medical practice more than three years in the mainland. CEPA agreement also allows Hong Kong and Macau TCM service providers who have obtained the mainland “Physician Qualification Certificate” to apply for individual clinics in the mainland. Another breakthrough has been made in the mutual recognition of TCM qualifications. The CEPA agreement allows permanent residents of Hong Kong and Macau to apply for the Mainland Physician Qualification Examination in the categories of Clinical, TCM, and Stomatology. Hong Kong permanent residents who have graduated from the Chinese University of Hong Kong, Hong Kong Baptist University, the University of Hong Kong, and the University of Science and Technology of Macau with a degree in TCM and obtained legal medical practice rights in Hong Kong or Macau are allowed to participate in the medical qualification examination in mainland China after completing one year of internship and assessment, or after having practiced medicine in Hong Kong for more than one year. Those who pass the exam will get a “Physician Qualification Certificate” from mainland China. This clause opens a channel for the circulation of TCM talents within the GBA.

2.1.2. The political obstacles

There are still certain obstacles in the integration of TCM service trade in the GBA. In the Specific Commitment of the Mainland to Open Service Trade with Hong Kong, there are 69 industries that implement national treatment for service providers from Hong Kong and Macao, accounting for 45 % of the total, and mainly concentrated in areas such as accommodation, catering, wholesale and retail. Affected by factors such as the recent epidemic, rising raw material prices, and supply chain disruptions, the level of soft connectivity in the GBA, which focuses on service trade rules, standards, and systems, is still relatively low, and the potential is far from being unleashed. The CEPA service trade agreement does not stipulate effective tax and trade policy coordination, free flow of production factors, and common monetary and fiscal policies. It is just a free trade agreement without the details of market access and investment liberalization in service trade. And the support for the integration of trade services in the GBA needs to be strengthened. Additionally, for TCM products that have obtained legal permits from Hong Kong and Macao, a series of approval procedures still need to be carried out before entering the mainland market. However, thanks to the “Hong Kong and Macao Drug and Equipment Connect Policy”, the integrated approval procedures for drug and medical equipment will solve this problem to some extent. Legal differences are also a hindrance. Hong Kong belongs to the Anglo-American legal system, Macau adopts the European continental legal system, and the mainland boasts a socialist legal system. Legal conflicts cannot be resolved through a unified legislative body in the GBA. Moreover, there are many regulations in the medical and health field which restrict the establishment of TCM commercial presence. TCM service trade is only reflected in relaxing the qualifications of TCM practitioners and other forms of natural person mobility. There are also limitations in financial services and currency settlement processes. The key to promoting the integration of service trade in the GBA lies in institutional openness. There are significant differences in the political

and economic systems of Guangdong, Hong Kong, and Macao.⁴⁵ The Chinese government should formulate comprehensive frameworks and effective mechanisms to achieve the maximum utilization of human resources, capital, and technology within the GBA.

2.2. Economic

2.2.1. The economic advantages

Trade in TCM products and services has gained new momentum: Chinese medicine has now spread to many countries and regions, including ASEAN, the European Union, the African Union, as well as members of the Shanghai Cooperation Organization (SCO) and the BRICS countries. TCM has also been incorporated into several free trade agreements and 31 national TCM service export bases have been built. Commercial presence is the dominant form with the most profound influence on the market of health services.⁴⁶ The current commercial presence of TCM in the GBA is small in scale, but fast in development. Many enterprises and organizations in the GBA have developed TCM specialty products, building up energy for TCM commercial presence. There is a mature sale model of TCM in PRD. As the largest pharmaceutical group in China, Guangzhou Baiyunshan Pharmaceutical Holdings Company Limited (GPC), with 12 established brands and lots of TCM products, has been constantly building a stable and orderly overseas TCM registration system. The recent construction of the first TCM hospital in Hong Kong becomes a milestone. At the same time, there has been an expansion and optimization of TCM resources in GBA. Hong Kong will take this opportunity to set up a TCM consortium and a cluster of TCM hospitals. Macau is also establishing TCM hospitals and clinics, supporting private TCM suppliers, laying the foundation for the overseas commercial presence of TCM.

The integration of TCM trade services within the GBA is beneficial for the international development of TCM. The TCM service trade has been in the fast track and in turn strengthens TCM service trade ties in the three regions. Currently, there are two state-level TCM service export bases in the GBA, namely the Guangdong Provincial Hospital of Chinese Medicine and the GMTCM Park. In 2021, the Guangdong-Hong Kong-Macao TCM Service Trade Port was established, aiming to build a golden signboard for Lingnan TCM in the new era and a hub for the distribution and trading of Chinese herbal medicines, as well as an integrated platform for production and sales matching, research cooperation, thus leading to the sustainable development of Lingnan TCM industry. In 2022, the 4th Greater Bay Area Conference on Traditional Chinese Medicine Inheritance and Innovation Development set off a new wave of cooperation and development. The agreements on distance learning, university alliances, industrial transformation platforms, and industry-university-research cooperation have also set the tone for the joint construction of TCM highlands. As a result, the endogenous impetus for the integration of TCM service trade within GBA is gradually bursting forth.

Medical tourism is combining people's urgent needs for health with tourism.³⁰ The integration of TCM services with tourism is the main form of medical tourism in China. The consumption of “TCM + tourism” is mainly concentrated in TCM hospitals, clinics, and theme tourism units. At present, there are a total of 90 TCM hospitals in the GBA. But in Macau which there are 83 TCM clinics with no specialized TCM hospitals. The first TCM hospital in Hong Kong is currently under construction.

Table 1 shows that among the four world bay areas, the Guangdong-Hong Kong-Macao Greater Bay Area tops in terms of GDP growth rate but with the lowest share of service industry. Therefore, GBA can fully tap its own service base resources and create a new form of medical tourism by combining TCM with tourism, so as to expand the trade of TCM services.

2.2.2. The economic disadvantages

Although the trade in TCM services in the GBA has been very fruitful in recent years, as a new service industry developed in the “young” Bay Area, there are still certain shortcomings in the synergy of the stock of resources, the amount of infrastructure, the competitiveness of trade, the

Table 1
Comparison of the four bay areas.

Bay Area	Location	GDP Growth Rate	Tertiary Industry Share	Representative Industries
New York Bay Area, U.S.A.	East Coast, U.S.A.	3.5 %	80 %	Financials
San Francisco Bay Area, U.S.A.	West Coast, U.S.A.	1.7 %	82 %	High-tech industry
Tokyo Bay Area, Japan	Central Pacific Coast, Honshu Island, Japan	3.6 %	89.5 %	Manufacturing
Guangdong-Hong Kong-Macao Greater Bay Area, China	South China	7.9 %	62 %	Tertiary (Services)

number of service units, and the classification of statistics, etc. TCM resources are one of the foundations of trade, while service infrastructure is the key, and the two are complementary to each other. However, due to complex factors such as the historical background of the three regions,⁴⁷ there are fundamental difficulties in the collaborative development of trade in TCM services. Hong Kong and Macao relatively lack human resources for TCM. At the end of 2022, there are 8394 registered TCM practitioners Hong Kong, with 1.13 TCM practitioners per 1000 people, while there are 709 TCM practitioners in Macau, with 1.04 TCM practitioners per 1000 people. Additionally, there are only 90 TCM hospitals in the GBA. The Bay Area still has problems maintaining the concentration and equity of TCM resources, and with the inadequacy of TCM talents,⁴⁸ there are structural shortcomings for the development of TCM trade in services.

The Trade Competitiveness (TC) Index refers to the proportion of trade surplus to the country's total import and export. It is a direct reflection of trade terms. In 2020, the TC Index for mainland China's trade in services was -0.04, a competitive disadvantage. Hong Kong, as a free trade port, is known to be extremely competitive in trade. However, according to the Hong Kong Bureau of Statistics, the TC Index for TCM service trade in 2021 Hong Kong was only 0.106. Meanwhile, Macau had a stronger TC Index for trade in services of 0.65. Hong Kong's tertiary industry accounted for 93.4 % of its GDP, of which the TC index of trade in pharmaceutical services was 0.106; Macao's tertiary industry accounted for 91.3 % of its GDP, and the TC index of trade in services was 0.65, a relatively competitive advantage. There is a clear gap in the competitiveness of Hong Kong and Macao's services sector in TCM, and the degree of synergy is extremely low. The proportion of tertiary industry in GDP of Guangzhou was 71.6 %, the highest in the PRD region, while Shenzhen 62.9 %, with other cities at the 40–50 % range, and TC indexes of service trade are all negative, which is obviously a competitive disadvantage. Therefore, despite the rapid development of trade in services in GBA, second only to the New York Bay Area in terms of volume, but the competitiveness was weak,⁴⁹ and the unbalanced development of the service industry still persisted. In the 2022 Fortune 500, the GBA has become a new growth pole, but few enterprises related to the healthcare industry are on the list. It is crucial for the Bay Area to pull out strengths and make up for the weaknesses, and synergistically answer to underdeveloped trade in TCM service.

Medical tourism is an emerging form of service healthcare. In Southeast Asia, some private hospitals are already comparable to their counterparts of developed countries.^{13,50} Many European and American tourists come to Southeast Asia for medical services. With national policy support and the endorsement of authoritative units such as the Joint Commission on Accreditation of International Healthcare Organizations, medical services in Southeast Asia have gradually built up a good reputation. In contrast, the TCM service trade in GBA shows a state of absence. Although in Shenzhen there are more than 900 medical equipment suppliers, medical resources in the Bay Area are still slightly backward. It

can be seen from Table 2 that, there are 11 TCM theme service units in GBA, but most of them are theme parks open mainly to local residents. Only a small number of TCM service scenic spots such as Shennong Thatched Cottage, Lui Seng Chun Thatched Cottage and Xiangjing Medicine Valley Ecological Park provide services such as acupuncture, moxibustion, and cupping, as well as sales of related derivatives. Therefore, it is far from matching TCM services with tourism.

Due to the intangible and heterogeneous characteristics of the service trade, it is inherently difficult to carry out statistical work on service trade volume. Moreover, the trade in TCM services takes various forms, and it is difficult to ensure the accuracy of statistical data. China launched its first statistical work on TCM service trade in 2019, and a total of 213 service trade institutions were included. According to the Report on China's Development of Trade in Services 2021, as of the first half of 2021, there are 344 service trade institutions included in the statistics, but the scope of trade in TCM services is not yet fully covered. The existing statistics for TCM trade in services belong to the national scope, and further breakdown is needed to obtain data for the GBA. The current pilot statistics on trade in TCM services covers five categories: TCM medical institutions, health care service institutions, institutions of higher learning, enterprises and publishers. However, a unified and fixed classification system has not yet been formed, so further theoretical and empirical research is needed. The poor statistical data makes it difficult to clarify the current situation of TCM services, which to a certain extent hinders the integration of trade in TCM services in the three regions.

2.3. Social

2.3.1. The social advantages

China has realized diversified exchanges with the rest of the world through TCM, which is also a competitive edge of us. Xinhua News Agency reported that TCM has spread to 196 countries and regions, and has become an important area of cooperation between China and abroad such as ASEAN, EU, AU, SCO and BRICS countries. TCM service trade has not only stimulated vitality in various regions, but also reflected the influence and attractiveness of Chinese culture on a global scale.

The GBA boasts high-quality teaching resources of TCM. The schools offering international teaching of TCM are shown in Table 3 (excluding interdisciplinary subjects such as integration of TCM and western medicine). As a leading unit in the development of TCM services in GBA, the Guangdong Macao Cooperative TCM Technology Industrial Park has organized multiple "AMIGO Partner Camps", inviting multiple TCM universities from Portugal, Mozambique, Cape Verde, and other regions. A series of online seminars organized by the Hong Kong Baptist Association, including the "Global Development Strategies for TCM in the 21st Century", have attracted international attention.

Of course, we should not overlook the development of trade in TCM services in other countries around the world. For example, 86 special cooperation agreements on TCM have been signed with foreign governments and regional organizations, most of which are in countries along the Belt and Road. Countries all over the world are actively promoting

Table 2
TCM materia medica service units in GBA.

Place	Service Unit
Guangzhou	Shennong Thatched Cottage
Guangzhou	Lingnan Traditional Chinese Materia Medica Culture Expo Park
Foshan	Foshan Traditional Chinese Materia Medica Culture Museum
Zhongshan	Shenwan Shenxi Village Huxin Park
Zhuhai	Zhuhai Traditional Chinese Materia Medica Valley
Zhuhai	Lingnan Earth
Zhuhai	Liandi Traditional Chinese Materia Medica Science and Technology Creative Museum
Huizhou	Nan She Ling Traditional Chinese Materia Medica Culture Theme Park
Jiangmen	Kaiping Liangjinshan Herbal Garden
Macao	Macao Xiangjing Medicine Valley Ecological Park
Hong Kong	Lui Seng Chun Hall

Table 3
TCM materia medica cross-border education service institutions in the GBA.

Major	Institutions	Region
Traditional Chinese Materia Medica	Jinn University	Pearl River Delta
	Guangzhou Medical University	
	Guangzhou University of Chinese Materia Medica	Macao
	Guangdong Pharmaceutical University	
	Maca University of Science and Technology	
Traditional Chinese Materia Medica	University of Hong Kong	Hong Kong
	The Chinese University of Hong Kong	
	Hong Kong Baptist University	Pearl River Delta
	Guangzhou University of Chinese Materia Medica	
	Guangdong Pharmaceutical University	
	Guangdong Medical University	
	University of Macau	
Macao University of Science and Technology		
Hong Kong Baptist University	Hong Kong	

the development of trade in TCM services, demonstrating the enormous potential of TCM. The GBA, with significant advantages in TCM, should also learn from the successful experiences of other countries and regions around the world.

2.3.2. The social disadvantages

Despite a high-quality foundation of TCM education in GBA, there are some obvious disadvantages. Firstly, there is a lack of original technological innovation in the TCM industry. Due to poor intellectual property protection and incentive mechanisms, the investment in TCM R&D are not sufficient. Secondly, TCM resource allocation is unbalanced and inefficient. In addition, the public health emergency response mechanism is not effective. The public has realized the unique advantages of TCM in preventing and controlling infectious diseases and responding to public health incidents, but the potential of TCM in public health emergencies has not been fully utilized. Moreover, the distribution of TCM education resources is uneven, the TCM education system and standards have not been unified, and the coordination between TCM education and scientific innovation has not been improved, affecting the quality and benefits of TCM service trade. Finally, the publicity of TCM culture is not enough, leading insufficient public recognition, thus affecting the market trust in TCM service trade.

2.4. Technological

2.4.1. The technological advantages

In the “14th Five Year Plan for the Development of Traditional Chinese Medicine”, the informatization of TCM has become a major requirement. Remote diagnosis empowered by digital technology has become a new trend in GBA. In June 2022, Macao first proposed telemedicine of TCM in the plan. During COVID-19, TCM participated in the fight against the epidemic throughout, a preliminary framework for telemedicine of TCM was conceived and committed to playing a role in the construction of smart medical system. During the epidemic, Hong Kong Baptist University set up the TCM telemedicine center to provide remote diagnosis and outreach services for patients and quarantine personals, the first of its kind. At the same time, Guangdong also used remote TCM medical platforms to connect with foreign medical experts through video communications, transmitting excellent experiences of “three drugs and three prescriptions”.

The China-Malawi Artemisinin Malaria Center, is a TCM aiding Africa institution established by the Guangzhou University of TCM, and it is also the first commercial presence model to export TCM products and services overseas. The center has gathered many TCM experts, providing

theoretical and technical assistance for African medical and health undertakings. In GBA, there are two national-level bases for the export of TCM services, namely the Guangdong Provincial Hospital of Traditional Chinese Medicine (GDH TCM) and the Guangdong-Macao Traditional Chinese Medicine Science and Technology Industrial Park Development Company Limited (GMTCM Park), facilitating the important mission of TCM going abroad. For example, GMTCM Park cooperated with the Thai Ministry of Health to carry out a series of ‘Thai-China TCM Academic Exchange Free Clinic’ activities, providing efficient diagnosis and treatment services for residents and promoting TCM application in Thailand. In addition, several research cooperation platforms have been established in Guangdong, Hong Kong and Macao, including the GBA TCM Innovation Center, the TCM Cancer Prevention and Treatment Transformation Medicine Joint Laboratory and Guangdong-Hong Kong-Macao Joint Laboratory of the Ministry of Education. These platforms have promoted the internationalization of TCM.

2.4.2. The technologic disadvantages

There are several technological dilemmas and opportunities. On one hand, in response to the Healthy Bay Area Strategy, there is an increasingly urgent need to build a TCM highland. The number of overseas TCM service enterprises are insufficient. On the other hand, limited commercial presence cannot effectively promote the internationalization of TCM. It is necessary to strengthen technology transfer and service output of TCM. At present, overseas TCM centers mainly rely on state assignment and official cooperation. Collaborative bases and service export centers jointly established by Chinese and foreign governments are mainly a small number of TCM clinics and the overseas branches of large-scale medical groups. This situation has limited the technological exchanges and innovations of overseas TCM services. In addition, the lack of confidence of private enterprises in exporting TCM services not only affects R&D investment of TCM, but also undermines innovation, making it difficult for these enterprises to cultivate competitiveness.

3. Policy recommendations

3.1. Establishing unified standard for trade in TCM services in the GBA

GBA should break down institutional barriers and relax restrictions under the CEPA framework. Firstly, GBA can jointly develop unified guidelines for TCM services, simplifying approval processes, and coordinating policies to promote TCM service trade. The government should reform tax systems and regulations for the high-quality development of TCM service trade. The GBA should attach importance to statistical standards, draw on foreign practice, improve statistics for the construction of TCM highlands, thus providing high-quality data for TCM service trade. It is necessary to promote institutional openness in areas such as a streamlined and transparent negative list of cross-border service trade between Guangdong, Hong Kong, and Macao, as soon as possible. Guangdong should implement national treatment for service providers from Hong Kong and Macao, setting out specific standards including admission standard, factor supply, financing methods, trade rights, tax policies, legal protection, and judicial remedies, etc. GBA should promote the integration of rules, regulations, management, and standards in the service trade. In key areas such as law and accounting, GBA should establish certification standards for “recognized economic operators”, allowing eligible enterprises to freely carry out relevant businesses, and gradually expand the scope of certification to medicine, education, finance and other fields. GBA should also promote the efficient allocation of resources, the integration of market supervision and regulations, unified market access and the free and convenient flow of capital, cultivating a more convenient system for the payment and transfer of funds for service trade.

Secondly, we need to strengthen mutual recognition and exchange of TCM services and effectively allocate TCM resources in the GBA. For example, Hong Kong and Macao TCM medical institutions should join the

PRD medical system to build the GBA Medical Union. The GBA TCM Innovation Platform should promote resource sharing of key laboratories and research institutions of TCM in Guangdong, Hong Kong and Macao, collaborate on common admission policies for TCM institutions and practitioners from Hong Kong and Macao. In addition, GBA should strengthen data collection work for a public information platform of TCM service trade, actively cooperate with chambers of commerce and intermediary institutions, and gradually achieve information sharing and data exchange between government agencies, intermediary organizations, and consulting companies.

3.2. Actively cultivating a “GBA brand” for TCM service trade

The integrative development of the GBA is a major opportunity for TCM inheritance and innovation. The existing TCM museum in Guangdong Province provides a pioneering model. Macao, as the “Monte Carlo of the Far East”, with rich tourism resources and a developed service industry, has become the new mode of tourism service trade. On the other side of the Pearl River estuary, Hong Kong, the “Pearl of the Orient”, is a world-renowned free trade port and a tourist destination, attracting 56 million visitors each year. The GBA should give full play to its advantages as international pharmaceutical highlands and build a distinctive TCM brand on the world stage. Guangdong should consolidate the foundation for TCM to go abroad. Macao is building a diversified economic system in an orderly manner, deeply integrating TCM to tourism and acting as a bridgehead of TCM services. Hong Kong should steadily carry on the innovation of TCM resources and act as a showcase.

To build a GBA brand of TCM, it is necessary to “seek common ground while accommodating differences”, utilize quality resources in TCM, and boost confidence in the consumption of TCM services. Besides, TCM hospitals and tourism service providers of GBA can make reference to the excellent international medical tourism models of Thailand, the United States and other countries, develop high-quality TCM medical tourism projects with local characteristics. GBA should improve policies and supervisions for medical tourism, encourage the establishment of pilot zones for medical tourism, and launch a series of TCM-themed tourist routes, creating a new model of “TCM lifestyle”. We should strive to expand the scale of TCM service in an orderly manner, and give play to the demonstration effect of the export base. Bankers are encouraged to increase the financing of medicine-related industries, and promote the listing of medical companies. The exhibition industry and high-level economic and trade exchange platforms such as the China Import and Export Commodities Fair, the China International Fair for Trade in Services, the China International Import and Export Fair, and the World Expo, are advantageous for spreading the international influence of Chinese medicine.³⁴

3.3. Creating a social foundation of trade in TCM services

The momentum of inheritance and innovation provides strong support for the expansion of TCM service trade. To rejuvenate the market's attention to TCM, the government should focus on TCM service projects and build an intellectual property system. It is necessary to improve the guarantee mechanism, strengthen funds for talents, and stimulate the transformation and upgrading of high-quality TCM service trade. On the trade front, we should facilitate the circulation channels for TCM, ensure the stability and security of service trade, explore intelligent and personalized TCM service models, demonstrate the unique advantages of TCM in public health emergencies, and establish an effective mechanism for co-ordination and co-operation. In terms of education, we should optimize the layout of TCM disciplines and specialties in universities of Guangdong, Hong Kong and Macao, draw on the quality medical schooling experience of Harvard and Oxford, and cultivate high level talents in TCM. In terms of culture, it is necessary to build cultural identity and self-confidence of Lingnan Chinese medicine, pass on the excellent tradition of TCM, continue to do the translation and

dissemination of TCM scripts, and innovate TCM in various forms such as film and television, animation, food and beverage, clothing, handicrafts and cosmetics, etc. GBA should launch products of TCM with Lingnan characteristics, the Southern style of Chinese medicine, and the brand of the Bay Area.

3.4. Vigorously promoting TCM service trade through digital technology

In March 2022, the Chinese central government issued the “14th Five-Year Plan for the Development of Traditional Chinese Medicine” and pointed out the direction for the informatization of TCM industry. The COVID-19 pandemic has triggered widespread attention to digital medical care. The GBA has great advantages in IT and communication technology, digital medical equipment, and hospital informatization management. Therefore, the market potential for digital empowerment of TCM services is huge, providing new ideas for the development of traditional Chinese medicine service trade. Currently, there are lots of barriers such as the standardization of TCM, the international recognition of TCM products, the cross-border integration of TCM services, and the shortage of talents. Digital technology will provide technical opportunities to solve these problems.

Firstly, GBA should consolidate the foundation of digital technology cooperation. The Greater Bay Area should increase R&D investment, strengthen technological support, encourage TCM service suppliers to exchange and cooperate with relevant TCM education institutions, improve innovation conditions, and accelerate the transformation of TCM achievements into products. People's fast-paced and diversified needs of TCM service should be met with digital technology, which can improve the quality and added value of TCM service trade.

Secondly, GBA should vigorously promote the “Internet + Medicine” mode of TCM services with the support of 5G technology. Medical consortia and smart hospitals can provide intelligent TCM services in a co-ordinated manner. “Remote medical service”, as a new form of cross-border delivery of TCM service trade, conforms to the nature of TCM service trade. It is necessary to promote the coverage and popularization of cross-border service platforms, encourage the establishment of resource-sharing Internet TCM hospitals, and actively build a digital platform for online prescriptions, TCM cloud services, Cantonese TCM customs and other characteristic scenario applications. It is compulsory to build an efficient, inclusive, and intelligent medical platform, and further improve the big data analysis system of the cross-border TCM service platform. We should make full use of the massive data of TCM treatment, disease diagnosis and outpatient prescription records. Through digital technology, we can establish a database of TCM diagnosis and treatment, perform data mining, to aid in syndrome differentiation and treatment, master the methods of auxiliary prescription, analysis of etiology, and provide support for the cultivation of TCM talents.

Finally, we should seize the great opportunity of the integrated development and cultivate a GBA brand of TCM. We should give full play to the international advantages of the medical highland in the GBA and show the charm of TCM on the world stage. We should rely on the International Science and Technology Innovation Center of the GBA, the Hengqin Guangdong-Macao Cooperation TCM Industrial Park and other technological innovation bases, carry out collaborative tackling of problems and technological innovation, and cultivate a brand of high quality TCM service products.

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Declaration of competing interest

These authors have no conflicts of interest to declare.

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Abbreviations

TCM	traditional Chinese medicine
GBA	Greater Bay Area
GATS	General Agreement on Trade in Services
ASEAN	ASSOCIATION OF SOUTHEAST ASIAN NATIONS
CEPA	Closer Economic Partnership Arrangement
TC	The Trade Competitiveness

References

- Brock WE. A simple plan for negotiating on trade in services. *World Econ.* 1982;5(3): 229–240.
- Askew RD. *Trade in Services and the World Economy: An American Point of View.* Geneva Pap Risk Insur; 1983:142–146.
- Sauvant KP, Coombe G, Hummer LA, et al. Trade in services: the case of transborder data flows. In: *Proceedings of the Annual Meeting.* JSTOR: American Society of International Law; 1985:246–260.
- Iqbal BA. Developing countries and trade in services. *India Q.* 1995;51(2/3): 137–138.
- Smithies R. Air transport and the general agreement on trade in services (GATS). *J Air Transport Manag.* 1995;2(2):123–126.
- Footer ME. Global and regional approaches to the regulation of trade in services. *Int Comp Law Q.* 1994;43(3):661–678.
- Francis P. Foreign economic policy making in Australia: trade in services. *Aust Q.* 1994;66(1):44–57.
- Garnier P. International trade in services: a growing trend among highly skilled migrants with special reference to Asia. *Asian Pac Migrat J.* 1996;5(4):367–397.
- Verma PC. India's international trade in services. *Indian Econ J.* 1997;44(3):103–120.
- Kim JI, Kim JD. Liberalization of trade in services and productivity growth in Korea. In: *In Trade in Services in the Asia Pacific Region.* University of Chicago Press; 2003: 179–208.
- Adlung R. Liberalizing trade in services: from marrakech to Seattle. *Intereconomics.* 1999;34(5):211–222.
- Mattoo A, Rathindran R. *Does Health Insurance Impede Trade in Health Care Services?* World Bank Publications; 2005.
- Arunanondchai J, Fink C. Trade in health services in the ASEAN region. *Health Promot Int.* 2006;21(suppl_1):59–66.

- Wibulpolprasert S, Pachanee C, Pitayangsarit S, et al. International service trade and its implications for human resources for health: a case study of Thailand. *Hum Resour Health.* 2004;2:1–12.
- Cattaneo O. *Trade in Health Services: What's in it for Developing Countries?*. vol. 5115. World Bank Policy research working paper; 2009.
- Wongkit M, McKercher B. Desired attributes of medical treatment and medical service providers: a case study of medical tourism in Thailand. *J Trav Tourism Market.* 2016;33(1):14–27.
- Blouin C. *International Trade in Health Services and Health Impacts.* 2014.
- Loh CPA, Triplett RE. International accreditation, linguistic proximity and trade in medical services. *Soc Sci Med.* 2019;238:112403.
- Dingel JI, Gottlieb JD, Lozinski M, et al. *Market Size and Trade in Medical Services.* National Bureau of Economic Research; 2023.
- Tang H, Huang W, Ma J, et al. SWOT analysis and revelation in traditional Chinese medicine internationalization. *Chin Med.* 2018;13(1):1–9.
- Kuah KE. Traditional Chinese herbal medicine as cultural power along the Southeast Asian belt and road corridor. *Asian J Soc Sci.* 2021;49(4):225–233.
- Wang G, Sun L. The impact of regional informatization on the trade of Traditional Chinese Medicine services. In: *Proceedings of the 3rd International Symposium on Artificial Intelligence for Medicine Sciences.* 2022.
- Xie R, Lv M. A study on the development of Traditional Chinese Medicine service trade facilitated by digital technology. In: *2022 2nd International Conference on Economic Development and Business Culture (ICEDBC 2022).* Atlantis Press; 2022.
- Wang Z, Li Z. Strategy for market expansion: medical services of traditional Chinese medicine. *J Tradit Chin Med.* 2013;33(2):280–282.
- Hinsley A, Milner-Gulland EJ, Cooney R, et al. Building sustainability into the belt and road initiative's traditional Chinese medicine trade. *Nat Sustain.* 2020;3(2): 96–100.
- Jiang L, Wu H, Song Y. Diversified demand for health tourism matters: from a perspective of the intra-industry trade. *Soc Sci Med.* 2022;293:114630.
- Moorhouse TP, Elwin A, Ye YC, et al. Beyond the Pharmacopoeia: to what extent is trade for “TCM” limited to official TCM taxa? *Global Ecol Conserv.* 2021;32:e01906.
- Jing L, Zhen S. TCM standardization today. *World J Acupuncture-Moxibustion.* 2017; 27(3):21–56.
- Wang J, Guo Y, Li GL. Current status of standardization of traditional Chinese medicine in China. *Evid base Compl Alternative Med.* 2016.
- Ye XX, Li YT, Sang Z. Key factors influencing the TCM nomenclature in international standards. *Pharmacol Res.* 2021;170:105516.
- Zhang LH, Hou HT, Wang H. Current situation and suggestions for the development of trade in Chinese medicine medical services. *Chin J Trad Chin Med Inform.* 2016; 23(3):1–4.
- Luo ZH, Liang T, Zhang X, et al. A study on strategies to promote the development of trade in Chinese medicine services in Gansu Province. *Chin J Trad Chin Med Inform.* 2017;24(1):15–19.
- Chung VCH, Ma PHX, Wang HHX, et al. Integrating traditional Chinese medicine services in community health centers: insights into utilization patterns in the Pearl River region of China. *Evid base Compl Alternative Med.* 2013.
- Leng W, Liu W, Wu F, et al. Research on the current situation of development of trade in services of private medical institutions of traditional Chinese medicine in Beijing. *Int J Translat Community Med.* 2018:1003–1007.
- Lin AX, Chan G, Hu Y, et al. Internationalization of traditional Chinese medicine: current international market, internationalization challenges and prospective suggestions. *Chin Med.* 2018;13(1):1–6.
- Bian Y, Song X. Situation and suggestions for the service trade of traditional Chinese medicine in Singapore. *Int J Translat Community Med.* 2018:897–899.
- Shao Q, Song X. Analysis on the development status and routes of traditional Chinese medicine service trade in The Netherlands. *Int J Translat Community Med.* 2020: 724–727.
- Hu W, Li Y, Song X. Study on the development condition and strategy of traditional Chinese medicine service trade in Switzerland. *Int J Translat Community Med.* 2020: 103–106.
- Shi X, Chen J, Zhang J, et al. Current situation research on the development of traditional Chinese medicine service trade in Russia. *Int J Translat Community Med.* 2019:107–110.
- Huang Y, Shao Q, Song X. Current situation and strategies on the development of traditional Chinese medicine service trade in Spain. *Int J Translat Community Med.* 2020:312–315.
- Yin X, Li M, Song X. Research on the development status and suggestions of traditional Chinese medicine service trade in the United Arab Emirates. *Int J Translat Community Med.* 2019:551–555.
- Zheng X, Lyu L, Lu H, et al. The internationalization of TCM towards Portuguese-speaking countries. *Chin Med.* 2021;16(1):81.
- Fang L, Wang B. Study on current trends in the development of traditional Chinese medicine in Australia and policy proposals of internationalization of traditional Chinese medicine education in future. *Chin Med Cult.* 2019;2(3):132–136.
- Jiao P. Study on promoting integration and innovative development of trade in services in the Greater Bay Area of Guangdong, Hong Kong and Macao. In: *Symposium on "Guangdong-Hong Kong-Macao Greater Bay Area and Globalized Trade" at the 2019 Guangdong Social Sciences Academic Annual Conference.* 2019.
- Zheng SC. Research on promoting the integration of Guangdong-Hong Kong-Macao greater bay area service trade. *Age Wealth.* 2019;(7):222.
- Gupta I. Commercial presence in the hospital sector under GATS: a case study of India. *J Int Area Stud.* 2004:17–43.

47. Huang J, Qian AX. "One country, two systems" three law families, and four legal regions: the emerging inter-regional conflicts of law in China. *Duke J Comp Intl L*. 1994;5:289.
48. Yang J, Pang ZM, Xu QF, et al. Equity of Chinese medicine and health resources in Guangdong Province based on agglomeration and GIS. *J Practical Med*. 2022;38(2): 222–227.
49. Xiao KX, Lin LM. Comparison of the competitiveness of trade in services between Guangdong, Hong Kong and Macao Greater Bay Area and the world-famous bay area. *City Watch*. 2019;(6):48–58.
50. Moghavvemi S, Ormond M, Musa G, et al. Connecting with prospective medical tourists online: a cross-sectional analysis of private hospital websites promoting medical tourism in India, Malaysia and Thailand. *Tourism Manag*. 2017;58:154–163.