The Impact of Regional Economic Growth and Factor Input on the Convergence of Health Tourism Industry—Based on the Data of 31 Provinces in China

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This study measures the convergence degree of the health tourism industry in 31 provinces and autonomous regions of China by input-output method and investigates the convergence driving force of the health tourism industry from five factors: economic growth, talent training, market perfection, technology input, and capital investment. The empirical study shows that the level of economic growth, talent training, market perfection, technology input, and capital investment all have a positive effect on the convergence of the health tourism industry in China. Moreover, K-cluster analysis is used to divide 31 provinces, municipalities, and autonomous regions into three types according to the measured convergence degree, and the five driving forces play different roles in different types of regions with different convergence degrees. For regions where the tourism industry and health industry are well integrated, the two industries can be integrated according to the demand by improving the market system. At the same time, talent training and technology input can also more effectively promote the convergence of the two industries. For regions where the tourism industry is well integrated with the health industry, strengthening capital investment and talent training can better promote the integration of the two industries. For regions where the health industry is well integrated with the tourism industry, by increasing capital investment, meeting market demand, and improving infrastructure investment, the industrial convergence can be promoted.

Keywords: tourism industry, health industry, health tourism industry, industrial convergence, China

1 INTRODUCTION

With "Healthy China" officially becoming the core concept of China's development, the health industry has become an important engine of service industry development under the new normal. With the increasing needs of people for a better life and the continuous improvement of consumption level, the consumption upgrading trend of the health tourism industry is obvious, which will surely usher in a golden period of development over the next decades. The health industry and tourism industry have broad convergence space. The state provides a convergence basis through policies and systems, stimulates convergence development through economic growth, drives

TABLE 1 | The ranking of positive convergence degree of the tourism industry to the health industry in 31 provinces, municipalities, and autonomous regions in China.

Provinces, municipalities, and autonomous regions	Mean of positive convergence degree (2013–2019)	Rank	Provinces, municipalities, and autonomous regions	Mean of positive convergence degree (2013–2019)	Rank
Shanghai	0.1394	1	Tibet	0.0299	17
Beijing	0.0956	2	Guangxi	0.0284	18
Zhejiang	0.0843	3	Jilin	0.0270	19
Guangdong	0.0817	4	Liaoning	0.0265	20
Hainan	0.0698	5	Qinghai	0.0198	21
Fujian	0.0558	6	Inner Mongolia	0.0176	22
Jiangsu	0.0519	7	Shaanxi	0.0157	23
Tianjin	0.0511	8	Sichuan	0.0150	24
Anhui	0.0509	9	Ningxia	0.0109	25
Hunan	0.0429	10	Henan	0.0082	26
Hubei	0.0414	11	Amur	0.0079	27
Chongqing	0.0391	12	Guizhou	0.0068	28
Shandong	0.0382	13	Xinjiang	0.0053	29
Yunnan	0.0369	14	Gansu	0.0045	30
Hebei	0.0316	15	Guangxi	0.0039	31
Shanxi	0.0302	16	Mean value	0.03768	—

Data source: China Input-Output Table 2012, 2015, and 2017.

TABLE 2 | The ranking of reverse convergence degree of the tourism industry to the health industry in 31 provinces, municipalities, and autonomous regions in China.

Provinces, municipalities, and autonomous regions	Mean of reserve convergence degree (2013–2019)	Rank	Provinces, municipalities, and autonomous regions	Mean of reserve convergence degree (2013–2019)	Rank
Shanghai	0.0793	1	Hainan	0.0182	17
Beijing	0.0664	2	Guangxi	0.0164	18
Xinjiang	0.0565	3	Shanxi	0.0159	19
Ningxia	0.0517	4	Liaoning	0.0128	20
Tibet	0.0484	5	Anhui	0.0117	21
Henan	0.0460	6	Jiangsu	0.0105	22
Inner Mongolia	0.0428	7	Hebei	0.0097	23
Chongqing	0.0407	8	Sichuan	0.0089	24
Qinghai	0.0384	9	Tianjin	0.0053	25
Guangxi	0.0337	10	Amur	0.0049	26
Hubei	0.0316	11	Fujian	0.0030	27
Guangdong	0.0291	12	Guizhou	0.0021	28
Shandong	0.0269	13	Zhejiang	0.0017	29
Yunnan	0.0235	14	Gansu	0.0015	30
Shaanxi	0.0211	15	Hunan	0.0011	31
Jilin	0.0302	16	Mean value	0.0255	—

Data source: China Input-Output Table 2012, 2015, and 2017.

convergence development through market demand, and catalyzes convergence development through industrial development.

The research on industrial convergence originated in the 1970s, which first appeared in the emergence and application of digital technology. The concept of industrial convergence was first proposed in the Green Paper published by the European Commission (1997). It stated that industrial convergence is "the coincidence of industrial alliance and merger, technology network platform and market" and that the service and business models involved in the convergence of telecommunications, broadcast television, and publishing are the future development trends. Early studies on industrial convergence are limited to telecommunications and media industries, which is a narrow sense of industrial convergence,

while the broad sense of industrial convergence can involve various fields of economic development (Greenstein and Khanna, 1997; Yoffie, 1997). Industrial convergence is a dynamic process in which industries cross and coordinate with each other and gradually blur their boundaries to form a new industry which produces more extensive compound economic effects (Li and Wang, 2002; Zhou, 2003). Masu (2001) also pointed out that industrial convergence continues to accelerate development in industries such as finance, energy, transportation, and manufacturing. It reduces industrial barriers and promotes competition and cooperation among enterprises through technological innovation and reduction of restrictions. To conclude, researchers studied the definition, reasons, and process of industrial convergence from the information

TABLE 3 | Cluster center

	First class	Second class	Third class
Positive convergence	0.0739	0.0931	0.0583
Reverse convergence	0.0312	0.0392	0.0183

TABLE 4 | Classification table.

	Provinces, municipalities, and autonomous regions
First class	Fujian, Jiangsu, Tianjin, Anhui, and Hunan
Second class	Shanghai, Beijing, Zhejiang, Guangdong, and Hainan
Third class	Xinjiang, Ningxia, Tibet, Henan, and Inner Mongolia

industry and extended the meaning of industrial convergence from a narrow sense to a broad sense, especially the problem of technological change promoting industrial convergence. However, there were only a few studies on the industrial convergence of the tourism industry and health industry in the past, and only a few studies have empirically analyzed the driving factors of the convergence of the tourism industry and health industry. Moreover, the driving factors for the convergence are not necessarily only the technological changes proposed by the previous study. Therefore, this article explores more driving factors of industrial convergence.

2 LITERATURE REVIEW AND HYPOTHESES

2.1 Convergence of the Tourism Industry and Health Industry

Health tourism originated from ancient Greek society and has a long history. Health tourism, in the modern sense, basically includes healthcare tourism and medical tourism. The concept of healthcare tourism originated from Goodrich and Goodrich (1987), who defined it and discussed the future of healthcare tourism development. Muller and Kaufmann (2001) suggested that health tourism is the travel activities and other related activities to maintain and promote health. After entering the 21st century, forest health care is favored by tourists, and the development of forest health products opened the prelude of forest health tourism (Konu, 2015). For example, Finland designed the Finnish forest health tourism plan specifically for Japanese tourists (Komppula and Konu, 2017). In addition, Selman et al. (2002) pointed out the efficacy of hydrotherapy, studied the problems existing in the development of hydrotherapy tourism and the countermeasures to accelerate its development. In addition to healthcare tourism, medical tourism is also a part of health tourism. Goodrich (1993) pointed out the definition of medical tourism, and he believed that medical tourism was a unique and attractive tourism activity combined with medical service facilities. Annette and Arellano (2007) indicated that the role of medical tourism is to promote employment, promote tourism development, and promote economic development. Other scholars have studied the

convergence model of the health industry and tourism industry. Yang and Shi (2020) claimed that there are mainly two modes of convergence of a healthy tourism industry: "health + tourism" nesting and "tourism + health" nesting, which can form a relatively stable healthy tourism mode by learning and imitating and self-adjusting according to their own actual situation. Fan (2019) stated that the development of a healthy tourism industry focuses on superior tourism resources or superior location conditions, which leads to the agglomeration effect of industrial development.

The previous literature discussed the purpose, significance, mode, and effect of the convergence of the health industry and tourism industry according to the relevant theories of industrial convergence. With the continuous improvement in people's living standards and economic development level, the health tourism industry has broad development prospects and opportunities, and the convergence of the health industry and tourism industry can improve the quality of industrial development. Thus, this study proposes Hypothesis 1.

H1. The convergence of the health industry and tourism industry is the trend of future tourism development.

2.2 Influencing Factors of the Convergence of the Health Industry and Tourism Industry
2.2.1 Economic Growth

Economic growth provides a strong material guarantee for the convergence of health and tourism industries, and the level of economic development is also the key to the convergence of the two industries. The economic development of the country is positively correlated with the consumption level of residents. Economic development brings about the improvement of consumption level, thus improving economic quality and optimizing industrial structure (Ma, 2008). On the other hand, the change in modern tourism resources is influenced by the development of the social economy, the change in times, and the change in tourism demand. Consumers' income and ideas will influence tourism choices, and these factors are closely related to the level of social and economic development (Wang, 2007). Xu and Fan (2008) found that the convergence of the health industry and tourism industry needs to be formed under a synergy of different means such as enterprise convergence, product convergence, technology convergence, market convergence, and system convergence, which are based on the continuous improvement of economic development level. The change of the concept of tourism resources can make us see that the convergence and development of the tourism industry make tourism resources more abundant, and the change of the concept of tourism resources is influenced by the level of economic development, so the level of economic growth determines the convergence degree of the health industry and tourism industry (Liu, 2011). Thus, this study proposes Hypothesis 2.

H2. The level of economic development is positively correlated with the convergence of the health industry and tourism industry.

TABLE 5 | Descriptive statistical of variables.

Variable	Mean value	Standard deviation	Minimum value	Maximum value
Health tourism industry convergence rate (IC)	0.142	0.039	0.027	0.189
Economic growth (EG)	6.428	7.541	0.567	42.536
Employment (EM)	0.052	0.019	0.042	0.126
Education level of residents (EDU)	12.591	7.738	3.264	54.291
Marketization (MAR)	0.483	0.106	0.239	0.668
Research and development level (R&D)	1.397	0.689	0.188	5.284
Investment in fixed assets (FI)	6,381.439	4,027.391	344.958	28,399.813
Capital stock (CS)	27,301	19,838	3,289	79,302

Data source: China Input-Output Table 2012, 2015, and 2017; China Statistics Yearbook; China Science and Technology Statistics Yearbook.

TABLE 6 | Driving force of Fujian health tourism industry convergence.

Fujian	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0234***	0.0382***	0.0134***	0.0212***	0.0119***	0.0336***	0.0291***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0001)
Employment (EM)	0.0038**	0.0012**	0.0064**	0.0212**	0.0057**	0.0067**	0.0049**
	(0.0231)	(0.0324)	(0.0402)	(0.0287)	(0.0360)	(0.0442)	(0.0349)
Education level of residents (EDU)	0.0114	0.3412	0.2449	0.3429	0.0039*	0.0021*	0.0041*
	(1.4553)	(1.3495)	(1.4347)	(1.3857)	(0.0729)	(0.0659)	(0.0811)
Marketization (MAR)	0.0024*	0.0032*	0.0035*	0.0302	1.2431	1.8267	1.4319
	(0.0617)	(0.0674)	(0.0692)	(1.2437)	(1.4422)	(1.3452)	(1.2449)
Research and development level (R&D)	0.0024*	0.0039*	0.0031*	0.0037*	0.0053*	0.0078*	0.0086*
	(0.0627)	(0.0775)	(0.0679)	(0.0792)	(0.0850)	(0.0837)	(0.0971)
Investment in fixed assets (FI)	0.0126**	0.0241**	0.0344**	0.0426**	0.0404**	0.0562**	0.0491**
	(0.0315)	(0.0343)	(0.0485)	(0.0310)	(0.0259)	(0.0411)	(0.0392)
Capital stock (CS)	0.0132*	0.0141*	0.0235*	0.0341*	0.0359*	0.0410*	0.0425*
	(0.0573)	(0.0724)	(0.0639)	(0.0633)	(0.0596)	(0.0610)	(0.0814)
Constant	0.0131	0.0081*	0.0332	0.0053*	0.2945	1.2334	0.2315
	(1.1347)	(0.0742)	(1.9383)	(0.0608)	(1.6221)	(1.3219)	(1.2834)

∗stands for $p < 0.1$, ∗∗ stands for $p < 0.05$, and ∗∗∗ stands for $p < 0.01$.

2.2.2 Talent Training

Population is the key factor of the convergence degree of the health industry and tourism industry. Whether there are high-quality talents, professional and technical talents, employment rate, and other factors will affect the convergence degree. Jin and Wang (2020) showed through empirical analysis that insufficient training of high-quality talents and lack of vocational ability training are the fundamental factors that affect the convergence of the tourism industry and health industry. They suggested that establishing the training mode of compound talents will help promote the development of the health tourism industry. However, there is a shortage of high-quality talents in the development of health tourism currently, and it is necessary for colleges and universities to actively carry out relevant professional education and increase the training of compound talents in the health tourism industry (Li, 2019; Zhang, 2020). Thus, this study proposes Hypothesis 3.

H3. Talent training is positively correlated with the convergence of the health industry and tourism industry.

2.2.3 Market Perfection

Tourism is closely related to the choice of consumers, and consumers are the main body of the market, so the health tourism industry is greatly influenced by market factors. There

is no doubt that the high-quality development of the health tourism industry should not only be combined with relevant national policies but also give full play to the spontaneous role of the market, encourage market subjects to seize opportunities, integrate regional resources such as medical care and health care, and integrate the health industry and tourism industry with the domestic and international market as the guidance (Zhang, 2020). Tang et al. (2007) claim that the health and tourism industries can form industrial clusters from the perspective of industrial form and purpose, give full play to the role of the market, and provide substitutes for related products so as to promote industrial convergence. Meanwhile, the diversified market demand for health and tourism will promote the continuous strengthening of the correlation between the health industry and the tourism industry and then promote the convergence and development of the two industries (Yang and Shi, 2020). With the improvement of living standards, people pay more and more attention to the quality of life. With the continuous improvement of market demand, the two major industries, health and tourism, are more and more closely linked, so the convergence of the two industries becomes inevitable. While industrial convergence triggered by relying solely on technological innovation and deregulation can not achieve real convergence as a result of the lack of support of a strong resource market and organizational structure (Yang, 2008). The improvement of the

TABLE 7 | Driving force of Jiangsu health tourism industry convergence.

Jiangsu	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0313***	0.0182***	0.0281***	0.0103***	0.0295***	0.0348***	0.0136***
	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0000)	(0.0000)	(0.0001)
Employment (EM)	0.0151**	0.0034**	0.0201**	0.0073**	0.0062**	0.0139**	0.0054**
	(0.0342)	(0.0403)	(0.0316)	(0.0224)	(0.0401)	(0.0392)	(0.0177)
Education level of residents (EDU)	0.0293	0.5730	0.3074	0.2877	0.0291	0.0043*	0.0037*
	(1.9371)	(1.0938)	(1.6682)	(1.6595)	(0.1033)	(0.0804)	(0.0590)
Marketization (MAR)	0.0048*	0.0029*	0.0033*	0.0883	1.3305	1.9043	1.0386
	(0.0804)	(0.0722)	(0.0663)	(1.8960)	(1.5099)	(1.0844)	(1.7340)
Research and development level (R&D)	0.0063*	0.0091*	0.0015*	0.0028*	0.0053*	0.0039*	0.0096*
	(0.0592)	(0.0801)	(0.0632)	(0.0668)	(0.0694)	(0.0805)	(0.0771)
Investment in fixed assets (FI)	0.0105**	0.0319**	0.0375**	0.0461**	0.0506**	0.0583**	0.0614**
	(0.0412)	(0.0207)	(0.0338)	(0.0212)	(0.0451)	(0.0375)	(0.0430)
Capital stock (CS)	0.0116*	0.0190*	0.0274*	0.0297*	0.0382*	0.0430*	0.0487*
	(0.0612)	(0.0694)	(0.0774)	(0.0553)	(0.0628)	(0.0707)	(0.0935)
Constant	0.1134	0.0205	0.0462*	0.0193	0.4471*	1.3996	0.3588
	(1.9580)	(0.1545)	(0.0632)	(1.3361)	(0.0537)	(1.6659)	(1.3742)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

TABLE 8 | Driving force of Tianjin health tourism industry convergence.

Tianjin	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0173***	0.0206***	0.0117***	0.0247***	0.0332***	0.0293***	0.0152***
	(0.0004)	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0003)
Employment (EM)	0.0051**	0.0027**	0.0153**	0.0042**	0.0039**	0.0128**	0.0061**
	(0.0292)	(0.0438)	(0.0115)	(0.0377)	(0.0273)	(0.0482)	(0.0356)
Education level of residents (EDU)	0.0362	0.2794	0.3749	0.3976	0.0103*	0.0035*	0.0048*
	(1.3097)	(1.8701)	(1.5832)	(1.4402)	(0.0842)	(0.0795)	(0.657)
Marketization (MAR)	0.0137*	0.0072*	0.0064*	0.0392	1.2269	1.7613	1.0775
	(0.0664)	(0.0842)	(0.0536)	(1.3769)	(1.0935)	(1.3879)	(1.5836)
Research and development level (R&D)	0.00194*	0.0262*	0.0391*	0.0369*	0.0385*	0.0436*	0.0477*
	(0.0794)	(0.0573)	(0.0830)	(0.0937)	(0.0741)	(0.0664)	(0.0752)
Investment in fixed assets (FI)	0.0273**	0.0336**	0.0407**	0.0495**	0.0552**	0.0596**	0.0681**
	(0.0387)	(0.0293)	(0.0475)	(0.0162)	(0.0296)	(0.0178)	(0.0473)
Capital stock (CS)	0.0095*	0.0186*	0.0259*	0.0361*	0.0394*	0.0410*	0.0452*
	(0.0843)	(0.0769)	(0.0572)	(0.0633)	(0.0751)	(0.0842)	(0.0694)
Constant	0.0488	0.0361	0.0568*	0.1730*	0.2973*	1.4726	0.4075
	(1.8857)	(0.3874)	(0.0590)	(0.0734)	(0.0398)	(1.7302)	(1.8694)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

marketization degree would help eliminate the obstacles in the process of the convergence of the health industry and tourism industry and promote the convergence of the two industries (Xu and Fan, 2008). Undoubtedly, the realization of market convergence is a necessary condition to ensure the realization of industrial convergence. Thus, this study proposes Hypothesis 4.

H4. The level of market perfection is positively correlated with the convergence of the health industry and tourism industry.

2.2.4 Technological Input
Technological input is the key factor for the convergence of the health industry and tourism industry, and the improvement of the technology level of the health industry is the foundation and the key to the development of the related tourism industry. There is a difference in capabilities among enterprises. When enterprises with

core competitiveness are willing to carry out industrial convergence with enterprises in other industries, they will also encounter constraints from core rigid issues such as technology. Therefore, innovation is crucial to industrial convergence, and technological input is the key to innovation and the improvement of core competitiveness. Without technological input, there will be no core competitiveness (Leonard-Barton, 1992). Making full use of advanced digital technology and the advantages of internet plus's industrial development, allowing new technologies such as big data and cloud computing to run through the whole process of the health tourism industry would provide a solid foundation for the integrated development of the health and tourism industries. For example, build a one-stop smart service platform for health tourism, provide "whole process, customization and personalization" services, improve residents' health tourism quality, and transform science and technology into endogenous power and a strong engine for the convergence and development of health tourism industry (Sun et al.,

TABLE 9 | Driving force of Anhui health tourism industry convergence.

Anhui	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0461***	0.0382***	0.0475***	0.0185***	0.0294***	0.0758***	0.0148***
	(0.0000)	(0.0001)	(0.0002)	(0.0001)	(0.0003)	(0.0000)	(0.0001)
Employment (EM)	0.0047**	0.0059**	0.0136**	0.0084**	0.0179**	0.0096**	0.0034**
	(0.0402)	(0.0386)	(0.0290)	(0.0371)	(0.0427)	(0.0296)	(0.0195)
Education level of residents (EDU)	0.0295	0.0173	0.1792	0.0748	0.0139*	0.0069*	0.0072*
	(1.6791)	(1.6905)	(1.0648)	(1.3946)	(0.0663)	(0.0841)	(0.0745)
Marketization (MAR)	0.0184*	0.0073*	0.0095*	0.2960	1.3844	1.9057	1.4487
	(0.0751)	(0.0842)	(0.0538)	(1.4769)	(1.1075)	(1.9758)	(1.3962)
Research and development level (R&D)	0.0095*	0.0047*	0.0183*	0.0039*	0.0286*	0.0051*	0.0076*
	(0.0847)	(0.0592)	(0.0548)	(0.0691)	(0.0760)	(0.0744)	(0.0603)
Investment in fixed assets (FI)	0.0085**	0.0127**	0.0161**	0.0295**	0.0382**	0.0409**	0.0552**
	(0.0291)	(0.0183)	(0.0174)	(0.0253)	(0.0487)	(0.0366)	(0.0167)
Capital stock (CS)	0.0075*	0.0128*	0.0194*	0.0236*	0.0381*	0.0407*	0.0469*
	(0.0893)	(0.0571)	(0.0664)	(0.0960)	(0.0773)	(0.0519)	(0.0704)
Constant	0.0071*	0.0065*	0.0073	0.0136*	0.2547	1.3879	0.3915
	(1.0753)	(0.0512)	(1.6484)	(0.08907)	(1.2870)	(1.6358)	(1.3996)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

TABLE 10 | Driving force of Hunan health tourism industry convergence

Hunan	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0282***	0.0176***	0.0299***	0.0327***	0.0309***	0.0182***	0.0195***
	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0002)	(0.0001)	(0.0000)
Employment (EM)	0.0052**	0.0078**	0.0183**	0.0096**	0.0281**	0.0060**	0.0072**
	(0.0481)	(0.0274)	(0.0189)	(0.0323)	(0.0380)	(0.0552)	(0.0422)
Education level of residents (EDU)	0.0114	0.3412	0.3274	0.1938	0.0875	0.0065*	0.004*
	(1.4553)	(1.3495)	(1.4347)	(1.3857)	(0.0729)	(0.0659)	(0.0811)
Marketization (MAR)	0.0074*	0.0086*	0.0132*	0.0493	1.3846	1.6071	1.5829
	(0.0766)	(0.0584)	(0.0681)	(1.4283)	(1.5506)	(1.7399)	(1.6495)
Research and development level (R&D)	0.0071*	0.0125*	0.0072*	0.0326*	0.0173*	0.0092*	0.0037*
	(0.0792)	(0.0563)	(0.0584)	(0.0639)	(0.0841)	(0.0596)	(0.0637)
Investment in fixed assets (FI)	0.0086**	0.0142**	0.0241**	0.0284**	0.0322**	0.0385**	0.0427**
	(0.0401)	(0.0283)	(0.0438)	(0.0127)	(0.0394)	(0.0165)	(0.0281)
Capital stock (CS)	0.0107*	0.0185*	0.0226*	0.0274*	0.0328*	0.0415*	0.0469*
	(0.0692)	(0.0840)	(0.0623)	(0.0844)	(0.0762)	(0.0537)	(0.0681)
Constant	0.0043	0.0074	0.0259*	0.0136	0.0074*	1.6682*	0.0936
	(1.7549)	(1.0581)	(0.0527)	(1.0839)	(0.0742)	(0.0741)	(1.6903)

Note: * stands for $p < 0.1$, ** stands for $p < 0.05$, and * * * stands for $p < 0.01$.

2019). Li (2015) used econometric software to analyze relevant data and suggested that it is necessary to strengthen the construction of industrial informatization and use technology to improve the convergence quality of the health industry and tourism industry. Zhou (2018) used spatial econometric analysis to empirically analyze the motivation of the convergence development of the health industry and tourism industry and argued that consumer demand, institutional environment, and technological innovation play a vital role in the convergence development of the health industry and tourism industry. In addition, with the proposed carbon neutrality targets, eco-innovation also has an important impact on the sustainable development of the health tourism environment (Sun et al., 2021). Thus, this study proposes Hypothesis 5.

H5. The level of technological input is positively correlated with the convergence of the health industry and tourism industry.

2.2.5 Capital Investment

As modern service industries, the health industry and tourism industry face the pressure of fierce competition, shortage of resources, and imbalance of supply and demand. In order to make better convergence of the two industries, it is necessary to introduce enough external capital investment, develop distinctive health tourism products, reduce the pressure of homogeneous competition, and promote the development of the local economy (Geng, 2018; Yang et al., 2020). Yang and Yang (2020) agreed that the health tourism industry is a new integrated industry under the framework of "great health" and also an important pillar industry for China's economic development. The convergence of the two industries is the only way for development. Therefore, it is necessary to increase capital investment to ensure the cross-border transformation and upgrading of the tourism industry chain (Ren, 2016). Furthermore, Du and Li (2004) stated that external

TABLE 11 | Driving force of Shanghai health tourism industry convergence.

Shanghai	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0454***	0.0569***	0.0550***	0.0575***	0.0441***	0.0689***	0.0586***
	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0000)
Employment (EM)	0.0153**	0.0138**	0.0136**	0.0147**	0.0159**	0.0176**	0.0197**
	(0.0491)	(0.0386)	(0.0204)	(0.0412)	(0.0237)	(0.0316)	(0.0265)
Education level of residents (EDU)	0.0033**	0.0082**	0.0098**	0.0117**	0.0126**	0.00138**	0.0156**
	(0.0381)	(0.0259)	(0.0288)	(0.0292)	(0.0336)	(0.0241)	(0.0359)
Marketization (MAR)	0.0148***	0.0159***	0.0195***	0.0219***	0.0344***	0.0386***	0.0421***
	(0.0001)	(0.0002)	(0.0003)	(0.0000)	(0.0001)	(0.0003)	(0.0001)
Research and development level (R&D)	0.0155**	0.0147**	0.0237**	0.0254**	0.0321**	0.0362**	0.0376**
	(0.0476)	(0.0289)	(0.0386)	(0.0316)	(0.0462)	(0.0349)	(0.0423)
Investment in fixed assets (FI)	0.0015	0.0032	0.0047	0.0055	0.0092	0.0083	0.0051
	(1.2091)	(1.3483)	(1.7493)	(1.3549)	(1.3475)	(1.6469)	(1.2367)
Capital stock (CS)	0.0038	0.0184	0.0314	0.0226	0.0314	0.0937	0.0694
	(1.9336)	(1.3749)	(1.9684)	(1.5909)	(1.3482)	(1.3149)	(1.5334)
Constant	0.0530	0.0165	0.00137	0.0056*	0.0037*	0.0279	0.0064*
	(1.0753)	(1.3152)	(1.8453)	(0.0587)	(0.0577)	(1.5348)	(0.0788)

*stands for p < 0.1, ** stands for p < 0.05, and *** stands for p < 0.01.*

TABLE 12 | Driving force of Beijing health tourism industry convergence.

Beijing	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0649***	0.0672**	0.0726***	0.0674***	0.0823***	0.0725***	0.0751***
	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0000)
Employment (EM)	0.0213**	0.0284**	0.0365**	0.0417**	0.0461**	0.0491**	0.0476**
	(0.0245)	(0.0240)	(0.0245)	(0.0391)	(0.0427)	(0.0326)	(0.0356)
Education level of residents (EDU)	0.0154**	0.0112**	0.0125**	0.0213**	0.0310**	0.0362**	0.0436**
	(0.0349)	(0.0393)	(0.0324)	(0.0412)	(0.0336)	(0.0241)	(0.0392)
Marketization (MAR)	0.0436***	0.0497***	0.0519***	0.0567***	0.0651***	0.0713***	0.0841***
	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Research and development level (R&D)	0.0377**	0.0410**	0.0459**	0.0645**	0.0549**	0.0462**	0.0536**
	(0.0385)	(0.0479)	(0.0296)	(0.0316)	(0.0267)	(0.0335)	(0.0356)
Investment in fixed assets (FI)	0.0165	0.0124	0.0173	0.0135	0.0112	0.0153	0.0251
	(1.2945)	(1.3256)	(1.9340)	(1.4960)	(1.7235)	(1.1234)	(1.6637)
Capital stock (CS)	0.0038	0.0024	0.0072	0.0064	0.0040	0.0080	0.0072
	(1.1536)	(1.7963)	(1.2164)	(1.2168)	(1.1029)	(1.4449)	(1.3784)
Constant	0.0359	0.0312	0.0127*	0.0223*	0.0121	0.0197	0.0144*
	(1.5313)	(1.1642)	(0.0653)	(0.0670)	(1.5397)	(1.3210)	(0.0589)

*stands for p < 0.1, ** stands for p < 0.05, and * * * stands for p < 0.01.*

activating factors play an important role in promoting the convergence and development of the tourism industry, and the main external activation factors are government control policies and the planning work of relevant management departments, especially the government's capital investment policy has played a crucial role in promoting the convergence of health and tourism industries. Also, Li and Weng (2015) built a coupling model and index system from four dimensions of capital investment, talents, market, and institutions, and analyzed the coupling coordination between the health industry and tourism industry in 31 provinces, cities, and autonomous regions in China, showing the importance of capital investment. Thus, this study proposes Hypothesis 6.

H6. The capital investment is positively correlated with the convergence of the health industry and tourism industry.

3 EMPIRICAL METHODOLOGY

3.1 Health Tourism Industry Convergence Measurement Methodology

According to previous studies' measurements of industrial convergence, most of them focus on the following three ways:

1) Input-output method

The input-output method mainly uses the ratio of the intermediate input of another industry in a certain industry to the total output of the industry to calculate the direct consumption coefficient, which can measure the degree of correlation between the two industries.

2) Coupling evaluation model

TABLE 13 | Driving force of Zhejiang health tourism industry convergence.

Zhejiang	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0352***	0.0533**	0.0676***	0.0565***	0.0659***	0.0754***	0.0792***
	(0.0000)	(0.0002)	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0002)
Employment (EM)	0.0125**	0.0284**	0.0385**	0.0443**	0.0497**	0.0567**	0.0637**
	(0.0445)	(0.0362)	(0.0319)	(0.0231)	(0.0275)	(0.0469)	(0.0436)
Education level of residents (EDU)	0.0117**	0.0297**	0.0367**	0.0489**	0.0331**	0.0401**	0.0439**
	(0.0291)	(0.0323)	(0.0349)	(0.0422)	(0.0436)	(0.0256)	(0.0286)
Marketization (MAR)	0.0364***	0.0475***	0.0567***	0.0345***	0.0462***	0.0512***	0.0546***
	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0000)
Research and development level (R&D)	0.0098**	0.0112**	0.0210**	0.0546**	0.0559**	0.0567**	0.0362**
	(0.0325)	(0.0295)	(0.0390)	(0.0466)	(0.0370)	(0.0451)	(0.0265)
Investment in fixed assets (FI)	0.0535	0.0715	0.0433	0.0549	0.0424	0.0452	0.0325
	(1.3355)	(1.7236)	(1.0673)	(1.3846)	(1.5681)	(1.6783)	(1.4138)
Capital stock (CS)	0.0198	0.0130	0.0205	0.0140	0.0169	0.0130	0.0135
	(1.3676)	(1.2732)	(1.6524)	(1.5379)	(1.4490)	(1.4254)	(1.1286)
Constant	0.0079	0.0212	0.0241	0.0923	0.0411	0.0085*	0.0149
	(1.3034)	(1.4529)	(1.6570)	(1.2707)	(1.2375)	(0.0719)	(1.1809)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$

TABLE 14 | Driving force of Guangdong health tourism industry convergence.

Guangdong	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0569***	0.0539**	0.0623***	0.0650***	0.0679***	0.0719***	0.0733***
	(0.0001)	(0.0000)	(0.0002)	(0.0000)	(0.0001)	(0.0000)	(0.0000)
Employment (EM)	0.0254**	0.0307**	0.0417**	0.0491**	0.0519**	0.0527**	0.0578**
	(0.0439)	(0.0462)	(0.0429)	(0.0301)	(0.0451)	(0.0398)	(0.0436)
Education level of residents (EDU)	0.0201**	0.0250**	0.0367**	0.0418**	0.0537**	0.0450**	0.0591**
	(0.0321)	(0.0363)	(0.0399)	(0.0451)	(0.0346)	(0.0227)	(0.0365)
Marketization (MAR)	0.0379***	0.0421***	0.0407***	0.0455***	0.0521***	0.0578***	0.0598***
	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0002)	(0.0001)	(0.0001)
Research and development level (R&D)	0.0182**	0.0196**	0.0287**	0.0319**	0.0441**	0.0576**	0.0522**
	(0.0335)	(0.0435)	(0.0309)	(0.0316)	(0.0340)	(0.0389)	(0.0352)
Investment in fixed assets (FI)	0.0895	0.0575	0.0657	0.0469	0.0349	0.0527	0.0423
	(1.3105)	(1.6367)	(1.2013)	(1.6306)	(1.4351)	(1.8572)	(1.2448)
Capital stock (CS)	0.0568	0.0183	0.0134	0.0425	0.0561	0.0756	0.0215
	(1.4536)	(1.8321)	(1.5149)	(1.6589)	(1.7523)	(1.5671)	(1.5401)
Constant	0.0129	0.0133*	0.0412	0.0120	0.0154*	0.0390	0.0034*
	(1.1246)	(0.0509)	(1.1196)	(1.3412)	(0.0736)	(1.2781)	(0.0781)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

This model consists of two systems. Each system includes its own subsystem and various indicators to measure the relationship between the two systems. This model is suitable for evaluating the coupling degree between different subdivided manufacturing industries and other industries.

3) Patent analysis method

Patent analysis refers to the use of statistical methods and patent-related information to evaluate industrial convergence.

Since this study investigates the convergence degree of the health industry and tourism industry, the input-output method is selected. The formula is as follows:

$$X_{it} = \frac{P_{ait}}{p_{it}} \times 100\%$$

Where p_{ait} is the input of another industry in an industry in year t and p_{it} is the total output of an industry in year t. The input-output method mainly studies the relationship between two major types of production in the national economy.

According to the measurement method of the positive convergence degree between the tourism industry and the health industry, in the process of the development and production and operation of the health industry, the proportion between the intermediate input from the tourism industry and the total output of the health industry can be expressed as follows:

Positive convergence degree of tourism to health industry = Intermediate investment of tourism industry to health industry/ Average total output of health industry *100%

The measurement method of the degree of reverse convergence is that the proportion between the intermediate input of the health industry to the tourism industry and the total output of the tourism industry is expressed as follows:

TABLE 15 | Driving force of Hainan health tourism industry convergence development.

Hainan	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0382**	0.0350**	0.0263***	0.0335***	0.0269***	0.0298***	0.0433***
	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0001)
Employment (EM)	0.0134**	0.0174**	0.0204**	0.0211**	0.0193**	0.0247**	0.0178**
	(0.0342)	(0.0442)	(0.0317)	(0.0239)	(0.0341)	(0.0298)	(0.0236)
Education level of residents (EDU)	0.0021**	0.0025**	0.0047**	0.0038**	0.0037**	0.0029**	0.0048**
	(0.0213)	(0.0234)	(0.0219)	(0.0214)	(0.0265)	(0.0372)	(0.0451)
Marketization (MAR)	0.0109***	0.0124***	0.0135***	0.0218***	0.0259***	0.0289***	0.0227***
	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Research and development level (R&D)	0.0092**	0.0116**	0.0127**	0.0119**	0.0111**	0.0136**	0.0122**
	(0.0253)	(0.0354)	(0.0379)	(0.0240)	(0.0208)	(0.0312)	(0.0294)
Investment in fixed assets (FI)	0.0453	0.0425	0.0560	0.0547	0.0319	0.0570	0.0643
	(1.4382)	(1.6540)	(1.5461)	(1.6976)	(1.3419)	(1.8421)	(1.4852)
Capital stock (CS)	0.0657	0.0231	0.02344	0.1329	0.0659	0.3266	0.5685
	(1.5738)	(1.1312)	(1.5489)	(1.6589)	(1.5489)	(1.5671)	(1.6591)
Constant	0.0039*	0.2312	0.0052*	0.2013	0.5324	0.3949	0.7434
	(0.667)	(1.3432)	(0.0696)	(1.6257)	(1.7436)	(1.4356)	(1.5671)

*stands for p < 0.1, ** stands for p < 0.05, and * * * stands for p < 0.01.

TABLE 16 | Driving force of Xinjiang health tourism industry convergence.

Xinjiang	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0472**	0.0612**	0.0391**	0.0504**	0.0096**	0.0447**	0.0515**
	(0.0251)	(0.0285)	(0.0438)	(0.0173)	(0.0257)	(0.0427)	(0.0175)
Employment (EM)	0.0601	0.0764	0.8631	0.9371	0.0646	0.4803	0.8602
	(1.0587)	(1.3075)	(0.1764)	(0.1099)	(2.9048)	(0.7845)	(1.2085)
Education level of residents (EDU)	0.0739	0.0657	0.3760	0.4871	1.0385	0.9847	2.7498
	(1.4891)	(0.1987)	(0.4982)	(0.5738)	(1.3966)	(0.8401)	(2.6301)
Marketization (MAR)	0.2074	0.0894	0.2985	0.8401	0.9065	0.0749	0.7593
	(0.3905)	(0.7048)	(0.6408)	(1.2089)	(1.3871)	(2.6744)	(0.8774)
Research and development level (R&D)	0.3025	0.4870	0.5433	0.7926	0.6492	1.3787	0.8861
	(1.7409)	(0.9633)	(0.8664)	(2.0905)	(1.3672)	(0.8099)	(1.3875)
Investment in fixed assets (FI)	0.0385*	0.0672*	0.0298*	0.0448*	0.0274*	0.0835*	0.0704*
	(0.0742)	(0.0586)	(0.0902)	(0.0617)	(0.0842)	(0.0729)	(0.0673)
Capital stock (CS)	0.0982	0.0854	0.0573	0.0385	0.0974	0.0591	0.0853
	(1.3941)	(1.8744)	(1.9705)	(1.0842)	(1.0417)	(1.3285)	(1.4711)
Constant	0.0163*	0.0488*	0.0915*	0.3847	0.7403	0.2871*	0.3877
	(0.0748)	(0.0711)	(0.0804)	(1.9491)	(1.3622)	(0.0793)	(1.4905)

*stands for p < 0.1, ** stands for p < 0.05, and *** stands for p < 0.01.

Reverse convergence degree of tourism to health industry = Intermediate capital investment of health industry to tourism industry/Average total output of tourism industry *100%

The degree of industrial convergence is generally between 0 and 1. The larger the ratio, the higher the degree of direct convergence with other different industries. On the contrary, the degree of mutual convergence with other industries is lower; If the degree of convergence is equal to 1, it means that the two industries are fully integrated.

3.2 Analysis of Health Tourism Industry Convergence
3.2.1 Convergence Measurement Results and Comparative Analysis
Based on the Input-Output Tables of China's provinces in 2012, 2015, and 2017, this article estimates the two-way convergence degree of the tourism industry to the health industry in 31 provinces, municipalities, and autonomous regions in China and ranks them in descending order. The results of the positive convergence degree are shown in **Table 1**.

According to the results in **Table 1**, the convergence degree of Shanghai's tourism industry to the health industry is absolutely at the leading level, reaching 13.94%, which indicates that for Shanghai, the development of the health industry needs more investment and support from the tourism industry. Followed by Beijing, Zhejiang, Guangdong, Hainan, Fujian, Jiangsu, Tianjin, and Anhui, the positive convergence degree is higher than 5%; Thirdly, Hunan, Hubei, and Chongqing and other 16 provinces, municipalities, and autonomous regions, the positive phase fusion degree is in the range of 1%–5%; Henan, Heilongjiang, Guizhou, Xinjiang, Gansu, and Guangxi ranked last, the degree of convergence is less than 1%. In addition, the overall average level (3.768%) of the positive convergence of the tourism industry to

TABLE 17 | Driving force of Ningxia health tourism industry convergence.

Ningxia	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0548**	0.0374**	0.0270**	0.0385**	0.0164**	0.0085**	0.0382**
	(0.0481)	(0.0304)	(0.0172)	(0.0392)	(0.0375)	(0.0399)	(0.0225)
Employment (EM)	0.0183	0.0364	0.1643	0.8630	0.1760	0.3769	0.0688
	(1.3764)	(1.3905)	(0.8744)	(0.7301)	(1.3764)	(0.9846)	(1.6539)
Education level of residents (EDU)	0.0587	0.1833	0.4895	0.8102	1.4498	0.0129	1.5844
	(1.3874)	(0.8755)	(1.4703)	(0.7595)	(1.4892)	(0.6893)	(1.0382)
Marketization (MAR)	0.4906	0.1874	0.4769	0.5481	0.7471	0.2874	0.0942
	(0.4902)	(0.6332)	(0.7508)	(1.8648)	(2.0943)	(1.4860)	(1.0392)
Research and development level (R&D)	0.0762	0.9855	0.7485	0.2093	0.1176	1.7981	0.6705
	(1.0074)	(0.8718)	(0.4213)	(1.3984)	(1.6684)	(0.7329)	(1.0049)
Investment in fixed assets (FI)	0.0283*	0.0095*	0.0174*	0.0849*	0.0774*	0.0816*	0.0083*
	(0.0858)	(0.0608)	(0.0758)	(0.0859)	(0.0548)	(0.0680)	(0.0864)
Capital stock (CS)	0.7668	0.0940	0.0943	1.2904	0.8837	0.0972	0.3795
	(1.0491)	(1.3288)	(1.0385)	(1.3352)	(1.2804)	(1.0591)	(2.4093)
Constant	0.1842	0.0395*	0.0594*	0.5720	0.0832*	0.0539	0.7491
	(0.3760)	(0.0695)	(0.0772)	(1.0853)	(0.0685)	(1.3562)	(1.8831)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

TABLE 18 | Driving force of Tibet health tourism industry convergence.

Tibet	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0251**	0.0492**	0.0369**	0.0750**	0.0947**	0.0536**	0.0053**
	(0.0691)	(0.0847)	(0.0503)	(0.0682)	(0.0563)	(0.0937)	(0.0848)
Employment (EM)	0.2843	0.1955	0.1843	0.7559	0.7401	0.6492	0.1843
	(1.7481)	(1.4096)	(0.9400)	(0.5848)	(1.6592)	(0.7649)	(1.0347)
Education level of residents (EDU)	0.1293	0.3096	0.7481	0.0387	1.7648	0.6482	1.3981
	(1.0644)	(2.3985)	(1.4936)	(0.8039)	(1.3364)	(0.8491)	(1.8482)
Marketization (MAR)	1.2093	0.8740	1.3844	0.4327	0.5583	1.3930	0.8495
	(0.1982)	(0.4878)	(0.6649)	(1.6743)	(2.8840)	(1.4860)	(1.0392)
Research and development level (R&D)	0.1134	0.8642	0.2874	0.3099	0.7748	1.2096	0.8452
	(1.4872)	(0.9066)	(0.7291)	(2.3984)	(1.4091)	(0.8597)	(1.4983)
Investment in fixed assets (FI)	0.0492*	0.0185*	0.0063*	0.0075*	0.0854*	0.0948*	0.0285*
	(0.0674)	(0.0769)	(0.0872)	(0.0685)	(0.0859)	(0.0588)	(0.0764)
Capital stock (CS)	0.3981	0.0682	0.2805	1.4873	1.3794	0.2873	0.0896
	(1.2769)	(1.4065)	(0.7836)	(1.5274)	(1.4906)	(1.9982)	(2.0091)
Constant	0.2384	0.0871*	0.0339*	0.0852*	0.1052	0.0878	0.3806
	(1.2094)	(0.0794)	(0.0509)	(0.0638)	(0.3981)	(1.7049)	(1.2765)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

the health industry in China is higher than the median level (3.02%), which proves that the positive convergence level of the tourism industry to the health industry in China is relatively balanced.

The measurement results of the reverse convergence degree of the tourism industry to the health industry in 31 provinces and cities in China are shown in **Table 2**. According to **Table 2**, the reverse convergence degree of Shanghai and Beijing is still very high, exceeding the level of 5%, followed by Xinjiang and Ningxia. It shows that the development of the tourism industry in these provinces, municipalities, and autonomous regions needs more investment and support from the health industry. Second, the reverse convergence degree of 18 provinces, municipalities, and autonomous regions such as Tibet, Henan, and Inner Mongolia is higher than 1%, and finally the reverse convergence degree of 9 provinces, municipalities, and autonomous regions such as Hebei, Sichuan, and Tianjin is less than 1%. In addition, the overall average level of reverse convergence in China (2.55%) is

lower than the median level (3.02%), which means that the level of reverse convergence between the tourism industry and the health industry in China is unbalanced. As a result, China's tourism industry has a high level of positive convergence with the health industry at present, but the level of reverse convergence is relatively uneven. The development direction of China's tourism industry and health industry must be to promote the mutual convergence of the two industries and reduce the difference in convergence degree between developed areas and underdeveloped areas in the future, and thus Hypothesis 1 was supported.

3.2.2 Cluster Analysis of Industrial Convergence Degree
Using the data of positive convergence degree and reverse convergence degree of 31 provinces, municipalities, and autonomous regions in **Table 1** and **Table 2**, k-means clustering analysis is conducted on the convergence degree of

TABLE 19 | Driving force of Henan health tourism industry convergence.

Hennan	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.0649*	0.0337*	0.0491**	0.0975**	0.0874**	0.0082**	0.0064**
	(0.0363)	(0.0251)	(0.0304)	(0.0335)	(0.0320)	(0.0275)	(0.0213)
Employment (EM)	0.4873	0.2096	0.3764	0.5673	0.6739	0.5099	0.4765
	(1.0843)	(1.0481)	(0.6723)	(0.7685)	(1.5839)	(0.8492)	(1.7692)
Education level of residents (EDU)	0.0384	0.2748	0.6735	0.5904	0.9481	0.8847	1.8092
	(1.8493)	(0.9847)	(1.0047)	(0.4908)	(1.5602)	(0.2844)	(1.6751)
Marketization (MAR)	1.4872	0.9807	1.5706	0.8381	0.7845	0.7649	1.3092
	(0.4906)	(0.8574)	(0.5572)	(2.4091)	(1.3875)	(1.8602)	(1.5658)
Research and development level (R&D)	1.0347	0.9984	0.4096	0.4733	0.3090	1.5907	0.9835
	(1.7768)	(1.0295)	(1.2263)	(0.9584)	(1.3894)	(0.8857)	(1.0937)
Investment in fixed assets (FI)	0.0371*	0.0490*	0.0186*	0.0092*	0.0077*	0.0386*	0.0071*
	(0.0742)	(0.0536)	(0.0605)	(0.0519)	(0.0762)	(0.0835)	(0.0557)
Capital stock (CS)	0.6498	0.1285	1.2986	1.0948	1.2875	0.8793	0.8824
	(1.0943)	(0.8746)	(0.7401)	(0.8835)	(1.0947)	(1.6834)	(1.3872)
Constant	0.0933*	0.3842	0.0447*	0.0693*	0.3985	0.1844*	0.0355
	(0.0659)	(0.1846)	(0.0664)	(0.0737)	(1.2073)	(0.0782)	(1.5934)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

TABLE 20 | Driving force of Inner Mongolia health tourism industry convergence.

Inner Mongolia	2013	2014	2015	2016	2017	2018	2019
Economic growth (EG)	0.1038**	0.0874**	0.0905**	0.0673**	0.0954**	0.0163**	0.0054**
	(0.0650)	(0.0738)	(0.0596)	(0.0628)	(0.0783)	(0.0695)	(0.0708)
Employment (EM)	1.0392	0.7835	0.7216	0.8255	0.7284	0.8047	0.0094
	(1.5781)	(1.7446)	(0.8847)	(0.2765)	(2.4870)	(1.3283)	(1.3047)
Education level of residents (EDU)	0.0482	0.3086	0.5294	0.0387	1.2384	0.8096	1.4986
	(1.0064)	(0.8739)	(1.3985)	(0.3761)	(1.8738)	(0.3345)	(1.0946)
Marketization (MAR)	1.3095	0.7605	1.0374	0.3984	0.0837	0.3657	1.2096
	(1.2835)	(0.7947)	(0.5091)	(1.1674)	(1.6672)	(1.2094)	(1.7762)
Research and development level (R&D)	1.3875	0.8740	0.8702	0.0384	0.7650	1.0388	1.3872
	(1.0528)	(1.4871)	(0.9474)	(0.6739)	(1.2763)	(0.3364)	(1.7495)
Investment in fixed assets (FI)	0.0489*	0.0621*	0.0385*	0.0037*	0.0374*	0.0062*	0.0385*
	(0.0743)	(0.0879)	(0.0594)	(0.0618)	(0.0950)	(0.0672)	(0.0646)
Capital stock (CS)	0.3091	1.0482	1.4816	0.8496	1.7493	0.5832	0.0387
	(0.3874)	(0.7381)	(0.3085)	(0.9504)	(1.3544)	(1.0945)	(0.7649)
Constant	0.1382	0.0384*	0.2879	0.0086*	0.0768	0.0387	0.0826*
	(1.3095)	(0.0871)	(0.8436)	(0.0591)	(1.4826)	(0.1865)	(0.0655)

*stands for $p < 0.1$, ** stands for $p < 0.05$, and *** stands for $p < 0.01$.

each region, which is divided into three types. **Table 3** shows the situation of three types of final class centers. It can be seen from **Table 3** that the indexes of the second class are the best, followed by the third class, and the indexes of the first class are the least ideal.

Among them, three types represent areas where the tourism industry is well integrated with the health industry, areas where the tourism industry is well integrated with the health industry, and areas where the health industry is well integrated with the tourism industry (**Table 4**). Among them, Shanghai, Beijing, Zhejiang, Guangdong, and Hainan have a high degree of two-way convergence of the tourism industry and health industry, and these five regions have a high level of economic development, which further verifies the importance of convergence of the tourism industry and health industry.

After examining the degree of convergence of the tourism industry and health industry in 31 provinces, municipalities, and

autonomous regions in China, this study further examines the convergence of the health tourism industry in five factors: economic growth, talent training, market perfection, technology input, and capital investment, and explores the driving factors of the integrated development of the health tourism industry.

3.3 Empirical Research
3.3.1 Variable Selection
3.3.1.1 Interpreted Variable
In this article, the input-output method is used to measure the degree of convergence between the tourism industry and the health industry. According to the classification of 31 provinces, municipalities, and autonomous regions mentioned previously, the industrial convergence degree (IC) of three major provinces, municipalities, and autonomous regions from 2013 to 2019 is selected as the interpreted variable.

3.3.1.2 Explanatory Variables

This article examines the convergence driving force of the health tourism industry from five factors. Economic growth provides a material guarantee for the convergence of the tourism industry and health industry; therefore, this article introduces economic growth (EG) as an explanatory variable. The market mainly promotes the convergence of the two industries in two ways. One is the spontaneous realization of the market. According to the development of the market, the tourism industry and the health industry are integrated according to the demand; therefore, this article introduces marketization level (MAR) as an explanatory variable; Another is to invest capital and technology in the health tourism industry through the government or enterprises, which find the great development potential of the industry. Therefore, this article introduces research and development level (R&D) and fixed asset investment (FI) as the substitution variables of technological input and capital investment. Moreover, researchers used to think that the shortage of talents in the health tourism industry is an important problem that restricts the convergence of the two industries. Therefore, this article introduces the education level of residents (EDU) as a substitute variable for talent training.

3.3.1.3 Control Variables

In order to ensure the accuracy of estimation, this article introduces control variables. The development of the tourism and health industry is closely related to consumers' income, and the employment level is the basis to meet residents' income, so this article introduces the employment level (EM) as the control variable. Also, the existing production and operation scale and technical level of tourism and health enterprises affect the convergence and development of the two industries, so this article introduces capital stock (CS) as the control variable.

3.3.2 Model Building

Based on the choice of the above-interpreted variable, explanatory variables, and control variables, this article establishes a multiple linear regression model to explore the influence degree of economic growth, talent training, market perfection, technology input, and capital investment on the integrated development of the health tourism industry. The model is as follows:

$$IC_{it} = \alpha_0 + \beta_0 EG_{it} + \beta_1 EDU_{it} + \beta_2 MAR_{it} + \beta_3 R\&D_{it} + \beta_4 FI_{it}$$
$$+ \beta_5 EM_{it} + \beta_6 CS_{it} + \zeta_{it},$$

(1)

IC represents the convergence degree of the health tourism industry ; EG represents the economic growth; EDU represents the education level of residents; MAR represents the marketization level; $R\&D$ represents the investment in research and development, FI 为represents the investment in fixed assets, EM represents the employment level , α_0 is a constant and, and ζ_{it} is a random error term.

3.3.3 Data Sources and Descriptive Statistics

The data relating to industrial convergence comes from *China Input-Output Table*. As the sample interval of *China Input-Output*

Table in this paper only exists in 2012, 2015, and 2017, for the analysis of vacant years, this paper uses the equal hypothesis method to fill in the input-output data of vacant years. The remaining variables come from *China Statistics Yearbook*, *China Science and Technology Statistics Yearbook* and statistical yearbooks of various provinces and cities. Descriptive statistics of variables are shown in **Table 5**.

According to the descriptive statistics in **Table 5**, it is found that the average convergence rate of China's health tourism industry is 0.142, and the maximum and minimum values are 0.189 and 0.027, respectively, which indicates that the average convergence degree of China's two industries is low at present, and there is a big gap between these two industries in different regions. The average value of economic growth is 6.428, with the maximum and minimum values of 0.567 and 42.536, respectively, which indicates that China's current economic growth is at a relatively stable level, but the gap of economic growth among different regions is too large. The average educational level of residents is 12.591, and the maximum and minimum values are 54.291 and 7.738, respectively, which indicates that the overall educational level of residents in China is relatively high, but there are still backward areas in education. The average value of the marketization level is 0.483, and the maximum and minimum values are 0.668 and 0.239, respectively, which indicates that there is not much difference in marketization level among regions in China, and the market development is relatively balanced. The average R&D level is 1.379, and the maximum and minimum values are 5.284 and 0.188, respectively, which indicates that there is still an imbalance in R&D investment in China. The R&D level in some areas far exceeds the average value, but there are still areas with insufficient R&D investment. The average value of investments in fixed assets is 6,381.439, and the maximum and minimum values are 28,399.813 and 344.958, respectively, which indicates that China's capital investment and R&D investment are similar, with uneven development. The average value of employment is 0.052, and the maximum and minimum values are 0.126 and 0.042, respectively, indicating that there is not much difference in the overall employment level in China at present. The average value of the capital stock is 27,301, and the maximum value and minimum value are 79,302 and 3,289, respectively, which indicates that the gap between the development level of enterprises in developed areas and underdeveloped areas in China is too large.

4 EMPIRICAL ANALYSIS

4.1 Regions Where the Tourism Industry is Well Integrated With the Health Industry

Observing the empirical results from **Tables 6**, **7**, **8**, **9**, and **10**, we can see that in several regions where the tourism industry is well integrated with the health industry, the coefficient of economic growth is significantly positive at the level of 1%, which indicates that economic growth promotes the convergence and development of the tourism industry and the health industry, which verifies Hypothesis 2. The education level of residents gradually changed from 2017 to 10%, which proved that the

talents in the tourism industry and health industry in these regions gradually increased and began to promote the convergence of the two industries, which verified Hypothesis 3. Before 2015, the level of marketization was positive and significant at the level of 10%, which indicated that the market development promoted the convergence of the two industries in this time interval, which verified Hypothesis 4. However, since 2016, the level of marketization has become insignificant, probably because the market's own demand tends to be saturated, and the promotion effect on the convergence of the two industries has become less obvious. The coefficient of the R&D level is significantly positive at the level of 10%, indicating that R&D investment has significantly promoted the convergence and development of the two industries, which verifies Hypothesis 5. Investment in fixed assets is positive at the level of 5%, indicating that capital investment has significantly promoted the convergence of the two industries, which verifies Hypothesis 6. Observing the control variables, it is found that employment and capital stock are also significantly positive at 5% and 10% levels, respectively, which promotes the convergence and development of the two industries.

4.2 Regions Where With Better Mutual Integration of Tourism Industry and Health Industry

From the empirical results in **Tables 11**, **12**, **13**, **14**, and **15**, we can see that in several regions where the tourism industry and health industry are well integrated with each other, the coefficient of economic growth is significantly positive at the level of 1%, which indicates that economic growth has promoted the convergence and development of tourism industry and health industry. The education level of residents is positive at the level of 5%. Compared with the regions where the tourism industry has better convergence with the health industry, the regions with better convergence are positive in the whole sample range, which shows that these regions pay attention to the talent cultivation of the two industries, which can turn talents into the driving force of industrial convergence and promote industrial convergence. The level of marketization is positive at the level of 1%, which indicates that in the regions where mutual convergence is good, the market demand is endless, and the tourism industry and health industry can continuously create demand for the market according to their own characteristics, thus promoting the convergence of the two industries. The coefficient of the R&D level is significantly positive at the level of 5%, indicating that R&D investment has significantly promoted the convergence and development of the two industries. Investment in fixed assets is not significant. The reason may be that the mutually integrated areas are all areas with better economic development. Only capital investment cannot promote industrial convergence, so attention should be paid to the input of other factors of production, such as talents and technology. Observing the control variables, it is found that employment is significantly positive at the level of 5%, which promotes the convergence and development of the two industries, but the capital stock is not significant. The reason may be related to the economic

development level of these areas, which is relatively high, and the dependence on capital is relatively reduced.

4.3 Regions Where the Health Industry is Well Integrated With the Tourism Industry

From the empirical results in **Tables 16**, **17**, **18**, **19**, and **20**, we can see that in regions where the health industry is well integrated with the tourism industry, the coefficient of economic growth is significantly positive at the level of 5%, which indicates that economic growth promotes the convergence and development of the tourism industry and the health industry. The education level of residents is not significant, which indicates that in the areas where the health industry is well integrated with the tourism industry, there may be a lack of personnel training for the two industries, and it is impossible to promote the convergence and development of the two industries. The level of marketization is not significant either. The reason may be that the economy in these areas is relatively backward, the market demand itself is insufficient, and consumers only meet the basic needs of life but have not reached the level of consumption upgrading. Therefore, the promotion effect of the convergence of the two industries is not obvious. The level of R&D is not significant. The reason may be that due to the influence of economic development, the government and enterprises don't have extra funds to invest in R&D, so they can't promote the convergence and development of the two industries by promoting technological progress. Investment in fixed assets is positive at the level of 10%, indicating that capital investment has played a role in promoting the convergence of the two industries in these areas. Observing the control variables, it is found that employment and capital stock are not significant. By comparing the first two types of regions, we can find that for regions with relatively backward economic development, only by increasing capital investment, meeting market demand and improving basic investment construction can industrial convergence be promoted.

5 CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Empirical research shows that the level of economic growth, talent training, market perfection, technological input, and capital investment all play a positive role in promoting the convergence and development of China's health tourism industry. In this article, K-cluster analysis is used to divide 31 provinces, municipalities, and autonomous regions into three types according to the measured convergence degree. It is found that the regions with high integration degree of the tourism industry and health industry have higher economic development levels, which proves that the integration of the tourism industry and health industry is of great significance to regional development. It is also found that the above five driving forces for the convergence and development of the health tourism industry play different roles in the three types of regions. For regions where the tourism industry and health industry are well

integrated with each other, such as Shanghai, Beijing, Zhejiang, Guangdong, and Hainan, through the improvement of the market system, the tourism industry and health industry can be effectively integrated according to their needs. At the same time, increasing investment in technology and talent training will also promote the integration of the two industries more effectively. For regions where the tourism industry is well integrated with the health industry, such as Fujian, Jiangsu, Tianjin, Anhui, and Hunan, strengthening technology and capital investment and talent training can better promote the convergence of the two industries. For regions where the health industry is well integrated with the tourism industry, such as Xinjiang, Ningxia, Tibet, Henan, and Inner Mongolia, it is necessary to increase capital investment, improve the level of economic development, and lay a good economic foundation to better promote the integration of tourism health industry.

In view of the conclusion of this study, the following recommendations are proposed:

1) Give full play to regional advantages and formulate macro-policies: Each region should have an insight into the trend of the convergence of the health tourism industry by the level of economic growth, the cultivation of professional talents, the degree of market perfection, the degree of technical input, and the degree of capital investment; Coordinate and promote steadily the development of tourism industry and health industry with five factors input; Pay close attention to the development trend of health tourism industry convergence, actively plan countermeasures, and formulate relevant policies. In full consideration of the long-term and short-term impacts of health tourism industry convergence on the tourism industry and health industry, relevant policies of economy, talents, market, technology, and capital investment should be formulated in combination with the current situation of the health tourism industry convergence. In addition, all levels and regions should give priority to local advantages and give support and encouragement to units and enterprises that promote local health tourism industry convergence in combination with relevant national policies.

2) Build a collaborative innovation mechanism to enhance the ability of industrial convergence: The convergence of the health tourism industry needs to rationally allocate five factors according to the changes in consumer demand and policies. According to the level of economic growth, we should adjust the structure of talent training, improve the market operation mode, improve the degree of investment in technology and capital, and realize the innovative mechanism of "collaborative service, collaborative management and collaborative sharing". At the same time, it is necessary to enhance the convergence ability of industries, encourage strategic reorganization and acquisition cooperation between the tourism industry and the health industry, guide resources to concentrate on advantageous enterprises, promote joint operations, and form stable enterprise units.

3) Setting up the specialization of tourism health in colleges and universities and cultivating relevant professionals: The core of the convergence and development of the health tourism industry lies in talents, and comprehensive talents with the knowledge and skills of the tourism industry and health industry are the key to promote the convergence of health tourism industry. On the one hand, we should strengthen the retraining of on-the-job personnel to continuously improve their theoretical and practical ability; on the other hand, starting from education, we should encourage colleges and universities to set up programs or majors related to the convergence of the health tourism industry, offer related basic courses, carry out practical training of related practical skills, integrate school-enterprise resources, formulate joint training programs for talents, and encourage school-enterprise training mode. To speed up the training of professionals with "rich theoretical knowledge and strong practical ability" in health tourism industry convergence.

4) Strengthen the ability to cope with risks in the convergence of the health tourism industry: There are bound to be certain risks and threats in the convergence of the health tourism industry, so as to improve the ability to cope with risks, overcome the shortcomings, and seek a new way out. Through internal transformation and external drainage, we will build a stable foundation and flexible development trend. First, in view of the bleak situation of tourism in the epidemic, strengthen the application of artificial intelligence, digital travel, and other technologies in the health tourism industry, and improve the convergence efficiency and effectiveness of the health tourism industry. Second, internally, we should accelerate the improvement and transformation of the theoretical and practical ability of relevant personnel after industrial convergence and establish and improve the emergency plan, evaluation system and management system for talents. Third, externally, we should increase investment attraction, expand our own strength, improve the reserve efficiency, and realize the new layout of integrated production capacity of the health tourism industry.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by FQ and YS. The first draft of the manuscript was written by FQ, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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