Research on China's Digitization Level, High-Tech Industry Opening up and Industrial Structure Optimization Under the Background of Building Digital Silk Road

Jianhong Chen [a], Xiangzhong Zhao [b] and Meng Zhang [c]

School of Business, Guilin University of Electronic Technology, Guilin 541004, China.

[a]1123245353@qq.com, [b]929440975@qq.com, [c]1521337926@qq.com

Keywords: Industrial structure optimization; Digitization level; Opening to the outside world; High-tech industries; The mediation effect.

Abstract: Under the background of the construction of the digital Silk Road, the relationship between the level of digitalization and the industrial structure has attracted more and more attention. Based on the theoretical analysis of digitalization level, the relationship between high-tech industry opening to the outside world and industrial structure, this paper empirically examines the relationship between digitalization level, high-tech industry opening to the outside world and industrial structure optimization by using the panel data of 17 provinces in China from 2013 to 2017 and the intermediary effect method. The theoretical and empirical analysis shows that the improvement of digitalization level can enhance the opening-up level of high-tech industries by improving the international competitiveness of high-tech enterprises and products, and further promote the optimization of regional industrial structure, that is, the opening-up of high-tech industries affects the production of industrial structure in the process of digitalization level. Mediation effect was produced.

1. Introduction

Under the background of the new normal economy, President Xi Jinping proposed the "one belt and one road" initiative. The initiative pointed out that we should speed up the development of digital technology and build the digital silk road in twenty-first Century, so as to achieve a higher level of opening up to the outside world [1]. The development and application of digital technology in China is very rapid. It is estimated that the scale of digital economy will account for about 30% of GDP in 2016, and the contribution rate of digital technology to China's economic growth will rise to 50% in ten years. The promotion of digital level has become an important driving force for China's economic growth. Therefore, the construction of the digital silk road is conducive to improving the level of China's opening up, and the quality of the construction of the digital silk road is closely related to the level of digitization. Scholars seldom consider the factors of regional digital development in the study of China's industrial structure.

This paper attempts to sort out the influence mechanism of digital level on the optimization of high-tech industry and industrial structure in theory, and use provincial panel data to test the effect of digital level on the optimization of industrial structure in China's high-tech industry opening to the outside world. In order to find a new breakthrough for China to create a new pattern of opening up and promote the optimization and upgrading of industrial structure, whether there is intermediary effect in the process of influence.

2. Research Hypothesis

2.1 Digital Level and High-tech Industry

With the development and wide application of digital technology, digitalization has created a new modern production network, which makes economic activities around the world more closely

linked. The transformation of traditional enterprises through the application of the latest digital technology can provide new business opportunities and entrepreneurship activities for enterprises, thereby enhancing their competitiveness and expanding new channels for enterprises to enter overseas markets. For high-tech industries, digital innovation ability is an important factor affecting their import and export trade [2]. Gu Guoda, Li Jincheng and Zhang Hongsheng (2017) compared high-tech industries with medium and low-tech industries. The study found that the level of informationization played a greater role in promoting the export of high-tech industries with more input of information factors than information. The digitization level can directly or indirectly promote the opening up of high-tech industries in a country or region by improving the endowment of information factors or promoting technological innovation.

Based on the above analysis, this paper puts forward hypothesis one: a higher level of digitalization is conducive to enhancing the comprehensive strength of high-tech industries, and then to improving the level of opening up of high-tech industries.

2.2 High-tech Industries and Industrial Structure

Since the global financial crisis, the main trade types and technology fields of China's high-tech products have not changed much, but the export structure of products has been constantly optimized. Ma Zhangliang and Gu Guoda (2011) found that there is a long-term positive correlation between industrial restructuring and total import and export trade [3]. The higher the level of opening up of high-tech industries, the better the relationship between industrial restructuring and total import and export trade. The greater the impact of industrial structure. Sun Ying, Zhang Xiaoyu and Chen Xinyi (2018) further studied the export of high-tech products in China. They found that the export of high-tech products in China had a positive spillover effect within different high-tech industries and between high-tech and traditional industries. The higher the level of opening-up of high-tech industries to the outside world, the greater the driving effect on other industries. The stronger [4]. Yang Zuyi and Li Xiaoying (2018) have proved that FDI has a positive guiding effect on the optimization of industrial structure. For high-tech enterprises (Liu Jiansheng, XuanZhaohui, Lu Yongbo, Renyuan, 2018) which are still dominated by foreign capital, the improvement of the opening level of high-tech industries will enhance the absorption of high-tech industries in China. The ability of introducing foreign capital promotes the optimization of industrial structure.

Based on the above analysis, this paper puts forward hypothesis two: the improvement of high-tech industries' opening-up level has a positive impact on the optimization of industrial structure.

2.3 Digital Level and Industrial Structure

The level of digitalization can change the supply and demand of consumer market and drive the change of industrial structure. Firstly, Changzhongze and Mengqian (2018) have proved that the improvement of digitalization level can improve the production efficiency, product quality, optimize the supply capacity of enterprises, and promote the transformation and upgrading of industrial structure from low-end to high-end from the supply side [5] Secondly, the improvement of digitalization level will stimulate new demands of consumers and promote the growth of new industries. There are a large number of netizens in China (Zhang Xinhong, 2016), and the potential of digital consumer market is huge. Thirdly, with the increasing demand for IT and Internet technicians, Zou Xuan and Yang Xue (2018) found that the number of talents has an important impact on the industrial structure, cultivating more digital talents is conducive to promoting the optimization of industrial structure. Finally, the improvement of digitalization level is conducive to creating an open environment for enterprise innovation, government supervision system, making government financial expenditure and infrastructure construction more open and transparent, and more conducive to the adjustment of industrial structure.

Based on the above analysis, this paper puts forward hypothesis three: the improvement of digitalization level can indirectly promote the optimization of industrial structure by promoting the intermediary effect of high-tech industry opening to the outside world.

3. Model Construction and Variable Descriptio

3.1 Model Construction

In this paper, the level of industrial structure optimization and its subdividing dimension are taken as explanatory variables, the level of digitalization and its subdividing dimension are taken as core explanatory variables, and the level of opening-up and its subdividing dimension of high-tech industry are taken as intermediary variables to test the mechanism of the influence of digitalization level on industrial structure adjustment. And whether there exists the intermediary effect of high-tech industry opening to the outside world in the process of influence. In order to make the regression fitting result better, combined with relevant research, this paper takes market level, investment level, labor cost and financial development level as control variables into the regression equation. Firstly, the econometric model without intermediary variables is set as follows:

$$ISO_{it} = \alpha_0 + \alpha_1 DL_{it} + \alpha_2 DOM_{it} + \alpha_3 IL2_{it} + \alpha_4 LC_{it} + \alpha_5 FL_{it} + \varepsilon_{it}. \quad (1)$$

Among them, i represents region, t represents time, and α_0 is a constant term. ISO is the level of industrial structure optimization in different regions, DL is the level of regional digitalization, DOM, IL2, LC and FL represent the level of marketization, investment, labor cost and financial level respectively, which are the control variables of this paper. Then, we need to test whether the improvement of digitization level promotes the level of high-tech industry opening to the outside world. The model is as follows:

$$OUHI_{it} = \beta_0 + \beta_1 DL_{it} + \omega_{it}. \quad (2)$$

Finally, the level of high-tech industry opening to the outside world is included in the model (1) to test whether the intermediary effect of the level of high-tech industry opening to the outside world exists. The econometric model is set as follows:

$$ISO_{it} = \alpha_0 + \alpha_1 DL_{it} + \alpha_2 OUHI_{it} + \alpha_3 DOM_{it} + \alpha_4 IL2_{it} + \alpha_5 LC_{it} + \alpha_6 FL_{it} + \varepsilon_{it}. \quad (3)$$

3.2 Variable Description

3.2.1 Interpreted Variables

Industrial Structure Optimization (ISO).Based on the research of Xing Miao and Zhang Jiangang (2017) [6], this paper uses industrial growth coefficient, technology intensive degree and Hoffman ratio coefficient to synthesize the deviation of industrial structure from Taylor index, fixed investment structure, resource utilization level, investment in urban environmental infrastructure construction, investment in industrial pollution source control, etc. The investment of environmental protection acceptance projects, investment of environmental protection capacity-building funds and investment of environmental supervision and operation guarantee funds are used to evaluate the optimization of industrial structure from three perspectives of high degree, rationalization and greening.

3.2.2 Key Explanatory Variables

Digital Level (DL). According to "Global Information Technology Report" and "White Paper on China's Digital Economic Development and Employment", combined with digital economic development readiness index system (Zhang Bochao, Shen Kaiyan, 2018) and Internet maturity measurement index system (Dong Youde, Mi Xiaoxiao, 2019) [7], the digital market capacity (MC)

and innovation environment are screened out. The evaluation system of digital level is constructed from six aspects: IET, IC, DSL, IDL and AIT.

3.2.3 Intermediate Variables

The level of opening up of high-tech industries (OUHI).Referring to Xingmiao and Zhang Jiangang's (2017) practice of constructing industrial opening index, the degree of regional high-tech industry's participation in the world economy is measured by "total import and export volume of high-tech industry"; the dependence of regional high-tech industry's export on foreign trade, i.e. the proportion of export value of high-tech industry to GDP, is used to reflect regional high-tech products. International competitiveness; using the proportion of high-tech industry exports to total exports and foreign direct investment to measure the depth of high-tech enterprises' going out and inviting in respectively.

3.2.4 Control Variable

This paper chooses the degree of marketization (DOM), investment level (IL), labor cost (LC), financial development level (FL) as control variables. Among them, DOM= the gross product of non-state-owned enterprises /gross industrial output (Yuan Dongmei, Chen Xiaojia, Xin Chaohui, 2018); IL2=the investment of fixed assets of the whole society/GDP (Liang Feng, Cheng Junli, 2018) [8]; LC =the balance of loans of financial institutions at the end of the year/GDP (Yang Zuyi, 2018) [9]; and finally, the average wage of on-the-job workers in urban units is used to measure labor costs.

4. Empirical Results

4.1 Descriptive Statistics

Firstly, all indicators are empowered objectively by using the method of entropy weight, and then the digitalization level, the opening level of high-tech industries to the outside world and the optimization level of industrial structure and their subdivision dimensions are calculated. Finally, the average of the five-year scores from 2013 to 2017 is used as the comprehensive evaluation score.

Among the 17 provinces, municipalities and autonomous regions, the top three provinces ranked the highest in the overall level of industrial structure optimization are Shanghai, Guangdong and Zhejiang; from the subdivision dimension, Shanghai ranked the highest in industrial structure upgrading and rationalization, followed by Guangdong, and Guangzhou ranked the highest in the comprehensive evaluation of industrial structure greening. East, followed by Zhejiang. At the same time, the areas with low score of industrial structure optimization are mainly the western regions of Ningxia, Xinjiang, Qinghai and Gansu. From the time dimension, since 2013, although the score of industrial structure optimization in the western region is low, the rising trend is obvious, and the level of industrial structure optimization in the western region has been significant in the past five years. Although the overall score of industrial structure optimization level in the eastern region is higher, the speed of optimization increase slows down gradually, even declines. Shanghai and Zhejiang have a slight decline, Liaoning and Shaanxi provinces have a larger decline. The three areas with the highest overall score of digitalization level are Guangdong, Zhejiang and Shanghai, and the three areas with the lowest score are Hainan, Ningxia and Qinghai in turn. Geographically, the digitalization level of eastern coastal areas and economically developed areas is higher, while that of western areas and minority areas is higher. For slow. The eastern coastal areas are open to the outside world to a higher degree, with the rapid development of high-tech industries, and with more higher education resources, they have trained scientific and technological personnel and consumers with higher "digital quality", which is conducive to the improvement of digital level. According to the score of each subdividing dimension index of digitalization level, the phenomenon

of regional differentiation is quite serious, among which the data are most discrete, the level of Internet development in different regions is the highest in Guangdong, with a score of 83.32, and the lowest in Qinghai, with a score of 0.23. In addition, the application of information technology and digital service capabilities in different regions are the lowest. There are also obvious imbalances in the development level of innovation environment, especially in the eastern and Western regions. Obviously, there is a certain correlation between the level of digitalization and the adjustment of industrial structure in different regions, but what effect does the level of digitalization have on the adjustment of industrial structure, and what role does the high-tech industry play in the process of this influence, and what relationship needs to be made between them. The results of descriptive statistics of the remaining variables are shown in table 1.

Table 1. Descriptive statistical results of variables

Variable		Mean	Std Dev	Min	Max	Variable		Mean	Std Dev	Min	Max
	overall	17.29	10.76	4.27	58.95		overall	21.94	17.58	0	100
ISO	between		10.48	6.98	41.85	LC	between		15.51	8.59	77.77
	within		3.35	9.26	35.71		within		8.95	0.47	44.16
	overall	16.96	19.12	2.86	93.44		overall	49.55	22.31	0	100
DL	between		19.32	3.26	78.59	FL	between		20.92	1.166	86.55
	within		3.20	6.13	31.81		within		8.99	21.34	77.11
	overall	15.52	22.35	0.03	91.05		overall	9	4.93	1	17
OUHI	between		22.77	0.37	83.19	PROV	between		5.05	1	17
	within		2.44	8.41	24.32		within		0	9	9
	overall	52.50	23.76	0	100		overall	2015	1.42	2013	2017
DOM	between		23.56	7.23	87.04	YEAR	between		0	2015	2015
	within		6.02	31.64	74.38		within		1.42	2013	2017
	overall	49.21	23.00	0	100				N = 85		
IL	between		21.96	0.96	85.86	Obs			n = 17		
	within		8.37	21.28	75.10				T = 5		

4.2 Overall Empirical Results and Analysis

Firstly, Hausman test and LSDV method are used to estimate the model. It is found that there is no individual effect and mixed regression should be used. In table 2, the model (1) calculates the comprehensive score of digitization level of each region to measure the level of digitization development of each region. The higher the comprehensive score, the higher the digitization level of the region, and its coefficient is 0.2233, which is significant at the level of 1%. It shows that every unit of digitization level is raised, the industrial structure of the region is optimized. The level will be increased by 0.2233 units, which shows that the promotion of regional digitization has a positive role in promoting the change of regional industrial structure. In order to ensure the robustness of the regression results, in the model (2) - (7), we measure the digital development level of the region by digital market capacity, innovation environment, infrastructure construction, digital service capacity, Internet development level and information technology application respectively, and make a robust regression. Among them, digital market capacity and innovation ring Environment, Internet development level and information technology application level are all significant at 1% level, while the construction of digital infrastructure and digital service capability both promote industrial structure upgrading at 10% level. Therefore, the improvement of digital level has a positive impact on industrial structure optimization. It can be seen that the improvement of digital level can effectively reduce the cost of knowledge dissemination and enhance the spillover effect of technology, thus improving the production efficiency and supply capacity of

enterprises, at the same time expanding the capacity of digital markets in various regions, cultivating a large number of employees and consumers with high digital quality, thus promoting the relevant high-level production. The emergence and development of industry, therefore, the upgrading of digital level can directly promote the industrial structure to a high level from two aspects of supply and demand. At the same time, the improvement of digitalization level means a better innovation environment, a faster level of Internet development, and a better construction of digital infrastructure. All these provide external guarantee for the growth of enterprises, and are conducive to industrial restructuring in a more advanced, rational and healthy direction.

Table 2. The Regression Result of Digitalization Level to Industrial Structure Optimization without Intermediate Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DL	0.2233***a						
	(6.20)						
MC		0.1905***					
		(7.87)					
IET			0.2051***				
			(11.87)				
IC				0.1477*			
				(1.99)			
DSL					0.0764*		
					(1.89)		
IDL						0.1738***	
						(3.24)	
AIT							0.2229***
							(4.75)
DOM	0.0846***	0.0913***	0.0936***	0.1204***	0.1097***	0.0822***	0.0894***
	(4.18)	(4.79)	(4.17)	(4.85)	(3.45)	(3.73)	(4.98)
IL	-0.1298***	-0.1320***	-0.1580***	-0.1556***	-0.1960***	-0.1442***	-0.1273***
	(-4.97)	(-5.09)	(-6.34)	(-5.98)	(-5.99)	(-5.06)	(-4.73)
LC	0.2303***	0.2923***	0.2433***	0.2927***	0.2254***	0.2287***	0.1883***
	(11.83)	(12.37)	(10.39)	(10.30)	(7.50)	(12.35)	(10.04)
FL	-0.0044	-0.0069	0.0052	-0.0016	-0.0024	-0.0082	-0.0020
	(-0.25)	(-0.47)	(0.26)	(-0.09)	(-0.09)	(-0.39)	(-0.12)
C	10.6218***	9.2213***	11.9025***	8.9750***	12.8155***	12.6826***	11.7693***
	(4.88)	(4.50)	(5.80)	(2.90)	(5.18)	(5.52)	(5.40)
R^2	0.9164	0.9134	0.9182	0.8689	0.8505	0.9030	0.9193
N	85	85	85	85	85	85	85

4.3 The Impact of Digital Level on the Opening-up Level of High-tech Industries

The first condition for the existence of mediation effect has been verified in the analysis of the overall regression results. Next, the second condition for the existence of mediation effect needs to be verified. This paper takes digitization level and its subdivision dimension as explanatory variables and high-tech industry opening level as explanatory variable for fitting regression. The results are as shown in table 3. Whether it is the overall evaluation index to measure digitization

level, or the capacity of digital market, innovation environment, infrastructure construction, digital service capacity, etc. Dimensional indicators of digitization level, such as force, Internet development level and information technology application, have improved the level of opening of high-tech industries in all regions at a significant level of 1%. Therefore, the improvement of digitalization level can improve the production efficiency and innovation ability of China's high-tech enterprises, and make high-tech products have a stronger international competitiveness.

Table 3. The Return Result of Digitalization Level and Its Segmentation Dimension to the Opening Level of High-tech Industry

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DL	0.9602***						
	(6.55)						
MC		0.8425***					
		(7.02)					
IET			1.1065***				
			(9.31)				
IC				0.7451***			
				(3.17)			
DSL					0.4040***		
					(3.44)		
IDL						0..8549***	
						(3.24)	
AIT							0.9864***
							(6.58)
R^2	0.8144	0.7464	0.8105	0.5643	0.5817	0.7527	0.8138
N	85	85	85	85	85	85	85

At the same time, in table 4 model (2) - (5), this paper uses the four subdivisions of the level of high-tech industry opening to the outside world as explanatory variables to regression, and gets the same conclusion. From the coefficient and significance level of core explanatory variables, the improvement of digitalization level effectively promotes the integration of high-tech industries into the world economy, improves the international competitiveness of high-tech industrial products, and deepens the depth of high-tech enterprises' going out and inviting in. Hypothesis one has been confirmed, and the conclusion is robust, so the second condition for the existence of intermediary effect of high-tech industry opening to the outside world has also been met.

Table 4. The Return Result of Digitalization Level to the Opening Level of High-tech Industry and Its Subdivision Dimension

	OUHI (1)	TIE (2)	DHIFT (3)	PHIETE (4)	FDI (5)
DL	0.9602***	1.0602***	0.9611***	0.4325**	1.2973***
	(6.55)	(4.26)	(4.36)	(2.56)	(10.09)
C		-8.4646***		14.5745**	
		(-3.50)		(2.15)	
R^2	0.8144	0.7753	0.6147	0.1053	0.8556
N	85	85	85	85	85

4.4 Mediation Effect Test of High-tech Industry Opening to the Outside World on Industrial Structure Optimization

In combination with tables 2 and 5, the third and fourth conditions for the existence of mediation effects were examined. Firstly, the overall evaluation level of high-tech industry opening to the outside world is taken as the intermediary variable to analyze the model. As shown in table 5, the regression fitting coefficient of the overall digitization level to industrial structure optimization decreased from 0.2233 in table 2 to 0.1144 in table 4 when the level of high-tech industry opening to the outside world was included as the intermediary variable in the model with the overall evaluation of digitization level and its subdivision dimension as the key explanatory variable, and it was significant at the level of 5%. Therefore, it can be judged that the level of high-tech industry opening to the outside world has intermediary effect in the process of digitalization affecting the optimization of industrial structure. That is to say, all regions can improve the level of opening up of high-tech industries by improving the level of digitalization, and then indirectly promote the industrial structure of each region to change in a better direction. At the same time, in order to ensure the robustness of the regression results, this paper takes each subdivision dimension of digitalization level as the core explanatory variable, and adds different subdivision dimensions of high-tech industry opening level as the intermediary variable to carry out robust regression (as shown in table 5 and table 6).

Table 5. Mediation effect test results of OUHI in the process of influence of DL and its subdivision dimension on ISO

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DL	0.1144**						
	(2.14)						
MC		0.0870**					
		(2.60)					
IET			0.0994*				
			(1.96)				
IC				0.0428**			
				(2.15)			
DSL					-0.0035		
					(-0.15)		
IDL						0.0803**	
						(2.13)	
AIT							0.1247*
							(1.90)
OUHI	0.1272**	0.1340***	0.1231**	0.1836***	0.1988***	0.1487***	0.1229**
	(2.57)	(3.33)	(2.18)	(12.76)	(12.96)	(3.92)	(2.32)
DOM	0.0966***	0.1017***	0.1026***	0.1126***	0.1156***	0.0960***	0.0974***
	(6.76)	(8.26)	(6.00)	(8.61)	(7.07)	(7.04)	(7.02)
IL	-0.1126***	-0.1155***	-0.1308***	-0.1131***	-0.1261***	-0.1134***	-0.1090***
	(-6.95)	(-7.84)	(-8.45)	(-6.90)	(-8.78)	(-7.08)	(-6.32)
LC	0.1965***	0.2240***	0.2053***	0.1999***	0.1867***	0.1891***	0.1733***
	(6.43)	(5.48)	(5.68)	(6.99)	(6.03)	(6.70)	(9.52)
FL	0.0022	0.0016	0.0070	-0.0060	0.0080	0.0013	0.0031

	(0.16)	(0.13)	(0.46)	(-0.09)	(0.61)	(0.09)	(0.23)
C	9.4312***	8.8687***	10.2962***	8.4567***	10.0130***	10.0294***	9.9680***
N	(8.10)	(7.66)	(7.70)	(7.31)	(8.93)	(10.08)	(8.88)

Table 6. The Intermediate Effect Test Results of OUHI and Its Subdivision Dimensions in the Process of DL Influencing ISO

	(1)	(2)	(3)	(4)	(5)	(6)
DL	0.2233***	0.1144**	0.1192	0.1738***	0.2054***	0.2242***
	(6.20)	(2.14)	(1.70)	(5.10)	(6.19)	(4.28)
OUHI		0.1272**				
		(2.57)				
TIE			0.0921*			
			(1.79)			
DHIFT				0.0830**		
				(2.51)		
PHIETE					0.0526***	
					(3.30)	
FDI						-0.0009
						(-0.04)
DOM	0.0846***	0.0966***	0.0990***	0.0944***	0.0891***	0.0847***
	(4.18)	(6.76)	(4.60)	(6.95)	(5.95)	(4.08)
IL	-0.1298***	-0.1126***	-0.1290***	-0.1025***	-0.1289***	-0.1300***
	(-4.97)	(-6.95)	(-5.57)	(-6.42)	(-5.53)	(-5.31)
LC	0.2303***	0.1965***	0.2196***	0.1857***	0.2114***	0.2303***
	(11.83)	(6.43)	(8.96)	(5.24)	(12.98)	(11.59)
FL	-0.0044	0.0022	0.0057	-0.0019	-0.0044	0.0044
	(-0.25)	(0.16)	(0.31)	(-0.12)	(0.61)	(-0.25)
C	10.6218***	9.4312***	10.4520***	9.1431***	9.899***	10.6299***
	(4.88)	(8.10)	(6.07)	(7.47)	(6.05)	(5.01)
R^2	0.9164	0.9320	0.9243	0.9317	0.9294	0.9164
N	85	85	85	85	85	85

Except for the level of digital service, the other subdivisions have passed the significance test in different degrees, and their coefficients are lower than those in table 2. The third condition for the existence of intermediary effect is satisfied, and it is part of the intermediary effect. The coefficients of the mediation variable (OUHI) and its subdividing variable dimension are significant and positive except for FDI, which indicates that the improvement of the opening-up level of high-tech industries can promote the optimization of industrial structure, and the fourth condition for the existence of mediation effect is satisfied. At the same time, the robustness test results show that the regression conclusion of this paper is not affected by the choice of variables, and has robustness. The transmission mechanism between digitalization level, high technology opening up and industrial structure optimization is obvious. Firstly, the improvement of digitization level reduces the cost of knowledge dissemination, enhances the technology spillover effect, improves the production efficiency and innovation ability of high-tech enterprises, and then improves the external competitiveness of high-tech industries in various regions. Secondly, the level of opening up of

high-tech industries will have a positive impact on the change of industrial structure by improving the import and export of high-tech products and enhancing the technology spillover effect of related industries. Finally, the level of digitalization can significantly promote the level of high-tech industry opening to the outside world. By promoting the comprehensive development of high-tech industry, it can promote the optimization and upgrading of industrial structure. Hypothesis 2 and 3 have been verified.

5. Conclusion

In the context of the construction of the digital Silk Road, the study of the relationship between the level of digitalization and the optimization of industrial structure is one of the new research directions for Chinese scholars to study the changes of industrial structure in recent years. Based on the intermediary effect method, this paper empirically examines the relationship among digitalization level, opening up of high-tech industries and industrial structure optimization. The theoretical analysis shows that the improvement of digitalization level promotes the level of high-tech industry opening to the outside world, and further promotes the optimization and upgrading of industrial structure. That is, the intermediary effect of the improvement of digitalization level on industrial structure optimization occurs. The empirical results show that, without considering the intermediary effect of technological innovation, the digitization level and its sub-dimension indicators have significantly promoted the upgrading of industrial structure optimization level; after joining the level of high-tech industry opening to the outside world and its sub-dimension as intermediary variables, the improvement of digitization level can absorb high-tech industries in different regions. Introducing foreign investment, enhancing the international competitiveness of high-tech products in all regions, promoting high-tech enterprises in all regions to go abroad and actively participate in the process of international trade and economic globalization have indirectly had a positive impact on the changes of industrial structure in all regions of China, and the intermediary effect of high-tech industry opening to the outside world is stable. Health.

According to the above conclusions, we can draw the following enlightenments: Firstly, traditional research considers that industrial structure optimization is often related to government policy, financial level, foreign trade structure, investment structure and other factors, while ignoring the role of enterprise digital transformation in the process of industrial structure adjustment. Today, with the rapid development of digital economy, the digitization level will play a more and more important role in the process of economic and social evolution. The digitization of social production improves the utilization level of resources and the production efficiency of enterprises. Therefore, when formulating the "one belt and one way" related industrial policies, the departments concerned will enhance the digitalization level into the policy framework, and take the lead in developing new digital fields such as big data, cloud computing, Internet of things, AI, and so on, and enhance the international competitiveness of China's computer, communications and other high technology industries. Secondly, although the digitalization level in most areas of China has been rising rapidly in recent years, which has played a significant role in industrial structure optimization, there is a big gap between the eastern and western regions in the level of industrial structure optimization. It is more obvious that the scores of infrastructure construction and technological innovation environment evaluation in western provinces are relatively low. On the one hand, the western region should speed up the construction of digital infrastructure, such as increasing the length of optical cable lines, switching capacity and broadband access ports, so as to create good external conditions for the digital transformation of traditional industries, while attracting more emerging industries and high-tech industries, so as to bring into play greater economies of scale. At the same time, local governments should vigorously develop higher education, promote the deep integration of "industry-university-research", formulate relevant policies to improve the efficiency of enterprises, so as to provide a good innovation environment for enterprises. On the other hand, the western region should actively respond to the national strategy of developing the "one belt and one

way" strategy, combine the regional characteristics, cultivate high-tech industries with its own advantages, and strive to build a digital silk road. By strengthening the opening up level of high-tech industries, we can narrow the gap between the eastern and western regions in the optimization level of industrial structure, so as to achieve a higher level of opening up and economic development in China.

References

[1]. Jinghui, Zhang Tingting and Xi Jinping's value implication of the important exposition on opening [J]. Economist, 2019 (05): 5-13.

[2]. Li Yong, Jiang Keshen. Scientific and technological capabilities of high-tech industries and optimization and upgrading of industrial structure [J]. Science Research Management, 2011, 32 (02): 44-51+66.

[3]. Gu Guoda, Li Jincheng, Zhang Hongsheng. Can informatization enhance the comparative advantage of a country's high-tech industry? --An empirical study based on the data of 39 countries' informatization and value-added trade from 1995 to 2011 [J]. Journal of Zhejiang University (Humanities and Social Sciences), 2017, 47 (03): 202-216.

[4]. Zhang Zhinan. Opening-up and China's Manufacturing Industry Upgrading: A Test Based on Regional Panel Data [J]. Enterprise Economy, 2018,37(10): 76-83.

[5]. Chang Zhongze, Meng Qian. Mediating effects of information technology on industrial structure optimization and upgrading: empirical evidence from provincial level in China [J]. Economic Theory and Business Management, 2018 (06): 39-50.

[6]. Liu Shuru. Study on the Construction of Evaluation Index System for Rationalization of Industrial Structure [J]. Science and Technology Management Research, 2011, 31 (05): 66-69.

[7]. Dong Youde, Mi Xiaoxiao. Internet Maturity, Digital Economy and China's Foreign Direct Investment: An Empirical Study Based on Panel Data from 2009 to 2016 [J]. Shanghai Journal of Economics, 2019 (03): 65-74.

[8]. Liang Feng, Cheng Junli. Local Government Behavior, Financial Development and Industrial Structure Upgrading - Empirical Analysis Based on Interprovincial Dynamic Panel Data [J]. East China Economic Management, 2018, 32 (11): 68-75.

[9]. Yang Zuyi. Sys-GMM Analysis of FDI's Impact on Manufacturing Industry Structure: Based on Provincial Industry Dynamic Panel Data [J]. Macroeconomics, 2018 (08): 85-93+149.