

The Dynamic Change of High Quality Development of Equipment Manufacturing Industry In Liaoning Province In The New Era

Xiaonan Fan^{1,a}, Bo Chi^{1,b}, Xiaocheng Sun^{1,c}

¹Management, Dalian Polytechnic University, Dalian Polytechnic University, Dalian, China

Abstract. Dynamic change is the starting point of realizing the high quality development of equipment manufacturing industry in Liaoning Province. First of all, this achievement analyzes the development status of equipment manufacturing industry in Liaoning Province; second, it establishes an index system to measure the high-quality development level of equipment manufacturing industry, uses entropy weight method to comprehensively evaluate the high-quality development level of equipment manufacturing industry in Liaoning Province; third, it constructs high-quality equipment manufacturing industry. The demand side and supply side models of the source of power are developed, and the trend of power transformation of high-quality development of equipment manufacturing industry is summarized. Finally, policy suggestions are put forward to promote the power transformation of high-quality development of equipment manufacturing industry in Liaoning Province.

1 Introduction

At present, the research on high-quality development and the power source of high-quality development are basically focused on the macro level, mainly including the economic analysis of high-quality development (Jinbei, 2018), the value theory of high-quality economic development (Wu Jinming, 2018), the basic characteristics and supporting factors of high-quality economic development (Liu Zhibiao, 2018), and high-quality economic development System logic (DU Aiguo, 2018), evaluation system and measurement of high-quality economic development (ren Baoping and Li Yumo, 2018; Shi Bo and Ren Baoping, 2018), power transformation of high-quality economic development (Chen Changbing, 2018; PU Xiaoye and fidrmuc, 2018), efficiency change (he Xiaoyu and Shen Kunrong, 2018; Ru Shaofeng, 2018), and ways to achieve high-quality economic development (ren Baoping and Wen Fengan, 2018; Ren Baoping and Li Yumo, 2018; Liu Youjin and Zhou Jian, 2018), etc. There is little special research on the high-quality development of industry at the meso level.

So (1) what is the current level of high-quality development of equipment manufacturing industry in Liaoning Province? (2) What are the characteristics and conditions of high-quality development power transformation of Liaoning equipment manufacturing industry in the new era? (3) In order to realize the high-quality development of equipment manufacturing industry in Liaoning Province, in what aspects should the government give policy support? We explore and analyze

these problems theoretically and empirically.

2 Development status of equipment manufacturing industry in Liaoning Province

2.1 The scale of equipment manufacturing industry in Liaoning Province

(1) In recent years, the scale of total industrial output value, the development of equipment manufacturing industry in Liaoning Province has entered a bottleneck period, and the total industrial output value shows a significant downward trend. (2) The investment scale of fixed assets and the scale of total output value show the same trend. In 2015, there was a sharp decline; in 2017, it remained low, but the drop was 5.05%. (3) From 2012 to 2017, the number of enterprises showed a downward trend year by year.

2.2 The structure of equipment manufacturing industry in Liaoning Province

Equipment manufacturing industry in Liaoning Province mainly includes metal products industry, general equipment industry, special equipment industry, automobile industry, railway, ship, aerospace and other transportation equipment industry, electrical machinery and equipment industry, computer, communication and other electronic equipment industry, and instrument and meter industry. According to the standard of total industrial output value, automobile manufacturing industry, railway,

^acatfxn@126.com, ^b18340800583@163.com, ^camantsun@sina.com

ship, aerospace and other transportation equipment manufacturing industry account for half of the equipment manufacturing industry in Liaoning Province.

3 Measurement of high quality development level of equipment manufacturing industry in Liaoning Province

3.1 Construction of evaluation index system for high quality development level of equipment manufacturing industry

The evaluation indexes of high-quality development evaluation system of equipment manufacturing industry include five dimensions: industrial innovation development, industrial coordination development, industrial green development, industrial opening development and industrial sharing development. The coordinated development of industry is mainly measured by the volatility of output value. The green development of industry mainly includes the measurement index of total energy consumption. The development of industrial development is measured by the proportion of product exports in total output value. Industrial sharing development selects the proportion of equipment manufacturing employees in total employees as the measurement index.

3.2 Evaluation of high quality development level of equipment manufacturing industry

After the introduction of education dividend, although the population of the three Northeastern provinces decreased, the population quality may be improved to a certain extent, and have a certain impact on economic growth. Education bonus to improve labour quality. Education dividend improves human capital stock. Education dividend to improve the level of science and education innovation.

3.2.1 Evaluation method: According to the actual needs, entropy weight method is selected to evaluate the high-quality development level of equipment manufacturing industry in Liaoning Province. The basic principle of entropy weight method is to determine the objective weight according to the variation of index. Generally speaking, the smaller the information entropy of index in comprehensive evaluation is, the greater the variation degree of index, the more information it can provide, the greater the role it can play, and the greater the weight it occupies in the evaluation system. On the contrary, the larger information entropy the index has, the less variability the index has, the less information it provides, the less role it plays in the comprehensive evaluation, and the less weight it occupies.

3.2.2 Evaluation results: The data used in this paper are mainly from Liaoning statistical yearbook, China Science and technology statistical yearbook and China Industrial statistical yearbook, which are compiled by the National Bureau of statistics. Entropy weight method is used to evaluate the high-quality development level of

equipment manufacturing industry. It is not difficult to find that the starting point of high-quality development level of equipment manufacturing industry in Liaoning Province is relatively high, and there is a good trend of high-quality development between 2007 and 2014.

4 Analysis on the power source and change trend of high quality development of equipment manufacturing industry in Liaoning Province in the new era

4.1 Overview of power sources

At present, there is no detailed academic definition of the power for high-quality development of equipment manufacturing industry. This paper analyzes the power source from two aspects of supply and demand by referring to the power classification method of Sun Yue and Shi Haoting (2018). In some periods, the power is concentrated on the demand side; in some periods, the development power is more inclined to the supply side, but in the new era, the supply side power has gradually shown the pulling effect on the high-quality development of the equipment manufacturing industry.

4.2 An empirical analysis of power sources

4.2.1 variable selection and data description: Based on the above theoretical analysis, the main explanatory variables are selected in this paper, as shown in Table 1.

Table1. variable selection of high quality development power of equipment manufacturing industry in Liaoning Province

	Variable	Index selection
Demand side	Investment (X1)	Total fixed assets investment of equipment manufacturing industry
	Import (X2)	Export volume of equipment manufacturing products
Supply side	Capital investment (X3)	Total capital of equipment manufacturing industry
	Labor input (X4)	Number of employees in equipment manufacturing industry
	Innovation investment (X5)	Internal expenditure of R & D funds of equipment manufacturing industry

4.2.2 model construction: This paper summarizes the above dynamic sources, taking the comprehensive score of high-quality development level of equipment manufacturing industry as the explanatory variable, which is divided into two models: demand (formula 1) and supply (formula 2), respectively explaining the contribution of each power source to the high-quality development of equipment manufacturing industry. The model is.

$$Y=f(X1,X2) \quad (1)$$

$$Y=f(X3,X4,X5) \quad (2)$$

This paper adopts the form of double logarithm model:

$$LNY=\alpha_0+\alpha_1LNx_1+\alpha_2LNx_2+\mu_1 \quad (3)$$

$$LNY=\beta_0+\beta_1LNx_3+\beta_2LNx_4+\beta_3X_5+\mu_2 \quad (4)$$

In formula 3,4 both μ_1 and μ_2 are random error terms. Data processing and operation are completed on stata15 software.

4.2.3 Empirical results: The results of ADF unit root test show that the comprehensive score of high-quality development level of equipment manufacturing industry, four investment, export, capital input, labor input and innovation input indicators are single and integral in the second order, all of which can pass the stability test. The weighted least square method can effectively eliminate the heteroscedasticity. Therefore, the weighted least square method is used for regression estimation in this paper. From the results of model (1) and model (2), it can be seen that the export pull on the demand side is slightly weak, and the investment pull is greater; among the power sources on the supply side, the labor input plays the largest role, which is higher than the capital input and technology input. In co integration analysis, R1 is used to represent the residual in demand model and R2 is used to represent the residual in supply model. Because the residual items pass the ADF test, there is a long-term cointegration relationship between independent variables and dependent variables.

4.3 Trend analysis of dynamic change

From the results of model (3) and model (4), it can be seen that the driving force on the demand side of the province with strong equipment manufacturing industry is also weak, and the driving force on the export side is slightly larger; among the power sources on the supply side, the driving force of labor input is negative, indicating that in the province with strong equipment manufacturing industry, more labor input has no positive effect on the high-quality development of equipment manufacturing industry, and capital investment Both input and technology investment play a positive role, and at present, capital investment is more important. Therefore, in the future, the trend of high-quality development of equipment manufacturing industry in Liaoning Province is: (1) from demand side drive to supply side drive; (2) from factor driven to innovation driven

5 The policy choice of the dynamic change of the high quality development of equipment manufacturing industry in Liaoning Province in the new era

5.1 Maintain capital investment scale

Policy focus: guide and broaden the channels of financial support - create a good investment environment, one of the effective driving forces for the high-quality development of equipment manufacturing industry is investment, increase investment in the main sub sectors of equipment manufacturing industry, and provide stable impetus for the high-quality development of equipment manufacturing industry. In order to solve the problem of financing

difficulty in equipment manufacturing industry, it is suggested to focus on the following two aspects: guiding and broadening the channels of financial support. Create a good investment environment.

5.2 Increase scientific and technological innovation

Policy focus: encourage large-scale enterprises to lead - financial assistance to small and medium-sized enterprises - innovate service mode. Scientific and technological innovation is particularly important to promote the high-quality development of equipment manufacturing industry. Increasing investment in scientific and technological innovation is conducive to improving the level of high-quality development of equipment manufacturing industry in Liaoning Province at the technical level, improving the technical content of its products, and improving the profitability of the industry. The policy focus is to give full play to the leading role of large enterprises. Finance helps SMEs innovate. Innovative service, scientific and technological innovation, enterprise mode.

5.3 Strengthen the ability of talent support

Policy focus: strengthen the incentive of high-end talents - vigorously cultivate high skilled talents. There are many problems in the equipment manufacturing industry of Liaoning Province, the downward pressure of operation and operation, technical innovation and so on. The root cause is still due to the lack of talents. We should accelerate the implementation of talent strategy, improve the high-end talent system, and build up the supporting capacity of human resources. It will strengthen the incentive of high-end talents and vigorously cultivate high skilled talents.

5.4 Building green manufacturing system

Policy focus: vigorously develop green productivity - strengthen government supervision, vigorously develop green productivity, and strengthen government supervision on production activities of equipment manufacturing industry. Through strict supervision, strengthening the negative external control over the production activities of the equipment manufacturing sector, and taking measures such as taxation, charging and fines for the production activities with high energy consumption and high pollution, the external costs generated by the production of the equipment manufacturing industry are internalized, which forces the equipment manufacturing industry sector to comprehensively consider the social cost and environmental cost in the production decision-making, so as to resolve the backward from the source Production capacity, pollution production capacity, and promote the green development of the industry.

Acknowledgment

The authors are grateful for the support received from

National Natural Science Foundation Youth Fund Project (71703012); Liaoning Provincial Natural Science Foundation Plan Key Project (20170520264); Liaoning Provincial Social Science Planning Fund Project (L18BJY007); Liaoning Provincial Social Science Association Project (2020lslktyb-006); Liaoning Provincial Department of Education Project (2017J066); major research project of Dalian Social Science Association (2019dlsky047); key project of Dalian Social Science Association (2019dlskzd062).

14. Wang Shurong. Development path analysis and financial policy research of Liaoning equipment manufacturing industry [J]. *Local finance research*, 2016 (6): 38-45.
15. Guo Chunli, Wang Yun, Yi Xin, et al. Correct understanding and effective promotion of high-quality development [J]. *Macroeconomic management*, 2018

References

1. Cimoli, M., Primi, A. and Pugon, M. "A low-growth model : informality as structural constraint " [M]. *CE-PAL Review* , 2006 vol. 88
2. Shaheen, G.T. Approach to transformation [J]. *Chief Executive*, 1944 (5):2-5.
3. Gereffi G. International trade and industrial upgrading in the apparel commodity chain [J]. *Journal of international economics*, 1999, 48(1) : 37-70.
4. Lucas, Robert E. Jr .On The Mechanics of Economic Development [J]. *Journal of Monetary Economics* , 1988
5. Milton Barossi-Filho, RICARDO Goncalves Silva, and Eliezer Martins Diniz. The empirics of the slow growth model: long term evidence [J]. *Journal of Applied Economics*, 2010:31-51.
6. Adams, John D. transformation work : a collection of organizational transformation readings [M]. Miles River Press. Alexandria. 1984:11-15.
7. Li Ting. Research on environmental governance policy selection in Jiangsu Province Based on performance evaluation [D]. 2018.
8. Hu Lei. Dynamic mechanism and policy choice of triple play [D]. Nanjing University, 2013
9. Sun Yue, Shi Haoting. Supply side structural reform and transformation of old and new driving forces for economic growth of northeast old industrial base [J]. *Academic exchange*, 2018 294 (09): 121-126.
10. Zhu Ziyun. Dynamic transformation and policy choice of China's economic growth [J]. *Research on quantitative economy, technology and economy*, 2017 (03): 4-21.
11. Jiang Xianchen. An Empirical Study on the evaluation of technological innovation ability of equipment manufacturing industry in Liaoning Province [D]. Shenyang Normal University, 2013.
12. Zhao Hongjuan. Countermeasures and suggestions for promoting high-quality "going out" of equipment manufacturing industry in Liaoning Province [J]. *Economic outlook around Bohai Sea*, 2016 (12): 13-16.
13. Li Fangfang, Ding Meimei, Lin Pingfei. How to achieve high-quality development in China: a review of the 2018 China Industrial Economic Research Annual Conference [J]. *Industrial economic review*, 2019 (2): 118-124.