

A Mechanism of Financial Support for the Development of Electric Vehicle Industry

Weixuan HU^{1,2}, Qiang ZHANG¹

¹School of Economics, Wuhan University of Technology, 122 Luoshi Road, Wuhan, Hubei, P.R. CHINA

²Wuhan Technical College of Communications, 6 Baishazhou Avenue, Wuhan, Hubei, P.R. CHINA

Abstract: The electric vehicle industry was selected to be one of the most important industries in "the State Council on accelerating the cultivation and development of strategic emerging industries" in the year of 2010 in China. Based on the characteristics of the electric vehicle industry and the structures and functions of the electric vehicle industry financial support, this paper made the systematic interpretation of the general mechanism of financial support and the development of electric vehicles, and illustrated how financial support bodies suit the development of the electric vehicle industry. Lastly, the theoretical model of financial support to electric vehicle industry was set.

Keywords: Financial Support; Electric Vehicle Industry; the Theoretical Model of Financial Support to Electric Vehicle Industry

1. Introduction

The development of electric vehicle industry is critical to the upgrading and transformation of the automobile industry for conserving energy and reducing emissions. Finance is the core of modern economy; industrial development needs financial support and actively cooperates with the financial market, which can optimize the allocation of resources and guide the flow of capital to the potential high growth industry. As a strategic emerging industry, it is imperative to search financial support bodies match for every stage of electric vehicle industry development.

So far, most relative studies focus on relationship between financial policy and industrial development. Researchers show that the financial policy on one hand, played a significant role in leading the transformation of financial support(Beck (2000); Neil (2000); Kelly (2007)); Du (2010)), on the other hand, in the promotion of the use of electric vehicle(Hui Wang (2010); Qin-jie Sun(2010);Yong Wu(2010);You Yan(2012);Yi-fang Zhu(2013)).However, research on financial support for industry development of electric vehicles is still in an exploratory stage. This paper aims to show the general mechanism of financial support and illustrate how financial support bodies suit the development of the electric vehicle industry.

2. Electric Vehicle Industry Financial Support Participants

2.1. Matrix of Financial Support for Electric Vehicle Industry

The electric vehicle industry financial support participants, according to their operating aims, are divided into two sorts: the policy financial support body and market financial support body. The former includes direct investment on the industry, such as industry funds, venture capital funds, financial subsidies and government purchases, and indirect financial support, such as policy financial institutions and taxes. The latter also includes direct financial support, such as convenience to the issuance of stocks and bonds in the capital market, and indirect ones, such as commercial loans, credit guarantee, science and technology insurance. The matrix of financial support for electric vehicle industry is shown in figure 1.

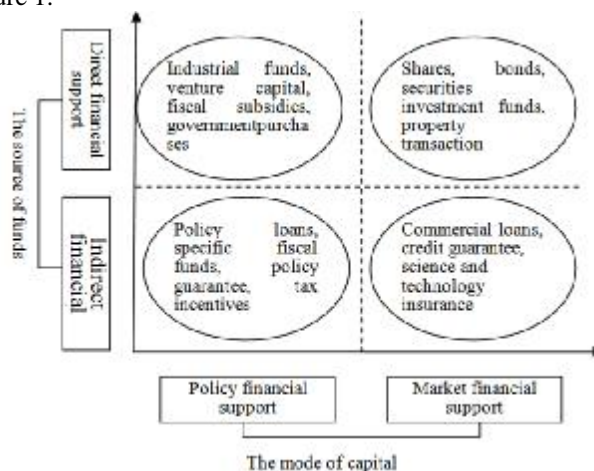


Figure 1. Matrix of financial support for electric vehicle industry

2.2. Functions of Financial Support

Financial support has four main functions:

a. Capital oriented function of policy financial support
In the infancy of electric vehicle industry, it is likely to benefit from preferential finance and taxation policy and policy financial institutions. The amount of money available the authorities and their affiliated institutions given, however, are limited. The essential goal of policy financial support lies in steering society capital towards electric vehicle industry. Functional realization through government guarantee, equity transaction.

b. Financial market financing function
The source of funds is the corn of developing electric vehicle industry. It is hard to solve the issue just rely on the enterprise's own funds and limited government support. Yet financial market can act as a bridge connecting the capital supply and demand. The funds can be raised by selling equity stakes, obtaining credit from commercial banks, initial public offerings, issuing bonds.

c. Financial market risk decentralization function
Diversity of investment body and agency experienced are supposed to disperse risk. Financial market can find suitable investors for electric automobile industry through the price mechanism and divide financing risk into them.

d. Financial market capital allocation function
Financial market is a primary approach to realize efficient capital allocation. The direction of capital flow needs to match share price and bond interest. In order to optimize capital allocation, surplus funds flow to higher future returns industry.

3. The Operating Mechanism of Electric Vehicle Industry Financial Support

3.1. Innovation Mechanism

The innovation of financing system was made on the basis of characteristics of electric vehicle industry. It mainly includes three aspects:

a. The innovation of fiscal support mode
Fiscal support aims to guide reasonable circulation of capital. According to the development of electric vehicle industry, the authorities need to pump more money in the initial stage and give enough attention to infrastructure construction and fundamental research. However, markets are in the ascendancy in the semi-late period.

b. The innovation of financial institutions and financial instruments

Recently, electric vehicle industry is confronted with both bright future and unexpected risks. Though the main function of the merchant banks is to raise capital for industry, they are still scarred from risks. Financial instruments neither meet the demands of industrial development. It is important to expand financing channels by development of new loan financing, the issue of enterprise collected bonds and establishment linkages among different financial institutions.

c. The innovation of capital markets
Capital markets, an alternative source of funds, are underdeveloped currently in China. From the administrative intervention, China's financial markets are more administrative intervention. It is necessary to develop the small and medium-sized enterprise vigorously the direct finance channel and inspire new high technology enterprises to go public by establishment of a multi-level capital market and more relaxed financing condition.

3.2. Financial Support in Industrial Innovation Value Chain

The industrial innovation value chain extends from research and development to marketing operation. It needs financial back in every link of process. Really new technology should start at the basic research level, and fundamental researches are in urgent need for policy financial support. By comprehension and cooperation of multi-subject, it is also suitable in universities and scientific research institutions for aim-oriented applied background research. In order to keep up with advanced technology, some enterprises would like to participate in investment to high-tech industry in the process from applied research to application of research achievements. And then, from the industrialization to the marketing operation, government-led gradually transforms into market-oriented. An influx of financial institutions and investors give financial support to the industry. Financial support in industrial innovation value chain as the figure 2 shows.

Policy and/or market financial support bodies give funds to every stage of the development of electric vehicle industry. Meanwhile, innovation of financial instrument and expansion of the scale of financial market are appeared during development of electric vehicle industry.

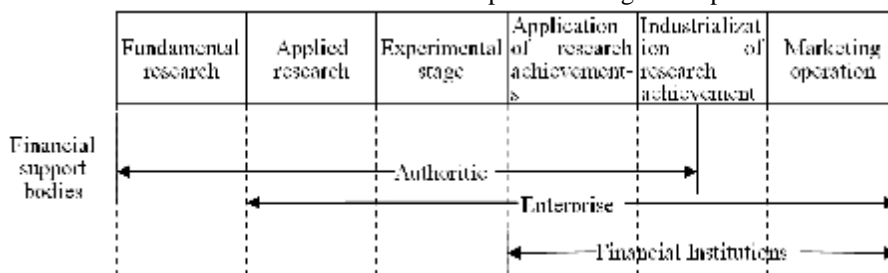


Figure 2. Financial supports in industrial innovation value chain

4. The Evolution Process of Electric Vehicle Industry and Its Financial Support

According to the size and growth potential of development, electric vehicle industry is divided into four stages: cultivation period (including seed period and start-up period), growth period, maturity period and recession period.

4.1. Industry Cultivation Period

In the cultivation period, electric vehicle industry is seen as an exciting new technology with a lot of potential. But it is of great risks and small-scale. Due to the prospect of its technology application market is not clear and profit for the purpose of investment funds usually invest in cost-effectiveness as the expected standards, electric vehicle industry can't get a lot of business investment by market financial support body. Therefore, it is high time that governments did something about it, such as policy loans, fiscal subsidies, special fiscal funds, policy guarantee and so on.

4.2. Industry Growth Period

In the growth period, the development of electric vehicle industry is immense; the product is well known and universally acknowledged; a big shortfall in funding grows. To replenish the fund gap, market financial support bodies supply commercial loans on mortgage, credit guarantee, science and technology insurance; companies even go public in order to obtain more financing support in the late growth period. Meanwhile, it is without excessive government intervention and support.

4.3. Industry Maturity Period

In the maturity period, the electric vehicle industry is in a dominant position in the economy. The purpose of industry financing is to reduce financing costs and maintain its position. The viable modes of financing as follows: sell stock or issue new stock to investors; issue bonds on bond markets; get credit guarantee or science and technology insurance and so on. The effect of policy support bodies gradually decreases.

4.4. Industry Recession Period

In the recession period, transformation and upgrading is basic outlet if industry wants to resolve its dilemma. Theoretical model of financial support to electric vehicle industry is set as figure 3.

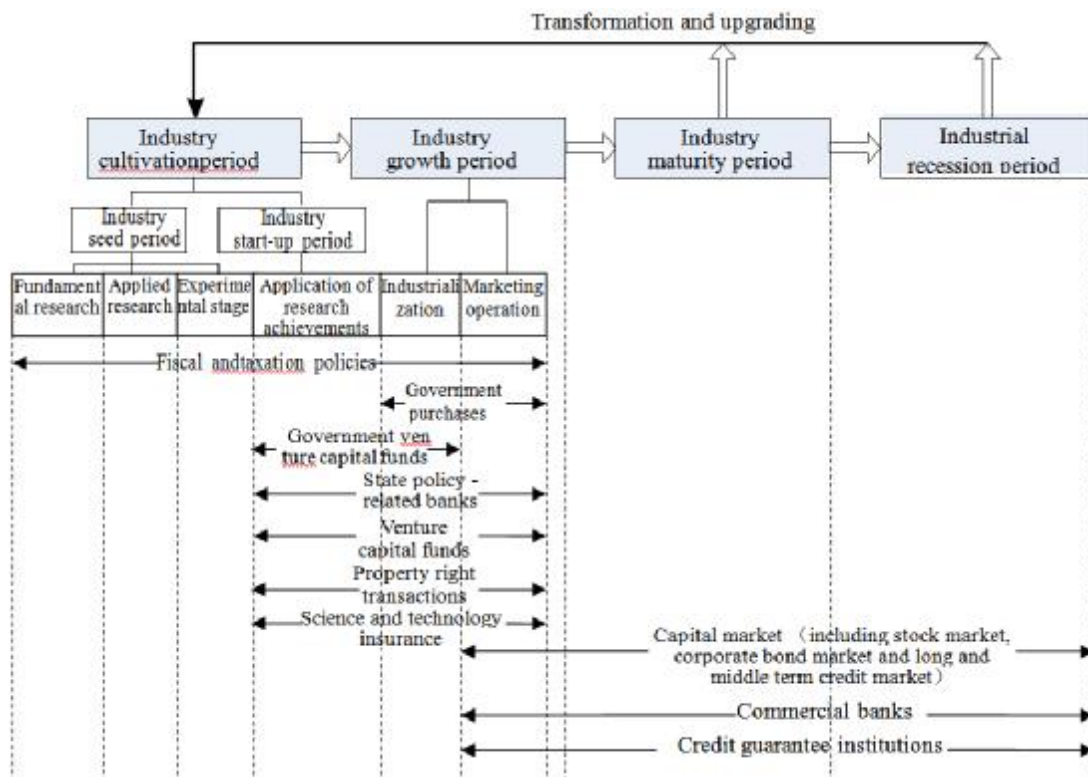


Figure 3. Theoretical model of financial support to electric vehicle industry

5. Policy Recommendations

Some policy proposals for financial support for the development of electric vehicle industry are given as follows: policy financial support and market financial support should match and coordinate each other so as to suit the development of the electric vehicle industry; create a sound development environment to provide safeguards for the industry financing; further reform and perfect the industry financing system, implement national industry policy, break area block, promote capital resource optimal allocation, enhance the development of electric vehicle industry.

References

- [1] SPENCER J W, MURTHA T P, LENWAY S A. How governments matter to new industry creation [J]. *Academy of Management Review*, 2005, 30(2):321-337.
- [2] Alessandra C, Stoneman P. Financial Constraints Innovation in the UK: Evidence from CISZ2 and CIS3. *Oxford Economic Papers*, 2008, 60(4): 711-730.
- [3] Luigi B, Fabio S, Alessandro, S. Bank and Innovation: Microeconomic Evidence on Italian Firms, *Journal of Financial Economics*, 2008, 90(2): 197-217.
- [4] Beck T, Levine R, Loayza N. Finance and the sources of growth [J]. *Journal of financial economics*, 2000, 58:261-300.