Research on the Influence Mechanism of Green Finance and Laws on Green Technology Innovation

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Abstract: With the gradual deterioration of the global environment, manufacturing enterprises must devote considerable financial resources and develop green technological innovation, in order to save energy, reduce pollution and produce more environmentally friendly and reusable products based on the constraints of laws. Firstly, it has analyzed about the impact procedure of green finance and regulations on green technology innovation. Secondly, the problems have explored on the inadequacies in the legal system and the unbalanced growth of green finance and green technological innovation. Finally, some countermeasure suggestions have put forward such as a sound law framework and the balanced growth of green finance and green technological innovation. The research content of this paper will have a certain impact on providing protection of the law system and long-term financial support for the green technology innovation of manufacturing corporations and be at the forefront of reducing environmental pollution and supporting the advancement of a green economy.

Keywords: Environmental Pollution; Green Finance; Laws; Green Technological Innovation; Green Economy

1. Introduction

Green technology innovation in manufacturing enterprises refers to the innovative activities in the manufacturing industry that aim to lower energy use, decrease environmental contamination, enhance the efficiency of resource utilization through the growth and utilization of new technological methods[1]. This type of innovations can be manifested in the development of new products, the optimization of new production processes, the use of new materials, and the recycling of waste products and resources.

Green finance is a emerging financial model in which the finance sector provides financial services and builds financial mechanisms to support and encourage sustainable development in economy and social, especially environmentally friendly economic activities. Green finance covers green credit, green insurance, green bonds, green funds, etc., which is designed to foster the growth of green economy and achieve the harmonious progress of economy, society and environment by financial means.

Green finance provides financial assistance for the green technology innovation of manufacturing enterprises and reduces the risk of innovation. Green technology innovation upgrade the production mode, reduces environmental pollution, and brings more benefits for green finance. Laws provide protection for green finance and green technology innovation. These three together promote the enduring prosperity of green economy. A better understanding and application of relationship between these three can improve enterprise competitiveness for enterprises. Enterprises are able to upgrade their performance and reduce overhead through green technology innovation, while obtaining the necessary financial support to increase their competitiveness[2] through green finance. For investors, it can help them identify new investment opportunities. Investors can earn substantial returns by investing in companies that focus on green technology innovation or participating in green finance. For policymakers, it promotes policy innovation. It helps policymakers to design more effective policies to encourage enterprises to make green technological innovations and boost the success of green finance.

2. Analysis of Mechanism on the Influence of Green Finance and Laws on Green Technological Innovation

2.1 Mechanism on the Effect of Green Finance on Green Technology Innovation

(1) Green finance provides funding directly. Green technology innovation requires a vast number of capital expenditure, including financial support for R&D, purchase of new equipments, testing of new processes and so on. Green financial institutions, such as green banks and green investment funds, can provide necessary financial support to help enterprises realize innovation.
(2) Green finance can minimize the hazards of innovation. Green finance can provide risk management tools, such as green insurance, to mitigate the risks that enterprises may face due to the failure of technology innovation, and reduce the threshold of innovation.
(3) Green finance enhances the economic efficiency of innovation. Through green finance, enterprises can transform the outcomes of their green technological innovation into economic benefits[3]. For example, green bonds or stocks can convert green innovation outcomes into capital gains and enhance the economic benefits of enterprices.
(4) A favorable innovation environment could be established by developing green finance. Green financial institutions usually impose environmental protection requirements on enterprises receiving their investments, which prompts enterprises to focus more closely on ecosystem protection and form a favorable green innovation atmosphere.
(5) Long-term innovation will be valued more. Green finance is concerned about long-term investment returns. Compared with short-term returns, green finance pays more attention to the long-term sustainable growth of enterprises, and encourage carrying out long-term, sustained technological innovation.
In summary, green finance has a positive impact on green technology innovation by extending monetary support, reducing risk, enhancing efficiency, establishing a favorable innovation environment and encouraging long-term innovation[4].

2.2 Analysis of Mechanism on the Influence of Laws on Green Technological Innovation

(1) Laws help formulate green economic policies. The government can incentivize and guide firms to carry out green technological innovation by formulating green economic policies. For example, environmental protection standards, green technology goals, implement green procurement policies and many other actions taken by the government can push enterprises to carry out green technology innovation effectively.
(2) Financial laws can deliver funding. The government can promote green technology innovation by providing financial support. For example, the government can provide tax incentives for firms that perform green technology research and development, or provide special subsidies for enterprises carrying out green technology application.
(3) A green property rights system will be established. A green property rights system can protect the R&D achievements of green technology and incentivize firms to realize green technological innovation. To give more enterprises confidence to contribute to the R&D of green technology, governments can set up a specialized green patent system, to protect the R&D achievements of green technology effectively[5].
(4) Environmental protection legislation will be enhanced. The government can strengthen environmental protection legislation to push enterprises to enact green technology innovation. For example, the government can formulate strict eco-friendly guidelines and laws. Regulations can stipulate that enterprises must adopt clean production technology and reduce pollution emissions, which will force enterprises to accomplish green technology innovation.
In general, the regulatory framework can promote green technology innovation and the success of a green economy from multiple perspectives through measures such as formulating green economic policies, providing financial support, establishing a green property rights system, and strengthening environmental legislation.

2.3 Analysis of the Common Effect of Green Finance and the Regulatory System on Green Technological Innovation

(1) Both can provide power and guarantee. Green finance provides business incentives to implement green technological innovation by providing financial support[6]. The regulatory system provides guarantee for green technological innovation from the policy level,

gives enterprises a clear direction of innovation, and also gives necessary preferential policies and legal protection.

(2) Both can guide and regulate enterprises behavior. Green finance and regulations can guide and regulate the behavior of enterprises, making them more inclined to green technological innovation. Financial institutions can provide green financial products to incentivize enterprises to make green investments. And the regulatory system can set up standards and regulations to regulate corporate behavior and promote green technological innovation.

(3) Both can promote environmentally sustainable development. Green finance and the regulatory system are important means to promote environmental development. Green finance can guide capital movement to eco-friendly projects, while the regulatory system can promote low-carbon and environmentally friendly production activities through policy guidance.

(4) Generate synergistic effect could be formed. Green finance and regulations can produce synergistic effects and jointly promote green technological innovation. Financial institutions can design financial products that meet the desires of enterprises and push green technological innovation according to the relevant regulations and systems, while enterprises can also carry out innovation more effectively under the guidance of regulations and systems while receiving financial support accordingly.

In general, green finance and regulations and systems jointly influence green technology innovation, and make a positive effect on promoting sustainable development and enhancing enterprise competitiveness.

3. Problem Analysis

3.1 Imperfect Laws and Inadequate Supervision

The advancement of green finance requires the support of a good policy environment and supervisory system. If the relevant laws can not keep up with the growth of green finance, or lack of effective supervision, it may hinder the growth of green finance.

(1) Risk management may become progressively more difficult. The risks of green finance mainly include credit risk, market risk and environmental risk. Without perfect regulations and effective supervision, financial institutions may face greater difficulties in risk assessment and risk control, increasing financial risks.

(2) It may be impossible to ensure the correct use of green financial funds. If the laws are not sound and supervision is not in place, there may be misappropriation or misuse of green financial funds, which not only violates the original intention of green finance, but also undermines investor confidence.

(3) Investors may be skeptical about green finance. For investors, the perfection of laws and effective supervision is the guarantee of their confidence[7]. Otherwise, it may lead to investor misgivings about green finance, and it is difficult to attract more funds into the green financial market.

(4) Environmental damage may be sustained.

If the regulatory system is not enough to restrain the behavior of enterprises, environmental damage will likely continue to occur. In some regions or industries, if there is no strong law to stipulate and supervise the implementation of environmental protection standards, enterprises may choose low-cost methods with high-pollution production for short-term benefits, which will undoubtedly cause serious damage to the environment.

(5) Enterprises may be less motivated to invest in green technology. The influence of the laws on the green technological innovation is multifaceted. On the one hand, if the law is lax in penalizing environmental damage and insufficient in rewarding green technological innovation, it may be insufficiently motivated for enterprises to innovate. On the other hand, if the regulatory system is inadequate, such as poor patent protection, enterprises may worry that the results of their innovation will be stolen, thus affecting their motivation.

3.2 Uneven Development of Green Finance and Green Technology Innovation

The progress pace of green finance has a close relationship with it of green technology innovation. Green technology innovation needs the capital support provided by green finance, while green finance relies on green technology innovation to generate investment projects and opportunities. If these two go hand in hand, everything will move forward in a good direction, otherwise, the speed of green development will slow down.

(1) Green finance is well developed and green technology innovation is lacking. As green finance advances, more investors begin to participate in a variety of green investment. If green technology innovation lags behind in the advancement of green finance, it may cause the supply of green projects is insufficient, resulting in a slowdown in the advancement of green finance, thus causing the stagnation of green finance furthermore. The number of green projects cannot keep up with the growth of green finance, which may also bring about a cutback in the return rate of green finance. Lower yield will affect the attractiveness of green finance and slow down the growth of green finance.

(2) The pace of green technology innovation development exceeds green finance. On the one hand, R&D funds are difficult to maintain. When the green technology innovation develop fast, more R&D funds are needed to support it. However, the R&D phase of green technology is usually time-consuming, and it may take time for the results to be transformed into specific products and services, which leads to a long recovery cycle of R&D funds and certain risks. In this case, enterprises' own funds and traditional loan methods may be difficult to meet the financial needs of green technology innovation, thus limiting the further development of green technology innovation.

On the other hand, financing constraints limit the pace of green technological innovation. As green technology innovation has high risks and uncertainties, traditional financial institutions may take a cautious attitude towards such projects, resulting in enterprises facing financing difficulties. Even if enterprises are able to obtain financing, financial institutions may set higher interest rates or stricter repayment conditions for loans due to their concerns about risk. It undoubtedly increases the cost and pressure of innovation for enterprises. In addition, some innovative green technologies may not yet be widely recognized in the market and may therefore face difficulties in seeking financing.

To solve these two problems, further development of green finance is needed to provide more and more flexible green financing products to fulfill the financial needs of green technology innovation.

4. Suggestions for Countermeasures

To maintain the stable promotion of green technological innovation, it is necessary to ensure the healthy development of green finance. At the same time, it is also necessary to support the relevant laws and supervision system.

4.1 Establishing A Sound Supervision System

(1) Perfect laws that match green finance should be issued. The prosperity of green finance needs a sound regulatory system as a guarantee. These laws may include the operating rules of green finance, risk control mechanisms, information disclosure standards, etc., in order to standardize the operation of green finance, prevent financial risks, protect the rights and interests of investors, and ensure the safe and compliant use of funds[8].

(2) An effective risk assessment and management mechanism should be established. We need to do it to supervise and manage the operation of green finance. It makes sure that green finance meets the relevant regulatory requirements and green finance funds are not abused or misappropriated, reducing financial risks.

(3) Information disclosure should be enhanced to improve transparency. Under the premise of perfect laws and effective supervision, through the method of increasing publicity, information disclosure should be continuously strengthened to reinforce investors' belief in the long-term bullishness of green finance, enhance investor confidence, and continuously attract funds from various investors to the green finance market.

(4) Penalties for environmental damage should be increased. To promote green technological innovation, it is inevitable to improve the regulatory system, strengthen the setting and implementation of environmental standards, and increase the penalty for environmental damage.

(5) The protection of patented products should be strengthend. A perfect regulatory system also includes increasing rewards for environmentally beneficial green patented technologies. By setting strict environmental protection standards, enterprises' behavior is

constrained, prompting them to adopt environmentally friendly production methods. In order to encourage and protect enterprises' green technological innovation, legal means are good choises. For example, we can provid tax incentives, subsidies and other policies to motivate enterprises to invest in the research. At the same time, we also need to strengthen the protection of intellectual property rights of green technology to protect the innovation achievements of enterprises and encourage them to complete continuous technological innovation.

4.2 Balanced Development of Green Finance and Green Technology Innovation

A close relationship between green finance and green technology innovation does exists. Green finance provides funding assistance for the latter, while green technological innovation generates investment opportunities for green finance. Therefore, we need to promote the development of these two in a balanced way to ensure the positive interaction between them. On the one hand, financial institutions can meet the financial needs of green technological innovation through innovative financial products and services. And at the same time it is vital to put in effort to the prevention of financial risks to ensure the safety of funds. On the other hand, enterprises and scientific research institutions also need to increase the research and growth of green technology, and continuously generate new green technology to provide more investment opportunities for green finance[9,10]. Through balanced development, green finance and green technology innovation can promote each other and jointly promote the development of green economy.

5. Conclusion

Under the current environment, the imperfections of regulation system and supervision, and the unbalanced development of green finance and green technological innovation have led to many problems in green technological innovation. Countermeasures to solve these problems are as follows: Formulate perfect regulations and systems matching green finance; Establishe effective risk assessment and management mechanisms; Strengthen information disclosure and improve transparency; Increase the penalty for environmental damage; Enhance protection of patented products; Promote the advancement of green finance and green technological innovation in a balanced way to ensure the benign interaction between the two. To sum up, green finance, regulations and green technology innovation jointly push the green economy and realize the sustainable improvement of economy, environment and society.

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