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Risk and path analysis of global industrial transformation in the context of climate change

Rui Gao

Wuxi No.1 Senior High School,Wuxi, 214031,China;

Abstract:

Global industrial transformation is accelerating, and climate risks and natural disasters brought by climate change may have an impact on global industrial transformation. Therefore, how to promote global industrial reform in the context of climate change is an important issue that needs to be urgently solved by various countries at this stage. Starting from the background of climate change, this paper deeply discusses the impact of climate change on global industrial transformation and analyzes the possible risks and challenges. The results show that the impact of climate change on global industrial transformation may be a double-edged sword. Global industrial development may make new progress under the influence of climate change, but climate change may affect the process of industrial transformation, bring some pressure to industrial development, and reduce the economic benefits of industrial development. Therefore, it is necessary to scientifically understand the impact of climate change, take effective measures to mitigate climate risks and promote high-quality industrial development. Due to the differences in the economic levels of different countries, it is necessary to formulate corresponding development measures according to their conditions in the process of coping with climate change. The conclusions of this paper provide implications for coping with climate change and global industrial transformation.

Keywords: Industrial Transformation;Climate Risks;Technological Development;Green Finance.

1. Introduction

Climate change has become a common problem and challenge facing human society (Zafar and Ammara, 2024; Xu and Deng, 2024). As climate change breeds more and more climate risks, it poses many threats to economic and social development. On the one hand, climate change will bring extreme weather to the world, causing obvious adverse effects on agricultural production and people's lives. In recent years, extreme temperatures, natural disasters, and other events have occurred frequently, and human society has become increasingly concerned about extreme weather. Many countries and international organizations have taken solving the climate crisis as a guarantee for sustainable economic development. On the other hand, climate change is also a direct threat to the survival and development of some countries, such as melting glaciers and rising sea levels. For countries and regions at lower altitudes, the impact of climate change is very intuitive. Therefore, how to mitigate the various risks brought about by climate change is an issue that all countries need to actively face. Considering that with the recovery and development of the global economy, greenhouse gas emissions and carbon emissions are likely to increase, it is necessary to take some proactive measures to analyze the risks of climate change and take strong measures to deal with it. At the same time, various countries have made many achievements in the process of coping with climate change, and it is necessary to further sum up the experience.

For industrial transformation, the global industry is in a state of continuous progress and upgrading in the process of economic development and urbanization (Yu et al., 2024; Luo et al., 2024). On the one hand, global industrial development has seen many new changes in a new round of scientific and technological revolution. Digital economy, artificial intelligence, and other technologies are gradually deeply integrated with traditional industries, and many new industrial models have been derived, and the global industry is in the process of transformation and development. On the other hand, the global industry is becoming more resilient. With the development of digitalization and intelligence, the large-scale application of digital technology is of great significance in enhancing the resilience of global industries. The production mode of traditional factories is gradually replaced by the Internet, computers, and other technologies, which improves indus-

trial productivity and also helps to enhance the competitiveness of industrial development and better withstand various external risks. However, it is worth noting that the global industry is still in the process of continuous development, and future industrial development is full of uncertainties and various risks and challenges, so the pace of actively promoting global industrial change and development can not stop. Industrial change is an inevitable phenomenon in the process of economic development of each country, and there are many factors affecting the development of industrial change.

This paper focuses on the development mode of global industrial transformation under the background of climate change, hoping to better analyze the impact of climate change on global industrial transformation. In fact, in the context of climate change, there will inevitably be many new changes in global industrial development. First, the risks posed by climate change will drive industrial changes to address these risks. For example, in the context of climate change, extreme weather becomes more frequent and severe, so agriculture must improve its production technology to mitigate the impact of weather change because the agricultural industry is highly sensitive to climate and weather. If the production methods and technologies of agricultural development are not correspondingly improved, the negative impact of climate change will have a huge blow to agricultural development. This paper explores the ways in which global industry is transforming in the context of climate change and provides an in-depth analysis of possible risks and challenges. From the perspective of practical significance, climate change and industrial transformation are the two major themes of global economic and social development at this stage, and there is a close relationship between them. The analysis of this topic can provide some analysis and discussion for understanding the relationship between climate change and global industrial transformation, and provide some evidence for the specific path of global industrial transformation under the background of climate change.

This paper makes an in-depth study on the risks and paths of global industrial transformation under the background of climate change, and the specific research contributions are mainly reflected in the following aspects: First, there are few existing studies on the topic of global industrial transformation under the background of climate change, and most literature pays more attention to the analysis of the impact of climate change on economy and finance. However, the effects and ways of climate change on industrial development are not comprehensive enough, which provides some inspiration for the research theme of this paper. The analysis and discussion in this paper can further expand the impact of climate change and provide some new arguments for a better understanding of the relationship between climate change and industrial change. Secondly, this paper not only focuses on the direct impact of climate change on global industrial transformation but also deeply discusses the risks and dilemmas existing in global industrial transformation under the background of climate change, which can provide some help for comprehensively sorting out the various impacts of climate change on global industrial transformation. From this perspective, the research framework of this paper is more comprehensive and rich, and it also provides a worthwhile research paradigm for the subsequent study of the impact of climate change. In addition, this paper also provides some implications for the formulation and implementation of some policies. On the one hand, this paper puts forward some suggestions to deal with the negative impact of various climate risks on global industrial transformation and development in the context of climate change and provides references for promoting global industrial transformation. On the other hand. This paper can provide some policy suggestions for global industrial transformation and development, which help global green development.

The remaining structure of this paper is arranged as follows. The second part is the concrete way of global industrial transformation under the background of climate change. The third part is the risks and challenges of global industrial transformation in the context of climate change. The fourth part is the policy recommendations, hoping to inspire coping with the impact of climate change on global industrial transformation. The fifth part is the conclusion.

2. The global industrial transformation in the context of climate change

2.1 The upgrading of industrial structure

In the context of climate change, the upgrading of industrial structures may continue to upgrade. As we all know, the country's economic structure may be divided into three industries, namely the primary industry, the second industry, and the third industry. According to the general law of economic development and the law of industrial structure evolution, the industrial structure always moves from the primary industry to the secondary industry, and then from the secondary industry to the tertiary industry. As extreme weather and natural disasters increase around the world, different industries are likely to suffer different impacts. First of all, for the primary industry, the comprehensive strength of the primary industry is relatively weak, and in the face of the impact of climate change, some high-lat-

itude countries and regions may increase production and scale. And for some low-dimensional countries and regions, some agriculture may suffer. In the agricultural industry chain, some weaker industries may be eliminated. For the secondary industry, manufacturing industry is the core of the development of the secondary industry. Climate change will also promote the transformation and upgrading of the development of the manufacturing industry, and some high-end manufacturing industries may continue to emerge, to better adapt to the impact of global climate change. As for the tertiary industry, the tertiary industry mainly consists of some service industries, which may be relatively less affected by extreme weather but may also promote the increase of sales of some service products, such as food.

2.2 Green and low-carbon transformation of industries

With the continuous occurrence of global warming and extreme weather, the frequency and intensity of natural disasters will continue to increase, such as heavy rains, droughts, and floods. Therefore, for the industry, the requirements for green and low-carbon will become higher and higher. On the one hand, industries such as traditional manufacturing and agriculture need to improve their level of development to better adapt to the risks posed by climate change. In this process, green technologies and green industries will continue to emerge, and the government will also advocate green consumption and low-carbon environmental protection for the masses to cope with the increasingly serious climate risks. This is also objectively conducive to the green and low-carbon transformation of the industry, which has brought huge market demand for the development of green industries and is conducive to the low-carbon development of the industry. As government departments pay more attention to climate change, some new policy tools will increasingly help the low-carbon and green development of industry. For example, some green finance will also play an increasingly important role, and these policy tools can provide financial support for the development of green industries. In the process of responding to climate change in various regions, some ecological products and green products will continue to emerge, because these products have better market demand, which objectively also provides impetus for the development of green industries.

2.3 The development of digital industry

Climate change and digital economy are hot topics of economic development in recent years, with the development of digital economy big data. Artificial intelligence, the Internet has become an important driving force for global economic development, but also become an important way to deal with climate change. First of all, the development of the digital economy can improve the production efficiency of various industries and enhance the application ability of production factors. Therefore, the efficient use of resources is conducive to reducing resource consumption and carbon emissions, which can resist the positive impact of climate risks. In the process of coping with climate change, scientific and technological innovation is the key and the carrier of scientific and technological innovation lies in industry and enterprises. The development of the digital industry can greatly enhance the ability of regional scientific and technological innovation, because the digital industry itself is a high-tech industry, and these high-tech industries can use more advanced and low-carbon environmental protection production models and technologies. In this process, the negative impact of extreme weather on industrial development is relatively weak. At the same time, with the help of some big data and artificial intelligence technologies, we can strengthen some supervision of resource and environmental changes. For example, the Environmental Protection Department can carry out real-time monitoring of pollution emissions, and once the pollution of enterprises exceeds the standard, the government supervision department can grasp the pollution information of enterprises in time and make decisions. Therefore, the development of the digital industry will inevitably become an important measure to solve climate change.

2.4 The development of green finance

With the development of climate change, the economic and social structure may undergo profound adjustments and changes, and some new fields and industries will be derived. First, some new models of climate change will continue to emerge, such as green finance, carbon finance, and so on. Although economic models such as green finance and carbon finance have also been reflected in past economic development, these traditional economic models have been given new functions and ushered in new opportunities under the background of climate change. For example, green finance has long existed in the economic practice of developed and developing countries, including green credit, green insurance, green finance, and other new models. However, with the aggravation of climate change and the high attention of government departments, green finance will provide more impetus for energy conservation, emission reduction, and climate change. Therefore, economic models and industries such as green finance can play a greater role in the development of climate change. Many countries attach great importance to the development of green finance. In recent years, many

countries have applied green finance to the practice of economic development, which shows that green finance has achieved better development in the context of climate change.

3. Risks and challenges in the context of climate change

3.1 The risks of climate change

The existence of climate risk in the context of climate change is obvious. First of all, climate risk will lead to changes in precipitation, temperature, and other factors, bringing uncertainty to the development of agriculture, industry, and service industries. Whether it is agriculture or other industries, there is a certain dependence on natural conditions, and the degree of dependence may vary. Therefore, climate risks can lead to changes in traditional production patterns, but some industries may not be able to adapt to such changes in natural conditions. Secondly, climate risks will also change the climate policies and environmental policies of some countries, because various countries and governments need to formulate climate policies and environmental policies based on the existing climate risks to deal with climate risks, and the previous climate policies and environmental policies may not be able to use the new climate change and natural conditions. At the same time, enterprise development and industrial change are often affected by policies, because government policies are important factors for enterprise development and industrial change, and can provide necessary financial and technical support for enterprise development and industrial change. However, in the context of climate change, policies tend to change more frequently, which also makes the development of enterprises face more policy uncertainty, thus bringing adverse effects on industrial reform and enterprise development.

3.2 the risks to the optimization and upgrading of industrial structure

The upgrading of industrial structure is an objective law of economic development and can better meet the needs of economic and social development. At present, the global industrial structure is in an important stage of continuous optimization and adjustment, and the emergence of a large number of new technologies and new industries makes the industrial structure better adapted to the requirements of economic development and residents' lives. However, climate events have occurred frequently in recent years, and climate change may hinder the optimization and upgrading of industrial structures. For example, from the perspective of tourism development, the increase in extreme weather after climate change may make some natural landscapes disappear. Melting glaciers and climate warming reduce the global tourism landscape, which is not conducive to the development of tourism. At the same time, the increase in extreme weather may reduce the demand for tourism consumption, and the uncertainty of tourism development will also increase. At the same time, for physical industries such as manufacturing, extreme weather will lead to an increase in natural disasters, causing direct damage to factories and equipment, which may reduce corporate labor productivity and hinder the production of products and innovation. Therefore, climate change is giving birth to some new industries, but it may also cause more risks to the development of traditional industries and hinder the upgrading process of industrial structures. Strong measures must be taken to mitigate the negative impact of climate change on the optimization and upgrading of industrial structures.

3.3 the risks to the process of energy conservation and emission reduction

Energy conservation and emission reduction are closely related to climate change, and climate change may have a certain impact on the process of energy conservation and emission reduction in industrial development. At present, the global industry is facing greater development pressure and uncertainty in the process of change and development. In particular, the industrial development of developing countries often needs a lot of fossil energy as support, but climate change has caused a huge impact on industrial development. A large number of industrial enterprises need to consume a large amount of fossil energy to maintain their stability and development, which may further increase the carbon emissions of industrial development. At the same time, from the perspective of residents, climate change may increase residents' electricity consumption, because climate change will bring more extreme temperatures, which will increase the demand for residents' electrical consumption. For example, when the weather is hotter in summer, residents need to use appliances such as air conditioners and refrigerators for a long time, resulting in the need for more electricity from the power supply department. The source of electricity mainly relies on the burning of fossil fuels such as thermal power generation, which causes additional carbon emissions. Therefore, as climate change and climate risks increase, the energy industry, manufacturing, power, and other sectors need to consume more energy and resources to sustain growth.

3.4 The risks to the economic benefits

Economic benefits are the primary goal pursued by various industries and enterprises, and climate change is often detrimental to the economic benefits of industrial develop-

ment. First of all, climate change will lead to an increase in the cost of industrial development, because all types of enterprises need to come up with a certain amount of capital to cope with the various risks brought by climate change. When climate change causes serious natural disasters, it will also increase the economic losses of enterprises. If the economic performance of industrial development is reduced, it will inevitably make many enterprises and factories close down, and even cause unemployment and other phenomena. At the same time, climate change will promote the technological progress of enterprises, because, in the context of climate change, enterprises need technological innovation to maintain their own production and development. However, technological innovation is often a research and development activity with large investments and low benefits, which can not improve economic efficiency in the short term. At the same time, extreme weather may also affect the production activities of enterprises, and some industries that depend on climate and weather will suffer losses. Secondly, climate change will have a sustained impact on all aspects of the enterprise, such as transportation, procurement, sales, and other links of the enterprise need a good climate environment as a guarantee. If extreme weather is frequent and weather conditions deteriorate, the assets and operations of the company will be affected, which will ultimately be reflected in the financial and market performance of the company.

4. Suggestions for addressing climate risks

4.1 Vigorously develop green technologies and enhance the competitiveness of industrial development

Green technology is an effective tool to deal with climate change and improve industrial competitiveness. At present, in the process of economic development, the role of green technology continues to be highlighted. Green technology can not only achieve energy conservation and emission reduction but also improve the impetus for industrial change and development. Because green technology is the main feature of low-carbon and environmental protection, and in the context of climate change, global industrial reform needs more high-tech and green technology as support, to better cope with various climate risks brought by climate change. As countries around the world pay more and more attention to environmental protection, the application space of green technology will be more and more extensive. Therefore, all countries should pay attention to the development of green technology, invest more money in the development of green technology, and formulate some policies and plans to ensure the progress of green technology. At the same time, enterprises also need more green technology in the process of coping with climate change. Enterprises are the main body of green technology development, and should vigorously develop green technology while promoting the progress of production technology, and invest more human and financial resources in the development of green technology. In addition, industrial development also needs to develop in the direction of green and low-carbon, the use of more green technologies to achieve industrial structure transformation and upgrading, and constantly improve the competitiveness and quality of industrial development.

4.2 Strengthen policy guarantees to provide impetus for sustainable industrial development

Whether it is to deal with climate change or to promote industrial change, the power of policy cannot be ignored. On the one hand, policies can provide support for industrial development, reduce the cost and pressure of sustainable industrial development, and improve the efficiency of industrial change. On the other hand, policies can enhance the speed of industrial change and development, and promote industrial development to better evolve in the direction of green and low-carbon. Countries around the world have introduced many policies to address climate risks and achieve high-quality industrial development, but the existing policy system may not be perfect. First, some of the climate policies that boost industry may not work. For example, with green finance policies, some companies may use green credit funds to invest in production rather than to reduce climate risks. Therefore, the implementation and formulation of policies in various countries need to be more targeted to ensure that relevant policies are truly applied to the process of coping with the climate crisis and enhancing industrial development capacity. At the same time, different types of countries should develop differentiated policies. The economic foundations of developing countries and developed countries are different, and the implementation of policies cannot be athe same. Each country should implement targeted policies according to its actual situation and industrial base.

4.3 Promote the development of digital technologies to enhance the resilience of industrial development.

Technology is key to advancing the global industry's response to climate change (Zhu et al., 2024). With the rapid development of a new round of scientific and technological revolution, digital technology has been widely

used in economic society and production and life and has produced huge economic and social benefits. The development of various industries in the future will actively use digital technology. In particular, the development of digital technologies can improve the resilience of industrial development and enhance the capacity of industry to cope with climate risks and climate change. Therefore, all countries should take digital technology as a development goal, constantly develop new artificial intelligence technology and Internet technology, promote the deep integration of digital technology and industrial development, and enhance the resilience of industrial development. Because industrial resilience can improve the ability to generate resistance to external risks, it is difficult for industrial development to be affected by external environmental risks. At the same time, digital technology should be effectively combined with industrial development to form some new industrial and economic models, such as green finance and inclusive finance, to provide more tools for industrial development and combating climate change. For digital technology, it is also necessary to develop more smart systems specifically to deal with climate risks, such as strengthening the monitoring system for carbon emissions and constantly improving the ability to sense climate change.

4.4 Strengthen the international cooperation and promote the integrated development of global industries

It is worth noting that in the context of economic globalization, industrial integration is a development trend. At the same time, international cooperation and exchanges are indispensable in the process of addressing climate change. Because climate change affects every country, the responsibility for dealing with it is shared by all countries. However, the impact of climate change on different countries varies. The technological base and industrial level of different countries are also significantly different, so the attitudes of countries to climate change are different. Therefore, in the process of promoting industrial integration and combating climate risks, all countries should maintain cooperation and exchanges to jointly cope with the impact of climate change. At the same time, it is necessary to strengthen industrial and technological cooperation and give full play to their respective advantages. For example, developing countries can learn from the technological and industrial development experience of some developed countries and continuously promote the green and low-carbon development of their industries. Developed countries can provide some advanced technology and green financial support to developing countries to help them cope with climate risks and improve the quality of industrial development in developing countries.

5. Conclusion

With the significant impact of climate change on human society and economic development, coping with climate risks has become an important issue that all countries must face. At the same time, industrial reform has also been continuously promoted in the process of scientific and technological development and economic development, and industrial innovation and industrial structure upgrading have been reflected in the process of industrial reform in various countries. However, as the climate risks brought by climate change become more and more obvious, industrial changes will also be affected by climate risks. It is necessary to analyze the impact of climate change on industrial transformation and development and explore the problems and challenges that industrial transformation may face in the context of climate change, to formulate targeted policy recommendations. Although the existing literature has paid attention to various impacts of climate change, the relationship between climate change and industrial development has not been deeply discussed. This paper has made some discussion and analysis in this respect, hoping to provide a reference for relevant research. In the context of climate change, there will be many new changes in the global industry, and the speed of industrial reform and development may accelerate, especially some digital industries and green finance models will become a force to deal with climate change. However, climate change will also bring many risks to industrial transformation and development, although some new industries may achieve development in the process of coping with climate change, due to the increase in the external environment and production costs, the process of upgrading the industrial structure may be blocked. Therefore, all countries must take strong measures to actively cope with the negative impact of climate change and climate risk on industrial transformation and development. At the same time, different countries share common responsibilities in the process of tackling climate change, but the specific work and tasks they undertake should be different. Some developing countries are still in the important stage of industrialization and urbanization, and economic growth is still the main task facing many developing countries. It may be difficult for developing countries to provide more funds and technologies to cope with climate change for industrial development and economic growth. However, both developing and developed countries should fully recognize the importance of addressing climate change and actively address climate change in the process of realizing the transformation and development of their industries.

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