# The Driving Effect of the New Energy Vehicle Industry Development on Economic Growth

Jinze Li *

Shijiazhuang Foreign Language School, Shijiazhuang, China

* Corresponding Author Email: maingoxs6vgk7nuqit@gmail.com

**Abstract.** Nowadays, new energy vehicles' market share has greatly enlarged. The main market of cars is already opened for new energy vehicles such as China, America, Europe with a consistently increase. In recent years, the new energy vehicle industry has experienced rapid global expansion. Production and sales of new energy vehicles in major markets such as Europe, China, and the United States have maintained rapid growth. This article analyzes the direct and indirect impacts of the new energy vehicle industry on global economic growth from a global perspective. The results show that, in terms of direct effects, the new energy vehicle industry has boosted global automotive manufacturing output, driven the expansion of core component industries such as power batteries and drive motors, and created millions of jobs in production and R&D. Indirectly, the industry has strengthened demand for upstream mineral resources and equipment manufacturing, promoted the development of downstream charging infrastructure and after-sales services, and achieved deep integration with the energy storage and intelligent connected vehicle industries. However, the global new energy vehicle industry still faces challenges such as technological bottlenecks, uneven regional development, limited natural conservation, and incompletely stabilized cost and profit models. Overall, the new energy vehicle industry has become a key driver of global green transformation and economic recovery, and its future development will continue to influence the international industrial chain landscape and the path of global economic growth.

**Keywords:** New energy vehicle industry, economic growth, driving effect.

## 1. Introduction

New energy vehicles are a strategic priority in the transformation of the global automotive industry. According to the International Energy Agency global new energy vehicle sales are projected to reach 14 million units in 2023, accounting for 18% of new car sales. China, Europe, and the United States account for over 90% of this market share, while markets in India, Southeast Asia, and Latin America are also accelerating. This industry is not only crucial for emissions reduction and energy transition but also serves as a "new engine" for the global economy.

From a global perspective, new energy vehicles involve battery minerals (primarily concentrated in South America, Africa, and Australia), battery manufacturing (dominated by China, Japan, and South Korea), vehicle production (in major markets such as Europe, the United States, and China), and software and communications (in Silicon Valley, Europe, and Chinese tech companies). Its highly globalized supply chain structure means that the development of the new energy vehicle industry is not just a single-country economic phenomenon, but a crucial component in reshaping the global industrial landscape.

Existing research indicates that the global expansion of the new energy vehicle industry not only boosts manufacturing output but also plays a significant role in promoting employment, driving energy transition, and fostering cross-industry integration [1]. However, differences in technological capabilities, market size, and policy support across regions have led to uneven development of the global new energy vehicle industry. Therefore, analyzing the driving effect of the new energy vehicle industry on economic growth from a global perspective has important theoretical and practical value.

## 2. The Direct Driving Effect of the New Energy Vehicle Industry on Global Economic Growth

### 2.1. Contribution of the Industry's Own Output Value

The rapid development of the global new energy vehicle industry chain has directly promoted the growth of the output value of the world's automobile manufacturing industry. According to McKinsey, by 2030, the global new energy vehicle industry chain market size will exceed 6 trillion US dollars [2]. In the vehicle manufacturing link, the output value of the three major markets of China, Europe and the United States accounts for more than 80% of the world [3, 4]. in the core component link, the power battery industry has become an important source of global new output value, and companies such as CATL, LG Energy Solution, and Panasonic have established a transnational competitive landscape [5].

### 2.2. Job Creation Globally

The new energy vehicle industry has created millions of jobs. According to the International Labor Organization, by the end of 2022, new energy vehicles and related industries have provided more than 10 million jobs worldwide, of which the production end is mainly assembly and parts manufacturing, and the R&D end is concentrated in high-end fields such as battery materials, intelligent driving, and vehicle networking [6]. In the future, as new energy vehicles become more intelligent and software-based, they will also bring more employment opportunities related to the digital economy [7].

### 2.3. The Financial and Investment Driving Effect of the New Energy Vehicle Industry

In addition to its contributions to output and employment, the new energy vehicle industry has also significantly driven global financial markets and investment flows. The rapid development of the global new energy vehicle industry has attracted a significant amount of venture capital, equity financing, and green bond issuance. For example, in 2023, global investment in new energy vehicles and related industries, including battery manufacturing, charging infrastructure, and intelligent driving technology, exceeded US$120 billion [8, 9].

This influx of financial capital not only supports industry expansion but also drives technological innovation [4]. New energy vehicle startups have secured R&D funding through financing, accelerating the commercialization of solid-state batteries, in-vehicle intelligent systems, and autonomous driving technologies [10]. Furthermore, the development of the new energy vehicle industry has stimulated innovation in the insurance industry, financial services, and carbon trading markets. For example, new energy vehicle insurance products price risk based on vehicle type, usage scenario, and battery safety, providing financial institutions with new profit models [11]. This financial pull effect has transnational implications. Cross-border investment not only promotes the flow of technology and capital across markets but also accelerates the development of the new energy vehicle industry in emerging markets [12]. For example, new energy vehicle investment in Europe and North America is expanding to Southeast Asia and South America, driving the coordinated development of the global industrial chain through cross-border capital flows [13, 14].

Overall, the new energy vehicle industry is not only a driving force for real economic growth but also a key engine for global financial innovation and cross-border investment, providing long-term support for the industry's sustainable development and global economic recovery [15, 16].

### 2.4. Knowledge Spillover and Technology Diffusion Effects in the New Energy Vehicle Industry

The rapid development of the new energy vehicle industry has led to global technology diffusion and knowledge spillover effects. Core technologies include power battery management systems, intelligent driving algorithms, and motor control technologies. As these technologies flow through the global industrial chain, they have generated significant cross-industry and cross-regional

technology spillovers . On the one hand, innovations in new energy vehicle technology are driving technological upgrades in related industries. For example, battery management technology is not only applied to automobiles but has also expanded to energy storage, industrial robots, and smart home energy management systems, creating new technological growth points for the energy and manufacturing industries [17, 18]. On the other hand, knowledge spillovers from the new energy vehicle industry have promoted international cooperation and technological standardization. Countries have jointly developed standards for battery recycling, charging interfaces, and intelligent connectivity, making these technologies easier to replicate and apply globally [8, 16]. Furthermore, multinational corporations have spread their innovations to emerging markets through patent sharing, technology licensing, and R&D collaboration, raising the overall technological level of the global industry [19, 15].

This technological diffusion and knowledge spillover effect not only enhances the global competitiveness of the new energy vehicle industry but also drives the development of related industries such as green energy, intelligent manufacturing, and the digital economy, providing long-term technological support for global economic growth [14, 15].

## 3. Indirect Driving Effect of the New Energy Vehicle Industry on Related Industries around the World

### 3.1. Upstream Industries

The rapid development of the global new energy vehicle industry has driven the demand for mineral resources such as lithium and nickel. The lithium salt lakes in Chile and Argentina and the nickel resources in Indonesia have become key links in the global new energy vehicle industry chain. In addition, high-end manufacturing industries such as battery manufacturing equipment and robot welding equipment have also seen growth due to the demand for new energy vehicles [7, 8, 20].

### 3.2. Downstream Industries

Charging infrastructure has become a global growth point. Europe has built more than 500,000 public charging piles, the United States plans to add 500,000 charging facilities by 2030, and China has built more than 6 million charging piles in total [2]. At the same time, new energy vehicle after-sales service, used car transactions and battery recycling have gradually formed a new global market, promoting the transformation of the automotive service industry [21].

### 3.3. Cross-Border Industries

The integration effect of new energy vehicles with energy storage and intelligent network industries is significant. Assisting global energy transformation [22]. The development of intelligent driving and vehicle networking technologies has made new energy vehicles an important platform for artificial intelligence, 5G and big data applications [23]. Cross-border integration has promoted the coordinated development of the global digital economy and green economy [4, 24].

### 3.4. The New Energy Vehicle Industry's Contribution to Global Energy Mix Optimization

The development of new energy vehicles has significantly contributed to the optimization of the global energy mix. The electrification of transportation, centered around electric vehicles, is gradually reducing reliance on traditional fuels and promoting the use of clean energy [2, 12].

First, the rapid adoption of new energy vehicles has increased direct demand for renewable energy. For example, approximately 40% of new electric vehicle charging capacity in Europe and China in 2023 will come from solar and wind power, which has driven increased investment in new energy power generation [11, 13].

Second, the deep integration of new energy vehicles and the energy storage industry is promoting the coordinated development of energy supply and demand. The cascaded utilization of retired power

batteries to form distributed energy storage systems has increased the flexibility of the power grid and its ability to absorb renewable energy [1, 4]. At the same time, the development of vehicle-to-grid (V2G) technology has enabled new energy vehicles to become not only energy consumers but also a key component of energy management and regulation [5, 14].

Furthermore, new energy vehicles have promoted the optimization of the global electricity market structure. The construction of large-scale charging infrastructure and intelligent scheduling technologies have enhanced peak and valley load balancing capabilities, reduced reliance on fossil fuel power generation, and lowered global carbon emissions intensity [8, 12].

In summary, the new energy vehicle industry has become a major driving force for optimizing the global energy structure by increasing the proportion of clean energy use, promoting the application of energy storage technologies, and optimizing power scheduling [2, 13].

### 3.5. Indirect Impact of the New Energy Vehicle Industry on Global Logistics and Urban Infrastructure

In addition to optimizing the energy structure, the new energy vehicle industry has also indirectly promoted the upgrading of global logistics and urban infrastructure. First, the application of new energy vehicles in logistics, particularly the widespread adoption of electric commercial vehicles and urban delivery vehicles, has promoted the development of green logistics [4, 7]. For example, electric delivery fleets in major European cities have reduced urban transportation carbon emissions and promoted the development of delivery route optimization and intelligent dispatching systems [1, 14].

Second, the development of new energy vehicles has driven the intelligent upgrade of urban infrastructure. The construction of charging stations, battery swap stations, smart parking, and connected vehicle infrastructure not only meets vehicle usage needs but also promotes digital urban management [13, 15]. This infrastructure development has enabled cities to achieve greater efficiency in energy dispatch, traffic management, and intelligent operations and maintenance, supporting sustainable urban development.

Furthermore, the new energy vehicle industry has indirectly promoted the green transformation of public transportation and shared mobility systems. The electrification of urban buses, taxis, and ride-hailing vehicles not only reduces air pollution and noise but also promotes intelligent scheduling and green planning of urban transportation systems [1, 8].

Overall, the new energy vehicle industry, by promoting green logistics, power infrastructure development, and smart city management, has had a significant indirect impact on global urban infrastructure upgrades and logistics optimization, providing dual support for economic growth and environmental sustainability [12, 13].

## 4. Existing Problems in Driving Economic Growth in the Global New Energy Vehicle Industry

Although the energy density and cost of power batteries have increased significantly, high-end chips and advanced materials are still controlled by a few countries and companies, and the global supply chain is subject to technology dependence and risks [7, 15]. The global new energy vehicle market is seriously unbalanced. The market penetration rate in Europe and China exceeds 25%, while that in emerging markets such as India, Southeast Asia, and Latin America is less than 5%. Insufficient infrastructure and differences in purchasing power have limited the expansion of the industry [1, 2]. Lithium-ion batteries require a lot of energy during production and may produce greenhouse gas emissions such as carbon dioxide [16]. In addition, harmful chemicals may be used in the production process of batteries, which may pollute the environment if not handled properly [17]. Battery safety is also an important issue during the use of electric vehicles. Batteries may experience thermal runaway, leading to fire or explosion, releasing toxic gases and polluting air and water sources. For example, when an electric vehicle catches fire, it may release toxic gases such as hydrofluoric acid, posing a threat to the environment and human health.

## 5. Conclusion

This article systematically analyzes the direct and indirect impact of the new energy vehicle industry on economic growth from a global perspective. The research finds that the new energy vehicle industry has become a significant growth engine for the global economy, directly boosting output and employment in the automotive manufacturing industry and indirectly promoting the coordinated development of mining, equipment manufacturing, charging infrastructure, after-market services, and cross-sector industries.

At the same time, however, the development of the global new energy vehicle industry still faces three major challenges: technology, regional constraints, and cost in the future. International cooperation will be needed to promote breakthroughs in core technologies and build a diversified and secure global supply chain. At the same time, policy support and infrastructure investment in emerging markets will be strengthened to promote balanced development globally.

Looking ahead to around 2030, the new energy vehicle industry will play a central role in global energy transformation, the digital economy, and green development strategies. As long as countries strengthen coordination at the policy, technological, and market levels, the new energy vehicle industry will become a key engine driving sustainable global economic growth.

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