

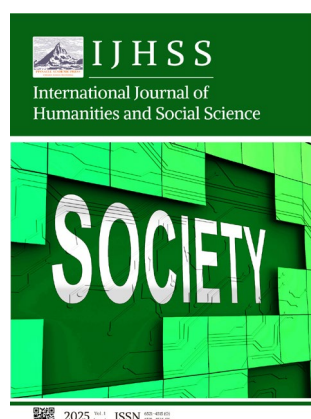
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# Green Exports and Sustainability Trends in Vietnam's International Trade: Empirical Evidence

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**Abstract:** This paper explores the evolving trends of green exports and sustainability within the context of Vietnam's international trade. The study begins by providing a comprehensive overview of Vietnam's trade landscape, emphasizing the critical role that exports play in driving the nation's economic growth. It defines the concept of green exports and explores their increasing significance in the global trade system, particularly in relation to environmental sustainability. The paper highlights the growing prominence of sectors such as renewable energy, sustainable agriculture, and eco-friendly manufacturing in Vietnam's export portfolio. These sectors are crucial for Vietnam as they contribute not only to economic prosperity but also to the global effort towards sustainable development. By analyzing export data, including volume trends, growth rates, and market shares in these green sectors, the paper presents empirical evidence of the nation's progress. Furthermore, the study identifies several challenges faced by Vietnam in expanding its green exports. Key issues include technological limitations, a lack of widespread awareness among stakeholders, and the high initial investment required for sustainable practices. Despite these barriers, the paper offers policy recommendations aimed at strengthening Vietnam's competitiveness in the global green export market. These recommendations emphasize fostering innovation, enhancing public-private partnerships, and improving the infrastructure for sustainable production. In conclusion, this research sheds light on Vietnam's growing role in the global green trade and provides valuable insights for policymakers, businesses, and academics seeking to further develop sustainable trade practices. The findings underline the importance of aligning trade strategies with environmental goals, ensuring that economic development goes hand in hand with the preservation of natural resources.

**Keywords:** Vietnam; green exports; sustainability; international trade; empirical evidence

## 1. Introduction

Vietnam has experienced exceptional economic growth in recent decades, with international trade playing a crucial role in driving its development. The country has risen to prominence as an active participant in the global market, with exports making a substantial contribution to its GDP. As the global community increasingly focuses on environmental protection and sustainable development, the emergence of green exports represents a new frontier for Vietnam's international trade sector.

### 1.1. Background

Over the past few decades, Vietnam has undergone transformative economic reforms, shifting from a centrally planned economy to a market-oriented one. This transition, known as Doi Moi, catalyzed a significant surge in international trade, turning Vietnam

into one of the fastest-growing economies in Asia. As a result, Vietnam's total export value skyrocketed from approximately \$6.2 billion in 1990 to over \$350 billion in 2024, as reported by the General Statistics Office of Vietnam. This remarkable growth was fueled by various sectors, including textiles, footwear, electronics, and agriculture, which collectively strengthened the country's trade position globally.

Despite this impressive growth, the traditional export-led growth model has often come at an environmental cost. The growing concerns about climate change, resource depletion, and environmental degradation have prompted global demand for products and services that are sustainable and environmentally friendly. This shift in market demand presents both challenges and opportunities for Vietnam. As a country with significant agricultural and manufacturing output, Vietnam faces the dual task of fostering economic growth while transitioning toward more sustainable production practices.

### *1.2. Research Objectives*

This paper seeks to examine the emerging trend of green exports in Vietnam's international trade. The specific objectives of the study are as follows:

**Defining Green Exports:** To provide a clear definition of green exports in the context of Vietnam's trade landscape, highlighting the characteristics that distinguish them from conventional exports.

**Empirical Analysis of Green Exports:** To present empirical evidence on the development of green export sectors in Vietnam. This includes examining the growth of key green sectors, such as renewable energy, sustainable agriculture, and eco-friendly manufacturing, as well as analyzing export volumes, growth rates, and market shares.

**Challenges and Barriers:** To identify the primary challenges that Vietnam faces in promoting green exports. This includes exploring technological barriers, lack of public awareness, high production costs, and the need for infrastructure development to support sustainable industries [1].

**Policy Recommendations:** To offer strategic policy recommendations aimed at enhancing Vietnam's competitiveness in the green export market. These suggestions will focus on improving innovation, supporting public-private collaborations, and building the necessary infrastructure to support sustainable production and export practices.

By addressing these objectives, the paper aims to provide insights into how Vietnam can capitalize on the growing demand for green products while ensuring sustainable development in its trade sector.

## **2. Conceptual Framework**

### *2.1. Definition of Green Exports*

Green exports are defined as goods and services that have a minimal environmental footprint throughout their entire life cycle, from production to disposal [2]. These products are designed with environmental considerations in mind, meeting specific criteria such as low carbon emissions, reduced reliance on non-renewable resources, and minimal pollution. In addition to their eco-friendly characteristics, green exports also contribute to the conservation of natural resources and the reduction of environmental degradation.

Examples of green exports include renewable energy products such as solar panels and wind turbines, which contribute to clean energy generation; sustainable agricultural products like organic food and fair-trade coffee, which promote environmentally friendly farming practices; and eco-friendly manufactured goods, such as recycled paper products and energy-efficient appliances, which help reduce waste and energy consumption [3]. By focusing on these sectors, countries like Vietnam can position themselves as leaders in the global shift towards sustainability.

## 2.2. Importance of Sustainability in International Trade

Sustainability in international trade holds significant importance for several reasons, all of which have long-term economic, environmental, and social implications.

**Environmental Protection:** First and foremost, sustainability in trade is essential for safeguarding the global environment [4]. The production, transportation, and consumption of goods can lead to substantial environmental impacts, such as greenhouse gas emissions, air and water pollution, and biodiversity loss. By prioritizing sustainable practices, countries can reduce these negative effects and contribute to the global efforts to combat climate change and preserve ecosystems.

**Economic Competitiveness:** Sustainable trade practices can enhance a country's long-term economic competitiveness. In an increasingly eco-conscious global market, consumers, particularly in developed countries, are more likely to favor products that are produced sustainably [5]. As a result, there is a growing demand for products with low environmental impact. Countries that can produce and export these goods, such as renewable energy solutions or sustainable agricultural products, are well-positioned to tap into premium markets and gain a competitive advantage.

**Alignment with Global Goals:** Sustainable trade also aligns with broader global initiatives, such as the United Nations' Sustainable Development Goals (SDGs) [6]. These goals, which focus on issues like poverty reduction, environmental conservation, and social equality, encourage nations to adopt sustainable development practices in all sectors, including trade. By embracing sustainability in trade, countries contribute to these global objectives and support the creation of a more equitable and resilient global economy.

## 3. Empirical Evidence of Green Exports in Vietnam

### 3.1. Renewable Energy Exports

Vietnam is rich in renewable energy resources, including solar, wind, and hydropower. Over recent years, the country has actively promoted the development of its renewable energy sector, not only to meet domestic demand but also to increase its exports in this growing global market.

#### 3.1.1. Solar Energy

The solar energy industry in Vietnam has seen substantial growth in recent years. The country's solar power capacity has expanded rapidly, driven by supportive government policies such as feed-in tariffs and investment incentives [7]. As a result, Vietnam's installed solar power capacity surged from under 1 MW in 2015 to over 12 GW by 2024. This remarkable growth reflects the government's commitment to green energy and the increasing interest of both local and international investors in Vietnam's renewable energy sector.

In line with this growth, Vietnamese companies have started exporting solar panels and related equipment to various markets around the world. A notable example is VinES, a subsidiary of Vingroup, which has been investing heavily in solar energy production and is making significant strides to expand its presence in the export market [8]. The increasing export value of solar-related products is evident, as shown in the following table, which presents the export figures for solar products in Vietnam between 2020 and 2024 (see table 1).

**Table 1.** Export Value of Solar-Related Products in Vietnam (2020-2024).

Year	Export Value of Solar-related Products (USD million)
2020	50
2021	70
2022	100
2023	130

2024

160

This steady increase in exports reflects the growing demand for solar technology globally, positioning Vietnam as an emerging player in the renewable energy export market.

### 3.1.2. Wind Energy

Vietnam's wind energy potential is also significant, particularly in its coastal regions, which offer ideal conditions for the development of wind farms. The government has been actively promoting wind energy projects, and several wind farms are already operational, contributing to both domestic energy supply and export potential [9].

While the export market for wind energy products remains smaller than that of solar energy, there is a noticeable upward trend. Vietnamese manufacturers have started to enter the wind turbine equipment market, supplying components to neighboring countries. The export volume of wind turbine components has been gradually increasing, as shown in Table 2.

**Table 2.** Export Volume of Wind-Turbine Components in Vietnam (2020-2024).

Year	Export Volume of Wind-turbine Components (tons)
2020	500
2021	700
2022	900
2023	1200
2024	1500

Data source: Vietnam Customs Department.

These figures illustrate a growing presence of Vietnamese wind energy products in the global market, suggesting that the country is on the path to becoming a competitive exporter in the wind energy sector.

### 3.2. Sustainable Agriculture Exports

As an agricultural powerhouse, Vietnam holds significant potential for boosting its export competitiveness through sustainable agriculture practices. With the global shift towards environmental sustainability, sustainable agriculture is becoming a crucial factor in expanding Vietnam's agricultural export market.

#### 3.2.1. Organic Agriculture

The global demand for organic food products has been steadily increasing in recent years, driven by growing consumer awareness of health and environmental issues. In response to this trend, Vietnam has seen a rise in organic agriculture production [10]. The number of organic farms has increased, and the area dedicated to organic cultivation has expanded significantly. Vietnam's organic agricultural exports, including organic fruits, vegetables, and rice, are now being sold in key markets such as Europe, the United States, and Asia.

In 2024, the export value of organic fruits from Vietnam reached \$50 million, marking a 30% increase compared to 2020. This growth underscores the country's capacity to tap into the lucrative global market for organic products. The following table 3 presents the export value of organic agricultural products from Vietnam between 2020 and 2024.

**Table 3.** Export Value of Organic Agricultural Products in Vietnam (2020-2024).

Year	Export Value of Organic Agricultural Products (USD million)
2020	30
2021	35

2022	40
2023	45
2024	50

This increasing export value highlights the potential for sustainable agricultural practices to drive both economic growth and environmental benefits, positioning Vietnam as a key player in the organic agriculture market.

### 3.2.2. Fair-Trade Products

Fair-trade products, which ensure that farmers and workers receive fair compensation for their labor, are also gaining traction in the global market. Vietnam, as one of the world's largest coffee producers, has seen a significant portion of its coffee exports certified as fair-trade [11]. This certification not only benefits Vietnamese farmers by providing them with a stable income but also aligns with the growing ethical consumption preferences of international consumers.

In 2024, the export value of fair-trade coffee from Vietnam was approximately \$200 million, accounting for about 20% of the country's total coffee export value. This demonstrates Vietnam's ability to cater to the rising demand for ethically sourced products, reinforcing the importance of sustainable and socially responsible trade practices.

### 3.3. Eco-Friendly Manufacturing Exports

The manufacturing sector in Vietnam is increasingly adopting sustainable practices, leading to a notable rise in the export of eco-friendly products [12]. As global demand for environmentally responsible goods grows, Vietnamese manufacturers are focusing on sustainable production methods to enhance their competitiveness in international markets.

#### 3.3.1. Textile and Apparel

The textile and apparel industry is one of the largest export sectors in Vietnam. In recent years, many textile companies have shifted towards more sustainable production methods. These include the use of organic cotton, recycled fibers, and water-saving technologies. Additionally, several companies have obtained international sustainability certifications, which have bolstered their appeal in global markets.

A prominent example is Thanh Cong Textile-Garment-Investment-Trading JSC, a leading textile company in Vietnam, which has expanded its exports of sustainable textile products to markets in Europe and North America. In 2024, the export value of sustainable textile and apparel products from Vietnam was estimated at \$1.5 billion, marking a 25% increase compared to 2020. This growth reflects both the industry's commitment to sustainability and the rising demand for eco-friendly fashion. The following table 4 presents the export value of sustainable textile and apparel products in Vietnam from 2020 to 2024.

**Table 4.** Export Value of Sustainable Textile and Apparel Products in Vietnam (2020-2024).

Year	Export Value of Sustainable Textile and Apparel Products (USD billion)
2020	1.0
2021	1.2
2022	1.3
2023	1.4
2024	1.5

This increase in export value underscores Vietnam's growing capacity to meet global demand for sustainable textile products, making it an important player in the global eco-friendly apparel market.

### 3.3.2. Packaging Materials

In response to the global push for reducing plastic waste, there is a growing demand for eco-friendly packaging materials. Vietnamese companies have recognized this trend and have started producing and exporting biodegradable and recycled packaging materials. These innovations in sustainable packaging are being increasingly sought after by international markets, especially as companies strive to reduce their environmental impact.

In 2024, the export value of eco-friendly packaging materials from Vietnam reached \$30 million, a significant increase from \$10 million in 2020. This growth highlights the potential of eco-friendly packaging as a key area for export expansion. The following table 5 illustrates the export value of eco-friendly packaging materials from Vietnam between 2020 and 2024.

**Table 5.** Export Value of Eco-friendly Packaging Materials in Vietnam (2020-2024).

Year	Export Value of Eco-friendly Packaging Materials (USD million)
2020	10
2021	15
2022	20
2023	25
2024	30

The steady increase in exports of eco-friendly packaging materials reflects both Vietnam's adaptation to global environmental standards and the rising demand for sustainable packaging solutions worldwide.

## 4. Challenges in Promoting Green Exports in Vietnam

### 4.1. Technological Barriers

Many green technologies are still relatively new and complex. Vietnamese companies often face difficulties in accessing and adopting these technologies. For example, in the renewable energy sector, the production of high-efficiency solar panels and advanced wind turbines requires sophisticated manufacturing technologies. Most Vietnamese companies lack the in-house R & D capabilities to develop these technologies and rely on imports, which can be costly.

### 4.2. Lack of Awareness

There is a lack of awareness among Vietnamese producers and exporters about the concept of green exports and the benefits it can bring. Many small and medium-sized enterprises (SMEs) are still focused on traditional production methods and are not aware of the growing global demand for sustainable products. This lack of awareness hinders their ability to adapt to the changing international market trends.

### 4.3. High Costs

The transition to green production often involves significant upfront investment. For example, adopting sustainable agriculture practices may require farmers to invest in new equipment, training, and certification processes. In the manufacturing sector, companies need to invest in new production lines and technologies to reduce their environmental impact. These high costs can be a deterrent for many Vietnamese companies, especially SMEs, which may not have sufficient financial resources.

### 4.4. Stringent International Standards

International markets, especially in developed countries, have strict environmental and sustainability standards. Vietnamese exporters need to meet these standards to access



these markets. However, complying with these standards can be challenging. For example, the EU's REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulation sets strict limits on the use of certain chemicals in products. Meeting these requirements requires Vietnamese companies to conduct extensive testing and documentation, which can be time-consuming and costly.

## 5. Policy Recommendations

### 5.1. Promote Technology Transfer and R & D

The government should encourage technology transfer from foreign partners to Vietnamese companies. This can be achieved through bilateral and multilateral cooperation agreements. Additionally, more investment should be directed towards R & D in green technologies. The government can provide incentives, such as tax breaks and research grants, to companies and research institutions engaged in green technology R & D.

### 5.2. Raise Awareness

The government, in collaboration with industry associations, should conduct awareness-raising campaigns about green exports. These campaigns can target producers, exporters, and farmers. Workshops, training programs, and seminars can be organized to educate them about the concept of green exports, the global market demand, and the benefits of sustainable production.

### 5.3. Provide Financial Support

To help companies overcome the high costs of green production, the government can provide financial support. This can include low-interest loans, subsidies, and grants. For example, a special green export loan program can be established to provide affordable financing to SMEs that are transitioning to green production.

### 5.4. Strengthen Standards and Certification Systems

The government should work on strengthening Vietnam's domestic environmental and sustainability standards, making them more in line with international standards. At the same time, the certification process should be streamlined and made more efficient. This will help Vietnamese companies meet international requirements more easily and reduce the costs associated with certification.

## 6. Conclusion

Vietnam's international trade has been growing steadily, and the trend towards green exports is emerging. The empirical evidence shows that sectors such as renewable energy, sustainable agriculture, and eco-friendly manufacturing are experiencing growth in exports. However, there are still many challenges that need to be addressed, including technological barriers, lack of awareness, high costs, and stringent international standards. By implementing the proposed policy recommendations, Vietnam can enhance its green export competitiveness and achieve sustainable development in international trade. This will not only benefit the environment but also contribute to the long-term economic growth of the country. Future research can focus on further analyzing the impact of specific policies on green exports and exploring new green sectors with export potential in Vietnam.

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