

# TOWARDS THE GREEN SUPPLY CHAIN: THE KEY ROLE OF EDUCATION TO ECONOMIC GROWTH AND SUSTAINABILITY

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**Abstract:** *In an increasingly interconnected and digital world, modern supply chains are pivotal for trade and economic growth. However, their environmental impact, encompassing purchasing, production, packaging, and transportation, raises significant concerns among scholars and policymakers. Consequently, global corporations are integrating green practices into their operations. This transition presents substantial challenges, demanding robust financial and human resources, alongside strategic management. This paper examines the human resource aspect, specifically the knowledge and skills of the workforce, within the context of Vietnam's emerging green supply chain landscape. Given the relative novelty of sustainable practices in Vietnam, the current labor force lacks essential capabilities for this transformation, necessitating enhanced organizational education programs. Utilizing secondary data from official news and prior research, this study analyzes the current state of environmental education in Vietnamese businesses, alongside relevant government policies. It identifies opportunities and challenges in implementing green supply chain education and proposes collaborative strategies for businesses and the government to foster sustainability and promote robust economic growth.*

**Key words:** *environmental education, green supply chain, green practices, human resources, sustainability*

## 1. INTRODUCTION

The dawn of the 21st century has witnessed an unprecedented surge in technological innovation, profoundly reshaping the global landscape. Within this transformative wave, the supply chain industry has emerged as a pivotal beneficiary, experiencing a radical modernization driven by advanced tools and systems. This technological infusion has acted as a potent catalyst, propelling trading activities and industrial processes to new heights across numerous nations, including the rapidly developing economy of Vietnam. However, despite promoting economic growth, this surge in industrial dynamism has unintentionally undermined environmental sustainability. The escalating volume of industrial activities, fueled by these modernized supply chains, has exerted a palpable adverse effect on the

environment, raising critical concerns about the long-term viability of current economic models.

In response to this growing environmental imperative, the concept of green practices and principles has risen to prominence, becoming a central tenet of the global economic discourse. Businesses and governmental agencies worldwide are increasingly recognizing the urgent need to integrate sustainability into their operational frameworks. This shift toward a greener economy necessitates a fundamental transformation in traditional supply chain management, demanding a holistic approach that prioritizes environmental responsibility alongside economic efficiency.

Within this transformative context, the role of human capital emerges as a critical determinant of success. The effective implementation of green supply

chain principles hinges on a workforce equipped with the requisite knowledge, skills, and awareness. Therefore, investing in comprehensive training and educational programs within organizational structures becomes not merely an option but an indispensable prerequisite for achieving a high level of sustainability (Murad, 2024). This emphasis on human capital development underscores the understanding that sustainable practices are not merely technological or procedural adjustments, but require a fundamental shift in organizational culture and employee mindset.

However, the adoption of green supply chain management presents unique challenges, particularly in emerging economies like Vietnam. The “green concept” remains relatively novel to many Vietnamese businesses, who may lack the necessary expertise and infrastructure to implement sustainable practices effectively (Duong, 2022). This lack of familiarity, coupled with potential resource constraints, can create significant obstacles to the successful integration of green principles into existing supply chain operations.

Despite these challenges, Vietnam’s dynamic and emerging economy presents a plethora of opportunities for businesses seeking to embrace sustainability. The nation’s strategic location, growing industrial base, and increasing integration into global value chains offer a fertile ground for the development of green supply chain initiatives. Furthermore, the Vietnamese government has demonstrated a growing commitment to environmental sustainability, implementing policies and regulations aimed at promoting green practices across various sectors.

This paper delves into the multifaceted landscape of green supply chain management in Vietnam, examining both the challenges and opportunities

associated with this transformative process. It specifically focuses on the critical role of human capital development, exploring the need for targeted educational programs and training initiatives to equip the Vietnamese workforce with the necessary skills to drive sustainable supply chain practices. This exploration is grounded in the understanding that fostering a culture of environmental awareness and competence within organizations is paramount to achieving long-term sustainability goals.

## **2. LITERATURE REVIEW**

### **2.1 Green supply chain**

Green supply chain is the application of green practices all through the main stages in the flow of products, ranging from the procurement of raw materials and production to the distribution to consumers and the disposal of used goods (Zhang et al., 2024). Green practices refer to the consideration of negative environmental impacts emanating from all activities in the supply chain and implementing plans and methods to mitigate them. Since the supply chain not only consists of one entity, which is the business itself, a green supply chain is the process conducted by many stakeholders, like businesses, suppliers, and consumers (Zhang et al., 2024). In order for businesses to carry out green supply chain practices, they have to form strategic relationships with suppliers with the same motives and visions as well as try to gain the support and attention from the local consumer communities. The purpose of a green supply chain is to create an ecology where every inhabitant is environmentally responsible and develops sustainability.

The concept of a green supply chain is inextricably linked with the concept of management. As a green supply chain is, in fact, an ecology where different entities participate in and contribute their

own efforts, the practices that businesses implement in this process are associated with the management of activities and related stakeholders (Feng et al., 2022). Green supply chain is an innovation in the modern business landscape designed to meet current environmental norms and expectations (Feng et al., 2022). In other words, it is the way businesses cope with the changes in society as well as among consumers in the world towards environmental issues relating to the activity of trading and logistics. Green supply chain is the sustainable direction for businesses and governmental agencies to diminish the amount of greenhouse emissions around the globe, especially in the heavily industrialized areas (Abbasi & Ahmadi Choukolaei, 2023).

Several studies have been conducted to examine the effect of green supply chains on the sustainable development of the economy. Green supply chain assists the nation's development in three aspects: environment, society, and economy, as well as enhances the sustainability of major industries and businesses (Khan et al., 2024). As for businesses, a green supply chain not only improves environmental performance but also serves as a vehicle to implement more strategic management and marketing innovations in the future (Roh et al., 2022). Well-implemented green supply chain policies showcase businesses' managerial capabilities as well as the creativity to come up with alternative and more efficient, sustainable practices. And with the technological explosions in recent years, the application of green supply chains in managerial activities has involved modern tools and information systems like big data platforms or artificial intelligence (Rashid et al., 2025). In other words, green supply chain benefits the business activities as well as social well-being through the enhancement of innovative processes and

sustainable policies with the assistance of current technological bases in the modern world; and as it improves the level of innovation and efficiency within businesses, green supply chain is also the key to gaining a competitive edge in the marketplace and attracting potential customers, especially more environmentally conscious ones.

## **2.2 Environmental education—the key in promoting green supply chains and green economic growth**

Environmental education is the conveyance of green practices and policies so that citizens or the personnel in businesses can modify their current behaviors and update their knowledge of environmental issues (Parmawati et al., 2023). Environmental education is often used to refer to the training and development of human resources within organizations which is the reflection of businesses' current policies and visions in the future (Murad & Zou, 2024) including supply chain and human resource professionals from the period of December 2021 to June 2022. Findings The partial least squares-structural equation modeling version 4 is applied to assess the data and test the hypotheses. Under the notion of resource-based view theory, the findings demonstrate that GHC has a positive and significant relationship with GSCM practices (environmental education and internal environmental management. The human resource is the direct transformer of business policies and visions into reality; hence, environmental education is the centerfold for businesses to achieve sustainable growth and be more accountable for the current environmental debacle. Environmental education is closely associated with the company's policies to foster green human capital inside the organizational structure, which facilitates the managerial and operational activities to develop sustainably (Hu &

Zhao, 2024) the concept of the intersection of green supply chain management and sustainable development is dissected at a foundational level. However, there has been little attention paid to how GSCM, GHC, environmental performance, and economic performance all relate to one another. This study fills that void in the literature by giving hard data to encourage businesses in the China area to adopt GHC (green human capital). Environmental education serves as the catalyst for business strategic pro-environmental plans and practices, as the implementation of these tactics requires an innovative and adept force of employees.

As for the impacts on green supply chain development, environmental education is proved to help stoke the fuel from within organizations and create the foundations for them to promote pro-environmental practices in their operations (Parmawati et al., 2023). In other words, the green human capital gained from the application of education is the internal force that pushes the business policies and visions ahead. All the stages in a supply chain of a business, such as procurement, production, sales, and transportation require a sufficient and skilled labor force; hence, the improvement of green behaviors within this force will result in heightened and sustainable management of the entire supply chain. Education plays an important role in raising employees' awareness towards environmental issues as well as equipping them with adequate skills and foundations to participate in the company policies to help diminish the environmental impacts from business activities (Parmawati et al., 2023). This increasing level of environmental awareness then spreads through the organizational structure, creating the pro-environmental culture inside the businesses, which is a favorable condition to further implement green supply chain practices. Green education is the way that firms can establish

a sustainable working culture and positive internal environmental targets, which is of great significance towards achieving high external performance and gaining customer trust and cooperation (Teixeira et al., 2016) such as green purchasing and cooperation with customers, presents several challenges, often due to a lack of green training. In order to analyze the relationship between green training and green supply chains, a survey of Brazilian firms with ISO 14001 certification was conducted. The main characteristics of green training in the sample were also explored. The results indicated that green training is positively correlated with the adoption of green supply chain practices in green purchasing and cooperation with customers, confirming the study's main hypothesis. The research results also indicated that green training tends to help firms improve their green supply chain management to cooperate with customers and implement green purchasing. This work extends the current literature by showing that employees' green training content and requirements for greening suppliers should be further aligned. This alignment should also involve cleaner production priorities built up through customer cooperation. As a consequence, firms will reach internal environmental targets and achieve external environmental improvements (such as through having greener suppliers. Environmental education bridges the gap between theoretical management policies and empirical evidence, which is the level of success businesses acquire in building a robust and sustainable green supply chain (Junejo et al., 2023). Environmental education is also the vehicle for environmental strategies and visions of one company to burst into life. The cultivation of the internal human resource is the way businesses can renew their operations and be more flexible to the current trend of development, which



in turn accomplishes new targets, both economically and environmentally.

### **3. THE REALITY OF GREEN SUPPLY CHAIN AND SUSTAINABILITY EDUCATION IN VIETNAM**

Vietnam, an emerging economy, has witnessed considerable growth over the years due to increasing trading activities and international integration. As the world is becoming more concerned with the sustainable practices implemented in trading and logistics activities, the Vietnam government also jumped on the bandwagon in promoting green supply chains. On December 16, 2022, the government issued Resolution No. 163/NQ-CP, posing tasks and solutions to improve Vietnam's competitive edges in the logistics sector as well as implementing sustainable practices in supply chain management (Viet Nam News, 2024). In addition, Vietnam also participated in COP26 held by the United Nations, which committed to adhere to green practices that reduce climate change. These events show governmental attention to current environmental issues and the endeavor to tackle them. However, despite the promising scenario proposed by the governmental policies and conferences, the reality of implementing green supply chains in businesses remains a major problem at present. One of the pivotal challenges to green supply chains practices is the deficit in skills and knowledge of the current human resources. The survey conducted by the Ministry of Industry and Trade has shown that over 73.2% of the businesses in Vietnam have successfully implemented green practices in their supply chain and logistics activities (Trang & Linh, n.d.). However, most of the businesses in Vietnam are small and medium-sized, which poses the problem relating to the lack of in human capital. A report in 2022 posited that only 3.17% of businesses in Vietnam possess

personnel of over 50 people, and over 40.22% of those only consist of under 5 employees (Khanh Chi, 2022). Moreover, a majority of businesses answer that both the grassroots and managerial levels in the organization are possessing a low level of knowledge and skills. Governmental estimates have pointed out the need for over 2.2 million laborers until 2030, of whom 200,000 are skilled and proficient in certificates and languages (Nhat Duong, 2022). The lack of labor and then the lack of skilled ones are the obstacles for many businesses to carry out green supply chains on a larger scale.

Given the deficit in the current human resources, there is a pressing need for businesses to develop sufficient and effective training programs for their employees. However, a survey proposes that 60 to 80% of Vietnamese businesses perceive their own personnel to be of low competency (Duong, 2022). Hence, besides education within the universities and vocational schools, businesses need to offer training programs to their employees to get them accustomed to practical situations and the business operational process. A report on Australian Aid in 2019 has shown that many Vietnamese businesses have put great effort into implementing training programs for their employees, but the effect is not so large in scale (Duong, 2022). According to the results of this report, over one third of the businesses choose to focus on developing their own training course, and almost one third of those send their employees to take part in extra-organizational programs. On the contrary, the total number of businesses that dispatch employees to universities, both located domestically and overseas, accounts for less than 5% of the aggregate. This leads to a quite low percentage of skilled labor force inside businesses as most of them have taken part in the training process but not invested heavily in it.

As for green supply chains and environmental education, the current reality of Vietnamese businesses seems to be worse off, as many of those considered the sustainability practices to be a burden and of lower priority (Song Ha, 2023). 70% of businesses are not fully equipped with sufficient knowledge and the benefits brought by implementing green practices in their operations. As these businesses are not even ready to embrace the green supply chain practices in their own motives, the probability of them training their employees in this realm is quite slim and, for many cases, is non-existent. However, there are definitely positive changes in business behaviors over the year; for example, many supermarkets in Vietnam have been using shrink wrap and self-destructing plastic bags over the years (Vu, 2024). On the other hand, the government has also stepped in and issued instructive policies towards implementing a green supply chain inside businesses, such as Decision No. 2308/QĐ-BCT providing criteria and indicators to assess the level of green practice adoption in the retail distribution system, or the Handbook on Environmental Management in Goods Distribution Facilities issued by the Ministry of Industry and Trade, focusing on the current issues and instructions in different stages of building a distribution system. These efforts suggest a brighter future for green supply chain development and environmental education, contingent on government and business collaboration to solve current challenges.

***The opportunities to promote green supply chains and green economic growth through education in Vietnam***

One of the opportunities for businesses to promote green supply chain education inside their organizational structure is the favorable condition provided by the government. The Vietnamese government has developed

significant attention towards the application of green supply chains over the years, and this can be the ultimate chance for businesses to take part in the process. The policies and instructions issued by the government can be the resources for businesses to brush up on their knowledge about the application of green supply chains. In order to construct an effective educational program, the business itself needs to acquire a sufficient repertoire of knowledge and skills beforehand. Hence, the managers of businesses have to keep up with the changes in sustainable development of the supply chain in the modern world so that they can be confident enough to convey the knowledge to their inferiors. Instructions and favorable policies from the government are the launching pad for corporations to start applying green supply chain practices in their operations. In addition, the international conferences that the Vietnam government has actively participated in over the years will boost international integration in the application of green supply chains, which is the opportunity for businesses to seek foreign partnerships and gain more resources to turn the process into reality. Favorable governmental regulations and the increasing speed of integration and volume of trading activities are the solid foundation for businesses to update their knowledge on the sustainable practices in the current supply chain landscape and then transfer these resources to their employees.

The second opportunity to integrate environmental education in the business operations is the existence of big corporations, especially foreign ones, which have successfully implemented standardized programs to train their employees. Besides, big corporations also issue annual sustainability reports providing information on their application of green practices and programs, which can be deemed a benchmark for smaller businesses to refer to and apply back into their own operations

and organizational structures. Vinamilk serves as a prime example. According to its sustainable development report in 2023 (Vinamilk, 2023), Vinamilk has developed a favorable working condition with a focus on the training and development of employees along with implementing green practices like sustainable raw materials, green energy use, and circular economy application. In addition, Vinamilk also collaborated with experts in education to conduct educational programs not only for their own employees but also done as a contribution to increasing the knowledge level of the youth communities and general consumers. These programs are the precedent and opportunity for many businesses to follow and apply green supply chain practices in their operations and educational plans.

The integration occurring on a worldwide scale has certainly brought businesses with foundations to collaborate and develop educational programs towards green supply chain practices. Another opportunity that comes along with this trend is the unification of customer preferences worldwide for green products and green practices implemented by businesses. Hence, the development of green supply chain education in businesses is not a money- and time-consuming process because it helps increase the brand image and attracts potential customers. In addition, the international integration that has happened in recent decades has brought about the emergence of standardized international certifications and instructions associated with the application of green supply chain practices, which are the references for businesses to embrace and transfer the information to employees.

***The challenges to promoting green supply chains and green economic growth through education in Vietnam***

Besides the opportunities to incorporate environmental education in businesses and

enhance the application of green supply chains, the first challenge to implementing green educational programs is the lack of modern training infrastructure in the logistics and supply chain realm. The current facilities at universities and vocational schools in Vietnam are considered to be limited and lacking in qualified human resources (Duong, 2022). In addition, the main teaching method in these institutions mostly focuses on the theoretical approach without many activities and hands-on courses outside the scope of classrooms. Such practices can lead to the knowledge learned by students being out of touch with reality and cause businesses to have to train their employees from scratch. In addition, most courses in universities are introductory to the logistics and supply chain industry, so a specific niche like green supply chain will not be covered exhaustively in the academic environment. This can cause difficulties for businesses to conduct green supply chain practices, as these seem quite foreign and novel to the current labor force.

The second obstacle comes from within the business itself, which is the cost problem. As the concept of green supply chains is relatively new, its application requires businesses to modify certain components of their current processes and activities as well as seek new partners and suppliers. This entails businesses investing money and time in building new policies, applying new processes, and more importantly, training their employees with new knowledge and skills. Both the transforming process and the construction of new training programs for employees require financial resources from the businesses. Hence, small and medium-sized companies can grapple with implementing green supply chain practices among employees, as it is a time- and money-consuming process. Economic incentives can be the obstacle that hinders the intention to change of businesses.

Greenwashing is a process that takes time and efforts, yet the yield is not immediate, causing many businesses to be reluctant to take part in the process.

Finally, the challenge to developing environmental education is the lack of skills and knowledge about the green supply chain of the business itself, more particularly the managerial board. As previously mentioned, many Vietnamese businesses lack a clear understanding of green supply chain trends, making it nearly impossible to effectively communicate sustainable practices to their employees. One reason for this lack of knowledge is the governmental policies currently mostly rely on the voluntary intention of businesses, which is quite ineffective. Many policies only theoretically encourage the application of the green supply chains without clear instructions and strict enforcement. Therefore, businesses may embrace the application of green supply chains in spirit without the clear intention to carry out the actual actions, as there are no legislative boundaries that force them to do so.

#### **4. SUGGESTIONS TO PROMOTE GREEN SUPPLY CHAIN AND GREEN ECONOMIC GROWTH THROUGH EDUCATION**

In order for environmental education, especially towards the concept and application of green supply chains, to foster in the business landscape, the collaboration between governmental agencies and corporations is of great importance. The paper proposes some suggestions for the government and businesses to promote green supply chain education in the organizational structure. First, the government should continue to invest in higher educational systems relating to the logistics and supply chain industries. The new curriculum should incorporate current trends, more particularly

more sustainable and greener activities, in the industry as well as more practical courses where students get to apply their knowledge to solving real problems occurring in the business landscape right after theory classes at schools. As for businesses, the awareness of current educational policies is crucial as it provides them with the knowledge about the level of the labor force as well as the gap in training programs in academia so that they can develop their own employee educational approach. The reference to governmental policies and the official curriculum of universities and vocational schools is the guideline for businesses to notice which skills or knowledge the current human resources lack and incorporate these deficits in the training and development plans inside corporations.

Second, to solve the financial resource problems, the government should take part in more international conferences and agreements, as it will showcase the effort of the nation to solve the environmental issues around the globe and, in turn, attract more foreign investments to assist with infrastructure constructions and green supply chain system enhancement. Global integration is the favorable condition to promote green practices and sustainable economic growth on a nationwide scale. As the greenwashing process is the global task right now, the Vietnamese government can receive the assistance in terms of financial resources and instructions from more developed countries to improve the sustainability level of the economy contemporarily. As the government becomes more active in environmental conferences held internationally, local businesses can capitalize on this opportunity to seek foreign partnerships that help with the lack of resource problem. Local businesses can use the indigenous market knowledge as their “weapon” to attract the attention of larger companies from overseas to form strategic



business relationships. This collaboration can provide local companies with the standardized human resource training and development programs that already exist and foster in the big corporations.

Third, governmental agencies should impose stricter regulations to enforce the application of green supply chain practices within businesses. Depending completely on the voluntary intentions of businesses is an ineffective move as most businesses will fall back into their old ways and strategies of operation and management. Mandatory regulations are needed to force the application of green supply chains into the business landscape. Besides, instruction policies and official documents need issuing as green supply chains are a relatively new concept to most businesses currently. While encouraging policies and conferences are essential for familiarizing businesses with green supply chain trends, mandatory regulations are crucial for ensuring implementation and achieving tangible results. In addition, performance measuring tools and frequent audits need to be implemented to assess the efficiency of businesses in embrace the green supply chain practices in their operations. The government's strict assessment regulations can incentivize businesses to take the implementation of the new process more seriously, as it requires skilled and knowledgeable human resources, and to develop their own employee training

and development strategies. To reinforce the correlation between businesses and the government, rewards and official acknowledgments should be given when specific companies perform well and achieve high sustainability status in the organizational culture and activities.

## 5. CONCLUSION

The increasing volume of trading activities and industrialized processes has brought significant and rather positive changes to the economy of many nations. However, the environmental impacts that come along with this development are on the rise and become more widespread over the years, posing the need for businesses to change their operations in a more sustainable and greener way, and to do so, the investment in training and educating employees about the green supply chain is extremely crucial. But besides the opportunities to implement the new concept inside businesses like international integration and considerable governmental efforts, there are certain challenges to the transformation of the current business landscape in Vietnam, most notably the lack of financial and adequate human resources and loose governmental regulations. Hence, in order for the situation to improve, the changes in both the government's policies and business strategies are the way to tackle the problem and shift the current reality.

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# HƯỚNG TỚI CHUỖI CUNG ỨNG XANH: VAI TRÒ THEN CHỐT CỦA GIÁO DỤC ĐỐI VỚI TĂNG TRƯỞNG KINH TẾ VÀ PHÁT TRIỂN BỀN VỮNG

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**Tóm tắt:** Trong bối cảnh thế giới ngày càng kết nối và số hóa, chuỗi cung ứng hiện đại đóng vai trò quan trọng đối với thương mại và tăng trưởng kinh tế. Tuy nhiên, tác động môi trường của chuỗi cung ứng, bao gồm các hoạt động mua sắm, sản xuất, đóng gói và vận chuyển đang đặt ra những mối quan ngại lớn đối với các nhà nghiên cứu và hoạch định chính sách. Do đó, các tập đoàn toàn cầu đang tích hợp các ứng dụng thực tiễn xanh vào hoạt động của mình. Quá trình chuyển đổi này đối mặt với nhiều thách thức lớn, đòi hỏi nguồn lực tài chính và nhân sự mạnh mẽ cùng với quản lý chiến lược.

Bài báo này tập trung vào khía cạnh nhân sự, đặc biệt là kiến thức và kỹ năng của lực lượng lao động trong bối cảnh chuỗi cung ứng xanh đang hình thành tại Việt Nam. Với tính mới mẻ tương đối của các biện pháp bền vững tại Việt Nam, lực lượng lao động hiện tại còn thiếu các năng lực cần thiết cho sự chuyển đổi này, điều này đòi hỏi phải tăng cường các chương trình giáo dục có tổ chức. Sử dụng dữ liệu thứ cấp từ các nguồn tin chính thức và nghiên cứu trước đó, nghiên cứu phân tích tình trạng hiện tại của giáo dục môi trường trong các doanh nghiệp Việt Nam cũng như các chính sách liên quan của chính phủ. Bài báo xác định cơ hội và thách thức trong việc triển khai giáo dục chuỗi cung ứng xanh và đề xuất các chiến lược hợp tác giữa doanh nghiệp và chính phủ nhằm thúc đẩy phát triển bền vững và tăng trưởng kinh tế mạnh mẽ.

**Từ khóa:** chuỗi cung ứng xanh, giáo dục môi trường, nguồn nhân lực, phát triển bền vững, ứng dụng thực tiễn xanh

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## Ghi chú

Tác giả xác nhận không có tranh chấp về lợi ích đối với bài báo này.