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THỰC HÀNH THEO HƯỚNG BỀN VỮNG VỀ MÔI TRƯỜNG TRONG HOẠT ĐỘNG LOGISTICS CỦA FEDEX VÀ BÀI HỌC KINH NGHIỆM CHO CÁC CÔNG TY VIỆT NAM

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Tóm tắt

Bài viết nhằm mục đích đánh giá các thực hành theo hướng bền vững về môi trường trong hoạt động logistics của FedEx và cung cấp những cái nhìn có giá trị và những bài học áp dụng để nâng cao tính bền vững trong hoạt động của các công ty cung cấp dịch vụ logistics tại Việt Nam. Để đạt được mục tiêu này, bài viết đã phân tích kỹ càng dữ liệu thứ cấp từ các báo cáo chính thức và dữ liệu do FedEx cung cấp trên trang website, cùng với những thông tin từ các nguồn nghiên cứu đa dạng liên quan đến các hoạt động trước đây của FedEx. Kết quả nghiên cứu cho thấy FedEx cam kết hoạt động trung hòa carbon vào năm 2040 thông qua các biện pháp đổi mới bền vững, thể hiện ở việc giảm 15% cường độ phát thải và các biện pháp tác động đến môi trường. Từ đó, nhóm tác giả đề xuất một số biện pháp để các công ty logistics Việt Nam cải thiện hiệu quả hoạt động bền vững của mình. Khi các doanh nghiệp này phát triển lớn mạnh hơn trong tương lai, việc điều chỉnh các chiến lược bền vững về môi trường của họ sẽ được hưởng lợi từ những phát hiện của nghiên cứu này.

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Từ khóa: Logistics, Thực hành theo hướng bền vững về môi trường, FedEx

ENVIRONMENTAL SUSTAINABILITY PRACTICE IN FEDEX LOGISTICS OPERATIONS AND LESSONS LEARNT FOR VIETNAMESE COMPANIES

Abstract

The study aims to evaluate the Environmental Sustainability Practices within FedEx logistics operations and provide valuable insights for Vietnamese logistics providers, offering lessons that can be applied to enhance sustainability in their operations. To this end, this study critically analyzed the secondary data from official reports and data provided by FedEx on its official website, coupled with insights from diverse research sources concerning FedEx's past activities. The results of the study showed that FedEx is dedicated to achieving carbon-neutral operations by 2040 by successfully implementing innovative sustainability measures, demonstrating a 15% reduction in emission intensity and environmentally impactful practices. From this, our team proposes several measures for Vietnamese logistics firms to improve their sustainability performance. As the businesses grow faster and bigger, their new adaptation of environmentally sustainable strategies will benefit from the findings of this study.

Keywords: Logistics, Environmental Sustainability Practices, FedEx

1. Introduction

The logistics industry plays a significant role in our economy. The demand for efficient and prompt delivery of goods from consumers necessitates the utilization of various transportation modes, including rail, air, vehicles, and now drones. Unfortunately, this extensive transportation network has a significant impact on the environment. However, with the world's population increasing and common overconsumption habits, this pattern of production and consumption is unsustainable in the long term (Richard, 2020). The adverse effects of environmental changes are increasingly affecting human health, lifespan, and leading to a rise in natural disasters. The everyday logistics operations contribute significantly to environmental pollution and waste, posing a challenge that requires resolution through environmental sustainability strategies (Croom et al., 2018; Sathaye et al., 2006). A growing number of companies within the logistics sector are actively addressing environmental concerns raised both internally and by their customers. By improving their environmental performance, logistics providers have the potential to reduce the negative environmental impacts of their service activities, ultimately strengthening their competitive advantage (Wong et al., 2016). Therefore, logistics service providers play a role in contributing to a sustainable environment.

Numerous leading logistics providers have implemented a diverse array of policies geared towards sustainability, showcasing positive impacts on both the environment and their overall operations. Notably, DHL's Environmental Protection Program has demonstrated positive environmental impacts by integrating sustainability into both logistics operations and future vision,

resulting in improved management systems (Tran et al., 2019). Thanks to this program, in 2007, DHL set out an efficiency rate goal to be achieved by 2020, but it reached out the target long before the deadline in 2016 to reduce 30% of total carbon emission (DHL, 2017). Nevertheless, this study lacks the detailed aspects of DHL's sustainability strategy, given that the company maintains confidentiality regarding certain aspects of its sustainability initiatives. Additionally, literature on FedEx primarily focuses on managerial aspects rather than delving into its sustainability strategy. Young-S. J (2015) examined FedEx's environment-friendly management practices, contributing to sustainable development by significantly reducing vehicle emissions. However, those analyses did not provide the comprehensive exploration of FedEx's strategic approach to sustainability and its potential implications for Vietnamese businesses. To address this gap, this study aims to conduct a thorough analysis of FedEx's environmental sustainability practice as well as offering insights into its operational aspects and extracting valuable lessons applicable to the Vietnamese context.

This qualitative study aims to conceptualize a strategy for improving environmental sustainability in FedEx logistics operations. First, we will assess the current state of FedEx's environmental sustainability practices in logistics operations, focusing on any notable changes toward environmentally sustainable operations. Subsequently, we will evaluate the current situation within the general supply chain activities of Vietnamese logistics companies, highlighting the necessity for heightened awareness of environmental issues in the logistics sector. Additionally, we will discuss the opportunities, challenges, and provide recommendations for Vietnamese logistics companies.

2. Theoretical framework

This part lays the foundation for understanding the concept of environmental sustainability and its specific application within the logistics industry. It establishes the theoretical context for analyzing FedEx's practices and extracting valuable lessons for Vietnamese companies.

2.1. Sustainable practice

The concept of sustainability encompasses various perspectives, including sustainable cities and societies. According to the "Report of the World Commission on Environment and Development: Our Common Future" by the World Commission on Environment and Development (WCED) in 1987, the concept of sustainability encompasses the pursuit of activities that meet the needs of the present without compromising the ability of future generations to meet their own needs. This definition is most widely acknowledged in both academics and business (Martins et al., 2019).

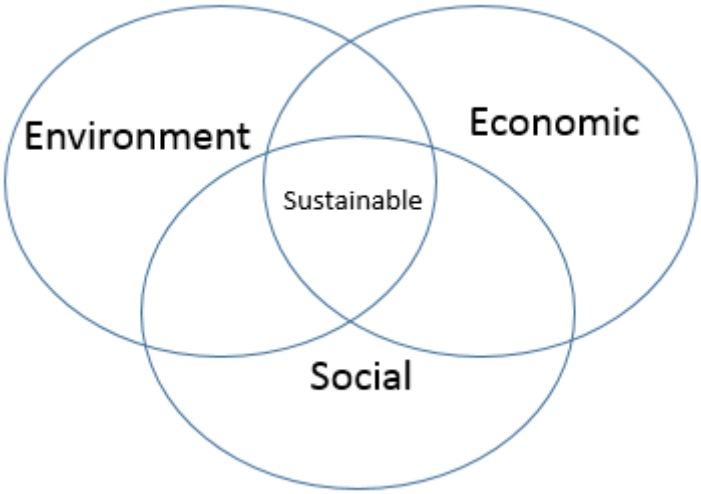

Figure 1. Three circles presenting the three different aspects of sustainability

Source: Elkington (1998), Thatcher (2015)

Sustainable development seeks to improve social, economic, and environmental sustainability while balancing environmental concerns with economics, improves human well-being and lessens environmental damage overall (Wichaisri & Sopadang, 2014). Moreover, the term is described as "the incredibly prevalent green perspective to corporate processes" (Alameri, 2021). Sustainable development can be illustrated in the interlocking circle model (Figure 1). The framework not only assigns equal significance to each of the three lines, creating a sense of balance within the framework (Elkington, 1998) but also highlights the interdependence among the three fundamental elements (Foley, Bogue, and Onakuse, 2016).

To achieve sustainability, industries must adopt sustainable practices throughout their supply, manufacturing, and distribution chains (Martins et al., 2019). Notably, businesses must consider being "actively concerned about the environment, human rights, work requirements, anti-corruption, business ethics, gender equality, and diversity." (Tsvetkova et al., 2020). A sustainability practices framework has been developed, including ten areas for companies to focus on: Energy Efficiency & Conservation, Water & Wastewater Systems, Green Building, Waste Reduction & Recycling, Climate Friendly Purchasing, Renewable Energy & Low-Carbon Fuels, Efficient Transportation, Land Use & Community Design, Open Space & Offsetting Carbon Emissions, and Community & Individual Action (Institute for Local Government, 2013).

2.2. Environmental sustainability practice

Stated by The US Department of Energy, within the broader framework of sustainable practices, environmental sustainability practices to minimize emissions, prevent pollution and waste, and consume less energy by including sensible resource use as an essential foundation of day-to-day operations. Specifically, environmental sustainability practice concentrates on the

environment as a critical aspect while still protecting the economics and social views, different from the balancing of all three circles of sustainability.

In terms of supply chain and logistics, sustainability is crucial for long-term success as it assists in optimizing profitability, minimizing environmental impact, and increasing the quality of life in the community (Wichaisri & Sopadang, 2014). Logistics is the process of planning, implementing, and managing the efficient, effective inventory, services, and related information from point of origin to site of consumption according to the customer's requirements (Council of Logistics Management, 1991). These days, logistics is the foundation of the world economy and is fueled by both production and consumption (Liu et al., 2018). Thus, the more significantly and steadily these two industries grow, the more global concerns for the environment. This is due to the fact that whenever resources are used to produce desired utilities, pollutants are inadvertently produced as byproducts at every stage of the integrated supply chain process (Vidová et al., 2012). Additionally, an enormous amount of energy and CO2 emissions are required yearly to transport billions of tonnes of freight (ISO, 2023). Researchers from the Massachusetts Institute of Technology Supply Chains Initiative estimate that 8% of the world's greenhouse gas emissions are caused by freight transportation. When warehouse operations are included, this percentage rises to 11% (Climate Portal, 2023).

Table 1. CO2 emissions from freight transportation

Type of freight transport	Amount of freight moved (billions of tonne-kilometers)	CO2 emissions (millions of tonnes)
Air	303	155
Rail	10,842	170
Road (mainly trucking and urban deliveries)	26,807	2,230
Sea and inland waterways	101,486	657

Source: Climate Portal, 2023

Environmental sustainability practices in logistics defines the range of actions that companies use in the supply chain to reduce their environmental impact, from the extraction of raw materials to the delivery of the finished product to the customer (Mohsen, 2022). In short, they dive into mitigating the ecological footprint of logistics operations (Dekker, Bloemhof, and Mallidis, 2012).

In 2014, Wichaisri and Sopadang created a sustainable logistics system framework inclusive of three perspectives of environment, economy and society. Centering on the environmental side, the framework suggests businesses to deal with the drawbacks of things like emissions, land use,

raw material use, energy and water consumption, contamination, general and industrial waste disposal due to their negative influence on the environment. For example, in terms of manufacturing, the operations involving chemicals and hazardous materials that can affect the environment are carbon emissions and pollution, which should be kept in mind of the managers and companies for disposal solutions.

Table 2. Environmental sustainability logistics perspectives

Resource Usage	Energy Usage Water Usage Land Use Raw Material Use
Pollution	Air Pollution Water Pollution
Emission	CO2 Emission
Waste	Waste Disposal
Eco-Efficiency	Product/ Service Value Environmental Influence

Source: Wichaisri & Sopadang, 2014

By understanding the theoretical foundations of environmental sustainability practice, the research aims to assess how these principles are implemented within the logistics operations of FedEx, a global leader in the industry and point out valuable lessons for businesses in Vietnam.

3. Environmental sustainability practice in FedEx logistics operations

3.1. Overview of FedEx

FedEx Corporation, previously known as Federal Express Corporation or simply FedEx, stands as one of the largest express transportation enterprises globally. Since its establishment in 1971, FedEx has experienced substantial growth. With a presence in over 220 countries and territories, including Vietnam, FedEx offers a diverse range of services such as FedEx Express,

FedEx Ground, FedEx Logistics, FedEx Freight, FedEx Services, FedEx Office, FedEx Dataworks (Fedex, 2023).

For the fiscal year 2023, according to FedEx, the company achieved a total revenue of $90.2 billion. Within this, FedEx Express contributed $42.7 billion (47% of the total), FedEx Ground contributed $33.5 billion (37% of the total), and FedEx Freight contributed $9.6 billion (11% of the total) (FedEx, 2023). The company's strategic approach of competing collectively, operating collaboratively, and embracing digital innovation serves as a competitive advantage. This approach caters to the needs of customers who frequently utilize services from two or more of FedEx's operating companies.

In terms of environmental sustainability, FedEx is committed to achieving carbon-neutral operations by 2040. Their strategy for promoting environmental stewardship revolves around three main concepts: Innovating operations to minimize environmental impact, undertaking initiatives through research and development, and encouraging customers to adopt more sustainable practices. The company's progress towards the planet shows through its transparency reflected by all of its sustainability reports, FedEx's giving and volunteering initiatives, and publications of the company's emission footprint (FedEx, 2022c).

3.2. Current FedEx's situation of environmental sustainability practice in logistics operations

FedEx's dedication to environmental sustainability is firmly embedded in its "Reduce, Replace, and Revolutionize" philosophy, ultimately aiming for carbon neutrality. Overall, FedEx's environmental sustainability practice proves to be effective with emission intensity decreasing by 15% from 2019 to 2022 (Figure 2, 2023).

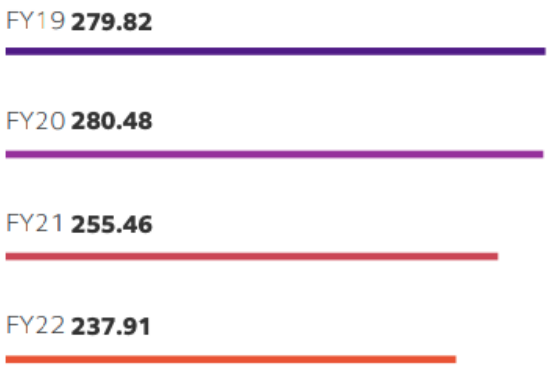

Figure 2. FedEx total emission intensity (metric tons CO2e/million USD revenue)

Source: FedEx, 2023

3.2.1. Reduce

Alternative fuels. FedEx continues to explore and utilize alternative fuels. Its fleet boasts over 6,200 vehicles powered by hybrid, electric, natural gas, and hydrogen fuel cell technologies. Collaborating with key stakeholders, the company actively promotes the future of alternative fuels in logistics and aviation. By incorporating biodiesel blends into 48% of its diesel fuel, FedEx avoided over 20,000 metric tons of CO2 in 2022 alone, demonstrating the effectiveness of this approach (FedEx, 2023).

Aircraft fuel conservation. FedEx has been trying to reduce the fuel consumption of aircraft since 2006 with its FedEx Fuel Sense program. Fuel Sense consists of 40 distinct initiatives, targeting every aspect of air cargo operation from pre-flight planning to post-flight activities. Its aim is to maximize air cargo efficiency and minimize in-flight fuel consumption. The program leverages the collective expertise of flight crews, dispatchers, mechanics, engineers, and analysts to identify and capitalize on ground and airborne optimization opportunities. These opportunities are then evaluated, planned, and implemented across the entire network. One of the initiatives from the Fuel Sense program is reducing aircraft waiting time on the runway. Departure queues at airports pose a significant environmental challenge as aircraft waiting on runways consume excessive fuel and generate harmful emissions (Dissanayaka, Adikariwattage, and Pasindu, 2019). FedEx's improved departure queue management system calculates the most efficient departure sequence for each aircraft within the queue. This dynamic approach ensures that aircraft depart at the optimal time to minimize runway wait times and engine idling. The system has been credited with saving an estimated 45,000 gallons of jet fuel per month, translating to a reduction of approximately 44,000 metric tons of carbon dioxide emissions annually (FedEx, 2012). Another key initiative is optimum profile descent.

Consolidation. From an economic point of view, as a fundamental principle, the unit cost of transporting goods typically decreases with increasing shipment size and distance traveled (Liu et al., 2015). This principle underscores the importance of consolidation, the strategic merging of smaller shipments into larger units for more efficient and cost-effective transportation. Moreover, consolidation can help mitigate carbon and energy waste (Ulku, 2012). Consolidation process at FedEx starts at the origin manufacturing facility, where multiple packages destined for various recipients are strategically consolidated into a single, optimized shipment. This consolidated cargo then undertakes international transportation via air, land, or maritime routes, efficiently clearing customs as one entity. Upon arrival at the designated destination, the shipment undergoes deconsolidation, separating individual packages for direct delivery to customers and retailers, ensuring prompt and efficient fulfillment (Figure 3, 2019). Consolidation is also applied in the FedEx reverse logistics model in the US. Returned items are strategically grouped based on destination, minimizing the number of shipments needed and eliminating unnecessary transportation emissions.

Figure 3. FedEx consolidation model in forward logistics

Source: FedEx, 2019

3.2.2. Replace

Vehicle electrification. By 2025, it aims to replace 50% of its global pickup and delivery vehicles with electrical vehicles (EVs), eventually reaching 100% by 2030 (FedEx, 2023). This timeline underscores FedEx's unwavering commitment to sustainable transportation solutions and its leadership role in driving industry-wide change. Electric vehicles produce zero emissions, which helps to improve air quality and reduce greenhouse gas emissions (Alanazi, 2023). EVs are also becoming more affordable and have longer ranges. This means that FedEx can strike a balance between profits and environmental sustainability. To support the change to electric vehicles, the company has also invested in charging infrastructure. In California alone, FedEx has built over 500 charging stations with the capability to charge more than 1000 electric vehicles (FedEx, 2023)

Aircraft modernization. According to McKinsey, aircraft of the latest generation boast a fuel efficiency advantage of 15-20% compared to their predecessors, and ongoing advancements in engines, materials, aerodynamics, and other areas promise to extend this trend (2022). With over 700 aircrafts, FedEx had saved over 150 million gallons of jet fuel by replacing and retiring older aircraft models, with MD-10 and MD-11 mostly retired by 2024 (Figure 4, 2024). Boeing 767, which is 30% more fuel efficient than the MD-10 they replaced, accounts for about 25% of the active FedEx aircraft fleets.

Aircraft Type	Current			Future [2]	Historic	Avg. Age	Total
	In Service	Parked	Total				
+ ATR 42/72	50	3	**53**	**2**	**14**	22.3 Years	**69**
+ Airbus A300	53	11	**64**		**7**	28.3 Years	**71**
+ Airbus A310					**70**		**70**
+ Boeing 737	12	1	**13**		**5**	22.6 Years	**18**
+ Boeing 747					**6**		**6**
+ Boeing 757	94	23	**117**		**6**	32.1 Years	**123**
+ Boeing 767	131	5	**136**	**7**	**3**	5.1 Years	**146**
+ Boeing 777	55	2	**57**			8.4 Years	**57**
+ Cessna 408 SkyCourier	18		**18**	**6**		0.8 Years	**24**
+ McDonnell Douglas DC-10					**114**		**114**
+ McDonnell Douglas MD-11	38	1	**39**		**36**	30.4 Years	**75**
Total	451	46	**497**	**15**	**261**	18.9 Years	**773**

Figure 4. FedEx fleet matrix

Source: Planespotters, 2024

3.2.3. Revolutionize

Route optimization. FedEx optimizes the efficiency of every vehicle in its fleet. An exemplification is evident in FedEx Express, where the installation of updated GPS tracking systems is underway. By providing drivers with the most efficient turn-by-turn routes, the technology enables them to not only save time but also optimize driving distance, ultimately contributing to a reduction in emissions. Furthermore, within FedEx Ground, independent service providers benefit from dynamic route optimization technology. The primary goal of this technology is to assist independent service providers in planning the most efficient routes for delivering packages. By analyzing real-time data, the system can identify the optimal paths to reach multiple destinations, considering factors like distance, traffic patterns, and delivery time windows. It also helps in making decisions about which types of vehicles are best suited for specific routes, taking into account factors like package size, weight, and the overall delivery schedule (FedEx, 2021). Through the optimization of routes and the careful selection of vehicles, FedEx effectively minimizes or eliminates unnecessary carbon emissions.

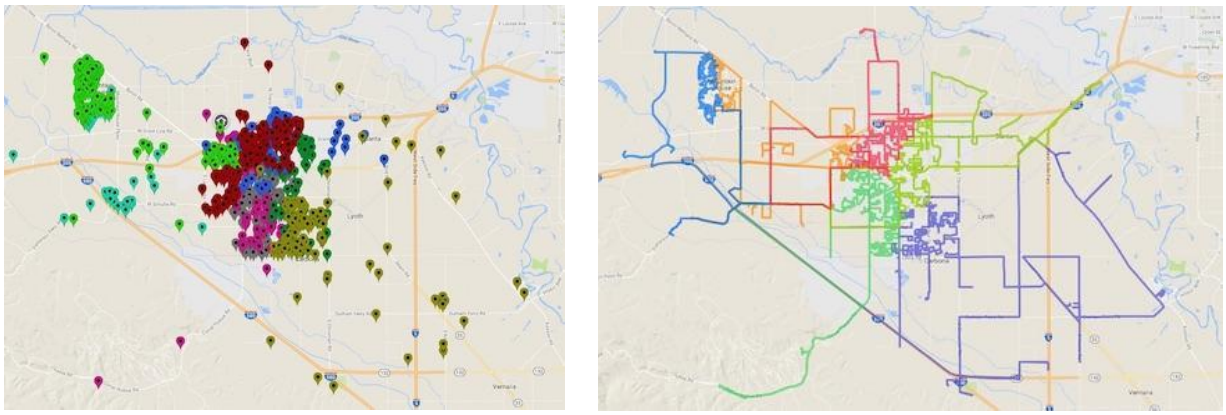

Figure 5. Original and optimized delivery routes for FedEx Ground in Central California

Source: Routific, 2023

Facilities. FedEx owns more than 5000 facilities including air and ground hubs and retail locations. With the investment in EVs and charging stations, the energy demand is expected to increase highlighting the importance of energy management and renewable energy procurement (FedEx, 2023). Firstly, FedEx leverages a centralized energy management system to optimize energy consumption, adjusting settings for occupied and unoccupied buildings based on real-time data. This system helps identify potential energy savings opportunities and proactively address inefficiencies (FedEx, 2021). FedEx has also begun investing in both on-site and off-site renewable energy generation, including 29 solar energy installations as of 2023. However, progress seems limited. With over 122 million square feet of rooftop space across all facilities, an untapped potential for solar energy generation remains. Harnessing this vast rooftop area by installing solar panels could significantly contribute to FedEx's energy needs, powering its buildings and potentially even its growing fleet of EVs (Neumann, 2023).

Packaging. FedEx tackles the environmental impacts of transporting goods through a multi-pronged approach. They minimize packaging materials through efficient design, optimize package size and weight to reduce fuel consumption, and prioritize recyclable materials with a focus on responsible disposal. Beyond their own operations, FedEx empowers customers with a range of eco-friendly packaging options and actively explores carbon-neutral shipping solutions, demonstrating a commitment to minimizing the environmental footprint of every delivery. As a result, FedEx-branded cardboard packaging is 100% recyclable and contains an average of 36% recycled content (FedEx, 2023).

3.3. Evaluation of FedEx's environmental sustainability practice

3.3.1. Situational evaluation according to Environmental sustainability logistics perspectives

Table 3. Evaluation of FedEx based on Environmental sustainability logistics perspectives

Criteria		Presence	Note
Resource Usage	Energy Usage	Strong	Centralized energy management system, investments in renewable energy, and various strategies like route optimization and aircraft modernization demonstrably reduce energy consumption.
	Water Usage	Weak	Water usage and conservation efforts are not the main focus for FedEx.
	Land Use	Weak	Land use for facilities and conservation efforts are not the main focus for FedEx.
	Raw Material Use	Moderate	Strategy for raw material usage is not the main focus for FedEx but it mainly shows through the company's sustainable packages and packaging practices: FedEx-branded packaging is 100% recyclable and composed of 45% recycled content with the majority of their paper being forest-friendly. FedEx also incorporates alternative fibers into its product mix to save trees (FedEx, 2020).
Pollution	Air Pollution	Strong	Focus on alternative fuels, vehicle electrification, and aircraft modernization reduces air pollution.
	Water Pollution	Weak	Water usage and conservation efforts are not the main focus for FedEx.
Emission	CO2 Emission	Strong	Various strategies including investments in renewable energy, route optimization, and aircraft modernization reduced CO2 emission intensity (15% decrease from 2019 to 2022).
Waste	Waste Disposal	Moderate	FedEx has multiple recycling programs in selected locations. For example, FedEx Brazil

			recycles all toners and batteries used in its Brazilian plants. However, data on the effectiveness of these programs are not readily available.
Eco-Efficiency	Product/ Service Value	Moderate	Eco-friendly packaging options and exploration of consolidation shipping solutions for reverse logistics enhance environmental value. However, these strategies are not on the global scale.
	Environmental Influence	Strong	Positive impact through emission reduction (including energy usage), responsible packaging practices, and focus on alternative fuels.

Source: Author's own construction

Table 3 demonstrates the evaluation of FedEx's environmental sustainability practices against a set of Environmental sustainability logistics criteria. It is clear that while several criteria show a strong presence within FedEx's current practice such as Emission, Waste and Eco-efficiency, Resource Usage and Pollution - oriented practices show weaker representation. Based on the characteristics of the logistics industry which rely heavily on transportations and various business considerations, FedEx might prioritize specific criteria like energy consumption and emissions that have a larger immediate impact on their environmental footprint and operational efficiency. Moreover, implementing and maintaining sustainable practices across all criteria requires resources, expertise, and planning. FedEx might be strategically focusing on areas where they have the most potential for impact and where progress can be measured within their current resources and capabilities.

3.3.2. SWOT Evaluation

a. Strengths

FedEx's strengths in its environmental sustainability efforts primarily lie in the transparency of its website and media platforms. The company publishes its own Environment, Social, Governance (ESG) Report in every fiscal year, detailing progress and performance on material ESG topics. In addition to ESG reports, FedEx also releases a Materiality Assessment, with the latest version released in 2019. This assessment addresses their ESG priorities for their customers, team members, shareholders, business, and other stakeholders. Furthermore, FedEx annually reports to the CDP Climate Change Survey Response, a global disclosure platform for environmental impact. According to its website, in 2022, the company attained a B (Management-level) score on the CDP Climate Change Disclosure Ranking for its sustainability and emissions

management. These reports and publications are readily available and easily accessible through the company's website, providing investors and consumers with a transparent insight into the company's current environmental practices.

FedEx also exhibits significant strength in its high commitment and ambition in setting goals. The company has set ambitious sustainability targets, emphasizing its dedication to mitigating its environmental impact. The ambition to achieve carbon neutrality by 2040 (FedEx, 2021) aligns with the urgent need to address climate change. Additionally, the specific goal of Vehicle Electrification, which means by 2040, the entire FedEx parcel pickup and delivery (PUD) fleet will be zero-emission electric vehicles reflects a determined approach to tackling one of the most challenging aspects of its operational carbon footprint, PUD trucks (FedEx, 2021).

Furthermore, FedEx's strength is also evident in its same concentration on sustainability initiatives across all four regions in which it operates: Canada, Latin America and Caribbean, Europe, Middle East, India, and Africa. Several initiatives that have been successfully applied in these four regions are eco-driving in Canada, electric and alternative-fuel vehicles in Brazil and Chile, upgraded trailers, trucks, and tractors in Brazil for more fuel efficiency and lower emissions, cargo bicycles in Europe and solar energy facility in South Africa, etc. Recognizing the global nature of environmental challenges, the company takes a comprehensive approach to sustainability. This broad and inclusive strategy allows the company to address environmental challenges on a global scale, proving its global commitment to sustainability.

b. Weaknesses

FedEx faces several weaknesses in its environmental sustainability practices, notably incurring high sustainability investment costs. For example, in 2021, FedEx devoted more than $2 billion of initial investment in vehicle electrification, sustainable energy, and carbon sequestration. This included a pledge of $100 million to Yale University to help establish the Yale Center for Natural Carbon Capture, accelerating research into methods of carbon sequestration at scale (FedEx, 2022a). This initial investment already occupied almost 50% of FedEx's GAAP net income as of 2021 recorded at $5.23 billion (according to its full year 2021 report). Furthermore, the investment required to do research and development activities to implement innovative, sustainable technologies and practices can also potentially strain the company's financial resources.

In terms of reverse logistics, a notable weakness is the limitation of consolidated returns being available only in the United States as of 2023 (FedEx, 2022c). The Consolidated Returns allows customers in the US to drop off the items they wish to return – no box or label required– at approximately 2,000 FedEx Office locations, which will then be consolidated with other returns from a variety of merchants, saving materials and space, reducing carbon emissions compared to single prepackaged/prelabeled returns. This regional constraint poses a challenge for global sustainability efforts, as the absence of consolidated returns in other regions may result in inefficiencies and increased environmental impact due to fragmented reverse logistics operations.

Another weakness lies in the measurement of FedEx's carbon footprint, where the classification of drivers as contractors rather than employees (Reuters, 2009) distorts the true environmental impact. In its ESG Report 2023, this case still remains. By not including drivers as employees, the company may not accurately account for the carbon footprint associated with its workforce. This oversight could result in underreporting and a lack of transparency regarding the full environmental impact of its operations.

c. Opportunities

FedEx has several promising opportunities to enhance its environmental sustainability effort, with one notable point being the potential development of circular logistics. In a circular logistics system, products and materials undergo a comprehensive process following their initial use. They are gathered, transported to a sorting facility, and meticulously sorted based on their highest value for reuse, repair, refurbishment, remanufacturing, repurposing, or recycling. This approach, known as "closing the loop," prevents products and their constituent materials from being disposed of in landfills and allows for their sustained use in production (Pyxera Global, 2023). Valuates Reports announced in January 2023 that the circular logistics market is projected to reach USD $921.6 billion by 2028 through growth in the returns process. According to Pyxera Global in 2023, embracing circular logistics presents numerous opportunities for logistic companies through leveraging existing services and facilities, improving the value chain by selecting off-takers that adhere to robust sustainability targets, influencing the incentives to collect and redistribute used materials and goods and collaborating pre-competitively with peers and customers, and collaborate intra-company within business units that normally compete. This approach offers FedEx the chance to pioneer innovative solutions that not only benefit the environment but also enhance operational efficiency and customer satisfaction.

The increasing customer concern and preference for sustainable options present another significant opportunity for FedEx. According to Deloitte’s ConsumerSignals, nearly half (46%) of consumers across 23 study countries purchased at least one sustainable good or service in April 2023. In a Deloitte survey fielded in the same month of 2023 targeting adults who purchased a sustainable good or service within the previous month, 8% of green purchases fell into transportation. As environmental awareness continues to rise, consumers are increasingly prioritizing eco-friendly practices and sustainable choices in their purchasing decisions. By aligning its services with these evolving consumer preferences, FedEx can capitalize on the growing market demand for sustainable shipping and logistics solutions.

Moreover, technological advancements offer a unique opportunity for FedEx to bolster its environmental sustainability efforts. The development of new technologies, such as advancements in battery technology and the utilization of hydrogen fuel cells, can revolutionize the logistics industry (Luthada, 2023). These technologies have the potential to power electric vehicles and aircraft, reducing reliance on traditional fossil fuels and lowering carbon emissions. This is aligned with FedEx’s ambitious goals of Vehicle Electrification, Sustainable Fuels and Fuel Conservation and Aircraft Modernization.

d. Threats

FedEx faces significant threats including the challenge of customer skepticism arising from the case of greenwashing prevalent in the industry. In 2022, the Harris Poll conducted a survey which reveals that 72% of the participants from companies headquartered in North America acknowledged that their respective companies had exaggerated their sustainability initiatives and were involved in greenwashing (Aristova, 2023). One example is Amazon who in September 2023 resorted to the purchase of carbon credits (Twidale and Henderson, 2023) to enhance their environmental image without making substantive changes. As a result, customers may become increasingly skeptical about the authenticity of sustainability efforts. This skepticism can undermine the credibility of FedEx's own sustainability initiatives, even if they are genuinely impactful.

International operations introduce another threat to FedEx's environmental sustainability efforts, given the diverse and sometimes conflicting regulations across different regions. Navigating varying environmental standards and regulations across four different regions in its operations can pose a significant challenge. Compliance with different rules and requirements may result in increased operational complexities and costs for FedEx.

Furthermore, the rise of greener rivals poses a competitive threat to FedEx. As more companies prioritize and invest in sustainable practices, competition intensifies in the logistics industry. FedEx faces huge competition in the green area from several counterparts such as Deutsche Post AG and United Parcel Service Inc (UPS). This is evident as in the Top 500 Greenest Companies - Green Ranking 2017 (Newsweek, 2017), UPS stood at 149 and Deutsche Post AG at 89, far higher than FedEx at 210. Rivals that successfully establish themselves as leaders in green logistics may attract environmentally conscious customers, potentially eroding FedEx's market share.

4. Recommendations for Vietnamese logistics companies

4.1. Current situation

Government Policies

Being one of the six countries most severely affected by climate change, Vietnam consistently takes responsibility in fulfilling international commitments related to climate change mitigation and environmental protection.

Internationally, Vietnam signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. At the 2021 United Nations Climate Change Conference (COP26), Vietnam committed to reduce greenhouse gas emissions, aiming to reduce methane emissions by 30% by 2030 and achieve net-zero emissions by 2050 (Figure 6).

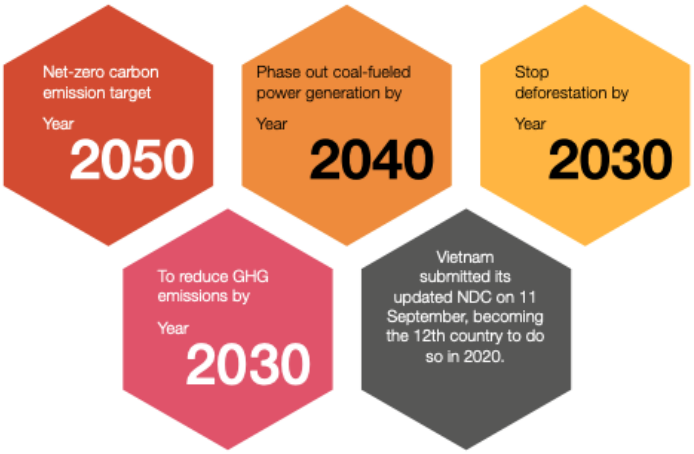

Figure 6. Vietnam's commitment to tackle climate change

Source: PwC, 2022

Domestically, since 2010, Vietnam has had regulations for the development of green transportation. Circular No. 16/2010/TT-BGTVT issued by the Ministry of Transport on June 30, 2010, outlining the management and operation of airports and airfields, requiring assessments on environmental impacts be publicly published and regularly monitored.

On October 29, 2020, the"Green Port Development Project in Vietnam" was approved. Starting from 2023, pilot green port models will be implemented in some Vietnamese ports, with mandatory application of green port criteria in Vietnam after 2030.

Clause 1, Article 65 Law on Environmental Protection 2020 states that "Transport vehicles must be tested and certified conformable with technical regulations on environment by registration authorities in accordance with regulations of law and international treaties to which the Socialist Republic of Vietnam is a signatory." This requires transport enterprises in Vietnam to regularly inspect and upgrade their vehicle fleets, plan for the use of environmentally friendly vehicles, thereby increasing the level of green logistics.

On July 22, 2022, decision No. 876/QD-TTg approved the "Action Program on Green Energy Transition", with an aim to reduce carbon and methane emissions in the transportation sector, developing a green transportation system towards achieving net-zero greenhouse gas emissions by 2050.

National infrastructure

As of June 2022, 23 segments of the highway network are operating, equivalent to 1,239 km. 14 segments are under construction, totaling 840 km. By 2022, 10 crucial road projects (worth 8,000 billion VND) have been invested in, upgraded, completed, and put into operation, enhancing the connectivity of the road transport network. However, infrastructure shortcomings in road transport include narrow and substandard quality roads, improper distribution of highways,

overpasses, and tunnels affects vehicle quality and transport time, leading to frequent traffic congestion and increased greenhouse gas emissions.

Regarding inland waterway transport, there are 292 inland ports nationwide, including 217 cargo ports, 12 passenger ports, 2 general ports, and 63 specialized ports (Ministry of Industry and Trade, 2022). Regarding sea transport, Vietnam's seaport system comprises 286 ports, categorized into 5 groups, with a total wharf length exceeding 96 km. The infrastructure can handle a cargo throughput of over 706 million tons in 2021 (Ministry of Industry and Trade, 2022).

In terms of rail transport, the national railway network has a total length of 3,143 km and 277 stations, including 2,703 km of mainlines, 612 km of sidings and branches, covering 7 mainlines. The railway network interconnects in Hanoi, passing through 34 provinces and cities, including 4 out of 6 economic regions nationwide, with 2 railway lines currently connecting with China. The railway density is approximately 9.5 km/1000 km2 (an average level in the ASEAN and global context).

Regarding air transport, the country has 22 operating airports with a total area of about 11,859 hectares, including 9 international airports and 13 domestic airports (Ministry of Industry and Trade, 2022). The air cargo transportation market has experienced significant growth, reaching a cargo volume of 1.3 million tons in 2021 and surpassing 1.52 million tons in 2022, nearly 83 times higher than in 1991 and 21.2% compared to 2019. The average annual growth rate for the period 1991-2022 is 15.3%.

Logistic enterprises

Vietnam currently has more than 30,000 registered businesses operating in the logistics sector. The logistics market sees the participation of over 5,000 logistics service providers, with 89% being domestic enterprises, 10% joint ventures, and 1% wholly foreign-owned enterprises providing cross-border logistics services (Le, 2022). Despite the majority of businesses being domestic, they only hold about 30% of the market share. The remaining share is dominated by foreign enterprises because Vietnamese businesses are primarily small-scale, with limited capital, up to 90% of them having registered capital below 10 billion VND (Le, 2019).

On average, transport activities emit about 45 million tons of CO2 annually in Vietnam and at an expected annual growth rate of 6-7%, it is projected to reach 90 million tons yearly by 2030. Among all, road transport accounts for the largest proportion with 80% of the CO2 emissions, followed by sea and inland waterway transport at 10%, air transport at 6%, and rail transport at an insignificant rate (Nguyen, 2022). This is đue to the prolonged used of transporting vehicles (averaging 7.5 years with trucks and 14 years with inland waterway vehicles), low vehicle efficiency (train speed at approximately 80-90 km/h), and a shortage of appropriate vehicles (heavy duty trucks accounting for only 7% of the truck fleets) (Ministry of Industry and Trade, 2022). This can be attributed to the fact that Vietnamese logistics enterprises are primarily small-scale and have limited budgets.

Regarding the warehouse systems, the current domestic warehouse system owned by logistic companies has lower quality compared to other Asian countries. Regarding energy for warehouse systems, warehouses primarily use electricity for lighting and temperature control when necessary. Environmentally friendly warehouse features, such as solar energy utilization, natural lighting, suitable space, thick walls and floors, on-site recycling, are requirements in the construction and operation of warehouses by Vietnamese businesses (Ministry of Industry and Trade, 2022).

Surprisingly, the expenses for the logistics operations are considered high. Currently, Vietnam's logistics costs average around 16.8% of GDP, significantly higher than the global average which is 10.6% (Phan, 2022). It is evident that the allocation of investment for logistics activities of Vietnamese enterprises is inappropriate, leading to wastefulness and inefficiency. This is exemplified by a recent survey in 2022 of 237 enterprises, 40.3% of the surveyed businesses reported having a vacant transportation capacity ranging from 10% to 30%. Interestingly, a notable 13% of the businesses indicated that their vacant transportation capacity exceeds 50% (Ministry of Industry and Trade, 2022). The high proportion of empty transport vehicles returning is primarily due to insufficient cargo for round-trip journeys, suboptimal transportation routes, and a lack of resource-sharing with partners.

In terms of last-mile delivery services, a notable concern arises in the form of environmentally unfriendly packages. Delivery agents fail to provide their business partners with sustainable packaging requirements. The existing problem stems from a lack of effective communication and coordination among the delivery agents and sellers. The problem is escalating at an alarming rate as e-commerce, a business field that is closely related to last-mile delivery services, continues to thrive. This market is expected to reach 49 billion USD by 2025 (Thuong, 2023).

Several companies are actively exploring solutions to align with a green transportation strategy and sustainable infrastructure. DHL Express, a leading international express service provider, added 10 electric motorcycles to its fleet in Vietnam in January 2020. In a significant development, VinFast and Ahamove launched AhaFast, a freight transportation service using electric motorcycles – a pioneering initiative in Vietnam. Ahamove has established a delivery network in 17 provinces/cities with over 100,000 partner drivers. VinFast handed over 100 FelizS electric vehicles to Ahamove for the initial deployment of the AhaFast service in Da Nang. The goal is to have 10,000 electric motorcycles in operation by 2025, gradually replacing gasoline-powered and low-quality vehicles that negatively impact the environment.

To contribute to optimizing the transportation process and minimizing environmental impact, Vietnamese logistics businesses have introduced environmentally sustainable practices. These encompass International Freight Management System (FMS), Warehouse Management System (WMS), Transportation and Order Management Systems (TMS/OMS), Sorting/Fulfillment Systems, Automated Storage and Retrieval System (ASRS), and applications for truck, container, and freight booking. Notable Vietnamese companies contributing to this technological advancement include Phaata.com, SmartLog, Logivan, Abivin, NetLoading, and DTK Logistics Solution, among others (Ministry of Industry and Trade, 2022). Viettel Post is considered the

leader in applying these technological strategies. Viettel Post's strategy for sustainable development in logistics encompasses three key steps. In the first mile, the company employs a "Mobile Post Office" model, integrating surveillance cameras, GPS, QR codes, and real-time data updates onto trucks to efficiently sort and categorize goods during transportation, reducing intermediary steps and lowering environmental impact. For the middle mile, Viettel Post addresses the challenge of empty return trips by introducing the "MyGo Transport Platform," achieving a 50% reduction in truck operation frequency, streamlining supply chains, and promoting business activities. In the last mile, the company utilizes Smart Locker solutions, allowing customers to pick up and send packages at convenient locations without courier involvement, resulting in cost savings and a modern service experience (Ministry of Industry and Trade, 2022).

However, the lack of cooperation in the application of technological solutions hinders the development of the logistics industry in a more streamlined direction towards sustainability. There are the lack of connectivity within systems, insufficient information about digital technology, inadequate digital technology infrastructure, a shortage of in-house personnel for digital technology application, difficulties in terms of investment costs, challenges in adopting digital technology, and resistance to changes in business habits and practices, along with suboptimal service quality. Additionally, over 90% of small and medium-sized enterprises encounter difficulties in selecting suitable technology for their business operations (Ministry of Industry and Trade, 2022).

In terms of reporting, logistics companies are facing the same problem as other industries in Vietnam. In a time where customer skepticism is on the rise, especially in response to concerns related to greenwashing, logistics companies in Vietnam encounter a common challenge in reporting. As highlighted by PwC, 71% of surveyed Vietnamese companies in all industries expressed a deficiency in understanding the necessary data for accurate reporting (Figure 7). This poses a significant hurdle for these companies as they strive to meet the growing demand for transparent and trustworthy sustainability practices in the face of heightened consumer scrutiny.

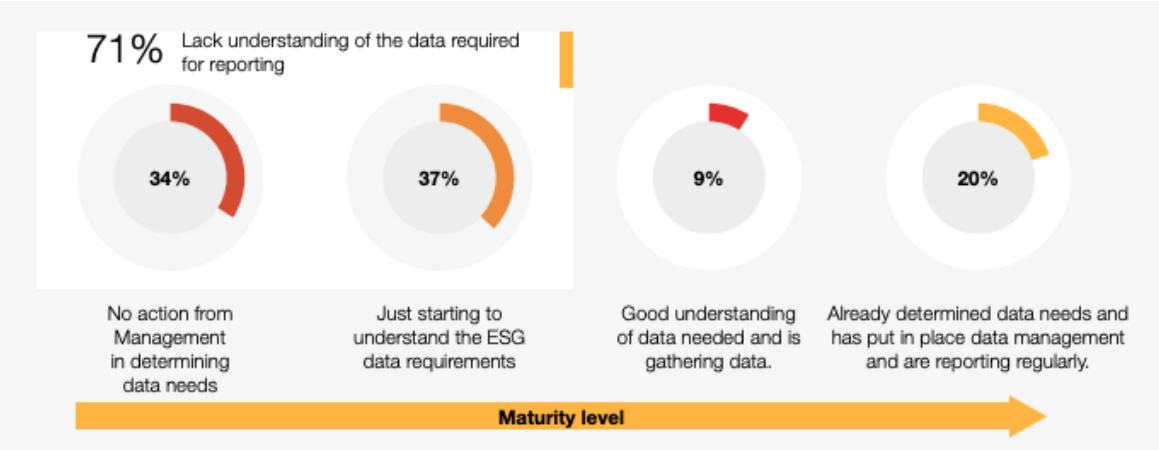

Figure 7. Stages in processing ESG data

Source: PwC, 2022

4.2. Evaluation

4.2.1. Threats

Logistics infrastructure in Vietnam has been invested in, but there are still many limitations, particularly in terms of transportation means and the transport network. The restricted quality of the national infrastructure affects the implementation and effectiveness of businesses' green logistics solutions. Developing multimodal transportation to minimize the environmental impact of the transportation system is still limited. The excessive number of transport vehicles, along with the weak capacity of the transportation infrastructure system, inevitably leads to traffic congestion. When congestion occurs, vehicles stop on the road, still consuming energy, resulting in inefficient fuel usage and higher emissions into the environment.

The logistic sector demonstrates a notable level of cooperation between service providers and customers, as illustrated by the establishment of the Vietnam Logistics Business Association (VLA). However, while contemporary updates are frequently discussed through annual conferences addressing macro-situational dynamics of the logistics sector, the provision of actionable and sustainable measures tailored specifically for logistics enterprises remains limited. Also, there is a lack of synchronized technological solutions at state-level. Policies have been issued, but there is no provision of specific guidance for actual implementation and national information hub for businesses to connect with others.

Although the government has issued regulations, the practical implementation of these regulations has not achieved high efficiency. The current regulations and policies mainly focus on road transport, limiting regulations related to other types of logistics infrastructure, leading to a lack of consistency in the application and implementation of green logistics. Additionally, policies on production processes to ensure the development of green logistics are limited, especially in terms of regulations on recycling, repairing, and recovering waste; recycling and developing environmentally friendly packaging; and promoting the use of renewable resources.

In terms of workforce, it is projected that by 2030, the demand for logistics personnel will exceed 200,000 individuals; however, the workforce's capacity to meet this demand is only about 10% of the market needs. Vietnam's logistics workforce not only lacks in quantity but also suffers from a deficiency in quality, with approximately 5-7% of the labor force engaged in this sector has received formal training in logistics services (Ministry of Industry and Trade, 2022). This is an emerging concern as there will be a shortage of trained personnel who possess knowledge to choose optimal solutions, consequently increasing the overall cost of logistics with less efficient and sustainable outcomes.

Despite numerous improvements, the customs clearance time for goods still extends in certain cases, impacting the manufacturing and business activities of enterprises, especially those dealing with goods requiring specialized inspection procedures. The delayed customs clearance time also contributes to an increased burden on logistics costs. Higher logistics costs directly translate to increased product or service prices. This, in turn, diminishes competitiveness against similar

products or services from other businesses or countries (Vu et.al, 2023). Consequently, enterprises may resort to solutions that expedite customs clearance but are less environmentally friendly.

4.2.2. Opportunities

The opportunity for logistics businesses adopting sustainable practices is significant. According to the 2023 Business Outlook Study by the United Overseas Bank (UOB) in Vietnam, 94 percent of the surveyed companies acknowledge the significance of sustainability. Over half of them indicated that adopting sustainable practices not only enhances their business reputation but also attracts investors, providing a competitive advantage. As a result, 80% of Vietnamese companies have made ESG commitments or plans to do so in the following years (Figure 8).

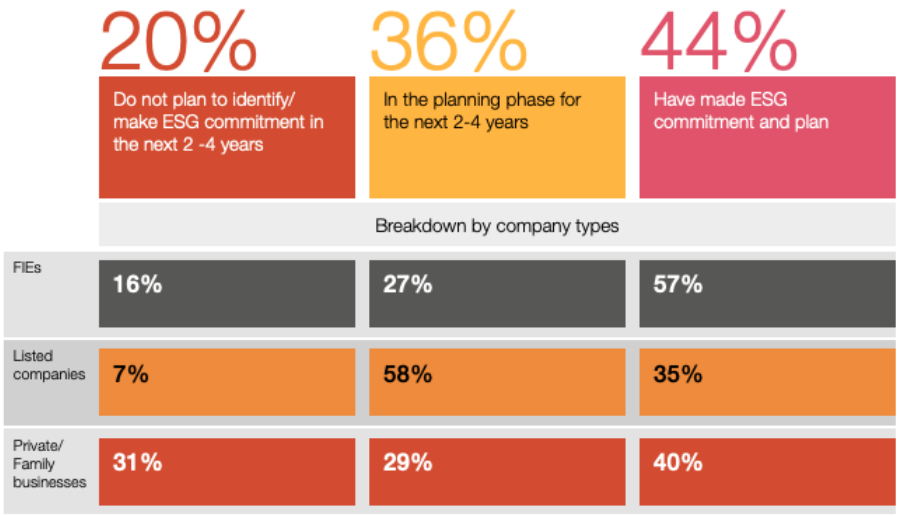

Figure 8. Current status of organizations' ESG commitments

Source: PwC (2022)

One of the primary opportunities for Vietnamese logistics businesses to implement sustainable practices arises from the government's commitment to green development. The introduction of programs like the circular economy development plan and the national environmental protection strategy until 2030, with an extended vision to 2050, highlights Vietnam's comprehensive approach to promoting environmentally sustainable practices. Complementary policies, including tax incentives and the Green Credit Program, are designed to incentivize businesses to embrace environmentally sustainable practices. As an illustration, the government has implemented incentives to promote the adoption of electric vehicles (EVs), aligning with an increasing emphasis on sustainability.

According to Vietnam National Trade Repository, the logistics sector holds a major attraction for foreign investors. In light of the growing global interest in sustainable practices, Vietnamese businesses are strategically positioned to capitalize on these opportunities. The increasing allure of Vietnam to foreign investors, especially those prioritizing environmentally sustainable practices, is evident from a EuroCham survey, where 63% ranked Vietnam among their top 10

investment locations and 31% placed it in their top three choices. By proactively developing and prioritizing sustainability, Vietnamese businesses can play a pivotal role in advancing the country's broader ESG objectives, attracting more investment, and fostering sustainable economic growth.

Vietnam's expanding tech sector opens doors for businesses to integrate environmentally sustainable practices into their operations. Embracing modern and efficient management solutions is key to achieving this goal. Seaports in Vietnam have witnessed a transformation with automated systems streamlining paperwork processes, minimizing errors, and saving both time and costs in operations and management. Furthermore, the automation of container handling and transportation at seaports contributes to process optimization. The rising demand for digital logistics solutions in Vietnam reflects a broader commitment by businesses to optimize supply chains, cut operational costs, and boost overall efficiency, aligning with the principles of environmental sustainability.

Another advantageous opportunity is the heightened awareness among consumers. Vietnam's expanding middle class, coupled with a growing consciousness of sustainability, is fueling the demand for environmentally friendly products and services. Specifically, 84% of respondents to a consumer survey in Vietnam from 2021 stated that they would be willing to pay more for sustainable items. This awareness plays a pivotal role in driving service providers to adopt sustainable practices, responding effectively to the increasing demand for logistics solutions that prioritize environmental friendliness and sustainability.

4.3. Recommendations

Reduce

Vietnamese logistics businesses can explore alternative fuels by collaborating with research institutions like the Vietnam Academy of Science and Technology (VAST) and universities to test and implement initiatives such as biofuels or natural gas even on a small scale initially. Collaborating with stakeholders to advocate for infrastructure development and policy support for alternative fuels in Vietnam will further contribute to sustainable transportation practices. This might include policies incentivizing the establishment of refueling stations for alternative fuels, offering tax incentives or subsidies for the adoption of eco-friendly vehicles, and setting emissions standards that encourage the use of cleaner energy sources in the logistics industry. By actively participating in the formulation and promotion of such policies, logistics businesses can contribute significantly to the advancement of sustainable transportation practices in Vietnam.

Additionally, implementing fuel-saving initiatives is crucial. Analyzing transportation operations, optimizing routes, minimizing empty miles, and leveraging technology for real-time tracking and route planning can significantly reduce carbon emissions. Exploring using inland waterways and railways for bulk cargo when feasible, partnering with Vietnam Inland Waterways Corporation (VIWACO) or Vietnam Railways (VR).

Consolidating shipments is another impactful measure. Businesses can explore opportunities to combine smaller shipments into larger units for more efficient transportation, especially for long

distances. This can be achieved internally or through collaboration with other businesses, promoting shared logistics solutions.

Replace

The government has actively provided significant support for the development of electric vehicles; therefore, logistics businesses in Vietnam should capitalize on and further enhance these opportunities by transitioning fleets toward electric vehicles. Firstly, Vietnamese logistics companies need to assess factors such as range requirements, payload capacity, and charging infrastructure availability to determine the best-fit EV models for various operational needs. Next, they should develop a strategic plan for charging infrastructure deployment by identifying key locations, such as depots or distribution centers, where charging stations can be installed. Further collaboration with charging infrastructure providers, including potential partners like Vingroup or other specialized companies, is also needed to ensure comprehensive coverage along urban delivery routes. Lastly, companies should implement training programs for drivers to familiarize them with the operation and maintenance of electric vehicles. This includes educating drivers on charging protocols, energy-efficient driving techniques, and addressing any concerns or misconceptions about EVs.

Modernizing equipment is equally vital. Logistics companies in Vietnam may consider specific actions such as evaluating the efficiency of their truck fleets and investing in newer, more fuel-efficient models. This may involve adopting vehicles with advanced engine technologies, aerodynamic designs, and improved fuel consumption rates. Logistics companies can also replace diesel-powered container lifting equipment with electric ones. Additionally, exploring leasing options for such modern and greener technologies can be a strategic move. Leasing provides the flexibility to incorporate the latest equipment without the immediate capital investment, allowing logistics businesses to stay at the forefront of sustainability trends. Additionally, the incorporation of predictive maintenance technologies, such as IoT solutions, ensures optimal equipment efficiency.

Revolutionize

To revolutionize their sustainability practices, Vietnamese businesses can optimize energy consumption within their facilities. Implementing building management systems to control energy usage based on occupancy and real-time data can lead to significant energy savings. Additionally, exploring on-site renewable energy generation through solar panels or other local sources aligns with the global shift towards cleaner energy solutions, collaborating with solar panel providers like Sungroup to install solar panels on rooftops or exploring wind power options in collaboration with the Institute of Energy (IE).

Logistics businesses in Vietnam should prioritize sustainable packaging strategies. This includes a focus on designing packaging that is lightweight, recyclable, and incorporates recycled materials whenever feasible. For instance, companies may explore the use of eco-friendly materials such as biodegradable plastics or recycled cardboard for packaging. Additionally, it is

crucial for logistics businesses to actively educate their customers about responsible disposal options for packaging materials. This may involve providing clear information on how to recycle or properly dispose of packaging, encouraging customers to participate in recycling programs, and emphasizing the importance of sustainable practices.

Collaboration and advocacy play a crucial role. Vietnamese businesses can share best practices and knowledge within their industry through industry workshops, annual meetings, conferences, fostering a community committed to sustainability. Advocating for government policies and infrastructure development that support sustainable practices across the logistics sector contributes to a broader positive impact on the environment.

Conclusion

In conclusion, FedEx's commitment to achieving carbon-neutral operations by 2040, driven by its "Reduce, Replace, and Revolutionize" strategy, showcases notable strengths in transparent reporting and ambitious goals. However, challenges such as high sustainability investment costs and regional constraints in reverse logistics pose potential weaknesses. Opportunities arise in meeting growing customer demand for sustainability and technological advancements, while threats include customer skepticism and competition from greener rivals. On the other hand, Vietnamese logistics companies are coping with challenges in environmental sustainability, ranging from high CO2 emissions to inefficient operations. Infrastructure issues and high logistics costs further contribute to the complexity. Therefore, our group proposes some feasible solutions with the aim of upgrading vehicle fleets, implementing energy-efficient features, advocating for infrastructure development, and fostering collaboration that can enhance sustainability, efficiency, and competitiveness in the Vietnamese logistics sector. Moreover, Vietnam's commitment to green development and the growing tech landscape provides significant opportunities for businesses to adopt and thrive in sustainable practices. By implementing these measures, Vietnamese logistics companies can not only improve overall operational efficiency and increase profits but also reduce the negative impacts on the environment in the logistics process, contributing to broader environmental goals and attracting investments.

Regarding research limitations, as for the data collection and discussion, the main source of data was from FedEx annual sustainability reports. Therefore, the study might show certain elements of biasness due to the confidentiality of FedEx data and limited number of previous research. On top of that, even though the data was originally from FedEx, there are still some uncertainties and inaccuracies which are hidden to external parties including the authors of this research.

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