Sri Lanka Journal of Marketing
University of Kelaniya - Sri Lanka

SLJM Vol 9 No 2: May - August 2023

ISSN 2719 – 2598 (Online)

Green Competitiveness in the Logistics Industry: Analysis of Emerging Practices from Three Continents

Rukmal De Silva
rukmal@361.lk

DOI: https://doi.org/10.4038/sljmuok.v9i2.136

ABSTRACT

The logistics industry is under increasing pressure to operate sustainably as it is one of the major contributors to global pollution. This study examines current green trends and emerging practices in the logistics industry and their impact on future competitiveness. To achieve this objective, the authors conducted a literature review and identified a classification of green practices based on recent literature. Then it analysed the annual and sustainability reports of three large logistics companies, namely XPO Logistics from the USA, CMA CGA from Europe, and SF Logistics, to determine the alignment of their practices with the identified industry trends. The practices were interpreted using the Resource-Based View (RBV) theory to assess their potential for sustained competitiveness. The study provides insights into the current and emerging green practices of the three logistics companies, their relevance to mitigating the impact of the identified trends, and their potential for leveraging a competitive advantage. The findings show that existing green practice classifications are inadequate to describe emerging green practices, the differences in green practices across the regions are not significant, and most of the green practices do not add sustainable competitive advantage to the companies. This study highlights the academic classification of green practices has to be revisited and reworked frequently based on the trends at the time of the study and the need for academic interpretations based on current industry practices rather than older insights which might be inadequate and irrelevant. Most significantly, this study proposes a new classification of categories of green practices in the logistics industry and an approach to achieving sustainable competitive advantage.

Keywords: *Circularity, Green Business Models, Green Competitiveness, Green Practice Classification, Green Practices, Green Trends, Industry 4.0, Logistics, Resource Based View, Sustainability*

1. INTRODUCTION

In the last few decades, the call for individuals, communities, companies, organizations, and governments to take proactive steps to protect the environment has gathered tremendous pace. According to Zhang (2020), the CO2 emissions from transportation is almost equal to a quarter of the world's total emissions. With this scale of impact, the logistics industry has been under tremendous influence to reduce aggressive pressure on the environment, save scarce resources and stop global warming. According to Adebanjo, The and Ahmed (2016), external pressure has a significant impact on the adoption of formal sustainability programs to deliver lower impact on environmental impact.

Green practices can be referred to as the collection of strategies, initiatives, and activities implemented by an organization to reduce their impact on the natural environment (Awaysheh and Klassen, 2010; Sarkis et al., 2010). Though the logistics industry initially responded by complying with minimum criteria, companies have adopted green practices as strategies to create Green Competitiveness. Green Competitiveness can be defined with Feurer and Chaharbaghi's (1994) definition of competitiveness as the "ability to act and react within the competitive environment and the potential of people and technology in implementing the necessary strategic changes" to meet emerging needs of environmental protection and sustainability.

Although there is a significant amount of academic literature on Green Practices and Green sustainability, key players in the logistics industry have driven the quest to create best practices. However, documentation and academic interpretation of such emerging practices are scarce, particularly the emerging practices to meet the green demands of the post-COVID-19 world on logistics amplified by the disruption due to the war in Ukraine, which must be studied. According to Cosimato and Troisi (2015),

ISSN 2719 – 2598 (Online)

identifying emerging trends and the evolution of green practices in the logistics industry and enabling future cross-country comparisons to form an academic perspective is paramount.

This study aims to address the issues of identifying emerging green practices in the logistics industry and their contribution to the competitiveness of companies in three continents. To bring in a academic perspective for the study, a recent list of green practices was chosen through a literature review and the result was compared with information of the green practices published on the sustainability reports of SF Logitics (SFL) of China, CGM-CGA in Europe, XPO Logistics in North America. These three companies were chosen as they are among the top 5 logistics companies in respective markets who have a publicly announced commitment to sustainability with comprehensive annual sustainable reports. Additionally, the logistics industry one of the most respected trend reports published by DHL was used to analyze the practices from a trends perspective.

The next two chapters of the report outlines research questions and the research methodology, followed by a review of existing academic literature on green competitiveness and recent industry publications on current trends in Section 4. The green practices of the selected companies are presented in Section 5, and their contribution to competitiveness is analyzed using the Resource Based View (RBV) model.

1. BACKGROUND AND RESEARCH QUESTION

The global effort to mitigate environmental harm, driven by the pressing need to conserve Earth's resources and preserve nature, has culminated in collective actions such as the 2015 Paris Agreement. In response, governments worldwide have adopted stringent environmental regulations to counter excessive damage. This has compelled stakeholders to embrace eco-friendly practices across economic sectors. However, adhering to these standards demands increased investments and substantial organizational transformations.

ISSN 2719 – 2598 (Online)

Amid debates about the impact of rigorous environmental policies on competitiveness, scholarly discourse has emerged. Rathnayake (1998) analyzed comparative advantage patterns and concluded that environmental standards didn't necessarily lead to competitiveness loss. Porter and van der Linde (1995) proposed that environmental regulations might spark innovation, offsetting compliance costs. Conversely, the pollution haven hypothesis (McGuire 1982) predicts that stricter regulations might reduce competitiveness for firms facing more stringent rules.

In this dynamic landscape, numerous companies have proactively adopted innovative green practices to maintain a competitive edge amidst strict policies. As per the Euromonitor Consumer Trend Report 2022, 45% of executives prioritize investment in sustainability initiatives over the next five years. The UN Global Compact Accenture Report (2022) states that 98% of CEOs view enhancing sustainability as their responsibility, with sustainability becoming a competitive differentiator. Kailash Lalpuria of Indo Count Industries observes that sustainability isn't merely a cost but a catalyst for innovation, growth, and new market opportunities.

Amidst this growing green movement, evolving consumer and B2B demands in the logistics industry highlight the need for sustainability. End consumers seek environmentally conscious companies, while businesses look for logistics partners aligned with their sustainability goals (Baah et al., 2020). Companies addressing these demands stand to improve environmental, financial, and marketing performance. Notably, businesses focusing on environmental issues gain a competitive edge, prompting many to adopt corporate-wide environmental strategies and products from global markets.

However, meeting these challenges necessitates companies to consistently align customer expectations with sustainable goals. Staying competitive demands innovative strategies that either capitalize on emerging trends or mitigate negative impacts. Many companies have already adopted innovative green practices to stay competitive. To thrive, businesses must continually innovate their core operations

(Schaltegger, 2012). Responding to stakeholder pressure enhances reputation and financial performance (Baah et al., 2020). Katja Busch of DHL emphasizes how logistics players have embraced Green Competitiveness on a global scale.

"The significance of supply chains in connecting people and enhancing lives is more evident than ever. Businesses are transforming logistics into a strategic asset and value driver. Meanwhile, technology visionaries are recognizing vast opportunities to innovate green solutions in the logistics industry worldwide."

This sentiment resonates with Nassar & Tvaronavičienė (2021), who highlight the necessity for large organizations to embrace innovation, enhancing core businesses while continuously innovating or reimagining existing operations and Nikeresht (2023) asserted the need to examine the diversity of practices among different multinational corporations. Evangelista et al. (2013) pointed out that the need for a comparative analysis of companies operating in different countries is a dire need. Additionally, Nikeresht (2023) identified the need for "examining the impact of diverse national contexts on the implementation of low-carbon supply chain practices".

Amidst such a backdrop this study aims to explore answers to the following questions.

RQ 1 - What are the trends in current green practices embraced by key global players in three different continents?

RQ 2 - What are the key differences of practices based on geographical location.

RQ 3 - How do those practices impact the competitiveness of logistics companies on an international scale?

2. METHODOLOGY

As the objective of this study is to provide an academic analysis of emerging green practices, the case study methodology has been adopted. This approach delves into

ISSN 2719 – 2598 (Online)

questions like "What is happening?" and "Is it scientifically possible?" (Hollweck, 2016). To achieve this, the logic model proposed by Yin (2003) is employed, which matches empirically observed events to theoretically predicted events and concepts. This method aids in comprehending current green practices and investigating trends (Yin, 2003).

The methodology unfolded in the following steps. Initially, an exhaustive analysis identified a comprehensive list of green practices based on recent empirical studies.After compiling the list, the authors scrutinized reports from reputable lo gistic companies and renowned institutions to identify emerging green trends. The DHL Trend Radar Report (DHL, 2022) was chosen due to its consistent publication, comprehensiveness, and relevance to the logistics industry. Centobelli (2020) highlighted the importance of studying multiple logistics service providers to establish an interpretive taxonomy of green practices. Hence, three major companies from China, Europe, and North America were selected to provide a global perspective on emerging practices. The information gathered from these sources was compared and analyzed using the Resource-Based View theory to gauge the competitiveness of the emerging practices.

The criteria for selecting the three companies were as follows:

i. One company from each of the three continents with pan-continent reach.
ii. Presence of multiple operations as separate strategic business units across the logistics value chain.
iii. Ranking within the top 10 logistics operators in their respective regions.
iv. A workforce of at least 25,000 employees.
v. Public commitment to a carbon net-zero ambition as part of their business and sustainability strategy.
vi. Publication of annual sustainability and/or green strategy and action reports.

This study's focus revolves around the practices adopted by leading logistics service providers from three geographical regions: CMA CGA from Europe, SF Logistics

from China, and XPO from the USA. Each of these companies is a market leader in their respective regions and has the capacity to embrace new green practices to maintain competitiveness. The authors utilized their annual reports, sustainability reports, and credible public reports.

CMA CGA Group (CMA) is headquartered in Marseille, France, offering comprehensive marine, port, and logistical services across 160 countries. With over 400,000 employees, they have committed to becoming Net Zero by 2050 and have outlined strategies to engage regulators, meet market demands, and leverage technology.

SF Logistics (SF), the largest integrated logistics service provider in China and the fourth largest globally, has diversified its services into various markets. They aim to provide "all green" supply chain solutions to compete and have committed to reducing carbon footprint and increasing carbon efficiency by 2030.

XPO, a major logistics service provider with a revenue of USD 16 billion, serves successful companies globally. Although they haven't committed to a Net Zero target, they plan to formulate a net-zero goal by 2050.

This study adopted a comprehensive approach to understanding and evaluating the competitive advantage of emerging green practices in the logistics industry using these selected companies.

3.2 Resource Based View (RBV) Theory to Assess Competitiveness

From the perspective of green competitiveness, a systematic literature review conducted by Nassar and Tvaronavičienė (2021) unveiled that a substantial 40% of the academic works examined employed the Resource-Based View (RBV) theory to analyze and elucidate the significance of sustainable management and green competitiveness. Thus, drawing inspiration from the RBV theory, the authors applied its lens to dissect and comprehend the dimensions of green competitiveness encompassing both current and emerging practices.

ISSN 2719 – 2598 (Online)

The RBV theory conceives a company as an amalgamation of resources and competencies, which, in turn, confer on it with an enduring competitive advantage and lead to superior performance (Barney et al., 2001; Guesalaga et al., 2018). This theoretical framework underscores the pivotal role of resources and capabilities in engendering a distinct competitive edge (McGee, 2015). By possessing resources and competencies that are not only valued by customers but also rare, difficult to imitate, and devoid of ready substitutes, a company can fortify its competitive stance (Barney, 1991).

Subsequent iterations of the RBV theory introduced an evolution in the non-substitutability criterion, shifting towards the concept of organization. This pertained to the firm's adeptness at harnessing valuable, unconventional, and imperfectly imitable resources or capabilities (Barney, 1995). The specific resources required for a company to foster a sustainable competitive advantage are contingent upon the company's interaction with the environment and its alignment with societal well-being (Hart, 1995; Tate & Bals, 2018). Furthermore, this extended interpretation posits that the amalgamation of multiple attributes plays a determinant role in shaping the level of competitive advantage.

- Competitive parity – Only valuable
- Temporary competitive advantage – Valuable and rare
- Unused competitive advantage – Valuable, rare, and non-imitable
- Sustained competitive advantage - Valuable, rare, non-imitable and non-substitutable.

The author’s assessment of the practices based on the literature review and their own analysis was used to construct a verdict on the competitiveness of the green practices.

3. LITERATURE REVIEW

This component of the study report is aimed to understand the existing literature on green practices based on recent publications. In building a comprehensive list of

practices the authors focused more on recent publications as the recent acceleration of the green agenda has led to many innovations and disruptions.

4.1 Green Practices Comprehensive Classification

Since the commencement of accelerated growth within the realm of sustainable logistics, a notable surge in academic interest has been directed towards comprehending the essence of green practices and their systematic categorization. Notably, Sureeyatanapas (2018) highlights that the pioneering endeavor to compile and classify green practices was undertaken by the Eye for Transport company in the year 2007. In the nascent stages of academic exploration, the works of Maas (2012) and Lacob et al. (2013) significantly contributed to shaping the conceptual landscape of green practices through the formulation of taxonomies and categorizations. Expanding upon this foundation, Evangelista et al. (2017) delineated a classification of green practices, encompassing vehicle energy efficiency, inter-modality, warehousing, green building, recycling materials, waste reduction (including the realm of reverse logistics), environmental management systems, green certifications, and collaborations for environmental objectives. Similarly, Baz and Laguir (2017) made a parallel contribution by categorizing practices such as transport and vehicle utilization, including fleet modernization, route optimization, and the efficient loading of vehicles.

In the contemporary vista, the models introduced by Centobelli (2020) and Wehner et al. (2021) emerge as pivotal sources, yielding insightful perspectives into the classification of green practices and facilitating the construction of a holistic comprehension of the evolutionary trajectory of green practices as a phenomenon. The model introduced by Centobelli (2020) introduces an alternative lens comprising five distinct phases, namely Transport, Warehousing, Logistics in services, Management, and Supply chain management (Figure 01). On the other hand, the framework proposed by Wehner et al. (2021) is founded upon three fundamental "building blocks," which encompass actions such as sustainable building design, processes that encompass energy mapping for impact reduction, and services oriented

towards sustainable deliveries. This intricate framework encompasses a total of 13 discrete practices (Figure 02).

A stride forward in 2021 was marked by Vienazindiene et al.'s adoption of the classifications elucidated within the framework devised by Centobelli (2020). This endeavor led to the establishment of a comprehensive and detailed roster of practices, garnered through a survey of 292 logistics service providers within Lithuania (Table 03). This endeavor aimed at substantiating the applicability and relevance of the framework in a specific context while enriching the spectrum of practical insights and real-world implications.

Table 01: Centobelli (2020) Framework

Taxonomy of LSP enabling technologies.

Phase of the service	Enabling technology
Transport	- Emission control systems - GPS applications
Warehousing	- Real-time locating systems - Warehouse management systems
Logistics service	- Logistics management systems - Material management systems
Management	- Enterprise resource planning - Environmental database systems - Environmental management systems - Expert systems - Learning management systems - Order management systems
Supply chain management	- Cloud computing - Collaborative systems - Content management systems - Customer relationship management systems - Environmental email - Environmental apps - Mash-up - P2P resource sharing - Social media - Syndication systems - Videocasting - Wiki

Table 02 : Wehner (2021) Framework

Category	Dimension
Actions	Building design
	Vehicle-related actions
	Information and communication technology-related actions
	Managerial actions: collaboration and encouragement
	Monitoring and reporting
Processes	Energy mapping
	Measuring environmental performance
	Environmental management systems
	Operations management
	Environmental training
	Documentation and communication
	Investments
Services	Sustainable transport solutions and deliveries
	Other sustainable services

Table 03: Green practices in Lithuania (Vienazindiene,2021)

Category	**Practice**
Green transport	Monitoring of emissions from vehicles Use of biofuels in vehicles Use of alternative or new energy vehicles Reduction of used vehicles Optimization of transport routes Optimization of transport cargo distribution Eco-driving Use of intermodal transport
Green Warehousing	Maximum use of warehouse space Use of improved or innovative loading systems Responsibly chosen method of product storage Optimization of storage space
Green Packaging	Application of innovative packaging technologies. Choosing a greener type of packaging Use of recyclable packaging materials and logistics

	containers Reduction of the use of transport packaging
Green Management	Establishment of an enterprise quality environmental management system Cooperation with partners or clients in the field of environmental management Environmental management certification such as ISO 14000 series Intelligent information system development/installation in enterprise Audit of the effectiveness of environmental measures Selection of partners and assessment of the effectiveness of their environmental measures Ongoing training of employees in environmental management knowledge Promoting employees' initiatives in the development of environmental measures Identification o0of environmental management strategies
Sustainable waste management	Recycling of transport and storage waste. Monitoring of recycling of transport waste. Recycling of containers and other logistics packaging materials Responsible waste sorting

In consolidating all the above, this study used Vienazindiene,2021 list of practices and classifications for analysis of green practices.

4. CASE ANALYSIS

The ever-evolving landscape of green logistics has emerged as a captivating focal point, captivating the attention of well-established industry incumbents as they navigate their course of transformation. Simultaneously, it presents an enticing prospect for nimble start-ups to assume the role of disruptors, reshaping conventional paradigms. Within this intricate milieu, academics find themselves immersed in a multifaceted crucible, formulating scientific interpretations that unravel the dynamic evolution of this domain. Moreover, industry thought leaders seize this juncture as an opportune platform to steer and influence the trajectory of this transformative journey. Thus the focus of the study can be construed in the same manner.

5.1 Comparing Academic Interpretations with Industry Practices of the 3 Companies

The researcher conducted an exhaustive examination of the latest sustainability reports of all the companies to ascertain their commitment to adopting various green practices. The degree of engagement in these practices was evaluated across three levels of intensity. A three-star rating was assigned if substantial evidence was identified, a single star was allocated if the practice was mentioned with minimal emphasis, and practices falling in between received a two-star rating. Furthermore, the researcher assessed the significance of initiatives, projects, and their overall impact. The summarized findings of this analysis are presented in Table 05.

Table 05: Analysis of Green Pracitces

	SF Logistics	**XPO**	**CMA-CGA**
Green Transportation			
Monitoring of emissions from vehicles	***	*** Piloting a Zero Emission Truck	***
Use of biofuels in vehicles	***	***	***
Use of alternative or new energy vehicles	***	***	*** B
Reduction of used vehicles	***	*** (Life time optimization)	***
Introducing electric vehicles	***	*** Full ET in Europe	***
Optimization of transport routes	***	***	***
Optimization of transport cargo distribution	***	***	***
Eco-driving	***	***	*
Use of intermodal transport	***	***	***
Increasing fuel economy with fleet modifications	***	***	***
Zero emission fleet		***	***
Green Warehousing			
Maximum use of warehouse space			
Innovative loading systems			
Responsibly chosen method of product storage			
Optimization of storage space			
Reduction of energy consumption	***	***	***
Green Packaging			
Application of innovative packaging technologies.	***		

Choosing a greener type of packaging	***		
Use of recyclable packaging materials and logistics containers	***		
Reduction of the use of transport packaging	***		***
Green Management			
Establishment of an enterprise quality environmental management system	***	***	***
Cooperation with partners or clients in the field of environmental management	***	***	***
Environmental management certification such as ISO 14000 series	***	***	***
Intelligent information system development/installation in enterprise	***	***	***
Audit of the effectiveness of environmental measures	***	***	***
Selection of partners and assessment of the effectiveness of their environmental measures	***	***	***
Ongoing training of employees in environmental management knowledge	***	***	***
Promoting employees' initiatives in the development of environmental measures	***	***	***
Sustainable waste management			
Recycling of transport and storage waste.	***	***	***
Monitoring of recycling of transport waste.	***	**	***
Recycling of containers and other logistics packaging materials	***	*	***
Responsible waste sorting	***	***	

5.2 Analysis Notable Initiatives and Impact

In addition to the above here is an analysis of notable initiatives and their impact based on green transportation, green warehousing, green packaging, green management practices and sustainable waste management.

5.2.1 Green Transportation

In the realm of environmentally conscious transportation, each of the three companies has made substantial commitments to green practices (Table 05). Notably, all the green practices that have been recognized in the existing literature are fully evident in their operational strategies. However, it's worth highlighting that there are unique and noteworthy initiatives being pursued by each of these companies.

ISSN 2719 – 2598 (Online)

In the context of last-mile delivery, both XPO and IKEA have joined forces to create a remarkable last-mile electric vehicle initiative in New York City. This partnership exemplifies their dedication to sustainable urban logistics. On a different front, CMA CGM has adopted an innovative approach by utilizing boats to handle smaller cargo deliveries in select European cities. This distinct strategy showcases their inventive adaptation of green solutions to specific transportation challenges.

Shifting focus to broader transportation strategies, SFL has made remarkable strides by introducing a fleet of over 26,000 new energy-powered trucks. This concerted effort aligns with their commitment to reducing emissions across the logistics spectrum. Additionally, they are actively engaged in mitigating aviation-related emissions through measures such as aircraft replacement, optimized dispatching, and the implementation of online fuel management systems. In contrast, CMA CGM has strategically invested in LNG-powered ships and is actively working on the development of a Zero emission cargo ship, demonstrating their pioneering approach to sustainable maritime transportation.

Not to be outdone, XPO has also made noteworthy advancements in the adoption of green technologies. They have integrated a fleet of 20 Hydrogen-powered trucks into their operations, showcasing their commitment to exploring innovative solutions that reduce the carbon footprint of their transportation activities.

It's interesting to note that SFL is taking a comprehensive approach by constructing a green airport that incorporates a range of sustainable practices. However, it's essential to recognize that this ambitious endeavor might inadvertently increase energy consumption by up to 10%, which highlights the complex balance between environmental and operational considerations.

In the realm of alternative fuels, CMA CGM emerges as a frontrunner with an impressive array of initiatives. They have embarked on multiple experiments, including the use of LNG-powered ships and trucks, as well as the exploration of methane, e-methane, biofuels, and Hydrogen as viable fuel sources. This multi-

pronged approach underscores their commitment to pushing the boundaries of sustainable fuel technologies.

5.2.2 Green Warehousing

In the context of energy-efficient practices, XPO is making notable strides in minimizing power consumption. Their commitment to sustainability is evident through their widespread implementation of LED lighting. Notably, more than 57% of their US contract logistics locations have transitioned to environmentally friendly LED lighting, encompassing a vast expanse of over 7 million square feet in 2020 alone. Furthermore, they set their sights on a significant goal: to incorporate intelligent LED lighting into 75% of their European facilities by the close of 2020. This concerted effort has resulted in a substantial reduction of over 2,500 tons of CO2 equivalent emissions, attributed to the successful implementation of the LED lighting initiative.

In a similar vein, CMA CGM is demonstrating a proactive commitment to energy efficiency by pursuing a comprehensive transition to LED lighting across their installations. Their ambition doesn't stop there; they are striving for a notable 20% reduction in energy consumption, signifying their dedication to both sustainability and operational optimization.

Parallel to these endeavors, SFL has set ambitious targets in the realm of renewable energy. With aspirations to generate 100MW of energy through photovoltaic installations and an impressive 40 million kWh of clean energy projects, SFL is forging ahead with their green energy agenda. Remarkably, they've further enhanced operational efficiency within the industrial parks they manage through the development and deployment of an intelligent water and electricity monitoring system.

Steering towards innovation, SFL is embarking on an ambitious experiment involving the utilization of Unmanned Aerial Vehicles (UAVs) in the terminal delivery process.

This forward-thinking approach showcases their willingness to explore cutting-edge solutions that could potentially reshape the logistics landscape.

Interestingly, upon an examination of the sustainability reports from all three companies, it becomes apparent that certain aspects of green practices within warehousing, such as innovative loading systems, are notably absent. This omission raises the question of whether such practices are not being implemented or if their impact is considered negligible to the extent that they are not deemed report-worthy. Given the sophisticated nature of these companies' operations, the latter assumption appears to be a reasonable inference.

5.2.3 Greener Packaging

SFL remains at the forefront of sustainability by actively executing comprehensive strategies to mitigate the impact of its packaging practices. Through a combination of reduction, reuse, recycling, and biodegradation techniques, the company is making significant strides in minimizing its packaging footprint. In the year 2022, SFL impressively curtailed its base paper consumption by approximately 150,000 tons and substantially reduced plastic usage by around 47,000 tons. This achievement was made possible through initiatives like the implementation of lightweight designs and the adoption of eco-friendly packaging technologies. Notably, a remarkable 90% reduction in greenhouse gas (GHG) emissions was realized over the course of this year.

An exemplary example of SFL's dedication to sustainable packaging is evident in the innovative "Feng Bag," a fully degradable solution that surpasses established biodegradation standards. This unique bag has seen substantial implementation, particularly in locations like Beijing and Guangzhou, effectively contributing to a more environmentally conscious approach to packaging. Impressively, in 2022, SFL derived a significant 32.5% reduction in their overall greenhouse gas emissions directly from their adoption of greener packaging alternatives. This all-encompassing

ISSN 2719 – 2598 (Online)

approach involves engaging stakeholders across the entire value chain, both upstream and downstream.

SFL's commitment extends to their pioneering flagship initiative – the carbon-neutral product π-box, a packaging solution designed for recyclability. Remarkably, they utilized a substantial 1,258 million π-box units in their operations during 2022. Going beyond standard efforts, SFL has extended their recycling endeavors to encompass both temperature-controlled and normal temperature packaging options, particularly focusing on the pharmaceutical industry.

Taking a long-term perspective, SFL has made significant investments in Research and Development (R&D) for Green Packaging. Their commitment to sustainability extends to the establishment of laboratory testing facilities, offering industry players the means to explore and adopt innovative, environmentally friendly packaging solutions.

In contrast, CMA CGM's packaging endeavors predominantly revolve around waste management initiatives. On the other hand, XPO's sustainability reports do not make mention of any specific green packaging initiatives.

5.2.4 Sustainable Waste Management

SFL's dedication to sustainable practices extends to their visionary concept of a "zero waste city." At the forefront of this initiative is the active promotion of an express packaging recycling ecosystem, supported by a robust recycling operation platform for efficient data management. Moreover, SFL envisions a comprehensive plastic packaging eco-system that covers the entire lifecycle – from design and manufacturing to consumption, recycling, and advanced utilization. The core objective is to mitigate the detrimental impact of plastic waste on the environment and establish a self-sustaining, closed green loop for the industry. In an effort to actively involve consumers in waste management, SFL has launched ingenious marketing campaigns. These campaigns include engaging social media to propagate creative DIY methods for repurposing packaging waste at home. Furthermore, SFL

has instituted a platform that encourages users to adopt a low-carbon lifestyle by rewarding their efforts with redeemable points.

CMA CGM's engagement in the circular economy spans multiple domains. One such domain entails the application of circular economy principles to restore carbon and nutrients to the soil through the reclamation of biomass waste. Additionally, the company has taken significant strides in implementing circular economy practices at the Marseille Maritime Port. Here, landfill gas from waste in the Marseille region is harnessed and repurposed as fuel, showcasing a commendable approach towards resource optimization. A particularly intriguing initiative from CMA CGM took shape in 2022 with the launch of the Plastic Odyssey ship. This vessel embarked on a three-year expedition across 30 countries in South America, Africa, and Asia, all of which are severely affected by plastic pollution. Throughout the journey, the ship collaborates with local entrepreneurs, showcasing around ten innovative technologies on board. These technologies demonstrate the intricate processes of plastic collection, sorting, crushing, melting, and decomposition for subsequent reuse, either as fuel or in the creation of other recycled products.

In contrast, XPO's contribution to the circular economy does not find a significant presence in their sustainability reports. While their efforts in waste management are featured, primarily revolving around the reuse of wooden pallets, the broader scope of circular economy initiatives does not seem to be prominently highlighted.

5.2.5. Green Management

All three companies have made unequivocal declarations of their unwavering commitment to all facets of green management practices identified in the literature review, and their actions resonate with this pledge. Moreover, they are not content with merely aligning themselves with the existing practices; instead, they are actively driving the narrative forward. Their commitment is visibly reflected in their leadership roles in engaging with regulatory bodies, contributing to the definition of industry standards, and championing initiatives that foster biodiversity and

sustainability. While all three companies display dedication to these endeavors, it's worth noting that SFL and CMA CGM exhibit a higher degree of intent and intensity in this realm compared to XPO.

Notable projects in this regard include CMA CGM's active involvement in safeguarding both marine and terrestrial biodiversity, further underlining their commitment to a holistic approach to sustainability. On the other hand, SFL's initiatives encompass the establishment of a dedicated R&D and Testing laboratory, showcasing their proactive approach to staying at the forefront of innovative sustainability practices. Interestingly, within the spectrum of their green management efforts, XPO appears to showcase a distinctive emphasis on their European operations. This is evidenced by initiatives such as spearheading zero-emission truck trials in Spain, a testament to their commitment to driving sustainable advancements within the region

5.3 Comparing Academic Interpretations with DHL Trend Report

Regarded as the vanguard of accurate and forward-looking trend reports in the logistics arena, the DHL Trend Report (www.dhl.com, 2022) is an invaluable resource. Presently in its fifth iteration, the report's prescience is notably evident through the realization of many predictions previously made in its earlier editions. Over time, the classification of the report's content has undergone an evolution to enhance its relevance, applicability, and reliability. For instance, the domain of space logistics has been rechristened as the space economy, while augmented and virtual reality now find themselves recategorized under the umbrella of extended reality.

The progressive evolution of the report and the profoundness of its content provide an alternative vantage point for gauging industry practices, thereby enabling a comprehensive comparison with the insights furnished by published academic literature. Remarkably, the report's purview on environmental sustainability trends is all-encompassing, encapsulating domains such as decarbonization, circularity, physical Internet, environmental stewardship, stratification, the sharing economy,

everything as a service, alternative energy sources, next-generation packaging, big data analysis, and bio-based materials.

In a quest to discern alignments and discrepancies between the two paradigms, the author meticulously charted a comparative analysis between the list of green practices and the landscape sketched by the DHL Trend Report, thus shedding light on the interplay and divergence between these two influential perspectives.

Table 06: Comparison of DHL Trend report and green practices of Vienazindiene

Trend	**Description**	**Green practices (Vienazindiene,2021)**	**Alignment**
Decarbonization	Reduction of CO2 or CO2 equivalents in emission.	Monitoring of emissions from vehicles Reduction of used vehicles Introducing electric vehicles Optimization of transport routes Optimization of transport cargo distribution Eco-driving Use of intermodal transport Increasing fuel economy with fleet modifications Zero emission fleet Maximum use of warehouse space Innovative loading systems Responsibly chosen method of product storage Optimization of storage space Reduction of energy consumption	Fully aligned.
Circularity	Eradicating waste and pollution through a proactive approach that takes into account the complete product life cycle.	Use of recyclable packaging materials and logistics containers Recycling of transport and storage waste. Monitoring of recycling of transport waste. Recycling of containers and other logistics packaging materials	The trend represents a wider scope than the practices.
Physical Internet	Physical Internet is an open global logistics system founded on physical, digital, and operational interconnectivity, through encapsulation, interfaces and protocols		Zero alignment. No practices could be aligned.

Environmental Stewardship	Environmental Stewardship trend involves significant shifts in behaviour both at the individual and collective levels within industries, governments, and societies.	Establishment of an enterprise quality environmental management system Cooperation with partners or clients in the field of environmental management Environmental management certification such as ISO 14000 series Intelligent information system development/installation in enterprise Audit of the effectiveness of environmental measures Selection of partners and assessment of the effectiveness of their environmental measures Ongoing training of employees in environmental management knowledge Promoting employees' initiatives in the development of environmental measures	The trend represents a wider scope than the practices.
Smartification	Smartification trend involves equipping previously standalone analogue assets with sensor and wireless technologies, transforming them into interconnected and intelligent entities. This process bridges the gap between analogue and digital realms.		Zero alignment. No practices could be aligned.
Sharing economy	The Sharing Economy trend pertains to a system where businesses and consumers engage in temporary sharing, renting, or borrowing of assets and services rather than traditional ownership and purchase.		Zero alignment. No practices could be aligned.
Everything as a service	The Everything as a Service trend, also known as 'XaaS' or 'servitization', involves a transition from traditional product-based transactions to service-based offerings		The trend represents a wider scope than the practices.

	that deliver specific outcomes.		
Alternative energy sources	Encompasses a diverse range of technologies and the associated infrastructure that captures, stores, and utilizes energy derived from renewable and unlimited sources.	Use of alternative or new energy vehicles	Fully aligned.
Next generation packaging	This concept pertains to the ongoing modifications in the materials utilized for primary, secondary, and tertiary packaging, coupled with the integration of advanced technologies within this packaging.	Application of innovative packaging technologies. Choosing a greener type of packaging Use of recyclable packaging materials and logistics containers Reduction of the use of transport packaging	Largley aligned. Advanced technology in packaging is not discussed.
Big data analysis	Involves the examination of vast volumes of data to uncover historical patterns, identify real-time shifts in current conditions, and generate predictions and projections for future outcomes.		Zero alignment. No practices could be aligned.
Bio based materials	Encompasses all materials produced exclusively from substances derived from traditional sustainable biomass, as well as modern bio-synthetic processes.	Use of biofuels in vehicles	Fully aligned.

Though Vienazindiene (2012) publication seems to be the most recent on green practice classification, in comparion with DHL trend report, the list and the classification seems inadequate to accommodate and explain the most contemporary trends among the green practices. Nevertheless, some of the trends have been discussed individually in academic literature such as Pan (2021) on Physical Internet, Jia & Cui (2021), Hu et al. (2019) in Sharing economy, Bag et al. (2020) on Big data,m Ahamadi (2021) on Everything as a service, Deckert (2017) on Environmental stewardship and Kahn (2023) on Digitally enabled packaging.

5.4 Comparing DHL Trend Report with Industry Practices

Table 07: Analysis of industry practice again the trends

Trend	Description	Impact	SFL	XPO	CMA CGA
Decarbonization	Reduction of CO2 or CO2 equivalents in emission.	High	***	***	***
Circularity	Eradicating waste and pollution through a proactive approach that takes into account the complete product life cycle. This involves designing and utilizing each component with the intention of reintegrating them into the supply chain once their usefulness has been fulfilled.	High	***		***
Physical Internet	Physical Internet is an open global logistics system founded on physical, digital, and operational interconnectivity, through encapsulation, interfaces and protocols	Moderate	None	None	None
Environmental Stewardship	Environmental Stewardship trend involves significant shifts in behaviour both at the individual and collective levels within industries, governments, and societies. Its aim is to reduce environmental harm and enhance preservation efforts.	Moderate	***	***	***
Smartification	Smartification trend involves equipping previously standalone analogue assets with sensor and wireless technologies, transforming them into interconnected and intelligent entities. This process bridges the gap between analogue and digital realms.		*	*	*
Sharing economy	The Sharing Economy trend pertains to a system where businesses and consumers engage in temporary sharing, renting, or borrowing of assets and services rather than traditional ownership and purchase.	Mild	*	*	*
Everything as a service	The Everything as a Service trend, also known as 'XaaS' or 'servitization', involves a transition from traditional product-based transactions to service-based	Mild	None	None	None

	offerings that deliver specific outcomes.				
Alternative energy sources	encompasses a diverse range of technologies and the associated infrastructure that captures, stores, and utilizes energy derived from renewable and unlimited sources.	High	***	***	***
Next generation packaging	This concept pertains to the ongoing modifications in the materials utilized for primary, secondary, and tertiary packaging, coupled with the integration of advanced technologies within this packaging.	Moderate	***	*	*
Big data analysis	involves the examination of vast volumes of data to uncover historical patterns, identify real-time shifts in current conditions, and generate predictions and projections for future outcomes.	Moderatex	***	***	***
Bio based materials	ncompasses all materials produced exclusively from substances derived from traditional sustainable biomass, as well as modern bio-synthetic processes. This trend focuses on the beginning rather than the end of the product life cycle and so it includes both biodegradable and non-biodegradable materials.	Low	***	***	***

From a holistic perspective, the investment in green practices by the companies are seemingly co-related to the trends of the DHL Trend Report. But none of the companies, have reported any initiatives on smartifications, everything as a service or sharing economy as green initiatives or practices. The reality might be that the companies might be using these practices but does not see a need to recognize them as green practices.

5.5 Resource-Based View (RBV) Theory as a tool for assessment of competitiveness

To bring more meaning to the study, the industry practices were analyzed with the level of competitiveness using the Resource Based View model. The authors used their judgement to analyze the results.

Table 08: Analysis of competitiveness of green practices (Author's interpretation)

	Competitive parity	**Temporary competitive advantage**	**Unused competitive advantage**	**Sustained competitive advantage**
Green Transportation				
Monitoring of emissions from vehicles		√		
Use of biofuels in vehicles			√	
Use of alternative or new energy vehicles		√		
Reduction of used vehicles	√			
Introducing electric vehicles	√			
Optimization of transport routes	√			
Optimization of transport cargo distribution	√			
Eco-driving	√			
Use of intermodal transport		√		
Increasing fuel economy with fleet modifications	√			
Zero emission fleet	√			
Green Warehousing				
Maximum use of warehouse space	√			
Innovative loading systems	√			
Responsibly chosen method of product storage	√			
Optimization of storage space	√			
Reduction of energy consumption	√			
Green Packaging				
Application of innovative packaging technologies.		√		
Choosing a greener type of packaging		√		
Use of recyclable packaging materials and logistics containers		√		
Reduction of the use of transport packaging		√		
Green Management				
Establishment of an enterprise quality environmental management system		√		
Cooperation with partners or clients in the field of environmental management		√		
Environmental management certification such as ISO 14000 series		√		

Intelligent information system development/installation in enterprise		√		
Audit of the effectiveness of environmental measures		√		
Selection of partners and assessment of the effectiveness of their environmental measures		√		
Ongoing training of employees in environmental management knowledge	√			
Promoting employees' initiatives in the development of environmental measures		√		
Sustainable waste management				
Recycling of transport and storage waste.	√			
Monitoring of recycling of transport waste.	√			
Recycling of containers and other logistics packaging materials	√			
Responsible waste sorting	√			

Table 09: Analysis of competitiveness of the trend (Author's interpretation)

	Competitive parity	**Temporary competitive advantage**	**Unused competitive advantage**	**Sustained competitive advantage**
Decarbonization		√		
Circularity			√	
Physical Internet			√	
Environmental Stewardship		√		
Smartification			√	
Sharing economy		√		
Everything as a service		√		
Alternative energy sources		√		
Next generation packaging			√	
Big data analysis			√	
Bio based materials		√		

Drawing upon the comprehensive analysis presented above, several stark realities come to the forefront. While certain practices showcased within Sustainability reports appear remarkable – such as the widespread adoption of LED lighting or large-scale integration of solar energy – their real-world impact on fostering a sustainable competitive advantage might not be as substantial as initially envisioned.

ISSN 2719 – 2598 (Online)

Nevertheless, these initiatives do play a pivotal role in ensuring compliance and generating cost savings for the organizations. Furthermore, they wield considerable influence in enhancing market reputation and fortifying brand image, owing to the visible environmental stewardship demonstrated by the companies. Yet, the replicability of such practices across the industry landscape poses a challenge, rendering them devoid of a sustained competitive edge. Instead, they might offer ephemeral advantages until competitors adopt similar strategies and practices. Notably, these initial movers could harness a transient advantage that subsequently shapes the industry dynamics to their benefit (OECD, 2022).

A pivotal determinant governing the temporal scope of competitive advantage lies in the rapid pace of technological evolution. Given the mounting pressure on the green logistics sector to achieve heightened environmental sustainability, industry participants and members of the green tech ecosystem are engaged in swift and incessant experimentation to unveil disruptive technological solutions for the array of ecological challenges (World Bank, 2018). Consequently, any competitive advantage a company secures could be swiftly nullified. One strategic avenue to sustain competitiveness involves crafting innovative and revolutionary business models that present greener value propositions, superseding mere product and service offerings. This approach can engender customer loyalty and dependence, serving as a formidable shield against competitiors (Schaltegger, 2012).

Recognizing the inadequacy of existing classifications and practice lists to encapsulate the dynamic requisites and emerging trends of the green logistics landscape, the author proffers the following categorization schema as a comprehensive framework for defining green practices:

Table 11: A future-oriented classification model of green practices

Category	Description/ Meaning
Decarbonization	Reducing CO2 emission
Reducing emissions	Reducing the emission of greenhouse gases
New age energy	Introducing alternative energy sources

Integrated platforms	Platforms that provide real-time transparent and traceable information
Waste management/ circularity	Reduce waste and drive reuse
Green Technology Integration	Using Industry 4.0 standards and technology in logistics
Integrated green business models	Innovative business models built on sustainability
Environmental Stewardship	Promoting green agenda with external stakeholders

The above categories have been proposed as a way forward to discuss green practices as a format for meaningful impact than just "tick boxes" for a team of executives who are flaunting their efforts in media than making a real impact.

In expressing how this could be done using the above framework as the core structure of green strategy and enabling green practices, the author wishes to take the role of a green logistics business expert narrating his/her recommendations to an executive team of a logistics team in person.

> *In today's dynamic business landscape, the convergence of multiple innovative practices is shaping a new era of sustainable business models. Imagine a transformative approach that seamlessly integrates fleet modification with cutting-edge energy solutions. This dynamic fusion not only curbs costs but also significantly reduces environmental footprints.*
>
> *But the journey doesn't stop there. You must introduce the power of smartification and Industry 4.0 practices, where real-time data becomes your guiding compass. Data is no longer just numbers; it's the pulse of sustainability. By collecting, analyzing, and controlling real-time information on the impact of your actions, you're not just shaping your business; you're molding your commitment to a greener world.*
>
> *Now, envision extending this wealth of knowledge to your clients. Providing them access to insights that empower decision-making like never before. Give them control over the choices they got to make to meet their own green agendas. Transparency, trackability and traceability on a real-time basis*

ISSN 2719 – 2598 (Online)

become the cornerstones of your relationship, fostering trust, loyalty and strategic dependability.

This holistic approach creates a unique value proposition. You're not just a service provider; you're an enabler of informed choices, transforming your clients into partners in sustainability. Your clients aren't just using your services; they're locked into a partnership built on shared values and a common goal. As costs diminish and ecological footprints shrink, they're invested in the journey towards a brighter, greener future. Whilst you do this be a flag bearer of your green cause with the external world. Influence how they think, speak and act about creating a better world for tomorrow's generation.

5. FINDINGS AND CONCLUSION

The objective of this study was to examine the impact of emerging green practices on the green competitiveness of three large companies on three continents. To achieve this goal, the case study method was combined with academic literature to provide scientific meaning to emerging practices. Based on the case study of three companies, the large logistic companies are embracing and investing in green practices as a means to add value to their customers and to enhance their corporate brand value.

Based on the literature review, DHL Trend Radar report and evidence of the three companies was possible to respond to the first research question (What are the trends in current green practices embraced by key global players in three different continents?). In spite of operating in 3 different continents and being owned by key shareholders from those respective regions the green practices do largely remain similar. The key trends that were discovered in this study are intense decarbonization efforts for reduction of the emission of greenhouse gases, interest in alternative energy sources, the emergence of information platforms, the transition from waste management to circularity, intense efforts on using technology for green strategies, using Industry 4.0 standards and technology in logistics, innovative business models

ISSN 2719 – 2598 (Online)

built on sustainability, and environmental Stewardship. In answering RQ2 (What are the key differences of practices based on the geographical location?) there are not major differences in most of the practice areas. Nevertheless, the major difference of focus comes from the Europe-based company where they explicitly work with regulators to meet the standards and influence future standards. This is due to the stringent influence of European environmental regulations and focus (Gouldson. 2015). Also, the author could not find any evidence of the circularity of the US-based company. The findings for RQ3 (How do those practices impact the competitiveness of logistics companies on an international scale?) seem surprising. With all the fanfare of subscribing to the green agenda of all three companies, the study could not identify a higher level of sustainable competitive advantage of the current green practices. Most of the practices are towards meeting either regulatory compliance or meeting customer expectations whilst those practices could be easily imitated, acquired and deployed by any competitor with adequate investment capacities. But there is emerging evidence that holistic green business models supported with new age technologies clubbed together as Industry 4.0 can enhance the value proposition that will give a sustainable competitive advantage.

Amidst all these findings, the study found that current green practice classifications are inadequate to describe current green practices and trends in the logistics industry and found that such classifications need to be overhauled at least every two years to keep up the pace of the evolution of the industry. Therefore the author has suggested a list of categories for future green practice classifications (Table 11).

In spite of the findings, there are some limitations to the study. The study relied solely on published data, it may not capture the strategic intent of key executives. As the findings are based on three companies generalisability of the findings might be a challenge. Therefore future research should accommodate a larger number of companies for the study with data from key executives. The study on real impact of the green practices from a customer perspective should be done to evaluate the competitiveness from a different perspective. Moving forward, researchers should

track the evolution of specific companies' practices against industry trends over time as a continuous research study.

In conclusion, as the urgency to mitigate the effects of climate change increases, logistics companies must continually adopt innovative practices to remain competitive and thrive in the market.

6. REFERENCES

12th United Nations Global Compact-Accenture CEO Study. (n.d.). Retrieved January 21, 2023, from https://info.unglobalcompact.org/ceo-study

Adebanjo, D., Teh, P.-L., & Ahmed, P. K. (2016). The impact of external pressure and sustainable management practices on manufacturing performance and environmental outcomes. *International Journal of Operations & Production Management*, *36*(9), 995–1013. https://doi.org/10.1108/IJOPM-11-2014-0543

Antonides, G. (2017). Sustainable Consumer Behaviour: A Collection of Empirical Studies. *Sustainability*, *9*(10), Article 10. https://doi.org/10.3390/su9101686

Awaysheh, A., & Klassen, R. D. (2010). The impact of supply chain structure on the use of supplier socially responsible practices. *International Journal of Operations & Production Management*, *30*(12), 1246–1268. https://doi.org/10.1108/01443571011094253

Baah, C., Jin, Z., & Tang, L. (2020). Organizational and regulatory stakeholder pressures friends or foes to green logistics practices and financial performance: Investigating corporate reputation as a missing link. *Journal of Cleaner Production*, *247*, 119125. https://doi.org/10.1016/j.jclepro.2019.119125

Bag, S., Wood, L. C., Xu, L., Dhamija, P., & Kayikci, Y. (2020). Big data analytics as an operational excellence approach to enhance sustainable supply chain performance. *Resources, Conservation and Recycling*, *153*, 104559. https://doi.org/10.1016/j.resconrec.2019.104559

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Bin-Nashwan, S. A., Hassan, M. K., & Muneeza, A. (2022). Russia–Ukraine conflict: 2030 Agenda for SDGs hangs in the balance. *International Journal of Ethics and Systems*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/IJOES-06-2022-0136

Blanco, E., & Cotrill, K. (n.d.). Delivering on the Promise of Green Logistics. *SUSTAINABILIT Y*.

Centobelli, P., Cerchione, R., & Esposito, E. (2017). Environmental sustainability in the service industry of transportation and logistics service providers: Systematic literature review and research directions. *Transportation Research Part D: Transport and Environment*, *53*, 454–470. https://doi.org/10.1016/j.trd.2017.04.032

Cheema-Fox, A., LaPerla, B. R., Serafeim, G., Turkington, D., & Wang, H. (Stacie). (2021). Decarbonization Factors. *The Journal of Impact and ESG Investing*. https://doi.org/10.3905/jesg.2021.1.026

Chen, Y.-S., Chang, T.-W., Lin, C.-Y., Lai, P.-Y., & Wang, K.-H. (2016). The Influence of Proactive Green Innovation and Reactive Green Innovation on Green Product Development Performance: The Mediation Role of Green Creativity. *Sustainability*, *8*(10), 966. https://doi.org/10.3390/su8100966

Chygryn, O., Rosokhata, A., Rybina, O., & Stoyanets, N. (2021). Green competitiveness: The evolution of concept formation. *E3S Web of Conferences*, *234*, 00004. https://doi.org/10.1051/e3sconf/202123400004

CMA CGM. (n.d.). Fortune. Retrieved August 7, 2023, from https://fortune.com/company/cma-cgm/global500/

Cosimato, S., & Troisi, O. (2015). Green supply chain management: Practices and tools for logistics competitiveness and sustainability. The DHL case study. *The TQM Journal*, *27*(2), 256–276. https://doi.org/10.1108/TQM-01-2015-0007

Durand, R., Paugam, L., & Stolowy, H. (2019). Do investors actually value sustainability indices? Replication, development, and new evidence on CSR visibility. *Strategic Management Journal*, *40*(9), 1471–1490. https://doi.org/10.1002/smj.3035

Efthymiou, O. K., & Ponis, S. T. (2021). Industry 4.0 Technologies and Their Impact in Contemporary Logistics: A Systematic Literature Review. *Sustainability*, *13*(21), Article 21. https://doi.org/10.3390/su132111643

El Baz, J., & Laguir, I. (2017). Third-party logistics providers (TPLs) and environmental sustainability practices in developing countries: The case of Morocco. *International Journal of Operations & Production Management*, *37*(10), 1451–1474. https://doi.org/10.1108/IJOPM-07-2015-0405

Evangelista, P., Santoro, L., & Thomas, A. (2018). Environmental Sustainability in Third-Party Logistics Service Providers: A Systematic Literature Review from 2000–2016. *Sustainability*, *10*(5), Article 5. https://doi.org/10.3390/su10051627

Feurer, R., & Chaharbaghi, K. (1994). Defining Competitiveness: A Holistic Approach. *Management Decision*, *32*(2), 49–58. https://doi.org/10.1108/00251749410054819

Foster, M. N., & Rhoden, S. L. N. H. (2020). The integration of automation and artificial intelligence into the logistics sector: A Caribbean perspective. *Worldwide Hospitality and Tourism Themes*, *12*(1), 56–68. https://doi.org/10.1108/WHATT-10-2019-0070

Gavronski, I., Klassen, R. D., Vachon, S., & Nascimento, L. F. M. do. (2011). A resource-based view of green supply management. *Transportation Research Part E: Logistics and Transportation Review*, *47*(6), 872–885. https://doi.org/10.1016/j.tre.2011.05.018

Gouldson, A., Carpenter, A., & Afionis, S. (2015). Environmental leadership? Comparing regulatory outcomes and industrial performance in the United States and the European Union. *Journal of Cleaner Production*, *100*, 278–285. https://doi.org/10.1016/j.jclepro.2015.03.029

Hollweck, T. (2016). Robert K. Yin. (2014). Case Study Research Design and Methods (5th ed.). Thousand Oaks, CA: Sage. 282 pages. *The Canadian Journal of Program Evaluation*. https://doi.org/10.3138/cjpe.30.1.108

Hu, J., Liu, Y.-L., Yuen, T. W. W., Lim, M. K., & Hu, J. (2019). Do green practices really attract customers? The sharing economy from the sustainable supply chain management perspective. *Resources, Conservation and Recycling*, *149*, 177–187. https://doi.org/10.1016/j.resconrec.2019.05.042

Jabbour, C. J. C., & de Sousa Jabbour, A. B. L. (2016). Green Human Resource Management and Green Supply Chain Management: Linking two emerging agendas. *Journal of Cleaner Production*, *112*, 1824–1833. https://doi.org/10.1016/j.jclepro.2015.01.052

Jia, X., & Cui, Y. (2021). Examining interrelationships of barriers in the evolution of maritime port smartification from a systematic perspective. *Transport Policy*, *114*, 49–58. https://doi.org/10.1016/j.tranpol.2021.09.004

Johansson, J. (2014). Why do forest companies change their CSR strategies? Responses to market demands and public regulation through dual-certification. *Journal of Environmental Planning and Management*, *57*(3), 349–368. https://doi.org/10.1080/09640568.2012.743882

Jovanovic, N., Zolfagharinia, H., & Peszynski, K. (2020). To Green or Not to Green Trucking? Exploring the Canadian Case. *Transportation Research Part D: Transport and Environment*, *88*, 102591. https://doi.org/10.1016/j.trd.2020.102591

Khan, Y., Su'ud, M. B. M., Alam, M. M., Ahmad, S. F., Ahmad (Ayassrah), A. Y. A. B., & Khan, N. (2023). Application of Internet of Things (IoT) in Sustainable Supply Chain Management. *Sustainability*, *15*(1), Article 1. https://doi.org/10.3390/su15010694

Khanra, S., Kaur, P., Joseph, R. P., Malik, A., & Dhir, A. (2022). A resource-based view of green innovation as a strategic firm resource: Present status and future directions. *Business Strategy and the Environment*, *31*(4), 1395–1413. https://doi.org/10.1002/bse.2961

Klien, A. (n.d.). *Can disruptive business models and technologies be the key to unlocking trillions in climate finance?* Retrieved January 22, 2023, from https://blogs.worldbank.org/climatechange/can-disruptive-business-models-and-technologies-be-key-unlocking-trillions-climate-finance

Lin, Y.-H., & Chen, Y.-S. (2017). Determinants of green competitive advantage: The roles of green knowledge sharing, green dynamic capabilities, and green service innovation. *Quality & Quantity*, *51*(4), 1663–1685. https://doi.org/10.1007/s11135-016-0358-6

Logistics Trend Radar. Delivering Insight Today. Creating Value Tomorrow. (n.d.). DHL. Retrieved January 14, 2023, from https://www.dhl.com/global-en/home/insights-and-innovation/insights/logistics-trend-radar.html

Lupita, J. (n.d.). Green policies and firms'competitiveness. *Organisation for Economic Co-Operation and Development*. https://www.oecd.org/greengrowth/GGSD_2018_Competitiveness%20Issue%20Paper_WEB.pdf

Maas, S., Schuster, T., & Hartmann, E. (2014). Pollution Prevention and Service Stewardship Strategies in the Third-Party Logistics Industry: Effects on Firm Differentiation and the Moderating Role of Environmental Communication. *Business Strategy and the Environment*, *23*(1), 38–55. https://doi.org/10.1002/bse.1759

Marconi, D. (2012). Environmental Regulation and Revealed Comparative Advantages in Europe: Is China a Pollution Haven? *Review of International Economics*, *20*(3), 616–635. https://doi.org/10.1111/j.1467-9396.2012.01042.x

Martinsen, U., & Huge-Brodin, M. (2014). Environmental practices as offerings and requirements on the logistics market. *Logistics Research*, *7*(1), 115. https://doi.org/10.1007/s12159-014-0115-y

McGee, J. (2015a). Resource-Based View. In C. L. Cooper (Ed.), *Wiley Encyclopedia of Management* (pp. 1–8). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118785317.weom120134

McGee, J. (2015b). *Resource Based View*. https://onlinelibrary.wiley.com/doi/epdf/10.1002/9781118785317.weom120134

Nassar, N., & Tvaronavičienė, M. (2021). A systematic theoretical review on sustainable management for green competitiveness. *Insights into Regional Development*, *3*(2), 267–281. https://doi.org/10.9770/IRD.2021.3.2(7)

Nathan J. Bennett, Tara S. Whitty, Elena Finkbeiner, Jeremy Pittman, Hannah Bassett, Stefan Gelcich and Edward H. Allison, N. J. (2018). Environmental Stewardship: A Conceptual Review and Analytical Framework. *Environmental Management*.

News | About | SF. (n.d.). Retrieved January 14, 2023, from https://www.sf-express.com/we/ow/chn/en/product-promotion/news/detail?id=109

Nikseresht, A., Golmohammadi, D., & Zandieh, M. (2023). Sustainable green logistics and remanufacturing: A bibliometric analysis and future research directions. *The International Journal of Logistics Management*. https://doi.org/10.1108/IJLM-03-2023-0085

Noorliza, K. (2023). Determinants of an Environmentally Sustainable Model for Competitiveness. *Sustainability*, *15*(2), Article 2. https://doi.org/10.3390/su15021444

Oliveira-Dias, D., Kneipp, J. M., Bichueti, R. S., & Gomes, C. M. (2022). Fostering business model innovation for sustainability: A dynamic capabilities perspective. *Management Decision*, *60*(13), 105–129. https://doi.org/10.1108/MD-05-2021-0590

Pan, S., Trentesaux, D., McFarlane, D., Montreuil, B., Ballot, E., & Huang, G. Q. (2021). Digital interoperability in logistics and supply chain management: State-of-the-art and research avenues towards Physical Internet. *Computers in Industry*, *128*, 103435. https://doi.org/10.1016/j.compind.2021.103435

Pieters, R., Glöckner, H.-H., Omta, O., & Weijers, S. (2012a). *Dutch Logistics Service Providers and Sustainable Physical Distribution: Searching for Focus*.

Pieters, R., Glöckner, H.-H., Omta, O., & Weijers, S. (2012b). *Dutch Logistics Service Providers and Sustainable Physical Distribution: Searching for Focus*.

Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, *25*(9), 898–916. https://doi.org/10.1108/01443570510613956

Ratnayake, R. (1998). Do Stringent Environmental Regulations Reduce International Competitiveness? Evidence from an Inter-industry A nalysis. *International Journal of the Economics of Business*, *5*(1), 77–96. https://doi.org/10.1080/13571519884585

Saber, A. Y., & Venayagamoorthy, G. K. (2011). Plug-in Vehicles and Renewable Energy Sources for Cost and Emission Reductions. *IEEE Transactions on Industrial Electronics*, *58*(4), 1229–1238. https://doi.org/10.1109/TIE.2010.2047828

Sanchez Rodrigues, V., & Kumar, M. (2019). Synergies and misalignments in lean and green practices: A logistics industry perspective. *Production Planning & Control*, *30*(5–6), 369–384. https://doi.org/10.1080/09537287.2018.1501812

Sarkis, J., Zhu, Q., & Lai, K. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, *130*(1), 1–15. https://doi.org/10.1016/j.ijpe.2010.11.010

Schaltegger, S., Hansen, E. G., & Lüdeke-Freund, F. (2016). Business Models for Sustainability: Origins, Present Research, and Future Avenues. *Organization & Environment*, *29*(1), 3–10. https://doi.org/10.1177/1086026615599806

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2012). Business Cases for Sustainability ; The Role of Business Model Innovation for Corporate Sustainability. *International Journal of Innovation and Sustainable Development*.

Seles, B. M. R. P., Lopes de Sousa Jabbour, A. B., Jabbour, C. J. C., Latan, H., & Roubaud, D. (2019). Do Environmental Practices Improve Business Performance Even in an Economic Crisis? Extending the Win-Win Perspective. *Ecological Economics*, *163*, 189–204. https://doi.org/10.1016/j.ecolecon.2019.04.013

Sureeyatanapas, P., Poophiukhok, P., & Pathumnakul, S. (2018). Green initiatives for logistics service providers: An investigation of antecedent factors and the contributions to corporate goals. *Journal of Cleaner Production*, *191*, 1–14. https://doi.org/10.1016/j.jclepro.2018.04.206

Sustainability | Free Full-Text | Sustainability Outcomes of Green Processes in Relation to Industry 4.0 in Manufacturing: Systematic Review. (n.d.). Retrieved August 13, 2023, from https://www.mdpi.com/2071-1050/12/15/5968

Sustainable Logistics: A Framework for Green Logistics and City Logistics | SpringerLink. (n.d.). Retrieved August 13, 2023, from https://link.springer.com/chapter/10.1007/978-3-319-63561-3_4

Top Logistics Companies In USA. (2022, November 2). Yahoo Finance. https://finance.yahoo.com/news/top-logistics-companies-usa-123754271.html

Transport, Infrastructure and Logistics—Logistics Companies by Revenue. (n.d.). Retrieved August 7, 2023, from https://www.linkedin.com/company/globaldataplc/

Vienažindienė, M., Tamulienė, V., & Zaleckienė, J. (2021). Green Logistics Practices Seeking Development of Sustainability: Evidence from Lithuanian Transportation and Logistics Companies. *Energies*, *14*(22), 7500. https://doi.org/10.3390/en14227500

Wehner, J., Taghavi Nejad Deilami, N., Altuntas Vural, C., & Halldórsson, Á. (2022). Logistics service providers' energy efficiency initiatives for environmental sustainability. *The International Journal of Logistics Management*, *33*(5), 1–26. https://doi.org/10.1108/IJLM-10-2019-0270

Why global industrial supply chains are decoupling. (n.d.). Retrieved January 14, 2023, from https://www.ey.com/en_rs/automotive-transportation/why-global-industrial-supply-chains-are-decoupling

Zhang, W., Zhang, M., Zhang, W., Zhou, Q., & Zhang, X. (2020). What influences the effectiveness of green logistics policies? A grounded theory analysis. *Science of The Total Environment*, *714*, 136731. https://doi.org/10.1016/j.scitotenv.2020.136731