



Ca' Foscari
University
of Venice

Master's Degree in
International Management

Final Thesis

**Logistics in the Era of Macro-Disruptions
and Environmental Compliance:
The Gallozzi Group Case**

Supervisor

Ch.ma Prof. ssa Monica PLECHERO

Graduand

Flora BARBERIO

Matriculation Number 906857

Academic Year

2025 / 2026

A chi mi ha aspettato, anche quando non c'ero

Abstract

This thesis explores the transformation of the logistics sector from a cost-driven operational function into a strategic lever for competitive advantage. Driven by recent global macro-disruptions, such as the COVID-19 pandemic, Ukraine-Russia war, the Suez Canal crisis and the Hormuz Strait crisis; and stringent European environmental regulations (the "Fit for 55" package, including EU ETS, CBAM, and CSDDD), traditional supply chains are forced to shift toward resilience-based strategies. To investigate how logistics providers are adapting to these dual challenges, this study adopts a qualitative methodology based on a case study of the Gallozzi Group. Primary data from semi-structured interviews, with secondary reports, reveals that modern logistics providers have evolved into risk managers and strategic consultants. By acting as a "shield" for their clients, they ensure business continuity through asset vertical integration, more practical route diversification and proactive Compliance as a Service. In an era of systemic uncertainty, prioritizing supply chain resilience and environmental compliance over mere cost-minimization is essential for international competitiveness.

Tables of Contents

Abstract

Introduction 1

Chapter 1 Logistics: From Cost to Competitive Advantage..... 4

1.1 The Evolution of Supply Chain Management: From an Operational Function to a Strategic Lever... 5

1.2 Logistics in the Age of Macro-Disruptions 7

1.3 The Evolution of Green Supply Chain Management 14

1.3.1 The GHG Protocol and the Central Role of Logistics in Scope 3 15

1.3.2 Overcoming the Environmental Trade-off 17

Chapter 2 The European Regulatory Framework for Sustainability:

Navigating the "Fit for 55" Package 20

2.1 The Inclusion of Shipping in the EU ETS: The “Polluter Pays” Principle. 21

2.2 The Carbon Border Adjustment Mechanism as a Climate Protection Tool: Mitigating Carbon Leakage in Global Trade 26

2.3 The Corporate Sustainability Due Diligence Directive (CSDDD): Expanding Accountability Across the Supply Chain 29

Chapter 3 The Logistics Partner as a “Shield”: The Case of the Gallozzi

Group 32

3.1 Presentation of the Gallozzi Group: An Integrated Logistics Ecosystem..... 33

3.2 Gallozzi in the Age of Macro-Disruptions 36

3.2.1 COVID-19..... 37

3.2.2 Ukraine-Russia War 41

3.2.3 The Suez Canal Crisis 45

3.2.4 The Hormuz Strait Crisis 48

3.3 Compliance as a Service: Addressing CBAM, EU ETS and CSDDD 52

3.3.1 Carbon Border Adjustment Mechanism (CBAM).....	52
3.3.2 European Union Emissions Trading System (EU ETS)	54
3.3.3 Human Rights, Workplace Safety and Business Ethics	56
Conclusion	62
AI Statement	66
List of figures.....	67
List of Tables	68
Bibliography.....	69
Sitography.....	73
Acknowledgments.....	79

Introduction

In today's global economic landscape, logistics has evolved from a simple operational function focused on cost minimization into a strategic lever for creating value and competitive advantage. The extremely fragmented structure of modern Global Value Chains (GVCs) has made the system deeply interconnected but at the same time structurally vulnerable. The period of macro-disruptions, which includes the COVID-19 pandemic and the geopolitical instabilities caused by the war in Ukraine, and the crises in the Suez Canal and the Strait of Hormuz, has proven the inefficiency of traditional approaches to supply chain management, making it imperative to adopt resilient strategies.

Besides ensuring geopolitical stability, logistics is required to face another urgent challenge: environmental sustainability. The transition to Green Supply Chain Management is no longer a simple ethical or voluntary choice but a response driven by market forces and increasingly stringent regulatory pressures. With the implementation of the "Fit for 55" climate package in the European Union, international trade has entered a new stage where the environmental aspect has become a restrictive factor. This thesis analyses the main directives of this package (including the inclusion of maritime transport in the EU ETS, the CBAM and the CSDDD Directive), which outline a framework in which environmental compliance becomes a fundamental requirement for market access.

To effectively investigate how modern logistics is evolving to address global uncertainty and stringent sustainability guidelines, this study attempts to answer the research question: *"How are recent global macro-disruptions and new European environmental regulations transforming the role of integrated logistics providers?"*. To answer this question, the empirical section focuses on a case study of the Gallozzi Group, a prominent integrated logistics provider. By analysing real-world business dynamics and practical insights collected directly through an interview, this study will illustrate how the Gallozzi Group has successfully addressed recent global shocks, highlighting how the Group has transformed itself into a strategic partner, ensuring business continuity and compliance for its importer and exporter clients.

To effectively analyse the complexities of modern logistics and environmental compliance, the thesis is structured into three main chapters. The first Chapter explores the theoretical evolution of Supply Chain Management, detailing how recent macro-disruptions and sustainability factors have encouraged the shift towards Green Supply Chain Management. Chapter 2 examines the second mission that companies must solve, which is the European regulatory framework for sustainability, specifically analysing the "Fit for 55" package, including the EU ETS, CBAM and CSDDD directives, to highlight how environmental compliance has become a strict market barrier. Lastly, Chapter 3 presents the empirical case study of the Gallozzi Group, investigating the specific strategies that the company adopted to mitigate the impacts of the COVID-19 pandemic, geopolitical conflicts and new environmental regulations, demonstrating its evolution into a strategic ally.

Chapter 1

Logistics: From Cost to Competitive Advantage

In the modern global economic landscape, logistics has undergone a profound transformation, moving from a mere operational necessity to a cornerstone of corporate strategy. This evolution is driven by the need to survive in an environment characterized by extreme fragmentation and systemic volatility, in which the traditional focus on cost minimization is being replaced by an approach centred on value creation and resilience. In this chapter, it will analyse how logistics can help companies not only in "moving goods," but also in surviving in the global market, revealing the multifaceted nature of the current supply chain management and the transition of logistics into a strategic tool of competitive advantage.

Recent macro-disruptions, including the COVID-19 pandemic, trade wars and other geopolitical conflicts made companies move away from the efficiency-oriented "Just-in-Time" approach and adopt resilience-oriented strategies, enabling companies to survive external shocks. Then the analysis addresses the growing pressure for sustainability, illustrating how Green Supply Chain Management has evolved from a regulatory burden into an essential driver of competitiveness and corporate reliability. Specifically, it analyses the three-fold motivation behind the corporate shift toward green practices: the escalation of international regulatory requirements (analysed in the second chapter), the increasing pressure from investors who use ESG ratings to assess long-term reliability, and the rise of more conscious consumers that bases purchasing decisions on the environmental footprint of the products.

1.1 The Evolution of Supply Chain Management: From an Operational Function to a Strategic Lever

Logistics forms the operational core of the supply chain, that is, the broader ecosystem of processes, organizations, people and technologies that enables a company to source, transform and distribute goods and services to the end consumer.

The supply chain manages all aspects of the procurement and purchase of goods, carrying out a series of interconnected activities, starting with the initial handling of raw materials, followed by processing and manufacturing, and reaching the end consumer as a finished product. This process covers the entire physical and information flow, playing a multifaceted role and ensuring that resource management is kept under control at every stage.

Logistics cannot be considered only a support function anymore. The most authoritative and universally recognized theoretical definition is provided by the Council of Supply Chain Management Professionals (CSCMP)¹: *“Logistics is that part of supply chain management that plans, implements, and controls the efficient and effective flow (inbound and outbound) and storage of goods, services, and related information from the point of origin to the point of consumption, to meet customer needs”*. When applied to modern business dynamics, this definition highlights that even the most advanced theoretical strategies depend heavily on flawless execution to succeed.

As highlighted by Christopher M. (2016), while Supply Chain Management acts as the strategic “brain” managing relationships with partners, designing networks and setting cost parameters, logistics acts as its “operational arm,” translating these plans into concrete actions through transportation, warehousing and packaging processes (Christopher M., 2016). The relationship between supply chain management and logistics is based on the concept of value creation, since the former aims to maximize the overall value generated throughout the entire chain by significantly reducing waste, while the latter operates specifically through what is known as “time and space utility”. In fact, a product has value for the customer only if it is available at the exact moment it

¹ The **Council of Supply Chain Management (CSCMP)** is the world's leading professional association dedicated to advancing and disseminating research and knowledge on supply chain management and innovation.

is needed (*time*) and at the requested point of sale or delivery (*place*). These concepts, also reiterated by Kumar and Rajeev (2016), demonstrate that value is only realized at the exact time and place the consumer needs it (Kumar D. & Rajeev P.V., 2016).

At the strategic level, the Value Chain, a concept introduced and analysed by Michael Porter in 1985 in his book *"Competitive Advantage: Creating and Sustaining Superior Performance"*, focuses instead on the set of activities that generate added value and help to build a company's competitive advantage by improving performance in terms of profitability or market pricing relative to competitors. The Value Chain consists of core activities (logistics, production, marketing and after-sales services) and support functions (infrastructure, human resources, information technology and procurement). Within this chain, logistics plays a central role in two key stages: inbound logistics, which is responsible for the management of materials and the distribution of goods to warehouses, and outbound logistics, which includes all the procedures involved in delivering the final product. Within both stages, the operational efficiency is crucial since any mistake will lead to the loss of value and customer dissatisfaction.

However, due to globalization, the traditional value chain model was extended beyond the national borders, giving rise to Global Value Chains (GVCs). As a result of increasing international competition, enterprises started to decentralize their production by taking advantage of different geographic locations, relocating labour-intensive stages to Asia and maintaining those with higher value added (such as R&D and design) in the West. As a result, the lifecycle of a single asset is now so fragmented. According to the OECD, Global Value Chains (GVCs) now account for about 70% of international trade, with a volume generated by goods, services and know-how that cross borders multiple times before reaching the end consumer.

In this globalized ecosystem, international logistics serves as the critical link coordinating suppliers, manufacturing facilities and end markets. As also confirmed by the World Bank's Logistics Performance Index (LPI)², countries with superior logistics infrastructure are significantly more likely to integrate successfully into Global Value Chains (GVCs).

² The **Logistics Performance Index (LPI)** is a benchmarking tool that measures countries' logistics competitiveness by assessing the efficiency of customs, infrastructure, and international transport, as well as the quality of logistics services.

Given this complexity and the constant threat of geopolitical and economic turbulence, logistics must prioritize system resilience over only cost minimization. As Petit, Fiksel, and Croxton (2010) emphasize, resilience, that is, the capacity to survive, adapt and grow after sudden disruptions, has become an essential requirement to absorb external shocks and guarantee service continuity for the market (Pettit T.J., Fiksel J. & Croxton K.L., 2010).

1.2 Logistics in the Age of Macro-Disruptions

The shift from domestic supply chains to Global Value Chains has transformed logistics from a simple operational function into a strategic lever for creating value. Today, it integrates actors across different geographic areas into a coordinated and interdependent production network. However, the existence of an international logistics network does not automatically guarantee resilience against external shocks because extreme fragmentation has made global value chains more vulnerable. The strategic approach to transform logistics into an essential driver of business resilience and competitive advantage consists of managing it through flexibility, data visibility and route diversification.

Historically, the structure of Global Value Chains focused primarily on minimizing costs and optimizing the Just-in-Time (JIT) model³. While this reduced inventory levels and freed up capital, it has also eliminated the necessary “buffers” (the operational safety margins). As argued by Jiang, Rigobon D. and Rigobon R., this systematic elimination of these safety “buffers” to minimize costs has rendered the global supply chain structurally rigid, vulnerable and incapable of effectively absorbing external shocks (Jiang B., Rigobon D. & Rigobon R., 2021). This hyper-globalized and cost-driven model exposed supply chains to structural vulnerabilities that became evident during the current era of macro-disruptions.

³ **Just-in-Time (JIT)** is an inventory management model developed by Toyota in the 1950s. It involves producing or purchasing materials only when they are actually needed, with the aim of eliminating waste and excess inventory, operating on a pull system in which production is based on actual customer demand.

The impact of COVID-19 on global logistics networks illustrates this structural weakness. In early 2020, strict lockdowns imposed in China halted factory operations, paralyzing domestic and global production. According to the National Bureau of Statistics (NBS) in Beijing, China's industrial sector experienced its sharpest contraction in the past thirty years, with an industrial output falling by 13.5% in January and February and retail sales fell by 20.5% compared with the same period last year. Faced with this critical situation, the global shipping industry has gone through a period of great uncertainty. To manage the demand collapse and the reduced operations at Chinese ports, but above all to prevent empty vessel departures, major shipping companies implemented "Blank Sailings" cancelling scheduled routes or skipping a port call. During the first six months of the year, to avoid an excess of empty vessel routes, the major shipping alliances⁴ cancelled over 1,000 scheduled departures. As illustrated by *Figure 1* and the data provided by eeSea⁵ in the "Blank Sailings Tracker" section, the first significant global spike in blank sailings occurred in February, with approximately 18% of scheduled departures cancelled, reaching a peak in May at over 20%. The data highlights the inability of a rigid and buffer-less supply chain to readjust to asymmetrical shocks between supply and demand, showing that short-term cost-saving measures can trigger important global bottlenecks. From a strategic perspective, this chart explains the physical origin of the "bullwhip effect", as the massive cancellation of sailings to curb short-term costs drained the supply pipelines exactly before Western demand exploded due to the lockdowns.

⁴ The **first shipping alliances** to take action were: the 2M Alliance (comprising the giants Maersk and MSC), Ocean Alliance (comprising CMA CGM, COSCO Shipping, and Evergreen, specializing in trans-Pacific routes and those between Asia and Europe) and THE Alliance (with Hapag-Lloyd, ONE, Yang Ming, and Hyundai Merchant Marine, which joined the group in April 2020).

⁵ **eeSea** is a maritime and supply chain intelligence platform based in Copenhagen. It specializes in real-time tracking of container ships, carrier reliability analysis, and delay forecasting, with the aim of optimizing logistics by analysing the best routes, transit times, and blank sailings.

Figure 1: Monthly planned and blank sailings, with percentage of blank sailings, January–December 2020.



Source: U.S. International Trade Commission. (2020). *The impact of COVID-19 on maritime trade and port operations. Trade Shifts 2020 Special Topic.*

The **green line**, tracking the percentage of cancellations (over 20% in May), represents not just inactive ships, but empty containers trapped in the wrong ports and accumulated delays that would spill over into subsequent months.

The **bar chart below** shows the absolute number of departures by month: the blue portion of the bar represents ships that departed (Planned sailings), while the orange portion represents ships whose departures were cancelled (Blank sailings).

Note: Cancelled sailings are referred to the industry as blank sailings. The figures pertain to global sailings.

This situation has interrupted the flow of goods to the West, creating the first major “gap” in the supply chain and affecting the global GDP. That because the maritime transport and logistics account for approximately 12% of global GDP and, according to the International Monetary Fund, the global economy contracted by 4.9% in 2020 due to the pandemic, followed by a slow recovery with growth of 5.4% only beginning in 2021.

With the arrival of lockdowns in Europe and the United States, strict measures to contain the pandemic have radically changed consumer and purchasing patterns⁶. The inability to leave home has generated an increase in demand for imported consumer

⁶ There was a phenomenon known as “**panic buying**”: fears of running out of supplies led people to buy compulsively, causing shortages of basic goods and prompting some countries to ration essential items.

goods, most of which are transported in containers⁷. To avoid running out of stock, Western companies began ordering far more than they needed. This phenomenon, also documented by Saricioglu, Genevois and Cedolin (2025), demonstrates how minor variations in consumer demand can trigger a catastrophic “bullwhip effect” across the entire chain, generating a gradual build-up of excess inventory for manufacturers and distributors across the chain (Saricioglu, A., Genevois, M. E., & Cedolin, M., 2025). The shipping industry struggled to manage this unexpected increase in demand due to the large number of previous blank sailings and the problem of empty containers. Since global logistics depend on the delicate balance of empty containers returning to their point of origin to be re-shipped, due to trade imbalances during that period, local lockdowns and warehouse closures, empty containers arriving in the West to transport exports from China to overseas destinations were being unloaded extremely slowly or were blocked in American and European ports. SRM⁸ data confirms that transit time from China to the United States for a container ship increased from 39 days in 2019 to 49 days in 2020, reaching 68 days in 2021; as a result, arrival times at destination ports have dropped from 78% (in 2019) to 36% (in 2021). The situation has been critical, especially in the United States⁹. As reported by UNCTAD, starting in mid-2021, the San Pedro Bay port hub (U.S.)¹⁰ experienced massive congestion of anchored container ships, with an average of 30 ships waiting. The crisis eased slightly between mid-April and late July 2021, before flaring up again in August 2021, reaching an average of 60–80 ships waiting to dock.

Even though the gradual reduction in port congestion and the normalization of shipping routes in 2022 allowed the global economy to start recovering, this crisis has shown that supply chains are too dependent on individual suppliers and are not flexible enough to respond to unexpected global shocks. As highlighted by Jang et al. (2021), the pandemic forced a necessary paradigm shift from a purely “Just-in-time” model to a “Just-in-case”

⁷ UNCTAD data show that over 80% of **global trade volume** is transported by sea in containers. In fact, according to a recent study conducted by SRM, container traffic stands at approximately 865.9 million TEUs (Twenty-foot Equivalent Units), with a projected increase of 14.2% (989.1 million TEUs) by 2028.

⁸ **SRM** is a specialized research centre affiliated with the Intesa Sanpaolo Group that focuses on analysing supply chains, logistics, the maritime economy, energy, and business internationalization.

⁹ Clearly, the longer the distances, the higher the costs. According to the study conducted by SRM, the **cost of shipping containers** by sea increased from an average of \$1,421 to \$7,556 in 2020.

¹⁰ The port manages almost 40% of U.S. imports from Asia.

approach, restoring critical operational buffers and increasing safety stocks to survive future disruptions (Jiang B., Rigobon D. & Rigobon R., 2021).

During the initial post-pandemic recovery phase, the geopolitical situation became even more complicated due to the outbreak of the Ukraine-Russia war in February 2022, introducing a new layer of systemic instability, with significant impacts on international logistics in many ways. The closure of airspace between Russia, Ukraine and Western countries immediately interrupted air cargo transport between Asia and Europe. The forced extension of routes has led to an increase in fuel consumption and, as a result, in shipping rates, just when the market was still recovering from the delays accumulated during the pandemic.

The conflict also disrupted Eurasian land transport, affecting the northern rail corridor (which runs through Russia and Belarus), which had previously been considered a strategic and efficient alternative for transport. Faced with economic sanctions and the risk of traveling hundreds of kilometres through war zones, companies have been forced to redirect shipments to maritime transport. In this context, the Trans-Caspian Transport Corridor (TCTC)¹¹, also known as the “Middle Corridor”, gained strategic importance. This route, which connects Europe and China by crossing Central Asia, the Caspian Sea and the South Caucasus, has proven to be a fast and secure alternative; in fact, as confirmed by the International Institute for Strategic Studies, following the invasion, there was a 33% increase in container traffic on this route.

From an energy perspective, the Russian Federation’s key role as a major exporter of oil and gas has turned the outbreak of the war into a serious global energy crisis. The costs of marine bunker fuel and electricity for port terminals have skyrocketed, causing, according to OECD estimates, a decline in global economic growth of more than one percentage point and a 2.5% rise in inflation.

The conflict triggered a global energy crisis. As stated in the UNCTAD report titled *“Maritime trade disrupted: The war in Ukraine and its effects on maritime trade logistics,”* the rise in energy costs, combined with trade restrictions and the logistical need to rely

¹¹ The **European Union** has recognized the strategic importance of the Middle Corridor and has proposed an investment of 10 billion euros to develop its infrastructure. Estimates indicate that by 2030, the annual volume of goods transported along the Middle Corridor will reach 10–11 million tons.

on alternative suppliers (often located in more distant locations), has led to a 64% increase in the cost of very low-sulphur fuel oil (VLSFO)¹² compared to the beginning of the year.

However, the illusion of having found an alternative and efficient logistics “solution” was broken at the end of 2023, due to the Suez Canal crisis and growing military instability in the Red Sea. Unlike the March 2021 blockage caused by the container ship *Ever Given* running aground due to technical and weather-related factors¹³, this time, repeated attacks by Houthi militias on merchant ships transiting the Bab el-Mandeb Strait brought traffic through the Suez Canal to a standstill. The importance of this trade hub cannot be underestimated because it is considered the shortest and most direct maritime route between Asia and Europe, accounting, under normal conditions, for approximately 12–15% of global trade and nearly 30% of worldwide container traffic. Indeed, according to the World Bank, the blockade caused a 5% decline in international trade in 2023 alone, directly affecting the efficiency of global shipping.

To avoid conflict zones, ships have been forced to sail around Africa toward the Cape of Good Hope, extending their route by about 40% (adding an average of 10 to 20 extra days of sailing), so ships are taking much longer to complete a single round trip, increasing transport costs and tripling shipping rates¹⁴, again generating a shortage of empty containers at ports of origin.

The impact of macro-disruptions peaked with geopolitical tensions in the Strait of Hormuz. Starting in February 2026, the reopening of the conflict between the United States, Israel and Iran pushed (in April 2026) the Islamic Revolutionary Guard Corps (IRGC) to actively disrupt commercial shipping in the area, attacking and seizing several container ships¹⁵ accused of transiting without authorization. While the Red Sea crisis

¹² **VLSFO** (Very Low Sulphur Fuel Oil) is a marine fuel with a maximum sulphur content of 0.5%, introduced to reduce pollutant emissions from the shipping industry.

¹³ In **March 2021**, the blockage of the Suez Canal paralyzed 12% of global trade for six days, resulting in a loss of approximately \$89 million for Maersk Line alone, \$76 million of which was spent solely on maintaining container inventories.

¹⁴ **Before** the Panama Canal crisis, shipping a 40-foot container from Shanghai to Genoa cost \$1,600; today, the rate for the same container is \$5,200.

¹⁵ Among the container ships are the **MSC Francesca**, sailing under the Panamanian flag, and the **Epaminondas**, sailing under the Liberian flag.

had disrupted the main East-West trade route for consumer goods, the blockade of the Strait of Hormuz affects the heart of the planet's most important energy chokepoint. According to S&P Global Ratings, these military operations are having a significant impact on oil and gas reserves and energy infrastructure, given that most of the oil passing through the Strait of Hormuz comes from the Gulf countries¹⁶, and that approximately 20% of the world's total maritime trade in Liquefied Natural Gas (LNG)¹⁷ passes through this single strait. Specifically, Qatar accounts for 93% of this trade, as it is one of the world's largest gas exporters (especially thanks to its Ras Laffan hub), while the remaining 7% is handled by the United Arab Emirates (S&P Global Ratings, 2026).

Even in that critical situation, there are alternative routes for bypassing the strait, such as the Saudi East-West connection to the port of Yanbu (Red Sea) and the Emirati oil pipeline that ends in Fujairah (on the Gulf of Oman). Of course, this change in route has increased overall logistics costs by up to 50%, extending the transit time for goods by an average of 20 additional days.

It's also important to mention that the Middle East is not only the main exporter of oil and gas, but also of chemical fertilizers. In fact, this blockade has forced global agro-industrial companies to search for alternative suppliers in North America or North Africa, generating brutal competition to secure the availability of containers on these new alternative routes (World Bank, 2026). Once again, it has been shown how a local blockade and changes in the geopolitical landscape can trigger global inflation.

This sequence of events confirms the necessity of shifting from a global logistics system based exclusively on efficiency and cost minimization to a model centred on resilience. Developing flexible systems capable of surviving and absorbing global shocks is now a fundamental strategic priority for international trade.

¹⁶ **Saudi Arabia** (37%), the **United Arab Emirates** (13%), and **Kuwait** (10%).

¹⁷ **Liquefied Natural Gas (LNG)** is natural gas that is first cooled and liquefied, then shipped and transported on specialized LNG carriers, eliminating the need for physical pipelines.

1.3 The Evolution of Green Supply Chain Management

Beyond geopolitical instability, the logistics sector is confronting an equally critical challenge: environmental sustainability. Logistics and supply chain management traditionally prioritized cost minimization and speed of delivery. However, as mentioned in the theory by Sarkis (2003), ecological limitations cannot be viewed any longer as external variables, but they need a transition to Green Supply Chain Management (GSCM) (Sarkis J., 2003).

The implementation of sustainable practices is caused not only by ethics but also by strategic changes due to external market and institutional pressures. Firstly, there are stricter government and supranational regulations concerning the reduction of CO₂ emissions and waste disposal. Secondly, from the point of view of the market, consumers are becoming more conscious about the impact of their purchases on the environment. Thirdly, investors nowadays evaluate the reliability and perspectives of a firm based on rigorous ratings of ESG (Environmental, Social, Governance). These indicators highlight how companies address challenges and opportunities related to the environment (greenhouse gas emissions, climate change mitigation, use of renewable energy, management of environmental risks), social impact (promotion of green skills¹⁸, workplace inclusivity, promotion of diversity), and corporate governance (wage equity, transparency, reporting). As Zumente and Lāce observe, ESG ratings transform corporate sustainability into a key indicator of corporate reliability, evaluating performance across these three dimensions (Zumente I. & Lāce N., 2021).

As a result, Green Supply Chain Management has evolved into a strategic lever essential for global competitiveness and the very survival of businesses in the global market, as well as an opportunity to further integrate sustainability. This new “green” approach involves the systematic integration of environmental considerations throughout the entire product lifecycle, from eco-design and the sourcing of low-impact materials to logistics and distribution. This systemic approach, as formalized by Sarkis (2012), implies that the total ecological footprint of a final product depends on the integrated practices of the entire network, considering every stakeholder accountable for the

¹⁸ **Green skills** are the set of competencies and talents that enable organizations to operate in a sustainable way.

network's overall ecological footprint (Sarkis J., 2012).

1.3.1 The GHG Protocol and the Central Role of Logistics in Scope 3

To effectively manage the environmental impact of complex and articulated value chains, it is necessary to introduce rigorous measurement standards to reduce greenhouse gas emissions and fight global warming. The primary international benchmark is the Greenhouse Gas Protocol (GHG), the global accounting standard used by governments and businesses to inventory and report corporate greenhouse gas emissions.

Developed in the late 1990s by the World Resources Institute (WRI)¹⁹ and the World Business Council for Sustainable Development (WBCSD)²⁰, the GHG Protocol provides companies and institutions with shared standards, guidelines and tools for measuring and managing emissions into the atmosphere.

To ensure the transparency of information, the Protocol classifies emission sources into three distinct categories, called "Scopes."

- The **Scope 1** quantifies direct emissions generated by sources owned or directly controlled by the organization (such as the combustion of boilers or the company's vehicle fleet).
- The **Scope 2** measures indirect emissions resulting from the production of electricity or heat energy purchased and consumed by the company.
- The **Scope 3** includes all other indirect emissions generated along the value chain, so all emissions from sources not owned or controlled by the reporting company, but which are a direct consequence of its operational activities (such as raw material extraction, logistics, transportation, the use of products sold, and their end-of-life disposal).

¹⁹ The **World Resources Institute (WRI)** is a global research organization that transforms ideas into concrete actions for the environment, the economy, and human well-being.

²⁰ The **World Business Council for Sustainable Development (WBCSD)** is an alliance of more than 200 global companies working together to accelerate the global transition to a fair and zero-carbon future.

This classification not only makes it easier to identify direct and indirect emission sources but also prevents double-counting by ensuring that two or more companies do not report the same emissions under the same scope.

The determination of the carbon footprint, that is, the total environmental impact generated by every single process, is based on the sum of these three categories. Not including Scope 3 in the calculation would mean reporting the company's actual environmental impact incompletely. The urgency of monitoring this sector is also confirmed by a study conducted by Accenture in 2023, which found that supply chains account for approximately 60% of global CO₂ emissions. On a global level, the transportation sector accounts for approximately 19% of global energy consumption and generates 23% of energy-related CO₂ emissions, with road transport alone accounting for 80% of the transportation sector's oil demand (Goldsby, T. J., Iyengar, D., & Rao, S., 2014). This alarming statistic, in this specific category, demonstrates that logistics processes and outsourced transportation represent the most significant environmental impact within the entire value chain.

This emissions framework shows how outsourced transportation can become a relevant "competitive vulnerability" for exporting companies. As McKinnon et al. (2015) assert, in today's global economic landscape, a company's sustainability claims are invalid if its third-party logistics (3PL) partners do not share and apply the same environmental standards (McKinnon, A., Browne, M., Whiteing, A., & Piecyk, M., 2015). As a result, sustainability performance is no longer measured on a single entity, but across the entire supply chain. If a third-party logistics provider (3PL), that is an external partner that outsources a company's logistics activities (including warehousing, inventory management and transportation), relies heavily on polluting road transport, those emissions are directly transferred to the client company's Scope 3 inventory. This "transfer" of emissions negatively impacts the exporting company's ESG rating, which, as mentioned earlier, has now become the primary "business card" for every company, restricting market access and deterring investors.

A low ESG rating is not only damaging to a company's reputation and discouraging to investors but also creates a real commercial barrier. As noted by Oberhofer and Dieplinger (2014), today, environmental compliance is a restrictive selection requirement, carrying the same strategic weight as price competitiveness and delivery

speed (Oberhofer, P. & Dieplinger, M., 2014). So, the relationship between customer and supplier is radically transformed, changing the role of the green logistics partner into a key strategic ally, capable of offering intermodal solutions, low-emission vehicles and optimized networks, while safeguarding the customer's ESG profile.

1.3.2 Overcoming the Environmental Trade-off

The integration of sustainability into logistics operations shifts environmental management from an external compliance burden to a core component of corporate strategy. Green logistics, therefore, is no longer seen as an additional cost but as a key factor in creating a sustainable competitive advantage. Historically, the academic and industrial debate on the relationship between business and the environment was based on the concept of a trade-off: improving environmental performance automatically reduced profit margins. So, taking care of the environmental impact of their operations was perceived exclusively as a cost factor, a requirement imposed by regulatory compliance, or a luxury reserved for companies experiencing high profitability.

This perspective shifted in the mid-1990s when Michael Porter and Claas van der Linde demonstrated that well-designed environmental regulations encourage technological and organizational innovations capable of compensating for, if not exceeding, the costs incurred in complying with them (Porter, Michael E., and Claas van der Linde, 1995). In line with this hypothesis, Ambec and Lanoie in 2008 later systematized the empirical evidence regarding this transition, demonstrating how environmental performance translates into tangible financial benefits. In particular, the authors identified seven specific mechanisms²¹ through which being “green” not only increases revenue (for example, by gaining access to new markets and differentiating products), but also significantly reduces operating and capital costs (Stefan, A., & Paul, L., 2008).

²¹ These **seven mechanisms** that highlight the benefits of adopting sustainable environmental practices are: better access to certain markets, product differentiation, the sale of pollution-control technology, risk management and relations with external stakeholders, the cost of materials, energy, and services, the cost of capital and lastly labour costs.

Aligning with the Resource-Based View (RBV)²², managing natural resources efficiently, transforming the ability to minimize the impact into a distinctive capability, can generate a competitive advantage that is difficult for competitors to replicate (Hart S.L., 1995). This concept is exemplified by the “Lean and Green” paradigm, which, as explained by Cabigiosu and Favarin (2009), establishes a direct correlation between operational efficiency (cost minimization) and reduced environmental footprint (emissions minimization) (Cabigiosu A & Favarin A., 2009). In the logistics sector, pollution and emissions represent a direct economic waste, as they result from systemic inefficiency and the suboptimal use of resources purchased by the company. A clear example of this is the excessive fuel consumption resulting from empty miles, poor loading optimization or suboptimal routing, which automatically result in both environmental and financial losses for the company. So, reducing your impact by optimizing physical flows, promoting intermodal solutions and adopting low-emission modes of transport does not mean incurring additional costs but rather optimizing them. (Womack, J. P., & Jones, D. T., 2017). This creates a win-win situation, in which the elimination of physical and energy waste and the optimization of transport processes become the pillars of business profitability.

Today, one of the most important driving forces behind the integration of “green” practices comes from the market and from changes in end-consumer behaviour (B2C), where sustainability has become a primary factor in decision-making. A study conducted in 2023 by McKinsey & Company, in collaboration with NielsenIQ, analysed sales trends in relation to sustainability criteria, finding that products with clear ESG claims experienced a 28% higher growth rate over the past five years than their non-ESG counterparts (McKinsey & Company, 2023).

A growing segment of consumers is willing to pay a “green premium”, which means paying extra for goods whose supply chain ensures a low environmental impact and high transparency²³. According to the Global Sustainability Study conducted by Simon-

²² The **Resource-Based View (RBV)** is a strategic management framework that shapes business operations by evaluating a company's internal assets and capabilities

²³ According to a Deloitte study on the “**Sustainable Consumer**” in the UK alone, 30% of British consumers choose brands that promote environmental sustainability, while 28% have stopped buying certain brands due to a lack of transparency regarding their sustainability practices.

Kucher & Partners, the 34% of consumers worldwide are ready to pay a higher price for the sustainability of products and services, and a study conducted in 2025 by BearingPoint²⁴ shows that the 69% of Europeans consider sustainability in their purchasing decisions. This trend is driven mainly by younger generations: 42% of Millennials and 39% of Generation Z take care of the impact of their purchases, compared to 31% of Generation X and 26% of Baby Boomers. Currently, China is the market with the highest propensity of all, with 52% of consumers willing to pay a premium for sustainability (Simon-Kucher & Partners, 2021).

Despite these encouraging market trends, the emergence of the global climate crisis has made voluntary self-regulation insufficient. Relying only on market forces risks encouraging greenwashing²⁵ and unfair competition practices²⁶, where companies exploit lax regulations to gain an unfair pricing advantage while shifting negative externalities onto the public.

To correct this imbalance and accelerate the ecological transition on a global scale, European and international institutions are enforcing stringent measures.

Environmental externalities are now transitioning from corporate ethics to strict financial constraints. The rules of international competition are changing radically, with the implementation of stringent regulations and carbon tariffs that leave no space for non-compliant supply chains.

²⁴ **BearingPoint** is an independent multinational management and technology consulting firm. The study was conducted in collaboration with the polling firm Odoxa, surveying a sample of 4,010 European consumers.

²⁵ The term “**greenwashing**” refers to the misleading practice whereby a company communicates or promotes environmental initiatives in a deceptive, exaggerated, or unfounded manner, with the aim of projecting a positive public image to attract sustainability-conscious consumers and investors, while diverting attention from the actual negative impact of its overall operations.

²⁶ **Environmental dumping** is a type of unfair competition that is associated with sustainability. It refers to cases where firms gain unfair competitive advantage in market pricing due to the lack of adequate regulations or avoiding investment in clean technologies. Though environmental dumping firms shift the costs of its negative externalities to the general public.

Chapter 2

The European Regulatory Framework for Sustainability: Navigating the "Fit for 55" Package

To encourage businesses to protect the planet and reduce the environmental impact of their operations, the European Union is introducing increasingly stringent sustainability regulations. The turning point came in July 2021 with the introduction of the “Fit for 55” package, whose directives were adopted in 2023. As outlined by the European Commission (2021), this package doesn’t represent just a set of rules but an important paradigm shift, acting as the flagship legislative package of the European Green Deal²⁷'s overall strategy (European Commission, 2021). To the logistics and international trade industries, this is the beginning of a change from self-regulated approaches towards sustainability to legally binding and financially enforced regulations.

The “Fit for 55” package is not an isolated measure, but rather a set of coordinated policy and initiative actions designed to align EU regulations with the climate targets set out by the European Council and the European Parliament, whose primary goal is to reduce greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. This legislation affects the most important sectors for the economy and the environment, such as energy (a greater reliance on renewable energy and increased energy efficiency), industry (reinforcement of the existing emissions trading system), transport (stricter requirements regarding vehicle CO₂ emissions, along with new provisions regarding the usage of sustainable fuel in aviation and the maritime transport sectors), buildings (introduction of new directives for the energy performance of buildings and adding residential heating to the new ETS II scheme), and land use & agriculture (more ambitious goals for carbon sequestration through forestry and sustainable agriculture).

Specifically, this chapter analyses three key pillars of this regulatory framework: the inclusion of maritime shipping in the EU ETS, the Carbon Border Adjustment Mechanism (CBAM) and the Corporate Sustainability Due Diligence Directive (CSDDD). The analysis

²⁷ The **Green Deal** is an ambitious package of reforms and strategic policies presented by the European Commission on 11 December 2019, aimed at making Europe the first climate-neutral continent by 2050 by promoting a modern, sustainable, and circular economy.

explores how these instruments are transforming global logistics. By establishing carbon tracking and ethical sourcing as strict preconditions for market access, these directives are completely addressing logistics providers to act as useful compliance consultants for companies operating within or trading with the European Union.

2.1 The Inclusion of Shipping in the EU ETS: The “Polluter Pays” Principle.

The Emissions Trading System (EU ETS) is the first international emissions trading system, launched by the European Union in 2005 and revised in 2015 to achieve the 2030 targets established in the “Fit for 55” package. As codified under European Directive 2003/87/EC, the system regulates emissions trading by enabling firms to buy and sell allowances to emit greenhouse gas emissions. The system is based on the principle of “Cap and Trade”, which determines the maximum permissible level of greenhouse gas emissions that can be emitted, as well as a limited number of allowances that can be purchased to emit CO₂ into the atmosphere.

According to Directive 2023/959, the strategic purpose of this system is to progressively force industries to decarbonize through a gradual reduction of this maximum cap. While the EU ETS initially targeted the energy and manufacturing sectors, its progressive tightening now exerts a direct and disruptive impact on global supply chains. In fact, *Figure 2*, provided in the Commission’s report on the functioning of the European carbon market published on November 19 2024, illustrates this progressive reduction of the emission cap. Observing the historical phases exposed in the chart (*Figure 2*), the total number of allowances issued annually in the EU has been gradually reduced by 1.74% (between 2013 and 2020), by 2.2% (between 2021 and 2023) and by 4.3% (between 2024 and 2027) per year, and, according to forecasts from 2028 onward, by 4.4% per year (Directive (UE) 2023/959, 10 may 2023). This chart visually demonstrates the end of the “voluntary sustainability” era and the beginning of a punitive regulatory regime. The accelerated reduction of available allowances (the increasingly lower bars) will inevitably lead to a surge in the price of carbon certificates.

In relation to maritime logistics, which is part of the system from 2024, this means entering the EU ETS market at its most rigid period. This is the reason why the firms are

forced to apply surcharges to their clients. The cap reduction shown in *Figure 2* isn't merely an environmental target but a financial deadline that makes pollution financially impractical and forces the industry to adopt alternative fuels or practices (like slow steaming).

Figure 2: Evolution in the cap across all stages of the EU ETS, including upcoming adjustments.



Source: European Commission. (2024). Report from the Commission to the European Parliament and the Council: State of the Energy Union Report 2024. (COM/2024/538 final)

Note: The figure includes maritime transport from 2024 and excludes UK installations (considering only electricity producers in Northern Ireland) from 2021 (European Commission [EC], 2024).

Allowances are the currency of this market, and each allowance corresponds to one ton of CO₂, which must be returned to the competent authorities each year for every unit emitted into the atmosphere. The European Commission (2024) reports that the EU ETS is the world's largest emissions trading market, representing over three-quarters of international carbon trading; in fact, approximately 45% of the EU's total greenhouse gas emissions are regulated by the EU ETS (European Commission [EC], 2024).

The management of emission allowances is assigned to the European Union Registry²⁸: they can be purchased through public auctions by companies that need to offset their emissions, or they can be allocated for free. In the first case, the need to purchase allowances encourages companies to drastically reduce their emissions and to invest in new technologies or use more environmentally friendly alternative energy sources. On the other hand, the allocation of free allowances helps prevent so-called "carbon

²⁸ The **Union Registry** is an online database managed by the European Commission to monitor greenhouse gas emissions (EU ETS) and companies' compliance. It allows for the tracking of emission allowances, simplifying the annual review of deadlines and compliance with environmental obligations.

leakage”, that is, the phenomenon whereby operations in specific sectors²⁹ are shifted to other countries where emissions restrictions are less stringent or virtually absent, leading to an increase in greenhouse gas emissions (Böhringer et al., 2012).

The EU ETS evolved through several phases. During the first pilot phase (2005–2007), the EU ETS covered the sector of thermoelectric power generation and energy-intensive industrial sectors (such as oil refineries and steel mills). Then, in the second phase (2008–2012), the aviation sector was included, specifically covering flights within the European Union and the European Economic Area (EEA)³⁰ and flights departing for the United Kingdom and Switzerland, while in the third phase (2013–2020), the aluminium and petrochemical industries were included (EC, 2024).

Only in the most recent phase (2021–2030), with the introduction of the EU Directive 2023/959, has the EU ETS been extended to maritime transport, representing a radical shift for logistics. The maritime sector is no longer exempt, forcing shipping companies to respect very specific limits on CO₂ emissions and to internalize their environmental impact. This integration process is based on the MRV (Monitoring, Reporting, and Verification) system, introduced by Regulation (EU) 2015/757, which requires ships to monitor, report and verify their fuel consumption and related emissions as early as 2018, providing the essential data for calculating the allowances to be returned.

The maritime sector is being gradually integrated into the system, starting with a requirement to return allowances for 40% of verified emissions in 2024, rising to 70% in 2025, and eventually covering 100% of emissions generated from 2026 onward, for which allowances must be physically surrendered in 2027 (DIRECTIVE (EU) 2023/959, May 10, 2023). To reduce the complex greenhouse effect, the updated directive states that starting in 2026, the obligation will not be limited to CO₂ alone but will also include

²⁹ As confirmed by the European Commission’s official report, there are approximately 170 **sectors** subject to carbon leakage, and these are included in an official list that is updated every five years.

³⁰ The **European Economic Area** (EEA) came into effect on January 1, 1994, and includes the 27 member states of the European Union, as well as Iceland, Liechtenstein, and Norway. It is based on a single market founded on the four fundamental freedoms: the free movement of goods, people, services, and capital.

emissions of methane and nitrous oxide, which together contribute significantly to global warming.

The urgency to regulate emissions in this sector is supported by European Commission reports, which show that since 1990, emissions from fuels sold in the European Union for routes starting in one Member State and ending in another Member State or in a third country have increased by approximately 36%. Under a scenario of no change and no regulation, emissions from international maritime transport are estimated to increase by approximately 14% between 2015 and 2030 and by 34% between 2015 and 2050 (DIRECTIVE (EU) 2023/959, May 10, 2023). In fact, in 2018, global emissions from maritime transport amounted to 1,076 million metric tons of CO₂, or about 2.9% of global emissions caused by human activities. In 2023, maritime transport accounted for about 4% of total CO₂ emissions in the European Union (approximately 128 million metric tons).

The introduction of the EU ETS for shipping applies to all large ships with a gross tonnage of 5,000 tons³¹ or more that call at ports in the European Union. Specifically, the system covers 50% of emissions from shipments departing from or arriving in ports outside the EU³² and 100% of emissions occurring between two EU ports. (DIRECTIVE (EU) 2023/959, May 10, 2023).

In the shipping sector as well, the logic behind the purchase of allowances and the maximum amount of greenhouse gases that can be emitted follows the same rules and principles as in the other sectors mentioned above, as do the gradual reductions in limits over time, to incentivize energy efficiency and narrow the price gap between traditional and alternative marine fuels.

Due to its significant environmental impact, the inclusion of maritime transport in the EU ETS has gradually reduced emissions from logistics but has also led to higher transportation costs. This has forced large international logistics companies to introduce

³¹ According to EU Directive 2023/959, emissions from ships **weighing less than 5,000 tons** account for less than 15% of total emissions generated in the Union. For this reason, it has been established that, no later than December 31, 2026, the European Parliament and the European Council must decide on the actual economic, environmental, and social impact of including ships with a gross tonnage of less than 5,000 tons (but not less than 400 tons) in the EU ETS Directive.

³² Giving the **third country** the discretion to decide on appropriate measures for the remaining portion of emissions.

an “ETS surcharge” on the final price paid by the end customer, a surcharge applied starting January 1, 2024, to cover the costs incurred for purchasing emission allowances.

Anticipating the 100% emissions coverage mandate starting in 2026, industry leaders are restructuring their pricing models. As stated by MSC (2025) in an article published on December 8, 2025: *“Starting in 2026, the EU ETS regulation will require shipping lines to account for 100% of emissions, a significant increase from the 70% coverage requirement in 2025. This will result in increased operational and compliance costs for cargo to and from EU/EEA countries. Customers will contribute to the additional costs via an EU ETS surcharge that will apply across the supply chain like those applied for other forms of regulation.”* (MSC, December 2025). To mitigate these excessive costs, companies are adopting alternative operational practices, such as “*slow steaming*”, that is, the voluntary reduction of sailing speed, which reduces fuel consumption and, automatically, the amount of ETS allowances that need to be purchased.

In the maritime sector, the EU ETS operates in close coordination with Regulation (EU) 2023/1805 on FuelEU Maritime. As reported by the Council of the European Union, the regulation, which entered into force on January 1, 2025, establishes progressive limits on the greenhouse gas intensity of energy used on board ships³³, starting with a 2% reduction in 2025 and reaching 80% by 2050. A new requirement introduced by this regulation is the obligation for container ships and passenger ships to connect to shore power (cold ironing) for their electricity needs while berthed at the quay in major EU ports starting in 2030, to mitigate air pollution in ports as well (Regulation (EU) 2023/1805, September 13, 2023).

However, the strict application of the “polluter pays” principle through the EU ETS transforms environmental impact into a tangible economic factor, presenting the logistics sector with significant financial and operational challenges that are essential for achieving the complete decarbonisation of global supply chains.

³³ Unlike trucks, cars, and trains, large ships cannot easily be fully electrified. Currently, **Bio-LNG** represents the best eco-friendly solution, as it is a renewable fuel produced by liquefying biomethane (a renewable gas).

2.2 The Carbon Border Adjustment Mechanism as a Climate Protection Tool: Mitigating Carbon Leakage in Global Trade

The EU ETS and the objectives of the European Green Deal are excellent tools for reducing greenhouse gas emissions from industrial and business activities, but at the same time, they do not appear to be enough to prevent many companies from offshoring their carbon emissions to other countries that are less environmentally conscious³⁴. To avoid emissions from high-carbon products escaping the EU ETS, creating unfair competition within the market and undermining European climate commitments, in July 2021, the European Commission proposed the Carbon Border Adjustment Mechanism (CBAM), a tax mechanism that is part of the “Fit for 55” package, transforming environmental compliance into a critical barrier to entry for the European market. This mechanism effectively transforms environmental compliance into a mandatory condition for market access, functioning as a carbon tariff applied to imports from extra-EU countries in highly emissive sectors (European Commission, 2021a).

The Regulation (EU) 2023/956 on the Carbon Border Adjustment Mechanism (CBAM) officially entered into force on 1 October 2023, introducing an initial transitional phase that extends until 31st December 2025. During this phase, importers are exempt from paying any carbon tax but must monitor and report information on the quantities of imported goods covered by the mechanism³⁵. According to the Commission Implementing Regulation (EU) 2023/1773 of the European commission of August 17 2023, this data must be uploaded to the CBAM Transitional Registry³⁶ through a quarterly report containing the specific quantities of goods, the CO₂ emissions (direct and indirect)³⁷ incorporated in those goods and any emissions costs already incurred in the country of origin³⁸ (European Commission, August 17, 2023). So important to

³⁴ As analysed with EU ETS, this process of shifting carbon emissions to other countries is known as “**carbon leakage**”.

³⁵ As established by CBAM Regulation 2023/956, the industrial **sectors with a high level of carbon leakage** (and therefore subject to the CBAM) are: cement, iron and steel, aluminium, fertilizers, electricity, and hydrogen.

³⁶ As stated in EU Regulation 2023/1773, “the **CBAM transitional register** is a standardized and secure electronic database containing common data for reporting during the transitional period, which ensures access, case management, and confidentiality.”

³⁸ If the importer has already paid carbon taxes or ETS costs in the country of origin, the amount paid during the transitional period, provided it is properly documented, becomes deductible in the final phase.

consider is the difference between the emissions: total direct emissions refer to greenhouse gases emitted directly during the production of goods, while indirect emissions are those resulting from the generation of the electricity consumed during the manufacturing of goods.

To ensure the proper execution of operations during the transitional period, the competent national authorities could impose penalties ranging from 10 to 50 euros for each ton of unreported emissions or if the quarterly CBAM report was inaccurate or incomplete. As highlighted by Business Europe (2024), this initial phase exposed significant tracking vulnerabilities within global value chains, given that during the first reporting year (2024), only 12% of European companies were able to collect and submit emissions data, while approximately 80% of the companies that submitted a report used the default values³⁹ provided by the European Commission, highlighting a low level of tracking in the supply chains (BusinessEurope, 2024).

Despite the problems, this transitional phase proved to be a critical phase because the European Union had the opportunity to refine the calculation methodology for the emissions to 2026, while at the same time, the European importers and non-EU producers could revise their accounting and IT systems for tracking emissions.

Once the accounting and administrative foundations were established during the transitional period, the definitive phase officially began on January 1, 2026. From this moment, importers are required to monitor emissions at their own expense and to purchase and submit CBAM certificates. The start of this phase strategically coincides with the phased elimination of free allowances allocated to European industries within the EU ETS system, ensuring compliance with World Trade Organization (WTO) rules on equal treatment. Basically, EU importers will have to purchase CO₂ certificates, the cost of which represents the price of the emissions they would have paid if the goods had been produced in Europe (and thus in compliance with European regulations) (Bellora and Fontagng, 2023). By May 31 of each year, starting in 2027, each authorized CBAM reporter must surrender some certificates equivalent to the total emissions embedded

³⁹ To support importers during the initial phase of the CBAM, the EU offered default values per each product category. However, since these figures tended to overestimate real emissions, the Commission has permitted their usage only till July 2024 (for the first three reports). Starting from this date, there is a 20% restriction applied to the usage of the default values, which have to do with complicated emissions.

in the goods imported during the previous calendar year. In addition to safeguarding the internal market, the CBAM indirectly promotes decarbonisation in third countries.

According to an OECD study analysing the impact of the CBAM, without this mechanism, for every ton of CO₂ emissions not generated in Europe (due to the ETS system), approximately 0.19 tons of emissions would be shifted to non-EU countries, increasing logistics from polluting countries. With the implementation of the CBAM, this trend is reversed, as importers shift their sourcing to cleaner producers, leading to an estimated additional 0.54% decline in global emissions (Dechezleprêtre et al., 2025).

Starting in 2026, CBAM compliance requirements will no longer be only a matter of corporate sustainability but an essential customs requirement for the movement of goods. European companies, even if they are not yet very familiar with the system, are required to ensure maximum transparency in their emissions reporting, as even the slightest error could result in goods being held up at the port or significant delays in customs clearance procedures.

For this reason, the logistics and customs partner plays a relevant role, acting as a strategic advisor to ensure regulatory compliance and lightening the responsibility for companies in verifying and certifying the actual emissions embedded in imported goods. In many instances, and in cases where the importer is not established in the European Union, the customs agent assumes the role of “Indirect Customs Representative,” and is responsible both legally and financially for the procurement and declaration of CBAM certificates.

This operational urgency is reflected in the following statement by Bryan Stocker, Head of Global Trade and Customs Advisory of Maersk: *“While companies are aware of the CBAM, many are still failing to meet reporting deadlines and lack the necessary information and expertise needed for future compliance.”* (Maersk, June 3, 2024).

For this reason, global logistics providers, to verify that the information provided by foreign manufacturers complies with European requirements, have already started to provide training and customs consulting services on the CBAM, as well as IT platforms for data collection, becoming essential partners in ensuring that the CBAM’s bureaucratic requirements do not lead to operational delays.

2.3 The Corporate Sustainability Due Diligence Directive (CSDDD): Expanding Accountability Across the Supply Chain

While the CBAM mechanism acts as a trade protection measure focused on the carbon footprint of specific imported goods, the European Union has recognized that the green transition must extend beyond greenhouse gas emissions. It has now become necessary to expand the scope of corporate responsibility not only to its internal operations but to the entire chain.

Against this background, the Corporate Sustainability Due Diligence Directive (CSDDD) was launched as an effort to practice sustainable and responsible business practices in global value chains. The EU Directive (EU) 2024/1760, which has been officially adopted since July 25, 2024, is a strict due diligence requirement. Companies are now legally required to determine, avoid, minimize and address negative consequences of their activities on the environment (for example, pollution, biodiversity loss, greenhouse gas emissions) and on human rights (for example, child labour, exploitation, unsafe working conditions) (Directive (EU) 2024/1760, 2024).

The directive doesn't apply to all businesses, but only to European companies with over 1,000 employees and a global net turnover exceeding 450 million euros, as well as non-EU parent companies that generate a net turnover of more than 450 million euros within the European Union. This threshold guarantees that there is equal competition within the internal market (Directive (EU) 2024/1760, 2024). The implementation will follow a gradual approach, starting in 2027 for very large companies (organizations that have more than 5,000 employees and a turnover of more than €1.5 billion) and gradually expanding to cover all eligible enterprises by 2029.

According to this Directive, companies are required to ensure the proper functioning of their internal processes and comply with them along the whole supply chain including suppliers of raw materials and logistics providers. The Directive also requires the adoption and implementation of a climate transition plan aligned with the Paris Agreement global warming target of 1.5°. To ensure the effectiveness of the regulation, the framework includes severe financial penalties (up to 5% of global net turnover) and civil liability mechanisms for any damages resulting from a lack of due diligence (Directive (EU) 2024/1760, 2024). This legislation effectively forces large corporations

to use their commercial influence to promote sustainable practices across their entire ecosystems.

As outlined in Directive 2024/1760, the practical implementation of this duty of care involves six key steps based on international guidelines for responsible business conduct:

- Integrating due diligence into corporate policies and management systems.
- Identifying and assessing actual or potential adverse impacts⁴⁰ on human rights and the environment.
- Preventing, mitigating, and bringing an end to negative impacts.
- Monitoring and evaluating the effectiveness of the implemented due diligence measures.
- Communicating publicly on the company's due diligence processes and results.
- Providing remediation to victims of corporate abuse or adverse environmental impacts.

The CSDDD Directive directly impacts the logistics sector, as operators will be required to provide transparent data and operational guarantees to their clients. For this reason, exporting and importing companies can no longer focus only on raw material suppliers and manufacturers, but they must apply rigorous due diligence to the partners who transport and handle their products.

The joint evaluation of the EU ETS, CBAM and the CSDDD Directive provides a promising regulatory framework to drive the ecological and ethical transformation of the European market.

Even though these three tools function using their own principles, they are complementary. The EU ETS internalizes the domestic emission costs, the CBAM prevents carbon leakage, while the CSDDD is responsible for the accountability across the entire chain.

⁴⁰ The distinction between actual and potential negative impacts is: **actual impacts** are environmental violations or damage that are already occurring or have already materialized as a result of the company's activities or those of its supply chain (so the company's obligation is to mitigate, stop and remedy them), and **potential impacts** are those damages that have not yet occurred but are highly likely to occur due to the nature of the business, so in this case the obligation is prevention.

Together, these regulations transform sustainability from a voluntary choice into a strategic imperative, irreversibly redefining the rules of trade and supply chain management on a global scale.

Chapter 3

The Logistics Partner as a “Shield”: The Case of the Gallozzi Group

To understand how a logistics provider operates in the era of macro-disruptions and in response to the growing regulatory pressures regarding sustainability discussed in the previous chapters, this chapter will examine the case of the Gallozzi Group. Through the analysis of experiences and practical cases emerging from an interview conducted with Luigi Guariglia, we will investigate how the Group has reacted to market shocks, proving to be a fundamental strategic ally in safeguarding the business continuity of numerous companies caught up in these important changes.

The analysis examines how the operator responded to and managed the challenges that emerged during the COVID-19 pandemic, the Russia-Ukraine war, the Suez Canal crisis and the blockade of the Strait of Hormuz, standing side by side with its customers to address the consequences of events that have disrupted the global economy and the performance of their businesses.

The second part of the chapter, however, examines the regulatory environment, analysing how the Gallozzi Group, even where its presence was not strictly required, proved to be a decisive support in meeting the sustainability requirements imposed by the EU ETS, CBAM and CSDDD, which are analysed in detail in Chapter 2.

While every event and change has had catastrophic consequences for the shipping and logistics sectors, it has also raised awareness among importers and exporters. They have begun to anticipate the possibility of future unexpected events and to view their logistics partner as an integrated consultant capable of assisting them at every stage of the supply chain.

3.1 Presentation of the Gallozzi Group: An Integrated Logistics Ecosystem

The Gallozzi Group was founded in 1952 in Salerno by Giuseppe Gallozzi and his wife Titina, starting as a shipping agency offering shipping, storage and port management services. Over more than 70 years, the Group has evolved significantly, transforming itself from a simple terminal operator into a real international logistics holding company. Today, the Group controls more than twenty companies operating in the shipping agency, freight forwarding, logistics and container terminal sectors, with a combined revenue of 200 million euros, fixed assets totalling 150 million euros and a workforce of 500 employees.

From its headquarters in Salerno, the company coordinates an articulated global network that includes strategic offices in China (Shanghai and Tianjin), the United Kingdom⁴¹, Turkey and the Netherlands, as well as new strategic locations in San Francisco (USA), Spain and Germany.

The map shown in *Figure 3* illustrates the international reach of the Gallozzi Group's network. The connecting lines highlight the strategic coordination from the headquarters in Salerno to the direct offices already operational in major global commercial hubs (Europe, Asia, the United States) and to the branches set to open soon (Coming Soon), an infrastructure that is essential for providing customers with a one-stop-shop service on a global scale.

⁴¹ In 1984, Giuseppe Gallozzi was **awarded** the M.B.E. (Member of the Most Excellent Order of the British Empire) by H.M. Queen Elizabeth II.

Figure 3: The Gallozzi Group's global logistics network and operational locations.



Source: Official company documentation, Gruppo Gallozzi (2025)

The Group's competitive strength in today's global value chains landscape lies in its extensive diversification, which enables it to operate as an integrated logistics ecosystem capable of offering a "one-stop-shop" service. This means that the Gallozzi Group can present itself as a single strategic partner capable of managing the entire shipping chain from start to finish, relieving exporters and importers of the burden of having to enter into separate contracts (with a trucking company, a shipping line, a customs broker and a warehouse) and instead dealing directly with an integrated logistics provider that centralizes all these operations.

As stated in the Gallozzi Group's official documents, their "one-stop-shop" service includes a full package of services:

- Pickup: Collection of the export cargo by truck.
- Transportation management: Booking space on trains or ships (feeder vessels).
- Regulatory compliance: Handling all customs formalities in both the country of departure and the country of arrival.

- **Delivery (Last Mile):** Transporting and delivering containers to their destination.

The Gallozzi Group offers this full package of services through three complementary in-house operating divisions:

- **Gallozzi Shipping:** It represents the company's historical origins and is currently one of the longest-standing shipping agencies in Italy. To provide ship support services (*husbandry services*) with 24/7 operations 365 days a year and coordinate commercial contacts for shipowners, the company has a customs department entirely dedicated to the management of complex import, export and transit procedures. A key advantage of this division is its AEO (Authorized Economic Operator) certification, a European authorization that attests to the highest level of financial reliability and full compliance with customs regulations. This enables the Group to ensure fast and secure customs clearance procedures, acting as a true “regulatory shield” that is essential today for supporting customers in the complex reporting required by restrictive regulations such as the CBAM.
- **GF Logistic:** This company was founded in 2002 and is involved in international shipping and efficient door-to-door multimodal logistics. GF Logistic operates under the NVOCC (*Non-Vessel Operating Container Carrier*) license, meaning that it is authorized to issue its own bill of lading, ensuring that customers have a single point of contact responsible for the shipment from pickup to delivery. Apart from its operational capabilities, GF Logistics’ real strategic value comes from its rigorous set of international certifications, which attest to its reliability and commitment to sustainability. Specifically, the company has been certified by *Sustainable Logistics Inspection*, a relevant audit developed by the *Association of International Forwarding and Logistics Service Providers (UTIKAD)* that certifies high performance in environmental sustainability, energy management, occupational health and safety, as well as the protection of workers’ rights and road safety. This “green” focus proves to be a key asset for clients who need to report on their ESG portfolio and reduce Scope 3 emissions.
- **Gallozzi Intermodal:** Developed to expand the long-standing connections between Southern Italy, the United Kingdom and Northern Europe, this division designs and manages intermodal transport solutions. To support supply chain

continuity through rail and feeder services, the company has invested in its own fleet of over 400 45-foot containers and 100 40-foot containers, ensuring multiple weekly departures and extremely fast transit times. From a Green Supply Chain perspective, intramodality is a key strategic lever, as shifting significant volumes of traffic from road to sea and rail enables companies to reduce their Scope 3 emissions and mitigate the costs associated with the EU ETS.

Presenting the Gallozzi Group's organizational structure and operational capabilities, it's now important to analyze this integrated logistics ecosystem within the turbulent context of the past decade. The Group's capabilities and strategy have not been tested under normal operating conditions but have been tested by a series of global crises that have disrupted traditional paradigms of international trade.

3.2 Gallozzi in the Age of Macro-Disruptions

In the first two chapters of this thesis, the focus has been on the theoretical and macroeconomic framework of the systemic shocks that have deeply reshaped the global economy over the past decade. This section illustrates the transition from theory to empirical evidence through the analysis of primary data and firsthand accounts collected during the interview, examining the actual impact of these unexpected shocks, such as the COVID-19 pandemic, the Russia-Ukraine conflict, the blockage of the Suez Canal, and the crisis in the Strait of Hormuz. The main objective is to illustrate, through real-world operational cases, the strategies adopted by the Gallozzi Group to absorb these unexpected crises and to safeguard the business continuity of its clients, demonstrating in practice the transformation of the logistics provider into a true strategic partner.

To fully understand the Gallozzi Group's strategic evolution during these turbulent years, this empirical section employs a qualitative research methodology. All the data, operational dynamics and practical case studies presented in the following sections are the direct result of this targeted analysis. Specifically, primary data was collected through a semi-structured interview conducted with Luigi Guariglia, Freight Forwarding Sales Executive at the Freight Forwarding Division of GF Logistic S.p.A. This approach was essential for collecting practical insights and real-world examples of crisis

management, enabling an overview of the actual impact that global shocks have had on both the logistics provider and its customers, as well as the specific strategies implemented to address them. To triangulate these results and build a solid analytical framework, the primary information provided by the company was supplemented with secondary data, including internal reports, regulatory texts and broader industry analyses, demonstrating how the logistics provider is evolving from a simple operational supplier to a strategic partner essential for the resilience and international competitiveness of importing and exporting companies.

3.2.1 COVID-19

As discussed in the first chapter, the COVID-19 pandemic represented the first major asymmetric shock to global value chains, highlighting the inability of a supply chain without operational “buffers” to adapt to unexpected fluctuations in supply and demand. Faced with a collapse in demand, a shutdown of production in China and the reduced terminal operations, the major global shipping alliances (including MSC, Maersk, CMA CGM and Hapag-Lloyd) have had to reorganize their operational assets to avoid sailing empty vessels, relying on the practice of blank sailings. This phenomenon has led to the systematic cancellation of scheduled departures and the skipping of port calls, reaching a critical peak of over 20% in May 2020.

The interview conducted at the Gallozzi Group and the operational data and practical case studies provided by Luigi Guariglia (Sales Dept. of the freight forwarding division GF Logistic S.p.A.) confirm these macroeconomic and oligopolistic dynamics on an operational level. The drastic reduction in available capacity and freight rates has triggered an unprecedented inflationary spiral in the maritime shipping market. According to data provided by the company, import rates from China, which in the pre-pandemic era averaged \$1,000 for 20-foot containers (TEU) and \$1,500 for 40-foot containers (FEU), have reached unsustainable speculative peaks, hitting \$9,000 and \$14,000 respectively.

In this highly volatile environment, which has forced many small shipping companies and carriers operating in the non-essential manufacturing sector to shut down, the Gallozzi Group has managed to maintain its operational stability by implementing a

strategy to diversify the risk associated with its customer portfolio. The company has, in fact, “offset” the drop in volumes by focusing on the agri-food sector, a market segment that has never experienced disruptions due to the various national lockdowns. GF Logistic’s strong historical connection with the Campania food processing industry (particularly the Agro Nocerino Sarnese region, a key hub for the export of tomato products, legumes and fruit juices) has served as a real strategic “buffer,” allowing the company to absorb the financial shock that otherwise forced many other less diversified freight forwarders to close.

The crisis highlighted how supply chains were excessively dependent on a rigid shipping system. In a period when a shortage of empty containers at origin hubs and the inflexibility of major shipping lines made traditional cargo space unavailable and shipping rates prohibitively high, the Gallozzi Group demonstrated how a strategic logistics partner must be able to break away from traditional routes to protect its customers.

A case of great strategic and operational significance is the strategic partnership established between the Gallozzi Group and the Italian logistics operator *Rif Line*⁴². Starting in September 2021, specifically to fill the cargo capacity gap left by major carriers, Rif Line launched a new direct maritime service (called the “*Kalypso Line*”) which links the Chinese ports of Taicang (near Shanghai) and Da Chan Bay (near Shenzhen) with the Italian port of Civitavecchia (Rome), though the use of chartered ships at rates slightly lower than market peaks (which at that time ranged between \$15,000-\$16,000), while ensuring direct calls in Italy. In this context, the strategic insight of the Group's CEO, Agostino Gallozzi, became particularly evident when he negotiated the inclusion of the Port of Salerno (the Group's main hub) in direct routes from and to major Chinese ports (Taicang and Da Chan Bay).

The expansion of the service to the Port of Salerno took place in early 2022 with the introduction of a third vessel, the “*Green Ocean*” (a container ship with a capacity of 1,809 TEU), with the purpose of serving and capturing supply flows directed towards Southern Italy. From a supply chain risk management perspective, this alternative route

⁴² **Rif Line** is an Italian international logistics and freight forwarding company headquartered in Fiumicino (Rome). During the post-pandemic supply chain crisis, it notably bypassed major global shipping alliances by independently chartering its own container vessels to guarantee importers faster, direct routes between Asia and Italy.

has generated a double immediate competitive advantage for Gallozzi's customers. On the one hand, it has made it possible to optimize transit times to just 25 days, compared to the 45–50 days required by the major multi-port routes of the leading global alliances, bypassing global port congestion. On the other hand, the strategic decision to use Salerno responded to the need to develop an integrated network that was physically close to local businesses, while simultaneously reducing land transport costs from the unloading hub to the destination.

Although Kalypso's operations came to an end in early 2024 due to the natural realignment of global freight rates toward historical market levels (approximately \$3,000 per 40-foot container), the commercial intuition and the network agility demonstrated by the Gallozzi Group during the 2021–2023 period were decisive factors in protecting local customers from the speculations of major global logistics companies and ensured business continuity for many Italian importers.

The COVID-19 pandemic showed the shift from the application of the Just-in-Time model for importers, where the strategy was based on cost minimization, to the Just-in-Case model, which focuses on business continuity and the creation of safety stock. Thus, customers understand that the cost of an interruption in supply chain operation is higher than the savings in a single shipment. In the conditions of the new competitive environment, the role of the NVOCC operator has been completely transformed, becoming both a service and a strategic consultant as well as a commercial intermediary.

A representative case managed by GF Logistic in 2021 shows the process of transformation described above. An importer based in Abruzzo had purchased three 20-foot containers containing around 70 tons of cast iron manhole covers⁴³ from the port of Tianjin in China, under CIF (Cost, Insurance, and Freight) terms of sale to the Port of Naples⁴⁴. According to the contract, the usual price for the shipment was around \$1,000 per container, with the shipment scheduled for June 2020. However, due to production delays accumulated by the Chinese supplier, the goods were not ready until after

⁴³ A product historically manufactured by domestic foundries but gradually shifted to the Asian market for cost reasons.

⁴⁴ This means that the importer entered into a purchase agreement based on a *pro forma invoice*, under which the price of the goods included shipping costs to the ship's rail at the port of Naples.

October 2020, exactly at the peak of the inflationary explosion in freight rates. The Chinese supplier therefore refused to fulfill the shipment under the original terms, requiring the integration of the maritime shipping costs, which had in the meantime risen to \$5,600 per container.

Under normal circumstances, the dispute would have been resolved through legal channels (based on the Hague-Visby Rules or the Brussels Convention)⁴⁵, resulting in extremely long delays and leaving the client in Abruzzo facing stock shortages for months. In contrast to the purely legal approach of solving this dispute, Gallozzi proposed and implemented a successful commercial mediation whereby the additional cost of shipping was shared equally between the Chinese exporter (\$2,800) and the Italian importer (\$2,800).

With traditional discounts under the charter contracts (“allotments”) no longer guaranteed effective shipments due to the lack of empty containers and regular blank sailings, Gallozzi recommended to its client the MSC’s “DIAMOND” service line. Although this option required premium rates, it provided a guaranteed space on the ship and the availability of containers. The goods were shipped as scheduled on July 16, 2021, and arrived at their destination on September 13, 2021, thereby preventing a stockout that would have paralyzed the Italian customer’s distribution network. In this case study, the importer accepted higher shipping costs to safeguard its market share, demonstrating in practice how risk mitigation and supply security have definitively surpassed the importance of a low price.

The effectiveness and tangible value of an integrated logistics operator are most clear in its ability to directly control port terminal infrastructure, translating the vertical integration of assets into immediate operational flexibility.

An episode of extraordinary timeliness occurred at the beginning of Italy's first major national lockdown. On the morning of March 9, 2020, a container ship carrying a vital shipment for a Gallozzi Group client arrived in Salerno. A few hours later, the national government announced a decree from the Prime Minister that imposed a total nationwide ban on the movement of goods and people, effective from the following day

⁴⁵ The **Hague-Visby Rules** and the **Brussels Convention** are the primary international conventions governing maritime freight contracts, as they define the rights, obligations and liability limits between the maritime carrier and the shipper, establishing the criteria for competent jurisdiction in the legal resolution of cross-border commercial disputes.

(March 10, 2020). The risk that the container would remain blocked indefinitely within the port was extremely high.

Thanks to the close internal collaboration between GF Logistic and SCT (Salerno Container Terminal), the Group's terminal operator in the Port of Salerno, it was possible to monitor the exact location of the container on board the ship in real time, starting from the anchoring phase. By anticipating the planning of unloading operations, the Group's customs officials proceeded with the immediate customs clearance of the goods (in time), simultaneously arranging for the container to be loaded onto a truck that had already been appropriately informed and was ready to depart.

The entire process, from unloading and customs clearance to inspection and delivery to the importer, was completed by the evening of March 9, 2020. A series of complex operations that under normal circumstances would require a standard turnaround time of no less than 3 business days was executed and completed in less than 10 hours total. This effort not only prevented a disruption in the customer's value chain but also demonstrated how modern logistics has definitively evolved into a complex infrastructure for integrated risk management.

While the pandemic emergency highlighted the structural failures of a logistics system based only on cost efficiency and the absence of buffers, the difficult process of post-COVID recovery was brutally interrupted by a new type of challenge: geopolitical instability. As soon as supply chains began to normalize, a new, unpredictable shock hit the markets, forcing operators to face a crisis of a completely different nature.

3.2.2 Ukraine-Russia War

The conflict that broke out in February 2022 between the Russian Federation and Ukraine has triggered a severe global crisis, the effects of which have not been limited to the territories where fighting is taking place but have seriously compromised transportation and trade in goods worldwide. While at the macroeconomic level, the airspace closure and the disruption of northern Eurasian rail corridors have forced a radical reorganization of trade flows, on a strictly operational level, the most disruptive

impact has been driven by the global energy crisis caused by Russia's status as a major exporter of hydrocarbons.

Evidence recorded in the field by the Gallozzi Group shows how this asymmetric shock immediately led to inflationary growth in transportation costs, closely linked to the increase in the cost of marine bunker fuel and the electricity needed to operate port terminals. The interview with Luigi Guariglia, regarding how the Gallozzi Group managed the transition to the Trans-Caspian Corridor (Middle Corridor) and addressed the increases in marine fuel and electricity costs, revealed a structural rise in costs throughout the entire logistics supply chain.

As for the maritime and port sector, rising fuel costs (such as VLSFO) have pushed shipowners to apply significant surcharges to ocean freight rates through the Bunker Adjustment Factor (BAF)⁴⁶. At the same time, Italian terminals have introduced a fuel surcharge for the movement of import/export containers, with an average cost of approximately 25 euros per operation, subject to variation depending on the port. However, the increases in prices have become inevitable for the road transport sector, with increases ranging from 18% to 22%.

Analyzing the impact on traffic volumes, the Group observed market disruption immediately following the outbreak of the conflict, which caused a slowdown in operations and shipments for about a month. However, once this initial phase of uncertainty had passed and the new costs had been absorbed, traffic restarted at full speed, quickly returning to normal volumes. This recovery demonstrated, in fact, the great resilience and adaptability of global supply chains.

While managing energy costs has required ongoing financial monitoring, the real strategic challenge for an integrated logistics operator has centered on route stability and the mitigation of geopolitical risk.

A very unique case study handled by GF Logistic includes a manufacturing firm based in Puglia that produces industrial machinery to filter the water used in agricultural

⁴⁶ The **Bunker Adjustment Factor** (BAF) is a variable surcharge based on changes in the cost of marine bunker fuel and is applied as an adjustment to maritime shipping rates. This rate is set by shipping companies.

irrigation, and normally exports its goods to Russia via the port of Salerno, to the strategic port of Novorossiysk⁴⁷ on the Black Sea coast.

Before hostilities, the Salerno-Novorossiysk route operated under a fully competitive market environment⁴⁸, ensured by the presence of at least three major commercial shipping lines. The international sanctions regime and the increased risk of war have prompted most global carriers to implement permanent blank sailings to Russian ports, causing a rapid collapse of the market due to geographical isolation. In this challenging environment, the only shipping company to have maintained a regular service (with a frequency of once every ten days) to Novorossiysk was the Turkish line *Akkon Line*, thanks to Turkey's geopolitical position. By not adhering to Western sanctions and the embargo against Russia, Turkey allowed its ships to continue sailing to Russian ports on the Black Sea without being subject to the restrictions imposed on European global carriers.

However, operating under a regime of substantial local monopoly and being the only operator to assume the risks associated with navigating such sensitive waters, *Akkon Line* has imposed a significant surcharge. The shipping rate for this specific route has skyrocketed by 70%, a speculative surcharge that includes the "War Risk" clause, an additional insurance and operational premium required to cover the threat of war and potential maritime accidents in conflict zones. The conscious acceptance of such exorbitant freight rates by the Puglia-based exporter empirically confirms the point made in the previous paragraph: faced with the risk of being completely shut out of the market and an irreversible breakdown in commercial relations, ensuring the operational continuity of the supply chain takes on a strategic priority that is hierarchically superior to cost savings on transportation.

The most critical aspect of logistics management during wartime is customs compliance, which refers to the ability of the logistics provider to act as a "legal and informational

⁴⁷ **Novorossiysk** is the Russian Federation's main commercial port on the Black Sea. The direct connection with the port of Salerno represented the most important logistics corridor for Italian exports, ensuring efficient transit times and privileged access to markets in Russia and the Commonwealth of Independent States (CIS).

⁴⁸ The **simultaneous presence** of multiple international carriers on the same route ensured competition in maritime shipping rates, keeping rates at highly competitive levels. It also guaranteed frequent departures and a constant supply of empty containers, protecting shippers from the risk of logistical bottlenecks.

shield” for the exporting company in a regulatory environment that is constantly evolving. In the case of the Puglia-based customer, GF Logistic’s role as a strategic consultant proved essential in correctly interpreting the numerous sets of sanctions issued by European authorities.

The operator's work was structured around a series of strict but essential verification and inspection steps:

- Goods Verification and Dual-Use: The shipping agent preliminarily analyzed the technical specifications of the agricultural water filtration equipment, verifying, based on official customs tables, that the goods were not classified as prohibited items or dual-use goods (technologies with both civilian and military applications), thereby ensuring the legality of the export.
- Intensive Document Review: To address the high alert level from authorities, Gallozzi implemented an extraordinary internal protocol, proactively requesting and reviewing commercial invoices, packing lists, certificates of origin and conformity, as well as copies of bank transfers to rule out illicit financial triangulation.
- Physical inspections at the port: From a customs perspective, the continuity of cargo flows had to consider a drastic increase in physical inspections at the port. Customs authorities ordered the frequent forced opening of containers at the Port of Salerno to verify that the machinery physically matched the items declared in the export customs documentation.

This strict inspection regime has caused delays throughout the entire supply chain, creating significant operational obstacles to the movement of goods. In one specific instance, the review of the documents for a container belonging to an exporter in Puglia that was departing from Salerno was transferred to the Rome Customs Office due to jurisdictional reasons. This bureaucratic splitting significantly extended the storage time of the goods in the port terminal, triggering a series of very high additional costs for the customer. In fact, the company had to cover both storage fees (i.e., the physical storage of the container within the Port of Salerno) and demurrage/detention costs payable to the *Akkon* shipping line for the extended use of the container over the contractual concession period. However, thanks to the prompt response of its logistics partner, the

company managed to keep its operations running and deliver the goods to their destination.

Even in this scenario, in an era of major geopolitical disruptions, logistics efficiency is no longer measured solely by delivery speed but above all by the ability to manage, in this case, bureaucratic and customs-related risks. Offering an Integrated Compliance service means avoiding costly legal penalties or expulsion from international markets due to the unsustainable costs generated by goods being blocked at the point of origin.

The need to manage the customs and operational complexities triggered by the conflict in Ukraine has demonstrated just how much a single source of instability can disrupt the balance of an entire shipping route. The systemic vulnerability of global supply chains became fully apparent when, after a short period of time, a major hub of maritime trade was struck, shifting the logistical crisis from the Black Sea directly to the Red Sea.

3.2.3 The Suez Canal Crisis

The blockage of the Suez Canal, caused by attacks by Houthi militias in the Red Sea, has paralyzed the most important maritime hub through which approximately 12–15% of global trade normally transits. The Gallozzi case study demonstrates the practical impact of this logistical shock. Specifically, the disruption of the main route between Asia and Europe has had two consequences. The first has immediate short-term effects on shipping costs and transit times; the second has even more devastating systemic effects in the medium term, causing the saturation of transshipment ports.

The first and most immediate consequence was the forced rerouting of merchant shipping around the Cape of Good Hope, extending the sailing distance by over 3,000 nautical miles and increasing the initial transit time by approximately 20 days. Financially, this circumnavigation imposed on shipowners additional operational expenses of around \$1.5-\$4 million per shipment because of the higher fuel consumption and the extended period of chartering and crew employment. All these expenses, combined with the insurance costs covering the war risks, largely neutralized and exceeded the savings from skipping the Egyptian transit fee (which usually amounted to over \$500,000 per transit).

This dramatic increase in costs was immediately transferred to the rates offered to customers. The data from GF Logistic show that import shipping rates have more than tripled. In numerical terms, a typical maritime shipment from Chinese home ports (Shanghai, Ningbo, Shenzhen) to the port of Salerno, priced in mid-December 2023 at \$1,700 for a TEU⁴⁹ and \$2,400 for a FEU⁵⁰ (via the Suez Canal), has skyrocketed in just six months (starting in June 2024) to \$5,500 for 20-foot containers and \$7,500 for 40-foot containers.

While direct costs have had a severe impact on importers' budgets, the secondary effect in the medium term has disrupted the very continuity of the supply chain, altering the lifecycle of container repositioning. Under normal circumstances, the market relies on a perfect balance between shipping full containers to the West and repositioning empty ones in Asia, thereby ensuring the necessary stock for new shipments. As happened during the pandemic crisis (which had made it necessary to adopt the "just-in-case" model to mitigate the lack of buffer stock), the expansion of African routes has delayed the return of empty containers to Asian ports. The inability to promptly reuse the equipment and therefore maintain the balance between full and empty containers has forced carriers to apply specific additional repositioning charges (Imbalance Surcharge), increasing the financial burden on customers.

To demonstrate the practical dynamics of this phenomenon, let's assume a weekly flow of 1,000 export containers from Country A to Country B. The ideal logistical balance (equipment balance) is achieved when the entire imported volume, once the unloading cycle at the recipients' facilities is complete, is automatically reused by local companies for new shipments (directed to Country A or other markets). This perfect two-way circulation allows shipping companies to maintain an optimal stock of equipment at the terminals, ensuring the smooth flow of commercial operations. However, if there is a shortage of empty containers at a particular port, caused by a decline in imports or delays in cargo arrivals, as happened during the Suez Canal crisis, this balance is disrupted. At this point, to avoid paralyzing outbound flows, the shipping company is

⁴⁹ **TEU** (Twenty-foot Equivalent Unit): This refers to a standard 20-foot container (approximately 6.1 meters).

⁵⁰ **FEU** (Forty-foot Equivalent Unit): This refers to a 40-foot-long container (approximately 12.2 meters), which occupies exactly twice the space (and volume) of a TEU.

forced to take operational action by transferring surplus containers from other ports to restore sufficient stock for exports.

This structural imbalance has been amplified by the crisis of the *hub & spoke model*⁵¹ in the Mediterranean basin. Due to the need to bear the costs of the African route, major carriers have deployed ultra-large container ships, which have generated massive and concentrated cargo volumes at major transshipment hubs. Specifically, CMA CGM unloaded larger quantities of containers at the Malta hub port, COSCO and Yang Ming at Piraeus, MSC at Gioia Tauro, Hapag-Lloyd at Genoa and Tangier and Maersk at Algeciras.

Consequently, these strategic ports faced container volumes that were triple their normal handling capacity, making the transshipment onto smaller vessels (feeders) destined for peripheral ports like Salerno impossible. While under normal conditions, laytime for transshipment is resolved within a week and on the first available feeder, this congestion caused goods to accumulate on the docks for months, forcing cargoes to be rolled over to the fourth or fifth available vessel. In terms of overall timelines, transit times, which typically are around 35 days, skyrocketed to 90 days, bordering on 4 to 5 months of latency in some critical cases⁵².

In this dramatic scenario as well, the logistics partner has proven to be a strategic ally in responding to and managing the unexpected shock. GF Logistic helped customers by letting them know they needed to reschedule their imports, considering transit times of up from 35 days to 90 days. Gallozzi representatives provided ongoing commercial consulting to anticipate the progression of rate increases and surcharges, allowing importers to assess the most cost-effective way to proceed with their import/export operations and to recalibrate final selling prices to offset the costs. Despite the physical congestion of Mediterranean terminals, the shipping company managed to avoid being delayed by implementing a digital tracking system to promptly detect any delays in container turnaround. By alerting shipping lines to the urgency and directly monitoring the crowded docks, Gallozzi has, on numerous occasions, managed to move its

⁵¹ The **Hub & Spoke model** is a logistics system in which a central hub receives, sorts and redirects goods to a network of peripheral ports. It optimizes transportation by reducing the number of trips required, ensuring faster deliveries and economies of scale.

⁵² A partial **exception** regarding the adherence to timelines was observed only among highly vertically integrated carriers, such as Maersk, which was able to use its direct ownership of the Algeciras terminal to prioritize its own cargo.

containers up the waiting lists, ensuring they are loaded on the first available feeder vessel and proving itself indispensable.

The Red Sea crisis wasn't an isolated event, but the beginning of a bigger instability that gradually made the whole Middle East area more complicated. While logistics operators were trying to process the forced rerouting around the Cape of Good Hope, a new and simultaneous crisis emerged at another maritime hub, making the global situation even more complex and unstable.

3.2.4 The Hormuz Strait Crisis

Unfortunately, the ongoing military escalation in the Strait of Hormuz is affecting not only traditional East-West trade routes but also the world's main energy chokepoint. The impact of this crisis, which has changed critical assets such as the transit of LNG, oil, and chemical fertilizers, has necessitated a complete overhaul of supply chains.

The escalation of this transformation was recently examined during the roundtable discussion "Global Trade & Shipping: New Routes, New Challenges," held on May 18 at the Lloyd's Baia Hotel in Vietri Sul Mare. The event, organized by CMA CGM in collaboration with Salerno Container Terminal (SCT), brought together key players from the maritime industry and the academic world (including representatives from Luiss Guido Carli, the SRM research center, and the geopolitical journal Domino), confirming that the redesign of global routes is now a structural necessity and no longer a temporary emergency.

The military situation in the region has specifically focused on oil tankers, consequently impacting the container traffic. According to GF Logistic, shipments to and from the main ports in the Persian Gulf (such as Jebel Ali, Abu Dhabi, Sharjah, Bahrain, Hamad, and Sohar) have experienced and continue to experience a significant increase in freight rates. In fact, maritime shipping rates on this route, which under stable conditions were around USD 800 for 20-foot containers (TEU) and USD 1,100 for 40-foot containers (FEU), have skyrocketed to USD 7,000 and USD 8,000, respectively.

To ensure business continuity for clients operating in this region and to bypass the naval blockade of the Strait, the Gallozzi Group has implemented multimodal logistics solutions. The main strategy involved rerouting ships to safe ports on the Red Sea (specifically, the port of Jeddah, complementing the routes to Yanbu discussed earlier), where, upon arrival, the containers are unloaded and the cargo is transferred to road carriers to reach final delivery locations on the Arabian Peninsula by land.

Over the surge in direct costs, Luigi Guariglia highlights a dangerous secondary effect, which is that ships blocked in the strait and severely slowed land-based delivery operations have again compromised the delicate global balance of empty container reallocation, triggering a shortage of empty containers for exports in key regions such as Turkey. The general increase in fuel costs (linked to oil market tensions) has generated an inflationary wave that has spread far beyond the Middle East. Strategic routes from the Far East (particularly from Chinese ports) have resumed a growth trend, rising from an average of \$2,000–\$3,000 (for 20'/40') to \$2,800–\$4,000.

The reaction to this latest shock confirms the definitive consolidation of a logistics paradigm based on resilience and adaptability. With strategic support from GF Logistic, which promptly informed its clients of the operational risks and economic implications of the blockade, Italian importers have rapidly implemented nearshoring strategies and diversified their supply sources. To mitigate the shortage of critical assets from the Gulf, companies have redirected their procurement of plastic raw materials (petroleum derivatives), lubricant bases and agricultural fertilizers toward geographically closer and more accessible markets, such as Turkey and Egypt.

This proactive approach, in which the shipping agent acts as a real risk manager for the client's supply chain, has turned the dynamics of the crisis. Instead of decreasing, the traffic volumes managed by the Group during this period of intense geopolitical instability have seen significant growth. The clearest evidence of this expansion is the historic milestone achieved by the Salerno Container Terminal (SCT), which managed over 10,600 TEU in a single week, placing the Salerno port terminal in third place overall among Italian ports in terms of cargo volume.

The case of SCT in contexts of macro-disruption demonstrates that a flexible logistics architecture and timely consulting not only protect companies from disruptions but also

create new competitive opportunities, enabling them to boost operational results precisely where their more inflexible competitors face market bottlenecks.

The analysis of the real-world cases addressed by the Gallozzi Group demonstrates how the nature of logistics has changed in the era of macro-disruptions. The four major shocks analyzed (the pandemic, the Ukraine-Russia war, the Suez crisis and the Hormuz crisis) show that the traditional Just-in-Time model, focused solely on minimizing transportation costs, is no longer sufficient, and that the logistics provider is no longer a simple executor of shipments but a strategic partner, that in some cases is transformed into a true supply chain risk manager. As evidenced by the Gallozzi Group's operations, the vertical integration of assets, from the shipping agency to customs compliance, all the way to port terminal management, now represents the only "shield" capable of ensuring business continuity.

In a global context where uncertainty has become the new normal, the ability to act quickly in the markets, negotiate commercial settlements, interpret European sanctions regulations and reroute shipments via alternative multimodal routes is no longer merely a competitive advantage but an essential requirement to prevent companies from being excluded from international markets. This is an important goal that companies can achieve only and exclusively with the support of an integrated and well-structured logistics partner.

Table 1 provides an overview of the four major macro-disruptions analyzed, highlighting the specific problems generated by each crisis, the practical cases managed by the Gallozzi Group and the strategic solutions implemented to safeguard clients' supply chains.

Table 1: Summary of global macro-disruptions and the strategic role of the Gallozzi Group.

MACRO-DISRUPTION	KEY PROBLEM	PRACTICAL CASE ANALYZED	SPECIFIC CASE CHALLENGE	SOLUTION & GALLOZZI'S STRATEGIC ROLE
COVID-19 PANDEMIC	- Blank Sailings - Extreme shipping rate inflation - Shortage of empty containers - National lockdowns	(1) Abruzzo-based importer of manhole covers (2) Vital container arriving hours before the March 2020 Italian lockdown	(1) Chinese supplier refused to cover the unexpected shipping rate hike, which would have caused a severe stockout for the Italian importer (2) On the morning of March 9, a container ship carrying a vital shipment for a client arrived at port, but on the same day, the Prime Minister issued a decree prohibiting the movement of goods and people starting the following morning, thereby blocking this shipment indefinitely and resulting in extremely high costs.	(1) Commercial Mediator: Negotiated a 50/50 cost split between importer/exporter and secured guaranteed shipping space on the line <i>MSC DIAMOND</i>. (2) Integrated Operator: Used the vertical integration with SCT to complete unloading, customs clearance and delivery in under 10 hours, avoiding the blockage and the costs.
UKRAINE-RUSSIA WAR	- Geopolitical sanctions - Closure of routes to Black Sea - Skyrocketing energy/fuel costs	Puglia-based manufacturer exporting water filtration machinery to Novorossiysk, Russia	Primary direct shipping routes were interrupted by global carriers due to war sanctions, risking complete market exclusion and delayed customs clearance.	Legal and Informational Shield: Maintained route continuity via a Turkish carrier (<i>Akkon Line</i>) bypassing sanctions. Managed complex customs compliance (dual-use verification, document reviews, physical inspections).
SUEZ CANAL CRISIS	- Rerouting via the Cape of Good Hope - Equipment imbalances - Massive congestion of transshipment hubs	Italian importers operating through saturated Mediterranean transshipment hubs.	Goods have been accumulating for months at congested hubs due to the use of massive ships carrying excessive cargo, extending transit times to as long as 90 days.	Supply Chain Risk Manager: Provided proactive commercial consulting to reschedule imports. Implemented digital tracking to monitor delayed containers, pushing shipping lines to prioritize their loading.
HORMUZ STRAIT CRISIS	- Naval blockades - Paralysis of the global energy chokepoint - Massive rate increases for the Persian Gulf routes	Italian importers who rely heavily on the Persian Gulf for critical goods (plastic raw materials, lubricant bases and fertilizers) as well as customers who need to ship products for export to the Arabian Peninsula.	The naval blockade has paralyzed container traffic to and from the major ports in the Persian Gulf (such as Jebel Ali and Abu Dhabi), causing an unsustainable rise in marine fuel costs and freight rates due to the need to take a longer route.	Strategic Consultant: Implemented alternative multimodal solutions, like sea routing to Jeddah, followed by road transport. Advised on nearshoring strategies to redirect supply sources to Turkey and Egypt.

3.3 Compliance as a Service: Addressing CBAM, EU ETS and CSDDD

To reduce the environmental and social impact of their operations, modern supply chains have had to adapt a significant part of their processes in response to the implementation of European environmental regulations. Unlike the geopolitical crises analyzed, in which shipping companies can actively act by reorganizing routes, the impact of climate taxes represents a non-negotiable obligation for importers. While Chapter 2 outlined the theoretical framework and the functioning of the main European regulatory instruments, specifically the Carbon Border Adjustment Mechanism (CBAM), European Union Emissions Trading System (EU ETS) and Corporate Sustainability Due Diligence Directive (CSDDD), this section will examine their practical application. We will analyze how the Gallozzi Group has supported and continues to support its clients in responding to these new and significant environmental and social challenges. It will be analyzed specific operational cases that demonstrate how the company has developed a true “Compliance as a Service” offering. The logistics provider not only provides technical support to importers in the complex process of tracking and reporting CO2 emissions but also acts as a guarantor of corporate social responsibility, ensuring compliance with corporate ethics, human rights and workplace safety along the entire supply chain.

3.3.1 Carbon Border Adjustment Mechanism (CBAM)

Chapter 2 examined how the introduction of the European “Fit for 55” legislative package has transformed environmental sustainability from an ethical parameter to a strict customs and financial requirement. In particular, the Carbon Border Adjustment Mechanism (CBAM) was designed with the noble aim of countering carbon leakage by requiring European importers to report and match the cost of carbon dioxide emissions from goods originating from non-EU countries to that of domestic products subject to the EU ETS.

However, the interview with Luigi Guariglia of GF Logistic confirms that the noble intent of the legislation has faced significant bureaucratic and IT challenges. As emerged from

the analysis of Regulation (EU) 2023/956 and observed in business practice, the burden of registering as an authorized declarant on the European Customs Portal (using SPID and EORI credentials) and the subsequent quarterly reports falls exclusively on the importer.

During this delicate transition from the transitional period to the definitive period, when for the first time the entry barrier is no longer represented solely by tariffs but also by environmental customs compliance, the customs department of the Group has become important in terms of providing information and guidance. Gallozzi's proactive efforts have focused on analyzing customs codes (HS codes/TARIC) to identify which goods are subject to the declaration requirement and whether they exceed the exemption threshold (set at 50 tons per year). Faced with an institutional portal that operators consider impractical and cumbersome, shipping companies have often had to refer their clients to specialized IT consulting firms, which were established specifically to assist importers and exporters with the parts of the registration process that are particularly unclear and to ensure they obtain the alphanumeric "CBAM Authorized Operator" code.

Gallozzi's commitment to ensuring business continuity for its customers amid these regulatory changes is evident in the on-site support it provided to a leading importer of tinsplate. This company, which imports between 16,000 and 17,000 tons annually of semi-finished products in coils for the canning industry, requested direct support from the shipping company as early as the complex CBAM pilot phase in the first months of 2024. Given the strategic importance of the client, Gallozzi's customs representative visited the importer's facility for three consecutive days, assisting the company's accounting manager with electronic authentication and the entry of shipment data into the customs portal. This training and operational support provided an inestimable competitive advantage. From 1st January 2026, with the CBAM entering its definitive phase, customs authorities have made possession of an authorized operator code a mandatory requirement for proceeding with customs clearance operations. Thanks to timely compliance, the importer was able to operate without any interruption: between February and June 2026, Gallozzi cleared over 2,000 tons of goods for this client that arrived on two conventional (bulk) ships and approximately 10 containers, completely avoiding the regulatory bottlenecks that instead paralyzed less prepared competitors. In a phase of total inexperience in the field, if preventive compliance is not achieved in

time, the logistics partner's customs expertise becomes the only lever to mitigate economic damage.

Another practical case examined by Gallozzi involved an importer of metallurgical materials for the construction industry, whose goods (shipped in containers with prepaid freight charges handled directly by the Chinese exporter) were unloaded at the port of Salerno while the company still did not have a definitive CBAM code. The problem of registration blocked customs clearance, triggering the accumulation of two significant cost items: demurrage (a charge imposed by the shipping line for the extended retention of its containers) and storage (the cost of occupying space at the port). To solve this problem and avoid additional costs for the client, Gallozzi decided to use an alternative method of customs procedures, suggesting the immediate unloading of the containers and the physical transfer of the goods to the customs warehouse. In this way, the goods remained in temporary customs-bonded storage pending the issuance of the CBAM code, allowing the importer to avoid additional demurrage and storage costs. Even though the importer had to pay handling costs for unloading and subsequent delivery via covered trucks (instead of the standard intermodal container transport), the customer benefited from warehouse storage rates that were drastically lower than the exorbitant port and shipping penalties.

This study empirically demonstrates what theory has long established. In a regulatory landscape that uses tariffs and environmental compliance as barriers, the certified customs broker assumes the dual role of problem-solver and risk manager. The logistics partner acts as a strategic ally and consultant in a context of total uncertainty.

3.3.2 European Union Emissions Trading System (EU ETS)

As demonstrated, the inclusion of maritime transport in the EU ETS system has generated new compliance costs throughout the supply chain, with tangible effects on corporate balance sheets and end consumers (Confcommercio Trieste; Transport Online).

Estimates provided by major global carriers, such as MSC, have confirmed the application of additional fees (ETS Surcharges) that can reach up to 500 euros per

container (The Medi Telegraph, 2022). The impact of these costs has been aggravated in recent years due to various geopolitical instabilities, which have forced longer routes, inevitably leading to increased bunker fuel consumption and higher CO2 emissions that the shipowner is required to compensate for by purchasing the relevant certificates (Port News, n.d.).

In this specific regulatory environment, the practical importance of the NVOCC operator is fundamental not for the purpose of bypassing any regulations but for ensuring the fulfillment of all legal requirements. The strategic importance of the Gallozzi Group has changed into an informational advisory activity focused on informing about the sudden changes in the ETS surcharge level and estimating the impact of environmental taxes on individual shipments. This approach enables importing and exporting companies to revise the price lists and protect their profit margins.

It should be noted that although the logistics provider cannot shield the customer from the costs of the global carbon tax, it still has a responsibility to ensure that its operations comply with strict European regulations, especially the CSDDD Directive. The Gallozzi Group has been applying ESG (Environmental, Social, Governance) principles, transforming sustainability from a mere obligation into a genuine strategic advantage.

On the environmental side, every strategic decision made by the Gallozzi Group is taken by the “*Internal Committee for Quality and the Environment*,” a governing body that brings together the managers of the various departments to draft an annual Improvement Plan approved by the Board of Directors to ensure a constant reduction in environmental impacts (Leadership & Management, n.d.).

As stated in the Salerno Container Terminal Code of Ethics dated March 1, 2021, to achieve the goal of “zero emissions” and comply with the 10 Principles of the *United Nations Global Compact*⁵³ and the *2030 Agenda*⁵⁴, SCT has implemented an investment

⁵³ The **United Nations Global Compact** is a voluntary strategic initiative that encourages companies around the world to align their operations and business strategies with ten universal and fundamental principles, grouped into four key thematic areas: the protection of human rights, respect for labor standards, environmental protection, and the fight against corruption.

⁵⁴ The **2030 Agenda** is a global action plan adopted in 2015 by the governments of the 193 UN member states. It consists of 17 Sustainable Development Goals (SDGs) and 169 associated targets, which aim to balance the three dimensions of sustainable development: economic growth, social inclusion, and environmental protection.

plan totaling over 30 million euros. This investment has enabled the acquisition of environmentally sustainable cranes⁵⁵, the construction of four fully automated gates for heavy vehicle access (drastically reducing waiting times and thus the pollutant emissions from queuing trucks), the purchase of fully electric vehicles for internal transportation and the installation of modern wastewater treatment equipment (Salerno Container Terminal S.p.A., 202, Codice Etico).

The Group's commitment to sustainability also extends to the tourism sector, with a significant private investment in the Marina d'Arechi tourist port. As stated in the September 2, 2025, interview published on "Blueeconomy.com," CEO Agostino Gallozzi emphasized the importance of the Group's financial independence: *"The Marina d'Arechi project stems from an entirely private initiative. To date, we have invested 85 million euros without public funding. This is a very significant undertaking, demonstrating how tourist port facilities can be supported by private capital"* (Blueeconomy, 2 settembre 2026). Designed according to eco-sustainability criteria, the port can accommodate up to a thousand boats and offers zero-impact bike-sharing services, ensuring it has been awarded the Blue Flag⁵⁶ and the maximum score (five out of five) in the Marine Excellence Quality certification issued by RINA⁵⁷ (Leadership & Management, s.d.).

3.3.3 Human Rights, Workplace Safety and Business Ethics

Over the continuous improvement of the environmental impact of its operations, the Gallozzi Group operates in strict compliance with human rights and workers' health, guided by the *"Universal Declaration of Human Rights"*. The company promotes fairness, prohibits all forms of child labor or irregular employment and actively supports workers' right to freedom of association and collective bargaining. A particularly

⁵⁵ Two Liebherr 600s and two Liebherr 800 **maxi-cranes**, capable of operating on ships with a capacity of 15,000 TEU.

⁵⁶ The **Blue Flag** is awarded annually by the FEE (Foundation for Environmental Education) to the beaches and tourist ports that meet standards for environmental sustainability, water quality, safety, and environmental education.

⁵⁷ **RINA** (Registro Italiano Navale) is the most important international certification body, which evaluates and certifies the level of excellence of tourist ports based on the quality of services offered, the safety of infrastructure, and environmental sustainability, assigning a rating ranging from one to a maximum of five "rudders."

significant social initiative is the commitment to promoting women's inclusion in a historically male-dominated sector such as the port industry, viewing diversity as an opportunity for corporate growth (Salerno Container Terminal S.p.A., 2021, Codice Etico).

Health and safety in the workplace are ensured through the implementation of management systems that comply with the international ISO 45001 standard (formerly OHSAS 18001), in line with Italian Legislative Decree 81/08 (Leadership & Management, n.d.). At the port terminal level, SCT has reorganized specific operations with a control room that enables remote operational management, significantly reducing the number of operators physically present on the dock and exposing them to fewer risks.

Corporate integrity is regulated by a strict Code of Ethics and the goal of implementing the voluntary international SA8000 standard for social responsibility, which ensures respect for human rights and ethical working conditions, safeguarding health, safety and freedom of association (Leadership & Management, n.d.). To ensure transparency and prevent corruption, money laundering and conflicts of interest, the company has established a dedicated *whistleblowing channel*, managed by an independent Supervisory Body (SB), to allow for anonymous reports and protect employees from any retaliation. Any violations of the Code of Ethics are subject to a strict system of sanctions ranging from a verbal warning to suspension from work and dismissal (Leadership & Management, n.d.).

In responding to the dual challenge of geopolitical crises and sustainability, the Gallozzi Group's case perfectly illustrates how the real value of a logistics operator is no longer measured by the freight rates it offers, but rather by its structural capacity to absorb uncertainty and risk. By acting as a true multi-layered "shield", adapting alternative multimodal routes to bypass geopolitical crises, leveraging advanced customs expertise to neutralize the administrative shocks and integrating ESG values into the core of its terminal infrastructure, the Group has redefined the boundaries of its profession.

To recap the analysis conducted in this final section about the European regulatory framework and the company's internal sustainability initiatives, *Table 2* provides an overview of how the Gallozzi Group addressed the requirements of the "Fit for 55" package and the CSDDD, showing the bureaucratic and financial challenges imposed on

the market, the specific obstacles faced by clients and the strategic solutions, including significant internal green investments implemented by the Group to ensure environmental compliance across the supply chain.

Table 2: Summary of Environmental Regulations and Gallozzi Group's Compliance Strategies

REGULATION/ AREA	KEY PROBLEM	PRACTICAL CASE ANALYZED	SPECIFIC CASE CHALLENGE	SOLUTION & GALLOZZI'S STRATEGIC ROLE
CBAM (Carbon Border Adjustment Mechanism)	A complex bureaucratic process that requires importers to register as authorized declarants and report CO2 emissions for extra-UE imports, acting as a strict customs barrier.	(1) An important importer of tinplate (16k-17k tons/year for the canning industry). (2) Importer of metallurgical materials for the construction industry.	(1) As completely inexperienced users, using the complex EU customs portal during the pilot phase to prevent goods from being held up at the port of origin. (2) Materials arrived at the port without a definitive CBAM code, blocking customs clearance and causing massive demurrage and storage penalties.	(1) Proactive Consultant: Gallozzi provided three days of on-site support to the client's accounting manager to assist with the portal registration, successfully shipping 2,000 metric tons of goods for this client in 10 containers and completely avoiding the regulatory bottlenecks that had paralyzed less-prepared competitors. (2) Problem-Solver: Rerouted goods to a customs-bonded warehouse (temporary storage) to drastically cut carrier and port penalties while waiting for the CBAM code.
EU ETS (Emissions Trading System)	The inclusion of the maritime sector is generating new compliance costs (ETS surcharges of up to €500 per container) that are transmitted along the entire supply chain.	Import and export companies are facing sudden and unpredictable shipping costs, which have been further exacerbated by recent instability that has driven costs even higher.	Fluctuations in the carbon surcharges imposed by major shipping companies have impacted corporate balance sheets and made it difficult for companies to protect their profit margins.	Transparent Advisor: Provided continuous, timely commercial consulting and updates on ETS surcharge fluctuations. This transparency allowed clients to accurately recalculate their pricing and protect their market positioning.
CSDDD & Corporate ESG Investments	Supply chain accountability requires logistics providers to prove strict compliance with all the environmental and human rights standards to safeguard their clients' ESG ratings.	The Gallozzi Group's internal operational and infrastructure upgrade to serve as a "green partner" that is fully compliant with the required standards.	Achieving total decarbonization of terminal operations, ensuring worker safety, and maintaining ethical integrity in a high-impact, historically male-dominated industry.	Green Investor & Ethical Partner: Gallozzi invested >€30M in eco-sustainable cranes, automated gates, electric vehicles, wastewater treatment and €85M in the touristic port of Marina d'Arechi. It also implemented remote control rooms to reduce dock risks (ISO 45001), whistleblowing systems and policies for women's inclusion.

Conclusion

This thesis has demonstrated how the logistics sector has undergone a radical and irreversible transformation over the past decade, evolving from a pure cost center to a genuine source of competitive advantage. Through an analysis of recent global dynamics, it emerged that traditional value chains have shown profound vulnerabilities in the face of major global instability. The macro-disruptions analyzed have forced a paradigm shift toward resilience and a “just-in-case” approach, while the implementation of the European “Fit for 55” package and stringent regulations such as the EU ETS, the CBAM and the CSDDD Directive have transformed sustainability from a voluntary ethical choice into a strict customs, trade and financial constraint, redefining the barriers to entry into international markets.

The Gallozzi Group’s case study provided relevant empirical evidence of this shift. Considering increasing operational and regulatory challenges, the case study highlighted the fact that the logistics partner is no longer only a simple transport provider but has evolved into a risk manager and consultant. As a “shield” for the client, the Gallozzi Group has shown that vertical integration of assets, providing alternative intermodal routes and strict support for customs and environmental compliance are the most effective ways of maintaining business continuity in importing and exporting firms. Today, relying on a partner capable of absorbing uncertainty has allowed many companies not only to survive market disruptions but also to transform risks into competitive opportunities.

In this global landscape, characterized by systemic uncertainty that now seems to represent the new normal, adaptability and foresight have become the most valuable managerial assets. The words of Agostino Gallozzi, CEO of the Gallozzi Group, sum up the strategic mindset needed to deal with and interpret the current turbulence in the sector: *“We must not get too carried away during periods of success, nor become discouraged when facing challenges. We are currently in a period of conflict, both military and commercial, but there will be a realignment”*. This perspective makes it evident that today’s challenges, even if complex, don’t determine the end of international trade but rather represent painful transitional phases toward a new global equilibrium. In this upcoming realignment, the competitiveness of companies in the global market will no

longer be measured solely by the price of the finished product but by the robustness, environmental compliance, and flexibility of their supply chains. Integrated logistics has emerged as the indispensable strategic ally for building the success and stability of future businesses.

The results of this research offer managerial implications for both importing and exporting companies and logistics service providers. From the Gallozzi Group's case can be learned that the traditional approach of selecting logistics partners based exclusively on the lowest shipping rate is fundamentally obsolete. The case shows that the financial damage caused by a rigid supply chain (regardless of whether it was triggered by geopolitical shocks or customs penalties) is much higher than the savings achieved on basic transportation costs. To behave appropriately in this case, the management of export/import companies should make sure that their logistics provider is included in their strategy as an internal player. The creation of operational buffers and compliance with the regulations should be of top priority. At the same time, for logistics providers, the primary implication is that future competitive advantage will rely on vertical integration; in fact, they must invest in green infrastructure, digital tracking and dedicated customs consulting to effectively act as a "shield" and protect their clients from both administrative bottlenecks and geopolitical disruptions.

This study presents some limitations because of being a single qualitative case study. But it's important to say that the Gallozzi Group can be considered a good example of the way integrated logistics providers overcome crises and cope with them. With the support of vertical integration and a proactive attitude towards geopolitical and environmental challenges, they give a good overview of how other firms in the industry should behave. Looking ahead, future research should expand the scope of study in this area by analyzing multiple cases to better compare the strategies of the various players in international logistics.

Since we are in an era where global uncertainty is the only constant, logistics is no longer just the engine of international trade but the definitive shield ensuring a company's survival and future success.

AI Statement

La sottoscritta *Flora Barberio*, matricola numero 906857, iscritta presso Ca' Foscari al corso di Laurea magistrale in *International Management*, autrice della tesi di laurea "*Logistics as a Strategic Lever: Resilience and Compliance in the Gallozzi Group Case*", relatrice *Monica Plechero*, consapevole delle sanzioni previste dall'art. 76 del Testo unico, D.P.R. 28/12/2000 n.445, e della decadenza dei benefici prevista dall'art. 75 del medesimo Testo unico in caso di dichiarazioni false o mendaci, sotto la propria personale responsabilità ai sensi degli artt. 46 e 47 del D.P.R. 28/12/2000 n. 445, dichiara di aver fatto ricorso a tecnologie di intelligenza artificiale generativa per supportare vari aspetti della ricerca e della scrittura della mia tesi di laurea, in particolare Gemini (versione 3.1 Pro) per la revisione e ottimizzazione dei testi per migliorare la chiarezza e la coerenza e per il supporto alla scrittura automatica di frasi, e DeepL come strumento linguistico per aiutare nella traduzione e garantire la coerenza terminologica.

Dichiara inoltre che tutto il materiale generato dall'IA è stato attentamente verificato, rivisto e rielaborato dall'autrice, che si assume la piena responsabilità per la qualità, l'accuratezza e l'integrità scientifica del lavoro.

List of figures

Figure 1: <i>Monthly planned and blank sailings, with percentage of blank sailings, January–December 2020</i>	9
Figure 2: <i>Evolution in the cap across all stages of the EU ETS, including upcoming adjustments.</i>	22
Figure 3: <i>The Gallozzi Group's global logistics network and operational locations.</i>	34

List of Tables

Table 1: *Summary of global macro-disruptions and the strategic role of the Gallozzi Group.* 51

Table 2: *Summary of Environmental Regulations and Gallozzi Group's Compliance Strategies* 59

Bibliography

- Cabigiosu, A., & Favarin, A. (2009). *Lean e green: L'impresa ecocompatibile*. Ticonzero, 96.
- Christopher, M. (2016). *Logistics and supply chain management*. Pearson UK.
- Evangelista, P. (2014). Environmental sustainability practices in the transport and logistics service industry: An exploratory case study investigation. *Research in Transportation Business & Management*, 12.
- Goldsby, T. J., Iyengar, D., & Rao, S. (2014). *The definitive guide to transportation: Principles, strategies, and decisions for the effective flow of goods and services*. Pearson Education.
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4).
- Jiang, B., Rigobon, D. E., & Rigobon, R. (2021). From just in time, to just in case, to just in worst-case: Simple models of a global supply chain under uncertain aggregate shocks (Working Paper No. w29345). National Bureau of Economic Research.
- Kain, R., & Verma, A. (2018). Logistics management in supply chain—an overview. *Materials Today: Proceedings*, 5(2).
- Kumar, D., & Rajeev, P. V. (2016). Value chain: A conceptual framework. *International Journal of Engineering and Management Sciences*, 7(1).
- McKinnon, A., Browne, M., Whiteing, A., & Piecyk, M. (Eds.). (2015). *Green logistics: Improving the environmental sustainability of logistics*. Kogan Page Publishers.
- Oberhofer, P., & Dieplinger, M. (2014). Sustainability in the transport and logistics sector: Lacking environmental measures. *Business Strategy and the Environment*, 23(4).
- Pettit, T. J., Fiksel, J., & Croxton, K. L. (2010). Ensuring supply chain resilience: Development of a conceptual framework. *Journal of Business Logistics*, 31(1).
- Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, 9(4).

- Sarkis, J. (2003). A strategic decision framework for green supply chain management. *Journal of cleaner production*, 11(4), 397-409.
- Saricioglu, A., Genevois, M. E., & Cedolin, M. (2025). Impact of COVID-19 on the bullwhip effect across US industries. arXiv. <https://arxiv.org/abs/2506.06368>
- Sarkis, J. (2003). A strategic decision framework for green supply chain management. *Journal of Cleaner Production*, 11(4).
- Sarkis, J. (2012). A boundaries and flows perspective of green supply chain management. *Supply Chain Management: An International Journal*, 17(2).
- Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews*, 9(1).
- Stefan, A., & Paul, L. (2008). Does it pay to be green? A systematic overview. *Academy of Management Perspectives*, 22(4).
- Sarkis, J. (2012). A boundaries and flows perspective of green supply chain management. *Supply chain management: an international journal*, 17(2), 202-216.
- Süle, E. (2008). The time factor on logistics. *Acta Technica Jaurinensis*, 1(2).
- UNCTAD. (2022). Maritime trade disrupted: The war in Ukraine and its effects on maritime trade logistics (UNCTAD/OSG/INF/2022/2). United Nations Conference on Trade and Development.
- Vincenzi, A. (2022). Le ferite belliche sulle supply chain globali: Le opportunità e i rischi in tempo di guerra. *GeoTrade: Rivista di Geopolitica e Commercio Estero*, 4.
- Womack, J. P., & Jones, D. T. (2017). *Lean thinking: Come creare valore e bandire gli sprechi*. goWare & Guerini Next.
- World Business Council for Sustainable Development & World Resources Institute. (2004). *The greenhouse gas protocol: A corporate accounting and reporting standard* (Rev. ed.).
- Böhringer, C., Balistreri, E. J., & Rutherford, T. F. (2012). The role of border carbon adjustment in unilateral climate policy: Overview of an Energy Modeling Forum study (EMF 29). *Energy Economics*, 34, S97-S110.
- Zumente, I., & Lăce, N. (2021). ESG rating—necessity for the investor or the company? *Sustainability*, 13(16).
- Simon-Kucher & Partners. (2021). *Global sustainability study 2021*.

- OECD. (2022). Potential spatial impacts of the war in Ukraine: A case study from Italy (OECD Local Economic and Employment Development (LEED) Papers, No. 2022/08).
- S&P Global Ratings. (2026, March 8). Middle East conflict: GCC energy value chain shows exposures.
- World Bank. (2026). Commodity markets outlook: April 2026.
- Christopher, M. (2022). Logistics and supply chain management. Pearson Uk.
- U.S. International Trade Commission. (2020). The impact of COVID-19 on maritime trade and port operations. Trade Shifts 2020 Special Topic.
- European Commission (2021). "Fit for 55": delivering the EU's 2030 Climate Target on the way to climate neutrality. Press release IP/21/3541.
- European Commission. (2024). Report from the Commission to the European Parliament and the Council on the functioning of the European carbon market in 2023 (COM(2024) 538 final)
- European Commission. (2024). Factsheet: The EU Emissions Trading System (EU ETS)
- Bar Am, J., Doshi, V., Malik, A., & Noble, S. (2023). Consumers care about sustainability—and back it up with their wallets. McKinsey & Company.
- European Commission. (n.d.). About the EU ETS. Retrieved May 5, 2024
- MSC, EU Emissions Trading System (ETS) Update, December 2025
- Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC. (2023). Official Journal of the European Union, L 234
- Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC. (2023). Official Journal of the European Union, L 234
- European Commission. (2024). Report from the Commission to the European Parliament and the Council: State of the Energy Union Report 2024. (COM/2024/538 final)
- Bellora, C., & Fontagné, L. (2023). EU in search of a Carbon Border Adjustment Mechanism. Energy Economics, 123, 106673.

- Dechezleprêtre, A., Haramboure, A., Kögel, C., Lalanne, G., & Yamano, N. (2025). Carbon Border Adjustments: The potential effects of the EU CBAM along the supply chain. OECD Science, Technology and Industry Working Papers, 2025(02).
- BusinessEurope. (2024). CBAM implementation - A BusinessEurope survey: Lessons learned from the 1st reporting period and recommendations going forward.
- European Parliament and Council of the European Union. (2024). Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859. Official Journal of the European Union, OJ L, 2024/1760.
- The Medi Telegraph. (2022, 3 Novembre). MSC, con il sistema Ets rincari fino a 500 euro a container.
- Confcommercio Trieste. (s.d.). Emissioni: dalle disposizioni comunitarie pesanti rincari per famiglie e imprese.
- Port News. (s.d.). ETS: ulteriori rincari a causa della crisi del Mar Rosso.
- Leadership & Management. (s.d.). La CSR e la sostenibilità nei trasporti marittimi: il caso della Gallozzi Group.
- Salerno Container Terminal S.p.A. (2021). Codice Etico.
- Intervista ad Agostino Gallozzi, I dazi? Dolorosi ma sostenibili. Ora il Sud Italia guarda anche al Far East, Blueconomy.com, [2 settembre 2025]

Sitography

- <https://www.esg360.it/digital-for-esg/twin-transition-il-ruolo-del-digitale-per-un-nuovo-modello-di-profitto-sostenibile/>
- https://www.ecb.europa.eu/press/conferences/shared/pdf/20230831_inflation/Li_paper.sk.pdf
- <https://www.emerald.com/cpoib/article-abstract/20/4/487/1229033/Critical-perspectives-on-GVC-theory-uncovering-GVC?redirectedFrom=fulltext>
- https://www.researchgate.net/profile/Dorothee-Rouzet-2/publication/273060682_Trade_Policy_Implications_of_Global_Value_Chains_Case_Studies/links/57dfdb9808ae484409238e76/Trade-Policy-Implications-of-Global-Value-Chains-Case-Studies.pdf
- <https://www.multimac.it/journal-detail.php/news=logistica-post-covid-da-just-in-time-a-just-in-case-con-visibilita-in-tempo-reale-resa-possibile-da-iiot-e-ai>
- <https://www.epc.eu/publication/europes-place-in-the-global-permacrisis/>
- <https://www.nber.org/papers/w29345>
- https://www.usitc.gov/research_and_analysis/tradeshifts/2020/special_topic.html#:~:text=The%20contraction%20of%20U.S.%20merchandise,from%20the%20COVID%2D19%20pandemic.
- <https://www.agi.it/economia/news/2020-03-16/coronavirus-cina-economia-produzione-industriale-7561260/>
- https://www.statista.com/statistics/1109662/blank-sailing-announcements-weekly/?srsId=AfmBOoqc_Ks7GESyrCFdqKpSVuklcXrqjS0RQZ7JDqyjpdaxhnG0H53e
- https://unctad.org/system/files/official-document/presspb2021d2_en.pdf
- <https://shipsy.io/blogs/blank-sailings-due-to-corona-virus-increasing-port-congestion/>
- <https://www.fondopriamo.it/blog/priamo/trasporti-marittimi-covid-rapporto-srm>
- <https://www.ilpost.it/2021/01/16/container-cina/>
- <https://www.sipotra.it/wp-content/uploads/2025/08/Protezionismo-e-dazi-impatti-su-shipping-globale-e-modelli-portuali.pdf>
- <https://arxiv.org/abs/2506.06368>

- <https://www.iiss.org/publications/strategic-comments/2023/greater-consensus-on-improving-the-middle-corridor/>
- <https://resilientmaritimelogistics.unctad.org/guidebook/case-study-1-ports-los-angeles-and-long-beach-united-states>
- <https://group.intesasanpaolo.com/it/research/area-media/mercati/2022/srm-trasporti-marittimi-long-covid#>
- <https://carnegieendowment.org/russia-eurasia/politika/2024/07/silk-road-war-ukraine>
- <https://unctad.org/publication/maritime-trade-disrupted-war-ukraine-and-its-effects-maritime-trade-logistics>
- https://www.oecd.org/en/publications/enhancing-the-competitiveness-of-the-trans-caspian-transport-corridor-in-central-asia_f261e7fa-en.html
- <https://traceca.ge/it/route/commercial-diplomacy/thetrans-caspianrouteisageopoliticalandeconomicvictory>
- <https://www.trasporto.europa.it/notizie/ferrovia/leuropa-punta-dieci-miliardi-sul-middle-corridor/>
- <https://kpmg.com/kpmg-us/content/dam/kpmg/pdf/2022/economic-analysis-russia-ukraine-war-impact-supply-chains-inflation.pdf>
- <https://www.consiglio.veneto.it/documents/34871/dc5144f7-cf5d-4832-bbe2-0204b3e2d2e1#:~:text=Secondo%20stime%20OCSE%2C%20il%20conflitto,ragioni%2C%20di%202.5%20punti%20percentuali.>
- https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/07/potential-spatial-impacts-of-the-war-in-ukraine_5120°432/b7dae4e9-en.pdf
- <https://mglobale.promositalia.com/approfondimenti/tutte-le-news/conseguenze-della-crisi-di-suez.kl>
- <https://www.lloydslist.com/LL1156987/Iran-claims-seizure-of-two-MSC-operated-boxships-while-transiting-the-Strait-of-Hormuz>
- https://www.repubblica.it/economia/rapporti/energitalia/trasformazione/2026/03/04/news/lo_shipping_evita_hormuz_in_gioco_il_20_del_petrolio_e_del_gnl_mondiale-425200128/
- <https://www.economymagazine.it/crisi-nello-stretto-di-hormuz-presenta-il-conto-costi-logistici-50-e-viaggio-delle-merci-20-giorni-piu-lunghi/>

- <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/consumers-care-about-sustainability-and-back-it-up-with-their-wallets>
- <https://www.fedex.com/it-it/campaign/small-business-hub/trends-and-insights/eco-conscious-consumers.html#:~:text=Quando%20si%20tratta%20di%20sostenibilit%C3%A0%2C%20i%20consumatori,pi%C3%B9%20recente%2C%20un%20prodotto%20sostenibile%20%20ecoresponsabile.2>
- <https://www.deloitte.com/uk/en/Industries/consumer/perspectives/the-sustainable-consumer.html>
- https://cscmp.org/CSCMP/cscmp/educate/scm_definitions_and_glossary_of_terms.aspx
- <https://rudycr.com/supchn/Christopher%20Logistics%20and%20Supply%20Chain%20Management%204th%20txtbk.pdf>
- <https://www.oecd.org/en/topics/global-value-and-supply-chains.html>
- <https://www.nber.org/papers/w29345>
- https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_21_3541/IP_21_3541_EN.pdf
- https://ec.europa.eu/commission/presscorner/detail/it/ip_21_3541
- <https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:52024DC0538>
- https://climate.ec.europa.eu/document/download/5dee0b48-a38f-4d10-bf1a-14d0c1d6febd_en?filename=factsheet_ets_en.pdf
- https://climate.ec.europa.eu/eu-action/carbon-markets/eu-emissions-trading-system-eu-ets_en
- https://climate.ec.europa.eu/eu-action/carbon-markets/about-eu-ets_en
- <https://www.msc.com/en/newsroom/customer-advisories/2025/december/eu-emissions-trading-system-update>
- <https://eur-lex.europa.eu/IT/legal-content/summary/eu-emissions-trading-system.html>
- [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/690897/IPOL_STU\(2021\)690897\(SUM01\)_IT.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/690897/IPOL_STU(2021)690897(SUM01)_IT.pdf)
- file:///C:/Users/TiGuido/Downloads/Il_settore_marittimo_in_EU_ETS_stato_dell%E2%80%99arte_e_visione_d%E2%80%99insieme_Feo_SOGESID.pdf

- https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-shipping-sector_en#documentation
- https://transport.ec.europa.eu/transport-modes/maritime/decarbonising-maritime-transport-fueleu-maritime_en
- <https://plana.earth/policy/eus-fit-for-55>
- <https://www.consilium.europa.eu/en/policies/fit-for-55/>
- <https://www.gruppoiren.it/it/everyday/energie-per-domani/2023/consiglio-europeo-approva-cinque-leggi-fit-for-55.html>
- https://publyon.com/fit-for-55-package-the-eu-energy-and-climate-legislation-at-a-glance/?switch_language=en
- <https://www.chrobinson.com/it-it/resources/resource-center/guides/eu-emissions-trading-system/>
- <https://www.mase.gov.it/portale/emission-trading>
- <https://prianomarchelli.it/ets-marittimo-2026-la-nuova-soglia-del-70-percento/>
- <https://www.dirittobancario.it/art/il-sistema-ets-marittimo-evoluzione-normativa-criticita-nazionali-e-prospettive-per-lo-sviluppo-di-strumenti-finanziari-nei-mercati-del-carbonio/>
- <https://cordis.europa.eu/article/id/454248-decarbonising-waterborne-transport-with-bio-lng>
- https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en
- <https://www.gallozzi.com/it/about-us/>
- <https://www.gallozzi.com/it/sct-salerno-container-terminal/>
- <https://www.gallozzi.com/it/gallozzi-shipping-ltd/>
- <https://www.gallozzi.com/it/salerno-transport-services/>
- <https://www.gallozzi.com/it/gf-logistic/>
- <https://www.dirittobancario.it/art/il-sistema-ets-marittimo-evoluzione-normativa-criticita-nazionali-e-prospettive-per-lo-sviluppo-di-strumenti-finanziari-nei-mercati-del-carbonio/>
- <https://www.dirittobancario.it/art/il-sistema-ets-marittimo-evoluzione-normativa-criticita-nazionali-e-prospettive-per-lo-sviluppo-di-strumenti-finanziari-nei-mercati-del-carbonio/>
- <https://prianomarchelli.it/cbam-2026-la-nuova-frontiera-della-compliance/>

- https://www.buinesseurope.eu/wp-content/uploads/2025/02/2024-05_cbam_implementation_-_buinesseurope_survey_results_and_recommendations-0c7-1.pdf
- https://commission.europa.eu/topics/business-and-industry/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en
- <https://testassetsopsaa.iica.int/storage/resource/2024/07/e7d13e0fc5b6f6b3b3d9b59fff112500.pdf>
- https://www.themeditelegraph.com/it/shipping/shipowners/2022/11/03/news/msc_con_il_sistema_ets_rincari_fino_a_500_euro_a_container-12216873/
- <https://www.confcommerciotrieste.it/it/news/rassegna-stampa/emissioni-dalle-disposizioni-comunitarie-pesanti-rincari-per-famiglie-e-imprese.html>
- <https://www.portnews.it/ets-ulteriori-rincari-a-causa-della-crisi-del-mar-rosso/>
- <https://www.leadershipmanagementmagazine.com/articoli/la-csr-e-la-sostenibilita-nei-trasporti-marittimi-il-caso-della-gallozzi-group/>
- https://www.salernocontainerterminal.com/wp-content/uploads/2021/05/Codice-etico_affiancate.pdf
- <https://blueconomy.com/it/trasporto-marittimo-e-logistica/porti/agostino-gallozzi-i-dazi-dolorosi-ma-sostenibili-ora-il-sud-italia-guarda-anche-al-far-east/>
- https://www.ilsole24ore.com/art/gallozzi-cresce-il-porto-salerno-investiti-60-milioni-5-anni-Ahc3v5mC?refresh_ce
- <https://eur-lex.europa.eu/IT/legal-content/summary/carbon-border-adjustment-mechanism.html>
- <https://www.bandierablu.org/common/index.asp>

Acknowledgments

Vorrei esprimere la mia più sincera gratitudine alla mia relatrice, la Professoressa Monica Plechero. I preziosi suggerimenti, la disponibilità costante e la guida attenta sono stati determinanti per la realizzazione di questo lavoro.