

# Green logistics for sustainable development: The challenge of general price increases

*Mariam Lazrak<sup>1</sup>, Hamid El amrani<sup>1</sup>*

<sup>1</sup>Abdelmalek Essaadi University, Morocco

**Abstract.** Green logistics is the process of reducing the environmental footprint of a product throughout its life cycle. The level of interest in this approach is growing and companies are increasingly concerned about environmental issues. When we talk about a green supply chain, we often tend to associate it specifically with road transport. However, green thinking can be applied to all links in the supply chain, from supply to distribution green logistics consists of integrating an ecological approach into the management of logistics processes in order to reduce their impact on the environment. This extends over the entire life cycle of the product: manufacturing, storage, transport, placing on the market, use, and destruction. On the other side, the health crisis has disrupted the various supply chains since the confinement end and the resumption of activities on construction sites has forced companies to supply themselves with material where production had resumed, thus leading to a rise in prices. . The objective of this article is to study the general effect of rising raw material prices on green logistics.

**Keywords :** Green logistics, sustainable development, rising prices.

## 1 Introduction

Green logistics is defined by the approaches and solutions aimed at reducing the environmental impact of a product or a business process. More than a trend, green logistics is an ecological shift. Companies in the logistics sector are more than ever faced with many challenges to meet: meeting increasingly stringent customer requirements and responding to the climate emergency. Indeed, the different types of logistics are at the forefront for the implementation of solutions aimed at developing a sustainable supply chain that is kinder to the environment. Ecology is at the heart of green logistics, with the main objective of making each logistics company a player committed to approaches, actions and choices that take environmental criteria into account. However, green logistics also extends to commercial and competitive issues.

A company is competitive when it manages to offer better commercial offers than its competitors, while achieving a good profit margin. Raising the selling price to make a profit is heresy because it would give the competition an advantage. So how do you increase your profits without varying the selling prices? We must produce and deliver at the lowest cost. And that is the importance of logistics. In 2021, the increase in logistics prices was mainly

driven by the rapid rebound in demand, itself favored by massive stimulus plans. This created an imbalance in relation to the available supply and therefore a balance of power favorable to carriers. The rise in freight rates was also fueled by a pass-through, albeit partial, of the inflationary pressures generated in particular on energy and raw material prices by this economic recovery.

## **2 Green logistics at the service of sustainable development and improving the competitiveness of companies**

The specific literature on green logistics can be divided into two categories, articles of a scientific nature and articles from industry professionals. As for articles of a scientific nature, they mostly come from the field of operational research, economics, product design and supply chain management. As for those dealing with strategic, tactical and operational decisions, they come from the field of administrative sciences.

Green or sustainable logistics refers to all the sustainable policies and measures implemented in the logistics sector in order to reduce the impact on the environment. This concept affects the configuration of processes and structure, transport systems or equipment, distribution and storage of goods.

Previously, the field of logistics paid little attention to the repercussions it could have on the environment. Now, with the rise of green logistics, the goal of warehouse managers is to find the right balance between economic and energy factors.

In fact, an entire sector is encouraged, incited or constrained, with the aim of adopting logistics solutions leading to sustainable and responsible management of the Supply Chain.

Indeed, road transport and the reduction of carbon emissions are not the only levers on which it is possible to act to limit the ecological impact of the flow of goods. As we will see, the objectives that logistics companies can or must set themselves are part of a much broader vision: the selection of suppliers and partners, management, the design of storage warehouses, the consumption of resources not renewables, the preparation and method of delivery of customer orders, and the management of packaging and waste. However, the major opportunity that presents itself to companies in the sector should not be overlooked, offering them the possibility of boosting their sales by communicating their commitment to consumers who are increasingly sensitive to the fate reserved for the environment. Adopting an environmentally responsible approach can therefore be a competitive advantage. The Covid-19 health crisis and the war in Ukraine have greatly contributed to the explosion of green and online sales. Following the various confinements, some consumers who did not use the internet for their daily purchases have taken on new habits and order more frequently, resulting in an increase in deliveries and their polluting emissions. More than ever, it is now crucial for manufacturers to adapt supply chains in order to make them greener and minimize their impact on the environment. Beyond transport, all links in the supply chain can thus be optimized to implement eco-responsible logistics. A green supply chain is a supply chain that seeks to minimize the impact of its activities on the environment and aims to reduce its environmental impacts throughout the life cycle of the product in question: design, purchases, production (at its various stages), logistics, packaging, distribution and recycling. It is therefore a question of having an environmental reflection from the cradle to the grave, from the extraction of raw materials to the dismantling and recycling at the end of their life. Among

the most polluting sectors, transport contributes to the emission of many greenhouse gases. Light commercial vehicles represent 20% of transport GHG emissions and heavy goods vehicles represent 22%. The last kilometer is the most expensive stage, in terms of economic but also environmental costs: it represents more than 20% of total delivery costs and is the source of 30% of CO<sub>2</sub> emissions according to figures published by the Committee strategic analysis, in the sense that the intervention of green logistics will have a very positive impact in order to optimize all supply chains as specified in the following figure:



**Fig. 1.** The Green logistics cycle.

A green supply chain or sustainable supply chain can be very useful from an economic point of view since it makes it possible to reduce operational costs, in particular thanks to its energy efficiency. Indeed, a green supply chain management makes it possible to reduce the consumption of electricity, water and the resources necessary for the production, supply and transport process. End products can also be recycled in order to put them back into a new production process. In an economic context of fierce competition, companies are increasingly interested in environmental issues and societal expectations, so they are led to adopt sustainable production practices to reduce their greenhouse gas emissions and review their logistics to minimize costs.

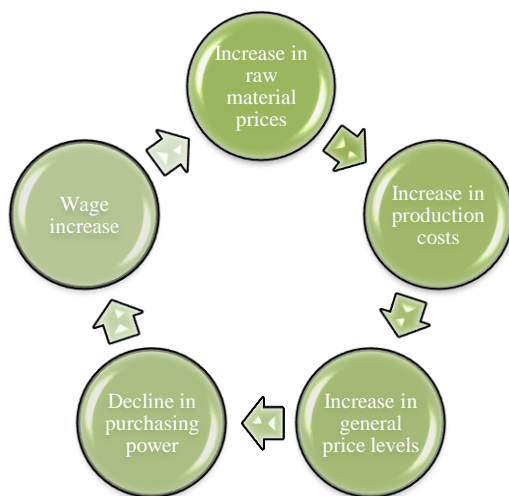
To reduce the quantities of goods in stock, companies use energy-intensive modes of transport. However, transport is not the only link in the greening of the supply chain, it also concerns buildings, production materials and recyclable packaging. The purpose of eco-logistics is to preserve the environment and reduce costs for the company. That has set clear and precise environmental objectives, in particular a reduction of around 35% of CO<sub>2</sub> emissions resulting from road freight transport. The initiatives planned or being implemented within the framework of this vision tend to enshrine the practices of Green Logistics. In addition, the logistics upgrading program for SMEs, , provides technical assistance for the implementation of outsourcing projects for the benefit of companies that are part of a green logistics approach. The public agency also funds eco-driving training actions which have a

direct impact on reducing fuel consumption and CO2 emissions. It is also worth mentioning the project to set up a green logistics label, as well as the 12 standards already approved for a sustainable logistics approach. But the problem is that after the general increase in prices, particularly of raw materials, all the companies involved in the phasing of this strategy are obliged to increase the final price of the service, something that will have an impact on the reduction of sales and therefore the reduction in the number of transactions.

### 3 The general price increase and green logistics

Over the past few months, the costs of raw materials and commodities have been steadily increasing, as have shipping and delivery times. For some products, it's downright shortage: all energy products, metals, wood, rubber, food raw materials... Today, the economy is picking up, demand is stronger than ever, especially that consumers have retained their purchasing power throughout the confinement period. According to the majority of studies carried out in relation to this soaring price, all of the studies revealed that it is a net result of inflation on an international scale.

Inflation is defined as the continuous rise in the general level of prices. Not every rise in prices is necessarily synonymous with inflation; to be qualified as an inflationary phenomenon, the upward movement of prices must be general (i.e. concern the majority of the branches of the economy; it is necessary, in fact, that the upward movement outweighs the price drops) and be maintained over time (a rise leads to others).



**Fig. 2.** The price stability policy

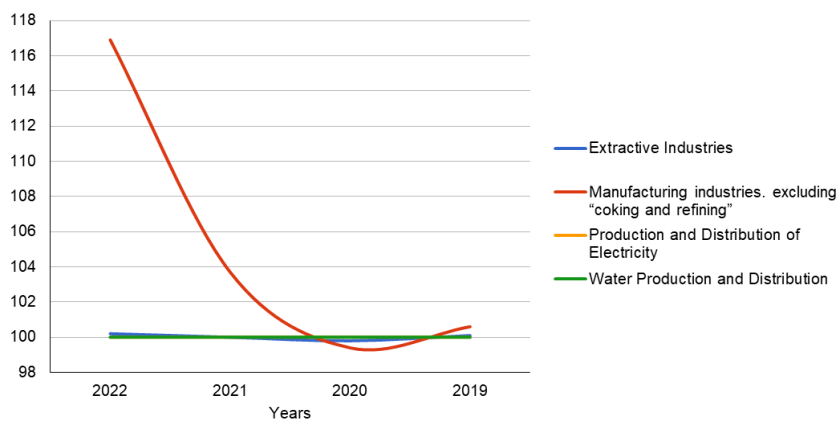
The main factors that generated this general price increase are unanimous: imported inflation, the increase in production costs for companies due to a difficult global economic situation (injections of post-covid liquidity, disruption of supply chains , energy crisis, war in Ukraine, etc.), but some will say that certain market practices and situations at the local level amplified and propagated the rise: multiplicity of intermediaries in the distribution circuit of certain products, speculation and monopolies, exaggerated repercussion rising production costs on selling prices, unjustified price increases. Energies, whether fossil,

nuclear or renewable, all have a cost for companies that have to manage logistics. The rise in the cost of fuel has a particular impact on the cost of transport, and this has repercussions for both businesses and customers. But it is also an opportunity for organizations to optimize their logistics. Concerning the case of Morocco, the environmental dimension is present in the integrated national strategy for the development of the logistics sector by 2030.

## 4 Results and discussion

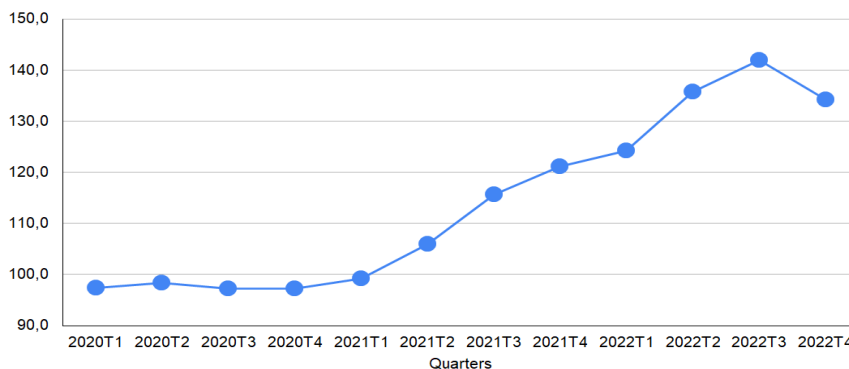
The results presented in this research work mainly relate to Foreign Trade by relating the statistics of exports and production prices through the producer price index since it has a close relationship with the logistics of goods and services. . It allows, in addition to monitoring the economic situation, to meet the information needs expressed by public authorities, international organizations and national and foreign economic operators, especially in terms of logistics optimization in general and green logistics in particular.

Statistical price and volume indices are developed to meet specific specific needs of both public and private organizations. These instruments make it possible to follow the situation of the economic situation in a relatively short time and allow users to update their estimates or their consumers. Regarding the producer price index, it is used to measure the relative evolution of prices at the production stage. The index basket is made up of 351 products and 787 varieties classified by activity, sub-branch and branch in accordance with the new nomenclature according to the High Commission for Planning in Morocco.



**Fig. 3.** Producer price survey in Morocco, Haut Commissariat au Plan

Green logistics aims to find a balance between ecology and economy. All imports / exports must pass from one economic zone to another through means of transport. Green transport allows you to take effective measures to become competitive in a context of rising supply costs. Transportation is considered green when it promotes environmental sustainability, emits low carbon, is economical and is socially acceptable.



**Fig. 4.** Export unit value index, Haut-Commissariat au Plan

Existing logistics systems affect the environment in various ways. For example, aviation emissions vary with flight duration. In road transport, cars, buses and trains produce different types of emissions. Emissions from ships have much greater environmental effects. Many ships travel overseas from port to port on long journeys that contribute to air and water pollution during their journeys. In this scenario, the global think tank is developing policies to reduce ship emissions by using ever-evolving green technologies to introduce green logistics globally. At the same time, the authorities concerned in Morocco have taken several measures and decisions to reduce the negative effects of the use of tools and means on the environment. Many businesses are impacted by rising fuel prices. Transport providers first, who are directly affected by the increase and must include it in their charges. But also companies that ship goods, whether they have their own means of transport or go through a logistics provider. From the analysis of the two figures as well as the design of the identification of the profit margin of the companies in the green logistics sector, we can say that this general price increase will have a negative impact, especially the reduction of profits for the companies and the increase in prices for end customers.

## 5 Conclusion

We can conclude that the principle of green logistics, consist of taking energy saving measures, complying with environmental regulations and coping with the increase in supply costs by adopting efficient technologies, that this done today under very complex conditions, in particular in the face of the general rise in prices, which involves major challenges in the field of global logistics. This green or ecological logistics in the global supply chain allows a country or a company to evolve new technologies and design policies to reduce carbon emissions, make the business sustainable and establish advantages competitive strategies. But the site lacks several data on green logistics, so we were forced to use only indicators relating to the challenges of green logistics in the face of the general rise in prices. In this framework, the use of metadata on the number of missing and imputed prices is considered a good practice to measure the challenges of green logistics in the face of general price increases. This data is particularly important given the economic climate, as it will increase transparency and promote user confidence. It is also important to determine the number of closed and open outlets. This metadata should be made available to users on request and published on the website of national statistical offices. This will be the subject of a future research project.

## References

1. Babel, S., & Del Mundo Dacera, D. (2006). Heavy metal removal from contaminated sludge for land application: a review. *Waste Management*, 26(9), 988-1004
2. Ourdi, A., Taghzouti, A., Bourekkadi, S. (2021) . CSR practices in countries in transition: the case of Morocco . *E3S Web of Conferences*, 319, 01036
3. Barakat, Y. et al (2021) . What contributions of Artificial Intelligence in Innovation? . *E3S Web of Conferences*, 2021, 234, 00105
4. Beamon B. M., (2008). Sustainability and the Future of Supply Chain Management. *Operations and supply chain management*, Vol. 1, N° 1, pp. 4-18.
5. Blomsma, F., & Brennan, G. (2017). The emergence of circular economy: A new framing around prolonging resource productivity. *Journal of Industrial Ecology*, 21(3), 603-614
6. Kassou, M., Bourekkadi, et al. (2021) . Blockchain-based medical and water waste management conception. *E3S Web of Conferences*, 2021, 234, 00070
7. Ebiesuwa S. et al. (2022) . Internet of things (iot) approach to combating economic and environmental issues . *Journal of Theoretical and Applied Information Technology* , May 2022. Vol.100. No 10
8. Dhaif Allah et al. (2021) . Extent Of Measurement And Disclosure Of Environmental Information In Financial Reports Under (IFRS & IAS) For Yemeni. *E3S Web of Conferences*, 319, 01079
9. Elamrani, H. Slopes of seasonal variations of time series and forecasts: Practical case on weather. *IOP Conference Series: Earth and Environmental Science*, 2022, 975(1), 012003
10. Données à partir du site web officiel de Haut Commissariat au Plan du Maroc
11. Gupta S., Soni U., Kumar G. (2019) . Green supplier selection using multi-criterion decision making under fuzzy environment: A case study in automotive industry. *Comput Ind Eng* ,136:663-80
12. Harris I., Naim M. and Mumford C., (2007). A review of infrastructure modelling for Green Logistics. *Proceedings of the Logistics Research Network Annual Conference*, 5th - 7th September 2007, pp 694-699.
13. El imrani, O. et al (2022). The consumer price index and it effect in the new ecosystems and energy consumption during the sanitary confinement: The case of an emerging country. *IOP Conference Series: Earth and Environmental Science* , 975(1), 012006
14. Seroka-Stolk, O., Ociepa-Kubicka , A. (2019) . Green logistics and circular economy . *Transportation Research Procedia* 39 (2019) 471–479
15. Klassen R., Johnson P.F., (2004). The green supply chain. In Westbrook, R. & New, S. (Eds.). *Understanding Supply Chains - Concepts, Critiques and Futures*, pp. 229 -251.
16. Korhonen, J., Nuur, C., Feldmann, A., & Birkie, S. E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, 175, 544-552