



AIRL-SCM 2024 : 15^e Conférence de l'AIRL-SCM

29 – 31 mai 2024

A model of price indexation mechanism in supply chain

Full paper

DOBRE Ionut Ciprian
BELU Mihaela Gabriela
PARASCHIV Dorel Mihai

Abstract

How can logistics service providers keep up with the challenges posed by rising costs and quickly align with an ever-changing economic environment, but keeping contractual conditions unaffected?

As a response to these challenges using a price indexation mechanism in transportation, based on indices like the Consumer Price Index (CPI), fuel price and labor cost, can help companies to measure and monitor the impacts over time, allowing the transport and logistics service providers to automatically apply indexations in relation with their clients, directly proportional with the operational costs drifts in transportation.

In order to plan an agile supply chain, to respond promptly to the challenges brought by the global market oriented towards demand-driven orders, with low prediction, looking at the global economic situation and with the fluctuations in transport flows volumes, the organizations have to rethink their strategies, taking into account rapid adjustment of prices with customers, in relation to fluctuations in operating costs.

Keywords: transport price indexation mechanism, price indexation in Supply Chain, price management in transportation, cost control management in transportation.

1. Introduction

The present paper wants to emphasize the importance of adapting the operating costs, within the supply chain, according to several indicators, which can currently have an impact in minimizing the risks of interruption of supply chains, in order to prioritize its transportation flows and the availability of materials in an increasingly complex global supply chain, demanding to become more agile from day to day.

Starting the research by analyzing the effects of the period 2020- 2023, it was aimed at exposing below some aspects selected on the basis of previous researches, which would form a starting base environment of further more in-depth researches and which can be developed on more focused well-defined directions.

An important element in today's economy, in response to the global supply-chain turbulences, is to increase the visibility from the point of origin, up to the final destination. How to get there, from a technological point of view, would involve the digitalization in supply chain, together with high-tech cargo tracking systems, as well as complex control systems. But at the same time, in order to facilitate

a favorable and stable business environment to connect supply chain visibility and support all new trends development, we need effective control over costs. In this regard, a possible solution to support a global challenge and an ever-changing environment can be offered by a model of a mechanism for automatic indexing of rates, in order to facilitate the acceleration of decision making and the adaptability of all parties involved to the present business environment.

The study aims to support current trends in globalization and to provide a simplified solution, which can be accepted by the private sector, but also by the public sector, as a solution for making supply chains more efficient.

The research is intended for logistics specialists, logistics service providers of 3PL, 4PL, 5PL, suppliers and customers, as parties in the supply chain, but not only. The study is also addressed to the economic control and supervisory authorities, in order to align the mechanisms and to facilitate a rapid adaptation in case of costs fluctuations, in relation to the selling prices.

2. Research objectives

The paper aims to underline the importance of adapting by all parties involved in a supply chain a model of price indexation, as a unique solution to allow companies to align quickly and be able to offer the level of agility required by the current logistics market, in response to the major challenges faced by supply chains, with a focus on the last period 2020- 2023.

In the absence of a mechanism for aligning the prices of transport and/ or logistics operations, to the current macroeconomic indicators of the market, the profitability of logistics companies would decrease considerably, which would lead to the impossibility of supporting operations at a high level of quality, but at the same time a considerable delay in taking decisions, by involving processes for negotiating contracts punctually, in order to align the operating costs with the contractual conditions.

The research aims to provide a solution to answer the following questions:

- How can we keep the transport processes in operation, without reducing the existing quality level?
- How can be maintained the profitability of logistics services at the same level, even if there are fluctuations with a considerable impact in operating costs?
- How to assess the impact of macroeconomic indicators in transport rates, over certain time intervals?
- How can transport rates and logistics operations be adjusted, without the risk of creating negotiation tensions between the parties?

3. Literature review

Both the current environment and the logistics solutions identified in response to the current challenges have a considerable impact in increasing operating costs, through the effects of global macroeconomic indicators, effects caused by the turbulence faced by the economy at global level, as well as effort to support new trends of development and implementation of new technologies such as the digitalization of supply chain, together with the support of sustainable logistics, that should be connected in maintaining a green environment.

(Zighan, 2021) in his study, aims to answer the question "how can large companies cope with whip effects caused by COVID-19?". Adopting an exploratory research method, information was collected based on 41 online interviews, conducted during the pandemic, and the study finds that the whip effect is produced by sudden changes in customer behavior and the impossibility of forecasting, and the management would be based on analyzing and understanding the situation, as an initial vital basic concept in emergency response, allowing for risk assessment and prioritization of immediate recovery actions. In addition, the location of the supply chain would reduce the geographical distances between the company and the parts of the supply chain, which would allow the adoption of an inventory based on a just-in-time supply model (JIT). At the same time, the digitalization of the supply chain would

develop visibility, communication efficiency, flexibility and would ultimately result in the optimization of the supply chain.

According to (Maselli, 2021), the disruptions of global supply chains due to the COVID-19 pandemic, have caused closures of production lines, delays, inability to deliver on time and a post-pandemic effect of rising inflation. Adjusting global production networks is a long-term trend, and as organizations use more and more locations to fulfill orders and reduce order delivery time, according to (Laloum, 2022), supply chains will become more and more localized. In order to support the concepts of JIT (Just In Time) deliveries in response to an agile supply chain, due to customer demands, same-day supply upon request has become a necessity, and the solution could be to change trends from global logistics to regional, localized logistics, allowing for an ultra-fast supply at a reasonable price.

At the same time, (Dixon, et al., 2022), believes that along with the regionalization of logistics operations, there is a need to assess the workforce. New technologies have brought fundamental changes to the way supply chains operate globally. Customer requirements are causing supply chains to change and evolve at a rapid pace, involving modern operations focused on digitalization and innovations, with supply chains becoming increasingly complex, which also involves a certain level of additional physical and technical skills within staff.

Although during the last years 2020- 2022, many countries have realized the importance of applying measures to improve production and supply processes, supply chains still need an improvement, an adjustment of the functional framework. According to (Guasch, 2022) the logistic operation costs have an impact of about 18% and 35%, up to even 45% for SMEs, of the value of the product, in the emerging countries, while some target benchmarks are about 10% of the product value in the OECD countries, and a platform for interventions to the available financial constraints, could represent a solution.

Among recent studies, (Ashutosh Kar, 2020), has attempted to establish a statistically significant relationship between prices and other factors, such as fuel, number of vessels, goods and weight ratio, by introducing a logistic coefficient to indicate the level of integration of logistics activities in order to keep the total cost (TLC) unchanged, proposing a dynamic model for the purpose of impact analysis of factors, in connection to the price of the product. However, the study focuses only on maritime transport and is based on similarities with the methodology for measuring the Total Cost of Transport and Logistics (TTLC), which is "the only methodology for measuring the performance of the supply chain that combines the direct costs of trade with all indirect costs (e.g. inventory, storage, theft, unemployment...)" according to (FACILITATION, 2020).

The importance of a well prepared pricing methods mechanism, to be very well elaborated is also explained by (Elena Balashova, 2022), that proves the final prices can be different and justified, depending on the conditions of normative legal regulation and on the control by the military representative offices, set by the state.

4. Research methodology

The research is based on recent studies, in the preparation of the work were collected data information from official sources of statistics, allowing an analysis of the evolution of transport costs, to provide an overview of the impact in the total cost of operation, as a basis in building a model of indexation of transport prices.

As a short overview, in the paper preparation were used several methodologies in the following way:

- Concept idea: solution to answer to market challenges, to support the logistics providers in aligning the transport prices with customers, in the same way and in the same time with the cost drifts;
- Historical and quantitative research: data collection for fuel prices and macroeconomics (CPI and labor indexes), market overview and economic impacts according to recent studies 2020-2023;

- Cross- sectional and Longitudinal research: comparison of statistical data collected between November 2020 up to November 2023.
- Case study research applicability: simulation of cost fluctuations and impact using a road trip example;
- Price indexation mechanism modelling: proposed price indexation mechanism to fit on the simulation studied;
- Qualitative research: data evaluation and comparison of the data collected and transposed in the mechanism;
- Result: effect estimation of macroeconomics impact using the indexation price mechanism and assignment of future directions.

In this regard, in order to assess the impact, using official statistical data, according to (EUROSTAT, 2023), it was aimed at analyzing the evolution of operating costs from November 2020 to November 2023, as component parts from the total price of road transport.

In order to estimate a calculation as close to reality as possible, it was taken into account a simulation of a transport route (**Annex I**) on one transport relation between France and Romania, general freight transport, NON ADR, carried out by road, having a loading point in France (Lens) and a final unloading point in Romania (Pitesti), applying a longitudinal research, by using as reference the financial data directly connected to the period from November 2020, as the initial period, calculating the impact of macro-economic development factors in transport costs, over time. The trip is used as an example and the same exercise can be applied on any other transport trip, taking into account the same way of calculation mechanism.

In order to identify the shares in the total transport cost, the cost components (that are building the total final sale price of the trip) were broken down as can be seen in

Annex 2 Shared breakdown per cost area / Route France (Lens)- Romania (Pitesti) .

In order to have an overview of the increase in operating costs, the cost was delimited into 4 reference cost areas, as major components in the final cost (A, B, C, D) as follows:

- Fuel;
- Infrastructure;
- Labour Cost;
- Others.

Taking as a reference area, the European Union, following the data available according to the Euro Area (EUROSTAT, 2023), to each cost area has been allocated an index, considered to be the closest as a reference macroeconomic indicator (see **Table 1** Indexing table- for analysis of evolution over time)

Table 1 Indexing table- for analysis of evolution over time

Index	Reference period (Nov-20)	Time stamp			Source
		Nov-21	Nov-22	Nov-23	
Diesel fuel price (€/ l)	0.89	1.21	1.57	1.39	https://www.ecgassociation.eu/publications-and-reports/#fuelprices
Inflation/ year (%)	100			134.3	http://statistici.insse.ro/shop/ipc_printer.jsp
Wages (RON)	1887			2148	https://tradingeconomics.com/euro-area/wages

5. Results and discussion

In order to transpose the theory of research, the focus was in analyzing how transportation prices can be affected from the perspective of increasing transport operating costs, following the road transport mode, which is the main transportation pillar for the European economy, through trucks carrying over 73% of the total goods transported by land in the European Union, according to (Anon., n.d.).

Following the simulation according to (**Annex I**), the trip analyzed on the France- Romania road transport route, was used to exemplify the key components in the formation of the price. The breakdown of the transport costs is based on gathering all the cost elements, by starting with the mean of transport used, together with the costs associated with it, the road distance traveled by the truck, the cost of the crew and the fuel cost.

The main elements measured are divided as bellow:

Truck details, with information about truck registration country, with information about Euro emission standards, type of trailer & dimensions. Based on this information we can calculate as well the CO2 emissions and the level of sustainability, as well as a truck with lower emissions or green standards will have lower costs on the road taxes, less fuel consumption or 0, but possible higher maintenance costs.

Distance, per each country from the entry crossing border, up to the exit crossing border on each country crossed on the route. This information helps in order to calculate, using different toll calculators of each country, the road taxes, but also to calculate the daily allowance of the drivers, according to the Mobility Package regulation, the daily allowance of drivers needs to respect the minimums according to each country crossed.

Drivers information, regarding the nationality, to be able to position the labor indicator on the country of residence, but also very important if the trip require a double crew team. Sometimes, depending on the emergency status of a trip, can be necessary to engage a double crew in order to arrive at destination on time. If a double crew is engaged, the labor cost will be double and will increase the share of labor on the total cost.

Driving program schedule, is calculated taking into account the driving regime, according to the legislation, the rest time of the driver, the waiting time on the borders and as well possible other waiting times, for example at loading, unloading, stops on the way, etc.

Fuel, calculation of average fuel consumption per 100 km, quantity of fuel filled per each country, taking into account the fuel cost per liter (excluding the taxes), according to the type of fuel used (diesel, LNG, etc.) or electric, is giving us the possibility to measure the cost impact in fuel and to decide on the reference prices source, in our case following the (ECG, 2023).

Infrastructure, calculation of road taxes and the cost with infrastructure like tolls, maut, road vignette per each country crossed, ferry if it is the case, train ROLA, tunnels, bridges, and so on, depends on each transport route.

Administrative expenses, to include the costs if the case and in special for non-EU shipments, customs clearance formalities, TIR carnet, but also other specific borders fees and taxes.

To allow the allocation of the macroeconomics reference indices, inside

Annex 2 Shared breakdown per cost area / Route France (Lens)- Romania (Pitesti) the total cost was bake down into 4 components, each of them following the trip costs gathered from (**Annex I**) exemplified, following the trip in subject, between France to Romania.

The cost breakdown can follow different models, depending on each company core business and the way the costs are consolidated, but the idea is to base the evaluation on existing statistics to serve companies in building accurate reports, in order to be able to measure and identify the impacts in costs.

In our simulation the breakdown of the costs, was divided into four major pillars:

A: Fuel	Diesel
B: Infrastructure	Tires, Repair - Maintenance, Customs costs & Adm. expenses, Ferry tariff (RO-RO), Tunnels / Bridges / Trains (ROLA), Tolls, MAUT, vignette, taxes, Material financing & depreciation costs, Equipment & IT, Insurances (tractor and trailer), Material tax (tractor and trailer)
C: Labor Cost	Drivers gross salaries and other compensations, Transport coordination, Administrative personnel, Travelling & admin. Expenses
D: Others	Overheads and other indirect charges, Profit Margin

The breakdown of the cost can vary based on the type of transport (by air, sea, road, rail, intermodal, etc.), service (transport, warehousing, logistics, etc.), complexity (2PL, 3PL, 4PL, 5PL, etc.), but in all cases the main factors with main impact contribution to total operational costs are: the CPI (giving the inflation), fuel, road taxes and legislation changes and the labor (wages and daily allowances are playing a major role).

The fuel share as part in a road transport, if using diesel as fuel, and an EUR 6 emission standard, is between 20 to 35%, depending on the length of a trip, but also it depends on the type of fuel used. In case of alternative fuels are used the share weights will change accordingly.

Countries in scope for the evaluation of diesel price in the simulation transport route: FR, BE, DE, CZ, SK, HU, RO, price based on the average price November 2020 (the reference price- **Table 2**) vs. November 2023 (the comparison time- **Table 3**).

Reference period, average price on the transited countries: 0.89 Eur/l

YEAR	2020	2020	2020	2020	2020
Day and month	2.11	9.11	16.11	23.11	30.11
Week	wk.45	wk.46	wk.47	wk.48	wk.49
Belgium	1.04	1.02	1.05	1.07	1.07
Czech Republic	0.83	0.85	0.85	0.85	0.86
France	1.01	1.00	1.01	1.02	1.04
Germany	0.89	0.90	0.92	0.92	0.93
Hungary	0.79	0.81	0.81	0.82	0.83
Romania	0.75	0.76	0.77	0.78	0.79
Slovakia	0.83	0.83	0.82	0.84	0.86

Table 2

Period for comparison, average price on the transited countries: 1.39 Eur/l

YEAR	2023	2023	2023	2023	2023
Day and month	02.11	09.11	16.11	23.11	30.11
Week	wk.44	wk.45	wk.46	wk.47	wk.48
Belgium	1.55	1.55	1.53	1.49	1.48
Czech Republic	1.33	1.33	1.32	1.30	1.28
France	1.55	1.54	1.51	1.51	1.49
Germany	1.50	1.52	1.48	1.46	1.47
Hungary	1.34	1.33	1.31	1.27	1.25
Romania	1.29	1.27	1.25	1.23	1.23
Slovakia	1.39	1.37	1.36	1.33	1.33

Table 3

Looking at the **fuel** part, inside the (**Annex 3** Fuel price evolution during Nov.2017- Nov.2023, at country level), we evaluated the fluctuation of fuel between Nov.2017 to Nov.2023, on a yearly basis, in order to give a better overview of the price evolution in fuel. Taking into account the fact that during Covid-19 pandemic period, the fuel price significantly decreased, we can see an increasing trend from 2017 up to 2019 period, with a drop in price in 2020 and an increase of the fuel price from Nov. 2021 to Nov.2023, which caught up with the 2017 price and surpassed it on all the European countries.

Inside the **infrastructure**, the costs are directly linked to the Consumer Price Index (CPI) and in particular situations the prices can be also adjusted based directly on the increases in road taxes, tolls, bridges, etc.

Inside the **labor** costs one of the biggest challenges in transportation sector is the shortage of drivers. According to the IRU report (Union, 2023), published on Nov.2023, over 3 million of truck driver jobs are not covered, following a study with analytics over 36 countries, with a forecast expected in the following 5 years to double the numbers. The result is showing that below 12% of drivers are under 25 years old and a part of only 6% from the total number of drivers are women. Shortage of truck drivers in transportation has a negative impact in the labor costs, expecting an increase year by year, in order to motivate drivers to work. This impact has to be aligned between the operational cost and the prices with customers.

Inside the **others**, expenditures like overheads and other indirect charges, including the profit margin, are considered to be at the level of each organization, to decide the share in total price of transport, not directly connected to a macroeconomic, reason why it was not allocated to a specific reference for indexation.

In order to estimate the impact rate in the total operating cost (%), (*Chart 1*) the growth rate (%) of each area was identified, relative to the share of the total operating cost (%), using the weighted average cost method (CMP). For the transport flow in subject, it generated as result a growth rate of the total impact in operating cost of **+31.3%**.

Cost area	COST (Eur)	Weight in %	Index of reference	Index (11.2020)	Index (11.2023)	Growth rate (%)	Impact in total cost (%)
<i>A. Fuel</i>	662	26.5%	Diesel fuel price	0.89	1.39	56%	14.9%
<i>B. Infrastructure</i>	828	33.2%	Inflation (CPI)	100	134.33	34.3%	11.4%
<i>C. Labor cost</i>	905	36.3%	Wages	1887	2148	14%	5.0%
<i>D. Others</i>	100	4.0%	None			0%	0.0%
TOTAL	2495	100%					31.3%

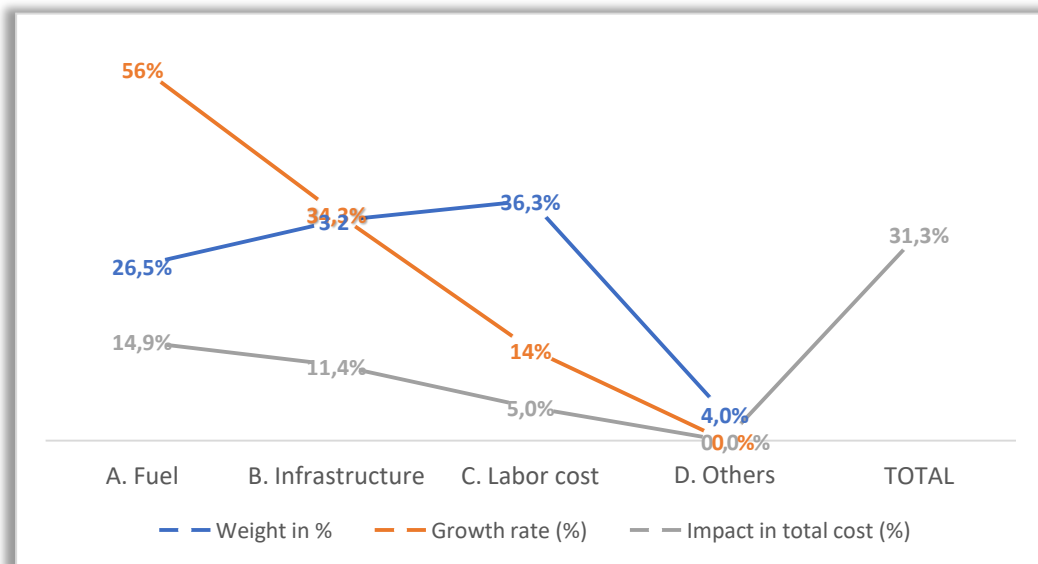


Chart 1 Impact in operating cost

The analyzed result reflects an environment in which costs are changing in a dynamic way. Starting from an initial period of a commercial contract, during its validity and the ongoing operations, we notice increases in costs due to fluctuations in macroeconomic indicators.

In order to maintain the transport processes in operation, without reducing the existing quality level and to secure the profitability of logistics services at the same level, even if there are fluctuations with a considerable impact in operating costs, organizations can decide in applying and defining price adjustments mechanisms, as the one proposed in this study, in order to be able to measure and align the impact of macroeconomic indicators in transport rates, over certain time intervals.

Most of the logistics contracts at global level, concluded between logistics providers and customers, are based on macroeconomic conditions from the initial moment of negotiating contracts, based on the market statistics available at the time. Some of these contracts include clauses or mechanisms for adjusting rates, but most of them using automatic mechanism mainly only on the fuel side, which represent a share of only 20- 35% of the total operating costs, the rest of the cost components not being automatically indexed, or only exceptionally accepted adjustments, following negotiation stages, which can span long periods of time, but last but not least, they can create imbalances in partnerships on the grounds of costs not budgeted on time by one or the other of the parties, when it comes to growth in indexing rates.

Looking at transportation sector from the time value of money perspective, as a fundamental financial concept, we can consider that an euro in transportation services today, worth more than same euro in the future, because the cost is increasing over time, but the prices with customers are not directly proportionally indexed to the same extent and with the same frequency, with an impact in transportation and logistics companies cash flow and profitability.

During the performance of logistics service contracts, there are several cost factors that can undergo significant changes from the initial moment, without any chance for logistics providers to predict them and take into account their impact on costs, although the decisions on signing the contracts are already agreed between the parties.

In addition to analyzing the impact of macroeconomic factors, it was intended to identify the major causes that create imbalances on the market. The general description of the challenging business environment and the variation in costs in the transport industry is due to several events from 2020 to 2023, such as the Covid-19 pandemic and the war in Ukraine, the lack of components, the lack of manpower, factory closures, production interruptions, unbalanced transport flows, transport units with insufficient degree of filling, or distances traveled on the empty runs, changes made in the legislation (such as the Mobility Package at European level), which still have ongoing visible effects. As major components in the total operating cost, the effects were visible, through changes reported regarding the increase in inflation, wages, fuel, energy prices, insurance, road taxes, vehicle ownership and maintenance, etc.

Taking as an example, the possible effects produced by the regulations brought by the Mobility Package, since May 2022, the transport companies who manage the so-called light fleet (with cargo vans, with MTMA under 3,5 tons) had to start to apply for authorization to exercise the business, to continue their transport activities. Before, there was no need for van licenses of up to 3.5 tons, so step by step, it became mandatory for transport companies with such fleets to obtain a community license and to prove a certain financial capacity. The European Commission is requesting guarantees of at least € 1,800 for the first vehicle in the fleet and € 900 for each additional vehicle. At the same time, in order to fulfill the authorization condition, it is mandatory to have at least one person within the company, to be certified according to the road authorities, as responsible person designated for the transport activity within the company.

The considerable decrease in the number of light vehicles available on the market, along with the inability to adapt in a short time of the existing carriers capable of operating (who need to increase their fleets, but also dealing with the challenge of the acquisition of new fleets, as a blockage caused by the lack of components to serve the production lines on time, generating very long waiting times, from the moment of placing the order of a new truck to the time of delivery, including registration and subsequent licensing), which led to an increase in market tariffs for transport services, resulting from increased demand, compared to a limited load capacity. In such a situation, the logistics service provider, must honor its existing contractual conditions with its customers, but its impact in

operational costs should be adjusted accordingly in order to be able to adapt quickly to economic fluctuations. Otherwise, all the pressure of costs increases would be reflected only on the logistics service provider.

As an answer to such challenges, in the relation between the service providers and customers, related to the transport rates and logistics operations adjustments, without the risk of creating negotiation tensions between the parties, an automatic price indexation mechanism can be the key, to allow all the parties, to have transparently access to the indexes and to increase, or decrease (if the case) the prices, according to the market trends, by following the macroeconomic indicators fluctuations.

6. Conclusions

Indexation of the prices of transport operations, by applying an automatic rate adjustment mechanism, established at certain time intervals, would provide companies with more certainty in controlling the level of profitability, transparency in monitoring macroeconomic indicators, by using commonly agreed sources that correspond to the intended purpose, as well as the possibility of not being in a position to create trade tensions between the parties, but instead encouraging the development of a stable and fair economic environment.

The application of such a mechanism would represent an improvement of the pace of price adjustment, with advantages not only for companies, but also for states, offering a much greater stability in adapting to an ever-changing economic environment. From this point of view, the application of such a mechanism can become a mandatory measure to be introduced in commercial contracts, with applicability at national and/ or international level, by which the indexation of the contractual prices between the parties is mandatory to establish and follow, based on indicators established in a particular way, correspondingly related to different sectors of activity.

An important aspect to consider is the market share of logistics providers and the competitiveness of the service offered, from the initial moment, the beginning of the contract, until the moment of renegotiation of the contractual conditions, aiming at increasing or decreasing the rates due to macroeconomic indicators.

In accepting the application of such a mechanism, as main drivers with influence in the decision making can be identified, but not limited to: competition, alliances, legislation at local / international level, as well as digitalization.

Through digitalization, environments can be created to accept such friendlier commercial conditions, and the use of the digital technologies (e.g. Supply Chain Twin, AI, Big Data, Blockchain, etc.) could help to better understand the changes, to speed up the process in adaptation of such automatic indexing mechanisms as quickly as possible.

The current research represent a starting point for further in-depth analyses, there is a need for more complex research that can expand the knowledge, by using different methods and at a broader level of analysis, with a focus not only at European level, looking not only on a road transport mode, but at a global level and taking into account an intermodal transportation service as well.

A future research can continue the existing results by analyzing the effect on the transport, if using different type of fuels, including alternative mobility fuel, and to compare the impacts taking into account cross-sectional and longitudinal researches over time.

Within a competitive market environment, in order to highlight the real effect on the impact on the profitability of logistics operators, a more in depth analysis is recommended, based on interviews with logistics companies, to analyse the level of success regarding the increase in prices with customers vs. the drift in operating costs.

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Annex 1 Cost segregation / Route France- Romania

Truck details										
	<i>Truck registration</i>	(reg. country)	ROMANIA							
	<i>EURO Norm</i>	(spec.)	EUR 6							
	<i>Type of trailer & dimensions</i>	(type - height)	Standard, 2.7H							
			Country 1	Country 2	Country 3	Country 4	Country 5	Country 6	Country 7	TOTAL
Distance/ country	<i>Departure from</i>	France (Lens)	France	Belgium	Germany	Czech Republic	Slovakia	Hungary	Romania	
	<i>From point</i>	(border point)	Lens (origin)	Crespin	Raeren	Waidhaus	Lanzhot	Cunovo	Nadlac	
	<i>Exit point for each country</i>	(border point)	Crespin	Raeren	Waidhaus	Lanzhot	Cunovo	Nadlac	Pitesti <i>(destination)</i>	
	<i>Total kilometres per country</i>	(km)	78	201	605	431	89	392	508	2304
	<i>Mileage on highway or expressway</i>	(km)	77	201	605	431	89	356	349	2108
Drivers info	<i>Nationality of the driver(s) for the route</i>	(spec.)	Romania	Romania	Romania	Romania	Romania	Romania	Romania	
	<i>Double crew</i>	(Yes/No)	No	No	No	No	No	No	No	
Driving program schedule	<i>Driving time</i>	(hours)	1.00	2.50	9.00	6.75	1.20	5.70	9.00	35.15
	<i>Rest time</i>	(hours)		0.75	11.75	0.75	11.00	0.75	11.75	36.75
	<i>Borders waiting time</i>	(hours)	1.00	0.25		0.25	0.80	2.50		4.80
	<i>Other waiting time</i>	(hours)	0.25		0.25		0.25			0.75
Fuel	<i>Average fuel consumption per 100 km</i>	(litter/100 km)	33.00	32.00	33.00	34.00	32.00	32.00	35.00	33
	<i>Quantity of fuel filled per country (pump + tub)</i>	(litter)	25.74	64.32	199.65	146.54	28.48	125.44	177.80	768
	<i>Fuel cost per litter excluding recoverable taxes (06.11.2020, ECG Association)</i>	(Eur / litter)	1.02	1.05	0.91	0.85	0.83	0.81	0.77	0.89
	<i>Fuel cost calculated</i>	(Eur / trip)	26.14	67.58	181.89	124.22	23.74	101.71	136.68	662
Infrastructure	<i>Tolls / MAUT / Vignette</i>	(tariff)	2.00	24.00	81.68	86.20	15.13	100.00	13.00	322
	<i>Ferry *indicate if complete truck or trailer only</i>	(tariff)								
	<i>Train ROLA</i>	(tariff)								
	<i>Bridge / Tunnel</i>	(tariff)								
Administrative expenses	<i>CARNET TIR</i>	(tariff)								
	<i>Customs costs</i>	(tariff)								
	<i>Other specific borders fees or taxes</i>	(tariff)								

Annex 2 Shared breakdown per cost area / Route France (Lens)- Romania (Pitesti)

	COST (Eur)	Weight in %	COMMENTS
A. Fuel	€ 662	26.5%	DIRECT COSTS
<i>Tires</i>	50	2.0%	
<i>Repair - Maintenance</i>	50	2.0%	
<i>Customs costs & Adm. expenses</i>	0	0.0%	
<i>Ferry tariff (RO-RO)</i>		0.0%	
<i>Tunnels / Bridges / Trains (ROLA)</i>	0	0.0%	
<i>Tolls, MAUT, vignette, taxes</i>	322	12.9%	
<i>Material financing & depreciation costs</i>	300	12.0%	MATERIAL'S COSTS
<i>Equipment & IT</i>	50	2.0%	
<i>Insurances (tractor and trailer)</i>	50	2.0%	
<i>Material tax (tractor and trailer)</i>	6	0.2%	
B. Infrastructure	€ 828	33.2%	LABOR COSTS
<i>Drivers gross salaries and other compensations</i>	780	31.3%	
<i>Transport coordination</i>	0	0.0%	
<i>Administrative personnel</i>	0	0.0%	
<i>Travelling & admin. Expenses</i>	125	5.0%	
C. Labor cost	€ 905	36.3%	STRUCTURAL COSTS
<i>Overheads and other indirect charges</i>	50	2.0%	
<i>Profit Margin</i>	50	2.0%	
D. Others	€ 100	4.0%	
TOTAL	€ 2,495	100%	

Annex 3 Fuel price evolution during Nov.2017- Nov.2023, at country level

Country	Fuel prices (in EUR, without VAT)						
	Nov-17	Nov-18	Nov-19	Nov-20	Nov-21	Nov-22	Nov-23
Austria	0.95	1.10	1.00	0.84	1.17	1.64	1.42
Belgium	1.07	1.26	1.19	1.05	1.38	1.66	1.52
Bulgaria	0.85	0.98	0.93	0.72	1.02	1.39	1.19
Croatia	0.96	1.10	1.06	0.90	1.18	1.53	1.35
Cyprus	1.04	1.16	1.05	0.91	1.21	1.57	1.36
Czech Republic	0.96	1.07	1.03	0.85	1.17	1.54	1.31
Denmark	1.00	1.15	1.11	0.95	1.28	1.64	1.44
Estonia	1.02	1.14	1.12	0.81	1.14	1.57	1.33
Finland	1.08	1.22	1.15	0.99	1.34	1.78	1.60
France	1.06	1.24	1.20	1.02	1.30	1.55	1.52
Germany	0.99	1.20	1.05	0.91	1.32	1.70	1.49
Greece	1.04	1.17	1.11	0.91	1.22	1.67	1.41
Hungary	0.94	1.03	0.96	0.81	1.07	1.43	1.30
Ireland	1.04	1.14	1.07	0.94	1.32	1.64	1.48
Italy	1.16	1.27	1.20	1.03	1.32	1.51	1.49
Latvia	0.89	1.04	0.99	0.81	1.15	1.60	1.38
Lithuania	0.87	1.01	0.94	0.79	1.11	1.55	1.26
Luxembourg	0.88	0.99	0.95	0.81	1.19	1.58	1.35
Malta	1.00	1.04	1.08	1.03	1.03	1.03	1.03
Netherlands	1.05	1.14	1.13	0.98	1.36	1.65	1.51
Poland	0.88	1.00	0.94	0.79	1.05	1.56	1.22
Portugal	1.04	1.13	1.11	0.98	1.25	1.49	1.35
Romania	0.97	1.06	1.00	0.77	1.06	1.53	1.25
Slovakia	0.98	1.08	1.03	0.83	1.16	1.56	1.36
Slovenia	1.00	1.11	1.02	0.83	1.20	1.40	1.31
Spain	0.94	1.04	1.00	0.85	1.14	1.60	1.33
Sweden	1.16	1.26	1.21	1.08	1.51	1.93	1.65

