PRICE FORMATION WORKSHOP

Report

European Commission

CCNR
CENTRAL COMMISSION
FOR THE NAVIGATION OF THE RHINE

INTRODUCTION

In partnership with the European Commission, the Central Commission for the Navigation of the Rhine (CCNR) carries out regular market observation reports on the development of inland navigation transport in Europe. Its publications consist of annual, semestrial and thematic reports. In the context of its market observation activities, the CCNR organised a thematic workshop on the topic "Price formation in inland waterway transport" on 8th November 2023.

Purpose of the workshop

The workshop had several objectives:

• to understand how price is formed and identify the different schemes of price formation in inland navigation freight transport (IWT);

• to look into evolution of freight rates over time;

• to address the different factors influencing price formation (supply and demand, water levels, market structure, type of contracting, etc.);

• to assess the impacts of price formation schemes on the IWT sector and its performance;

• to discuss the possible trends that might affect such schemes in the future and how they might have an impact on the competitivity of IWT;

• to support policy makers in assessing the impact of their policies on IWT prices.

Participants

The views of a wide range of IWT actors were sought: inland vessel operators, cargo owners, multimodal operators, policy makers, freight forwarders, brokers, cooperatives, banks, institutes publishing information about freight rates, ports, consultants.

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PRICE FORMATION MODELS IN IWT

Main Influencing factors

There are several influencing factors to price formation in IWT. During the workshop, it was specified that price formation was first and foremost a matter of supply and demand. From the perspective of the supply side, the new building rate, and the total fleet's loading capacity were the factors that were highlighted, whereas on the demand side, the transport demand per cargo segment appeared as an important influencing factor. Within the scope of main influencing factors on price formation in IWT, market structure, water levels and operating costs (such as fuel/energy or staff costs) were also highlighted. Other factors such as type of vessel, quality of vessel, special vessel requirements, origin and destination of the voyage, duration of the voyage and waiting times (for instance in ports during loading and unloading processes), type of cargo, value of the cargo and quantity, expected empty sailing time, and rate of inflation, were also pointed out (non-exhaustive list).

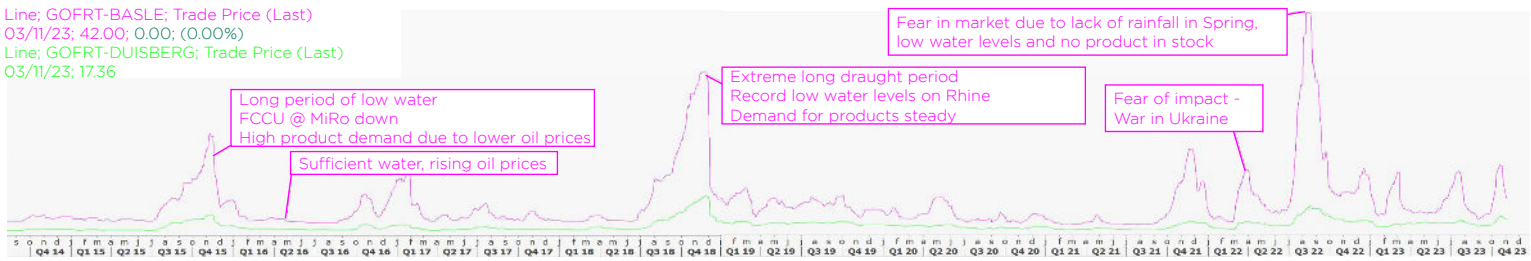
Some external factors that impact the freight rates were also addressed, such as Covid-19, economic and geopolitical conditions, as well as regulatory factors.

It was emphasised that the number of vessels and the available loading capacity is fixed in the short term. Yet, in some cases, the availability of barge capacity can change. An example is the transfer of vessel capacity from the Rhine to the Danube region (3% of Rhine dry cargo fleet capacity) in the context of the Solidarity Lanes which contributed to reducing the Rhine fleet and its loading capacity, and therefore impacted the container and dry bulk freight rates (upward movement).

On the other hand, demand can fluctuate strongly, as the boom in coal transport in 2022 and its impact on dry bulk freight rates has shown. Similarly, for the liquid bulk segment, fluctuation in availability of energy products or the shutdown of a large refinery can have a strong impact. Strong variation in transport prices can also occur during periods of low water and periods of rapidly changing demand conditions (for example during the outbreak of an economic crisis).

Within tanker shipping, the oil price dynamics play an important role for transport demand and therefore also for transport prices. Also, the term structure of the oil price on the futures market (reflecting expectations on how the oil price will evolve in the future) is an influencing factor for transport prices in tanker shipping. The term structure can be characterised by higher prices for deliveries in the future compared to actual spot market prices (a situation known as 'contango'). In this case, more liquid cargo will be transported to storage facilities, due to the expectation of selling oil products in the future at a higher price. The result of this contango situation is an upward movement of freight rates. The opposite of contango is backwardation (lower prices for the delivery of oil products in the future compared to actual prices).

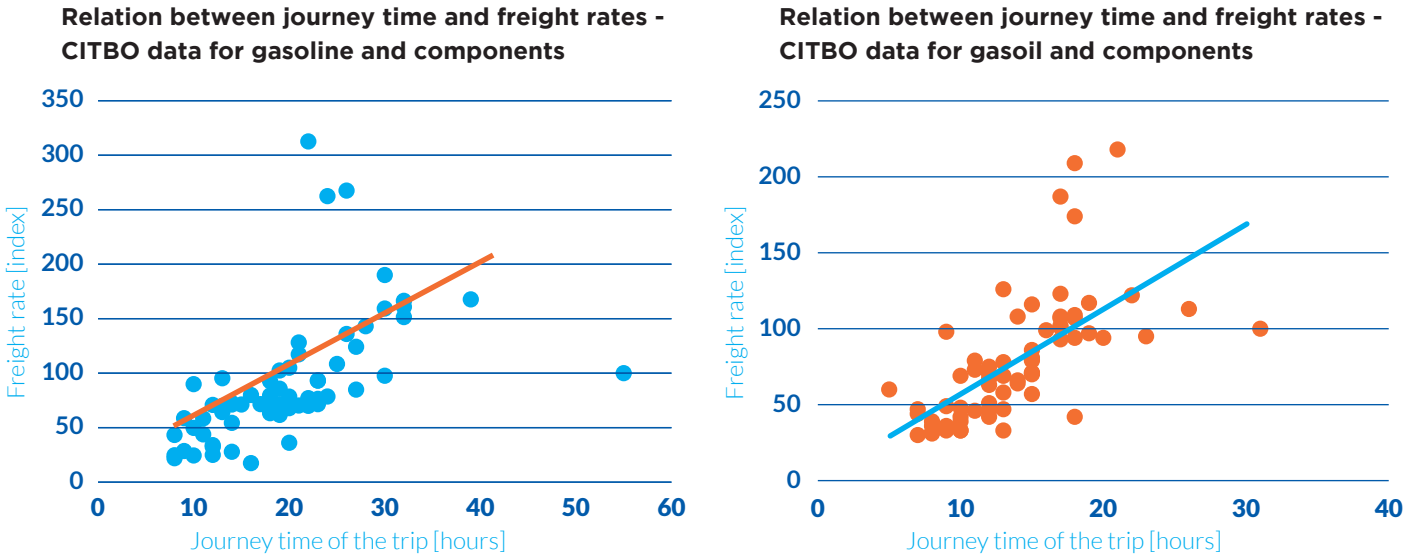
FIGURE 1: **EXAMPLE - TANKER BARGE FREIGHT RATES VERSUS MAIN INFLUENCING FACTORS**



Source: Insights Global

An example of how operating costs influence freight rates is shown in the following two charts. Operating costs are hereby measured by the journey time of a trip. An analysis of CITBO spot market freight rate data shows that the journey time in hours is an indication for the length of a trip and related costs. The longer the trip, the higher the costs and the higher the freight rate level.

FIGURE 2: **FREIGHT RATES ARE INFLUENCED BY OPERATING COSTS – MEASURED BY JOURNEY TIME**

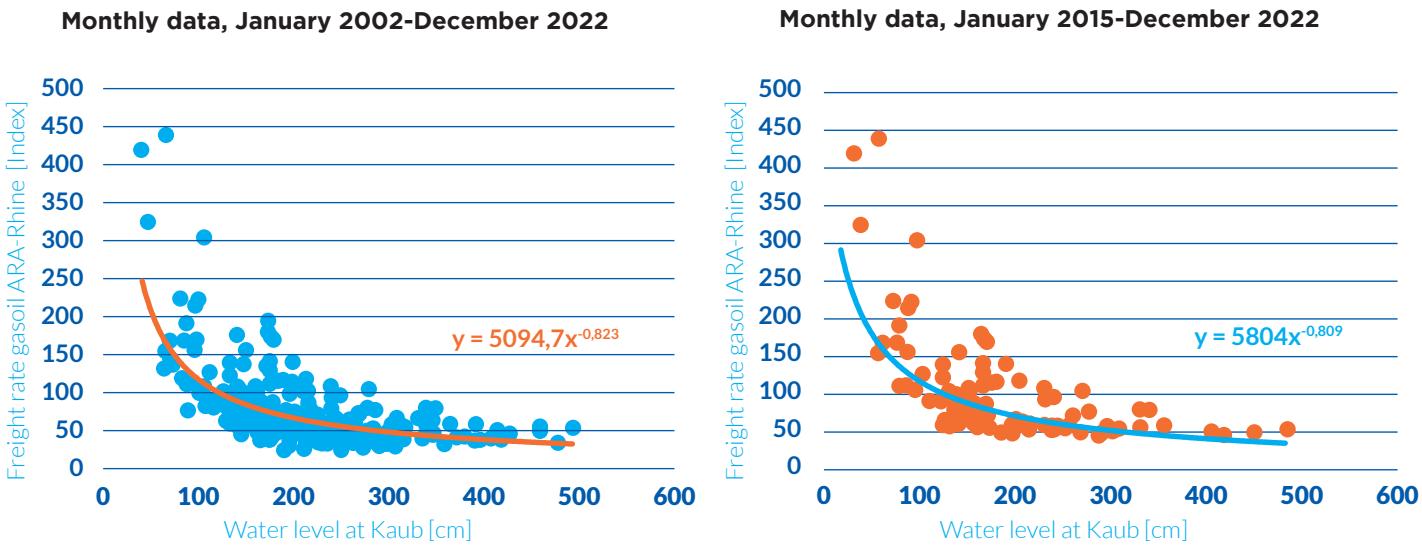


Source: CCNR analysis based on CITBO data

When the amount of cargo that is available on the market is low, vessels continue sailing at very low prices because those prices are mostly still higher than the variable costs (such as fuel). When the amount of cargo is high, transport capacity can only increase to a certain extent, as the supply side is more-or-less fixed. The prices therefore rise until clients (cargo owners) choose other options.

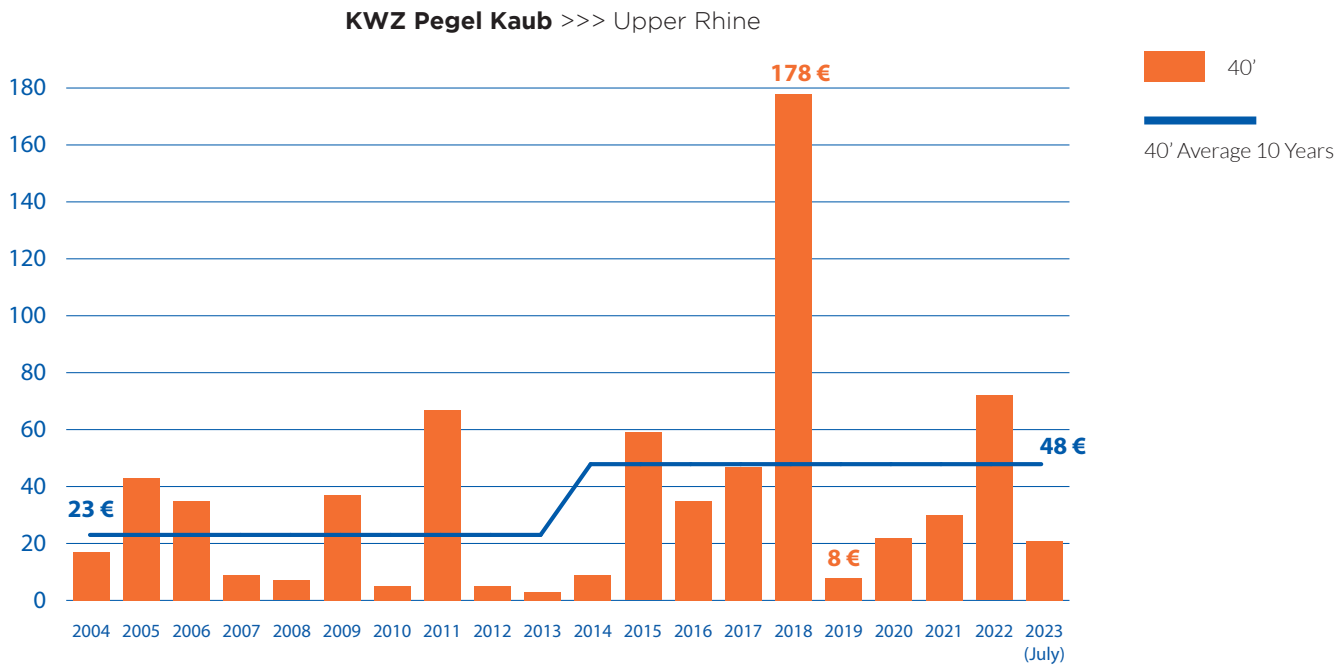
The strong impact of water levels on freight rates was highlighted by all speakers during the workshop. As shown in Figure 3, the impact of water levels on freight rates has become even more acute in recent years. In addition, Figures 4 and 5 show the high volatility of water level surcharges on container transport, making it difficult for transport and logistics providers to anticipate their impacts on the IWT freight rates. This can ultimately influence modal choice.

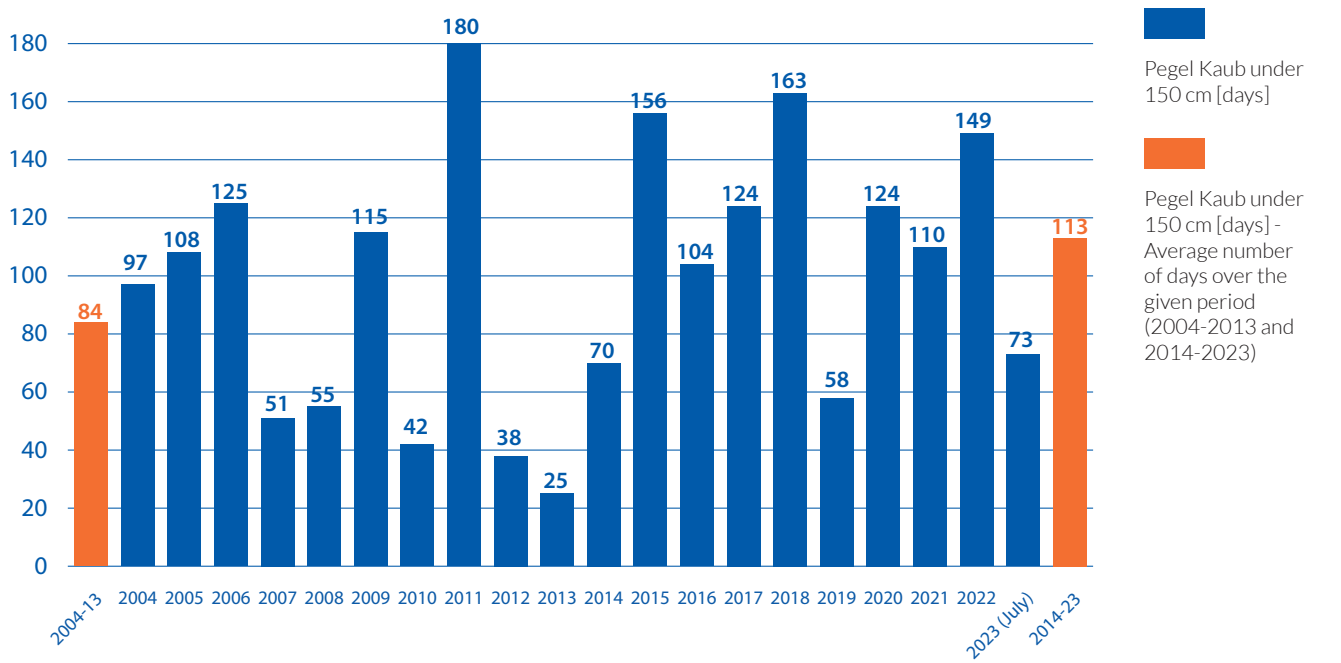
FIGURE 3: **RELATIONSHIP BETWEEN WATER LEVELS AND FREIGHT RATES**



Sources: CCNR analysis based on data from Insights Global and the German Waterway Administration/Federal Office for Hydrology
** Prices on the spot market for liquid cargo (gasoil) transport ARA-Rhine*

FIGURES 4 AND 5: **VOLATILITY (UP) AND DURATION (DOWN) OF LOW WATER SURCHARGES OVER TIME**





Source: Haeger & Schmidt Logistics, Division Intermodal

General market structure

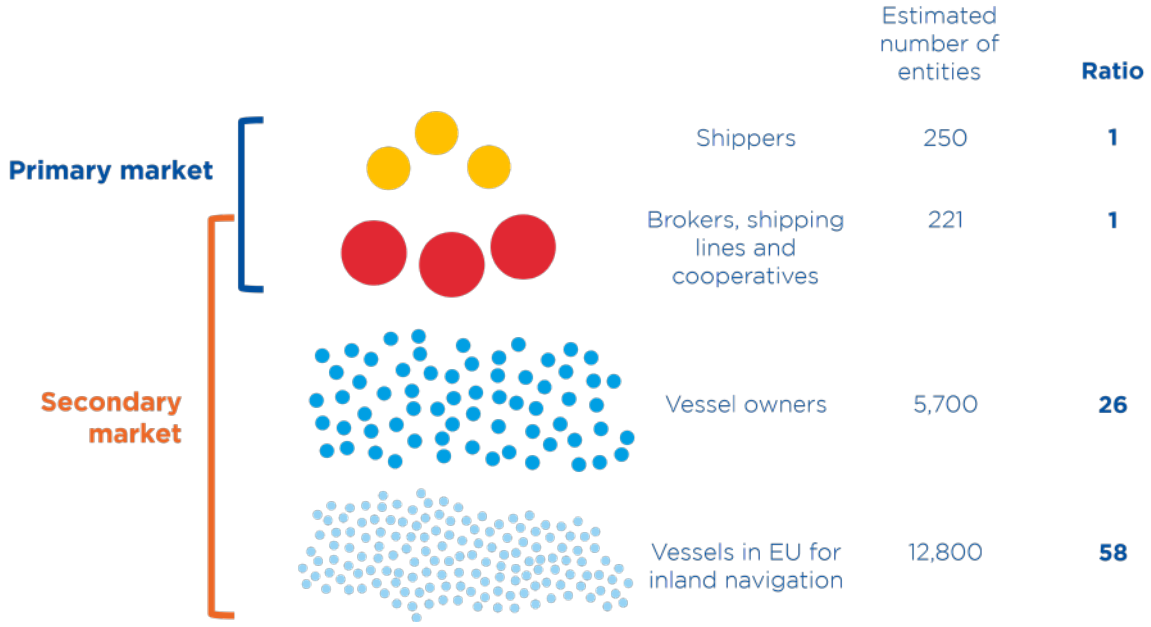
There are six main goods segments in the IWT sector. Within dry bulk, the segments of agricultural and food products, raw building materials, metals, coal and ores are found. Within liquid bulk, oil products and chemicals are mainly found. The third type of cargo is dedicated to containers.

Five main types of contracts to operate in IWT were highlighted during the workshop: spot market, time charters, voyage charters, long-term contracts and internal contracts (transport for own account). Spot market is the first contract option for the dry bulk market segment while time charter is the preferred option for liquid bulk and container markets. Price formation is directly driven by those different types of contracts. For instance, in the spot market, there are high earning possibilities during boom times to

be balanced with high volatility in income and therefore less stability. On the other hand, time-charter and long-term contracts enable income to be more predictable and more stable, therefore being more attractive for bank financing.

The IWT sector is generally composed of the primary and secondary markets. The first market is mainly composed of shippers, brokers, shipping lines and cooperatives, while the second market is composed of vessel owners, including the number of available vessels to transport the cargo. In western Europe there are mainly small vessel owners, particularly in the dry bulk sector. Large companies exist in the liquid and container sectors. In the Danube region, the company structure is different, dominated by a few large companies which operate mainly in the dry bulk sector, whereas in western Europe this is the case to a lesser extent in the liquid bulk sector.

FIGURE 6: **MARKET STRUCTURE IN THE IWT SECTOR**



Source: Platina2, D1.5 'Strategy to enhance market transparency and synergistic actions', 2015

In western Europe, there are a high number of owner-operators (operational functions at vessel level). Only a very limited number of vessel owners manage the functions at the upper levels themselves such as sales, marketing and drawing up contracts directly with cargo owners. The brokers operate at fleet level, connecting the cargo owners, often represented by large forwarding companies with the highly fragmented level of the vessel owners/operators, mainly consisting of small family companies owning only one or a few vessels.

Depending on the cargo segment, the way transport assignments are acquired varies. This also plays a role in price formation, particularly whether intermediaries play a role or not in the contract negotiations. For instance, in the liquid and container segment, transport operators rely mostly on one operator while in the dry bulk sector, transport operators rely more on multiple brokers. Only a few transport operators (generally the larger companies) rely on their own marketing or contacts to negotiate contracts directly with their clients. Cooperatives also play a role in contract assignments. Such cooperatives have added value for the clients by offering security of supply and security on costs, but also for their members, for instance by facilitating contract negotiations.

Again with regard to the market structure, it was observed that the IWT market presents two types of agents. On the one hand, there are those agents that constantly act in a battle to acquire the lowest cargo transport price in the market ("red ocean"), and on the other hand, the more added-value-oriented actors ("blue ocean"). Currently, at least in the dry cargo segment, the "red ocean" setting seems to prevail.

FIGURE 7 : **"RED OCEAN" VERSUS "BLUE OCEAN"**

Source: NPRC

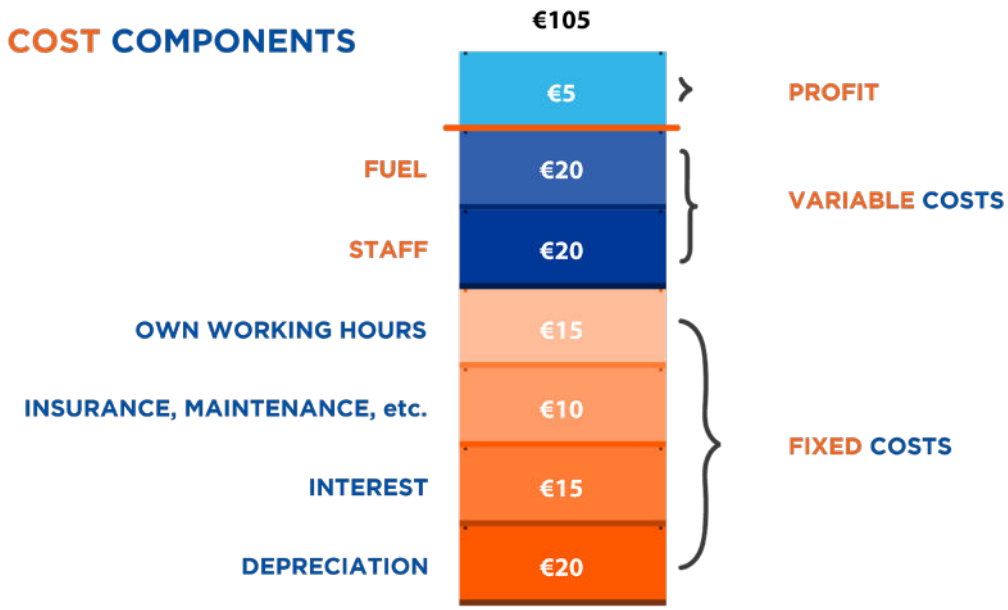
Transport rates composition - Formation of the price

The inland navigation sector is a capital-intensive market. Within the sector, vessels have different cost structures, cost prices and revenues, depending on a series of factors such as the method of financing, sailing area, fluctuations in water levels and global trade.

However, it can be verified that the general cost structure of the IWT market comprises both the fixed and variable costs. Under the variable costs, expenses for the staff and fuel are important components, whereas for fixed costs, the depreciation of the vessel, interest rates for loans and insurance and maintenance represent a significant part of the operational costs structure.

o General cost composition

FIGURE 8: **GENERAL COST COMPONENTS**



Source: NPRC

The costs for lock, navigation rights etc. should be added to these cost components. In the chart above, financing costs are considered under the heading “Interest”.

With more specific regard to container transport, issues linked with inefficient container handling and congestion in seaports might also lead to additional costs (i.e. no optimisation of the use of vessel due to long stays in port, minimum call sizes which might impact total cost, all contribute to issues of staff shortages.) In order to make more profit, strategies to reduce costs are always being investigated by transport providers. For instance, strategies to optimise fuel consumption through a better training of staff or investments in greening technologies, good preventive maintenance, strategies to reduce staff cost (automation) etc.

o General revenue components

As previously mentioned, within the IWT sector, vessels also have different revenues, depending on the sailing area, fluctuations in water levels, market structure, etc. At the workshop, particular attention was given to the impact of low water levels on freight rates. With the surcharge on freight rates, transport prices in IWT increase.

An example of a general revenue composition is given by adding:

• the revenue basic multiplier which is obtained by the product of the practised freight rate and the cargo quantity transported (rate per tonne);

• the low water surcharge (when operating on a free-flowing river and when it is a period of low water) as result of reduced loading capacity of a vessel;

• the fuel surcharge – extra fee (paid by client) added when the current oil price exceeds a specific level;

• the demurrage – fee (paid by client) as a result of failure to load or discharge the vessel within an agreed time period.

FUTURE TRENDS ON PRICE FORMATION IN THE IWT SECTOR

During the workshop, the following future trends on price formation were raised:

a. deindustrialisation due to high energy prices and transition costs;

b. more severe low water levels on the Rhine in the future;

c. degassing regulations in the field of liquid bulk (the change of liquid cargo in the cargo holds and the need for degassing has an influence on transport prices; the CDNI ban on degassing might also lead to more dedicated sailing and vessel capacity scarcity);

d. decarbonisation of barge transport, specifically the need to adapt/replace the motor of the vessels in order to run on alternative fuels/new energy sources;

e. energy transition will reduce transport demand for oil products in the long run and will lead to an increase for other types of products transported by inland vessels such as biomass and biofuels;

f. automation: according to the experience of Novandi, automation was presented as an added value for the future of inland navigation for several reasons. Reducing costs in inland navigation (10% costs reduction on average), partly addressing the issue of staff shortage, added value for family life of crew members but difficulties with changed hierarchy on board ;

g. staff shortage leading to higher staff costs;

h. newly built vessels becoming more expensive;

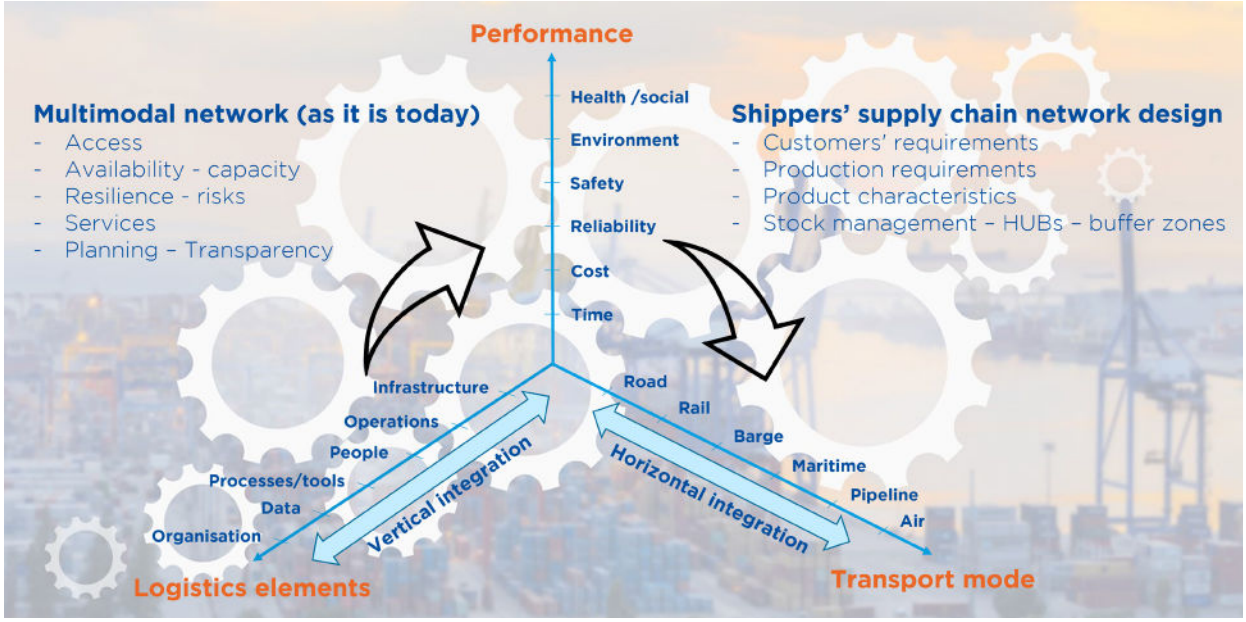
i. inefficient container handling in seaports/congestion, affecting more specifically container transport.

PRICE AND MODAL SHIFT: IS PRICE THE CENTRAL THEME FOR MODAL SHIFT?

For a long time, transport service buyers were preoccupied with price. Their main concern was to buy transport at the lowest price possible. More recently, even if price remains a decisive factor, other elements have come into play in making this decision, such as sustainability issues. Some cargo owners are for instance committed to use low emission transport modes, as long as it does not lead to a (certain) increase in prices.

Beyond price, other factors therefore play a central role when considering modal shift.

FIGURE 9: **PARAMETERS OF MODAL SHIFT ACCORDING TO CEFIC**



Source: CEFIC analysis on IWT

Modal shift: IWT must take advantage of its strong points

• Energy efficient and clean transport as well as innovative fleets.

• Labour extensive: the staff shortage is becoming a pressing concern in many transport sectors. However, according to the European Shippers' Council, the labour shortage challenge in IWT might be less difficult than in other more labour-intensive transport modes.

• Ability to transport large volumes of goods.

• Low level of accidents.

• Safety of supply, additional capacity.

• Capacity on infrastructure: in practice, cargo-owners face challenges in finding alternative modes, especially the capacity for rail-paths as the rail-infrastructure on the most important corridors is already congested. Compared to rail, the situation for inland waterway transport is greatly preferred as rivers and canals provide additional capacity for freight transport. This is certainly a factor which will be considered by cargo-owners.

Important aspects to take into consideration for modal shift

• Developments in other modes – energy transition and automation: one should not be oblivious to the fact that the position of inland waterway transport will be influenced by external developments in other modes.

• Realistic cost structure and disadvantages: for cargo owners, the overall cost of transport and logistics is more than simply the transport costs. “Shifting from road to inland navigation transport often involves reinventing the supply chain”. For instance, it should be ensured that sufficient storage capacity is available. Cargo owners must therefore have a clear picture of the total cost of shifting from road to inland navigation before making any decisions. In addition, additional investment costs might also be required on the side of transport suppliers if vessel owners ask for greener transportation modes to be used. Cargo owners should in these circumstances understand that longer-term contracts are necessary to guarantee innovation and obtain financing from the financial sector.

• Make use of digitisation: digitisation enables the reduction of costs, in particular to facilitate information exchange among the different actors of the transport chain.

• Reliability of transport: the cost that cargo owners might be ready to pay to ensure reliability of supply should not be underestimated. Inland waterways have always had a good track record in this regard. However, the influence of water levels on the inland waterway transport freight rates can lead to extremely high costs for cargo owners. Investments in infrastructure and a more adapted fleet is required to address this challenge.

• Prepare for the future: the long-term perspective would be that the sector would have to be competitive with others on efficiency, reliability, sustainability and costs. The sector should prepare for this in the future and not only rely on its present sustainable profile.

RECOMMENDATIONS TO POLICY MAKERS

As a general statement, it can be said that policies can have an impact on price.

Yet policies affecting price should be limited to the minimum in free markets and be applied uniformly (not limited to certain regions for instance). In addition, such policies should be clear and unambiguous. As far as possible, regulations should not change in line with the political environment so as to provide a long-term vision for the IWT actors.

It became clear from this workshop that policy makers will not intervene on how price is formed but rather on other factors that influence price, and ultimately the competitivity of IWT – low water surcharge, fuel surcharge, congestion charge, sustainability and how investment might impact price.

Some examples of policies mentioned that can be implemented, and which can influence price:

a. measures to increase the competitiveness of European base-industry;

b. measures to reduce impact of low Rhine water levels and optimise navigation conditions;

c. gradual implementation of decarbonisation measures in inland waterway transport;

d. equal treatment of modes of transport (external costs and subsidies);

- In a free market, and with regard to subsidies for modal shift, some participants indicated that funding should focus on start-up costs. Ultimately, the business case must be stand-alone. In addition, subsidies should not disturb the level-playing-field (currently, the level of subsidises for rail is higher than for IWT).
- To ensure that cargo owners would pay a “fair price” the concept of internalising external costs - which in pricing refers to the practice of factoring in the negative externalities or indirect costs associated with a product or service into its price - is valuable. Externalities are costs or benefits that are not fully accounted for by the buyers and sellers involved in a transaction and are often imposed on society or the environment. This development has already materialised in EU proposals for an Emission Trading Scheme (ETS) applicable to road transport. Some regret that the internalisation of external costs would not apply to all modes.

e. infrastructure investment;

f. measures to have more market transparency;

g. stronger funding programmes for the energy transition and terminal;

h. measures related to fuel price taxation;

i. measures contributing to raising awareness of cargo owners.

CONCLUSIONS

Different types and forms of price formation exist in the inland waterway transport sector, depending on the type of transport (dry cargo/liquid cargo/container). Some of these forms of price formation lead to volatile transport prices, in particular the orientation on the spot market in dry bulk transport. This phenomenon is often an obstacle to external financing by banks. More long-term forms of price formation (e.g. time charter) would therefore be one means of stabilising the sector and enabling investment in innovation (innovative vessels, greening of vessels).

The workshop also revealed trends that should have an influence on price formation in the future. A higher frequency of low water periods is one of those trends. In addition, automation as another trend can be an answer to staff shortage and can thereby reduce costs and prices in IWT.

With respect to the link between price and modal shift, while cost price is an important consideration for cargo owners in their modal choices, it should be evaluated in conjunction with other factors such as environmental benefits and reliability of transport service. The suitability of a modal shift to inland waterway transport will ultimately depend on the specific circumstances of the transportation route and the types of goods being transported.

Overall, it seems that the way such a price is formed in inland navigation is not necessarily a decisive factor to foster modal shift. Indeed, when compared to road transport for instance, the structure of prices and how they are formed are not so different.

In addition, other modes face similar problems such as staff shortages and increase in fuel prices. A particular feature of price formation in IWT is the influence of low waters. This factor plays against modal shift as it lowers the reliability of inland waterway transport and increases the costs for cargo owners when using IWT.

Yet, policy makers have a role to play, not in the form of policy intervention affecting price formation but rather the factors that influence price. One such policy intervention can relate for instance to internalisation of external costs or fuel tax.