

# SWOT analysis of the Slovak inland waterway transport

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**Abstract:** The paper deals with SWOT analysis of Slovak rivers. Although Slovak Republic is situated in the Central Europe, waterways are relatively short and not branched. Inland waterway includes commercial, sporting and tourist navigations. Commercial navigation is limited by flow volume and length of floating period. For commercial navigation have Danube, Váh and Bodrog the best conditions. All three navigable rivers do not allow maximum stable immergence use of actual vessels during the whole year. Navigable conditions (curve radiuses, fairway width, navigable depth, flow rate, flowage) are changeable during the year.

**Keywords:** SWOT analysis, river, inland waterway transport

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## 1. Introduction

Although Slovak Republic is situated in the Central Europe, waterways are relatively short and not branched. Total navigable length of Slovakian rivers is 172 km of which Canals are 38,45km. Inland waterway transport is partly on rivers Váh and Bodrog and on river Danube (following AGN agreement marked as E-80), which belongs to TEN-T and is also part of corridor VII and part of RHINE-MAIN-DANUBE waterway, but with time and local limitations. This water land allows connection to harbours in North and Black seas as well as connection to west European river lands net.

## 2. Slovak Rivers and Inland Waterway Transport

Inland waterway includes commercial, sporting and tourist navigations. Commercial navigation is limited by flow volume and length of floating period. For commercial navigation have Danube, Vah and Bodrog the best conditions with navigable length:

- Danube with length 172 km (Slovakian part, rkm 1708 – 1880)
- Váh with length 57 km (part Komárno – Šaľa, rkm 0,0 – 57,0)
- Bodrog with length approximately 7,5 km (border Hungary/Slovakia – Ladmovce)

All three navigable rivers do not allow maximum stable immergence use of actual vessels during the whole year. Navigable conditions (curve radiuses, fairway width, navi-

gable depth, flow rate, flowage) are changeable during the year. Tonnage of vessels which are adequate to limited conditions and navigable length are from 800 to 1600t on Danube, till 600t on Vah and 450t on Bodrog.

## 3. SWOT analyses

The study “Medium and Long Term Perspectives of Inland Waterway Transport in the European Union” provided by the European Commission describes a SWOT analysis of inland waterway transport (IWT) as follows:

**SWOT for IWT as seen from the supply side of transport**

**Internal origin - Strengths:**

- sufficient fleet capacity, in particular large vessels,
- much spare capacity on waterways to foster a growth of traffic,
- high amount of flexible entrepreneurs in the market.

**Internal origin - Weaknesses:**

- long life-time of inland vessels and engines, resulting in high air pollutant emissions,
- ageing human resources, lack of influx, shortage of qualified staff,
- fragmented and atomised SME structure resulting in low co-operation and lack of ability to integrate IWT in door-to-door chains,
- overcapacity and small profit margins,
- limited use of ICT systems,
- missing infrastructure links, limited fairway conditions and lack of transshipment areas and multimodal connectivity,
- poor safety culture resulting in significant safety risks for workers.

#### **External origin – Opportunities:**

- funding programmes for funding of infrastructure,
- stimulating policies to strengthen supply side of IWT,
- internalising external costs: pricing of competing modes: road transport and rail.

#### **External origin – Threats:**

- growing pressure on spatial planning (e.g. housing projects conflicting transshipment functions for IWT),
- conflicts with ecology (nature reserve),
- internalisation of infrastructure costs for IWT,
- possible impact of climate change on water levels on long term.

#### **SWOT of IWT activities in general as seen from the demand side:**

##### **Internal origin - Strengths:**

- low freight rates,
- reliable transport operation,
- low carbon footprint,
- available transport capacity (vessels),
- available infrastructure capacity; growth potential,
- high market share in traditional sectors (captive markets for IWT such as coal, ore, oil),
- comparatively high safety levels; in particular external safety (risks for population or the environment).

##### **Internal origin - Weaknesses:**

- not all origins and destinations are located in the proximity and necessitating the use of transshipment and other modes,
- high volumes needed (consolidation), dependence on a limited number of large customers and consolidation,
- low operational speeds,
- lack of visibility and poor image at potential clients,
- varying water levels on certain corridors causing a low predictability of service levels and changing freight rates,
- high or low water levels and accidents can block critical parts of the waterway network,
- low level of awareness in IWT of broader supply chain developments (door-to-door) and limited knowledge of marketing and supply chain management,
- industry fragmentation and reaction to external shocks (e.g. recent economic crisis)

##### **External origin – Opportunities:**

- infrastructure expansion (e.g. Seine - Schelde, Rhine-Rhone),
- commercial co-operation and increase of scale in (multimodal) logistics,
- growth of world trade resulting in steep growth of maritime container market,
- congestion on motorways and lack of capacity in rail transport,
- growing demand for low carbon transport solutions,
- attracting new markets such as waste transport, bio fuels, LNG, pallets, continental containers,
- increased awareness of safety and security problems,
- growing number and position of inland container terminals.

#### **External origin – Threats:**

- limited political support and funding resulting in poor condition of many waterways and inland ports,
- loss of markets due to energy policy (e.g. coal and fossil fuel transports),
- impact of high-oil prices on various industries that are customers of IWT,
- further liberalisation, efficiency and interoperability of rail transport markets,
- possible introduction of Long and Heavy Vehicles for road haulage (e.g. 3 TEU truck),
- increased restriction of banks for investment as a consequence of the crisis.

The SWOT analysis shows that there are many problems inside countries. Serious problem is the poor cooperation and organisation within the inland waterway transport, i.e. cooperation between carriers or with other modes of transport or communication with shippers. Another problem is a high level of fragmentation of carriers in the market. These appear to be essential weaknesses of the system. Further consolidation of the suppliers is necessary. This could be done by expanding companies and industry trade groups which would result in better operational performance, greater purchasing and marketing power and improvements to quality of door-to-door services.

Very urgent need is improvement of inland waterway transport infrastructure. It also needs a good labour market and clear rules and regulations. Otherwise it is not able to use its potential to the full.

In the waterway network there are still several missing links, such as limited depth of navigable parts or problems with low reliability and efficiency of fairways. In this respect, it is essential to provide better maintenance of fairways, including dredging.

#### **SWOT analysis of IWT of Slovak Rivers:**

##### **Internal origin - Strengths:**

- strategic geographic position of SR in transport links of West – East, North – South,
- Transport infrastructure of SR as part of trans-European transport networks (TEN-T),
- decentralization of road transport infrastructure administration,
- direct access to European transport Corridor VII (Danube – Mohan – Rhine),
- decongestion of roads in the Váh-side contributing to increased traffic flow and safety on the roads,
- savings in energy consumption by 30%, as compared with the direct long-distance transport of goods by road haulage,
- reduction of the cost per unit of transported goods,
- lowest environmental impact of traffic,
- job professions (e.g. captains, boatmen) are very perspective and demanded in the SP.
- reduction of environmental pollution by harmful emissions and noise due to their lower levels in water transportation, which makes a substantial part of the journey,

and significantly lower costs to restore environmental damage,

- lowest accident rate, low carriage costs, and lowest congestion rate in water transport,

#### **Internal origin - Weaknesses:**

- transport infrastructure within the TEN-T network is not constructed completely,
- lack of financial resources to develop transport infrastructure,
- low standard of information and communication technologies in transport,
- failing technical and qualitative condition of remaining transport infrastructure (national, regional and municipal level),
- lack on the modernisation of the fleet,
- insufficient waterway transport potential utilisation,
- low quality of transport services (public transport, integrated transport systems), lagging behind the EU 15 countries,
- low standard of transport vehicles renewal,
- insufficient navigation depth on the downstream Elbe and Danube rivers (goods may be also delayed due to the water level in rivers, where the limit is not only low, but also high water, as there are limits to the passage of ships under bridges),
- the Slovak Republic has had the lack of the qualified staff who could work in the area of IWT and logistics (The average age of the staff in the biggest shipping company called Slovak Shipping and Ports is more than 50 years old.),
- no secondary schools in the area of IWT, IWT and logistics are mentioned only in general content at secondary schools plus lack of students who want to study and work in IWT and lack of well educated nautical staff,
- negative influence on the aquatic environment,
- slowness of ships, absence of sewage stations,
- the crucial thing is that when it is necessary to get shipment "on water" railway transportation must be used, then it is loaded to the ship, and in the destination port, the entire procedure repeats,
- shortage of qualified crews and an increasing lack of entrepreneurial successors,

- obstacles: limited draught of vessels, dive clearance of bridges, locks dimensions prevent their full utilization and reduce competitiveness.

- no promotion of IWT in the SR,

#### **External origin – Opportunities:**

- national and international importance,
- capacity and efficiency of waterway,
- availability and capacity of water vessels,
- provision of sustainable mobility via supporting ecologic means of transport,
- improvement of transport quality, safety and reliability, based on intelligent transport systems,
- control and reduction of transport (via introducing fees for using the infrastructure),
- proportional development of individual types of transport infrastructure,
- improve the accessibility of SR and regions to TEN-T networks and to supra-ordinate transport infrastructure,
- reduce externalities by development of multimodal transport systems,
- increase resource allocation to transport infrastructure via multiple-resource financing of the transport infrastructure,
- increase utilisation of water transport potential,
- achieve more efficient and attractive services via regulated competition,
- new job opportunities,
- after construction of the stretch Trenčín – Piešťany other stretches of VVC can be built up to Žilina (national importance),
- upgrading of the Danube waterways, better utilization of the connection to European waterway network,
- connection to the Oder (international importance),
- creating opportunities for complex service of the area, where the number of participants in the transport chain is increasing, as well as the range of business activities,
- construction of the stretch will be a challenge for freight shipping and recreational sailing,

#### **External origin – Threats:**

- access to ports,
- the sector must constantly adapt and improve its logistics efficiency, safety, and environmental performance to new technological developments and market requirements,
- financial issues (e.g. the threat of non-earmarking funds from the state budget,
- Slovak certificates are not harmonized with other European certificates (mainly on the Rhine),
- decreased transport accessibility and thus reduced attractiveness of SR and its regions to investors,
- growth of negative impact of transport on the environment,

- deterioration in quality of transport infrastructure, caused by a lack of financial means for its development, maintenance and operation,
- congestion causing increased energy, time and economic loss which reduces the competitiveness of the Slovak economy,
- increase of transport's negative impact on the environment caused by a lack of financial means for renewal of public passenger transport fleet,
- qualified nautical staff is overaged (50 and more) and absence of well educated nautical staff in a near future,
- the threat of non-completion of the project due to lack of interest from towns, villages, factories, plants and insufficient funding,
- lower competitiveness when comparing to road and railway transportation,
- low demand for water freight.

In general there is not enough attention paid to the work on infrastructure to be done and the development is very slow. Insufficient maintenance provided by several member states is a problem, especially on the East-West and the Danube corridors. The existing ports and terminals in Western Europe are under pressure. On the other hand, along other corridors, such as that on the Danube, the density is insufficient.

In particular, when considering the container transport sector a high-quality and efficient international network of terminals is needed that is closely linked to factories and logistic areas as well as to other modes of transport. Lastly, better coordination is necessary in the regulatory field, one of essential points being the implementation of river information services.

## 4. Conclusions

Slovak rivers have big potential, but as was shown in the SWOT analysis weaknesses are stronger than strengths although there are many opportunities. Waterways offer a possibility of cheaper transport for bulk cargo and have sufficient capacities. Of course terms are usually longer but safety is higher.

Inland waterway transport of the Slovak Republic suffers from a general lack of incentives and support from the Slo-

vak government's side and from the fact that national transport policy is predominantly focuses on the development of the rail and road system in the country.

Potential of Slovak IWT is much higher than currently used, by success in increase of freight transport via existing IWW, the investments into Váh enhanced navigability up to port Žilina (cca 250km) can be promoted, which will be a step in building connections of Danube-Elbe-Oder, and Danube-Oder-Tisza via Váh.

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