

Smart and Sustainable Sea Logistics and Port Operations

Summary report

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1 Objectives of the project

This report summarises the main findings, results and recommendations of WP2 deliverables on smart and sustainable sea logistics and port operations.

The overall aim of the project Baltic Loop is to ensure the Baltic Sea Region's continued competitiveness and improved connectivity through energy- and cost-efficient measures to reduce transportation times and, above all, to reduce drastically the environmental impact of transportation to the aspired zero emission level in three West-East-bound project-defined corridors that extend from Örebro- via Turku/ Tallinn/Riga to St. Petersburg,

The following methodology and main data sources has been used in producing WP2 deliverables:

1. literature review
2. thematic online questionnaire to map stakeholder views
3. semi-structured interviews with maritime industry, transport infrastructure stakeholders and IT solution providers
4. stakeholder input and contribution at Baltic Loop seminars and workshops

Shipping and ports form central links in the logistics and transport chains and function as important transport nodes in the aforementioned Baltic Loop West-East corridors. Short sea shipping in the Baltic Sea Region (BSR) suffers from a number of inefficiencies leading to excessive environmental impact and decreased economic performance and competitiveness for the industry.

This report presents proposed solutions on how these cargo flow inefficiencies can be tackled through increased digitalisation and uptake of new technology, as well as business model adjustments and exploitation of alternative funding mechanisms for small Latvian ports functioning as hubs for hinterland cargo.

This report summarizes the following reports:

- Identification of bottlenecks and inefficiencies in transport flows in Baltic Loop East-West corridors with emphasis on maritime logistics.
- Recommendation report on methods, actions, and ICT solutions linked to enhanced information visibility and transmission processes for improving the cargo flow efficiency of the BSR maritime transportation and port operations
- Development of a Generic Business Model and infrastructure investment plan for Latvian Small Ports as Hubs for Hinterland Cargo (deliverables 2.4.1 and 2.5.1 combined)

2 Identification of bottlenecks and inefficiencies in transport flows in Baltic Loop East-West corridors with emphasis on maritime logistics

2.1 Objectives

The report focused on cargo flows and hindrances mainly related to short sea shipping (ro-ro, dry bulk, general cargo) sea transportation and ports along the three Baltic Loop Corridors running in the west-east direction.

In order to obtain a holistic view of the existing transport network and transport flows, covering all transport modes, a generic online questionnaire survey was conducted in the end of 2019 among various stakeholders identified by each Baltic Loop project partner. The total number of online survey responses was 93. The aim of the questionnaire was to:

- evaluate the transportation services and operations on selected Corridors;
- to identify the main hindrances to smooth transport flows;
- to highlight areas where improvements are needed for more efficient traffic flows

2.2 Results and Conclusion

Based on the questionnaire, the major causes for delays in the traffic systems are related to weather conditions, capacity issues such as insufficient capacity (e.g., traffic network and fairway dimensions, road load limits), concentration of traffic on certain routes (future traffic growth), constrained accessibility and conflicting interests between cargo and passenger transport.

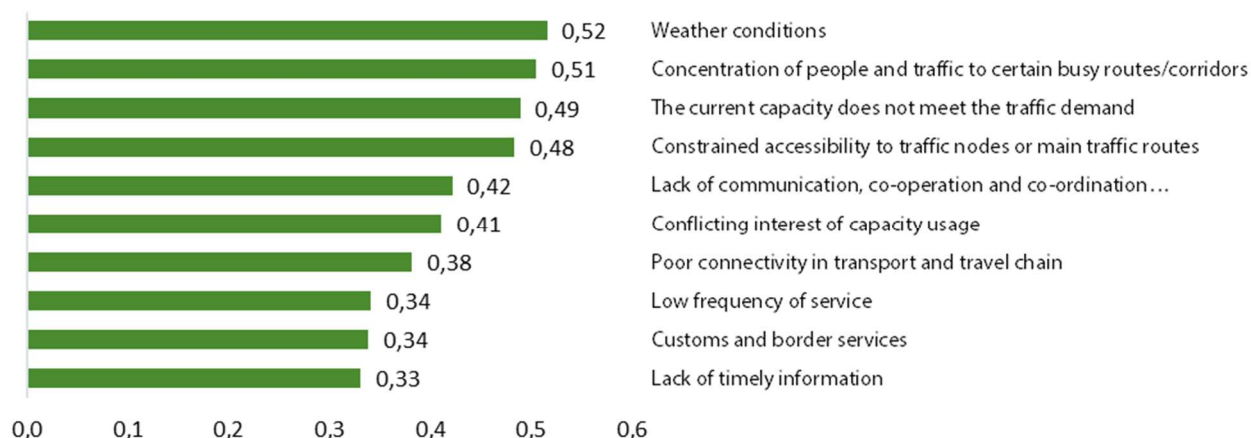


Figure 1 Major causes of delays

Traffic safety, the physical condition of the transport infrastructure being used, adequate infrastructure capacity and good accessibility were considered the most important criteria by all

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respondents for enabling smooth transport flows. These criteria function as prerequisites for operational efficiency and service speed, which also ranked high.

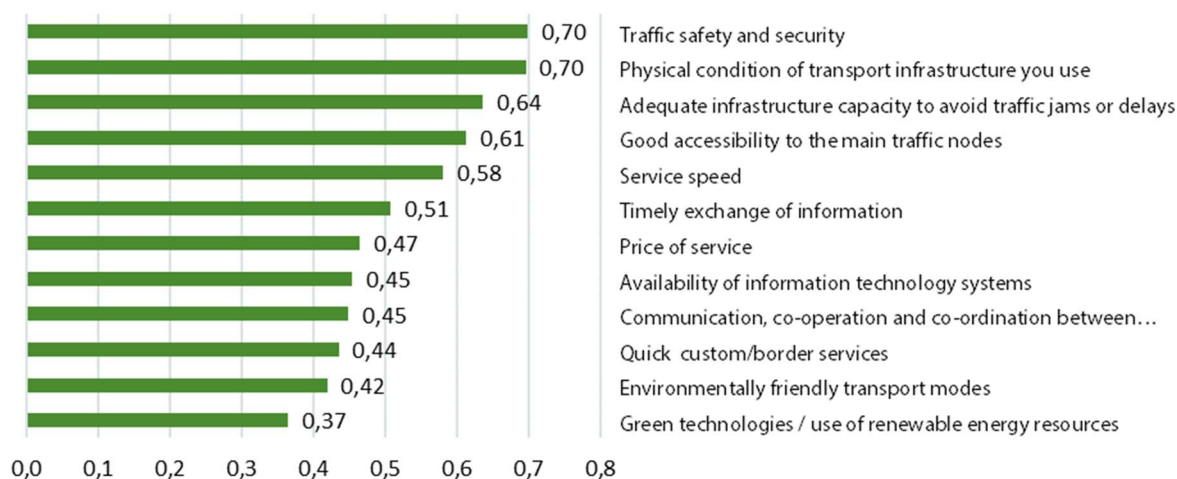


Figure 2 Conditions for smooth transport flows

Lack of funding and high investment costs were coupled by the respondents as the main hindrances to transport infrastructure development. The lack of long-term infrastructure planning and existing legislation on a political and regulative level were also grouped as significant development hindrances.

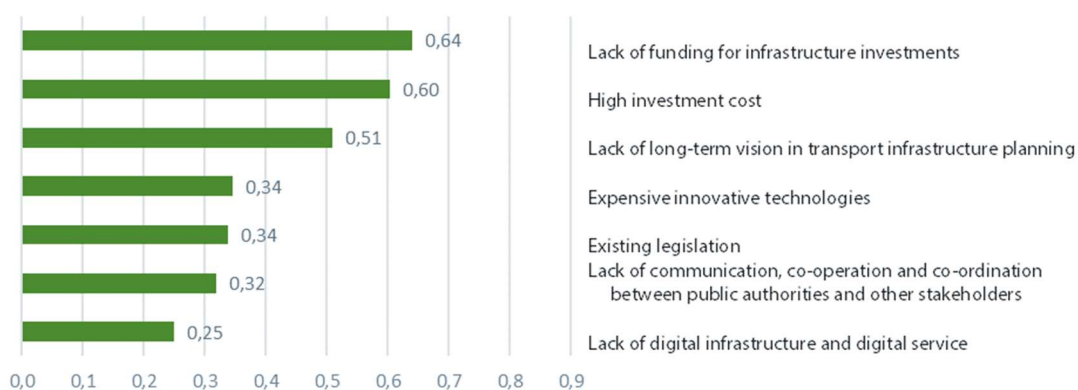


Figure 3 Hindrances of transport infrastructure development

Potential solutions for improving traffic flows in the international transport corridors were directly in line with the assessed major causes of delays described under the earlier survey result section, "Experienced delays". Increased infrastructure capacity, improved accessibility to logistical terminals and main traffic routes, as well as improved infrastructure capacity and traffic safety, were regarded as one of the most potential solutions to improve traffic flows. Increased use of IT systems, timely exchange of information and digitalisation ranked as an entity above the average, providing a potential solution for improved transport flows in international transport corridors.

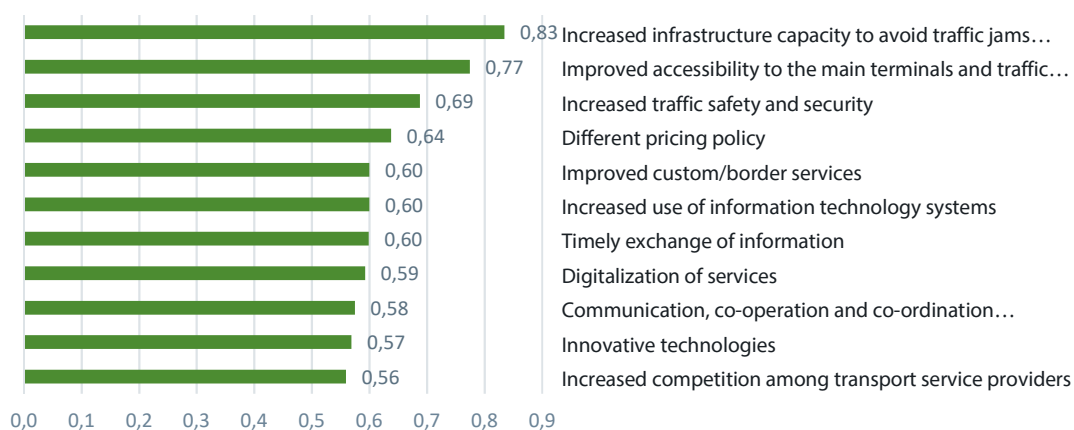


Figure 4 Potential solutions improving traffic flows in international transport corridors

Shipping and cargo flows are impacted to a high degree by change factors such as intensifying environmental regulation, demographic development, geopolitical settings, global trade and technological development.

Ports are directly affected by the future development of land-based transport volumes, transport capacity and the planning and execution of transport infrastructure projects on international, national and regional levels.

However, when shipping and port operations are viewed from an intrinsic efficiency perspective, much work is still needed to minimise the number of inefficiencies, such as unoptimised port calls, long waiting and dwelling times due to uncoordinated operations and disintegrated data management, especially regarding the more irregular dry bulk shipments. Although the ferry/ro-ro schedules are regular and punctual, the efficiency and speed of port traffic flows (trucks) and loading/unloading procedures can be further shortened and streamlined through information integration, aided by digital tools.

The relationship and dynamics between the ports and the cities has changed to some extent over time, and many ports or part of their functions, especially those handling containers, project cargo and bulk cargo, have been relocated from the hub cities within metropolitan areas in response to urbanisation and city expansion.

A parallel and alternative joint development path has been occurring simultaneously. Ports, residential, business and recreational areas are seeing an increasing functional and structural integration to eliminate conflicting interests related to land use or other urban challenges. Ferry/ro-ro ports' shrinking port areas and ship arrival/departure-generated traffic pulses typically constrain the inner city road network of hub cities, especially as the ship schedules often coincide with the city's rush hour traffic. This calls for better and more integrated traffic management systems and coordination inside the port and between the port and city.

Longer commuting distances and growing freight transport cause a growing concentration of traffic on certain routes leading to/from metropolises. This, in turn, may cause capacity conflicts between passenger and cargo transportation, congestion, delays and safety risks. Many of the Baltic Loop metropolitan areas are augmenting and improving their ring roads capacities or even seeing totally new ring roads being constructed to alleviate severe capacity issues.

A poor transport connectivity chain may be a significant hindrance to freight transport services for those using multimodal transport modes. The national governments should support and commit themselves more strongly to the EU ambition to capitalise on inland waterways and railway transportation as environmentally friendlier alternatives to road transportation. Many ports have an existing railway infrastructure, but the low or nonexisting utilisation levels have meant that the infrastructure is not receiving government funding for maintenance in many cases, whereby the infrastructures have progressively deteriorated. Hence, an undeniable mismatch and status quo situation prevails between the set EU goals and the national measures taken.

Ports' geographic locations, distance and capacity to connecting land infrastructures and the opening of new transport routes influence where transport flows are directed and channelled. The transport time, flexibility and frequency also play a crucial role for cargo owners when choosing a transport alternative. Sea transportation can generally be made more attractive to cargo owners by ensuring that sea freight is a cost-competitive alternative to other transport modes. Cost competitiveness can be pursued through route optimisation, higher loading rates and cargo coordination.

Freight transportation is changing with new trade patterns and integration of markets, regions and countries. The development has so far moved towards more efficient transport arrangements through increased capacity in both infrastructure and load carriers, increased cargo unit and infrastructure robustness to stand up well in international competition. Reliability of just-in-time supply chain deliveries has also formed the characteristics and development of freight transportation. At the same time, traffic safety requirements are high and reduced

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climate impact is a requirement, which challenges all sectors and industries to shift towards fossil-free systems. Consequently, the freight structure of sea transportation and dry bulk ports, in particular, will change due to the energy shift, which decreases the use of coal, for instance. At the same time, an opportunity for compensating fuels may arise.

Further efforts are needed to unlock the full potential of the opportunities offered by digital technologies. Digitalisation is the key to improving port functions, processes and data management of the entire port community and has a role as an enabler in reaching environmental targets. Today, ports still constitute a discontinuation point in real-time supply chains' information exchange and transparency. Data collaboration should extend beyond the port boundaries to cover all relevant private and public actors and bodies involved in various processes within the supply chain from the factory door to the end receiver.

The planning and implementation of well-functioning traffic/transport systems is a complex and multilayered process covering many measures and elimination of transport hindrances and bottlenecks. It affects many actors and sectors (users, planners, authorities and administrations) of the society on all levels. Thus, the process needs to involve and encourage all stakeholders, to a greater extent, to develop more open and transparent communication, better cooperation and a stronger commitment to establish a coordinated, long-term vision and holistic approach to transport system planning.

3 Recommendation report on methods, actions, and ICT solutions linked to enhanced information visibility and transmission processes for improving the cargo flow efficiency of the BSR maritime transportation and port operations

3.1 Objectives

This deliverable has looked at how the integration of digital solutions can improve the efficiency of sea logistics and port operations on a general level and from a shortsea shipping point of view. The report has laid out the common challenges ports and maritime actors typically face, looked at different ICT solutions and measures alleviating these lock-ins and inefficiencies and, finally, presented the benefits gained in operational efficiency and business performance.

3.2 Results and Conclusion

The demands for and on transport infrastructures are bound to increase with today's increasing trade and cargo volumes. The nature of the port operations is complex and requires orchestration and coordination of activities between different actors that involve numerous activities, machinery, and documentation processes.

Ports are frequently recognised as forming a discontinuation point in the maritime logistics and supply chain, because they exhibit low information transparency and coordination of processes and procedures inside the port. Additionally, the information flow is fragmented and compartmentalised into silos that do not enable real-time tracking; for instance, varied data formats are transmitted through several communication channels among organisations.

Dry bulk shipping presents a number of challenges regarding transport efficiency. Dry bulk ships are usually served by ports using the "first come, first served" principle. This means that vessels speed up during their voyage expecting an early arrival, exhibiting inefficient fuel economy, just to realise that a queue of waiting for ships outside the destination port has built up. Waiting outside the port can take up to several days, during which the auxiliary engines are running, simultaneously generating unnecessary emissions. Additionally, vessels often sail only partially loaded or even in ballast when cargo has not been found for both legs of the roundtrip.

AI-enabled port call optimisation and virtual port calls are emerging in ports; these predict more accurate arrival and departure times for vessels. The exact time of arrival is known, so ship operators can sail at optimal speed with regard to the actual arrival time, which also translates to higher onboard operational energy efficiency. At the same time, ports can better plan and coordinate functions and services, because ships arrive as an even and optimised flow.

Traffic pulses of arriving and departing ro-ro ships require efficient traffic management within and outside the port, in city areas and connecting infrastructure. Today, the lack of real-time traffic information and a slot system for trucks prior to ship departures cause traffic peaks and unnecessary waiting times in ports, hours before the actual departure. Real-time truck queueing systems for trucks can be implemented and used by ports and cross-border stations for land-based transport flows. The system suggests a just-in-time arrival to the port for truck drivers based on a driving-time prediction. Intelligent Traffic Systems (ITS) are also emerging that improve overall traffic management in ports and cities. However, this requires extensive communication network coverage and agreement on data sharing among various actors.

Different approaches exist for improving port operation efficiency: enhancing the connectivity of transport modes, managing traffic management, organising asset and resource management, and improving infrastructure or facility conditions.

The road transport infrastructure is innovating its maintenance measures through the use of artificial intelligence. Damaged road sections can be registered and repaired before the road conditions worsen. The market transparency on cargo transport availability is also increasing because the price of a shared container for shippers is already visible. The integration of transport demands can improve the current inefficiency in maritime transportation.

A continued and coherent introduction and implementation of technological solutions, [mobile services, cloud technologies, the Internet of Things (IoT), cybersecurity solutions, robotics and automated machinery, big data and data analytics, artificial intelligence (AI)] will facilitate efficient transport flow in the Baltic Loop corridors, which also translate into less transport-generated emissions regardless of transport mode. However, this requires collaboration between different actors in the transport chain, such as public authorities and companies, to align their strategic plans and pursue an ongoing discussion and collaboration.

Different strategic agendas exist for improving the communication and information flows within transport systems and cargo logistics. Nevertheless, many challenges will become apparent at the implementation stage, because the roots of the bottlenecks are sometimes more complex than initially was thought.

Tentative paths and operational processes should be given more attention compared to the implementation of individual technologies in order to improve communication efficiency along with the logistics and supply chains. Existing bottlenecks can be of different types; thus, the overall change requires systematic collaboration by all stakeholders. Furthermore, the improvement of cargo transport efficiency and, hence, the advances in improvement paths are a more coherent suggestion than are individual solutions.

Finally, a robust and well functioning digital infrastructure enables ports to manage and maintain their physical infrastructure and collaborate with other actors. Digital solutions can improve situational awareness and scheduling of critical, just-in-time processes, providing more

flexibility to operations. Both the actual port operations and the prediction and decision process regarding future maintenance and investment needs can be made more efficient. The digital transformation lays the foundation for improved competitiveness and for safe, secure and sustainable maritime logistics services.

4 Development of a generic business model and hub infrastructure investment plan for Latvian Small Ports as Hubs for Hinterland Cargo

4.1 Objectives

The primary goal of this report is to analyse and evaluate mainly from a spatial and regional planning perspective the potential of small Latvian small ports (Salacgriva, Skulte, and Mersrags) to function as hubs for hinterland cargo, thus complementing the operations and roles of the leading Latvian ports located in the functional Riga metropolitan area. The aim is further to generate replicable business models and present investment models for smart and sustainable sea logistics and port operations in small Latvian ports. As for methodology, this report has relied on a series of three stakeholder workshops mainly involving the ports and port operators of Skulte, Salacgriva and Mersrags and regional authorities.

A business model canvas was used as a tool to analyse and assess the structure of the Latvian small ports' existing business models. Based on the stakeholder interview results, a proposal of future business model adjustment needs for organisational value creation, delivery and capture, were carried out. Furthermore a technological road map was produced to provide a unifying structure supporting strategic planning and innovation processes of the Latvian small ports.

PROBLEM <i>List the top problems of the target customers.</i> <ul style="list-style-type: none"> • Limitations ports' technical parameters (draught, storage area). Ports cannot accommodate fully loaded ships or optimal sized vessels (particularly Salacgriva) • Traffic jams, congestion, weight limits (roads) in Riga metropolitan area • Low degree of digitalisation in communication and supply chain integration • Growing customer needs on sustainability • Shortage of funding options for development projects 	SOLUTION <i>Outline a possible solution for each problem.</i> <ul style="list-style-type: none"> • Develop existing infrastructure and resources to attract more traffic; • Develop digital infrastructure; • Consider private and public partnership as funding source option; • New collaborations forms between ports, operators, or shipping lines. 	PARTNERS <i>Main partners or resource providers.</i> <p>Business partners</p> <ul style="list-style-type: none"> • Port operators; • Local industries and manufacturers; • Shipping lines; • Associations (Small Ports' Association etc.); • Councils (Latvian Port, Transit and Logistics Council, Foreign Investors Council, Export Council of Latvia); • Chamber of Commerce. <p>Suppliers</p> <ul style="list-style-type: none"> • Technology providers. <p>Investors</p> <ul style="list-style-type: none"> • National and international private and public funding. <p>Political/regulative stakeholders</p> <ul style="list-style-type: none"> • Government (relevant ministries); • Municipalities and planning regions; • Maritime authorities; • Policy makers 	KEY ACTIVITIES <i>Key activities for materializing the value proposition.</i> <ul style="list-style-type: none"> • Port management; • Vessel services; • Cargo handling; • Leasing contracts; • Maintenance and development of port infrastructure and services; • Customer retention and acquisition. 	UNIQUE VALUE PROPOSITION <i>The unique value that the company could provide to satisfy the customers.</i> <ul style="list-style-type: none"> • Port location in BSR; • Proximity to local cargo market; • Uncongested connecting transport infrastructure; • Lean organisation and quick decision making; • Offering and flexibility of value-adding cargo processing services (packaging, inspecting, e.g.); • Potential to improve multimodality (Rail Baltica); • Potential to establish distribution centres, industry parks together with municipalities. 	UNFAIR ADVANTAGE <i>Advantages that cannot easily be bought or copied.</i> <ul style="list-style-type: none"> • Location and local production; • High flexibility and quick decision making; • Unobstructed hinterland connections; • Local and high-educated people (HR). 	CUSTOMER SEGMENTS <i>List the target customers and service users.</i> <ul style="list-style-type: none"> • Port operators; • Energy, agriculture, construction and forest industries and other potential customers; • Dry bulk customers; • Shipping lines.
EXISTING ALTERNATIVES <i>List how these problems are solved today:</i> <ul style="list-style-type: none"> • Competition from other Latvian and BSR ports; • Partially loaded vessels, smaller than optimal vessel sizes used, which produce unnecessary emissions; • Road transportation. 	KEY METRICS <i>List the key numbers that tell your business performance</i> <ul style="list-style-type: none"> • Cargo turnover; • Cargo handling efficiency (time/ton etc.); • Financial performance (profit, ROI); • Environmental performance; • Safety and security; • Hinterland reach; • Regional development KPI's. 		KEY RESOURCES <i>Key resources for carrying out the activities.</i> <ul style="list-style-type: none"> • Land area with existing infrastructure and facilities; • Cargo handling machinery, warehouses; • Organizational resources: skills and HR; • Digital communication channel; • Marketing skills. 		CHANNELS <i>Channels that reach to the customers.</i> <ul style="list-style-type: none"> • Promotion, marketing and sales of services (face-to-face meetings, fairs); • Lobbying through associations and other interest organisations; • Physical distribution of goods; • Digital channels (reporting, situational awareness). 	
COST STRUCTURE <i>List the variable and fixed costs.</i> <ul style="list-style-type: none"> • Port business currently cost driven but developing towards value driven; • Economies of Scale characteristic feature; • Port infrastructure maintenance and upgrade: expansion and digitalisation; • Operational costs, marketing and networking costs. 			REVENUE STREAMS <i>Sources of revenue.</i> <ul style="list-style-type: none"> • Vessel fees, cargo dues; • Leasing income (land, storage and buildings); • Auxiliary services (development of recreational services near the port, etc.); • Value-added services. 			

Figure 5 Business model canvas

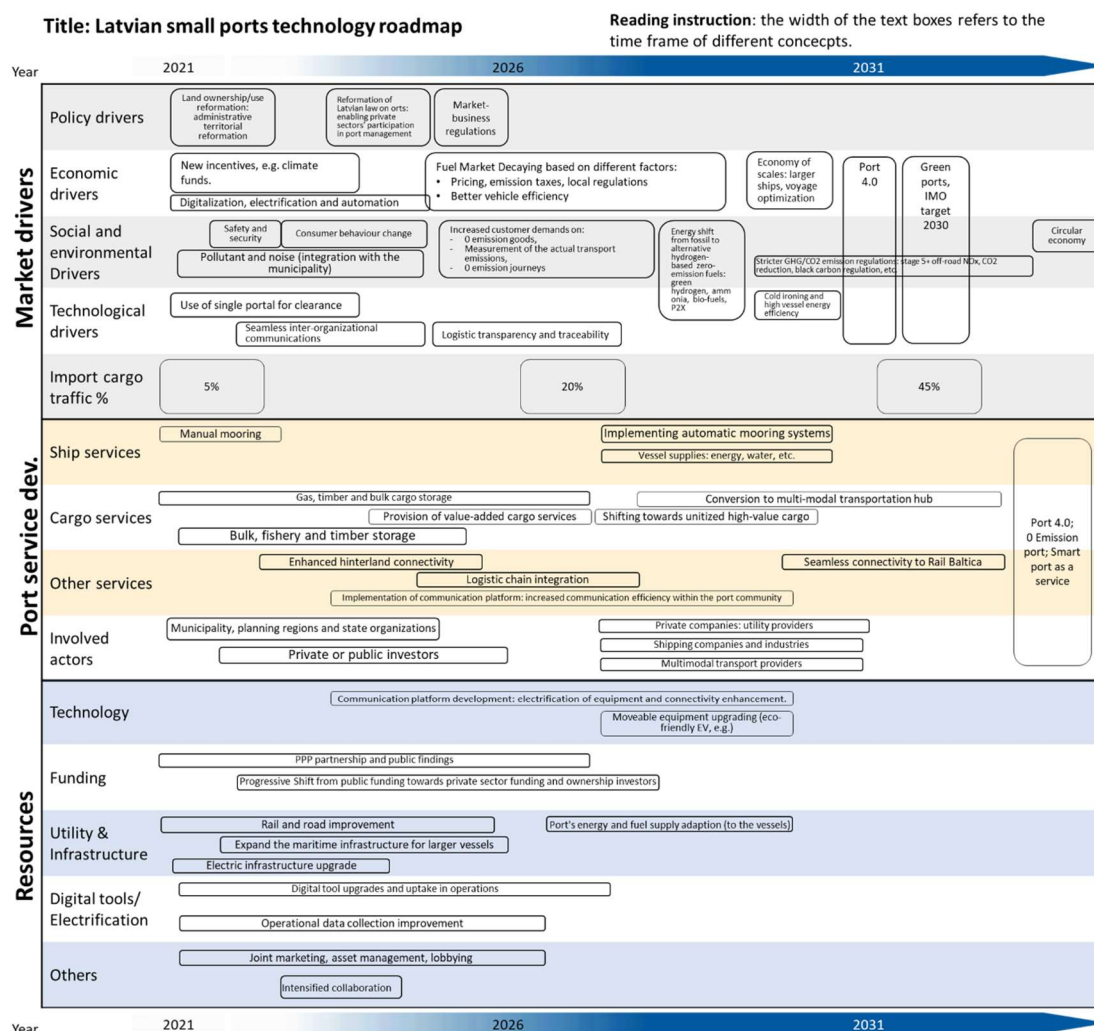


Figure 6 Latvian small ports' technological roadmap

4.2 Results and Conclusion

Today, the main services small Latvian ports offer is cargo handling of high-volume and low-value commodities (dry bulk and general cargo), mainly destined for export markets. They also function as a base for fishing vessels and fish processing industry, yacht marinas and location for industrial establishment.

One of the main competitive factors of the Latvian small ports is their location, open sea access, uncongested connective transports infrastructure and proximity of the cargo local cargo market.

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Due to the fact, that the small ports' markets are mainly of domestic origin, they have been able to exhibit more resilience to cargo fluctuations, triggered by geopolitics or trade chocks such as the Corona pandemics, that has caused severe disturbances in global supply chains and delivery of raw materials.

On the other hand, due to port parameter restrictions (shallow maximum draught), some of the Latvian small ports are unable to load vessels to their full capacity, which means that more vessels, are needed to transport the same amount of cargo.

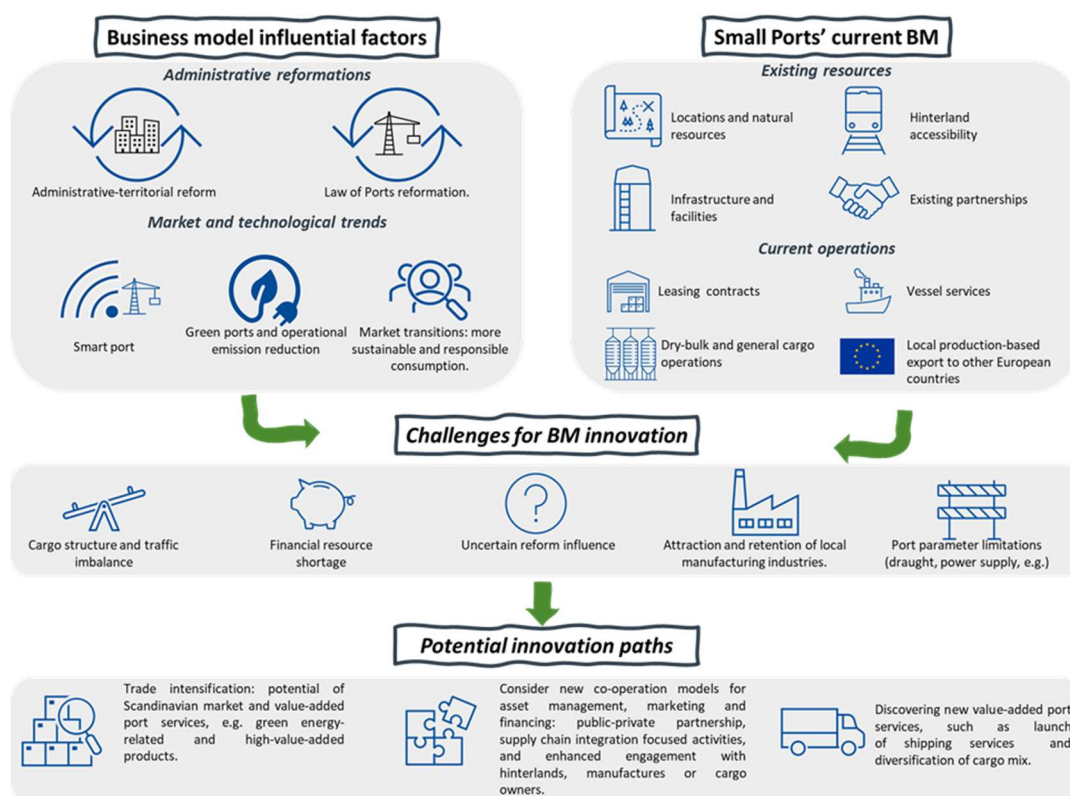


Figure 7 Business model innovation paths for small Latvian ports

Additionally, there is a clear export domination in Latvian ports, which means that ships sail more or less empty. This in turn is not desirable from an environmental point of view. These types of parametre limitations severely obstructs the ports' ability to attract new customers and hinders the diversification/specialisation in new potential cargo segments, such as project cargo (Rail Baltica project, construction of off-shore windfarms in Gulf of Riga). One of the ports' main concerns in the realisation of these types of projects, is to find financing resource.

With increasing international trade, development of land-based transport network and opening of land transport borders, the traditional role of ports has evolved to include transshipment

cargo and more recently the provision of logistics centres. Today, port customers are becoming increasingly demanding and consider value added services as an integral part of their supply chains and therefore it has become necessary to develop customer relations by augmenting the offering of services including for example assembly, inspections, order processing, (re)packaging and unitising of goods.

Ports can gain synergistic benefits from logistics centre, (situated nearby or within the actual port area), not only in terms of the facility itself, but also by attracting more cargo flows to the port. The provision of space for logistics activities within the port area has been catered for Latvian ports and is seen as one of the important policies in logistics oriented Free Trade Zones or logistics zones .

Latvia's main trading partners are found within the EU and the Baltic Sea Region. The ambition of EU level transport policies is to promote the use of environmentally friendlier transport modes such as short sea shipping, whilst simultaneously reducing road transportation. However, the share of road transportation has continued to grow in many countries, including Latvia. The Scandinavian market, and especially that of Sweden, has historically been important trading partner and source of foreign direct investments for Latvia. There is a great potential for the country to further develop this relationship and degree of market access by supporting the development of maritime connections, as the shortest and most energy efficient transportation mode, to ports south of Stockholm.

The structural change of Latvian economy and the subsequent development towards the production of higher-value processed goods, is bound to affect and alter the required maritime transportation needs more towards unitised goods. As a result, some of the major imbalances in the Latvian small ports' in import and cargo flows could possibly be evened out. Other trade and industry trends, may also call for early anticipation, adjustment and adoption of revised business strategies and models. These trends could be associated for instance to shrinking production and demand of paper products, growing circular economy, energy shift, growing global food demand, regionalisation of manufacturing catalysing and protecting supply chains from severe disturbances etc. Yet again, this direction requires investments in port infrastructure.

The investment object(s) in ports are numerous and diverse. The investments made in ports are typically capital intensive and have a long payback time. They may involve the construction of new infrastructure, redevelopment or upgrading of current assets and existing infrastructure. The investment needs may be of one-off or recurring in character. Investments may also be divided to policy driven mandatory ones or market driven voluntary ones ultimately contributing to the regional and national economical development and prosperity.

A lion's share of port investments, submitted by the Port Authority, are typically directed to basic infrastructure such as maritime access infrastructure and connective multimodal transport infrastructure within the port area, creating therefor value for the users of the port. Vessel

charges and levied tenant fees constitute the mechanisms through which the Port Authority captures the value they create for port users.

The challenge ports typically face, is the implementation of projects, driven by international and national policies and regulations, that are financially less attractive to the port authority, and even less attractive to external investors but which are essential from a societal and economic perspective.

Essential port infrastructure projects may also represent high societal added value and wider economic benefits beyond the port community, without generating sufficient return on investment for the investing Port Authority. The most prevalent societally value bringing investments include the following:

- local and regional economic development and associated employment creation
- improved maritime and hinterland connectivity, resulting in enhanced trade flows
- reduced road congestion reducing transportation times, unreliability, emissions
- reduced negative externalities for the settlement (noise, light, dust, emissions)
- relocation and transformation of port land for urban purposes
- increased safety and security

Port operators, representing ports' private commercial services, are increasingly participating in developing and co-financing port projects yielding mutual benefits such as in the case of warehouse construction, for instance. In response to increasing customer demand on cargo handling efficiency and value-added services, port operators are typically investing in storage areas and upgrade of cargo loading equipment and machinery. The private operators rely on company and credit resources. Beside own capital, the port authority rely on public funding and credit resources as investment tools.

With expanding trade volumes, increasing customer expectations, mandatory policy compliance and financial resource limitations, the role of private participation in infrastructure (PPI) has become as a vital part of port development projects. PPI projects facilitate the provision of financial support and commercial expertise that many ports may crave for. The investor on the other hand PPI gain from the opportunity to profit from rapid trade development.

In practical terms, PPI's seek to improve the port's overall performance and profitability by minimising the effects of the port's intrinsic bottlenecks, capacity constraints and congestions of access roads and intermodal connections, for instance. Capacity constraints cause unnecessary delays, missed berthing slots, higher fuel costs due to unnecessary waiting times and rescheduling of port calls. The multimodality feature of a port and its infrastructure and facilities can form a major selling point to the shipping lines and win over local authorities general interest to develop connecting infrastructure.

With the current Law on Ports reform, small Latvian ports will have the opportunity to maintain the existing model or establish a municipal company, which may facilitate the involvement of private investors in the future.

Within the European Union, the port infrastructure investments are typically partially publicly (EU, national, regional) funded. The public funding is primarily offered as grants. Apart from own capital, the Latvian small ports are able to capitalise on following financial sources:

- State budget
- Local government budgets
- EU Cohesion Policy Fund co-financing [European Regional Development Fund (ERDF); Cohesion Fund (CF)]
 - The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.
 - The CF is aimed at the EU Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average. It aims to reduce economic and social disparities and to promote sustainable development
- European Investment Bank's cohesion funding
 - The EIB has a wide range of financing products (loans) for municipalities and regional governments
 - lending supports the delivery of the EU budget's shared management funds
- EU Common Agricultural Policy Fund (European
- EU Common Fisheries Policy funds

Ports can furthermore pursue economic efficiency and strengthen their competitive position through port co-operation schemes, which aims at improving the port performance through optimised use of assets, counterbalancing of the unwelcomed effects of competition. The key drivers for growing co-operation between proximate ports include port regionalisation, imbalances in port capacity and fierce regional competition. Port co-operation supports sustaining existing maritime services and routes and implementation of new services. It can furthermore lead to specialisation in certain commodities or vessel types/sizes and possible pooling of hinterland transport flows and facilities. For smaller ports on the periphery, the co-operation logic is to bring more centrality to the ports in question, as well as to the region in which they are located. Port co-operation can prevent port authorities wasting limited resources on inter-port competition. These can for instance include duplicate services offerings leading to over-competition or shortcomings in the infrastructure capacity. ports can set up a joint marketing strategy to attract more cargo flows or develop a common regional public policy, that is mutually beneficial or concentrate certain services to one port.

The benefits of co-operation can also manifest itself in joint training, streamlining and reduction of overlapping administrative procedures, improved regional and market promotion and

communication of projects/initiatives/services, and articulation of a common position in relevant forums.