



Integrated and Sustainable Transport in Efficient Network - ISTEN

DT1.1.6 – Local context analysis for Thessaloniki

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Document information

Abstract

The report aims to provide a comprehensive analysis of the port hinterland environment of Thessaloniki, the existing market, infrastructural, operational, institutional and innovation bottlenecks and the main factors that will influence them in the next years. The port stakeholders contributed to the result and preparation of possible future scenarios.

Keywords

Local context analysis, port-hinterland, bottlenecks, influence factors, scenarios

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List of abbreviations and definitions

ERTMS – European Railway Traffic Management System
 OEM – The Orient East Med corridor
 MEPPW - Ministry of Environment, Physical Planning & Public Works
 MMM – Ministry of Mercantile Maritime
 MNEC – Ministry of Economy and Competitiveness
 MOF – Ministry of Finance
 MTT– Ministry of Trade, Tourism and Telecommunications

1 INTRODUCTION

The aim of this deliverable is to provide an in-depth analysis of the Port of Thessaloniki, including an overview of its local port community and relations among its actors, as well as their roles in the local intermodal chain. The present document includes, not only an analysis on the port's infrastructure, but also on the main hinterland logistics infrastructure and services provided.

The report gives an overview of the port-hinterland chain, of the relevant operations carried out and governance in place (chapter 2). In chapter 3, the identification of existing bottlenecks is recorded, as well as their impacts on the market, infrastructure, operations, institutional framework or innovative services. Finally, possible medium-term scenarios are identified and explored in view of the constantly increasing port- hinterland chain efficiency and sustainability, which solidifies the role of the port as intermodal hub.

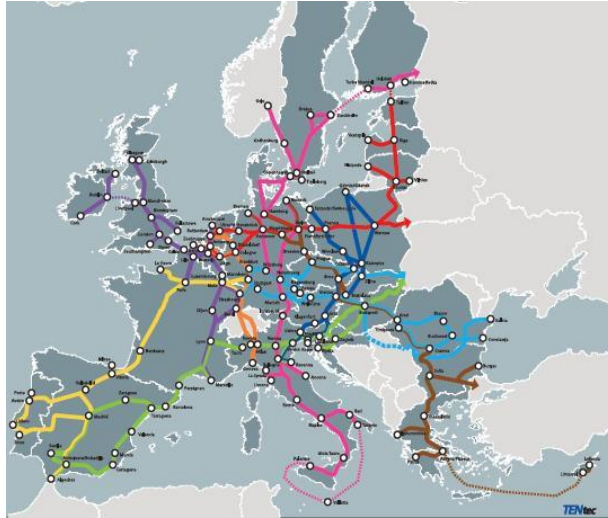
A structured questionnaire prepared by CERTH as WPT1 coordinator, was used as a basis in order to gather the stakeholder's views and their input has been assessed and discussed within the ISTEN project team. Their collective contribution has then been integrated in the relevant sections of this report.

Meetings were held with representatives of the Shipping Agents Association of Thessaloniki, Greek Exporters Association, Hellenic Logistics Company, the Ports Development Director and selected customers.

2 CHARACTERISTICS OF THE LOCAL ENVIRONMENT

2.1 Port-hinterland chain overview

Due to its advantageous geographical location and excellent road links and train connections, the port of Thessaloniki is considered to be an ideal Gateway port to the Balkans and South Eastern Europe. It is located within the Mediterranean, through which the majority of ships linking Asia with Europe pass, as well as a significant part of the "Round the World" lines, and is included in the Core European Transport Network (Trans-European Corridor Orient/ East Med, Pan European Corridors IV & X).



Greece is part of the main TEN-T network through the East Corridor / Corridor of the Eastern Mediterranean, which connects the German ports of Hamburg and Bremen and runs through the Czech, Slovak, Austrian, Hungarian, Romanian, Bulgarian and Greek countries. Moreover, through the interconnection of the corridor with the horizontal initiative of the Motorways of the Sea, the corridor leads up to Cyprus. It is noted that nine (9) countries are part of the corridor through a network of 15 urban centers, 15 airports and twelve seaports and inland ports.

The most important initiatives and strategies underway, that largely shaping the new landscape in European transport, are Short Sea Shipping, Integrated Maritime Policy and Single Maritime Transport. The Short Sea Shipping strategy, as expressed by the Marco Polo I & II programs, is directly relevant to the port of Thessaloniki, which can contribute to the decongestion of the land-based networks both in the north-south and east-west directions. The Trans-European Transport Network (TEN-T), set up by successive European Parliament and Council Decisions, has a prominent place in these strategies.

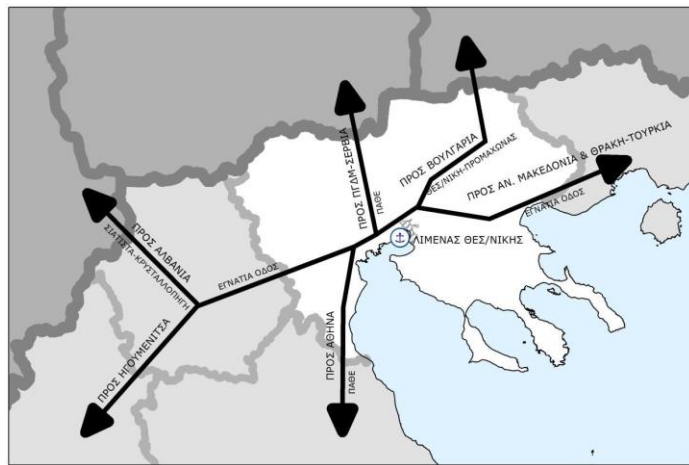
The convergence of the TEN-T strategic axes of the East Mediterranean Motorways of the Sea with the Baltic-Adriatic and Mediterranean Corridors, is resulting in the growth of port multimodal services and the development of innovative solutions in the field of rail-based intermodal transport nodes and operations.

The costs of Greek exports and imports by land are dependent on transit through non- EU countries; more specifically through the Balkans (Serbia, Former Yugoslavian Republic of Macedonia) for merchandise directed to European countries, and through Turkey for trade with Central Asia. Moreover, Greece is a transit country itself, primarily for Turkish trade. Transport transit is done by road or by rail.

The Port of Thessaloniki characteristics

- occupies a total space of 1,5 million square meters and it spreads across a length of 3,5 Km
- 27 berths, used for break bulks, multi-purpose vessels, container ships, Ro- Ro ferries, oil tankers, chemical tankers, passenger ships
- 6.200 meters of quay length, sea-depth up to 12m, (up to 16 m in the near future).
- Cargo storage: 700,000 m²

From the road connections point of view, PATHE and Egnatia Odos (roads that are part of the main Trans-European Transport Network TEN-T) connect the port of Thessaloniki to the wider cross-border area and from there, with the rest of Europe. More specifically, the port of Thessaloniki via PATHE and its Thessaloniki - Evzones section, which is now a vertical axis of the



Egnatia Motorway, is connected with FYROM and then with Serbia. With the vertical axis of the Egnatia Motorway, Thessaloniki-Promahonas, it is connected to Bulgaria, while via the Egnatia Motorway and the Siatista-Kristalopigi vertical axis is connected with Albania.

Six to seven million tons of cargo are transported on an annual basis from the port facilities, mainly by trucks via Egnatia and PATHE. The inbound traffic of the port on a daily basis exceeds 1.000 trucks. In 2017, transit goods represented the 28% of total conventional port traffic (45% vessel discharged goods, 6,5% vessel loaded goods). Only 12,5% of them were served by rail network.

	2015	2016	2017	Difference % 2015-2017	Difference % 2016-2017
Total throughput in tons	6.904.174	6.110.230	6.905.294	0,02%	13,01%
Liquid Bulk	51.516	32.408	54.890	6,55%	69,37%
Dry Bulk	3.589.534	2.766.172	2.996.715	-16,52%	8,33%
General Cargo	415.790	513.947	546.588	31,46%	6,35%
Ro Ro	67.400	62.720	93.688	39,00%	49,38%
Containers*	2.779.934	2.734.983	3.213.413	15,59%	17,49%
No of Containers in TEUs	351.741	344.316	401.947	14,27%	16,74%

*Tare not included

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The role of the port of Thessaloniki, is reinforced by the existence of railways at all its quays with double / triple rail links linked to the national and international rail network, thus, enhancing the opportunities of intermodal transport of goods, with destinations inside and outside Greece. It is connected to the wider cross-border area via the "backbone" of the railway network of the country, which is developed on two main axes:

- North-South direction, along the main PATHE Patras - Athens / Piraeus - Thessaloniki - Edomeni route, connecting Thessaloniki with Athens and most major urban centers (areas with significant import and export trade, other ports), adding an advantage over other Greek ports. The cross-border station of Edomeni is only a few kilometers from Thessaloniki and provides a connection with FYROM and through it to the Western Balkans and Central Europe. The line that ends up to Edomeni in its Greek section, is the only one, regular (1,435m), electrified, and 71 km long, and distributes much of the freight traffic to the Balkans and Europe from the port of Thessaloniki.
- In the direction of East-West along the second main line "Thessaloniki-Alexandroupolis-Ormenio", which is a vital railway that runs through the north area, providing rail links with Bulgaria and Turkey and through them with the eastern Balkans and the countries of the former USSR.

As Port Operator, THPA SA serves ships, cargo (Containerized cargoes, Dry bulk cargoes, General cargoes, Ro-Ro) and passengers (Ferry & Cruise). The main port cargo services are handled in the Free Zone area which, in terms of multimodal connections, is directly connected with the railroad, as mentioned above, and through PATHE and Egnatia Odos with the rest of the European road network.



Container Terminal – Pier 6

It occupies the western part of Pier 6 (Quay 26) and offers a variety of services for competitive fees, including loading/unloading, quayside handling, container storage, reefer containers, inspection and rail handling. Operations are carried out 365 days a year with flat rates, with no interruption, including customs formalities.

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- Characteristics: quay length of 570 meters and 12 meters berth depth, with maximum vessel draft of 10.8m. The total surface of the terminal is 317.000 sq. m. area, with a capacity of approximately 440.000 TEUs.
- Main equipment includes: 4 gantry cranes (2 post-panamax, 2 panamax), 16 straddle carriers, 1 transtainer, reach-stackers, as well as various other container handling equipment (tractors, front lifts, trailers, forklifts etc).

It must be noted here, that under ThPA's investment plans and due to the forecasts on future expected throughput, the Container Terminal will be expanded and its rail network will be modernized.

Conventional Cargo – Piers 4,5 and eastern part of 6

It offers quayside handling, loading/unloading services and storage facilities, mostly of dry bulk cargo (ores, minerals) and steel product handling. Operations take place in 2 shifts at flat rates and overtime upon request

- Berth depth of up to 12m and max vessel draft 11.1m
- Rail connection to all berths
- Annual throughput of about 4mil tones
- 32 rail-mounted cranes up to 40 ton lifting capacity. 2 new heavy duty rail-mounted cranes of 100 tones / 17m capacity, 2 Mobile Harbor Cranes of 100 ton lifting capacity, 2 Mobile telescopic cranes of 120 ton & 150 ton lifting capacity, Forklifts (lifting capacity up to 37tn), Loaders, Excavators, Road/rail shunting locomotives and other cargo handling equipment.

The railway infrastructure within the Free Zone of the port, includes two independent line systems, which entering the port from two different points (Gates 7 and 11). The first line entering near Gate 7, is old and currently inactive. The new line entering the Port near Gate 11, is operational and is an important infrastructure for the transport of various types of products from / to the port. The total line length, which is mostly developed within the Free Zone, amounts to approximately 17,400 meters. Nowadays, the above railway link through Gate 11, crosses the 26th October Street, a major entrance to the city of Thessaloniki, causing congestion in traffic towards the city center. Also, the poor geometric characteristics of the rail link, interfere with the unobstructed train movement to and from the port, increasing journey times between the port and sorting stations.

Overall, the rail network of the main Terminals of port operations in the port of Thessaloniki, are in need of further reinforcement. This, will be implemented under the Corporate Pact for Development Framework - NSRF 2014-2020, by a private actor ERGOSE SA. Railway connections surely represent a significant competitive asset for the port of Thessaloniki, offering an



Legend

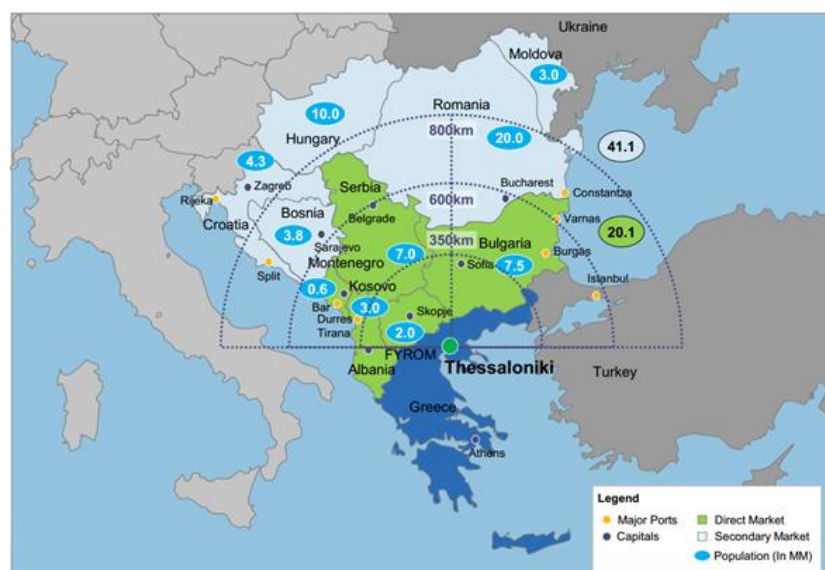
Proposed Rail Lines

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expansion of its catchment area, contributing at the same time to the mitigation of environmental impacts, such as air pollution.

2.2 Port-hinterland chain operations

The number of public and private actors involved in the wide-ranging and complex cargo operations and processes taking place in a port, constitute a challenge for the efficient management of the related supply chain. This is particularly true in the case of multimodal/intermodal transport settings, which imply the management and control of traffic flows both by sea and by rail/road taking into account that different sectors and actors involved have each their own procedures and priorities in terms of regulatory framework and economic/operational aspects.



ThPA SA, is the sole port operator and port services provider of the port of Thessaloniki. Since February 2018 the consortium comprising of “Deutsche Invest Equity Partners GmbH”, “Belterra Investments Ltd.” and “Terminal Link SAS”, is the main shareholder of 67%. ThPA SA enjoys, according to the Concession Agreement with the Hellenic Republic (Law 4522/2018), the exclusive right to possess, use, manage, maintain, improve and exploit the Concession Assets as described in the agreement.

All port operations, entail the interaction of different public authorities, each for its area of competence, such as:

- General Marine Secretariat – Ministry of Shipping and Island Policy
- Coast Guard
- Customs Brokers
- Customs Office
- Port Police
- Health and Veterinary Inspection office (Ministry of Agriculture)

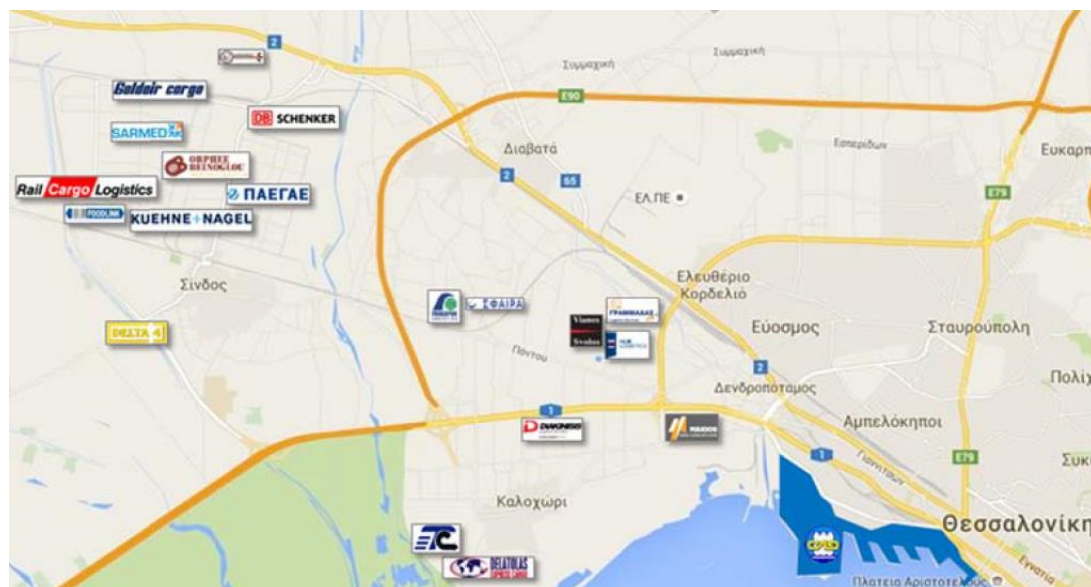
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Efficient global logistics providers (Kuhne & Nagel, DHL, Shenker, Geodis, Panalpina, and Express) operate in Greece, but they are only partially integrated with the rest of the Greek economy; Along with few large Greek operators, they operate efficient supply networks and provide their clients with timely and cost-effective deliveries between Greece and the rest of Europe, into and from their logistics centers in Athens and Thessaloniki regions.

On the other hand, a number of private actors operate in the port, from freight forwarders to railway undertakings. TRAINOSE SA, which is a private company owned from September 2017 by “Ferrovie dello Stato Italiane Group” (FSI), offers cargo transportation services to and from the port of Thessaloniki. Ferrovie, is expected to increase commercial transport links as well as passenger transport and has already raised funding to proceed with investments and upgrade the network. These commercial transport links, are expected to further increase, following the arrival of two new rail freight carriers, Rail Cargo Logistics Goldair SA and Piraeus Europe Asia Rail Logistics (Pearl) SA.

Furthermore, in the Gulf of Thessaloniki, there are installations owned by third parties, suitable for liquid fuel cargo.

Inside the Free Zone area, warehouse facilities are leased to third parties (3PL and forwarders) offering logistic services, whereas, many medium size logistics infrastructures are located near the port. In particular, in the nearby Sindos Industrial Zone, operate a significant part of intermodal companies, using railway transportation.



2.3 Port-hinterland chain governance

The marine system of Greece consists of approximately 900 ports of different size, administrative organization, uses and importance for national and local society and economy. The three basic categories, according to Joint Ministerial Decision 3514.96/02/92 (Official

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Gazette B 440/07-07-1992) are: 1. Ports of National Importance, 2. Ports of Major Interest and 3. Ports of Local Importance, with the port of Thessaloniki being included in the first category.

Moreover, the General Framework for Spatial Planning and Sustainable Development integrates the port of Thessaloniki into the main sea gates together with other six large ports in the country. The aim is to upgrade the port to a port of international services, with spatial influence beyond the Balkans (up to Scandinavian countries and Russia).

Under a concession agreement with the Greek State, signed in 2001 for 50 years, Th.P.A. S.A. had until recently, the exclusive right to use and exploit the infrastructure and superstructure of the Port of Thessaloniki. The most recent developments (2016) on port policy concern the establishment of the Public Port Authority (DPA), the redefinition of the Port Authority's role (transformation into an independent authority) and the exploration of the prospects for reorganization of the Port Facility, with possible mergers and transformation into societies anonymes (L.4389 / 2016).

In this framework, the consortium comprising of “Deutsche Invest Equity Partners GmbH”, “Belterra Investments Ltd.” and “Terminal Link SAS” acquired the 67% of the shares of Thessaloniki Port Authority SA, through a concession agreement, that was ratified with the law number 4522/2018 (Official Gazette A 39) “Ratification of the amendment and codification of the Concession Agreement dated 2 February 2018 between the Greek State and Thessaloniki Port Authority S.A. and other provisions”.

Apart from the change of THPA SA legal status, new EU Custom Code, and the recently (15/10/2018) published decision of the Greek government about the establishment and operation of Free Zones and implementation of EU 2017/352 Regulation, constitute main factors influencing port-hinterland chain structures.

3 BOTTLENECKS TOWARDS BECOMING AN INTEGRATED HUB

It is widely agreed that the key factor, for the ability of a country to participate in supply chains, is the efficiency of local trade facilitation and logistics services.

Trade between Asia and Europe is showing significant potential that it is expected to rise in the coming years. The relocation of productive activities from China is absorbed by countries on either side of the existing maritime lines and therefore the existing lines will continue to be constantly utilized. The plan to revive “the roads of silk” affects the port of Thessaloniki at a great extent. On the one hand, shipping lines to the Mediterranean are expected to be enhanced, thus improving the prospects for port development, while on the other hand, trade by inland freight between Asia and Europe will also be enhanced, absorbing traffic from maritime transport.

Moreover, the expected rise in traffic from India can affect Thessaloniki’s throughput and the role of the port should be reconsidered in order to benefit from the simultaneous development of sea and land transport between Asia and Europe, since its position favors the further development of its maritime links.

For Greece, the sea nodes of its central network, are Thessaloniki, Igoumenitsa, Patra, Piraeus and Heraklion. This means that, these ports should be linked to the rail and road infrastructure of the trans-European transport network no later than 31 December 2030. However, the corridor is characterized by significant discontinuities. More specifically, much of the rail network does not meet the structure and speed specifications of the networks listed in the relevant EU Regulation 1315/2013.

Apart from infrastructural bottlenecks, there are a number of factors that also influence the network’s efficiency. Technical, regulatory and funding-related harmonization is considered necessary to ensure well-connected cross-border infrastructure, which the various Member States approach in the same way. Above all, railway lines and links need to be standardized, e.g. electrification and European safety systems (ERTMS), or problems relating to different railway track gauges in many eastern European countries.

As far as standardization of technical aspects is concerned, it is also worth mentioning the removal of obstacles to the communication and dissemination of information and the creation of a common platform to provide information to users, online ticket sales and modernizing transmission of data relating to infrastructure. In order to achieve these objectives, it will be essential to involve and coordinate the state administrators of rail infrastructure responsible for these cross-border links.

In addition to technical harmonization, the harmonization of regulatory measures and of authorizing procedures is also necessary, in order to align timeframes for implementing cross-border interventions. Granting cross-border concessions for transport, can serve as a catalyst for improving the cross-border mobility system. Much more work must be done with regional cross-border transport areas and cross-border transport authorities.

Maritime transport in particular, needs to overcome the aforementioned bottlenecks and act on administrative simplification, port capacity and efficiency, connection to the hinterland and access to financing. The lack of high-quality infrastructure or low-performing port services can result in significant extra costs for shippers, transport operators and consumer.

3.1 Market bottlenecks

3.1.1 Market bottlenecks identified

According to the stakeholders, the hinterland market appears to be limited, although growth prospects exist. Increase in transit traffic, generates increased demand in combined transport, but the lack or low quality of services provided, create a discontinuity. It should be noted that the high cost of transportation, as well as the increasing demand to pass to the north-east and central-east Europe, directly affects port-hinterland services.

Political stability in the region, is also an important factor for market bottlenecks. Issues such as achieving a solution with FYROM or Kosovo independence, or the Accession of FYROM to the European Union, have a direct impact on the markets and the smooth operation of the local port hinterland system, mostly due to cross-border differences in legislation and network capabilities.

3.1.2 Impacts of market bottlenecks

Despite these bottlenecks, hinterland links from Thessaloniki port are competitive enough, but in terms of becoming an “integrated port-hinterland hub”, there are still a lot to be done.

3.2 Infrastructural bottlenecks

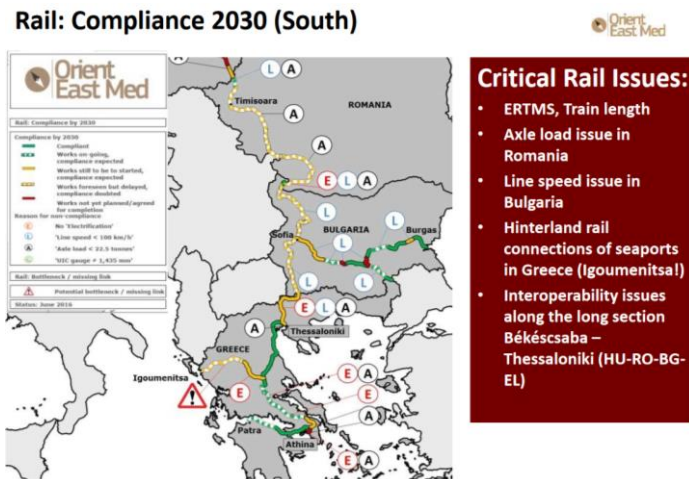
Road and rail infrastructure across the EU has been degrading because of too little road maintenance. Maintenance budgets have often experienced severe cuts and have not evolved in line with the increasing length of infrastructure and the ageing of crucial links. This has led to a worsening of the state of roads in many EU countries and has generated higher risks of accidents, congestion, increased noise and a reduced service to society.

Numerous missing links remain with most of the multimodal connections between Hungary, Bulgaria, Romania and Greece, that are yet to be constructed or substantially upgraded. Regarding the inland waterways of the corridor, the main problems are located at low depth, flood events and water level variation during the year. Regarding the port corridors, the main problems are the lack of rail interconnection (Patras, Igoumenitsa), annual capacity coverage (Limassol, Hamburg) and the lack of gas supply points (Greek ports besides Piraeus, Bourgas). Moreover, the increase in traffic flows resulting from the completion of the network projects, calls for increased capacity of all ports through relevant investment programs to avoid bottlenecks. As for the railway network, problems are detected in line lengths, axle loads and the poor state of railway infrastructure. Infrastructure of the Orient / East-Med Core Network Corridor is characterized by a North-South divide of typical infrastructure supply and quality,

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mirroring each Member State’s economic conditions, also with respect to its year of accession to the European Union. An additional challenge is the Corridor’s geographical alignment, especially in the southern Member States, where the relatively high costs of transport infrastructure crossing mountainous terrain is severed by a still relatively low transport demand.

The infrastructure of the railway network along the OEM Corridor is still in considerable parts of the alignment not compliant with some of the technical characteristics thresholds set out by Regulation No. 1315/2013, particularly regarding the key infrastructure parameters train length and cross-border traffic management systems (ERTMS). For other technical characteristics such as operational (line) speed, axle load, electrification, the non-compliance along the Corridor is around or below 20%.



However, in 50% of the network a train length of 740m is not allowed. Minimum Axle load of 225 kN is an issue in Hungary, Romania and Greece, summing up to 17% non-compliance rate of the OEM rail network. A maximum operating speed of lower than 100 km/h is a barrier for freight trains in Bulgaria and its cross-border sections to Romania and Greece, amounting to 21% of the OEM rail network, while only 11% of the network is not electrified.

In Greece, density of the rail network per surface and per population is one of the lowest in the EU. The limited capacity of the railway lines places a limit on the number of high speed trains that can use the existing network.

While in principle, Greek transport policy appears to correspond with the main directions of the EU transport policy, investments in Greece in the past 15 years, have mostly been focused on road construction. Investment in rail transport have been relatively modest and were mostly financed from EU support, especially in the second programming period. On top of that, traditional funding sources, such as loan facilities and public investment programs are becoming less sustainable, shifting the financing focus to the private sector. Projects regarding infrastructural upgrading are implemented by the final beneficiaries among which are ERGOSE, a subsidiary of the Greek Railways Organization, EGNATIA ODOS and EYDE PATHE. These are specific organizations set up to manage EU co-funded projects.

All the above have created a number of weaknesses to the current rail network:

- the railway alignment and morphology of the country, with steep gradients and acute curvatures allows only low speed travel; due to the morphology of the continental Greece,

the network is developed mainly linearly, thus limiting the development of railway transportation towards areas non adjacent to the railway axis.

- there are many single-track lines and a large number of level crossings;
- rail electrification stands at a low level (although electrification is increasing) and large part of the rolling stock is obsolete;
- incompatibility between Peloponnesus's line (metric gauge) and the rest of the network (standard gauge).

Greece	Kulata – Promachon	Single Line in poor condition	No electrification, no ERTMS, <22.5t, < 100km/h	Railway line upgrading with electrification
	Promachon – Thessaloniki Port	Single Line in poor condition. Strymonas bridge.	The bridge on the Strymonas River does not allow for a direct movement of trains in the direction to Promachonas/Kulata. Need for reversal of trains moving towards Bulgaria in the Strymonas station. No electrification, no ERTMS, <22.5t, < 100km/h, <740m	Railway line upgrading, construction of an additional Strymonas bridge with electrification.
	Thessaloniki – Platy	A number of old bridges restrict axle load	C4, no ERTMS	Plans for reconstruction or replacing old bridges
	Platy – Larisa	-	No ERTMS	-
	Larisa – Domokos	-	No ERTMS	-
	Domokos – Tithorea	Single Line in a mountainous area.	No electrification, no ERTMS <22.5t, < 100km/h	New high speed double railway line with electrification under construction.
	Tithorea – Inoi		No electrification, no ERTMS	Electrification reinstatement project under development
	Inoi – SKA	A number of old bridges restrict axle load. Restrictions due to old Ag. Stefanos Tunnel	No electrification, no ERTMS, <22.5t, <740m	Plans for general upgrading of the line and reconstruction of bridges and Ag. Stefanos Tunnel
	SKA – Athens	-	No ERTMS, <740m	-
	SKA – Thriassio	-	No ERTMS	-
	Thriassio – Ikonio	-	No electrification, no ERTMS (Line is part of Comprehensive Network)	Plans for electrification and GSM-R
	Svilengrad – Ormenio	-	No electrification, no ERTMS (Line is part of Comprehensive Network)	Plans for the upgrade, electrification and signalling of the line (if funds are found)
	Ormenio – Pithio	-		
	Pithio – Alexandroupolis	-	No electrification, no ERTMS, <22.5t, < 100km/h, <740m	
	Alexandroupolis – Xanthi	-	No electrification, no ERTMS, <22.5t, < 100km/h, <740m	Plans for the upgrade, electrification and signalling of the line (if funds are found)
	Xanthi – Drama	Temporary speed restrictions due to maintenance works	No electrification, no ERTMS (Line is part of Comprehensive Network)	
	Drama – Serres	-		
Serres – Strymonas	-			
Athens –Rentis/ Piraeus	-	No electrification, no ERTMS, <22.5t, < 100km/h, <740m	Plans for general upgrade and electrification	
Larisa – Volos Port	-	No electrification, no ERTMS (Line is part of Comprehensive Network)	Electrification works and ERTMS implementation under development	

3.2.1 Infrastructural bottlenecks identified

The new shareholders of the company, have to face significant challenges regarding port infrastructure. The need to expand the 6th pier and the modernization of the mechanical

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equipment, constitute as mandatory investments, described in the concession agreement with the Greek State.

The availability of port land area constitutes another issue. This derives from the need to use the port as a storage location for bulk and general cargoes in the transit market. This, in turn, is a function of the lack of rail capacity to link the port to inland depots. The recent growth in demand has also made the lack of truck capacity emerge in these markets.

It would be necessary to accelerate the passage of commodities through the port and diminish the role of Thessaloniki as a storage depot.

The incomplete bridge linking the main gate of the port with PATHE, creates serious problems and delays in the road link between the port and hinterland. The Region of Central Macedonia has already undertaken the completion of the project.



As mentioned above, Thessaloniki is connected to the Strymonas - Alexandroupolis line through a single line of normal length, with a total length of 442 km, of which 116 km are constructed with modern materials and the remaining 326 km with old infrastructure. On the other hand, the only railway operator operating in the port facility, does not have sufficient equipment (mainly wagons and engines) to support hinterland flows.

The need for upgrading and modernizing rail infrastructure inside and outside the port, must be a direct priority of GAIOS (a public undertaking in charge of railway infrastructure) according to stakeholders. Access by train to the gateway of the port, is also part of the city's road network, with proportionate consequences on the traffic conditions of the city and

hinterland. Moreover, ThPA SA, in collaboration with EGNATIA ODOS SA (private undertaker), has invested in the construction of an intersection, in order to upgrade its road connection.

The lack of an on-line connection of the port operator's information systems with those of public and private port community actors, such as the Customs Office, creates delays and does not facilitate the unobstructed export of the goods.

3.2.2 Impacts of Infrastructural bottlenecks

Bottlenecks, clearly diminish the potential of the port-hinterland system and restrict its competitiveness. The apparent weakness in rail services, burdens even more the road network, causing a direct impact on the environmental state of the area.

The bottlenecks of railway infrastructure negatively affect, in particular, its quantitative indicators, the importance of which has continuously increased in the latest period. The growth of transport performances in rail passenger and freight traffic has an effect on the overloading of the bottlenecks, which may lead to a reduction in the quality of rail transport services and a higher risk of accidents. On the other hand, the current infrastructure charging and transport taxation schemes in Greece, differ substantially from EU countries, creating market distortions and inefficiencies.

Although this situation can currently be assessed as stable, an increase in bottlenecks is expected, due to the growth of transport performances, the lack of capacity, low level of modernization of railway infrastructure and limited resources allocated to the removal of bottlenecks.

In case the bottlenecks are not gradually removed, there is a risk of reducing the required quality of railway infrastructure services, resulting in rail transport services not being competitive. Infrastructure managers and member states must therefore, pay sufficient attention in the form of measures and investments in the gradual removal of bottlenecks which represent a restriction of reliable, safe, continuous and competitive transport infrastructure.

3.3 Operational bottlenecks

It is widely agreed that rail freight services suffer from low quality and reliability. This is due to the lack of coordination in cross-border capacity offer, traffic management and planning of infrastructure works.

Procedures at the border appear to slow transit traffic. Regulatory requirements regarding health, product safety, security and the like often add a layer of complexity to the customs clearance process. Border controls by various agencies, especially phyto-sanitary, are cumbersome and create delay. Control by other border agencies is done before the customs submission. Those agencies are not in the perimeter of the terminal and come on demand for inspection.

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Given that rail transit does not require Customs Authority guarantees, the procedures at the borders can be greatly expedited and take about 30 minutes. Yet there are still delays in some areas. Veterinary controls at the Serbian and Former Yugoslavian Republic of Macedonia borders may cause delays of up to two hours, and there is the risk of wagons being blocked at the border.

Moreover, control for illegal immigrants creates delays concerns with issues of international terrorism and illegal immigration have led some states to ever more scrutiny at their borders. Thus, crossing borders remains one of the greatest challenges in global transportation for both passengers and freight.

3.3.1 Operational bottlenecks identified

Due to the proximity of the port of Thessaloniki to the northern border of the country, any congestion caused at the area, is transferred directly to the port-hinterland system. A typical example is the long-term closure of the Edomeni railway station on the border with Skopje, a couple of years ago, by immigrants who wanted to pass to central Europe.

The non-24-hour operation of the port's main gate creates congestion in the port-hinterland chain, during the morning hours. In addition, Customs Authorities stress the fact that there is a lack of staff, in order to accommodate the inbound and outbound traffic, while ThPA SA, is considering the widening of the gate (Gate 16), so that inbound and outbound traffic flows, are served unobstructed.



The stakeholders note, that the range of services provided by the port and the hinterland actors is limited. The manufacturing industry remains untapped, although it could be a major factor in the development of the port as a hub of the local intermodal chain.

3.3.2 Impacts of operational bottlenecks

Operational bottlenecks reduce the optimum performance of the port-hinterland chain and limit the economic development of the area. The key to improve the efficiency of port – hinterland logistics operations, is through effective communication flows. An interface, that enables the secure exchange of information between public and private actors, is in need.

Some steps, have already been made in rail transit. Rail is considered a much more secure mode of transportation from the perspective of customs control. Rail transit has simplified procedures, defined in two major international agreements covering Western and Eastern

Europe. Demand is showing an increase; several operators have been trying to operate scheduled block trains to/from Austria or the Czech Republic from/to Thessaloniki, through the Balkans.

In general, it can be useful to promote the harmonization of rules and standards, through initiatives to reduce the impact of restrictions in force in some states, and to encourage the development of rail-to-road intermodal terminals to serve cross-border traffic.

3.4 Institutional bottlenecks

Over the years, the Greek public policy framework has remained rather static with respect to creating an efficient regulatory environment for logistics, in contrast to practices from EU member states with better logistics. Greece has differed in at least two ways. First, the country has seen a proliferation of ad hoc regulations applied to logistics activities on top or in place of the EU-Acquis (i.e. accumulated legislation, legal acts, and court decisions which constitute the body of European Union law) with much duplication, overlap of administrative responsibilities, and unnecessary constraints. The responsible authorities for transports in Greece are three ministries (MEPPW, MMM, MTT), while the development of a Strategic Transport Plan, involves four Ministries (plus MNEC) with several Bureaus and Secretariats.

Second, Greece has exhibited relatively weak implementation and enforcement capacity in several areas. This situation generates distortions, including incentives that encourage inefficient practices, weak compliance, or non-compliance with regulations and missing or underdeveloped markets for some logistics activities. Ultimately, these distortions slow the transition of the sector to modern, world-class standards.

Another key problem is that over-restrictive policies artificially “break” the supply chain by introducing discontinuity and affecting reliability. Such policies include those that are enforced at the border (over-burdensome Customs, health, security requirements, etc.). Many of the policies that may raise costs or reduce the ability of firms to improve the efficiency of supply chains are regulatory in nature—e.g., transportation- and distribution-related standards and policies (e.g. maximum truck size requirements; axle loads; size of retail outlets; zoning restrictions for wholesale and retail operations; etc.).

Entry into a market or supply of certain services may be impeded as the result of exclusivity or preferential treatment for state-owned or state-supported enterprises (e.g. postal monopolies). The functioning of some parts of a supply chain may be impeded as a result of the exercise of market power by a dominant or monopoly supplier or entity that controls access to a gateway, facilities or networks (e.g. port operations or airport cargo handlers).

3.4.1 Institutional bottlenecks identified

The key operational and administrative barriers identified in the majority of the 12 OEM ports, are related to the multiplicity of actors involved and the related fragmentation of responsibilities and jurisdictions, the administrative, operational and legal framework

complexity of maritime transport compared to other modes, as well as the lack of direct e-exchange of information and documentation.

Barriers	Measures
Multiplicity of involved actors	Streamlining of procedures and establishment of an efficient coordination/cooperation modus operandi
Fragmentation of responsibilities and jurisdictions	
Administrative, operational and legal framework complexity	Harmonisation and simplification of procedures, certification of professional skills of transport personnel
Information exchange and documentation	Maritime "one-stop-shop" IT solutions

Furthermore, in the past two years, new governance structures were established, in order to provide the institutional framework of port operations and serve as the link between the State and port operators. Such entities are the Public Port Authority and Regulatory Port Authority. Public Port Authority is a public body, whose role is to monitor the compliance with the privatization terms, as described in the Concession Agreement, between the State and ThPA SA.

Regulatory Port Authority is an Independent Administrative Authority, with the overall task of supervising and ensuring the legality of relations between public and private parties of the national port system, with emphasis on the surveillance of the contractual order and the implementation of the legislation on free competition.

Moreover, Compulsory documentation of inventory management and goods movement along supply chains. Supply-chain operations require the filing of tax documents to track the movement of merchandise in inventory. This procedure was designed to fight tax evasion. In Greece, however, the private sector complains that the modalities for this documentary requirement, are a major source of complexity in operating supply chains. There is no equivalent in EU countries.

Simplifying procedures, is a bet that needs to be won by the new management of the port (ThPA SA). Nevertheless, new governance structures alone, without the interaction of the private sector, cannot yield the expected results. In this direction, the harmonization of the new legal framework with the EU and National regulatory framework, could help a great deal.

In the road transport sector, the market for international freight and passenger services has been entirely opened to competition, but domestic transport remains largely protected. On the freight side, "cabotage", i.e. domestic transport performed by foreign hauliers, is subject to restrictions. As a consequence, operators face difficulties in optimizing their operations.

Although the liberalization of the rail freight market is nowadays a reality, with the first license granted to the private company "Rail Cargo – Goldair" in 2017, the stakeholders point out that monopoly remains practically the same, as TRAINOSE is the only rail operator that operates on the inland railway network.

3.4.2 Impacts of institutional bottlenecks

Many sources of inefficiency can be traced back to regulation. Greece is one of the most highly regulated countries in Europe. The same constraints that hold back the overall business environment, also affect logistics. In Greece, the logistics regulatory framework is a maze, creating a sub-optimal logistics sector characterized by uncertainty, obstacles, poor compliance, perverse incentives, and a reduced ability to attract foreign investors.

A lack of clarity in both regulations and the authorities responsible for enforcing them, hurts efficiency in the logistics sector. The logistics provider is not given a comprehensive and exhaustive list of regulations to comply with and documents to produce. There also is lack of clarity about which department or agency in government is responsible for specific policy areas. The confusion translates into higher information costs and sub-optimal private economic decisions.

In commercial terms, similarly to operational bottlenecks, issues leading to the uncertain application of regulations and the fragmentation of authoritative powers, are considered detrimental for the port-hinterland chain. Reforms in trade facilitation and transit measures would best focus on facilitating supply chain management and reducing deviations from mainstream practices applied in other EU countries. A close link needs to be established between the three broad initiatives of the Greek Government in the area of international trade and transport: the National Logistics Strategy, the Trade Facilitation Strategy, and the customs modernization program. Some reforms are already part of the Trade Facilitation Strategy (under MOF), that are important components of a comprehensive National Logistics Strategy.

3.5 Innovation bottlenecks

Transit trade is subject to special customs procedures (transit regime) that facilitate trade and transport while protecting the state's revenues in the transit country. Transit regimes, guarantee the payment of duties and taxes that might become due if goods are (fraudulently) diverted and enter the market in the transit country. Transit regimes are common practice in Europe, as they proved essential in facilitating trade for decades. Greece implements two customs transit solutions: the Community Transit (through the New Computerized Transit System or NCTS) for trade transactions within the EU, on common transit for trade transactions with EEA countries or between EEA countries as well as international transport of goods under the Transport Internationaux Routiers (TIR) within the EU (NCTS-TIR); the rest of the traffic is handled through a paper-based system, the TIR Carnet, for the trade with or through a non-EU country.

3.5.1 Innovation bottlenecks identified

Stakeholders firmly stress the absence of innovation content in the services provided by the local port-hinterland chain. The main disadvantage appears to be the lack of connectivity and exchange of information regarding port operations. Despite the use of computerized systems of port-hinterland actors, there is inadequate exchange of information among them. For

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instance, procedures, such as paying Customs fees etc., consume more time than they should, due to the lack of connectivity.

For example:

- ▶ Containers originating from non-EU countries, the brokers submit the documentation to customs and pay the duties. The process is essentially manual and involves (i) paper documentation; and (ii) direct payment in cash or bank check. According to the terminal operators, the process is not too long (three days seems typical for the dwell time, but varies widely).
- ▶ Containers from the EU, which are mostly accompanied by a T2L (or equivalent) document that is expedited essentially in real time upon submission to customs. Operators mentioned that normally containers are removed the same day.

At the same time, the level of internal management tools and staff's computer literacy, seem to be very diversified across organizations.

To conclude, the integration of all the actors involved in port-hinterland operations, within the same interface, appears to be crucial in order to alleviate bottlenecks.

3.5.2 Impacts of innovation bottlenecks

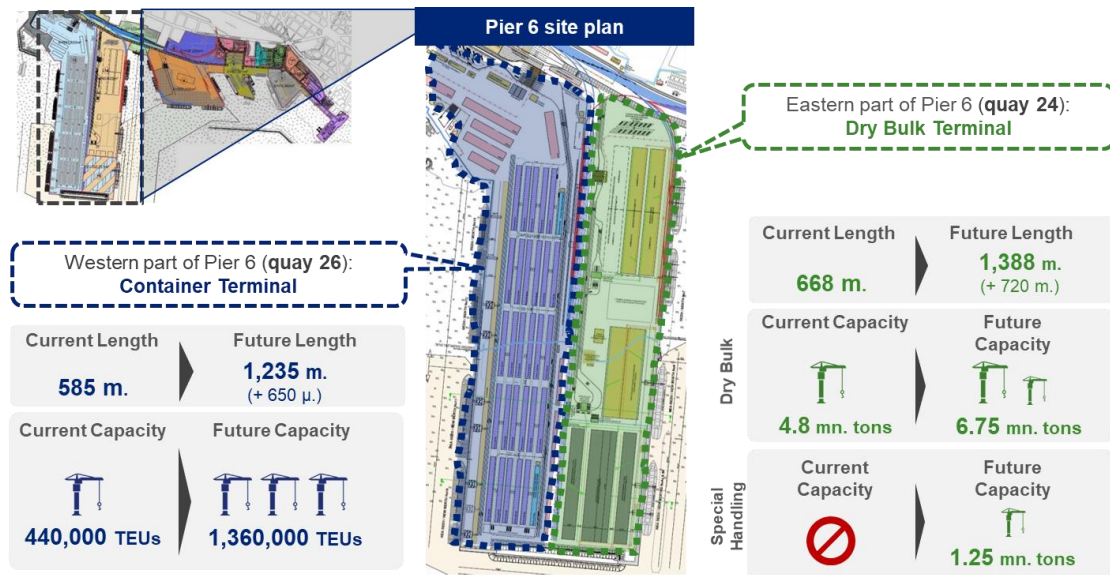
Innovation bottlenecks are created by the lack of innovative services, which discourages involved actors and consequently, reduces the efficiency and limits the competitiveness of the port-hinterland chain.

The transport policies in the EU are characterized by divergent national priorities. Fragmentation of the transport market will continue to limit the quality of transport services in Europe and will leave growth potential untapped, unless European policy initiatives towards a "unified market" for transport, are thoroughly implemented at national level. Standardization of systems and equipment, in its broader sense, is crucial to gain efficiency and reduce costs. Specific EU legislation, such as the Technical Pillar of the 4th Railway Package, aims at promoting interoperability. The rules are implemented with the assistance of the European Union Agency for Railways (ERA).

However, certain sources of supply chain inefficiency require international, or even, global solutions. Examples include harmonization of data formats, implementation of uniform electronic documentation standards and agreement on common approaches to security objectives. Many of the excess costs and inefficiencies in the operation of supply chains, reflect a lack of reliability due to delays and uncertainty stemming from manual paper-based documentation, redundancy in data requirements and the absence of pre-arrival clearance and risk management-based approaches. As a generalization, paper- and human-based systems are more expensive, time-consuming, error-prone, and open to corruption. Given that trade is international, efforts to adopt common documentary and data/information standards should be global.

4 MEDIUM-TERM SCENARIOS

All stakeholders point out the need to implement both private and public investments, mostly on infrastructure, in order to enhance the port's role in the international port – hinterland system. In this framework, ThPA SA first priority is the expansion of its infrastructure, as depicted in the Master Plan.



The port's Master Plan was developed in alignment with ThPA SA strategic directions, as well as the predictions made for its throughput up to 2040. The investment plan includes the expansion of pier 6 (container and dry bulk), in order to serve vessels of more than 8000 TEU, thus increasing its capacity.

Specifically, according to the ThPA SA concession agreement with the Greek State:

- the new operator, must proceed within a certain time to the expansion of the 6th pier and the modernization of electromechanical equipment.
- the Greek State, must proceed with the construction works of the new railway link between the 6th pier and the existing National Rail Network, as well as with the completion of the road link between 6th pier with the PATHE motorway and Egnatia Odos.

4.1 Main factors to influence future development

The last decade has brought a dramatic shift in competition for most companies. Technological advances, particularly in information technology, coupled with globalization, the rise of complexity and shrinking time horizons, are causing changes in the competitive demands on the management of supply chains, with the cost-effectiveness, in terms of time and money, remaining as the basic criterion.

In light of the strategic objectives and existing bottlenecks illustrated above, a number of high-level factors have been identified as capable of influencing future developments of the local port-hinterland chain.

Apart from the necessary investments on infrastructure from Greece's behalf, the development of the port-hinterland system, is also associated with similar investments in neighboring countries. In this direction, rail and road corridors of the EU are being upgraded, through different initiatives of all Member States.

Additionally, the developmental of a sustainable design of intermodal transport in order to create a hub is directly related to the level of cooperation and coordination among port-hinterland actors. Political stability in the region, with the accession of FYROM and other Balkan countries to the European Union, is expected to significantly affect the development of the wider region.

Communications and e-systems, which comprise both the technology available for collecting and sharing data and information, and the mechanisms in place to facilitate people-to-people communication in support of decision-making, is still an issue. The integration of tech solutions into the logistics chain is considered nevertheless to be a global challenge.

4.2 Scenarios' formulation

Local political stability	Private investments	Public / European investments	Importance placed by clients on efficiency as a port/corridor selection criterion	Level of integration of development planning between port & hinterland actors	Maturity of emerging tech solutions
Failing to reach agreement with FYROM	No private investments	No public/European investments	Lower importance	Low level	No tech solutions required
Achievement of an agreement with FYROM - EU membership	Not sufficient private investments of port & rail operators	Not sufficient public/European investments	Unchanged importance	Medium level	Tech solutions required but cost a lot
	Sufficient private investments of port operator but not of rail operators	Sufficient public but not European investments	Higher importance	High level	Tech solutions must be implemented
	Sufficient private investments of port & rail operators	Not sufficient public but sufficient European investments			
		Sufficient public & European investments			

Scenario A

Fyrom's accession in the EU, facilitates intermodal transportations by reducing costs in cash and time. The expansion of the 6th pier and the upgrade of mechanical equipment, increase the capacity and competitiveness of the port. The rail operators, operating in the port-hinterland chain exploiting the modernization of the railway network, offer adequate and high-quality services. The implementation of the Egnatia motorway project, enhances Thessaloniki's position on Balkan and European corridors. The common development objectives of port-hinterland actors, give life to the manufacturing sector and increase its

added value. Finally, the evolution in electronic information exchange between port and hinterland actors by applying new technologies, improves efficiency and increases the attractiveness of the port-hinterland system.

Scenario B

Fyrom's accession in the EU, facilitates intermodal transportations by reducing costs in cash and time. Although the extension of the 6th pier and the upgrade of machinery, increase the capacity and competitiveness of the port, rail traffic is unsatisfactory, as the services provided by rail operators, appears to be inadequate. Moreover, despite the upgrade of the railway network within Greece, there is no similar quality follow-up to other hubs of the corridors linking Thessaloniki to the wider hinterland. Port-hinterland actors recognize the significant impetus that technological solutions can deliver to the local intermodal chain. but are not ready to make costly changes.

Scenario C

FYROM is not a member of the EU and cross-border formalities continue to affect the cost and time of intermodal transports. Although port operator investments increase the capacity and competitiveness of the port, the network of rail and road links is inadequate, as there is no investments from public and private actors in Greece or neighboring countries. The integration of planning development between port & hinterland actors is low. Port-hinterland actors recognize the significant impetus that technological solutions can deliver to the local intermodal chain, but are not ready to make costly changes.

4.3 Expected impacts of alternative scenarios

Scenario A displays Thessaloniki as an integrated port-hinterland hub. The increase in competitiveness, combined with the modern and sustainable rail and road network, expand the hinterland catchment area and Thessaloniki is the main gate, not only for the Balkans but also for south eastern Europe. The development of the manufacturing industry attracts loads from countries in the East, further enhancing intermodal transports and added value.

The effects of **scenario B** are less positive. Rail connections cannot meet the increase in demand, thus burdening the road network and adversely affecting the environmental performance of the port-hinterland chain.

According to **scenario C**, Thessaloniki is not an integrated port-hinterland hub. The increase in port capacity and competitiveness does not entail growth of traffic volumes. The poor state of road and rail networks of neighboring countries, significantly reduces the hinterland catchment area.