

UNIVERSITY OF LJUBLJANA  
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**THE ANALYSIS OF PORT GROWTH FACTORS AND RECENT  
TRENDS IN PORT COMPETITION IN THE NORTHERN ADRIATIC  
REGION**

DOCTORAL DISSERTATION

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# ANALIZA DEJAVNIKOV IN TRENDOV RASTI TER KONKURENČNOSTI PRISTANIŠČ V SEVERNOJADRANSKI REGIJI

## Povzetek

Pomorska industrija je v zadnjih nekaj desetletjih doživela transformacijske spremembe. Povečanje uporabe kontejnerjev, skupaj z vedno večjimi velikostmi plovil in razvojem infrastrukture v zaledju, je povzročilo velik konkurenčni pritisk med pristanišči, ki je premešal globalne razvrstitve pristanišč in jih prisilil k sklepanju partnerstev in zavezništev. Pristanišča so se preusmerila od tekmovanja k sodelovanju. Obstoječa literatura o konkurenci med pristanišči je te trende dobro dokumentirala in analizirala. Čeprav se zdi v tej industriji trend sodelovanja med pristanišči pozitiven in se uveljavlja, ostaja v literaturi premalo raziskan. Zlasti primanjkuje univerzalnih, splošnih okvirov, ki bi omogočili ne samo konceptualizacijo sodelovanja med pristanišči, ampak tudi prizadevanje za odpravljanje ovir, ki preprečujejo obstoj globljih ravni sodelovanja med pristanišči. Ta disertacija je namenjena zapolnjevanju teh vrzeli v literaturi, tako da predlaga novo analitično orodje, matriko za razvrščanje primerov sodelovanja med pristanišči in uporabi študijo primera pristanišč, ki pripadajo Severno-jadranskemu združenju pristanišč t.i. "NAPA pristanišča" za prikaz uporabe matrike.

Prvo poglavje govori o razvoju akademske misli o konkurenci med pristanišči in preučuje dejavnike izbire pristanišč in pomembnost perspektive pri oceni izbire pristanišča. Avtor razpravlja o razvoju in dinamiki konkurenčnega okolja pristanišč, zaključi pa z uvodom o sodelovanju med pristanišči. Ugotovljeno je, da je navajanje in razvrščanje dejavnikov neprimeren pristop, saj vsi dejavniki povzročajo stroške na različne načine v različnih primerih za različne interesne skupine. Dobavne verige so zapletene in vse bolj dinamične, zato je vključenost v širše omrežje dobavne verige, skupaj z dostopnostjo do zaledja, povezljivostjo in zmogljivostmi, postalo veliko bolj pomembno. Zaradi pomembne konsolidacije in integracije, tako vertikalne kot horizontalne, so ladjarji ustvarili monopsonu podobne pogoje, kar je povzročilo velik pritisk na pristanišča. Avtor trdi, da bi morala biti ključna strategija pristanišč izpolnjevanje zahtev, ki jih narekujejo prav ladjarji. Tekmovanje na način sodelovanja — so-tekmovanje (angl. co-opetition) — še posebej med sosednjimi pristanišči, se zdi najbolj preudarno, da bi pristanišča uravnovesila naraščajoče pritiske s strani ladjarjev.

Drugo poglavje vzpostavlja teoretični raziskovalni okvir z razvojem matrike za razvrščanje primerov sodelovanja med pristanišči. Poskrbljeno je tudi za konceptualno strogost in pomen komplementarnosti pri oceni sodelovanja med pristanišči. Predstavljena so NAPA pristanišča in vzpostavijo se pogoji za njihovo komplementarnost. Uporabljeno je analitično orodje, ki je razvito v prvem delu, za oceno trenutne stopnje sodelovanja med NAPA pristanišči, na koncu pa se razpravlja o prihodnjih možnostih njihovega sodelovanja. Predpostavljeno je, da je analiza prihodov ladij v pristanišča nujen, vendar nezadosten pogoj

za vzpostavitev njihove komplementarnosti. Zato se lahko pristanišča obravnavajo kot komplementarna le, če je seštevek "učinka nadomestljivost" in "učinka povpraševanj" pozitiven. Predlagana matrika za razvrščanje primerov sodelovanja med pristanišči je sestavljena iz dveh osi, ki razlikujeta med globino sodelovanja (komercialno proti nekomercialnemu) in stopnjo vključenosti interesnih skupin (pristaniška uprava v primerjavi s podjetji v pristaniškem grozdu). Nato se na podlagi vzorcev prihodov ladij v pristanišča in poglobljenimi, strokovnimi intervjuji z ladjarji določi komplementarnost NAPA pristanišč na trgu kontejnerjev. Avtor ugotavlja, da vključitev še enega NAPA pristanišča zniža minimalni zahtevani prihodek za prihod ladje v dodatnem NAPA pristanišču. Prav tako se ugotovi, da služi NAPA regija, kot obračališče ladijskih servisov. Izvedeni so poglobljeni, delno strukturirani intervjuji s strokovnjaki iz pristaniških uprav, upravljalci terminalov, železniško-intermodalnih prevoznikov, glavnimi ladijskimi prevozniki in logističnimi podjetji v NAPA regiji. Opaziti je, da je trenutna raven sodelovanja med NAPA pristanišči in podjetji v pristaniškem grozdu omejena na nekomercialno lobiranje in skupne tržne dejavnosti, manjkata pa strateška usklajenost in komercialno sodelovanje. Po drugi strani bi bilo tesno komercialno sodelovanje med čezmejnimi pristaniškimi organi zahtevno, nenazadnje tudi zaradi politične perspektive. Edina potencialno izvedljiva možnost bi bilo skupno sodelovanje pristaniških oblasti in zasebnih podjetij, zlasti operaterjev pristaniških terminalov, pri razvoju komercialnega sodelovanja.

Tretje poglavje temelji na predlaganem teoretičnem okviru iz prejšnjega poglavja, prinaša pa pomembno dopolnitev za razlikovanje med nacionalnimi in čezmejnimi primeri pristanišč. Poleg tega prinaša bolj izčrpno razlago o kvadrantih matrike, s čimer se izboljša vrednost matrike kot orodja za pomoč pri odločitvah. Avtor nato s pomočjo nadgrajene matrike ponovno preuči in repositionira sodelovanje pristanišč NAPA. Razlikovanje med nacionalnim in čezmejnem kontekstom je ključnega pomena pri razumevanju zapletene dinamike sodelovanja med sosednjimi pristanišči in izhaja iz predpostavke, da so dejavniki, ki omogočajo tesnejše in bolj daljnosežno sodelovanje med pristanišči, veliko bolj verjetni v nacionalnih, ne pa čezmejnih situacijah. To domnevo je potrdila analiza več primerov nacionalnega in čezmejnega sodelovanja ter vpogled, ki je bil pridobljen v strokovnih intervjujih s prej omenjenimi deležniki. Ti teoretični zaključki so bili izvedeni s ponovnim preučevanjem in repositioniranjem NAPA pristanišč, kot skupino pristanišč in tudi kot posameznih parov pristanišč, pri čemer so bili uporabljeni podatki in informacije, pridobljeni v strokovnih intervjujih. Z vidika pristaniških uprav obstajajo nekatere ravni predkonkurenčnega sodelovanja. Večja stopnja sodelovanja bi bila mogoča le z radikalnimi političnimi in strateškimi spremembami, kar pa se v bližnji prihodnosti ne zdi realno. Najpomembnejša ovira se zdi ta, da se nacionalne vlade ukvarjajo z nacionalnimi političnimi in gospodarskimi programi, ki zaradi njihove kratkovidnosti in celo pogosto spreminjajoče se narave političnih vodstev v zadevnih državah onemogočajo kakršno koli nads nacionalno usklajevanje in sodelovanje na globoko strateški ravni. Z vidika komercialnih interesnih skupin je bilo ugotovljeno, da jih zanima izključno dobiček in da so pripravljene sodelovati zgolj v pobudah, ki naj bi prinesle komercialne koristi. Komercialne pobude se lahko in tudi

se izvajajo, ko se uskladijo finančni interesi. V tem primeru ni razlike med nacionalnim ali čezmejnim kontekstom, ker se podjetja ne ravna po državnih mejah, ampak zgolj po ekonomski motivaciji. Trst in Benetke imata v smislu umestitve NAPA pristanišč v matriko možnost napredovanja na komercialno raven sodelovanja za pristaniške uprave in podjetja v pristaniškem grozdu, NAPA kot celota pa le v smeri komercialne ravni za podjetja v grozdih pristanišč.

Ta disertacija ima več pomembnih prispevkov. Prvič, upošteva konkurenco med pristanišči in izbiro pristanišč v medsebojni povezavi. Zagotovljen je obširen pregled razvoja akademske misli o izbiri pristanišč in konkurenci med pristanišči. Drugič, vzpostavljena je konceptualna jasnost za analizo komplementarnosti med pristanišči. Tretjič, vpelje predpostavko, da morajo biti obravnavana pristanišča najprej komplementarna, če želimo obravnavati sodelovanje med sosednjimi pristanišči. Četrto, širi obseg analiziranih interesnih skupin. Za razliko od prejšnjih raziskav se ne upoštevajo samo institucionalne interesne skupine (tj. pristaniške uprave), temveč tudi komercialne interesne skupine, saj je sodelovanje dolgoročno učinkovito le, če prinaša komercialne koristi. Petič, pristanišča NAPA se v literaturi redko obravnavajo, kljub temu da so odličen primer za ugotavljanje čezmejnega sodelovanja v pristaniščih. Predlaganih je tudi več potencialnih strategij ustvarjanja vrednosti med komercialnimi operaterji v pristaniških grozdih. In slednjič, analitično orodje, razvito v tej razpravi, je splošno uporabno za analizo sosednjih komplementarnih pristanišč tako v nacionalnem kot v čezmejnem kontekstu. Pojavljajo se pomembne razlike med možnostmi in razsežnostmi sodelovanja v teh dveh ločenih kontekstih, zato je predlagana matrika zasnovana tako, da razlikuje med njima.

Zaradi dinamične narave pomorske industrije so predlagane nadaljnje izboljšave obstoječih modelov za oceno strategij sodelovanja med pristanišči. Priporočene so tudi nadaljnje raziskave za proučevanje dodatnih skupnih strategij komercialnega pristopa in nadaljnjo analizo uspešnih in neuspešnih primerov sodelovanja med pristanišči, s čimer bi se izboljšalo razumevanje dejavnikov uspeha in neuspeha pri implementaciji strategij sodelovanja med sosednjimi pristanišči.

**KLJUČNE BESEDE:** izbira pristanišč; rast pristanišč; konkurenca med pristanišči; sodelovanje med pristanišči; matrika sodelovanja med pristanišči; pristanišča severnega Jadrana; čezmejno sodelovanje; interesne skupine v pristanišču.



# **THE ANALYSIS OF PORT GROWTH FACTORS AND RECENT TRENDS IN PORT COMPETITION IN THE NORTHERN ADRIATIC REGION**

## **Summary**

The maritime industry has witnessed transformational changes over the last few decades. Increasing use of containers, coupled with ever-increasing vessel sizes and hinterland infrastructure development, has resulted in enormous competitive pressures between ports, which have reshuffled global port rankings and forced ports to seek partnerships and alliances. Ports have shifted from competing to cooperating. Extant literature on port competition has documented and analysed these trends well. While the industry trend of port cooperation seems to be positive and still emerging, it remains under researched in the literature. In particular, there is a lack of universal, overarching frameworks, which would allow not only to conceptualise port cooperation, but would also seek to address the impediments preventing the existence of deeper levels of cooperation among ports. This dissertation sets out to address these gaps in the literature, by proposing a new analytical tool, a matrix to classify cases of cooperation between ports and using the case study of the ports that belong to the North Adriatic Ports Association i.e. ‘NAPA ports’ to demonstrate the application of the matrix.

The first chapter discusses the evolution of academic thought on port competition, by reviewing port choice factors and the importance of perspective in evaluating port choice. The evolution and the dynamics of the competitive landscape of ports is discussed and it is concluded with an introduction to port cooperation. Listing and ranking factors are found to be an inadequate approach, since all factors drive costs in different ways, in different cases, for different stakeholders. Supply chains are complex and increasingly footloose and thus being included within wider supply chain networks, coupled with hinterland accessibility, connectivity and capacity has become far more important. Due to significant consolidation and integration, both vertically and horizontally, shipping lines have created monopsony-like conditions, resulting in enormous pressures on ports. It is argued that satisfying the requirements dictated by the shipping lines should be a key strategic consideration for ports. Competing through cooperation – co-opetition – especially between adjacent ports, emerges as a most prudent choice in order to counterbalance the increasing pressures from the shipping lines.

The second chapter establishes a theoretical research framework by developing a matrix to classify cases of cooperation between ports. Conceptual rigour and importance of complementarity in the assessment of port cooperation is also provided. NAPA ports are introduced and the case for their complementarity is established. The analytical tool, developed in the first part to assess NAPA ports’ current level of cooperation, is applied and finally the future prospects of their cooperation are discussed. It is posited that the analysis of call patterns is a necessary but insufficient condition to establish complementarity.

Instead, only when the sum of the ‘substitution effect’ and ‘demand effect’ is positive, can ports be regarded as complementary. The proposed matrix for classifying cases of port cooperation consists of two dimensions, discriminating between the depth of cooperation (commercial vs. non-commercial) and the level of involvement of stakeholders (port authority vs. firms in the port cluster). Next, complementarity of NAPA ports in the container market is established, based on ports’ vessel service patterns and shipping line interviews. It is found that the inclusion of another NAPA port reduces the minimum required revenue for a call in an additional NAPA port. The NAPA region is also a turnaround region for shipping lines’ service loops. In-depth, semi-structured expert interviews with port authorities, terminal operators, rail-intermodal operators, major shipping lines and freight forwarders in the North Adriatic region are used to position the NAPA ports in the matrix. It is observed that the current level of cooperation between NAPA ports and firms in the port cluster is limited to non-commercial lobbying and joint marketing activities, absent of any strategic alignment and commercial cooperation. On the other hand, deep commercial cooperation between cross-border port authorities would be challenging, not least due to the political perspective. The only potentially feasible option would be the joint involvement of port authorities and private firms, especially TOCs, in developing commercial cooperation.

The third chapter builds on the proposed theoretical framework from the previous chapter but provides an important extension for differentiating national and cross-border cases. Furthermore, it provides a more comprehensive explanation on the quadrants of the matrix in order to improve the value of the framework as a decision-making tool. It then reassesses and repositions the NAPA ports cooperation using the upgraded matrix. The distinction between the national and cross-border context is pivotal in understanding the complex dynamics of port cooperation between adjacent ports and lies in the premise that drivers for enabling a deeper and far-reaching cooperation among ports are far more likely in national rather than in cross-border situations. This assumption was confirmed by the analysis of several examples of national and cross-border cooperation cases and insights gained from the expert interviews. These theoretical conclusions were operationalised by the reassessment and repositioning of the NAPA ports, both as a group of ports and as individual port-pairs, using the data and information gained from the expert interviews. From the perspective of port authorities, some pre-competitive levels of cooperation exist. However, more cooperation would only be possible with radical political and strategic changes, which does not seem realistic in the foreseeable future. The major impediment appears to be that administrative governments pursue national political and economic agendas, which, due to the short-sightedness and even frequent-changing nature of political leaderships in the respective countries, makes any kind of supra-national coordination and cooperation at a deep strategic level improbable. From the perspective of commercial stakeholders, it was clear that they are purely profit led and willing to partake in initiatives which are expected to generate commercial benefits. Commercial initiatives can and do take place when profit interests are aligned. In this case, there is no difference between the national or cross-border context, because firms do not orient themselves by national borders, but purely by economic

motivation. In terms of positioning of the NAPA ports in the matrix, Trieste and Venice have the potential to move towards a commercial level of cooperation for both port authorities and firms in the port cluster, while NAPA as a whole only in the direction of the commercial level for firms in the port cluster.

This dissertation has several contributions. First, it considers port competition and port choice in conjunction with one another. An extensive overview on the evolution of the academic thought on port choice and port competition is provided. Second, conceptual clarity for analysing complementarity between ports is established. Third, it postulates that in order to consider port cooperation among adjacent ports, the analysed ports must first be complementary. Fourth, it enlarges the scope of analysed stakeholders. Unlike previous studies, not only institutional stakeholders, but also commercial stakeholders are considered, since cooperation is only effective in the long run, if it generates commercial benefits. Fifth, NAPA ports are rarely discussed in the literature, despite providing an excellent case for cross-border port cooperation observations. Several potential value-creating strategies among commercial operators in port clusters are also proposed. Finally, the analytical tool that has been developed in this dissertation is universally applicable for analysing adjacent, complementary ports in both a national and cross-border context. Important differences between possibilities and extents of cooperation in these two separate contexts arise and the proposed matrix is designed to discriminate between them.

Due to the dynamic nature of the maritime industry, further improvements of the existing models for assessing port cooperation strategies were suggested. Further research was also advised for exploring additional cooperative market approach strategies and further analysis of successful and failed cases of port cooperation, to increase the understanding of success and failure factors when implementing port cooperation strategies among ports in a vicinity.

**KEYWORDS:** Port choice; port growth; port competition; port cooperation; port cooperation matrix; North Adriatic ports; cross-border cooperation; port stakeholders.



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## LIST OF ABBREVIATIONS

**AHP:** Analytic hierarchy process

**APL:** American President Line

**BRI:** Belt and Road Initiative

**CEE:** Central and Eastern Europe

**SEE:** South Eastern Europe

**CEO:** Chief executive officer

**CMA-CGM:** Compagnie Maritime d’Affretement – Compagnie Generale Maritime

**COSCO:** China Ocean Shipping Company

**CSCL:** China Shipping Container Line

**ESPO:** The European Sea Ports Organisation

**EU:** European Union

**FDI:** Foreign Direct Investment

**GDP:** Gross Domestic Product

**ICT:** Information and communications technology

**IT:** Information technology

**ITF:** The International Transport Forum

**MOL:** Mitsui O.S.K. Line



**MSC:** Mediterranean Shipping Company

**NAPA:** North Adriatic Ports Association

**NYK:** Nippon Yusen Kabushiki

**OECD:** The Organisation for Economic Co-operation and Development

**ONE:** Ocean Network Express

**OOCL:** Orient Overseas Container Line

**RO-RO:** Roll-On, Roll-Off

**TEU:** Twenty-foot equivalent unit

**TOC:** Terminal operating company

**UASC:** United Arab Shipping Company

**ULCV:** Ultra large container vessel

**UNCTAD:** United Nations Conference on Trade and Development

**WTO:** World Trade Organisation



# INTRODUCTION

## Description of the research topic area

Trade without transport would not be possible. In principle, transport is the trade facilitator. This is particularly important in today's globalised and inter-connected world. Efficient and cost-effective means of moving the goods enable trade even in the most remote areas of the world. In fact, about 90% of global trade output by weight (UNCTAD, 2018) and between 50-60% in value is carried by vessels (Government Office for Science, 2017). Prospects for further growth of maritime transportation in the future seem to be favourable as well. It is perceived as both the cleanest means of transportation in terms of CO<sub>2</sub> emissions and the most cost-effective means of transportation per weight carried (ICCT, 2017). Globalisation of the trade is spurred by the growing trend of e-commerce, which has registered exceptional growth in recent years (Clement, 2019). Containers have enabled standardisation and uniformity of handling, which has in turn enabled simplifications in containers' multimodal usage, thereby significantly reducing overall transportation costs and improving transit time for goods carriage. Even cargoes like paper, wood, coffee beans, fruits and vegetables, that were previously transported by conventional vessels, are now being transported in containers. This has played an important role in the growing development of the hinterland intermodal network, which allows cargo to be moved virtually on a door-to-door basis, in the most cost-effective way, and with significantly reduced time and ease of cargo manipulation. The relevance and importance of the maritime industry is thus indisputable. In light of the trends mentioned before, its significance as a trade facilitator in the future will be unprecedented.

The maritime industry has witnessed transformational changes in the last few decades. Among the prevailing ones, as mentioned before, is the ever-increasing use of containers as a transportation unit. Around 750 million, twenty-foot equivalent units (TEU), were transported in 2016 (World Bank, 2019), which is a fourfold increase in a little over 15 years. The use of containers is growing each year and is currently estimated to be around 60% of the total seaborne trade (UNCTAD, 2018). The size of vessels carrying containers has also seen monumental increases. In merely 5 years, the industry has recorded a doubling in the size of vessels from 12,000 TEU to 24,000 TEU carrying capacity. Coupled with the increasing hinterland infrastructure development, seaborne trade is no longer limited to ports and port handling abilities, but, perhaps even more importantly, to the capacities and capabilities of the hinterland intermodal network. This has caused significant changes in the competitive landscape of ports, since it has facilitated competition between ports, where it was previously non-existent. The competitive pressures between ports have reshuffled global port rankings and have forced ports to seek partnerships and alliances, which was previously an uncommon practice.

Port competition has been extensively researched in the literature. There is a general consensus, especially in light of the trends described before, that ports are in competition

with one another. Port competition occurs at multiple levels i.e. intra and inter-port and intra and inter-range and between multiple stakeholders i.e. public and private (Notteboom & De Langen, 2015). Scholars used to predominantly analyse and discern different port choice factors that affected port throughput. These ranged from traditionally proposed physical and technical specifications of the port (e.g. see Yeo et al., 2008, for a literature review on these factors for period 1980-1996) to a wide range of economic (Yap & Lam, 2006), political (Loo & Hook, 2002) and even historical (De Langen, 2007) and behavioural factors (Notteboom, 2010). On the contrary, there is far less consensus on the prevailing port choice factors, since, as scholars argue, these also depend on the perspective of the relevant stakeholder i.e. shipper, freight forwarder or shipping line. Due to the rising power of the shipping lines and the increasing development of intermodal networks, inclusion in global supply chains has become more relevant than different listing and ranking factors (Alonso & Soriano, 2008; Yap et al., 2006). Finally, and in light of the above, port co-opetition was put forward as a necessary survival strategy for ports, whereby ports would compete through cooperation. Port cooperation has been studied by many scholars (e.g. Song, 2002; Malchow & Kanafani, 2004; Hoshino, 2010; Li & Oh, 2010). There were several attempts made to classify levels of cooperation. De Langen and Nijdam (2009) distinguish between ports that form a strategic cooperation (e.g. joint venture, merger), ports with some form of cooperation, but not on a strategic level, and ports with no form of cooperation. Freemont and Lavaud-Letilleul (2009) argue that the type of cooperation depends on the port profile in the sense that the strategy of cooperation is not universal for all ports in proximity and thus distinguish between ports linked within a strait or an island, ports with different profiles and ports with similar profiles. Mclaughlin and Fearon (2013) postulate a more comprehensive cooperation-competition matrix, which provides a framework for assessing the extent of cooperation among ports. While the industry trend of port cooperation seems to be positive and emerging, it remains under researched in the literature (Notteboom et al., 2018). Further research needs to be done in providing an overarching and more universal framework for ports' cooperation strategies and options.

Northern Adriatic ports belong to the group of South European ports, located between Italy (Ravenna, Venice, Trieste), Slovenia (Koper) and Croatia (Rijeka). These ports are also members of the North Adriatic Ports Association (NAPA) and will be hereinafter termed "NAPA ports". NAPA region has been receiving considerable attention in the industry, less so by the scholars, having attracted cargo that had previously been routed via the Hamburg-Le Havre range of ports (Notteboom, 2010), due to its shorter nautical route from the Far East, which in turn gave rise to the introduction of the direct deep-sea service loops. Both major alliances (2M and The Ocean Alliance) are calling at NAPA ports, MSC even holds a stake in the terminal operating company (TOC) in Trieste. All ports are multipurpose ports, with a general emphasis on containers. NAPA ports have recorded a doubling of their total container throughput in the last decade, exceeding 2.5 million TEU. Unlike many other European port hubs, where industries in their proximity generate a large shipping demand, NAPA aspires to serve the contestable hinterlands of Central and Eastern (CEE) and South

Eastern European (SEE) region, however faces a scale gap compared to the northern range of ports (Notteboom & De Langen, 2015). In addition, NAPA ports face common threats due to the new railroad connection from Piraeus port to CEE, which is already partly active, and is linked to the revival of the old Silk Road by rail from Central China to CEE, under the Belt and Road Initiative (BRI). NAPA ports thus provide an ideal example for analysing port cooperation. First, due to their proximity and overlapping hinterland, they would appear to benefit from an improved competitive position using a joint market approach. Second, ports face shared exposure to the risk posed by the promotion of new routes and options. Third, despite the fact that all ports lie in countries that are EU members, each country follows a different port strategy and port governance agenda. Fourth, and due to the latter, NAPA ports are a case for cross-border port cooperation. Finally, academic literature has mainly observed ports in Asia and North Europe, far less frequently those from Southern Europe, let alone the NAPA ports in particular. As such, the NAPA ports are a novel example.

### **Research goals and methodology**

There are a number of research goals this dissertation sets out to address. First, it considers whether progress has been made in our understanding of port choice and selection criteria. Second, it observes how the competitive landscape in the port industry has evolved over time, and how this, in turn, has affected port competition dynamics and strategies. Third, as attention is drawn to port cooperation, it is observed whether the existing frameworks and conditions for analysing port cooperation are sufficient. Finally, and most importantly, this dissertation sets out to answer what levels of cooperation between NAPA ports were observed and why that was the case. In addition, it would like to assess what are the possible additional strategies they can undertake to improve the level of cooperation in given conditions.

The research methodology is largely of a qualitative nature and it consists of an extensive literature review, data analysis and semi-structured expert interviews. In terms of data analysis, a thorough analysis of deep-sea and short-sea and feeder services, of port pairs in terms of shipping lines' calling patterns and hinterland rail services, all for NAPA ports, is performed. Also, cargo type throughput splits, and average deep-sea container ship sizes, in NAPA and a discrete time series of average weekly ocean freight rates for Hamburg and Koper, over a period of two years, are computed and observed. All the before mentioned data is publicly available, except for data on ocean freight rates, which is part of a private data set owned by the author, collected during his professional undertakings. A total of 15 semi-structured expert interviews were conducted, some of which were executed in person and some by phone during the period between May and July 2017. Expert respondents were selected based on their positions in their organisations, as well as their length of tenure in the companies they represented. Country managers or commercial managers of five major shipping lines for the NAPA region, four port authority representatives (commissioners, heads of research departments), two major rail-intermodal operators present in the region

and four CEOs of forwarders from Italy, Slovenia and Croatia (with a presence in at least two other countries) were interviewed. Questions that were prepared in advance were personalised for four categories (carriers, freight forwarders, intermodal operators and port authorities).

## **Contributions**

This dissertation has several important contributions. First, it considers port competition and port choice in conjunction with one another. An extensive overview of the evolution of academic thought on port choice and port competition is provided. It also provides a conceptual discussion on the importance of perspective on possible directions of port choice decisions and relationships among different port stakeholders.

Second, by analysing port cooperation, this dissertation contributes in several ways. For one, it provides conceptual clarity for analysing complementarity between ports. It posits that in order to consider port cooperation among adjacent ports, the analysed ports must first be complementary. Secondly, it enlarges the scope of the analysed stakeholders. Unlike previous studies, not only institutional stakeholders (port authorities), but also commercial stakeholders (shipping lines, freight forwarders, rail-intermodal operators) are involved. Ultimately, cooperation is only effective in the long run, if it generates commercial benefits.

Third, and based on the above, a cooperation matrix for classifying cases of port cooperation as an expansion of the existing frameworks for analysing port cooperation is proposed. In addition, several potential value-creating strategies among different stakeholders in port clusters are explored. Both the matrix and proposition on commercial strategies are further upgraded in the final chapter of the dissertation. The analytical tool that is proposed and developed is universally applicable for analysing adjacent complementary ports in both a national and cross-border context. The idea of ‘border’ also applies to the first-level administrative divisions within one country, such as states or provinces. There is a marked difference between the possibilities and extent of cooperation in these two separate contexts and the proposed matrix is designed to discriminate between them.

## **Structure of the dissertation**

This dissertation comprises of three chapters with interrelated content on port competition and cooperation based on a case study of the North Adriatic ports. All three chapters are designed as individual papers with guidelines of targeted journals, which has affected the structure, format and style of writing within individual chapters. In addition, to fit to the structure of this dissertation, the content of the original papers was modified to an extent.

The first chapter discusses the evolution of academic thought on port competition. It does so by reviewing port choice factors and the importance of perspective in evaluating port choice. It also discusses the evolution and dynamics of the competitive landscape of ports and concludes with an introduction to port cooperation.

The second chapter is composed of two important parts. The first part sets up a theoretical research framework by developing a matrix to classify cases of cooperation between ports. This part also establishes the conceptual rigour and the importance of complementarity in the assessment of port cooperation. The second part introduces NAPA ports and establishes the case for their complementarity. Next, it applies the analytical tool developed in the first part to assess the NAPA ports' current level of cooperation and finally discusses the future prospects for their cooperation. This chapter was published in the Special issue: "Port cooperation: types, drivers and impediments" of the *Research in Transportation Business & Management* journal (see Stamatović et al., 2018).

The third chapter builds on the proposed theoretical framework for classifying cases of port cooperation from the previous chapter but provides an important extension for differentiating national and cross-border cases. Furthermore, it provides a more comprehensive explanation on the quadrants of the matrix in order to improve the value of the framework as a decision-making tool. Finally, it then reassesses and repositions the NAPA ports cooperation using the upgraded matrix. This chapter was presented at the XXIII International Conference on Material Handling, Constructions and Logistics, Special session E: Maritime and Port logistics in Bar (see Stamatović & Groznik, 2019a) and at the 8th Economic and Business Review Conference on Managing business and policies in a changing global landscape in Ljubljana (see Stamatović & Groznik, 2019b). Finally, this chapter was accepted for publication in the *Economic and Business Review* journal (see Stamatović et al., forthcoming).

A comprehensive conclusion chapter is provided at the end of the dissertation, outlining the main outcomes of the conducted research, contribution, implications and directions for future research.

# **1 TOWARDS UNDERSTANDING PORT COMPETITION – A REVIEW OF THE RESEARCH**

## **Abstract**

Port competition has been extensively researched in the literature, by analysing port choice factors, by analysing case studies of port competition, by modelling port choices by different stakeholders and by suggesting some universal frameworks for port competition dynamics. This paper firstly provides a synthesis of existing academic thought. We find that discussions have shifted from the traditional approach of listing and ranking factors, to evaluations of ports' inclusion in wider supply chain networks. Secondly, we evaluate the importance of stakeholders' perspective on port choice and conclude that shipping lines' perspective is expected to prevail. Thirdly, we discuss the evolution of port competition and conclude by introducing port cooperation, which is an emerging topic both in the industry and literature. We find that the literature generally recognises the competition between ports, particularly among those sharing common hinterlands. While the industry trend of port cooperation is promising, this topic remains under researched in the literature. We conclude further research should be done to provide an overarching, and more universal, framework for ports' cooperation strategies and options.

**Keywords:** Port choice; port growth; port competition; port selection, literature review.

**JEL classification:** L90; R40.



## 1.1 Introduction

In 2017, close to 11 billion tons of cargo, which represents roughly 90% of total global trade output, was carried by sea and handled by maritime ports worldwide. 17% of the global trade by weight and over 60% by value was carried by sea container transportation (UNCTAD, 2018). Sea transportation, and in particular container transportation, is thus of immense economic importance. As such, the significance of the port and maritime industry as a global trade facilitator cannot be overemphasised. Efficient supply chain networks and effective access to international shipping services and port networks have been recognised as one of the most important competitive advantages for any given national trade and economic development. This notion is supported both by the sizeable amount of resources invested in the development of ports' infrastructures and their hinterland access, and by the vast political and economic attention given by governments, supranational bodies and organisations.

Although sea transportation takes several different formats<sup>1</sup>, container transportation, carried out by container ships, is arguably by far the most important product category in the shipping industry. Even commodities such as wood or paper, paper, wood, coffee beans, fruits and vegetables, which used to be transported by conventional ships, are now being more increasingly transported in containers. In 2016, over 750 million twenty-foot equivalent (TEU) containers were transported worldwide (World Bank, 2019), which was an increase of almost 400% since 2000. Considering that the largest 10 container shipping lines (hereinafter: shipping lines) control 90% of all containers moved worldwide today, while aggressively amassing capacities and abilities both vertically and horizontally, their omnipotence cannot be overstated. It is therefore evident that container shipping should be at the forefront of any academic shipping and maritime discourse.

The direct consequence of achieving port growth is port competition, which has substantially changed over the last two decades. While it used to be the case that ports relied on their immediate vicinity, monopolistic positions of ports are no longer attainable. Containerisation of cargo has enabled greater intermodality, which has in turn put ports in competition with one another, particularly for adjacent areas of influence (Fageda, 2005). However, it is not only in the neighbouring influence area that ports compete; they also compete as transshipment hubs. These ports are neither ports of origin nor destination ports; they are ports where containers are merely being consolidated and transhipped to their end destinations. Competition between ports also happens within and between different ranges and regions, particularly in those areas where there is no single port that has a lasting cost advantage over competing ports i.e. contestable hinterland (de Langen, 2007). The complexity of port competition has escalated to the point where it is no longer sufficient to analyse the individual characteristics of ports, but rather their inclusion within the wider supply chain network must be considered (Notteboom & de Langen, 2015).

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<sup>1</sup> liquid cargoes, such as gas and oil, are transported in tankers, certain raw materials are (still) transported by bulk cargo ships, cars and vehicles are transported by RO-RO ships and others with general cargo ships.

Port competition has been analysed from broadly three angles. The traditional approach was to identify and rank key characteristics over which ports compete – i.e. port choice factors. Next, it was identified that these factors may vary depending on decision makers' perspectives, meaning that it became relevant whether the decision on port choice was being made by the shipper, freight forwarder or a shipping line. Since the latter subjugated the former, the debate, however insightful, becomes redundant. Finally, and as a direct consequence of the rising power of the key decision makers, the shipping lines, the discussion shifted towards cooperation rather than competition. Cooperation between ports seems the most sensible way of competing – co-opetition – in order to offset the increasing pressures from the shipping lines.

Considering the above, each country will opt to maximise its competitive advantage by gaining and developing access to efficient supply chain networks and international shipping services. From this perspective then, ports and port authorities undoubtedly play a central role. The widely adopted measure of a port's success is port throughput, usually expressed in terms of tonnage or number of units moved (containers, vehicles, etc). Ports are not merely a reflection of the natural fluctuations in international trading patterns (Da Silva & Rocha, 2012), but rather there is an array of external and internal factors that affect cargo throughput in any given port. These factors range from, as traditionally proposed, physical and geographical attributes of the port, the port's infrastructure and hinterland accessibility, numerous economic and political elements, to even, and in line with the more contemporary economic thoughts on, for example, behavioural economics. Historical, psychological and personal preferences are found to have an impact on port choice (Notteboom 2009a; 2010). In this paper we focus our attention on obtaining a better understanding of how ports achieve growth, enhance competitiveness and consequently increase their cargo throughput. In addition, our analysis primarily considers developments related to containers as a transport unit, given that this market segment has the biggest growth potential for the majority of ports. This is also in accordance with the general industry trends where cargo, as mentioned above, is increasingly being moved in containers (McKinsey & Company, 2017).

Given both the increasing volume and the trajectory of the current research in port choice and port competition, it is now timely to review its current state. Thus, the broad purpose of this paper is to consider whether progress has been made in our understanding of the drivers of port growth and selection. While achieving port growth is the overarching goal of the relevant stakeholders, port competition is what prompts port growth strategies. Thus, the second purpose of this paper is to observe how the competitive landscape in the port industry has evolved over time, and how this, in turn, has affected port competition dynamics and strategies, as documented by the academic literature.

This paper is organised as follows. The first section discusses factors that affect port growth i.e. port choice criteria. Based on a review of the significant literature, these are then compiled and summarised into four major categories in a table format. This section concludes with a discussion on the importance of perspective on possible directions of port

choice decisions and relationships among different port stakeholders. The final section discusses the evolution and the dynamics of the competitive landscape of ports and concludes with an introduction to port cooperation, which has emerged as a key competitive strategy for ports.

## **1.2 Port choice factors**

Port choice or port selection (used interchangeably in the literature and in this chapter) is innately related to port growth. The relationship between them is clear, understanding the drivers of port users' requirements (i.e. port selection criteria) leads us to understand why ports grow (port growth factors). The direct measurement of port growth is its throughput, normally expressed in tons of cargo, number of containers or vehicles passing in and out of the port or terminal. The previous section mentioned that despite the containerisation process having started in the 1960s, it was not until the start of the 1990s that the very same process started to seriously impact global trade patterns. Thus, naturally academic interest in the topic sparked during the same period. There is a general consensus among authors that port throughput is a direct measurement of a port's competitiveness (Meerseman et al, 2010). Hence academics have focused their research interest on gaining a better understanding of the causes that are affecting port throughput. Nonetheless, even a brief examination of the literature reveals that the factors that are found to affect port growth and port selection are still under heavy scrutiny, albeit that many of the conclusions made by these studies result from observations made in numerous ports worldwide. There is thus a legitimate doubt over the possibility of generalisation, since each port is specific to a certain context and framework and thus observations from one port or group of ports may not necessarily be representative. Many attempts have been made to reconcile the key decisive factors in the literature (e.g. Yeo et al., 2008, Aronietis, et al., 2010, Parola et al., 2017, Moya & Valero, 2017). We discuss these in the following section.

### **1.2.1 Location, location, location**

According to Robinson (1998), 'Port growth is a function of the production outcomes of firms in the port's adjacent space, or of that space to which it is linked, either in landward space or in areas linked across water or ocean.' This famous statement implies that port location is central to the development of port growth. More so, it claims that port output can directly be measured by knowing the output. Chang et al. (2008) study and identify the factors that affect shipping companies' port choice. Authors consider six factors: local cargo volume, terminal handling charge, berth availability, port location, transshipment volume and feeder network. They found that a local cargo base was the most important port choice factor. They also suggested that port authorities should focus on growing the local cargo base, by means of enabling a favourable FDI environment and providing incentives to local manufacturers in the port's vicinity. Yap and Lam (2006) confirm that port location and distance from the cargo represent the pivotal factors in the port selection process and that a

port's hinterland contributes to explaining the evolution of its activity. On the other hand, Alonso and Soriano (2009) postulate that physical proximity of the port to the origination of the cargo is nowadays far less important than the quality and services that ports can provide. The authors concluded that dynamism of the hinterland and the inclusion in the logistics chains i.e. routes and networks of shipping lines should be a port's key priority. Their hypothesis is that the hinterland distance is still an important variable so that firms, which are deciding on their location, consider the locations of ports offering the services they require, whereas firms which are already established in an area tend to choose the service offered by the nearest port. Nevertheless, based on an analysis conducted in Spanish ports, the authors observed that the contribution of the hinterland is not enough to explain the success of the Spanish ports of Algeciras, Barcelona and Valencia. The Mediterranean Sea has seen significant development of new logistics chains, where for example Algeciras has become an important International transshipment hub, while Bilbao has not been part of such inclusions into these chains and has indeed depended on its hinterland much more. The authors therefore confirm our claim that any port's growth is somewhat context specific.

Another example confirming this notion is given by Liu and Park (2011), who conclude that in the case of Korean ports, geographical position and service level were the most important factors. In the case of Chinese ports however, the hinterland economic level and government attitude were the most important factors for container throughput. This should be understood in the context of Korean ports that have a central position on shipping routes between Asia and America. This explains why the geographical position is so important. However, in the context of China, the hinterland economic level and government attitude were the most important factors, since unlike Korean ports or the Algeciras port mentioned before, Chinese ports do not serve as transshipment ports but are instead direct gateways for cargo produced and exported from China. Hui et al. (2004) agree with these findings, as they claim that although Shenzhen will grow faster in the future and will eventually surpass the cargo throughput of Hong Kong due to the location advantage, Hong Kong will continue to grow due to its competitive edge accumulated in the previous years. Also, using Hong Kong as an example, Seabrooke et al. (2003) found that the factors that affected cargo movements in Hong Kong included: macroeconomic conditions, regional competition, China's entry into the WTO, the possible full-liberalisation of direct trade links between China and Taiwan, Hong Kong's economic restructuring and the major operators' market power. Their analysis predicted that the continuous growth of the total cargo pool in the South China region had resulted in the growth of cargo volume in Hong Kong, even after accounting for the diversion of cargo into Yantian and other neighbouring ports. The presence of neighbouring ports did not slow down Hong Kong's growth; as demand for the services of Shenzhen's ports increased, also demand for Hong Kong increased. In other words, Shenzhen ports are direct neighbours of Hong Kong and they have been gaining greatly at the expense of Hong Kong. One would thus conclude that the more convenient location for cargo will always be the more important factor. However, what authors show is that before location becomes important, there are other factors at play, which are considerably more important (e.g.

China's accession to WTO and cross-straits business with Taiwan). Furthermore, their results show that Hong Kong will continue to grow along with the growth of cargo volumes into the Pearl River Delta, albeit at a slower rate. Loo and Hook (2002) also posit that political factors and changing policies in China are strongly affecting throughput growth in Hong Kong. Hong Kong used to be a traditional platform for Chinese re-exports, but has recently lost this primacy, mainly due to Chinese accession to the WTO and the opening up of their economy. In a study conducted 10 years later, Wang et al. (2012) observed that the Shenzhen ports (Yantian, Chiwan, Shekou) were growing at a much faster rate and that by 2020, their throughput would be greater than that of Hong Kong. This occurred even earlier, since Shenzhen ports had already surpassed Hong Kong in 2013. The gap has widened and while Shenzhen enjoys third place, Hong Kong has dropped to seventh in the global list of largest ports (World shipping council, 2020).

De Langen (2007) provides an interesting example, which indicates that the location alone cannot explain market shares in the hinterland. This observation is made on the basis that in 2003, the Northern ports in Europe (Rhein-Scheidt Delta) had a clear market share supremacy (70%) over Austrian cargo throughput. The author concluded that although the South had a clear location advantage over the North, cargo was still routed mostly through the North. He postulated that there were several friction costs that prevented the switch from the North to the South, such as: opening of the Rhine- Main-Donau Canal in 1992, the water levels in the Rhine and political instability in former Yugoslavia. This was also in line with the OECD (2008) report, which claimed that while port competition was fierce, ports were not perfect substitutes i.e. they are not perfectly interchangeable or without cost. Nevertheless, the situation a decade later is different. The split between the North and the South ports has narrowed down and it is now 58% vs. 42% in favour of the North ports, of that almost 90% is routed via Koper, which belongs to the group of South European ports (Verkehr.co.at, 2019). This is an indication that the friction costs may be diminishing and that the split is gradually narrowing in favour of the South. The De Langen (2007) survey pointed out that location was still a very important factor for freight forwarders, less so for shippers. On the other hand, as the author (2007) concluded, there were other factors at play, which were stronger than location advantage. The tentative conclusion from the above observations is that port location is important, but there are other factors and friction costs, which may rule against the location advantage in the case of a contestable hinterland i.e. those regions where no single port has a lasting cost advantage compared to other ports.

### 1.2.2 Port location is no longer important?

Notteboom (2009a) claims that traditional views on port choice focus excessively on the physical attributes of ports, while arguing that ports' competitiveness strongly 'correlates with external coordination and control by outside actors'. Indeed, there is a growing number of scholars who conclude that achieving the economy of scale and reducing the time necessary to offer a door-to-door service favours the attraction of traffic to a certain port,

more than the physical proximity of the port to clients (Alonso & Soriano, 2009; Popa et al., 2010). Furthermore, scholars predict that in the future there will be fewer ports that prosper in a certain area, simply because they provide traditional services for which there is a lower demand. Instead there will be a dominance of superior service leaders that possess both a productivity and value-added service advantage (Popa et al., 2010). In contrast to Robinson (1998), Malchow and Kanafani (2004) claimed that port activity no longer depended on a port's immediate hinterland, due to the development of intermodal transport. Fageda (2005) confirmed this claim and added that intermodal transport enlarged the gravitational centres of ports and in many cases gave rise to competition between ports, where it was previously non-existent. While Notteboom (1997; 2010) disagreed with this notion, the author still acknowledged that intermodal transport played an important role.

Among opposing views that port location matters, were also Basta and Morchio (2008) who viewed that geographical distances were progressively 'dying' and that ports were now facing competition from ports located at greater distances away, which meant that port authorities had to adopt new strategies for maintaining competitiveness. They proposed investments into adequate infrastructure and space, high land accessibility and connectedness to the rail and road networks, adequate space for logistics activities and service quality. Cho and Yang (2011) by using a regression model posited that there was a positive relationship between the degree of globalisation and ICT capability with respect to container throughput. Similarly, Ugboma et al. (2006) found in the case of Nigerian ports that shippers placed a high emphasis on efficiency, frequency of ship visits and adequate infrastructure. Chou (2010) claimed that physical attributes such as berth length and sea depth matter, while also acknowledging the importance of costs and service level. Li and Oh (2010) had similar conclusions. Guy and Urli (2006) also mentioned the quality of ports' infrastructure and service, Jarašuniene et al. (2012) also agreed with these findings, while Haezendonck and Notteboom (2002) added the importance of hinterland infrastructure and accessibility.

There were ample other factors put forward such as inclusion in global supply chains (Alonso & Soriano, 2008; Yap et al., 2006), IT development, innovation (Liu & Park, 2011) and also political factors, such as governments' policies and agendas on the port and maritime industry (Loo & Hook, 2002). An analysis of European gateway port systems revealed that it was also historical (the so-called 'memory' effect), psychological and personal factors that could result in the routing of container flows, which deviated from perfect market conditions (Notteboom, 2010). Finally, De Langen (2007) also confirmed that 'behavioural factors' were relevant in port choice since distance alone could not explain the variations in port choice. Author (2007) posited that most likely, decisions on port choice were also made on the basis of history and existing relationships. Even bounded rationality, inertia and opportunistic behaviour were the behavioural factors, which resulted in suboptimal routing of cargo flows (Notteboom, 2009a). Literature on port choice is therefore abundant and provides many aspects, which need to be accounted for. Nevertheless, by

analysing around 30 papers that deal with the analysis of port choice factors (see Table 1), we find that there are certain factors which are commonly found to be significant port choice factors. Among them, the most frequently reported factors are service and quality of the port, the port's proximity to the cargo origin and port costs and charges (see Table 2). This is by no means a confirmation of their rank of importance, since, as discussed above, there can be many port context-specific reasons influencing the results. It is merely a cross-section of the academic thought on the port choice topic. Furthermore, in contrast to Yeo et al. (2008), we focus on the literature from the last two decades.

*Table 1: Summary of literature review on main port choice factors identified and methodology used*

| <b>Author &amp; date</b>                   | <b>Factors identified</b>  | <b>Methodology used</b>   |
|--|--|---|
| <b>Alonso &amp; Soriano, (2009)</b>        | port-province distance   | explicative-stochastic method                                   |
| <b>Basta &amp; Morchio, (2008)</b>         | port infrastructure, high land accessibility, availability of spaces for logistics activities, service quality | literature review   |
| <b>Chang et al., (2008)</b>                | local cargo volume, most important, port costs   | exploratory factor and confirmatory factor analysis (EFA & CFA) |
| <b>Cho &amp; Yang, (2011)</b>              | ICT capability, innovation, institutional influences   | regression analysis   |
| <b>Chou, (2010)</b>                        | depth of port, port costs, port loading/discharging efficiency (service level)                                 | AHP model   |
| <b>Comtois &amp; Dong, (2007)</b>          | hinterland accessibility over port proximity   | literature review   |
| <b>Cullinane &amp; Toy, (2000)</b>         | price, speed, transit time, service quality  | literature review   |
| <b>de Langen, (2007)</b>                   | port distance/location, but not the only factor, goods' characteristics, number of ship calls                  | questionnaire   |
| <b>Guy &amp; Urli, (2006)</b>              | quality of infrastructure, cost, service and port location   | literature review   |
| <b>Haezendonck &amp; Notteboom, (2002)</b> | hinterland accessibility, productivity, quality, cargo generating effect, reputation and reliability           | literature review   |
| <b>Jarašuniene et al., (2012)</b>          | port's depth, quality of infrastructure, quality of service  | ranking method/survey   |

|                                       |  |                         |
|---------------------------------------|--|-------------------------|
| <b>Li &amp; Oh, (2010)</b>            | natural conditions, price, ICT level, port service, hinterland   | literature review       |
| <b>Lirn et al., (2004)</b>            | cost factors, port location  | AHP model               |
| <b>Liu &amp; Park, 2011</b>           | geographic location, service level, hinterland, government policy  | regression analysis     |
| <b>Loo &amp; Hook, (2002)</b>         | global trends in container industry, containerisation in China, governmental policy  | literature review       |
| <b>Magala &amp; Sammons, (2008)</b>   | accessibility to markets, connectivity, level of integration in the supply chain   | multinomial logit model |
| <b>Malchow &amp; Kanafani, (2001)</b> | geographic factors, location   | multinomial logit model |
| <b>Malchow &amp; Kanafani, (2004)</b> | port location  | multinomial logit model |
| <b>Musso et al., (2013)</b>           | capacity, infrastructure, systems integration, productivity, prices, innovation  | literature review       |
| <b>Notteboom, (2010)</b>              | integration in global supply chains, hinterland, historical, personal, political factors, behavioural factors              | literature review       |
| <b>Park &amp; Min, (2011)</b>         | port operating expenses/cost, port infrastructure, port location   | AHP model, DEA model    |
| <b>Seabrooke et al., (2003)</b>       | macroeconomic conditions, regional competition, TOC market power   | literature review       |
| <b>Song &amp; Yeo, (2004)</b>         | port location, port facility, cargo volume, service level (descending order)   | AHP model               |
| <b>Tiwari et al., (2003)</b>          | port location, distance, port congestion   | multinomial logit model |
| <b>Ugboma et al., (2006)</b>          | efficiency, frequency of ship visits and adequate infrastructure   | AHP model               |
| <b>Yeo et al., (2008)</b>             | port service, hinterland condition, availability factor, convenience factor, logistics cost, regional centre, connectivity | fuzzy methodology       |



|                           |  |                   |
|---------------------------|--|-------------------|
| <b>Yeo et al., (2010)</b> | port service, hinterland condition, availability factor, convenience factor, logistics cost, regional centre, connectivity | fuzzy methodology |
|---------------------------|--|-------------------|

*Source: Author's summary based on the literature review.*

*Table 2: Most frequently identified port choice factors from the literature review as per Table 1*

| <b>Factors</b>                | <b>No. of mentions</b> |
|-------------------------------|------------------------|
| <b>service &amp; quality</b>  | 13                     |
| <b>port location/distance</b> | 12                     |
| <b>port costs and charges</b> | 10                     |

*Source: Author's own elaboration.*

*Table 3: Most frequently used methodology from the literature review as per Table 1*

| <b>Methodology</b>                     | <b>No. of papers</b> |
|--|----------------------|
| <b>literature review</b>               | 10                   |
| <b>AHP model</b>                       | 5                    |
| <b>multinomial/regression analysis</b> | 6                    |

*Source: Author's own elaboration.*

It is also worth mentioning that there have been several attempts in reconciling academic thoughts on port choice and perhaps the most thorough one was done by Parola et al. (2017), who examined 170 academic articles specifically on port choice. Their conclusion is very similar to our findings, not the least due to the fact that there are some overlapping papers. Authors (2017) found that port costs, hinterland proximity and connectivity, and location result are the most frequently appearing port choice factors. An additional remark here is that comparing the methodologies used in their sample also yields similar observations to

our findings, the majority of research techniques are quantitative, such as econometrics, modelling and simulation. Similarly, Aronietis et al. (2010) and Moya and Valero (2017) found that cost, service and location were mentioned most frequently. Furthermore, both papers made an additional distinction in discerning port choice factors for different port stakeholders, namely shipping lines, shippers and freight forwarders ('land-side decision makers'). It is to be expected that different stakeholders place different weightings on factors, due to the variation in motives, but nonetheless, even with that distinction in place, factors often overlap across the panel of stakeholders. It would appear shippers and shipping lines care more about the costs, while freight forwarders more about the quality of service, however the distinction is inconclusive. We address this issue in the following section.

In conclusion, port growth is inter-related with port choice. Factors that affect port growth are under heavy scrutiny. The literature suggests, without a consensus on the rank of importance, the 'usual suspects' to be geographical location, port costs, port infrastructure, space, capacity and hinterland infrastructure. Traditional views focus more on physical and technical attributes, while contemporary views emphasise the importance of hinterland infrastructure, inclusion in intermodal networks and even behavioural factors. In summary, we provide a table (see Table 4) which groups port choice factors into four broad categories: technical, economic, port governance & legal environment and behavioural factors.

Table 4: Recollection of (some) port choice factors grouped into four categories

#### Technical factors

- Port's infrastructure, terminal infrastructure and equipment
- Port's physical attributes (sea depth, berth and quay length)
- Port efficiency (turnaround time, terminal productivity, cost efficiency, port operating hours)
- Interconnectivity of port
- IT development and connectedness
- Availability of value added services in port
- Hinterland accessibility profile: intermodal, road, rail
- Reliability, capacity and frequency of inland transport services
- Port security, safety and environmentally friendliness
- Service with direct vessels, indirect with transshipment ports and/or feeder service

#### Economic factors

- Geographical location (closeness to cargo origin/destination, trade routes)
- Alliances, slot-sizes
- Cargo volume and cargo base (existing)
- Volume of import and export potential (potential)
- Inclusion in supply chain networks

#### Port governance & legal environment factors

- Political stability of the country; closeness to war zones
- Brand-name; port reputation
- Port's stability in terms of potential for strikes, bad weather conditions, damage control, congestion likelihood
- Port's governance, port's ownership structure
- Country noise and pollution regulations, customs' control, administrative and legislative environment

#### Behavioural factors

- Personal preference (language, culture, existing relationships)
- Historical
- Psychological

Source: Author's summary based on the literature review.

### 1.2.3 Perspective is important. Or is it?

Up until now, our discussion has not focused particularly on making a distinction between port choice factors for different port stakeholders. On the one hand it seems apparent that different stakeholders will pursue different goals and thus assign different weights to different port choice factors (Magala & Sammons, 2008), while many of them would probably be overlapping. On the other, limiting ourselves to a particular perspective would reduce the variance of all possibilities that exists in port choice, and which was partly

depicted in Table 4. In the literature, different approaches are chosen, which is partly inferential since port choice is complex and discerning the real (one) decision maker among highly inter-related relationships of port users may seem to be an ambiguous effort (Valls et al., 2020). For example, Moya and Valero (2017) and Aronietis et al. (2017) made a distinction between various stakeholders, while Parola et al. (2017) and Valls et al. (2020) did not. There may be little value in arguing for or against the different approaches taken. Instead, in this paper we argue that if there is one stakeholder, whose view on port choice matters more or, more importantly, will matter most in the future, it would be that of the shipping lines.

Shipping lines have undoubtedly become logistics behemoths, having built and acquired large capacities and capabilities down the vertical and horizontal value chains. Shipping lines now design and control almost all processes involved in door-to-door transportation. Within the field of horizontal integration and consolidation, the last decade, and in particular the last 5 years, has seen a surge in transactions, wiping out at least 10 of the 20 largest shipping lines from the market. CMA-CGM acquired APL in 2016, COSCO bought CSCL in 2016 and OOCL in 2018, A.P. Moller-Maersk (APMM) acquired Hamburg Süd in 2017, Hapag-Lloyd merged with UASC in 2017, Japanese carriers NYK, K-line and MOL merged to form one carrier called ONE in 2018. Meanwhile, due to the ever-increasing industry pressures, the seventh largest carrier at the time, Korean Hanjin, filed for bankruptcy in 2017. The 10 largest shipping lines thus control 90% of the global market share in container shipping today (see Figure 1).

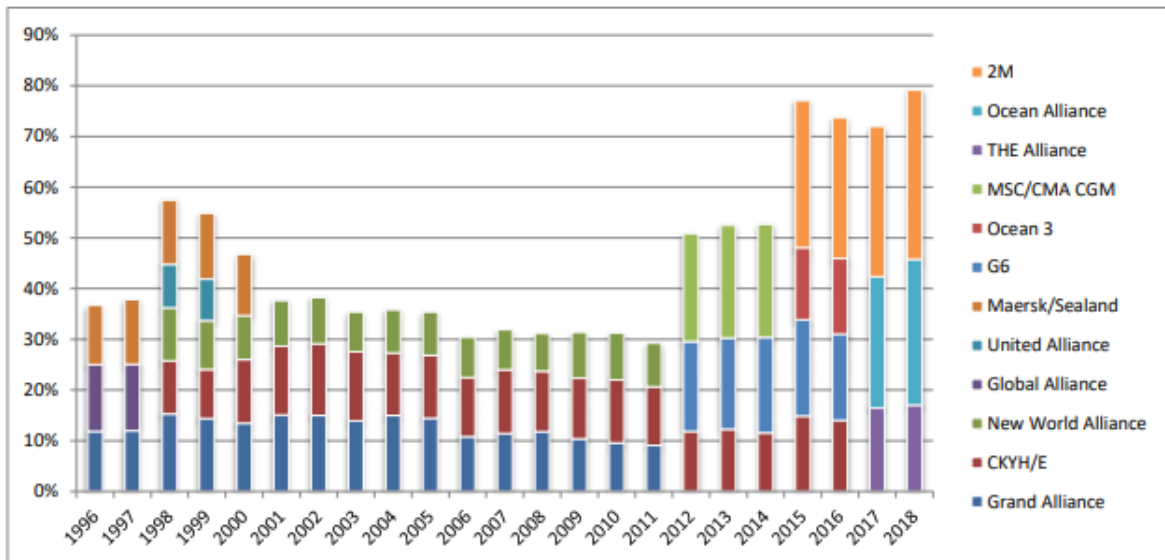
*Figure 1: Overview of the largest container carrier market share and their membership in alliances*

| Alliance       | Carriers    | Global market share (%) | Global carrier rank |
|----------------|-------------|-------------------------|---------------------|
| 2M             | Maersk      | 19                      | 1                   |
|                | MSC         | 15                      | 2                   |
| Ocean Alliance | Cosco-OOCL  | 12                      | 3                   |
|                | CMA CGM     | 12                      | 4                   |
|                | Evergreen   | 5                       | 7                   |
| THE Alliance   | Hapag-Lloyd | 7                       | 5                   |
|                | ONE         | 7                       | 6                   |
|                | Yang Ming   | 3                       | 8                   |

*Source: ITF, 2018.*

In addition, shipping lines have been progressively forging alliances on the sharing of vessels and other resources, to attain economies of scale and scope. Currently there are three alliances with a total of 8 shipping lines, controlling 87% of the global market in 2018 (see Figure 1 and Figure 2).

Figure 2: Market share by container carrying capacity of global alliances 1996-2018



Source: ITF, 2018.

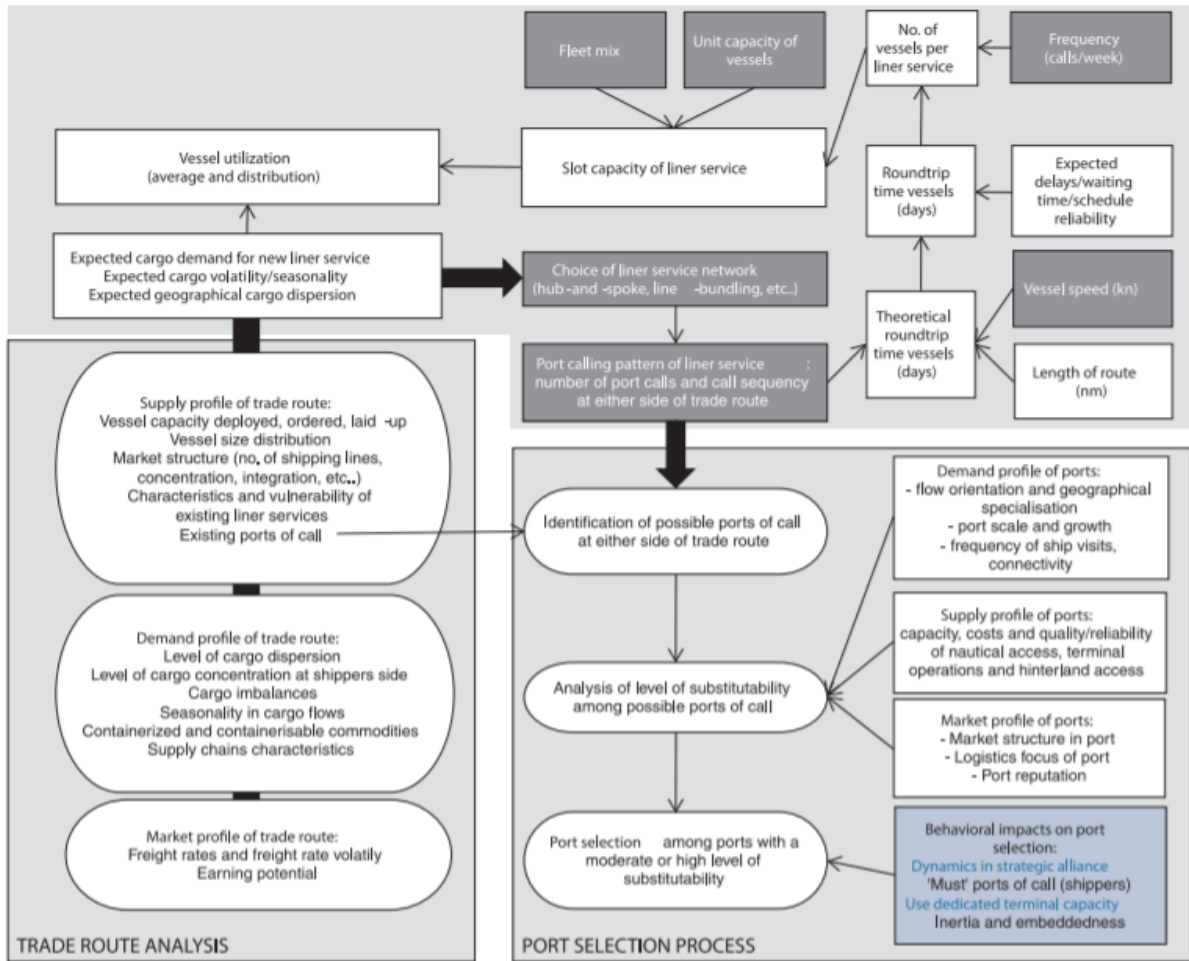
Finally, to increase container-per-vessel utilisation and drive further cost reductions, shipping lines are investing in ever larger ships. A telling manifestation of this is that it took 20 years to come from Panamax (3,000 TEU) to Post Panamax Plus (6,000 TEU) ships, but it only took 5 years from New Panamax (12,500 TEU) to Triple E (24,000 TEU) ships. In other words, the size and capacity of ships has doubled four times faster than in previous decades. This has not only increased pressures on ports to adapt their infrastructure to accommodate larger ships, it has also had an adverse effect on all other ports due to the cascading effect, since the vessels that are being replaced by larger ones are introduced to other trade routes, which previously were using smaller vessels. This means that virtually all ports are under pressure to adapt to larger vessels. On the vertical front, most of the top 5 carriers own and control terminal operating companies in all major and strategic ports e.g. APMM terminals is owned by A.P Maersk, COSCO owns COSCO Shipping Ports, MSC owns Terminal Investment Limited (TIL), etc. Since hinterland is the key competing ground, they also control hinterland terminals and block trains connecting them to the ports. This has gone so far that the ocean freight and onforwarding costs by intermodal delivery are not even disclosed separately. Instead, they are bundled and amalgamated into one all-in rate, thus representing the total cost of *moving* instead of *shipping* the goods. The cooperation of alliances is not limited to sharing vessels; it also includes cooperation on terminal and hinterland activities as well<sup>2</sup>. With their recent moves, the shipping lines started taking over activities that were traditionally performed by freight forwarders. These include mergers and acquisitions with 3PL companies (e.g. Maersk with DAMCO, CMA-CGM with CEVA) or specific skill acquisitions such as buying customs' brokerage houses or warehousing and contract logistics companies. Market concentration and the evident vertical integration have

<sup>2</sup> e.g. in any given port, where an alliance member also operates their own container terminal, this one will be preferred and used by all alliance's members over other terminals in the same port.

caused monopsony-like conditions at ports, insofar as ‘‘alliances could raise competition concerns in what has become a concentrated market’’ (ITF, 2018). Due to the increasing alliance relationships between carriers, the element of ‘fitting the trade lane into alliance agreements and requirements’, should also be considered in shipping lines’ port choice. Namely, Notteboom et al. (2017) find a positive correlation between an increased number of port calls and an alliance member having an ownership stake in a terminal operator in a particular port. Authors (2017) do acknowledge however that there has not been sufficient research done to establish direct causality.

Pending the above, it would be hard to imagine a future whereby port choice would not depend highly on satisfying the requirements dictated by the shipping lines. The viewpoints of the other two contenders, shippers and freight forwarders, may thus become insignificant. Not only will freight forwarders continue to be merged with shipping lines or become redundant, but both shippers and freight forwarders will be left to choose from a very small number of options that will be providing door-to-door services using a globally integrated network of ports and hinterland connections, designed to optimally utilise network resources at the lowest possible costs. To illustrate the point: whether a container will be routed via Antwerp, Rotterdam, Hamburg, Trieste or Koper and then moved by rail to arrive at an end destination in Vienna, may almost certainly be at the exclusive discretion of the shipping lines. The tentative conclusion is that port choice factors will depend largely on the preferences of the shipping lines. The complexity of how shipping lines make decisions on port choice and how they design their service networks based on the former has been well conceptualised and depicted by Notteboom et al. (2017) (see Figure 3).

Figure 3: A conceptual overview of the port selection process and liner service design by the shipping lines



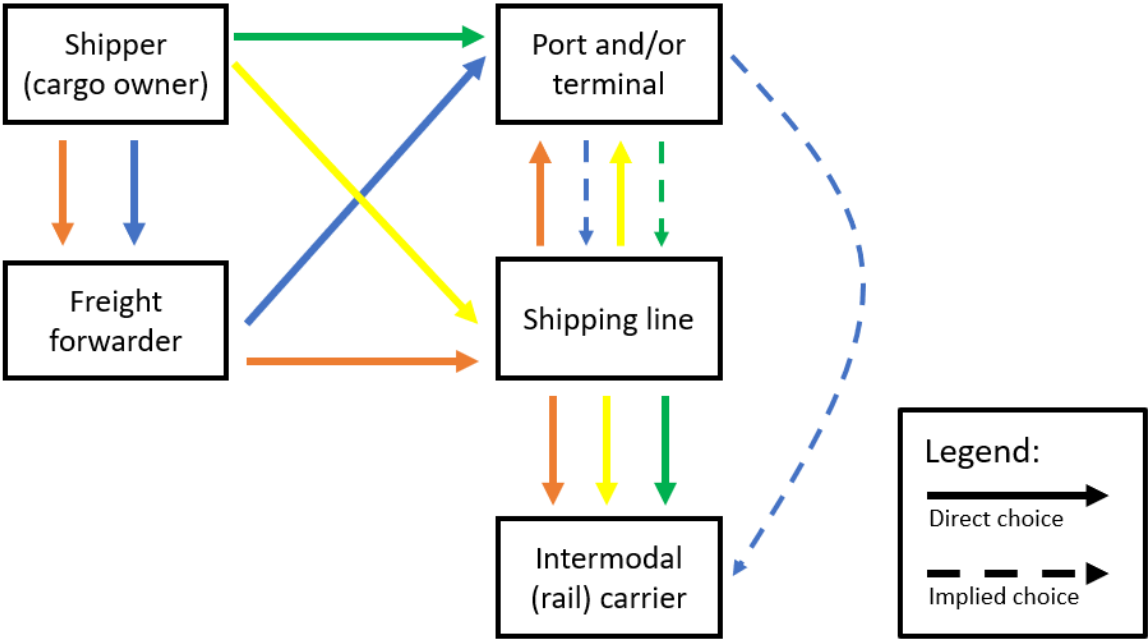
Source: Notteboom et al. 2017.

#### 1.2.4 Do other port stakeholders matter, then?

While previous section strongly advocates the importance of shipping lines' perspective in port choice theory, and in particular, their growing importance in the future, this does not mean that other stakeholders are obsolete. As already mentioned, relationships between the different stakeholders are inter-related and intertwined and most often, not straightforward. The complexity of pinpointing the (one) decision maker in port choice has been well discussed by Moya and Valero (2017). The authors point out that the identification of the port choice decision-maker remains ambiguous and many questions still remain open – e.g. do shippers decide directly on port choice or do they 'outsource' this decision to the contractual party – freight forwarder or the shipping line? Tongzon (2002) offers an answer to this question by proposing three types of shippers: those with long term contracts with shipping lines, those that outsource logistics to freight forwarders and third, 'independent shippers', who make transport choices themselves. However, the typology of different types

and thus options, is not confined to shippers only. Freight forwarders can be local, regional, or global in size and this can influence their port choice. For a local freight forwarder in a vicinity of any one port, port choice is straightforward. For a regional freight forwarder, who has a presence in a vicinity of multiple, substitutable ports, port choice may depend on economic and other preferences innate to their specific company policies. This may be similar for a global freight forwarder, however their port choice can further be influenced by gateway policies or even global contracts with the shipping lines, where preferences are given to the choice of shipping lines and not necessarily to the ports they utilise. For example, a global freight forwarder may consolidate all their volumes for a certain geography in one location and ship them via one port, which serves as their internal gateway port. Figure 4 provides an overview of different possibilities on how different stakeholders influence port choice. In addition, it depicts different relationships that can exist between stakeholders that directly or indirectly influence port choice and the choice of other port stakeholders.

*Figure 4: Overview of possible relationships between different port stakeholders and possible directions of port choice decisions*



*Source: Author.*

Different colours of arrows characterise different paths, which lead towards port choice. A straight arrow represents a direct choice. Following the blue arrow in Figure 4, a shipper or a cargo owner chooses a freight forwarder and then freight forwarder chooses the port or terminal to move this cargo. A dashed line represents an implied choice, meaning that the preceding direct choice subsequently defines the domain of available choices thereafter. Following the path of the blue arrow mentioned before, once freight forwarder chooses the port, then the choice of the available shipping lines and intermodal carriers is implied by that choice. In other words, the scope of choices of the shipping lines and/or intermodal carriers



serving the chosen port is predetermined by the choice of port. Same holds true if shipper (green arrow) informs the direct choice of the port. Study conducted by De Langen (2007) using the case study of contested hinterland market of Austria, shows that both shippers and freight forwarders can have a set of preferences, which directly or indirectly imply port choice. Study also shows that both port stakeholders hold similar views on port choice. Another scenario, following Figure 4, is when a shipper (yellow arrow) or a freight forwarder (orange arrow) directly chooses a shipping line due to e.g. a global service agreement or due to confined choices of shipping lines serving a specific hinterland. In this case, the choice of port and/or terminal and subsequently also of intermodal carrier is at the discretion of the shipping line. The only port stakeholder that does not inform decisions on port choice, or any other port stakeholder for that matter, is the intermodal carrier. In other words, intermodal carrier is always directly or indirectly *chosen*.

It can be deduced from the above analysis that port choice is context specific. For certain ports, the weight of importance of the shipping line's decision may be disproportionately higher (or lower) compared to another port. This paper does intend to imply however that, if freight forwarder is removed from the decision making process and/or when the choice of available shipping lines is limited to (top) 5 players in the market, then there is a lot more decision making power in the hands of the latter, when it comes to port choice. It can be argued further that to some extent this issue is much more pronounced with contestable hinterlands and landlocked regions, where shippers and freight forwarders must rely on the hinterland network service designed by the shipping lines, much more so than they would, if cargo origin or destination was in proximity of any one port.

An example of North Adriatic ports ("NAPA ports") and some of their hinterland markets they serve<sup>3</sup>, demonstrate the complexities outlined above. Hungarian market is, like Austria mentioned before, an example of a contestable hinterland. As a landlocked country it relies on having access to NAPA ports, notably to Koper and Trieste and to the North European range ports, primarily German ports, Hamburg and Bremerhaven. About 60-70% of their container volumes are moved via Koper (Port of Koper, 2018b). In the case of Hungary therefore, shipper or freight forwarder will predominantly first seek available shipping lines' options and rely on their hinterland service network design that connects inland container terminals in Hungary with the afore mentioned ports, rather than seek available shipping lines' options, after having made the choice of port. It may well be the case that a certain origin or destination is only served via one port and/or one carrier, which only has one possible routing. Since shipper's and freight forwarder's main objective is to move their freight, their port choice preferences may come second to the choices already made by the shipping line. South Germany provides for a similar example. A Drewry report (2016) showed that the most economical route from Far East to Munich is via Koper. Trieste came

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<sup>3</sup> NAPA ports include Ravenna, Venice, Trieste, Koper and Rijeka. We introduce NAPA ports in Chapter 2 and Chapter 3 in much greater detail. In this chapter, only some of the key elements are highlighted to support the discussion in Chapter 1.

as a very close second. Both Koper and Trieste ports have regular train connections with Munich, however, while CMA-CGM offers options to ship via both ports, Koper and Trieste (CMA-CGM, 2020), MSC only offers this option via Trieste (MSC, 2020). This is not surprising, since they also part-own the container terminal in Trieste. Per previous analogy, assuming cost and/or transit time is more important to the shipper or the freight forwarder, then their choice will primarily be confined to choosing the cheapest and/or fastest shipping line service rather than choosing a particular port.

### **1.3 Port competitive landscape revisited**

In contrast to port choice and selection criteria, there is more consensus on the topic of port competition, whereby literature generally recognises that ports are in competition with other neighbouring ports (Seo & Ha, 2010). Arguably, the type of port (transshipment port, gateway port) and the cargo group (containers, bulk, liquid cargo) defines the nature and attributes of competition between ports (Notteboom & de Langen, 2015). Competition between ports occurs at various levels. Van de Voorde and Winkelmanns (2002) proposed a basic type of classification of levels of port competition, distinguishing between intra and inter-port competition. Intra-port competition happens between competing terminals within the same port. These terminals compete for the same cargo type, as mentioned before. Inter-port competition happens between different ports, serving overlapping hinterlands. Authors (2002) made a distinction between port authority level and terminal level types of competition. Notteboom and De Langen (2015) suggested a more detailed type of classification. They added inter-port competition that normally occurs in the multi-port gateway regions. These are the regions where multiple gateways contend for the overlapping hinterlands. Another level is intra-range competition. This type of competition occurs between ports that are parts of larger port ranges, such as the Hamburg-Le Havre range. Finally, competition that occurs between different ranges (e.g. Hamburg-Le Havre range vs. South European range) i.e. inter-range competition. Competition thus occurs at multiple levels (intra and inter-port and intra and inter-range) and between multiple stakeholders (private and public).

Many authors have studied port competition between ports in Asia (Li & Oh, 2010; Hoshino, 2010; Yap & Lam, 2006) and Europe (Notteboom, 1997, 2010; Fageda, 2005, Jarašueniene et al., 2012), fewer examples can be found from other regions, such as Australia (Menezes, et al., 2007), Africa (Hoyle & Charlier, 1995), South America (Da Silva & Rocha, 2012) and the US (Jacobs, 2007). For example, Song (2002) argued that there has been considerable competition between ports in China and that the role of the Hong Kong port has been aggrandised. As discussed before, the Shenzhen ports already surpassed Hong Kong in 2013. Seo and Ha (2010) posit that ports can no longer take port users and their loyalty towards the location for granted, due to several reasons: containerisation, intermodal transport, concentration of the shipping industry and the liberalisation of transport markets, which created vertically and horizontally integrated, highly competitive, global players. Da Silva

and Rocha (2012) confirmed that port rankings were not static and sometimes one leads and another one trails, depending on the dynamics of the port's hinterland and the long-term strategy ports adopt in their bid for market leadership. If each port adopts such a strategy, then competition between ports may be a reality, otherwise the ports merely reflect the natural fluctuations of international markets. The more regions the port serves, the greater the demand it faces and vice versa, which suggests that port competition may take place by means of gains or losses of geographic area hinterlands. Fageda (2005) agreed with this notion, by claiming that intermodality had removed the monopolistic position of ports in their adjacent influence areas. Furthermore, competition is not only at the level of ports serving common hinterlands by means of intermodal connections, but also based on the transshipment functions of ports. Containers as transport cargo units improve the intermodality (the sea-surface transshipment) so that it becomes common that different ports share the same hinterland (Hoare, 1986). These borders will now depend on the development of intermodal transport corridors and not on the exclusive market areas of each port. Hoyle and Charlier (1995) analysed the throughput in ports in Eastern Africa, by which they showed how strict national policies and a country's autarkic regime can directly influence cargo throughput. The authors posit that in the developing world, the relationship between seaports and the hinterland regions they serve are often complex, as in the advanced world, and ports and hinterlands are normally closely linked in terms of their development. They observe that in fact little competition is present between Mombasa and Dar es Salaam within their own countries, since both have autarkical policies for port traffic as for many other matters. While there is no Kenyan transit traffic at all in Dar es Salaam, there is some limited Tanzanian cargo in Mombasa. As per authors the real competition is in the landlocked countries of Uganda, Rwanda and Burundi, since their policy has been to diversify their access to the sea in order to avoid exclusive dependency. This used to be the case in the past, with Mombasa serving Uganda and Rwanda, and Dar es Salaam serving only Burundi. However, the more significant diversification has been geographical, as an increasing share of Ugandan and Rwandan traffic uses Dar es Salaam and the all-Tanzanian routes whose cost and transit facilities are reputed to be better than those through Kenya. Intermodalism has become a key issue in hinterland competition.

On the other hand, while port competition is fierce, ports are not perfect substitutes i.e. they are not perfectly interchangeable or at least not without costs (OECD, 2008). Gateways still have a strong position in at least some of their service areas, as hinterlands never overlap completely. De Langen (2007) confirmed this notion, by exemplifying that Southern European ports clearly had a distance advantage for cargo from Asia, however most of the cargo is still routed via the Northern ports. Notteboom (1997, 2010) reported similar findings. It is also widely accepted that supply chains are becoming increasingly footloose, but it is less clear which elements of inertia remain (OECD, 2008). Contrary to many other findings however, Menezes et al. (2007) reported that port substitution was small. Authors find that the degree of substitution between the major East coast ports in Australia was small (Brisbane, Melbourne, Sydney). This suggests that ports have substantial market powers,

actual price mark ups are smaller than what their model would suggest, so the ports' monopoly power is limited by certain factors other than price competition. It should be added that all three ports do not have an overlapping hinterland, hence their results are not surprising. Even if any of the three ports offered a price advantage, it is unlikely port users would switch only because of the vicinity of the port i.e. port's location.

Yeo et al. (2008) posited that port competition has shifted away from 'hardware and labour' towards software and technology and that the most competitive ports rely on efficient hinterland logistics. They found that port competitiveness was achieved by port service, hinterland conditions, availability, convenience, logistics costs, regional centres and connectivity. Their analysis also implied that port competitiveness required more infrastructure combined with high levels of operational management. Enhanced port competitiveness, as perceived in Korea and China, does not require just increased port investments, but also high-quality service and technology focused port operations. There are also views that the trend is pointing towards shipping lines as the key decision makers in determining port choice, since shipping lines are becoming increasingly integrated in global logistics services (Yap et al., 2006). Being embedded in the global logistics chains is, according to the authors (2006), pivotal, since increasing attention is being given to the shipping lines to provide logistical services on a global basis in an integrated approach. However, it is also suggested that ports are elements embedded in value driven chain systems and that it is important for the port and its service providers to offer sustainable value. Cargo flows will seek out routes that offer the lowest cost for a given service level. As a node in the logistic chain, container ports that can help achieve this will be chosen as the port of call. Moreover, the concentration of services by shipping lines at the primary load centres might lead to intense competition between the primary load centres and ports located in close proximity that share their hinterlands. Ultimately, ports are just a single node in the international logistics chain. They must continuously strengthen their hub position by forging closer links with their hinterland and to respond to global trends, or they risk being side-lined.

### 1.3.1 Cooperation the way forward?

Due to the rising power of the shipping lines, and ever-increasing pressures on ports' infrastructures, as highlighted in section 2.3, many scholars are proposing cooperation between ports, particularly those sharing a common hinterland. Over 20 years ago, Notteboom (1997) already anticipated these pressures and suggested that ports should forge strategic partnerships. Song (2002) introduced the concept of co-opetition for the port industry, suggesting competition through cooperation. Hoshino (2010) suggested Japanese ports need to jointly cooperate to fight off the pressures, which caused their demise as Asia's shipping platform. Li and Oh (2010) claimed that the cooperation of Shanghai port and Ningbo-Zhoushan port is both necessary and emergent. Fancello et al. (2014) believed it was essential to promote strategic relationships among the Mediterranean port system

stakeholders. Twrdy and Batista (2014) claimed that the new trends in maritime transport favour the use of large container ships and that Northern Adriatic ports (NAPA) will have to join forces to attract shipping lines and their larger ships to this part of the Mediterranean. Acciaro et al. 2017 confirmed this notion and highlighted the importance of collaboration, both in marketing policies and hinterland infrastructure development. There are many possible types of cooperation between neighbouring ports, varying both in time, scope and in level of organisational integration, as discussed by Mclaughlin and Fearon (2013).

Scholars are already observing the cross-shareholdership between terminal operators in otherwise competing ports (Song, 2002) and are deducing that this is a step towards these new trends. Author (2002) also proposed that a joint venture of terminal operators and port authorities is one of the possible co-opetitive strategies. This is a sensible conclusion given that aligning interests of a commercial nature between ports may be a predicament. Wang et al. (2012) argued that cross-shareholding or a full merger was the most optimal way to coordinate commercial and operational strategies. Mclaughlin and Fearon (2013) agreed with this notion, however, they also argued that a merger as a partnership format was more likely when it was a part of a national economic agenda (e.g. China) or when the existence of ports was endangered by external forces (e.g. Copenhagen-Malmö). On the other hand, collaboration as a form of cooperation can still benefit all stakeholders, while maintaining the identity and autonomy of the ports and is thus arguably more appropriate and sustainable, particularly in the European port system context.

There are a number of successful cooperation examples. De Langen and Nijdam (2009) described the successful merger of Copenhagen-Malmö port in 2001. Ghent and Zeeland ports merged into the North Sea Port in 2017 and Ningbo merged with Zhoushan port in 2015. A number of other port alliances and cooperation examples exist in China (see Huo et al., 2018). As mentioned before, merger is not the only option. The Port of Seattle and the Port of Tacoma formed The Northwest Seaport Alliance, where members of both ports preside over the port authority. There are also cases where such cooperation seems sensible but did not materialise e.g. Los Angeles and Long Beach, Antwerp and Zeebrugge, Houston-Galveston, or did not realise its full cooperation potential e.g. the North Adriatic Ports.

It could be argued that port competition dynamics should be considered as one of the port growth factor. The justification is that when competition among ports is fierce, or when there is a lack thereof, this influences the port throughput. Furthermore, port cooperation strategy can overcome some impediments inflicted upon ports by 'technical factors'. For example, instead of making individual investments to overcome issues with naval accessibility or hinterland infrastructure, ports could coordinate their resources by complementing each other in their respective impediments. While the industry trend of port cooperation is promising, this topic remains under researched (Notteboom et al., 2018). We conclude that future research on port growth factors should include an evaluation of port competition/cooperation dynamics as well.

## 1.4 Conclusions and suggestions for further research

Port competition has been present in the maritime and shipping literature for a long time. The traditional approach has been to observe and analyse the factors that affect port choice. However, each stakeholder is driven by different motives and agendas, which results in different preferences of port choice factors. Listing and ranking factors are found to be insufficient, since they all drive costs in different ways in different cases. Supply chains are becoming increasingly footloose and complex, thus being included within wider supply chain networks has become a key consideration for ports. Port competition studies have focused on studying cases where competition occurs and why, while some attempts have been made to provide more universal frameworks to analyse port competition. We find that most studies focus on analysing port choice and port competition in isolation to one another, neglecting the fact that they are definitely intertwined concepts.

In this paper we focus our attention on obtaining better understanding of how ports achieve growth, enhance competitiveness and consequently increase their cargo throughput. In addition, our analysis primarily considers developments related to containers as a transport unit, given that this market segment has the biggest growth potential for the majority of ports. We do so by firstly discussing factors that are found to affect port growth. We compile a table by grouping them into four broader categories. We conclude this section by evaluating which perspective on port choice factors should matter most in the future. We provide a conceptual discussion on the importance of perspective on possible directions of port choice decisions and relationships among different port stakeholders. In the final section we discuss the evolution of port competition and conclude by introducing port cooperation, which is an emerging topic both in the industry and literature.

Several observations arise from this paper. First, we find that port growth factors are under review. Traditionally, focus was more on physical and technical attributes, however this has shifted over time towards the importance of hinterland infrastructure and even behavioural factors. Nevertheless, the listing and ranking of factors is insufficient, since they all drive costs in different ways in different cases. It is inclusion into wider supply chain networks, coupled with hinterland connectivity and capacity that have become the key drivers of port growth. Second, since there are many port stakeholders, discussions on whose perspective on port choice matters most, also emerge. In this paper we argue that satisfying the requirements dictated by the shipping lines seems a key strategic consideration for ports. Key arguments for this are that due to the colossal consolidation and integration, both vertically and horizontally, in the last decades, they have created monopsony-like conditions, resulting in enormous pressures on ports. Third, in contrast to port choice, there is more consensus on the topic of port competition, whereby literature generally recognises that ports, particularly those sharing common hinterlands, are in competition. We posit that port competition dynamics should be considered as one of the port growth factors, since it directly affects port throughput. Fourth, due to the rising power of the shipping lines and pressures on ports' infrastructures, cooperation between ports has been suggested. Cooperation can

take several formats, but the most effective are a merger or a joint venture. Among others, port cooperation strategy can overcome some impediments imposed on ports by the ‘technical factors’, but most importantly it can alleviate pressures imposed by the shipping lines. While the industry trend of port cooperation seems to be positive and emerging, this topic remains under researched in the literature. Further research should be done in providing an overarching and more universal framework for ports’ cooperation strategies and options.

## 2 PORT COOPERATION IN THE NORTH ADRIATIC PORTS<sup>4</sup>

### **Abstract**

Recent trends in port development show that ports are making increasing efforts to forge mutually beneficial cooperation strategies, particularly ports sharing a common hinterland. In this paper, we analyse the North Adriatic ports (Koper, Rijeka, Trieste and Venice) with a focus on two related themes. First, the complementarity of the North Adriatic (NAPA) ports in the container market is analysed based on port vessel service patterns and shipping line interviews. We operationalize the analysis of complementarity with an analysis of the effects of multiple port calls on the revenue required to make a call in a specific NAPA port economically feasible. We conclude that the inclusion of another NAPA port reduces the minimum required revenue for a call in an additional NAPA port.

Second, we assess the scope and depth of cooperation between ports. We map current and potential future cooperation using a 'cooperation matrix' with two dimensions: the involvement of stakeholders (limited vs. broad), and the depth of cooperation (pre-competitive vs. commercial). We use in-depth interviews with port authorities, terminal operators, rail-intermodal operators, major shipping lines and freight forwarders in the North Adriatic region to position the NAPA ports in the matrix. We conclude by discussing prospects of future NAPA ports cooperation.

**Keywords:** Port cooperation; North Adriatic; containers; stakeholders.

**JEL classification:** L90; R40.

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<sup>4</sup> This chapter has been published. Reference for the published article: Stamatović, K., de Langen, P., & Groznik, A. (2018). Port cooperation in the North Adriatic ports. *Research in transportation business & management*, 26, 109-121. The content of this chapter has been modified and adapted to a certain extent for the purposes of this dissertation.



## 2.1 Introduction

The North Adriatic ports traditionally encompass four ports in three EU member countries, Trieste and Venice in Italy, Koper in Slovenia and Rijeka in Croatia. All four ports are members of the North Adriatic Port Association (and will henceforth be termed the ‘‘NAPA ports’’). Ravenna, another Italian port, was also a member until 2012. Their exit from the association was attributed to the fact that Ravenna mainly serves the market of Italian region Emilia-Romagna and, unlike the previously mentioned ports, did not strive to serve the middle European hinterland. Ravenna re-joined the NAPA at the end of 2017. In the container segment, the focus of this paper, the NAPA ports jointly handled over 2 million TEU in 2016, up from slightly over 1 million TEU in 2007. This means the throughput has doubled in less than a decade. The growth is mainly achieved through attracting cargo that was previously shipped via ports in the Hamburg-Le Havre range (Notteboom, 2010). The NAPA region has attracted considerable attention from industry players in recent years, with e.g. a Drewry (2016) report concluding that the fastest route from the Far East to Munich is via Koper, with the MSC shipping line recently entering a joint venture with Trieste’s container terminal (Trieste Marine Terminal-TMT), and finally, the sizeable amount of infrastructure development projects co-funded by the European Union in all four ports, mostly pertaining to enlarging and expanding container terminals and upgrading rail and intermodal links with Central and Eastern Europe. From the academic perspective, the NAPA region has been attracting greater research attention (see Twrdy and Batista, 2013; 2014; 2016; Acciaro et al., 2017). The NAPA’s cooperation approach is to cooperate internationally and compete locally. However, as our analysis will reveal, the NAPA ports exhibit a low level of cooperation, especially on a strategic level.

Developments in the last decade have severely intensified the competitive landscape among ports. This has been caused by the concentration and consolidation among shipping lines and the increase in intermodality, which has enabled greater inter-range competition, as well as more recent initiatives such as ‘‘Belt and Road Initiative’’ (BRI), which is reviving the land trade route by rail between Asia and Europe (Casarini, 2016). These trends foster cooperation between ports, particularly those in adjacent areas. A number of authors have mentioned cooperation as a trend in the maritime industry (e.g. Notteboom, 1997; Wang, 1998; Li and Oh, 2010; Hwang and Chiang, 2010). The authors acknowledge that the type and format of cooperation are context-specific; nevertheless, most studies either categorize the types of possible cooperation (De Langen & Nijdam, 2009) or provide a context-specific analysis of port cooperation (Song, 2002; Yap and Lam, 2006; Hoshino, 2010). There have also been attempts to provide a universal framework for assessing the extent of cooperation between port authorities (McLaughlin & Fearon, 2013).

In this paper, we argue that *complementarity* among ports is a necessary condition for effective port cooperation among adjacent ports. This paper builds on the findings in the literature and contributes in two ways: first by enlarging the scope of analysed stakeholders. Previous research has focused mostly on port authorities and the benefits of their

cooperation. However, cooperation is only effective in the long run, if it generates commercial advantages. Assessing the benefits of cooperation from a commercial perspective requires an analysis of the involvement of all firms in a port cluster in the cooperative initiatives. Thus, unlike previous studies, we consider not only cooperation between port authorities and explore several potential value-creating strategies among commercial operators in port clusters. The second contribution of this paper is the conceptual clarity we provide for analysing complementarity between ports.

In the next section, we review the main literature on port cooperation and in the section thereafter, we set up a theoretical research framework by developing a matrix to classify cases of cooperation between ports. We also present our research design to assess the level of cooperation in NAPA within this matrix. In the next section, we provide a brief description of the NAPA ports and assess their current level of cooperation, based on the results obtained from detailed interviews with the stakeholders. In the following section, we first establish the case for the complementarity of the NAPA ports and then discuss the future prospects of NAPA port cooperation. In the final section, we summarize the results and suggest additional research on this topic.

## **2.2 Literature review**

Many scholars recognize that ports can no longer rely on serving captive hinterlands. Containerization has enabled greater intermodality, the expansion of international trade, the concentration of the shipping industry and the liberalization of transport markets, all of which has increased the intensity of port competition in shared hinterlands (Notteboom & Winkelmanns, 2001, Fageda, 2005, Seo & Ha, 2010). In light of the maturation of container traffic, which is closely linked to the maturation of the global economy (Rodrigue et al., 2013), but also, in the light of recent trends in port growth and competition, there is an increasing need for ports, particularly those sharing common hinterland, to forge mutually beneficial cooperation strategies. Already in the late 90s, Notteboom (1997) predicted that due to the concentration tendency among shipping lines, the pressure on port authorities in terms of efficiencies and costs would grow and suggested that the only way to counterbalance that pressure is for ports and terminals to cooperate and form strategic alliances. The term *co-opetition* was originally coined by Noorda (1993), meaning a mixture of competition and cooperation, thus having a strategic implication that those engaged in the same or similar markets should consider a win-win strategy. Song (2002) introduced the term *co-opetition* to the maritime industry. He explained that ports should compete through cooperation, effectively achieving win-win situations by proposing joint ventures and cross-shareholdership as the way forward. This is a sensible conclusion for ports that have complementary commercial interests. Jacobs (2007) observes that cooperation between Long Beach and Los Angeles ports seems prudent, since both ports depend on the same congested hinterland transport systems and face competition from other ports on the Pacific coast. De Langen and Nijdam (2009) identify three categories of cooperation among ports

in proximity and show for the case of the Copenhagen-Malmö port that even cross-national port authority joint venture can be successful and mutually beneficial. Hoshino (2010) suggests that Japanese ports *need* to collaborate with one another to survive the harsh competition from the Chinese ports. In the absence of anti-trust regulation, Wang et al. (2012) wonder why ports choose to compete at all, since potential gains are larger when ports cooperate instead. Furthermore, government agencies often encourage cooperation among ports. Consolidation in the maritime industry has gone hand-in-hand with greater efficiencies through the introduction of ever-larger vessels. Notteboom (2010) finds that compared to 1998, a weekly call in 2010 generated around three times more containers (around 300,000 TEU per year), due to the increasing ship size and associated increasing call size. The use of larger container ships provides an additional motive for cooperation, as ports that join forces may be better positioned to attract shipping lines. Moreover, ports in the wider regions become potential substitutes, thereby intensifying competition. Wang et al. (2012) argue that cross-shareholding or full mergers, if feasible, are the most optimal way to coordinate pricing and operational strategies in adjacent ports. McLaughlin and Fearon (2013) agree that some form of cooperation among adjacent ports is both favourable and appropriate, and note that mergers are more likely when they are part of a national economic agenda (e.g. China) or when the existence of ports is endangered by future prospects (e.g. Copenhagen-Malmö). Collaboration as a form of cooperation is feasible even when institutional inertia prevents mergers, joint ventures or cross-shareholding. Collaboration may be beneficial, while maintaining the identity and autonomy of the ports.

De Langen and Nijdam (2009) distinguish three levels of cooperation, namely: port authorities that have developed strategic cooperation with other port authorities in their vicinity in the form of joint holdings, investments and acquisitions; port authorities that have some form of cooperation, but not on a strategic level, and port authorities that do not have any form of cooperation with ports in their vicinity, despite being members of port associations (e.g. ESPO) or networks (e.g. Ecoports). Fremont and Lavaud-Letilleul (2009) distinguish between ports linked within a strait or an island, ports with different profiles and ports with similar profiles and argue the type of cooperation depends on the port profile. Fremont and Lavaud-Letilleul (2009) also argue that ports may change their profiles in cases when adjacent ports would consider building complementary relationships. For example, when one port has better nautical accessibility, while another has better terrestrial accessibility, ports could coordinate resources in a way to complement each other in their respective hindrances, thereby reducing the necessary investments. McLaughlin and Fearon (2013) provide a framework for assessing the extent of cooperation among ports in the form of a cooperation-competition matrix, which distinguishes the intensity of cooperation on one axis and the degree of competition on another axis. This framework allows them to assess whether and how intensive forms of cooperation can reduce competition.

## 2.3 Research framework and research design

### 2.3.1 Port complementarity

The core concept to assess the potential for commercial cooperation is complementarity. The term *complementarity* gained increased attention in microeconomics thanks largely to Milgrom and Roberts (see e.g. Milgrom, P., & Roberts, J., 1990; Roberts, J., 2007). They define complementarity as a relationship between two or more elements so that each element enhances the value of the other. Notteboom's (2009b) paper defines ports as complements and substitutes based on vessel calling patterns. If a container vessel in a specific loop calls at both ports (or at none of them), they are considered complements, if a container vessel calls at only one of the port pair in question, then they are considered substitutes. Notteboom finds that smaller ports typically act as complements to larger load centers, such as the case of Antwerp and Zeebrugge. However, Notteboom's operationalization of complementarity is not fully in line with the mainstream definition from Milgrom and Roberts (see above). A call pattern where a call at one port goes hand-in-hand with a call in another port may be because 'one element enhances the value of the other' but may also be because these ports are independent of each other. In addition, double call patterns at ports that are substitutes are possible. For instance, two nearby ports may have large volumes of captive cargo that justify a call in both ports, even though these ports continue to be substitutes for cargo destined for a common 'contestable hinterland'.<sup>5</sup>

In line with Merkel (2017),<sup>6</sup> the complementarity of two port calls can be assessed by analysing two different effects:

- The 'substitution effect' of a reduction of the generalized port costs of port A on port B. This effect may be either not relevant or negative. In general, for competing ports, the effect will be negative, as lower generalized port costs of port A lead to a shift of cargo from port B to port A.
- The 'demand effect' of a reduction of the generalized port costs of port A on port B. Such a demand effect may arise for two reasons:

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<sup>5</sup> As one possible illustration: ships may call in Ningbo and Shanghai given the large captive volumes, but Ningbo and Shanghai can continue to be substitutes for transshipment cargo, as well as cargo for inland waterway destinations along the Yangtze river.

<sup>6</sup>Merkel's (2017) study shows the 'complementarity of demand' in the Mediterranean ports by assessing the evolution of quarterly traffic volumes in the Mediterranean ports. However, such demand complementarity in our view does not necessarily imply that 'one element enhances the value of the other' but may be explained by the increasing economic integration of the Mediterranean economies leading to increasing volumes and increasingly similar economic cycles. Similarly, Twrdy and Batista's (2016) attempt to assess competition and complementarity based on past TEU volumes handled by the NAPA ports is in our view flawed, for one (as the authors themselves acknowledge) because of the capacity constraints that significantly affect the evolution of volumes and thus weaken the conclusions from their analysis.

- The lower total generalized transport costs of port A make the whole transport network cheaper, leading to additional demand.<sup>7</sup> This effect is very small, if not negligible, for a modest cost reduction of one individual port.
- A ‘range shift effect’, due to the increased attractiveness of the entire port range due to the reduced generalized transport costs in one port in that range. This may lead to a shift of volume for all ports in the range. Such a shift may occur because the lower generalized port costs of port A either make shipping to the port range in which port A and B are located more attractive, compared to other transport modes, or make the port range of port A and B more attractive compared to ports in other ranges.<sup>8</sup>

Given the above, the complementarity of call patterns (both ports A and B are called on) can in our view be regarded as a necessary but insufficient condition for complementarity. Ports can only be regarded as complementary when the sum of the two effects mentioned above (the substitution effect and the demand effect) of a reduction in the generalized costs of port A is positive. This is the case when the additional volumes for port B, due to the positive effect of the improved competitive position of the range as a whole compared to other ports/modes, is larger than the negative substitution effect due to the shift of cargo from port B to port A. Only in this case, does port A benefit from the improved competitive position of port B and vice versa. Whether or not that is the case for the NAPA is assessed in Section 2.4.

### 2.3.2 A ‘Cooperation matrix’ for classifying cases of port cooperation

This paper expands the analysis of port cooperation by proposing a new classification of cooperation between ports. In line with the literature discussed in the previous section, our matrix consists of two dimensions (see Figure 5):

- Commercial vs. Non-commercial cooperation. This distinction has previously been made, among others by De Langen and Nijdam (2009) and Donselaar and Kolkman (2010). We argue that, in a simplified way, this distinction is similar to the distinction between cooperation and co-opetition (introduced to the ports industry by Song (see e.g. Song et al., 2015)). Co-opetition implies cooperation while simultaneously competing. In this model, cooperation generally focuses on non-competitive issues such as lobbying

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<sup>7</sup> This can be considered as a version of the ‘income effect’: the higher global GDP (the equivalent for income of an individual) leads to additional trade, which positively affects all ports.

<sup>8</sup> As an example, the Great Lakes ports may be useful. Currently, the only significant container port in the Great Lakes area is Montreal. The development of an additional container port, for instance in Cleveland, would, alongside a possible ‘substitution effect’ (a shift of containers from Montreal to Cleveland), make the whole Great Lakes area a more competitive shipping destination. Thus, it may lead to a shift of cargo away from rail (for instance cargo with an origin or destination in Mexico, or the South of the US), and it may lead to a shift of cargo from the US East coast ports to the Great Lakes ports.

and environmental practices. Commercial cooperation leads to a shift away from competition, as joint propositions are developed.<sup>9</sup>

- Cooperation confined to the port authority (or port development company) vs. Cooperation across relevant companies in the port cluster. While most studies of port cooperation (implicitly) focus on the port authority (or port development company – in any case, one single actor, which is mandated to develop the port), we argue that port cooperation potentially can be much broader and involve other relevant companies in the port, such as terminal operators, shipping lines, hinterland transport companies and logistic service providers (see Van Der Horst and De Langen, 2008, for an overview of potential broader cooperative efforts in hinterland transport).

*Figure 5: Cooperation matrix for classifying cases of port cooperation*

|                       |  |                             |                          |
|-----------------------|--|-----------------------------|--------------------------|
| Nature of cooperation | Commercial   |                             |                          |
|                       | Non-commercial<br>(lobbying,<br>environmental<br>initiatives, .... |                             |                          |
|                       |  | Port authority              | Firms in<br>port cluster |
|                       |  | Involvement of stakeholders |                          |

*Source: Authors.*

In Section 2.4, this matrix is used to assess the case of cooperation in the NAPA.

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<sup>9</sup> While in theory it would be possible for ports to compete in one segment and cooperate *commercially* in another, in practice, we are not aware of cases where this works.

### 2.3.3 Research methodology

The case analysis of the NAPA ports focuses on container cargo. We acknowledge that focusing solely on containers is a limitation of our analysis,<sup>10</sup> since the results for one segment alone may not be (fully) representative of the level of cooperation among ports. There are several key reasons why our study considers containers only. Firstly, the share of tonnage throughput in containers among individual NAPA ports, with the clear exception of Trieste, is large (see Figure 6). Considering the NAPA as a whole, containers rank second after liquid cargo.<sup>11</sup> Secondly, containers have been recognized as the most profitable market segment with the biggest growth potential for all ports, which is in line with the general industry trends where cargo is increasingly moving in containers (McKinsey and Company, 2017). Finally, the expansion plans of the NAPA ports are mainly aimed at expanding container handling capacity.<sup>12</sup>

*Figure 6: Cargo type throughput split in percentages of total tonnage throughput in a single port and the NAPA as an entire region in 2015*

| <b>Cargo type split in % of total</b> | <b>KOPER</b> | <b>VENICE</b> | <b>TRIESTE</b> | <b>RIJEKA</b> | <b>NAPA-TOTAL</b> |
|---------------------------------------|--------------|---------------|----------------|---------------|-------------------|
| Dry bulk                              | 35%          | 32%           | 1%             | 38%           | 17%               |
| Liquid bulk                           | 16%          | 35%           | 70%            | 0%            | 48%               |
| Containers                            | 37%          | 22%           | 11%            | 41%           | 20%               |
| Ro-Ro                                 | 4%           | 3%            | 4%             | 0%            | 4%                |
| Other/General cargo                   | 7%           | 9%            | 13%            | 20%           | 11%               |

*Source: Eurostat.*

The research method consists of semi-structured expert interviews, as well as data analysis to assess whether or not the NAPA ports are complementary. We also use this data to assess the current level of cooperation and the future prospects of cooperation. We conducted a total of 15 interviews, part of which were executed in person and part by phone during the period of May – July 2017. Expert respondents were selected based on their position in their

<sup>10</sup> We also asked our respondents (see Appendix 2b question 14.) to assess a hypothetical situation where NAPA ports would agree on which cargo type category each of them would specialise in, given their existing specializations and capabilities, and thus create an ideal cooperation strategy. Their answers were that such a strategy is unattainable, since, among others, no port would forgo the most profitable and growing cargo category – containers.

<sup>11</sup> Controlling for the effect of Trieste's absolute weight of liquid cargo throughput, which is about 70% of the total tonnage throughput of all three other ports combined, containers would rank as the largest product category.

<sup>12</sup> See the development plans in Koper: <http://www.sloveniatimes.com/port-of-koper-expanding-container-capacity> and <http://www.zivetispristaniscem.si/index.php?page=static&item=17>; Rijeka: [http://www.portauthority.hr/en/development\\_projects/rijeka\\_gateway\\_project/container\\_terminal\\_brajdica](http://www.portauthority.hr/en/development_projects/rijeka_gateway_project/container_terminal_brajdica); Trieste: <http://www.oevz.com/en/news-en/expansion-plan-for-trieste-port-approved/>; Venice: <https://www.port.venice.it/en/the-new-container-terminal.html-0> & <https://www.vesselfinder.com/news/2319-Venice-plans-new-mega-port/>; [All accessed 27.01.2018]

organization, as well as their length of tenure in the companies they represented. In most cases, this meant that either the CEOs of the companies (freight forwarders, intermodal operators), country or regional managers (carriers) and commissioners and/or heads of R&D units (port authorities and terminal operators) were identified as experts. In certain cases, there were more participants in the interview from one organization. In total, we interviewed country managers or commercial managers of five major shipping lines for the NAPA region, four port authority representatives (commissioners, heads of research departments), two major rail-intermodal operators present in the region and four CEOs of freight forwarders from Italy, Slovenia and Croatia (with a presence in at least two other countries). Questions that were prepared in advance were personalized for four categories (carriers, freight forwarders, intermodal operators and port authorities). All respondents were asked to assess the current level of cooperation among stakeholders, to point out issues preventing better cooperation and to provide potential solutions in overcoming these issues. Respondents were also asked to consider several hypothetical NAPA port situations,<sup>13</sup> which were directed at confirming the issues that are hindering greater cooperation (see Appendix 2 for the lists of questions for all four interview categories). The respondent's answers were noted, and, after their reply, an oral summary of the reply was given to confirm that our understanding of the answer was correct. Respondents were promised anonymity, which the authors felt was necessary to allow the answers received to be as profound as possible.<sup>14</sup>

The data analysis was performed by collecting shipping line calling patterns for the NAPA region, as well as ocean freight rates, hinterland connectivity and maritime connectivity. This data is publicly available except for data on freight rates, which was collected over a two-year period by accessing the data of a forwarding company.<sup>15</sup>

## **2.4 Complementarity and cooperation in the NAPA**

Based on the conceptual discussion of complementarity, interviews and data are used to assess complementarity.

The NAPA region (see Figure 7) has undergone important changes in recent years. Most importantly, major carriers and alliances increasingly offer direct services to and from the NAPA. Currently (Autumn 2017) all major alliances or members thereof are calling at Trieste, Koper, Rijeka and Venice. ICTSI, a major international terminal operator company (TOC) has forged a long-term joint-venture to operate Rijeka port's container terminal (Adriatic gate d.d.), while a Polish logistics multinational (OT Holding) already holds a 20% share in Luka Rijeka d.d., the operator of all other terminals in Rijeka port. The

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<sup>13</sup> For example: if NAPA ports were in the same country and operated under the same legal and other frameworks, would there be more cooperation among them?

<sup>14</sup> Namely, certain respondents, if cited formally, would have to obtain approval from the institution's highest management on participation in the interview and for the answers provided, which could have influenced our research findings.

<sup>15</sup> The first author of this paper works with this forwarder.



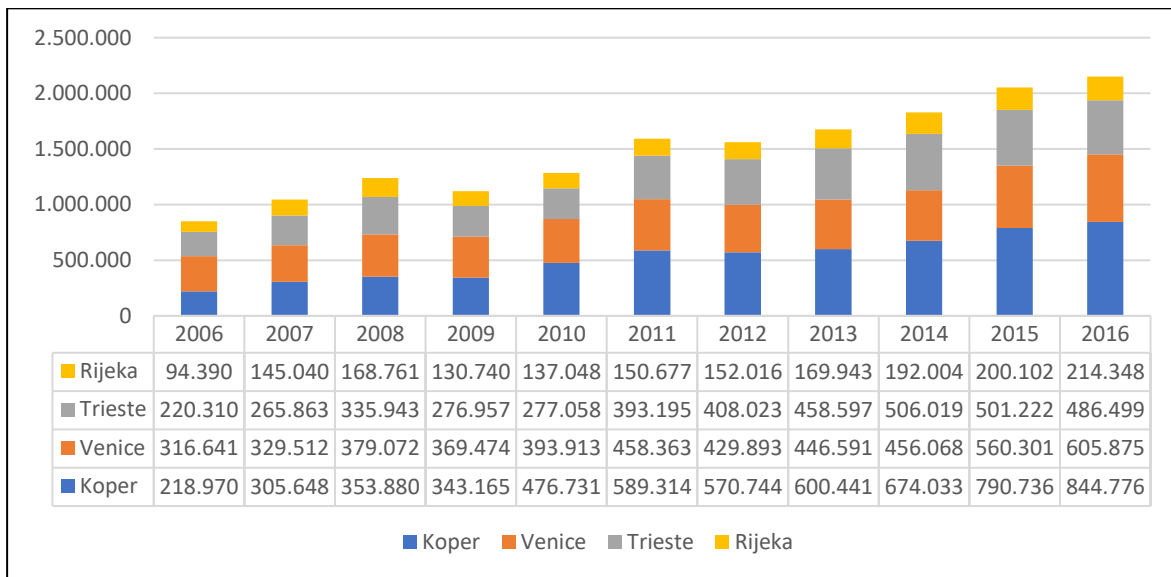
Mediterranean Shipping Company (MSC) acquired a major stake in Trieste's container terminal (TMT). Total container throughput in NAPA has grown more than 250% since 2006. Most noticeable growth has been observed in Koper, which now holds almost 40% of the total NAPA throughput. The development of container throughput and market share is provided in Figure 8.

*Figure 7: Location of the NAPA ports*



*Source: Port of Venice, 2015.*

Figure 8: NAPA container throughput during the 2006-2016 period



Source: Port of Koper, 2017a; Port of Rijeka, 2017, Port of Venice, 2017a; TMT, 2017a.

Unlike the Italian (Genoa, La Spezia), French (Marseilles, Le Havre) or German ports (Hamburg, Bremerhaven), where industries in direct proximity of the port generate a large shipping demand, the NAPA ports actively aspire on serving contestable hinterlands in the Central and Eastern Europe (CEE), aside from their immediate vicinity. Interviews confirmed that these hinterland markets are the key interest of and represent major growth opportunities for all four NAPA ports. Thus, the NAPA ports not only face inter-range competition from the Hamburg-Le Havre region (Notteboom & De Langen, 2015), but also compete against each other. This competition is not on a level playing field due to the differences in port policies and port management models (service port - Koper vs. landlord ports - Trieste, Rijeka, Venice).<sup>16</sup>

Notteboom and De Langen (2015) point out that the NAPA faces scale disadvantages compared to the northern hub ports, which hinder the further development of the hinterland intermodal network. Acciaro et al. (2017) conclude that the full potential of the NAPA region is not realised because of the distorted perception of potential port users<sup>17</sup> about the inefficiency and unreliability of the North Adriatic ports. This is congruent with Notteboom's (2010) finding that historical (the so-called 'memory' effect), psychological and personal factors influence the distribution of flows over ports.

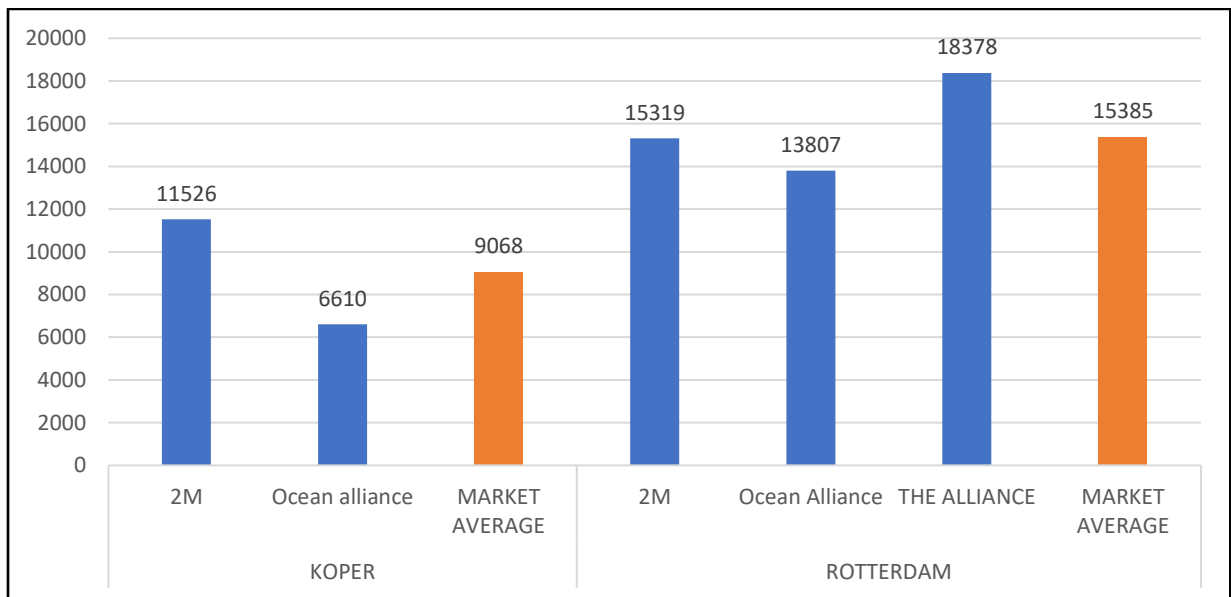
The interviews with the shipping lines reveal that the shipping lines decide on the shipping patterns based on considerations for the NAPA region as a whole and much less so based on the potential of one individual port. After the decision on whether or not to call at the region,

<sup>16</sup> Finally, NAPA ports face a common threat due to new railroad connections from Piraeus port to CEE, which are planned and already partly active.

<sup>17</sup> In their case, manufacturers in the South German region.

specific call pattern decisions for the NAPA ports are made. In this respect, the particularity of the NAPA is that it is somewhat remote from the major shipping routes, with generally no intermediate stops between a port close to the major shipping routes (such as Piraeus, Gioia Tauro or Marsaxlokk) and the NAPA ports. Thus, if a vessel is in the NAPA region, the cost of making an additional port call in the vicinity is relatively low, compared to the costs associated with sailing to the NAPA area in the first place. Our analysis reveals that due to the smaller ships used in the NAPA (9000 TEU) compared to North Europe (15000 TEU, see Figure 9<sup>18</sup>), slot costs for services to NAPA ports are higher (Notteboom & Vernimmen, 2009).

Figure 9: Average deep-sea container ship size in TEU

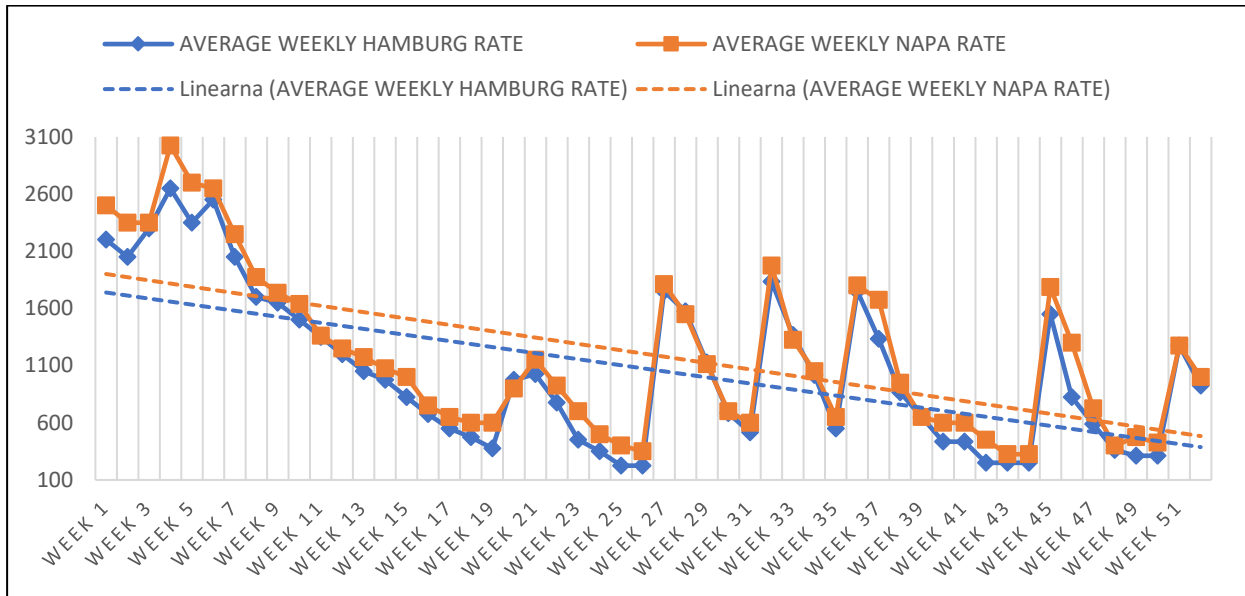


Source: CMA-CGM, 2017a; Maersk, 2017; YangMing 2017.

This is also confirmed by our comparison of westbound rates from Shanghai to NAPA and from Shanghai to Hamburg in 2015 and 2016. Despite the highly volatile rates in this period, we observe that the rates are approximate 100 US\$ higher in NAPA across the whole period (see Figure 10 and Figure 11). This is also in accord with the findings from a report of Drewry (2016).

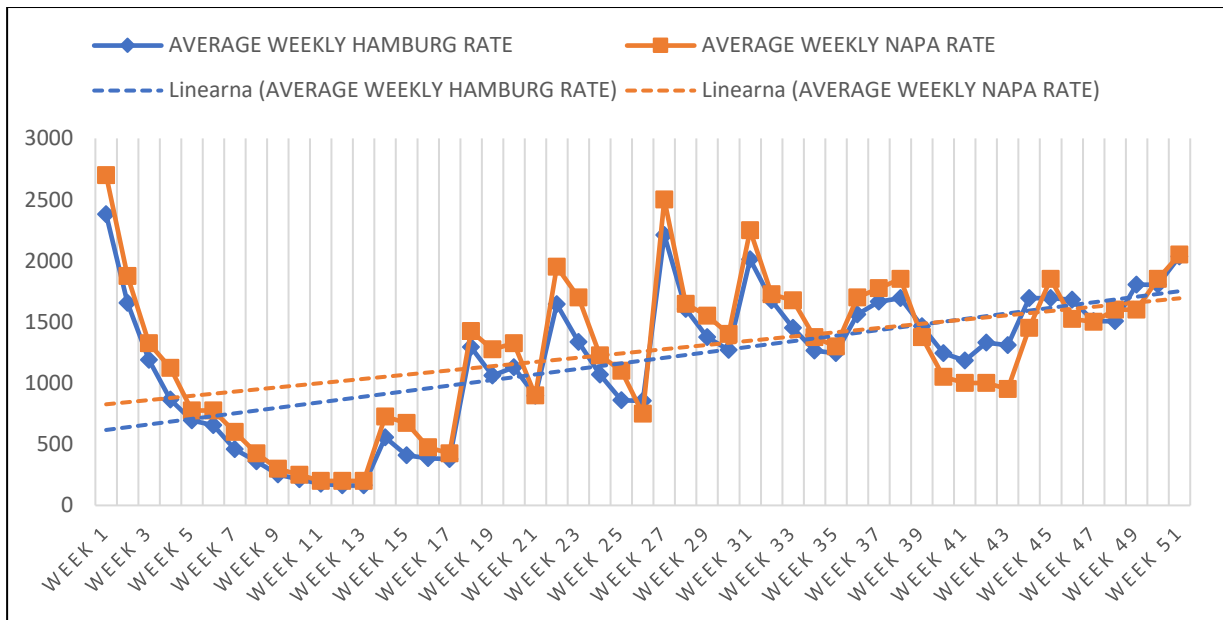
<sup>18</sup> The comparison between Rotterdam and Koper is representative of the North European ports and NAPA respectively. NB: The Alliance does not operate deep-sea call services to/from the NAPA region.

Figure 10: Average weekly rates on imports from Shanghai to Hamburg vs. Shanghai to the NAPA for 40' container in 2015 in US\$



Source: Authors' records.

Figure 11: Average weekly rates on imports from Shanghai to Hamburg vs. Shanghai to the NAPA for 40' container in 2016 in US\$

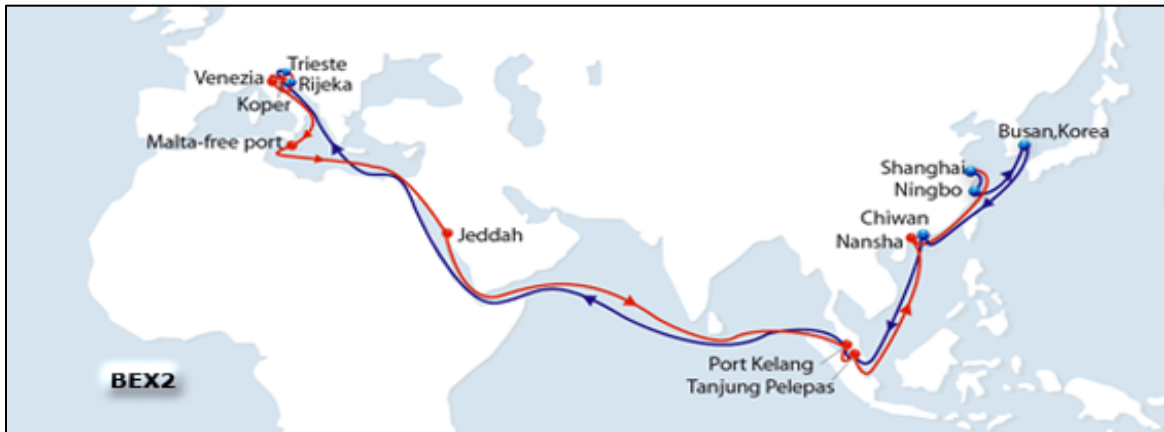


Source: Authors' records.

Several further observations arise from analysing the service patters of the NAPA. Namely, there is still a huge gap between the NAPA and North European port connectivity levels. For example, the only deep-sea services that call in the NAPA region are from the Far East (Asia) – an example of this is shown in Figure 12 – all other existing services are short-sea and

feeder services. No services connect the NAPA ports directly with South America or West & East Africa. Furthermore, the vessel size that operate these deep-sea calls are on average 6000 TEU smaller than the ones operated in the North, as seen in Figure 8. Finally, only two (2M and Ocean Alliance) of the three major alliances call at the NAPA ports with deep-sea calls.

Figure 12: Phoenician express service from Asia to NAPA operated by Ocean Alliance



Source: CMA-CGM, 2017b.

The limited connectivity is confirmed by comparing the liner shipping connectivity indexes. To ensure the comparability of our analysis, the indexes for The Netherlands and Slovenia are considered, since the main port in the Netherlands is Rotterdam and the main (and only) port in Slovenia is Koper, thus we can assume these results will be largely accurate for the individual ports of Rotterdam and Koper respectively. We observe the index to be around 96 for The Netherlands and around 33 for Slovenia (UNCTAD, 2017). This large gap in connectivity between the NAPA and North European ports is a huge disadvantage, but also considered an opportunity by the shipping lines and NAPA port authorities. Furthermore, by analysing the service patterns of the shipping lines, we observe two key findings. One is that the NAPA region is a *turnaround region* for shipping lines' service loops, meaning that they usually act as the last and the first call in a loop that returns to another continent, instead of an onward journey to other European destinations, as shown in Figure 12. This is because the additional sailing time into the NAPA region, in combination with multiple port calls, makes the product uncompetitive for potential onward ports such as Genoa or Valencia as the transit time would be at least 6 days longer than on services that do not call at the NAPA ports. Therefore, if the shipping lines do decide to call at the NAPA ports, the service loop calls at the NAPA as a turnaround region. Appendix 3 shows the current routing of the deep-sea services that operate from Asia to NAPA.

Following Notteboom's (2009b) approach, we analyse the service patterns of the NAPA ports since 2010. All deep-sea calls always called at Koper and Trieste, regardless of the service loop or alliance. In fact, with the exception of the CYKHE alliance (which operated

in the NAPA mostly in 2015), all deep-sea services that have operated since 2010 always called at Rijeka as well. More recently, only the O3 alliance and today the Ocean alliance call Venice as well, while the 2M alliance serves Venice with a dedicated feeder vessel from Trieste. The interviews revealed that the main argument against calling at Venice as well is the insufficient draught. The service loop of the Ocean Alliance is such that only import cargo is offloaded in Koper and Trieste, with Venice as the last port of call, before export cargo is loaded again in Trieste and Koper thereafter. It therefore appears that shipping lines (at least in the Ocean Alliance) have made significant adjustments to their service loops in order to make the call in Venice feasible. Taking into account all the current container services (short-sea and feeder services) in the NAPA ports, we find that 94% of all services call at a minimum of two port pairs and 56% of services call at a minimum of three out of the four NAPA ports. The most frequent port pairs are Koper and Venice with 80% of all container services calling at both ports (see Appendix 3, Appendix 4 and Appendix 5). From this analysis, as well as from the expert interviews, we conclude that the main challenge for the NAPA ports is not attracting established NAPA services to their port, but rather attracting new services to the NAPA.

From the interviews with rail operators, we gather that they follow the cargo demand generated by the shipping lines' routing and service offer. Our analysis of the rail hinterland connectivity in NAPA (see Appendix 6) reveals that main overlap of markets is between Koper and Trieste (5 out of 6 markets are served from Koper and Trieste, while 1 market, Hungary, is served from Rijeka as well); however, closer analysis shows that the frequency of trains indicates some level of market segmentation. Namely, Koper has a supremacy over the Hungarian, Slovakian and Czech markets, while Trieste leads the German and partly also the Austrian market. Our interviews further confirmed that with the exception of the Austrian market, the ports generally do not overlap, further proving the complementarity of the NAPA ports. Thus, based on the call patterns and interviews, we tentatively conclude that the NAPA is a case where the demand effect seems to be greater than the substitution effect, and in line with our conceptual approach, the ports are complementary.<sup>19</sup> Three arguments justify this conclusion.

First, we have established that the call patterns reveal that all the ports are called at unless there is a draught issue (i.e. in Venice and previously also in Koper). This is a necessary condition, in line with Notteboom's (2009b) postulation; however, it is an insufficient one, because two ports with large captive hinterlands that compete for the same contestable hinterland are not complementary. Second, the joint market position vis-vis ports in other ranges can be improved, for instance with more deep-sea calls (e.g. South and North America). Given the need for sufficient volumes to make a 'turnaround service loop' economically viable, an increase of the available containers in one port actually increases the attractiveness of an NAPA call and thus increases the value of other ports. Third, even

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<sup>19</sup> This result differs from Twrdy & Batista (2016), whose analysis is inconclusive, but does not work with the same conceptual approach to complementarity.

though there is clearly competition for serving the hinterland, the existing intermodal hinterland services are largely complementary with little market overlap. From this analysis, we can conclude that the relations between the NAPA ports are complementary. This implies that all the stakeholders in the region benefit from a joint market approach.

#### 2.4.1 The NAPA cooperation

Despite the complementarity, the cooperation of the NAPA ports and firms in the port cluster has been limited. The Port of Koper had a stake from 2000 until 2004 in the Trieste container terminal concessionary (Port of Koper, 2017b), since the Port of Koper did not have the capacities to grow and extend its infrastructure to handle containers at the time. The Port of Koper also intended to partake with a share in the General cargo terminal in Trieste, but unsuccessfully (OECD, 2011). The only clear cross-border port cooperation initiative, which is still currently active, is the North Adriatic Port Association (NAPA). The NAPA as an association was set up by the ports of Ravenna, Trieste, Venice and Koper in 2010. Later, Ravenna chose to exit the association and Rijeka joined it. Towards the end of 2017, Ravenna re-joined the association. The purpose of the association is to raise awareness and promote the NAPA ports as the gateway to Central and Eastern Europe. Aside from joint marketing activities, members also participate jointly in obtaining EU funding for a variety of security, environmental and IT-connectivity initiatives. Finally, the association also invests efforts in coordinating and lobbying for the development of road, rail and maritime infrastructure. The latter in particular has often been criticized, since investment projects are not coordinated, even on a national level between Venice and Trieste (see OECD, 2011), let alone on a cross-border level (e.g. a second rail track in Slovenia vs. a direct rail connection between Koper and Trieste<sup>20</sup>). Thus, while some level of pre-competitive cooperation does exist between the NAPA ports, there has been no commercial cooperation. This conclusion is supported by the expert interviews with port authorities and firms in the ports. Port authorities do cooperate on common marketing and awareness raising activities, EU funding for common security and environmental projects, the sharing of research and NAPA market analysis. The private sector interviewees point out that there is cooperation between port authorities, but no cooperation between commercial, private players. In conclusion, current state of the cooperation in the NAPA can be seen in Figure 13 – quadrant 1.

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<sup>20</sup> The possibility of building a second rail track from Divača to Koper has attracted a lot of attention and debate in recent years (see e.g. ITF, 2015), as it is a relatively large infrastructure project development for the Slovenian economy, assessed to be worth over 1 billion € in investment. The project was proposed more than a decade ago, since it was then estimated, correctly, that the container throughput via the Port of Koper would continue to grow, due to which the existing railroad would become insufficient and saturated. To increase the flow of containers by rail, a second rail track was proposed. As a possibly cheaper alternative, a rail link between Koper and Trieste was put forward, where Koper would then be connected to the Italian rail network. However, this proposal never obtained sufficient political momentum, particularly from the Slovenian side.

#### 2.4.2 Challenges for broadening the scope of and stakeholder involvement in NAPA port cooperation

As set out in the previous paragraph, there is a case for NAPA cross-border port cooperation. Despite this, the cooperation of ports and firms in the port cluster has been limited. Expert interviewees provide several important issues preventing a larger scope of cooperation. For one, and despite EU membership, the NAPA ports follow different national policies and operate under different national legal frameworks. In the case of the Italian ports, until recently, even the differences in respective provincial administrations<sup>21</sup> presented obstacles to cooperation. Since large infrastructural developments necessitate government involvement, long-term coordination on a multinational level is challenging, not least due to the relatively frequently changing nature of the governments in the respective countries. Furthermore, different port governance models complicate more strategic cooperation. The ports of Venice and Trieste are public sector ‘landlord’ port authorities, while the Port of Koper and partly the Port of Rijeka are commercially operating service port companies. This means that the latter ports are also concerned with commercial topics, which they would have to coordinate with different, private, terminal operators in Italy. Some respondents have raised the issue of differences in the cost of labour, the costs of running the ports, the costs of piloting and other nautical services in ports, which create unequal market conditions. Our respondents were unanimous that given all the obstacles, the NAPA as an association has achieved some important milestones and has indeed shown that cooperation is valuable. At the same time, they admit that the association is underfinanced and should be run autonomously.<sup>22</sup> Finally, they claim, radical political and strategic decisions would have to be made for significantly increased cooperation to emerge, which they consider to be unlikely in the foreseeable future.

Since the port authorities have little influence over calling patterns or shipping lines, the involvement of private firms in the port cluster is necessary in efforts to initiate commercial cooperation. In addition, private firms have little, if any, incentive to develop deep non-commercial cooperation. Thus, in Figure 11 quadrant 2 and 4 do not present feasible options to expand cooperation. The only potentially feasible option is the joint involvement of port authorities and private firms, especially TOCs, in developing commercial cooperation. An example of such a cooperative market approach would be the joint approach of port authorities and TOCs to offer (temporary) rebates to shipping lines for developing new container services to the NAPA (after all, we have pinpointed this as a primary concern for all NAPA ports), when three or four ports are involved. Likewise, a NAPA-wide quantum rebate system for the shipping lines could be introduced, so that the overall NAPA costs would decline with increasing NAPA volumes. The issue with such strategies is that there is a need for collective action. We have discussed such potential initiatives with the

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<sup>21</sup> i.e. Trieste falls under the administration of the province Friuli Venezia Giulia and Venice falls under Veneto.

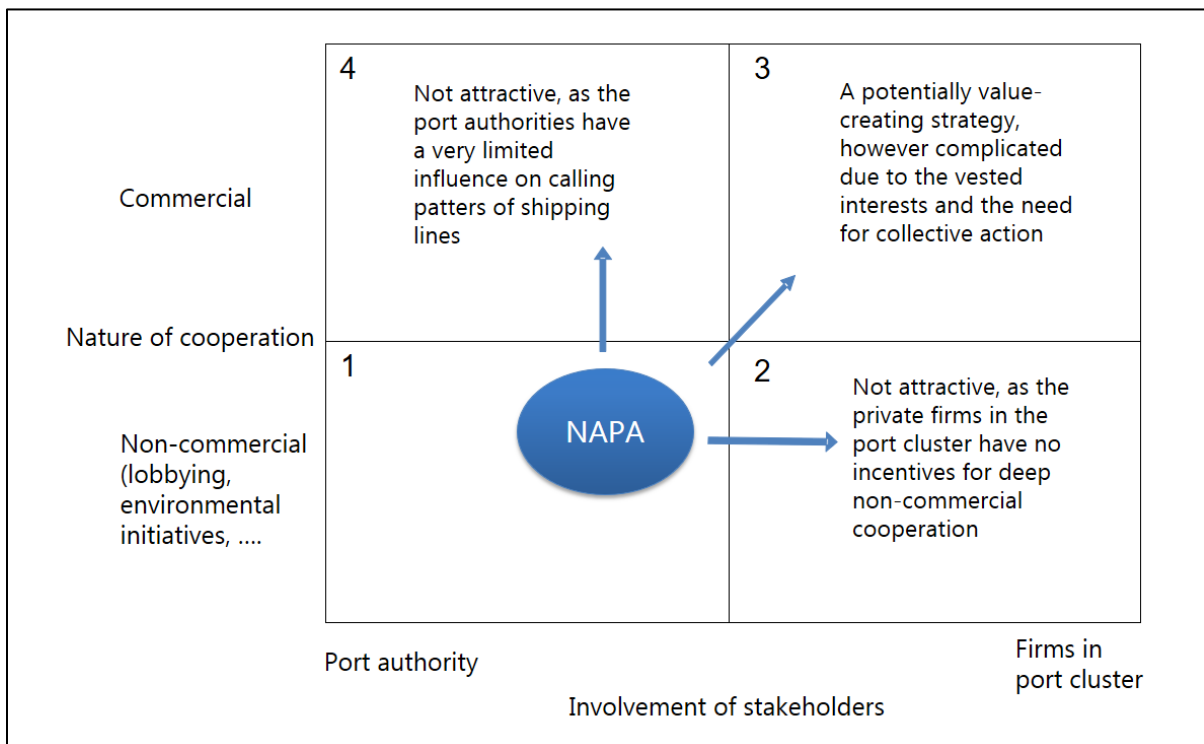
<sup>22</sup> Currently, the NAPA changes the presiding port every six months and it does not have a long-term leadership in place.



respondents and the responses were generally reluctant. One issue at hand is that due to the involvement of shipping lines in terminal operations (Trieste's TMT) and in various alliances, a conflict of interests prevents providing rebates to e.g. a competing alliance. In addition, this interferes with the strategy of those ports that pursue a neutral market position (Koper).

Lastly, port specialization, albeit potentially attractive due to the already existing complementarities in cargo handling types among the NAPA ports (see OECD, 2011), would require some ports to stall their container ambitions, which is unlikely to be accepted by the local port stakeholders. It can be concluded that profit-oriented commercial stakeholders will opt to seek cooperation with one another if mutual interests (e.g. an increase of container throughput) are aligned. Figure 13 summarizes our findings about the future prospects of cooperation between the NAPA ports.

Figure 13: Port cooperation matrix: future prospects of the NAPA



Source: Authors.

## 2.5 Conclusions

A growing body of academic literature argues in favour of port cooperation, particularly in the case of adjacent ports. This paper analysed the NAPA ports, a good case of adjacent ports with a clear case for cooperation. The NAPA region is characterized by inter-port and inter-range competition. This inter-range competition intensifies with the initiative to connect the port of Piraeus with the CEE.

To assess the potential for cooperation, we provide conceptual rigour for the concept of complementarity. This paper postulates that in order to consider port cooperation among adjacent ports, the analysed ports must be complementary. We posit that the analysis of call patterns is a necessary but insufficient condition to establish complementarity. We argue that when the sum of the ‘substitution effect’ and ‘demand effect’ is positive, ports can be regarded as complementary. Next, we develop a cooperation matrix for classifying cases of port cooperation as an expansion of the existing models for analysing port cooperation.

In light of the challenges faced by the NAPA ports outlined above, we assess the scope and depth of the current cooperation between ports using the cooperation matrix. We operationalize our analysis using in-depth interviews with port authorities, terminal operators, rail operators, major shipping lines and freight forwarders present in the NAPA region. Our finding is that the current level of cooperation between NAPA ports and firms in the port cluster has been limited to non-commercial lobbying and joint marketing activities, with little or no signs of strategic alignment and commercial cooperation. We then proceed to assess the complementarity of the NAPA ports based on shipping line patterns and interviews with the shipping lines in order to establish the necessary condition for port cooperation. We find that the North Adriatic is a turnaround region for the shipping lines and that 94% of all container services in the NAPA call at a minimum of two port pairs, while 56% of all container services call at three out of the four ports. Secondly, we assess whether additional conditions are also met in the NAPA. We observe that the intermodal hinterland services are largely complementary. Also, given the need for sufficient volumes to make a ‘turnaround service loop’ economically viable, an increase in the available containers in one port actually increases the attractiveness of a NAPA call and thus increases the value of other ports. The NAPA ports would thus benefit from a joint marketing approach to attract new services to their region. Therefore, we conclude that the NAPA ports are indeed complementary. Finally, we consider the future prospects of cooperation in the NAPA ports from the perspective of the cooperation matrix. We observe that a potential value-creating strategy would be the joint involvement of port authorities and private firms, including TOCs, on the commercial front of cooperation. We propose several examples of such strategies. Nevertheless, due to the need for collective action with such strategies, we acknowledge that their implementation is complicated.

With these contributions, our paper builds on the growing literature favouring port cooperation. In addition, it expands the current level of port cooperation analysis, by offering an analytical tool that expands the scope of the analysed stakeholders, as the debate thus far has been limited to port authorities only. However, cooperation is only ultimately effective if grounded on commercial pillars, which is why the involvement of commercial stakeholders in this analysis is pivotal. We also extend the conditions that need to be met when assessing port complementarity. The cooperation matrix that we propose is universally applicable when analysing port cooperation in adjacent port clusters. We also discuss common challenges that complementary ports face when enabling greater cooperation.

Policymakers and institutional decision makers on port strategies need to enable certain key conditions, which can spur cooperation between commercial stakeholders. Due to the dynamic nature of the maritime industry, further research and fine-tuning of existing models for assessing the level of port cooperation is expected and recommended. Finally, further research is also needed to explore additional cooperative market approach strategies.

### 3 REVISITING COOPERATION MATRIX FOR CLASSIFYING CASES OF PORT COOPERATION - CASE STUDY: NORTH ADRIATIC PORTS<sup>23</sup>

#### **Abstract**

The maritime industry has witnessed transformational changes due to the structural developments in the competitive landscape among maritime stakeholders. These trends lead to cooperation between ports, particularly those sharing common hinterland. This paper extends the existing frameworks for analysing cases of port cooperation among adjacent ports, by exploring the relevance of the presence or absence of a national border, thus proposing an upgraded version of the matrix for classifying cases of port cooperation. We operationalize our theoretical findings with a case study of North Adriatic (NAPA) ports. We conduct in-depth, semi-structured expert interviews with relevant port stakeholders in order to position the NAPA ports within the matrix, both as a group of ports and as individual port-pairs.

**Keywords:** Port cooperation matrix; North Adriatic ports; port cooperation; cross-border cooperation; port stakeholders.

**JEL classification:** L90; R40.

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<sup>23</sup> This chapter has been accepted for publication in the *Economic and Business Review* journal. Reference for the published article will be: Stamatović, K., de Langen, P., & Groznik, A. (forthcoming). Revisiting cooperation matrix for classifying cases of port cooperation - Case study: North Adriatic Ports. *Economic and Business Review*. The content of this chapter has been modified and adapted to a certain extent for the purposes of this dissertation.

### 3.1 Introduction

According to Robinson (1998, p.32), ‘Port growth is a function of the production outcomes of firms in the port’s adjacent space—or of that space to which it is linked, either in landward space or in areas linked across water or ocean’, which implies that the location is central to the development of port growth. This paradigm may have changed significantly in the last two decades. Many scholars recognize that ports can no longer rely on the loyalty of their users, since ports face increasingly international users, that may switch ports relatively easily. This has been caused not only by the increasing containerization of cargo, which has in turn enabled greater intermodality of the seaborne trade (Malchow & Kanafani, 2004), but also due the concentration and consolidation of the shipping industry, which has created large, vertically and horizontally integrated, global shipping lines (Seo & Ha, 2010). Recent developments, such as the ‘Belt-and-Road Initiative’ (BRI), which is reviving the old land trade route – Silk road – by rail between Asia and Europe, and the new shipping routes in the Arctic (Hong, 2012), also affect the competitive landscape among ports. All these trends lead to cooperation between ports, particularly those sharing common hinterland.

The majority of global seaborne trade by containers is now controlled by the ten largest vertically and horizontally integrated container shipping lines (UNCTAD, 2018; Alphaliner, 2019). Furthermore, the use of containers as a transportation unit is markedly increasing each year, due to the obvious benefits of standardization in transportation<sup>24</sup>. More recently, it has become apparent that the shipping lines are not only controlling the transportation by sea, port and terminal operations and hinterland delivery operations, but also the activities that were traditionally provided by the freight forwarders. These include, among others, customs processes, warehousing, cargo manipulation and last-mile delivery. Considering the trajectory of these trends, it has become imminent that the key decision making in routing of container traffic has shifted to the shipping lines. For ports and port authorities this should be a key strategic consideration.

Cooperation among ports has been mentioned by many authors as one of the possible forward going trends in the maritime industry (Notteboom, 1997; Wang, 1998; Park et al., 2006; Li & Oh, 2010; Hwang and Chiang, 2010). Most research describes and explains context-specific cases of port cooperation (Song, 2002; Yap & Lam, 2006; Seo & Ha, 2010, Wang et al, 2012 or more recently Wu & Yang, 2018; Trujillo et al., 2018; Huo et al., 2018). Some studies have categorized and classified types of possible port cooperation strategies (De Langen & Nijdam, 2009; Fremont & Lavaud-Letilleul, 2009). However, limited research has been made on providing an overarching understanding of port cooperation, which would not only help better assess the extent of port cooperation, but also shed more light on the options and possibilities for its improvement (McLaughlin & Fearon, 2013; Stamatović et al., 2018). Existing research frameworks are therefore of limited use in explaining varying levels of port cooperation or even absence thereof, in regions where

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<sup>24</sup> from approximately 200 million TEU in 2000 up to 750 million TEU in 2016 (World Bank, 2019).

various ports serve a shared hinterland. This paper attempts to build on the current understanding of port cooperation among adjacent ports by extending the existing framework for classifying cases of port cooperation and applies the new framework to the ports in the North Adriatic region.

The North Adriatic region is represented by five ports from three different EU member states: Ravenna, Venice, and Trieste in Italy, Koper in Slovenia and Rijeka in Croatia. As of late 2017, all five of them are also members of the North Adriatic Port Association (NAPA) and will be hereafter referred to as the NAPA ports. NAPA ports serve as an excellent, perhaps even unique, example for demonstrating the case for cross-border cooperation among ports in vicinity. Distance between the most distant ports Rijeka and Ravenna is 115 nautical miles. The shortest distance is the one between Trieste and Koper, which is merely 13 nautical miles (Figure 14).

Figure 14: NAPA ports by nautical distance



Source: Ports of NAPA, 2017.

These adjacent ports lie in three different countries, which despite all of them being members of the EU, have different approaches to port governance, transport infrastructure strategies and national agendas on development priorities. NAPA ports rely, largely, on serving contestable hinterlands of the CEE and SEE region, aspiring to become gateway for the afore mentioned regions. This is however complicated by the fact that, despite substantial

geographical advantages, they face scale differences to the North European hub ports (Notteboom & De Langen, 2015). The infrastructure capacity represent a large impediment and is unable to cope with the existing and growing throughput, which manifests itself in – railroad bottlenecks (Koper, Trieste, Rijeka), insufficient terminal quay capacity (Koper) or even lack of space for terminal expansion (Rijeka) and shallow shore unable to accommodate ultra large vessels (Venice), among others. Not only do NAPA ports face inter-range competition from the Hamburg-Le Havre region they also face inter-port competition, due to the dyssynchronous port policies and incongruent port management models (service port-Koper vs. landlord port-Trieste, Rijeka, Venice). Finally, initiatives to connect port of Piraeus to the CEE region by rail via Serbia up to Budapest in Hungary further endanger their ambitions. Also, since NAPA region is a turnaround region for the shipping lines (Stamatović et al., 2018), this requires additional economic justification of making a port call to NAPA. Finally, as already mentioned, given the omnipotent position of the shipping lines, bargaining power of each individual port is severely limited. Given the plethora of challenges upon them, NAPA ports seem as a clear case of adjacent ports, which would benefit from multilateral, cross-border cooperation. In addition, NAPA ports, as an example, allow us to evaluate national and cross-border perspective simultaneously.

This paper attempts to build on the current understanding of port cooperation among adjacent ports by extending the existing framework for classifying cases of port cooperation. First, we review the main literature on port cooperation and more specifically on the theoretical conceptualizations of the port cooperation that have been introduced thus far. Second, we observe several cases of port cooperation in adjacent ports in both national and cross-border contexts. Third, we propose an upgraded version of the matrix for classifying cases of port cooperation and propose several possible value creating strategies for each quadrant. Subsequently, we propose research design to evaluate the positioning of NAPA ports within the newly proposed matrix. Fourth, we present NAPA ports in greater detail, summarize the findings of our research and elaborate on the positioning of NAPA and potential future directions within the matrix, both from national and cross-border contexts. The final section summarizes our findings and suggests areas for further research.

## **3.2 Literature review**

### **3.2.1 Port cooperation as a survival strategy**

Malchow and Kanafani (2004) claim that port activity no longer depends on port's immediate hinterland, due to the development of intermodal transport. Fageda (2005) confirms this claim and adds that intermodal transport has enlarged the gravitational centres of ports and in many cases has given rise to competition between ports, where it was previously non-existent. De Langen (2007) goes further by saying that captive hinterlands have diminished, and that huge competition is in fact happening in the contestable hinterlands i.e. “those regions where there is no single port with a clear cost advantage over

competing ports’’. Acciaro et al. (2017) also find that port competition takes place on both sides: maritime and inland. Additionally, the rapid development of international container and intermodal transportation has drastically changed the market structure from one of monopoly to one of fierce competition in many parts of the world. Ports, especially those in the same region, became more substitutable, which has intensified competition between them for greater market share. On the other hand, while port competition is fierce, ports are not perfect substitutes i.e. they are not perfectly interchangeable or at least not without a cost (OECD, 2008). Gateways still have a strong position in at least some of their service area as hinterlands never overlap completely. De Langen (2007) confirms this notion by exemplifying that South European ports clearly have a distance advantage for cargo from Asia, however majority of the cargo is still routed via the North European ports. Notteboom (1997, 2010) reports similar findings.

In times when shipping lines are becoming large logistics conglomerates, amassing logistics assets both vertically and horizontally and thus controlling supply chains door to door, cooperation between ports results as imminent. The global top ten shipping lines now control over 75% of the global container market share and thus have strong leverage in negotiations with ports and terminals on terms and conditions. Furthermore, shipping lines deploy ever-larger ships to increase container-per-vessel utilization and thus reduce overall costs per unit carried. A weekly call of a 20.000 TEU vessel translates into about 300.000 TEU per year (Notteboom, 2010), hence winning or losing a weekly call service can have a considerable influence on port’s yearly throughput. This shows the impact of shipping lines on ports.

Considering above trends, there is a general consensus in the literature that port cooperation is a potentially beneficial strategy for ports. Cooperation between ports in adjacent areas can be instrumental both to attract shipping lines and to consolidate the bargaining power of ports vis-à-vis the shipping lines. Notwithstanding these potential benefits, we observe only a few examples in the world where cooperation actually does take place. Moreover, what can also be observed is that these cases normally happen within the same country and rarely across borders. A theoretical framework of port cooperation strategies should therefore attempt to encompass the observed varying levels of port cooperation strategies among adjacent ports. In the next section, we explore existing conceptualizations of port cooperation frameworks.

### 3.2.2 Current conceptualizations of port cooperation framework

De Langen and Nijdam (2009) propose three levels of cooperation namely: port authorities that have developed strategic cooperation with other port authorities in their vicinity in forms of joint holdings, investments and acquisitions; port authorities that do have some form of cooperation, but not at a strategic level and port authorities that do not have any form of cooperation with ports in their vicinity, beyond being members of port associations or networks (e.g. ESPO, Ecoports). Fremont and Lavaud-Letilleul (2009) provide a more



detailed classification of cooperation by registering different types of ports. They posit that the type of cooperation depends on the port profiles in the sense that strategy of cooperation is not universal for all ports in proximity. This is a sensible conclusion, since ports which specialize in RO-RO<sup>25</sup> cargo are not in competition with ports that specialize in container traffic. By analogy then adjacent ports which both specialize in container traffic are in competition. The authors therefore distinguish between ports linked in a strait or an island, ports with different profiles and ports with similar profiles. They go further in their proposal of the framework by claiming that ports may even change their profiles in cases when adjacent ports would consider building complementary relationship. Authors also provide good examples of mutually beneficial cooperation strategies, for example where one port has better nautical accessibility due to deep berth, while another has better terrestrial accessibility. Instead of each making individual investments to overcome these hindrances, ports could coordinate resources in a way to complement each other in their respective hindrances, thereby reducing the necessary investments. The ports that we analyse later in this paper fit perfectly to such example, for example, Venice port has shallow berthing while Trieste has natural deep-water access.

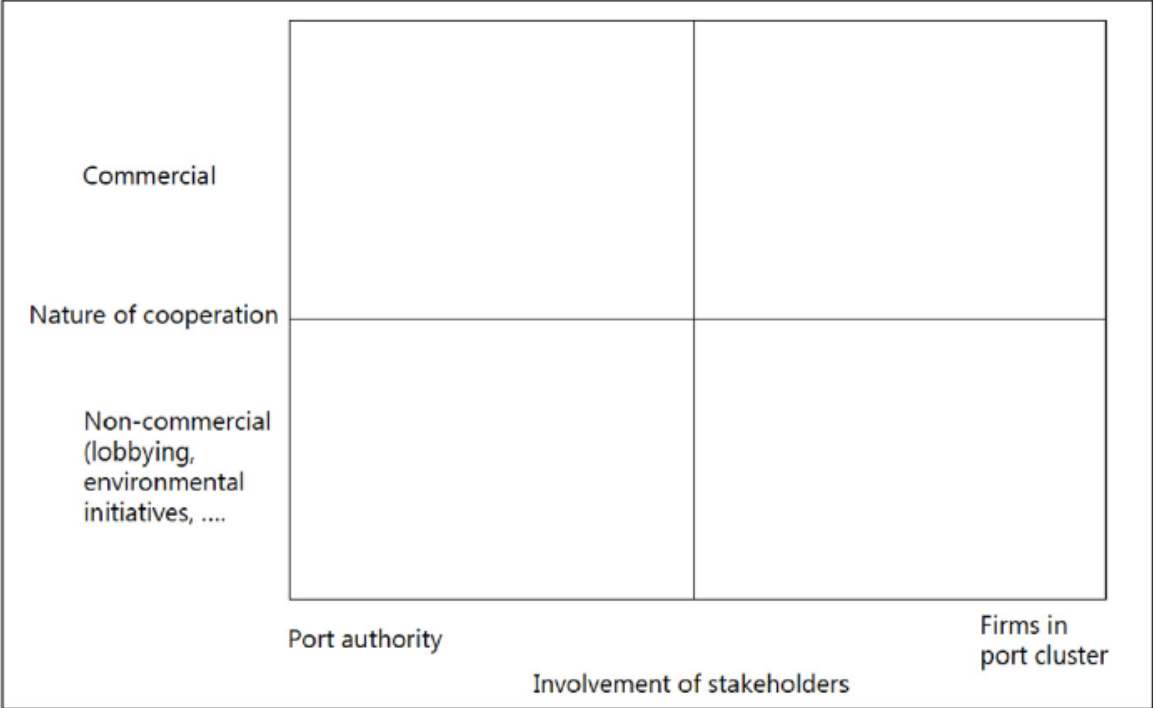
Mclaughlin and Fearon (2013) provide a comprehensive framework for assessing the extent of cooperation among ports by postulating a cooperation-competition matrix, which discriminates between the level of cooperation on one axis and the degree of competition on another axis. This framework enables the assessment of how different forms of cooperation reduce competition. Authors argue that ports should move towards the lower right-hand side of the matrix with higher degree of cooperation and higher private sector drivers and low competitive rivalry. This conceptual framework is useful for analysing ports with similar profiles (as per Fremont & Lavaud-Letilleul, 2009) sharing common hinterland, as it considers cooperation not only from a public but also from commercial perspective. More recently, Stamatović et al. (2018) developed a cooperation matrix for classifying cases of port cooperation (see Figure 15), which distinguishes between the depth of cooperation (commercial vs. non-commercial) and the level of involvement of stakeholders (port authority vs. firms in port cluster). The direction in which ports should consider moving is towards the upper-right quadrant, in which private firms in port cluster engage in commercial type of collaboration with joint collective action. All other quadrants are less attractive, due to the limited influence of port authorities on commercial decision, and on the other hand, due to the limited incentives for private firms to engage in non-commercial type of initiatives, such as lobbying or environmental initiatives. However, authors also draw another important conclusion not mentioned in the literature before – namely, for port cooperation to be effective, ports must first be complementary. As authors postulate, ports can be considered complementary when port A benefits from the improved competitive position of port B and vice versa. Complementarity thus becomes a necessary condition prior to evaluating port cooperation level among ports in vicinity. In other words, ports must first

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<sup>25</sup> Roll-On, Roll-Off (RO-RO): self-propelled vehicles, which are loaded on and off the vessels using their own wheels or a purpose-built tow vehicle.

be classified as complementary, for the evaluation of their potential cooperation strategies to be sensible.

Figure 15: Cooperation matrix for classifying cases of port cooperation



Source: Stamatović et al., 2018.

3.2.3 Examples of national and cross-border cooperation strategies

The following recapitulation of some examples of national and cross-border port cooperation will aid in better understanding of triggers and drivers of cooperation strategies. One well documented example is that of Copenhagen-Malmö port, which resulted as a merger of two ports, Copenhagen and Malmö, in 2001. Admittedly, the merger happened as a survival strategy due to the opening of the Öresund bridge connecting Denmark and Sweden, which in turn meant loss in passenger traffic, putting both ports to existential jeopardy. Nonetheless, the merger was completed and many new opportunities in logistics opened for the merged port. As De Langen and Nijdam (2009) document, success factors that led to a successful merger were a mix of commercial (leadership by port’s CEOs, momentum due to opening of the Öresund bridge, focus on cost reduction, better utilization of sources) and institutional (political and societal support, cultural commonalities) factors. Another example of a successful cross-border merger is a more recent one, between Ghent in Belgium and Zeeland ports in the Netherlands, which happened at the end of 2017 and is now called North Sea Port. The idea behind merger was very simply – efficiency, better economies of scale and removing overlapping activities with an increased possibility of optimizing cargo flows within the ports. Also, in Belgium, ports of Antwerp and Zeebrugge established a

commercial type of cooperation, whereby both ports offer the option of using Zeebrugge as import and Antwerp as export point. In addition, in times of congestion in Antwerp, vessels could be diverted to Zeebrugge. Finally, they also cooperate on joint commercial activities like fairs, customer visits, etc. (Hope, 2015), however merger, as the ultimate form of cooperation, has been ruled out so far (Pieffers, 2019). Another example is Ningbo-Zhoushan port merger which happened in 2015, whereby two competing ports merged into the world's busiest port by tonnage handled. Ningbo port specialized in container cargo, while Zhoushan port specialized more in the general and bulk cargo. By combining their port specialization portfolios, they are able to provide competitive offer serving the same clients without competing against each other. In general, Chinese national and provincial governments are able to facilitate mergers among ports where it appears to make sense, arguably with lesser difficulty, due to the centrally, state-planned economy (for a comprehensive list of port cooperation examples in China see Huo et al., 2018). Slightly different type of cooperation is that of Seattle and Tacoma in the US, now joined in the Northwest Seaport Alliance, where the governing party is a port development authority led by two ports respectively as equal members. Reasons for this strategic cooperation are broadly identical to the previous examples given – efficiency, economies of scale, better profitability and utilization of resources (see Yoshitani, 2018). On the other hand, there is also a handful of failed port cooperation attempts, e.g. Los Angeles-Long Beach (see Knatz, 2018) or Houston-Galveston (see Galvao et al., 2018).

### **3.3 Methodology**

#### **3.3.1 Revisiting matrix for analysing cases of port cooperation**

This non-exhaustive brief review of actual examples of port cooperation discussed in the previous section, indicates that there are both 'domestic' and 'cross-border' cases of port cooperation that can be analysed. Intuitively, overcoming certain obstacles both in commercial and institutional sense, is easier with a common political and legal framework. This is in line with McLaughlin and Fearon (2013) who posit that mergers, as the ultimate form of cooperation, are more likely when they are a part of national economic agendas. Existing frameworks assume, *ceteris paribus*, that the national political agendas and legal frameworks do not influence the likelihood and depth of cooperation, particularly at the institutional level. We believe however that the distinction between national and cross-border context is pivotal in understanding the complex dynamics of port cooperation between adjacent ports, hence why we propose an upgraded version of a matrix originally postulated by Stamatović et al. (2018). This version of the matrix clearly distinguishes between national and cross-border contexts (see Figure 16). However, the use of matrix is not limited to distinguishing cases that have actual, national borders between them. Cross-border can also apply to the first-level administrative divisions within the same country, such as states or provinces. As a rule of guidance, the matrix should be applied in such contexts,

where there are significant differences in policies, legislation and legal environments. This would consequently have a direct impact, particularly at the institutional level, on the extent and depth of possible port cooperation among the adjacent ports. We use this matrix to apply in our analysis of NAPA ports in the later section.

Figure 16: Upgraded cooperation matrix for classifying cases of port cooperation

|                                    |                | National context                    |                       | Cross-border context                |                       |
|------------------------------------|----------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------|
|                                    |                | 4                                   | 3                     | 8                                   | 7                     |
| Nature of cooperation              | Commercial     |                                     |                       |                                     |                       |
|                                    | Non-commercial | 1                                   | 2                     | 5                                   | 6                     |
|                                    |                | Institutional & public stakeholders | Firms in port cluster | Institutional & public stakeholders | Firms in port cluster |
| <b>Involvement of stakeholders</b> |                |                                     |                       |                                     |                       |

Source: Authors.

Furthermore, we expand the original explanation of the types of activities that can be classified in each quadrant for the matrix. This improves the value of the framework as a decision-making tool. Figure 17 suggests certain examples of what could pertain to each quadrant. The list is by no means exhaustive, it merely provides some specific examples of such strategies. In this context, there are also no differences between ‘national’ or ‘cross-border’ contexts on the possible strategies that are available to all port stakeholders, regardless if institutional or private. As a general guidance in terms of classifying cooperation strategies, we propose to consider the following.

Non-commercial quadrants represent types of cooperation where benefits do not directly translate into monetary terms. From the perspective of firms in port cluster, this could for example mean improvements in legislation, promotion of representation initiatives that represent the cooperating ports and lobby for improvements towards relevant institutions, and where benefits are spread towards all stakeholders. Usually, this would be done under the umbrella organisations such as shipping agents and brokers associations, port logistics

providers associations etc. Another such example would be joint investment into educational programmes and vocational trainings/workshops, which cater for the development of skilled labour force and improving the level of logistics competencies. These could be done even as a joint effort between institutional and private stakeholders (e.g. public-private partnership/competencies development centre). From the perspective of institutional stakeholders, non-commercial initiatives could mean joint marketing campaigns which promote entire region, not only a particular port, joint lobbying activities with relevant national and supra-national legislative bodies and various environmental initiatives, where benefits are also for the ‘public good’. Further such efforts could include development of single window IT systems, harmonisation of legislation on port governance, work and pay conditions etc. In general, the effects of non-commercial activities do not have a directly measurable monetary value, but instead have an overall positive effect in improving general position for the stakeholders in question.

On the other hand, commercial quadrants represent types of cooperation which have direct monetary impacts that will have a value directly (and only) for the stakeholders involved in a certain initiative. From the perspective of firms in port cluster, commercial type of cooperation could mean sharing of certain resources or doing joint investments into e.g. shared warehousing capacities, shared development of IT solutions, etc., or even common pricing strategies or guidelines on services provided<sup>26</sup> (e.g. freight forwarding services, terminal handling services etc.). From the perspective of institutional stakeholders, commercial activities could mean developing infrastructure projects that benefit more ports, such as dry ports, free-trade zone, rail links and connections. Another example could be common pricing strategy on port and pilotage services and even, as Stamatović et al. (2018) suggest, introducing quantum rebates on terminal handling costs to attract more shipping lines to a certain region. In conclusion, joint commercial efforts will have a direct (positive) monetary impact for the stakeholders (institutional/public or commercial) involved in such common strategies.

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<sup>26</sup> Without suggesting any cartel-like agreements on pricing, but more as a general guidance type of initiatives, e.g. minimum rate for rendering certain service in logistics industry. This is common e.g. in IT or Legal industry, where official representative bodies publish guidance on minimum hourly rates for lawyers, IT specialists etc.

Figure 17: Examples of cooperation strategies among stakeholders involved for each quadrant

|                       |                | National or cross-border context   |  |
|-----------------------|----------------|--|--|
|                       |                | Institutional & public stakeholders  | Firms in port cluster  |
| Nature of cooperation | Commercial     | <ul style="list-style-type: none"> <li>- Shared port and hinterland infrastructure projects (dry ports, logistics centres, free-trade zones, rail links and connections)</li> <li>- Common pricing for port services and pilotage (including rebates)</li> </ul>   | <ul style="list-style-type: none"> <li>- Common pricing for services rendered</li> <li>- Sharing of resources and capabilities (equipment, space and infrastructure, other capacities)</li> <li>- Joint commercial development projects (joint-ventures in buildings, equipment)</li> </ul>  |
|                       | Non-commercial | <ul style="list-style-type: none"> <li>- Joint marketing activities and promotion (fairs, events, customer visits)</li> <li>- Lobbying &amp; Environmental initiatives</li> <li>- Common IT &amp; EDI (single window) solutions</li> <li>- Harmonization of legislation (governance, work and pay conditions, taxation)</li> </ul> | <ul style="list-style-type: none"> <li>- Setting up national and/ or regional organisations for lobbying &amp; joint representation purposes (shipping agents and brokers association, port logistics providers association)</li> <li>- Investment in education of skilled labour force, logistics competencies development, vocational training programmes and workshops</li> </ul> |

Source: Authors.

### 3.3.2 Research design

We conduct in-depth, semi-structured expert interviews to assess the level of cooperation and in particular to position NAPA ports within the matrix proposed in the previous section. For our research project, we have conducted a total of 15 interviews, part of which were executed in person and part by phone. Expert respondents were selected based on their position in their organization and their length of tenure. We have thus gathered views from country managers or commercial managers of five major shipping lines for the NAPA region, four port authority representatives, C-level managers of two rail operators and of four freight forwarders from Italy, Slovenia and Croatia. Questions that were prepared in advance were personalized for four categories (carriers, freight forwarders, intermodal operators and port authorities)<sup>27</sup>. All respondents were asked to assess the current level of

<sup>27</sup> See full set of relevant questions per group category in Appendix 7.

cooperation among stakeholders, to point out benefits of cooperation and most importantly to highlight hurdles preventing higher levels of cooperation. Finally, we challenged respondents to provide potential solutions in overcoming these pitfalls, by asking them to consider several hypothetical NAPA port situations, such as ‘*would your answer differ, if all NAPA ports were located within the same country?*’. The respondent’s answers were marked, after which an oral summary of their reply was given to confirm that our understanding of their answer was correct. In addition, respondents were kept anonymous, since if they were cited formally, they would have to obtain approvals from their organizations, which could have had limited our findings. Interviews usually lasted between 1-2 hours and they took place between May and July 2017.

There are a few clarifications that need to be made. First, our research (both preparation and execution) has been done during the first half of 2017, during which Ravenna port was not yet (again) member of the NAPA organisation. It re-joined the organization in the late 2017 and it was thus not part of our analysis. We acknowledge that future research on this topic could provide insightful results, if Ravenna, as a third Italian port in the NAPA organization, would be included. Second, our focus is entirely on container traffic and throughput. Not only is the container traffic growing as a transport unit segment globally, it is also the most important market segment for NAPA ports, both in terms of profitability and future development and expansion plans. Finally, the interview transcripts and notes that were used as research material in this paper, were part of a larger research project conducted by the authors of this paper (see Stamatović et al., 2018, for the other publication of this research project).

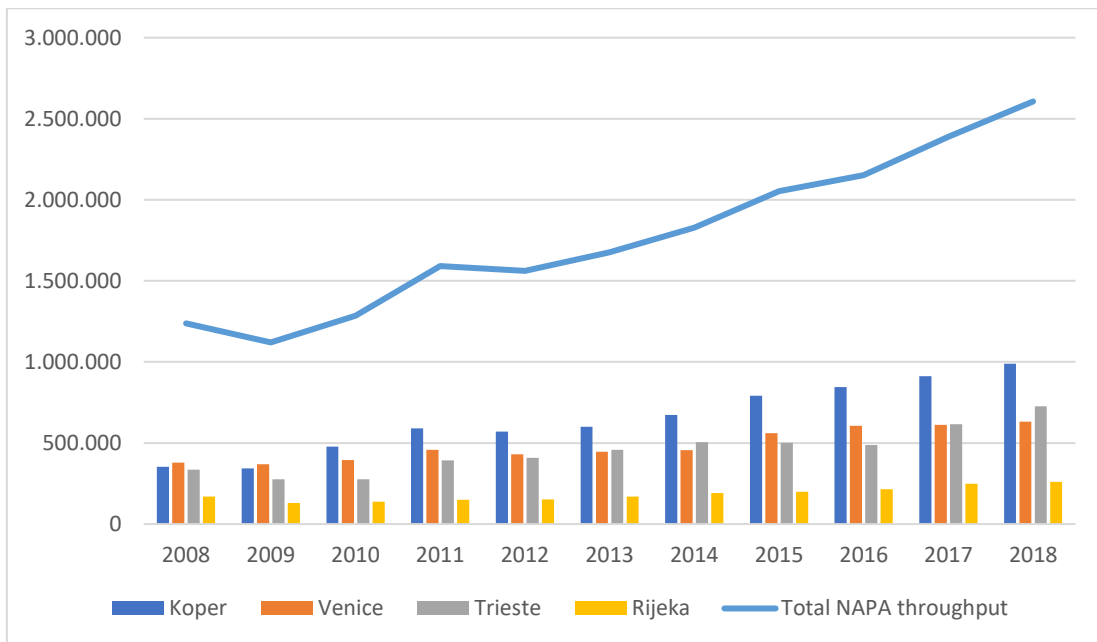
### **3.4 Evaluating port cooperation strategies in the NAPA**

#### **3.4.1 NAPA ports: brief introduction**

The NAPA region consists of five ports Ravenna, Venice, Trieste, Koper and Rijeka. However, since Ravenna re-joined NAPA organisation only in late 2017, as explained in previous section, we consider only Venice, Trieste, Koper and Rijeka for the purposes of our analysis. NAPA ports aspire to become a regional gateway for Central and Eastern and South Eastern European region, however arguably Venice mainly serves the Veneto region in Italy, while other three ports do indeed serve several markets, with some degree of overlap. In total

NAPA region has more than doubled its total container throughput in the last decade, exceeding 2.5 million TEU (see Figure 18).

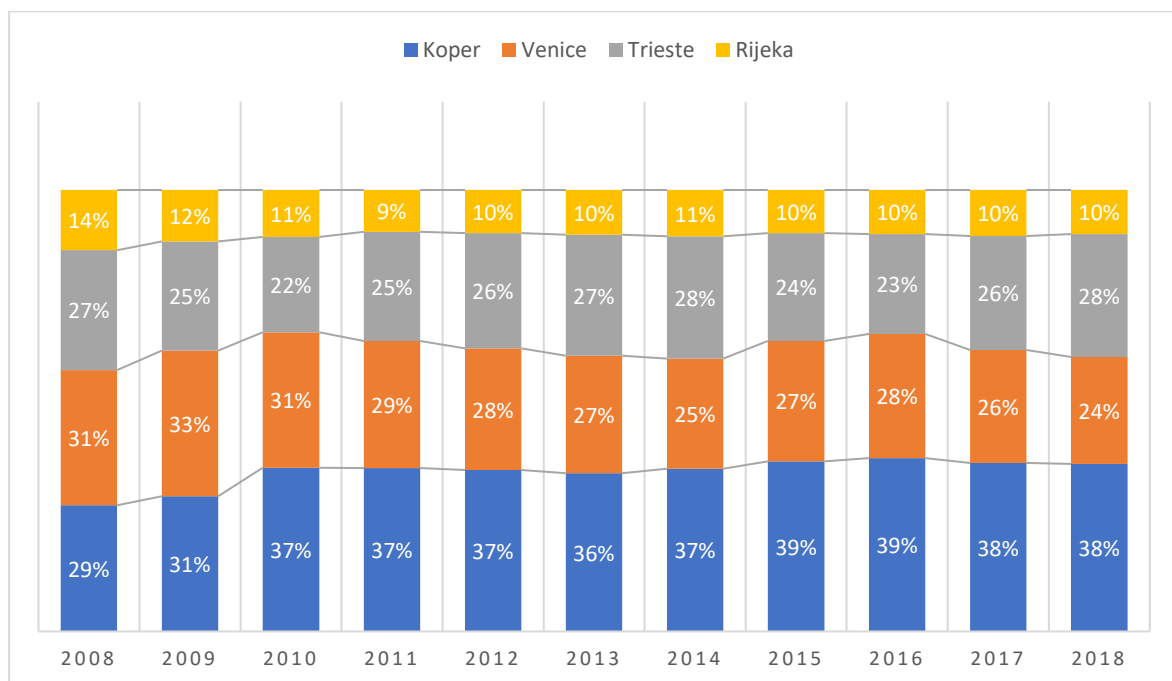
Figure 18: NAPA container throughput during the 2008-2018 period in TEU



Source: Port of Koper, 2019a; Port of Rijeka, 2019, Port of Venice, 2019; Port of Trieste, 2019.

Among them, Koper maintains the largest market share (40%), Rijeka the smallest one (10%), while Venice and Trieste share the remaining half in about equal shares (see Figure 19).

Figure 19: NAPA ports container throughput market share during the 2008-2018 period in percentage

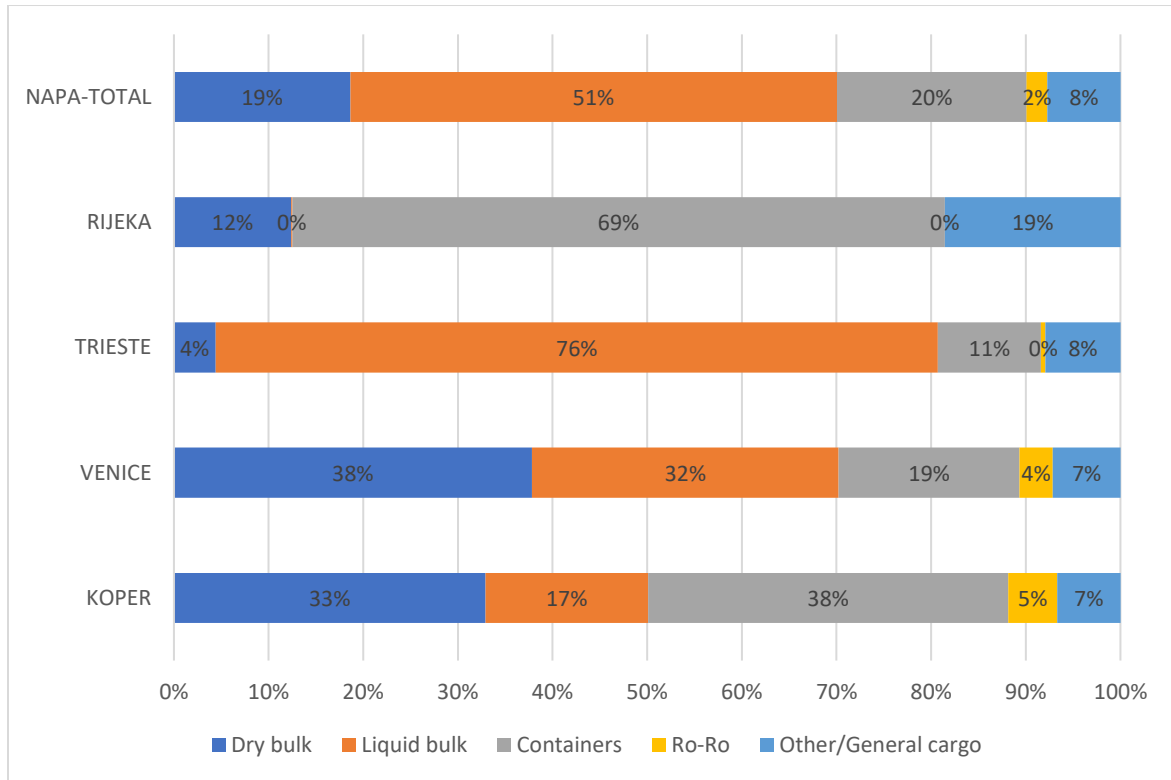


Source: Authors' own elaboration.



In terms of cargo type handled by weight<sup>28</sup> by NAPA ports, we can observe that liquid cargo is predominant in Trieste and containers in Rijeka, while Venice and Koper have a more evenly spread distribution between dry, liquid and container cargo (see Figure 20).

*Figure 20: Cargo type throughput split in percentages of total tonnage throughput in a single port and the NAPA as an entire region in 2017*



*Source: Eurostat (2019).*

All ports are multi-purpose ports, with general emphasis on container handling. It has been posited by Stamatović et al. (2018) that NAPA serves as a turnaround region for the shipping line's service loops (i.e. NAPA ports are the last and first calls in a service loop connecting two regions) and that NAPA ports are broadly complementary. The growth in NAPA ports' throughput in the last decade has been attributed to attracting cargo that has previously been routed via Hamburg-Le Havre range ports (Notteboom, 2010), due to its shorter nautical route from the Far East via Suez Canal, which in turn gave rise to the introduction of the direct deep-sea service loops with the Far East. All major alliances are calling NAPA ports, whereby Mediterranean Shipping Company (MSC) also owns a majority share in Trieste's main container terminal. Sizable amount of infrastructure projects, co-funded by the EU institutions, have taken place particularly in developing the hinterland railroad network, expanding and enlarging container handling capabilities and coastal dredging, necessary to

<sup>28</sup> However, cargo split per weight basis is partly biased in favour of heavy cargo – liquid and dry bulk – since containers are limited in terms of weight they can carry, while RO-RO cargo is by definition per unit basis and limited in weight as well. In other words, such comparison will indicate port specialization, but this cannot be entirely conclusive.

accommodate the largest vessels. Despite all the developments, the scale gap with the North European ports is still significant<sup>29</sup> (Noteboom & De Langen, 2015).

The NAPA ports have a shared exposure to risks brought by promotion of new routes serving the same hinterland (i.e. railroad to CEE from Piraeus, railroad from Mainland China to CEE, etc.). This implies that all stakeholders in the region would benefit from a joint market approach.

### 3.4.2 Positioning of NAPA ports in the upgraded port cooperation matrix

Observing the institutional cooperation efforts in the NAPA region in the past two decades, we can see the emergence of various cooperative initiatives and projects. The biggest cooperative achievement represents the North Adriatic Port Association (NAPA) established in 2010. All five ports are now active members of it (Ravenna, Venice, Trieste, Koper and Rijeka), with Ravenna's brief departure during the period<sup>30</sup> and Rijeka's joining a few years after the association was established. Prior to association's existence, there were some cross-investment and concessionary attempts between Koper and Trieste (see Port of Koper, 2019c and OECD, 2011, p.125), however without significant results. Theoretically, on paper, purpose of the association is to coordinate joint marketing activities in promoting NAPA ports, obtaining EU funding and partaking in various environmental and IT projects (e.g. single window, MOS4MOS, Fresh Food Corridor NAPA4CORE). The association is tasked also with coordinating the development of common infrastructure; however, this part has not had fruitful results.

One such initiative was to connect Trieste and Koper by rail, as an alternative to Slovenia building alone a second rail track between Divača and Koper (main bottleneck area in the Slovenian railway network). The possibility of building a second rail track from Divača to Koper has received lots of public and political debate, as it is a relatively large infrastructure project development for the Slovenian economy, assessed to be worth over 1 billion € in investment. As a potentially cheaper alternative, a rail connection between Koper and Trieste was put forward, where Koper would then also be linked to the Italian rail network. This proposal never obtained sufficient political momentum, particularly from the Slovenian side. Slovenia aimed for building the second rail track, partly with a loan from Hungary, until the newly elected government discontinued these efforts. The loan would have been extended in exchange, among others, for exclusive access and plot of land within Port of Koper<sup>31</sup>. As this deal did not materialize, Hungarian government continued the efforts of securing a strategic link and access to the Northern Adriatic. One possible alternative could have been Rijeka, as it being the closest to Hungary, however due to the underdevelopment of railway capacity, it probably did not appear as a viable option. In 2019 Hungarian government agreed

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<sup>29</sup> 3 million TEU (NAPA) vs. 34 million TEU (Rotterdam, Amsterdam, Hamburg) (Port of Koper, 2019b).

<sup>30</sup> Ravenna left NAPA due to the disputes over funding of Venice's offshore terminal (Ship2Shore, 2017).

<sup>31</sup> Current market share of Koper in Hungarian container throughput is estimated between 60-70% (Port of Koper, 2018b, slide 5).

with Trieste to purchase an old industrial part of the port, where they intend to build port and logistics infrastructure to serve the purposes of the Hungarian market and in 2020 this deal also materialised (Adriaports, 2020). Albeit, such initiatives may take a decade to come to force, it does show an intention even from the institutional stakeholders to play an active role in port choice and forge commercial types of partnerships.

There are more indications that activities of NAPA ports are still rather individual than joint efforts. For example, the Italian government is investing heavily in the railway network development towards Austria (and consequently also Germany). This seems to be a coordinated development with Austria, since Austria has also invested in excess of 5 billion € in the Koralm railway, which will connect western part of Austria to the north Italy (ÖBB, 2020). More recently, with the Belt and Road Initiative (BRI), Trieste is being singled out as the beacon of the Silk Road into the CEE region directly by the Chinese government and with, so it appears, support of the Italian regional and national governments (Scimia, 2018). Koper has, meanwhile, signed a Memorandum of understanding (MoU) with the Ningbo port (Port of Koper, 2018a), while other two ports do not seem to have gotten involved with the BRI at all.

This variety of initiatives, ranging from infrastructural development to general sales and marketing activities, could have been done jointly and more coordinated. This could bring benefits to the entire NAPA region, especially since NAPA is a turnaround region for carriers, meaning that carriers decide to make a call due to the potential of the region as a whole and not due to the individual port (Stamatović et al., 2018). Finally, there is also the issue of different port governance models in ports concerned, namely Italy uses the landlord model, while Slovenia and Rijeka operate under service port model. This prevents effective communication between various stakeholders due to the different legislature and decision-making authorities and responsibilities among communicating parties.

Expert interviews confirm the absence of any deep joint strategic type of cooperation between NAPA ports. From the perspective of port authorities, we gather that some pre-competitive levels of cooperation indeed exist. These are mostly due to and on behalf of the North Adriatic Ports Association. Port authorities acknowledge that since the introduction of Association, cooperation has improved and many successful projects were materialized, but at the same time they explain that the Association is underfinanced and not autonomous. Namely, presiding party rotates every 6 months between presidents of each member's port authority. In this way it is hard to assure autonomous and independent running of the organization and our respondents claim that they are considering changing the governance structure and framework in the future. In terms of successful projects, they list obtaining EU funding for various projects in fields of environmental and IT initiatives, common marketing activities such as participation in logistics industry themed fairs (Munich, Shanghai), exchanging and monitoring statistics, market analysis and R&D projects. Representatives of Italian ports admit that cooperation between them is now much better and more coordinated due to the initiatives made by the central government in Rome. They advise that

infrastructural projects are now considered for the benefit of all ports involved. They do admit however that provincial governments still cater more for the benefit of province (Friuli-Venezia Giulia and Veneto respectively) and not necessarily for the national benefit. An indication that provinces and national government in Rome are still not entirely in accord, has recently been shown with the departure of an otherwise praised and admired president of the Trieste port, Mr. D'Agostino. He was removed by the National Anti-Corruption Commission (ANAC) due to allegations over alleged conflict of interest by serving as the honorary president of the cruise terminal operating company and as the president of the Trieste port (ITJ, 2020).

On the other hand, cross-border cooperation on infrastructural questions is virtually non-existent. Respondents from port authorities advise that the cooperation efforts should not be limited to port development, but also, perhaps even more importantly, in the hinterland, with the development of dry ports, logistics clusters and free-trade zones. Another area for potential cross-border cooperation could be some level of port specialization, which is potentially attractive due to already existing complementarities in cargo handling types among NAPA ports (as already depicted in Figure 20). However, as explained by our respondents, in this case, ports would have to deliberately forgo cargo flow to another port and this is unlikely to be agreed, not at a national level and even less so at a cross-border level. They conclude that more cooperation, particularly on the level achieved by Copenhagen-Malmö port, would only be possible with radical political and strategic changes, which none of them consider realistic in foreseeable future. The major obstacle is that national (and even provincial in this case) governments pursue national political and economic agendas, which, due to the short-sightedness and even frequent-changing nature of political leaderships in the respective countries, makes any kind of supra-national coordination and cooperation on deep strategic level virtually impossible. This is partly understandable, but at the same time also problematic since the main point of the EU is cross-border, supra-national economic cooperation. Concerning the latter, port authority representatives also raise concerns of unequal legislative frameworks, work and pay conditions, thereby causing uneven costs of running of the ports, pilotage and nautical services in each respective country. Respondents conclude that the cooperation has been confined thus far to 'bottom up' and never as 'top down' approach, which they argue is another key impediment in enabling deeper level of cooperation.

From the perspective of commercial stakeholders (shipping lines, freight forwarders, rail operators) we gather that they are purely profit led and that they are willing to partake in initiatives which are expected to generate commercial benefits. Shipping lines follow regional guidelines issued by their respective headquarters, which do not discriminate between nor have preference for different countries but consider only market requirements and potential. There is no representative body or an umbrella organisation, which would cater for shipping lines interests, not on a national nor regional level. Respondents representing shipping lines claim that any port has a potential to become a hub port for the

region, costs and infrastructure permitting. Those carriers, notably MSC, who have a vested interest in Trieste, will have a natural preference for Trieste in terms of calling patterns and since MSC and Maersk are part of the 2M alliance, the same applies to Maersk. Therefore, it is not surprising that for the service loop from Far East to NAPA region and vice versa, the first and last call of the loop is Trieste. In addition, MSC is promoting hinterland connections to and from Trieste, rather than from other ports (see Chapter 1, section 1.2.4). Overall, shipping lines claim that cooperation is limited to alliances and vessel sharing agreements (VSA), primarily due to cost reductions and better vessel utilisation. However, we also learn that certain calling patterns of the alliances are not always profitable for all members, indicating that the shipping lines engage in an arms-length rather than strategic type of cooperation. This may of course not be limited to cooperation in NAPA region only. Our respondents also informed that when there is one general agent<sup>32</sup> representing a shipping line in all/some ports in question, more coordination and market strategy alignment is possible. Nevertheless, they conclude, each port/market ‘takes care of their own P&L<sup>33</sup>’.

On the one hand, freight forwarders are more active than shipping lines, when it comes to cooperation. Freight forwarders in all three countries have representative bodies, which have general lobbying and representation functions. Our respondents view these organisations as valuable and ‘serving their purpose’. In addition, these organisations and associations also promote educational and vocational training programmes in order to improve the level of work force competencies. An example of such an initiative in Slovenia is Logins-competence centre for logistics<sup>34</sup>. On the other hand, these organisations and associations do not cooperate cross-border. Similarly, as for the shipping lines, freight forwarders that act in both or all three countries will follow strategies which bring them the biggest profits, regardless of via which port in particular their controlled cargo is routed.

Respondents representing rail operators inform that they simply follow cargo demand, as routed by the carriers and from this perspective they have no deciding power over creating favourable conditions for all ports concerned. In addition, they claim they have little influencing power through which port cargo is moved. In other words, they simply follow the demand rather than actively create it. These observations are also in line with the assumptions made in Chapter 1, Section 1.2.4, depicted in Figure 4.

In summary, firms in ports cluster generally do not follow non-commercial strategies, neither on national nor cross-border level. There are some indications of non-commercial type of cooperation but limited within national context (e.g. competence centres). On the other hand, commercial initiatives can and do take place when profit interests are aligned. In this case,

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<sup>32</sup> This is valid for those shipping lines that are not represented in a port with their own company set-up, but via an exclusive agent, who acts on their behalf.

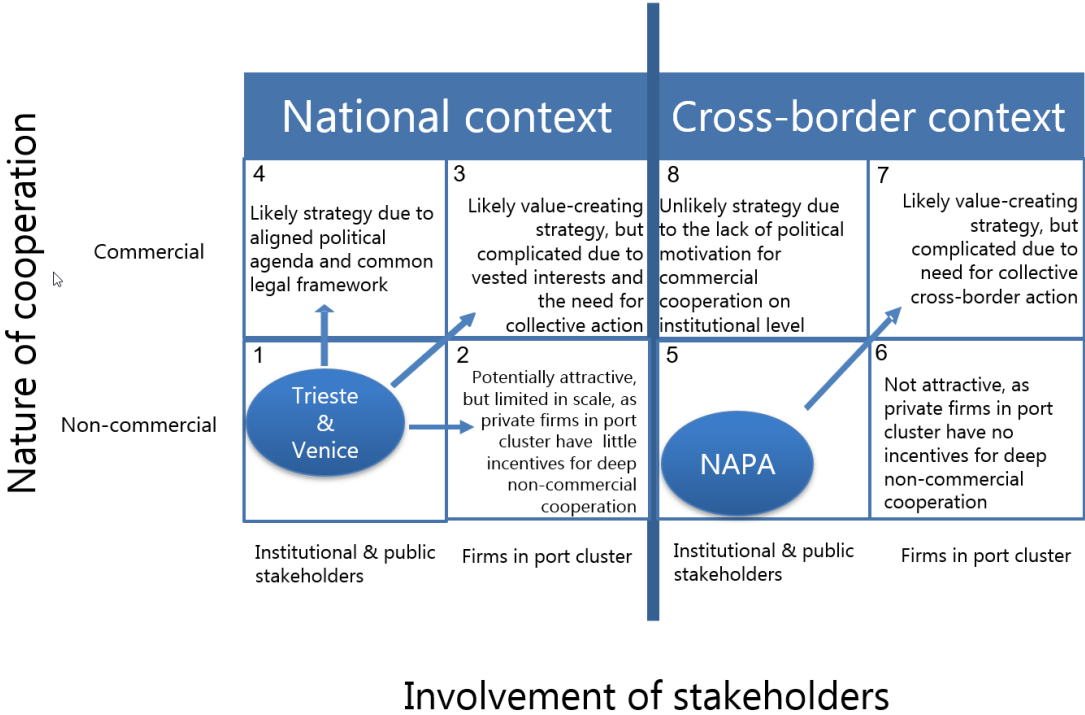
<sup>33</sup> Profit and loss account

<sup>34</sup> See [www.logins.si](http://www.logins.si) [Accessed 27.06.2020]

there is no difference between national or cross-border context, because firms do not orient themselves by the national borders, but purely by economic motivation.

Positioning of NAPA ports within the newly proposed matrix for classifying cases of port cooperation is therefore summarized in Figure 21. From national context we can position Trieste and Venice in quadrant 1, but slightly higher towards quadrants 3 and 4, given that our findings suggest better and higher likelihood of cooperation among institutional and commercial stakeholders, as compared to the NAPA as a whole. For that reason, we position NAPA lower in the quadrant 1, since there are only limited, pre-competitive cooperation strategies and initiatives, both from institutional and commercial stakeholders, taking place. With respect to the potential directions within the matrix, Venice and Trieste can consider moving towards quadrants 2, 3 and 4, due to the, on the one hand, aligned national legislation framework and political agenda and on the other hand, higher likelihood of aligned vested commercial interests of firms in port cluster. The latter is also valid for NAPA, since commercial stakeholders do not limit themselves by the national borders, as their interests are purely profit led. In addition, some low scale non-commercial cooperation is possible also between private firms in port cluster in national context (as shown by the example in Slovenia).

Figure 21: Current position of Trieste & Venice and NAPA ports in the upgraded matrix for classifying cases of port cooperation and their potential future directions within the matrix



Source: Authors.

### 3.5 Conclusions and further research suggestions

There is a growing academic literature supporting the notion that adjacent ports, provided they are complimentary, should develop common cooperation strategies. For our case study we chose North Adriatic ports (NAPA), which appears to be a clear case where cross-border cooperation would benefit all ports involved. This is supported not only due to their complementarity, but also since NAPA region is a turnaround region for ocean carriers, meaning the shipping lines will consider the justification of a NAPA port call due to the economic potential of the whole region and not due to an individual port. Furthermore, NAPA ports face inter- and intra-range competition, spurred by a variety of initiatives competing for the same catchment area.

In this paper, we first evaluate existing models and frameworks for assessing port cooperation strategies. We note that while existing models enable classification and evaluation of cooperation strategies, there is a gap in discriminating between national or cross-border contexts. Second, we observe several actual worldwide examples of port cooperation strategies in order to derive new theoretical conclusions. This leads us to propose an upgraded version of the matrix for classifying cases of port cooperation originally postulated by Stamatović et al. (2018). The new matrix distinguishes between cases of national and cross-border port cooperation strategies. Furthermore, we provide general guidance for different quadrants of the matrix, by providing examples of strategies that pertain to each quadrant. Third, we explain our research method for obtaining relevant information, which would enable us to position and evaluate cooperation level among NAPA ports. Another case in point in favour of NAPA ports is that it allows us to evaluate national and cross-border strategies simultaneously. We use in-depth, semi-structured expert interviews with relevant stakeholders (port authorities, ocean carriers, freight forwarders and rail operators) to gather insight and understanding on port cooperation strategies. Fourth, we introduce NAPA ports and proceed to analyse the insight gained from the expert interviews. We find that on cross-border level, NAPA ports are still at the very basic, arms-length type of cooperation, while on national level (that is between Venice and Trieste) we observe slightly more coordinated and deeper level of cooperation, though still in the very early stages of development. In evaluating potential future movements within the matrix for both Trieste and Venice and NAPA as a whole, we find that Trieste and Venice have the potential to move towards commercial and non-commercial level of cooperation for both port authorities and firms in port cluster, while NAPA only in the direction of the commercial level for firms in port cluster.

This paper adds to the existing and growing literature on port cooperation by proposing an additional dimension, which has not been considered before – that is the factor of national and cross-border context. We believe there is a marked difference between possibilities and extents of cooperation in these two separate contexts. The premise here is that given the large involvement of governments in national infrastructure development agendas, drivers for enabling a deeper and far-reaching cooperation among ports is far more likely in national

rather than in cross-border situations. This is confirmed by our analysis of ports and insight gained by the expert interviews. Due to the dynamic nature of the maritime industry, further fine-tuning of existing models for assessing port cooperation strategies is recommended. Finally, further research is also needed to explore additional cooperative market approach strategies and further analysis of successful and failed cases of port cooperation, to increase the understanding of success and failure factors when implementing port cooperation strategies among ports in vicinity.



## CONCLUSION

Port competition has been studied and observed by scholars for several decades. Due to the dynamic and fast-paced nature of the maritime and logistics industry, an array of developments in port competition dynamics were subjected to academic scrutiny. There were several research objectives of this dissertation. First, it considered whether advancements have been made in the understanding of port choice and selection criteria. Second, it observed how the competitive landscape in the port industry has evolved over time, and how this, in turn, has affected port competition dynamics and strategies. Third, it examined whether existing frameworks and conditions for analysing port cooperation are adequate, given the current state of knowledge. Most importantly it then set forth to analyse and assess the current levels of cooperation in NAPA ports and which additional strategies could be undertaken to improve the level of cooperation considering given conditions.

The first chapter focused on the evolution of academic thought on port competition, by observing port choice factors and discussing the importance of perspective in the evaluation thereof. It also discussed the developments in the port competitive landscape and introduced port cooperation. It was observed that port competition has been analysed from broadly three angles. The traditional approach was to identify and rank key characteristics over which ports compete. Initially, the focus was on physical and technical attributes, however it has shifted over time towards the importance of hinterland infrastructure and even of behavioural factors. For summarisation purposes, a table grouping port choice factors into four broader categories (technical, economic, port governance & legal environment and behavioural factors) was compiled. It has also been identified that these factors may vary depending on the decision maker's perspective, since it is pertinent which stakeholder is making the decision: shipper, freight forwarder or shipping line. Each stakeholder is driven by different motives and agendas, which results in different preferences of port choice factors. However, listing and ranking factors were found to be an inadequate approach, since all factors drive costs in different ways, in different cases, for the different stakeholders involved. Supply chains are complex and increasingly footloose and thus being included within wider supply chain networks, coupled with hinterland accessibility, connectivity and capacity has become far more relevant. In addition, due to significant consolidation and integration, both vertically and horizontally, in the last decades, shipping lines have created monopsony-like conditions, resulting in immense pressures on ports. It has been argued that satisfying the requirements dictated by the shipping lines should be a key strategic consideration for ports. On the other hand, port choice is also context specific. For certain ports, the weight of importance of the shipping line's decision may be disproportionately higher (or lower) compared to another port. Arguably, this issue is to some extent more pronounced with contestable hinterlands and landlocked regions, where shippers and freight forwarders must rely on the hinterland network service designed by the shipping lines, much more so than they would, if cargo origin or destination was in proximity of any one port.

In contrast to port choice, there is more consensus on the topic of port competition, whereby literature generally recognises that ports, particularly those sharing common hinterlands, are in competition. Port competition studies have mostly focused on analysing case studies where competition occurs, while only a few attempts have been made to provide more universal frameworks to analyse port competition. However, due to the rising power of the shipping lines and pressures on ports' infrastructures, academic discussion has shifted towards exploring port cooperation rather than the competition. Competing through cooperation – co-opetition – especially between adjacent ports, results as being the most prudent way to counterbalance the increasing pressures from the shipping lines. Cooperation exists in many formats, but the most effective is argued to be a merger or a joint venture. However, these are most likely when ports lie in the same country, or belong to the same administrative territory, and when interests from commercial stakeholders are aligned. While the industry trend of port cooperation seems to be positive and emerging, this topic remains under-researched in the literature. This motivated the research conducted in the second chapter, which attempted to provide an overarching framework for analysing port cooperation strategies.

The second chapter was divided into two related parts. The first part provided a theoretical conceptualisation of port cooperation and the second part applied this framework on the case study of NAPA ports, in order to assess current and potential future cooperation.

The first part established conceptual rigour and the importance of complementarity in assessment of port cooperation. It was postulated that in order to consider port cooperation among adjacent ports, the analysed ports must first be complementary. Complementarity has been defined as a relationship between two or more elements so that each element enhances the value of the other (Milgrom, P., & Roberts, J., 1990; Roberts, J., 2007). In terms of ports, if a vessel in a specific loop calls at both ports (or at none of them), they are considered complements, if a vessel calls at only one of the port pair in question, then they are considered substitutes (Notteboom, 2009b). However, the analysis of call patterns is a necessary, but insufficient, condition to establish complementarity. It was posited that only when the sum of the 'substitution effect' and 'demand effect' is positive, can ports be regarded as complementary. This is the case when the additional volumes for port B, due to the positive effect of the improved competitive position of the range as a whole, compared to other ports, is larger than the negative substitution effect due to the shift of cargo from port B to port A. Only in this case, does port A benefit from the improved competitive position of port B and vice versa. Next, a cooperation matrix for classifying cases of port cooperation as an expansion of the existing models for analysing port cooperation was developed. In line with the extant literature, the matrix consists of two dimensions, discriminating between the depth of cooperation (commercial vs. non-commercial) and the level of involvement of stakeholders (port authority vs. firms in the port cluster). The direction in which ports should consider moving is towards the upper-right quadrant, in which private firms engage in commercial types of collaboration with joint collective action.

All other quadrants are less attractive, due to the limited influence of port authorities on commercial decisions, and on the other hand, due to the limited incentives for private firms to engage in non-commercial types of initiatives, such as lobbying or environmental initiatives.

In the second part, the complementarity of the NAPA ports in the container market was analysed based on port vessel service patterns and shipping line interviews. The analysis was operationalised with an examination of the effects of multiple port calls on the revenue required to make a call in a specific NAPA port economically feasible. It was found that the inclusion of another NAPA port reduces the minimum required revenue for a call in an additional NAPA port. Another observation was that the NAPA region is a turnaround region for shipping lines' service loops, meaning that they usually act as the last and the first call in a loop that returns to another continent, instead of an onward journey to other European destinations. In addition, 94% of all container services in NAPA call at a minimum of two port pairs, while 56% of all container services call at three out of the four ports. Additional conditions for complementarity were also assessed. It was observed that the intermodal hinterland services were largely complementary and given the need for sufficient volumes to make a 'turnaround service loop' economically viable, an increase in the available containers in one port actually raised the attractiveness of a NAPA call and thus increased the value of the other ports. A joint marketing approach to attract new services to NAPA ports would benefit the entire NAPA region. It was concluded that the NAPA ports are indeed complementary. Next, the scope and depth of cooperation between ports was assessed. Current and potential future cooperation using the cooperation matrix were mapped, based on the in-depth interviews with port authorities, terminal operators, rail operators, major shipping lines and forwarders in the NAPA region. It was observed that the current level of cooperation between NAPA ports and firms in the port cluster was limited to non-commercial lobbying and joint marketing activities, absent of any strategic alignment and commercial cooperation. As far as potential future cooperation was concerned, it was noted that deep commercial cooperation between cross-border port authorities would be challenging, not least due to the political perspective. The only potentially feasible option would be the joint involvement of port authorities and private firms, especially TOCs, in developing commercial cooperation. Such potential value-creating strategies could be the joint approach of port authorities and TOCs to offer (temporary) rebates to shipping lines for developing new container services to the NAPA, when three or four ports are involved. Likewise, a NAPA-wide quantum rebate system for the shipping lines could be introduced, so that the overall cost of calling at NAPA ports would decline with increasing NAPA volumes. Nevertheless, due to the need for collective action with such strategies, their implementation would likely be complicated.

Further research is recommended to explore additional cooperative market approach strategies. Further research and fine-tuning of existing models for assessing the level of port cooperation is needed as well. For example, one possible impediment preventing larger scale

cooperation could be the fact that the NAPA ports lie in different countries, and despite EU membership, follow different national policies, operate under different national legal frameworks and port governance models. On the other hand, two Italian NAPA ports (Trieste and Venice<sup>35</sup>) are less subject to these limitations. The proposed matrix is limited in accommodating these different contexts. These limitations and suggestions for further research motivated the analysis conducted in the third chapter.

The third chapter filled in the gaps and caveats in the theoretical and practical parts of the proposed framework. Existing frameworks for analysing cases of port cooperation among adjacent ports were extended, by exploring the relevance of the presence or absence of a national border. An upgraded version of the matrix for classifying cases of port cooperation was proposed, which distinguishes between cases of national and cross-border port cooperation strategies. It was posited that the distinction between the national and cross-border context is pivotal in understanding the complex dynamics of port cooperation between adjacent ports. The premise was that given the large involvement of governments in national infrastructure development agendas, drivers for enabling a deeper and far-reaching cooperation among ports were far more likely in national rather than in cross-border situations. This assumption was confirmed by the analysis of several examples of national and cross-border cooperation cases and insights gained from the expert interviews. In addition, a more comprehensive explanation on the quadrants of the matrix was provided, by listing types of activities that could be classified in each quadrant, which has significantly improved the value of the framework as a decision-making tool. For general guidance, it has been discovered that the effects of non-commercial activities do not have a directly measurable monetary value, but instead have an overall positive effect in improving the general position for the stakeholders in question. On the other hand, the commercial quadrants represent types of cooperation which have direct monetary impacts that will have value directly (and only) for the stakeholders involved in a certain initiative.

These theoretical conclusions were operationalised by the reassessment and repositioning of the NAPA ports, both as a group of ports and as individual port-pairs, having used the data and information gained from the expert interviews. Greater insight into the current level of institutional and private stakeholders in NAPA ports was presented. From the perspective of port authorities, it was gathered that some pre-competitive levels of cooperation exist. These are mostly due to the North Adriatic Ports Association, in which the NAPA ports participate. Port authorities acknowledged that since the introduction of the Association, cooperation has improved and many successful projects, such as obtaining EU funding for environmental and IT projects, joint participation in logistics industry themed fairs (e.g. Munich, Shanghai), exchanging and monitoring statistics, market analysis and R&D projects were materialised. Representatives of Italian ports admitted that cooperation between them, including infrastructural projects, was now better coordinated and considered to be beneficial for all

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<sup>35</sup> It is acknowledged that Ravenna also belongs to the NAPA ports, however this research was done in early 2017, when Ravenna was not yet a member of the NAPA, hence why it was not part of the analysis.

the ports involved, due to the initiatives made by the central government in Rome. On the other hand, cross-border cooperation on infrastructure projects was non-existent. Port authorities also raised concerns about unequal legislative frameworks, work and pay conditions, thereby causing uneven costs in the running of the ports, pilotage and nautical services in each respective country. A potential cross-border cooperation strategy could be some level of port specialisation, which is potentially attractive due to the already existing complementarities in cargo handling types among NAPA ports. However, as explained by our respondents, ports would have to deliberately forgo cargo flow to another port and this is unlikely to be agreed, not at a national level and even less so at a cross-border level. Our respondents maintain the view that it is port users' decision on which port and transport route will be used. Respondents concluded that more cooperation would only be possible with radical political and strategic changes, which they did not consider realistic in the foreseeable future. The major impediment seems to be that national, and even provincial in this case, governments pursue national political and economic agendas, which, due to the short-sightedness and even frequent-changing nature of political leaderships in the respective countries, makes any kind of supra-national coordination and cooperation on deep strategic level improbable.

From the perspective of commercial stakeholders, it was gathered that they are purely profit led and willing to partake in initiatives which are expected to generate commercial benefits. Freight forwarders in all three countries have representative bodies, which have general lobbying and representation functions, but they do not cooperate cross-border. Freight forwarders that act in both or all three countries will follow strategies which bring them the biggest profits, regardless of via which NAPA port their controlled cargo is routed. Rail operators advised that they simply follow cargo demand, as routed by the carriers and from this perspective they have no deciding power over creating favourable conditions for any of the ports concerned. Carriers follow regional instructions issued by their respective headquarters, which do not discriminate between, nor prefer, any particular country. Carrier, notably MSC, who has a vested interest in Trieste, has a natural preference for Trieste in terms of calling patterns for the NAPA region. Since MSC and Maersk are part of the 2M alliance, the same applies for Maersk. In summary, firms in a port cluster do not follow non-commercial strategies, neither at national nor cross-border levels. Commercial initiatives can and do take place when profit interests are aligned. In this case, there is no difference between the national or cross-border context, because firms do not orient themselves by national borders, but purely by economic motivation.

In the context of the matrix, a higher likelihood of deeper and more coordinated cooperation among institutional and commercial stakeholders for Venice and Trieste as compared to the NAPA as a whole was suggested. With respect to potential future movements within the matrix, it was posited that Trieste and Venice have the potential to move towards a commercial and non-commercial level of cooperation for both port authorities and firms in

the port cluster, while for NAPA as a whole, it is only in the direction of the commercial level for firms in port cluster.

Due to the dynamic nature of the maritime industry, further improvements to the existing models for assessing port cooperation strategies were suggested. Further research was also advised for exploring additional cooperative market approach strategies and further analyses of successful and failed cases of port cooperation, to increase the understanding of success and failure factors when implementing port cooperation strategies among ports in a vicinity.

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## **APPENDICES**



## **Appendix 1: Summary in Slovenian language / Daljši povzetek disertacije v slovenskem jeziku**

### **ANALIZA DEJAVNIKOV IN TRENDOV RASTI TER KONKURENČNOSTI PRISTANIŠČ V SEVERNOJADRANSKI REGIJI**

Trgovina brez transporta ne bi bila mogoča. Transport je temelj mednarodne trgovine. To je še posebej pomembno v današnjem globaliziranem in medsebojno povezanem svetu. Zmogljivi in stroškovno učinkoviti načini za prevoz blaga omogočajo trgovino tudi na najbolj odročnih območjih sveta. Ladje prepeljejo približno 90 % svetovne trgovinske proizvodnje po teži (UNCTAD, 2018) in med 50 in 60 % po vrednosti le-te (Ministrstvo za znanost, 2017). Zdi se, da so možnosti za nadaljnjo rast pomorskega prometa ugodne tudi v prihodnosti. Velja za najčistejše prevozno sredstvo v smislu emisij CO<sub>2</sub> in stroškovno najbolj učinkovito prevozno sredstvo na prepeljano težo (ICCT, 2017). Globalizacijo trgovine spodbuja naraščajoči trend e-trgovine, ki v zadnjih letih beleži izjemno rast (Clement, 2019). Kontejnerji so omogočili standardizacijo in uniformnost ravnanja, kar je posledično omogočilo poenostavitev multimodalne uporabe kontejnerjev, s čimer so se znatno zmanjšali skupni stroški transporta in izboljšali tranzitni časi za transport blaga. Tudi tovari, kot so papir, les in druge surovine, ter riž, kavna zrna, sadje in zelenjava, ki so jih prej prevažala konvencionalne ladje, se zdaj prevažajo v kontejnerjih. To je igralo pomembno vlogo pri rastočem razvoju intermodalnega omrežja v zaledju, ki omogoča transport tovora praktično od vrat do vrat na stroškovno najučinkovitejši način, z bistveno skrajšanim časom in enostavno manipulacijo s tovorom. Ustreznost in pomen pomorske industrije sta zato nesporna. Glede na zgoraj omenjene trende bo njegov pomen vloge podpornika mednarodni trgovini v prihodnosti brez primere.

Pomorska industrija je v zadnjih nekaj desetletjih doživela transformacijske spremembe. Kot je že omenjeno, prevladuje in čedalje bolj narašča uporaba kontejnerjev kot transportnih enot. Leta 2016 je bilo prepeljanih približno 750 milijonov dvajset-čevljev ekvivalentnih enot (TEU) (Svetovna banka, 2019), kar je štirikratno povečanje v nekaj več kot 15 letih. Uporaba kontejnerjev vsako leto narašča in jo trenutno ocenjujejo na približno 60 % celotne pomorske trgovine (UNCTAD, 2018). Močno se je povečala tudi velikost ladij, ki prevažajo kontejnerje. Samo v petih letih je industrija zabeležila podvojitev velikosti ladij z 12.000 TEU na 24.000 TEU nosilnosti. Skupaj z naraščajočim razvojem infrastrukture zaledja trgovina, ki se prevažata po morju, ni več omejena na pristanišča in pristaniške zmogljivosti pretovarjanja, ampak, kar je morda še pomembneje, na zmogljivosti in zmožnosti intermodalnega omrežja zaledja. To je povzročilo pomembne spremembe v konkurenčnem okolju pristanišč, saj je omogočilo konkurenco med pristanišči, kjer je prej ni bilo. Konkurenčni pritiski med pristanišči so premešali globalno razvrstitev pristanišč in prisilili pristanišča k iskanju partnerstev in zavezništev, kar prej ni bila običajna praksa.

Konkurenčnost med pristanišči je bila v literaturi obsežno raziskana. Obstaja splošni konsenz, zlasti glede na prej opisane trende, da pristanišča tekmujejo med seboj. Konkurenca v pristaniščih se pojavlja na več ravneh, tj. znotraj pristanišč samih in med pristanišči ter znotraj in zunaj večjih skupin pristanišč (angl. intra- in inter-range) in med več interesnimi skupinami, tj. javnimi in zasebnimi (Notteboom in de Langen, 2015). Znanstveniki so večinoma analizirali in ugotavljali različne dejavnike izbire pristanišč, ki vplivajo na pretovor v pristaniščih. Te segajo od tradicionalno predlaganih fizičnih in tehničnih specifikacij pristanišča (npr. glej Yeo in sod., 2008, za pregled literature o teh dejavnikih za obdobje 1980—1996) do širokega kroga gospodarskih (Yap in Lam, 2006), političnih (Loo in Hook, 2002) in celo zgodovinskih (de Langen, 2007) in vedenjskih dejavnikov (Notteboom, 2010). Ravno nasprotno pa je glede prevladujočih dejavnikov izbire pristanišč precej manj soglasja, saj so, kot trdijo znanstveniki, ti odvisni tudi od perspektive določene interesne skupine, tj. pošiljatelja, logističnega podjetja ali ladjarja. Zaradi vse večje moči ladjarjev in vse večjega razvoja intermodalnih omrežij je vključitev v globalne dobavne verige postala pomembnejša od identificiranja in razvrstitve različnih dejavnikov, ki vplivajo na izbor pristanišč (Alonso in Soriano, 2008; Yap idr., 2006). Končno, in glede na zgoraj navedeno, je bilo so-tekmovalje (angl. co-opetition) pristanišč v literaturi predstavljeno kot nujna strategija preživetja pristanišč, pri kateri bi pristanišča konkurirala s sodelovanjem. Številni strokovnjaki so preučevali sodelovanje med pristanišči (npr. Song, 2002; Malchow in Kanafani, 2004; Hoshino, 2010; Li in Oh, 2010). Izvedenih je bilo več poskusov razvrščanja ravni sodelovanja. De Langen in Nijdam (2009) razlikujeta med pristanišči, ki sklepajo strateško sodelovanje (npr. skupno vlaganje, združitev), pristanišči z neko obliko sodelovanja, vendar ne na strateški ravni, in pristanišči brez oblike sodelovanja. Freemont in Lavaud-Letilleul (2009) trdita, da je vrsta sodelovanja odvisna od profila pristanišča v smislu, da strategija sodelovanja ni univerzalna za vsa pristanišča v bližini, zato razlikujeta med pristanišči, povezanimi v ožini ali otoku, pristanišči z različnimi profili in pristanišči s podobnimi profili. McLaughlin in Fearon (2013) predpostavljata celovitejšo matriko sodelovanja in konkurence, ki zagotavlja okvir za oceno obsega sodelovanja med pristanišči. Medtem ko se industrijski trend sodelovanj med pristanišči zdi pozitiven in rastoč, je v literaturi še vedno premalo raziskan (Notteboom idr., 2018). Za zagotavljanje splošnega in bolj univerzalnega okvira za strategije in možnosti pristanišč za sodelovanje so potrebne nadaljnje raziskave.

Pristanišča Severnega Jadrana (v nadaljnjem besedilu: NAPA pristanišča) spadajo v skupino pristanišč Južne Evrope, ki se nahajajo med Italijo (Ravena, Benetke, Trst), Slovenijo (Koper) in Hrvaško (Reka) (glej Sliko 1).

*Slika 1: Lokacija NAPA pristanišč*



*Vir: Luka Benetke, 2015*

NAPA regija je v pomorski industriji deležna velike pozornosti – manj z akademske strani – saj je zaradi krajše navtične poti z Daljnega vzhoda pritegnila tovor, ki je bil prej preusmerjen prek pristanišč iz skupine Hamburg—Le Havre (Notteboom, 2010), kar pa je privedlo do uvedbe direktnih čezoceanskih ladijskih servisov. Obe glavni aliansi (2M in The Ocean Alliance) trenutno prihajata v NAPA pristanišča, ladjar MSC ima celo lastniški delež v podjetju za upravljanje terminala (TOC) v luki v Trstu. Vsa pristanišča so večnamenska pristanišča s splošnim poudarkom na kontejnerjih. NAPA pristanišča so v zadnjem desetletju zabeležila podvojitev skupnega pretovora kontejnerjev, ki je preseгла 2,5 milijona TEU. Za razliko od številnih drugih evropskih pristaniških središč, kjer industrija v njihovi bližini ustvarja veliko povpraševanje po transportu, si NAPA pristanišča prizadevajo oskrbovati konkurenčna zaledja Srednje in Vzhodne (CEE) ter Jugovzhodne Evrope (SEE). Kljub temu pa se sooča z razliko v zmogljivosti in pretočnosti glede na Severna pristanišča (Notteboom in de Langen, 2015). Poleg tega se NAPA pristanišča srečujejo s skupnimi grožnjami zaradi nove železniške povezave od pristanišča Pirej do Srednje in Vzhodne Evrope, ki je že delno aktivna, in zaradi oživitve stare Svilne poti po železnici od Srednje Kitajske do Srednje in Vzhodne Evrope v okviru pobude Pas in cesta (BRI). Tako NAPA pristanišča predstavljajo

idealni primer za analizo sodelovanja med pristanišči. Prvič, zdi se, da bi zaradi svoje bližine in prekrivajočega se zaledja imela korist s skupnim tržnim pristopom in si s tem izboljšala svoj konkurenčni položaj. Drugič, pristanišča se soočajo s skupno izpostavljenostjo tveganju, ki ga predstavlja promocija novih poti in možnosti, kot prej omenjeno. Tretjič, kljub temu, da vsa pristanišča ležijo v državah, ki so članice EU, ima vsaka država različno pristaniško strategijo in nacionalni program upravljanja s pristanišči. Četrtič, NAPA pristanišča so zaradi slednjega primer, ki omogoča analizo čezmejnega sodelovanja med pristanišči. In slednjič, znanstvena literatura se je ukvarjala predvsem s pristanišči v Aziji in Severni Evropi, precej manj s tistimi v Južni Evropi, in najmanj s pristanišči NAPA. Kot taka, pristanišča NAPA predstavljajo izviren izbor za študijo primera.

Ta disertacija zastavlja številne raziskovalne cilje za obravnavo. Najprej preučuje, ali je bil dosežen napredek v našem razumevanju izbire pristanišč in izbirnih meril. Drugič, opazuje, kako se je sčasoma razvijalo konkurenčno okolje v pristaniški industriji in kako je to vplivalo na dinamiko in strategijo konkurence med pristanišči. Tretjič, ko se analizira sodelovanje v pristanišču, ugotavlja, ali obstoječi okviri in pogoji za analizo sodelovanja med pristanišči sploh zadostujejo. Zadnje in najpomembnejše pa je, da ta razprava poskuša najti odgovore, kakšne stopnje sodelovanja s pristanišči NAPA opazamo in zakaj je tako. Poleg tega želi oceniti, kakšne so možne dodatne strategije, ki jih lahko pristanišča sprejmejo za izboljšanje stopnje sodelovanja v danih pogojih.

Metodologija raziskovanja je v veliki meri kvalitativne narave in obsega obsežen pregled literature, analizo podatkov in poglobljene, delno strukturirane intervjuje s strokovnjaki. V smislu analize podatkov se izvede temeljita analiza čezoceanskih kontejnerskih povezav in kontejnerskih povezav na kratkih razdaljah, analiza parov pristanišč glede na vzorce prihodov ladij in zalednih železniških povezav, vse za NAPA pristanišča. Prav tako se izračuna in opazuje pretovor glede na količino tipa tovora in povprečno velikost kontejnerskih čezoceanskih ladij v NAPA pristaniščih ter posamezne časovne vrste povprečnih tedenskih cen za ladijski transport 20' kontejnerja za Hamburg in za Koper v obdobju dveh let. Vsi prej omenjeni podatki so javno dostopni, razen podatkov o tarifah za ladijski prevoz, ki so del nabora zasebnih podatkov v lasti avtorja, zbranih med njegovim poklicnim delom. Opravljenih je bilo 15 delno strukturiranih intervjujev s strokovnjaki, in sicer v obdobju med majem in junijem 2017, delno osebno, delno pa telefonsko. Strokovni intervjuvanci so bili izbrani na podlagi njihovega položaja v organizaciji in delovne dobe v podjetjih, ki so jih zastopali. Intervjuji so bili opravljeni z generalnimi direktorji ali komercialnimi vodji petih glavnih ladjarjev za NAPA regijo, štirimi predstavniki pristaniških uprav (komisarji, vodje raziskovalnih oddelkov), dvema glavnima železniško-intermodalnima podjetjema v regiji in štirimi generalnimi direktorji logističnih podjetij iz Italije, Slovenije in Hrvaške (ki so prisotni v vsaj dveh državah NAPA pristanišč). Vprašanja, ki so bila pripravljena vnaprej, so bila prilagojena vsem štirim kategorijam (ladjarji, logistična podjetja, železniško-intermodalni operaterji in pristaniške uprave).

V prvem poglavju se osredotočamo na razvoj akademske misli o konkurenci med pristanišči, tako da ugotavljamo dejavnike izbire pristanišč, in razpravljamo o pomembnosti perspektive pri njihovem ocenjevanju. Razpravljamo tudi o razvoju pristaniškega konkurenčnega okolja in predstavimo koncept sodelovanja med pristanišči. Ugotavljamo, da je bila konkurenca med pristanišči v literaturi analizirana večinoma s treh zornih kotov. Tradicionalni pristop je bil določiti in razvrstiti ključne dejavnike, pri katerih pristanišča medsebojno tekmujejo. Sprva je bil poudarek na fizičnih in tehničnih lastnostih pristanišč, ki pa se je sčasoma preusmeril na pomen infrastrukture v zaledju in celo na vedenjske dejavnike. Literatura je glede dejavnikov izbire pristanišč obsežna in terja obravnavo številnih aspektov, ki jih je potrebno pri tem upoštevati. Z analizo približno tridesetih akademskih člankov, ki obravnavajo dejavnike izbire pristanišč (glej Tabela 1), ugotovimo, da so določeni dejavniki večkrat omenjeni, kot drugi. Med njimi so kvaliteta storitev v pristanišču, lokacija pristanišča oz. bližina pristanišča izvoru tovora ter luški stroški (glej Tabela 2). Ta zaključek vsekakor ni potrditel njihove pomembnosti, saj so lahko na izsledke, kot že prej omenjeno, vplivali različni razlogi, ki so specifični za kontekst obravnavanih pristanišč. To je zgolj presek akademske misli na temo dejavnikov izbire pristanišč. Obenem pa za kontrast analizi narejene s strani Yeo idr., (2008), se naša analiza osredotoča predvsem na literaturo zadnjih dveh desetletij.

*Tabela 1: Povzetek pregleda literature glede pomembnejših dejavnikov izbire pristanišč ter glede uporabljene raziskovalne metode*

| <b>Avtor in datum objave</b>     | <b>Identificirani dejavniki</b>   | <b>Uporabljena metodologija</b>                              |
|----------------------------------|---|--|
| <b>Alonso in Soriano, (2009)</b> | Razdalja do pristanišča   | Eksplikativna stohastična metoda                             |
| <b>Basta in Morchio, (2008)</b>  | Pristaniška infrastruktura, dostopnost in povezljivost pristanišča, prostor za logistično dejavnost, kvaliteta storitev | Pregled literature   |
| <b>Chang idr., (2008)</b>        | Lokalna količina tovora, luški stroški  | Eksploratorna in konfirmatorna faktorska analiza (EFA & CFA) |
| <b>Cho in Yang, (2011)</b>       | Zmogljivost IT, inovativnost, institucionalni vplivi  | Regresijska analiza  |
| <b>Chou, (2010)</b>              | Globina morja ob privezu, luški stroški, učinkovitost pri nakladu/razkladu (kvaliteta storitev)                         | AHP modeliranje  |
| <b>Comtois in Dong, (2007)</b>   | Zaledna dostopnost/bližina pristanišča  | Pregled literature   |
| <b>Cullinane in Toy, (2000)</b>  | Cena, hitrost, tranzitni čas, kvaliteta storitve  | Pregled literature   |

|   |  |                                 |
|---|--|---------------------------------|
| <b>de Langen, (2007)</b>                | Lokacija pristanišča, tudi število prihodov ladij/povezljivost, narava blaga                         | Vprašalnik/kvalitativna analiza |
| <b>Guy in Urli, (2006)</b>              | Kvaliteta infrastrukture, stroški, kvaliteta storitev, lokacija pristanišča                          | Pregled literature              |
| <b>Haezendonck in Notteboom, (2002)</b> | Zaledna dostopnost, produktivnost, kvaliteta, sloves, zanesljivost, količina lokalnega tovora        | Pregled literature              |
| <b>Jarašuniene idr., (2012)</b>         | Globina morja ob privezu, kvaliteta infrastrukture, kvaliteta storitev                               | Vprašalnik/kvalitativna analiza |
| <b>Li in Oh, (2010)</b>                 | Naravni pogoji pristanišča, stroški, stopnja IT razvitosti, storitve v pristanišču, zaledje          | Pregled literature              |
| <b>Lirn idr., (2004)</b>                | Luški stroški, lokacija pristanišča  | AHP modeliranje                 |
| <b>Liu in Park, 2011</b>                | Lokacija pristanišča, kvaliteta storitve, zaledje, državne politike                                  | Regresijska analiza             |
| <b>Loo in Hook, (2002)</b>              | Globalni trendi v kontejnerski industriji, kontejnerizacija na Kitajskem, državne politike           | Pregled literature              |
| <b>Magala in Sammons, (2008)</b>        | Dostopnost od zalednih trgov, povezljivost, stopnja integracije v dobavne verige                     | Multinomsko logit modeliranje   |
| <b>Malchow in Kanafani, (2001)</b>      | Lokacija pristanišča, geografski faktorji  | Multinomsko logit modeliranje   |
| <b>Malchow in Kanafani, (2004)</b>      | Lokacija pristanišča   | Multinomsko logit modeliranje   |
| <b>Musso idr., (2013)</b>               | Kapaciteta, infrastruktura, sistemska integracija, produktivnost, stroški, inovativnost              | Pregled literature              |
| <b>Notteboom, (2010)</b>                | Integracija v globalne dobavne verige, zaledje, zgodovinski, osebni, politični in vedenjski faktorji | Pregled literature              |
| <b>Park in Min, (2011)</b>              | Luški stroški, infrastruktura, lokacija  | AHP in DEA modeliranje          |



|                               |   |                               |
|-------------------------------|---|-------------------------------|
| <b>Seabrooke idr., (2003)</b> | Makroekonomski pogoji, regionalna konkurenca, tržna moč upravljalcev terminalov                             | Pregled literature            |
| <b>Song in Yeo, (2004)</b>    | Lokacija pristanišča, infrastruktura pristanišča, količina tovora, kvaliteta storitev (padajoči vrstni red) | AHP modeliranje               |
| <b>Tiwari idr., (2003)</b>    | Lokacija pristanišča, razdalja, preobremenjenost pristanišča  | Multinomsko logit modeliranje |
| <b>Ugboma idr., (2006)</b>    | Učinkovitost, adekvatnost infrastrukture, ferenca prihodov ladij  | AHP modeliranje               |
| <b>Yeo idr., (2008)</b>       | Pristaniške storitve, zaledna situacija, dostopnost, ugodnost, primernost, stroški, povezljivost            | Fuzzy metodologija            |
| <b>Yeo idr., (2010)</b>       | Pristaniške storitve, zaledna situacija, dostopnost, ugodnost, primernost, stroški, povezljivost            | Fuzzy metodologija            |

*Tabela 2: Najbolj pogosto omenjani identificirani faktorji izbire pristanišč iz pregleda literature po Tabeli 1*

| <b>Identificirani dejavniki</b>            | <b>Število omemb</b> |
|--|----------------------|
| <b>Kvaliteta storitev v pristanišču</b>    | 13                   |
| <b>Lokacija pristanišča/bližina tovora</b> | 12                   |
| <b>Luški stroški</b>                       | 10                   |

Za namene povzetka je bil sestavljena tabela (glej Tabelo 3), ki je dejavnike izbire pristanišč razvrstila v štiri širše kategorije (tehnično, ekonomsko, upravljanje pristanišč in pravno okolje ter vedenjski dejavniki).

Tabela 3: Prikaz (nekaterih) dejavnikov izbire pristanišč razvrščenih v štiri kategorije

#### Tehnični dejavniki

- Pristaniška infrastruktura in operma
- Fizični atributi pristanišča (globina morja, priveza, dolžina pomola)
- Učinkovitost pristanišča (hitrost razklada/naklada ladje, produktivnost, stroškovna in časovna učinkovitost, delovni čas)
- Povezljivost pristanišča
- Razvitost IT sistemov in njihova povezljivost
- Razpoložljivost storitev dodane vrednosti
- Zaledna dostopnost po cesti, železnici
- Zanesljivost, kapaciteta in frekvenca kopenskih povezav
- Varnost, okoljska prijaznost
- Ladijski servisi z direktnimi in indirektnimi, feeder servisi

#### Ekonomski dejavniki

- Geografska lokacija (bližina tovara, trgovinske poti)
- Alliances in velikost prostorske alokacije na ladjah (št. TEU na ladjah/pristanišče)
- Obseg in količina tovara obstoječi in potencialni
- Vpetost v dobavne verige

#### Upravljanje pristanišč in pravno okolje

- Politična stabilnost države, bližina vojnih območij
- Dober ugled in stabilnost pristanišča
- Stabilnost pristanišča v smislu potenciala za stavke delavcev, slabega vremena, preobremenjenosti
- Upravljanje s pristaniščem in lastniška struktura
- Državna zakonodaja glede glasnosti in onesnaževanja, carinska zakonodaja, administrativne in drugo pravno okolje

#### Vedenjski dejavniki

- Osebnostne preference (jezik, kultura, obstoječi odnosi, izkušnje)
- Zgodovinski
- Psihološki

Ugotovljeno je bilo tudi, da se ti dejavniki lahko razlikujejo glede na stališče nosilca odločitve, saj je pomembno, katera interesna skupina odloča: pošiljatelj, logistično podjetje ali ladjar. Vsako interesno skupino vodijo različni motivi in interesi, kar se odraža v različnih preferencah glede dejavnikov izbire pristanišča. Ugotovili pa smo, da je naštevane in razvrščanje dejavnikov neprimeren pristop, saj vsi dejavniki povzročajo stroške na različne načine v različnih primerih za različne vpletene interesne skupine. Dobavne verige so zapletene in vse bolj dinamične, zato je vključenost v širše omrežje dobavnih verig, skupaj z dostopnostjo do zaledja, povezljivostjo in zmogljivostmi, postala veliko bolj pomembna. Poleg tega so zaradi pomembne konsolidacije in integracije, tako horizontalne kot vertikalne,

ladjarji ustvarili monopsonu podobne pogoje, kar je povzročilo velik pritisk na pristanišča. Avtor trdi, da bi morala biti ključna strategija pristanišč izpolnjevanje zahtev, ki jih narekujejo ladjarji. Ugotovljeno je bilo, da predlagani model morda ni tako podroben kot nekateri drugi predlogi v literaturi (glej npr. Notteboom 2009b; 2017 ali Ducruet in Notteboom, 2015), vendar služi kot veljaven predlog, podkrepjen z obsežnim pregledom literature, ki je bil izveden v tem poglavju.

V nasprotju z dejavniki izbire pristanišč obstaja več konsenza glede teme konkurence med pristanišči, pri čemer literatura na splošno priznava, da pristanišča, zlasti tista, ki imajo skupno zaledje, tekmujejo med seboj. Študije o konkurenci med pristanišči so se večinoma osredotočile na analizo študij primerov, kjer se pojavlja konkurenca, medtem ko je bilo le nekaj poskusov, da bi zagotovili bolj univerzalni okvir za analizo konkurence med pristanišči. Zaradi naraščajoče moči ladjarjev in pritiskov na infrastrukturo pristanišč, pa se je akademska razprava preusmerila v raziskovanje sodelovanja med pristanišči in ne v njihovo tekmovanje. Tekmovanje s sodelovanjem — so-tekmovanje — zlasti med sosednjimi pristanišči, se zdi najbolj preudarna rešitev, ki bi uravnovesila naraščajoče pritiske s strani ladjarjev. Sodelovanje obstaja v različnih oblikah, vendar je najučinkovitejša združitev ali ustanovitev skupnega podjetja. To scenarij je najbolj verjeten, kadar pristanišča ležijo v isti državi ali pripadajo istemu upravnemu ozemlju in ko so interesi komercialnih interesnih skupin usklajeni. Čeprav se zdi v pomorski industriji trend sodelovanja med pristanišči pozitiven in se uveljavlja, je v literaturi še vedno premalo raziskan. To je spodbudilo raziskavo, opravljeno v drugem poglavju, ki je poskušala zagotoviti splošen okvir za analizo strategij sodelovanja med pristanišči.

Drugo poglavje je razdeljeno na dva povezana dela. V prvem delu smo predstavili teoretično zasnovo sodelovanja med pristanišči, v drugem delu pa smo ta okvir uporabili na študiji primerov NAPA pristanišč, da bi ocenili njihovo trenutno in morebitno prihodnje sodelovanje.

V prvem delu smo določili konceptualno strogost in pomen komplementarnosti pri oceni sodelovanja med pristanišči. Predpostavka je, da je treba pri koncipiranju sodelovanja med sosednjimi pristanišči najprej ugotoviti, če so obravnavana pristanišča komplementarna. Komplementarnost je bila opredeljena kot razmerje med dvema ali več elementi, tako da vsak element poveča vrednost drugega (glej Milgrom, P., & Roberts, J., 1990; Roberts, J., 2007). Kar zadeva pristanišča, če ladja prihaja v obe pristanišči (ali v nobenega od njiju), se štejejo za komplementarna, če pa ladja pristaja zgolj v enem od pristanišč obravnavanega para, pa se štejeta za substituta (Notteboom, 2009b). Analiza prihodov ladij v pristanišča je nujen, vendar nezadosten pogoj za vzpostavitev njihove komplementarnosti. Predpostavlja se, da se lahko pristanišča obravnavajo kot komplementarna le, če je seštevek „učinka nadomestitve“ in „učinka povpraševanja“ pozitiven. To je primer, ko je povečan obseg pretovora za pristanišče B zaradi pozitivnega učinka izboljšanega konkurenčnega položaja celotnega območja v primerjavi z drugimi pristanišči večji od negativnega nadomestitvenega učinka zaradi prestavitve tovora iz pristanišča B v pristanišče A. Samo v tem primeru ima

pristanišče A prednost zaradi izboljšane konkurenčnega položaja pristanišča B in obratno. Avtor nato razvije matriko sodelovanja za razvrščanje primerov sodelovanja med pristanišči kot razširitev obstoječih modelov za analizo sodelovanja med pristanišči (glej Sliko 2). V skladu z obstoječo literaturo je matrika sestavljena iz dveh osi, ki razlikujeta med globino sodelovanja (komercialno proti nekomercialnemu) in stopnjo vključenosti interesnih skupin (pristaniška uprava v primerjavi s podjetji v pristaniškem grozdu). Smer premika, o kateri naj bi pristanišča razmišljala, je proti zgornjemu desnemu kvadrantu, v katerem se zasebna podjetja vključujejo v komercialno vrsto sodelovanja s skupnimi kolektivnimi ukrepi. Vsi drugi kvadranti so manj privlačni zaradi omejenega vpliva pristaniških oblasti na komercialne odločitve, po drugi strani pa zaradi omejenih spodbud za zasebna podjetja, da bi sodelovali v nekomercialnih vrstah sodelovanja, kot sta lobiranje ali okoljske pobude.

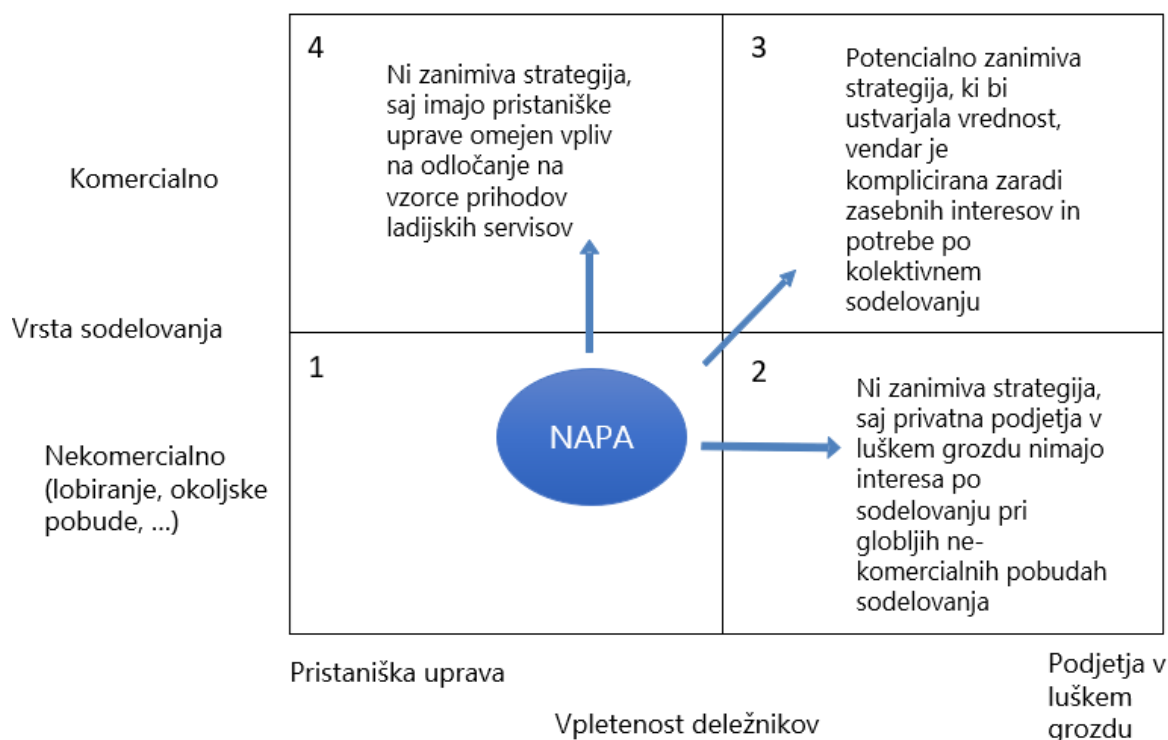
*Slika 2: Matrika za razvrščanje primerov sodelovanja med pristanišči*

|                   |   |  |
|-------------------|---|--|
| Vrsta sodelovanja | Komercialno   |  |
|                   | Ne-komercialno<br>(lobiranje, okoljske pobude, ...) |  |
|                   |   | Vpletenost deležnikov                            |
|                   |   | Pristaniška uprava      Podjetja v luškem grozdu |

V drugem delu smo analizirali komplementarnost pristanišč NAPA na trgu kontejnerjev na podlagi vzorcev prihodov ladij v pristanišča in intervjujev s predstavniki ladjarjev. Analizo smo izvedli s preučitvijo učinkov prihoda ladij v več pristaniščih na prihodek, ki je potreben, da je prihod v določenem pristanišču NAPA ekonomsko izvedljiv. Ugotovili smo, da vključitev še enega NAPA pristanišča zniža minimalni zahtevani prihodek za prihod ladje v dodatnem NAPA pristanišču. Naslednja ugotovitev je bila, da služi NAPA regija, kot obračališče ladijskih servisov, kar pomeni, da ta pristanišča po navadi delujejo kot zadnji in prvi prihod ladje v servisu, ki se nato vrne na nazaj na izhodiščno točko, namesto da bi se pot nadaljevala proti ostalim evropskim destinacijam. Poleg tega 94 % vseh kontejnerskih povezav v NAPA pride v najmanj dva para pristanišč, 56 % vseh kontejnerskih povezav pa

pride v tri od štiri pristanišča. Ocenjeni so bili tudi dodatni pogoji za komplementarnost. Ugotovljeno je bilo, da so intermodalne povezave v zaledju večinoma komplementarne in glede na potrebo po zadostni količini, da bi ladijski servis postal ekonomsko upravičen, povečanje razpoložljivih kontejnerjev v enem pristanišču dejansko poveča privlačnost prihoda v druga NAPA pristanišča in s tem poveča vrednost drugim pristaniščem. Skupni marketinški pristop za privabljanje novih ladijskih servisov v NAPA pristanišča bi koristil celotni regiji NAPA. Ugotovili smo, da so pristanišča NAPA res komplementarna. Nato je bil ocenjen obseg in poglobljenost sodelovanja med pristanišči. Na podlagi poglobljenih intervjujev s pristaniškimi upravami, upravljalci kontejnerskih terminalov, železniško-intermodalnimi prevozniki, glavnimi ladjarji in logističnimi podjetji v regiji NAPA smo načrtali trenutno in potencialno sodelovanje z uporabo matrike predhodno razvite matrike (glej Sliko 3). Opaziti je, da je trenutna raven sodelovanja med pristanišči NAPA in podjetji v pristaniškem grozdu omejena na nekomercialno lobiranje in skupne tržne dejavnosti, manjkata pa strateška usklajenost in komercialno sodelovanje. Kar zadeva morebitno prihodnje sodelovanje, je bilo ugotovljeno, da bi bilo globoko trgovinsko sodelovanje med čezmejnimi pristaniškimi organi zahtevno, nenazadnje tudi zaradi politične perspektive. Edina potencialno izvedljiva možnost bi bilo skupno sodelovanje pristaniških uprav in zasebnih podjetij, zlasti TOC-ov, pri razvoju komercialnega sodelovanja. Takšne potencialne strategije za ustvarjanje vrednosti bi lahko bile skupni pristop pristaniških uprav in TOC-ov, da bi ponudili (začasne) količinske popuste ladjarjem za razvoj novih kontejnerskih povezav za NAPO, kadar gre za tri ali štiri pristanišča. Prav tako bi lahko uvedli sistem količinske popuste za ladjarje v vseh pristaniščih NAPA, tako da bi se skupni stroški prihoda ladij v NAPA pristaniščih zniževali s povečanjem obsega. Kljub temu pa bi bilo njihovo izvajanje verjetno zapleteno zaradi potrebe po kolektivnih ukrepih pri takih strategijah.

Slika 3: Obstoječe in potencialno prihodnje sodelovanje med NAPA pristanišči prikazano z uporabo matrike



Za proučitev dodatnih strategij skupnega tržnega pristopa se priporočajo nadaljnje raziskave. Potrebne so tudi nadaljnje raziskave in natančna prilagoditev obstoječih modelov za oceno stopnje sodelovanja med pristanišči. Možna ovira, ki preprečuje širši obseg sodelovanja, je na primer dejstvo, da pristanišča NAPA ležijo v različnih državah in kljub članstvu v EU izvajajo različne nacionalne politike ter delujejo v skladu z različnimi nacionalnimi pravnimi okviri in modeli upravljanja pristanišč. Po drugi strani pa sta dve italijanski NAPA pristanišči (Trst in Benetke<sup>36</sup>) manj podvrženi tem omejitvam. Predlagana matrika je omejena pri prilagajanju na te različne okoliščine. Te omejitve in predlogi za nadaljnje raziskave so predstavljale spodbudo za analizo, opravljeno v tretjem poglavju.

Tretje poglavje je zapolnilo vrzeli in naslovilo opozorila v teoretičnih in praktičnih delih predlaganega teoretičnega okvira prejšnjega poglavja. Obstoječa matrika za razvrščanje primerov sodelovanja med sosednjimi pristanišči je bila razširjena z raziskavo pomena prisotnosti ali odsotnosti državne meje. Predlagali smo nadgrajeno različico matrike za razvrščanje primerov sodelovanja med pristanišči, ki razlikuje med primeri nacionalnih in čezmejnih strategij sodelovanja med pristanišči. Ob tem smo predpostavili, da je razlikovanje med nacionalnim in čezmejnim kontekstom ključnega pomena pri razumevanju zapletene dinamike sodelovanja med sosednjimi pristanišči. Domnevali smo, da so zaradi velike potrebe po sodelovanju državnih institucij v programih za razvoj nacionalne

<sup>36</sup> Tudi Ravenna spada med NAPA pristanišča, vendar je bila ta raziskava opravljena v začetku leta 2017, ko Ravenna še ni bila članica NAPA, zato tudi ni bila del naše analize.

infrastrukture, dejavniki, ki omogočajo globlje in bolj daljnosežno sodelovanje med pristanišči, veliko bolj verjetni v nacionalnih, kot pa v čezmejnih kontekstih. To domnevo je potrdila analiza več primerov nacionalnega in čezmejnega sodelovanja ter strokovni vpogled, ki smo ga pridobili v strokovnih razgovorih. Poleg tega je bila podana bolj izčrpna razlaga o kvadrantih matrike z navedbo vrst dejavnosti, ki jih je mogoče razvrstiti v vsak kvadrant, kar je znatno izboljšalo vrednost matrike kot orodja odločanja (glej Sliko 4). Kot splošno vodilo pri uporabi matrike je definirano, da učinki nekomercialnih dejavnosti nimajo neposredno merljive denarne vrednosti, pač pa imajo skupen pozitiven učinek na izboljšanje splošnega položaja zadevnih interesnih skupin. Po drugi strani komercialni kvadranti predstavljajo vrste sodelovanja, ki imajo neposredne denarne učinke, ki bodo imele vrednost neposredno (in samo) za interesne skupine, vključene v določeno pobudo.

Slika 4: Primeri strategij sodelovanje med različnimi deležniki za vsak kvadrant v dopolnjeni matriki za razvrščanje primerov sodelovanja med pristanišči

|                   |                | Nacionalni kontekst  |   | Čezmejni kontekst  |   |
|-------------------|----------------|--|---|--|---|
|                   |                | 4  | 3   | 8  | 7   |
| Vrsta sodelovanja | Komercialno    | - Skupni infrastrukturni projekti<br>- Skupne strategije cen luških storitev in pilotaže (vključno s količinskimi popusti, ipd.) | - Enotne strategije cen za storitve terminalov<br>- Delitev resursov in prostih kapacitet<br>- Skupni komercialno-razvojni projekti | - Skupni infrastrukturni projekti<br>- Skupne strategije cen luških storitev in pilotaže (vključno s količinskimi popusti, ipd.) | - Enotne strategije cen za storitve terminalov<br>- Delitev resursov in prostih kapacitet<br>- Skupni komercialno-razvojni projekti |
|                   | Ne-komercialno | 1. Skupne marketinške aktivnosti (sejmi, dogodki)<br>- Lobiranje in okoljske pobude<br>- Skupni IT in EDI rešitve ("eno okno")   | 2. Postavitev organizacij, ki zastopajo in lobirajo za skupne interese (npr. logistično združenje)                                  | 5. Skupne marketinške aktivnosti (sejmi, dogodki)<br>- Lobiranje in okoljske pobude<br>- Skupni IT in EDI rešitve ("eno okno")   | 6. Postavitev organizacij, ki zastopajo in lobirajo za skupne interese (npr. logistično združenje)                                  |
|                   |                | Institucionalni in javni deležniki   | Podjetja v luškem grozdu  | Institucionalni in javni deležniki   | Podjetja v luškem grozdu  |

## Vpletenost deležnikov

Te teoretične zaključke smo izvedli s ponovnim ocenjevanjem in repozicioniranjem pristanišč NAPA, kot skupino pristanišč in kot posamezne pare pristanišč, pri čemer smo uporabili podatke in informacije, pridobljene v strokovnih intervjujih. Predstavili smo večji vpogled v trenutno raven institucionalnih in zasebnih interesnih deležnikov v NAPA pristaniščih. Z vidika pristaniških uprav obstajajo nekatere ravni pred-konkurenčnega sodelovanja. Razlog za to je Združenje pristanišč Severnega Jadrana, v katerem sodelujejo NAPA pristanišča. Predstavniki pristaniških uprav so priznali, da se je od ustanovitve Združenja izboljšalo sodelovanje, uresničili so se tudi številni uspešni projekti, kot so pridobivanje sredstev EU za okoljske in IT projekte, skupno sodelovanje na tematskih sejmih

logistične industrije (npr. v München, v Šanghaju), izmenjava in spremljanje statistik, analiza trga in projekti za raziskave in razvoj. Predstavniki italijanskih pristanišč so priznali, da je zaradi pobud centralne vlade v Rimu sodelovanje med njimi, vključno na področju infrastrukturnih projektov, zdaj bolj usklajeno in obravnavano v korist vseh vpletenih pristanišč. Po drugi strani pa ni čezmejnega sodelovanja pri infrastrukturnih projektih. Tudi predstavniki pristaniških uprav so izrazili zaskrbljenost zaradi neenakih zakonodajnih okvirov, delovnih in plačilnih pogojev, kar povzroča neenakomerne stroške vodenja pristanišč, pilotaže in navtičnih služb v vsaki zadevni državi. Potencialno strategijo čezmejnega sodelovanja bi lahko predstavljala določena stopnja specializacije pristanišč, ki bi bila lahko zanimiva zaradi že obstoječih komplementarnosti v vrstah pretovarjanja v pristaniščih NAPA. Vendar bi to nujno pomenilo, kot so pojasnili naši sogovorniki, da bi nekatera pristanišča morala opustiti najdonosnejše kategorije – kontejnerje in RO-RO tovor – o čemer pa se verjetno ne bi uspeli uskladiti ne na nacionalni ravni in še manj na čezmejni ravni. Sogovorniki so sklenili, da bo več sodelovanja možno le z radikalnimi političnimi in strateškimi spremembami, kar pa se jim v doglednem času ne zdi realno. Najpomembnejša ovira se zdi ta, da se nacionalne in našem primeru celo provincialne (italijanske) vlade ukvarjajo z nacionalnimi političnimi in gospodarskimi strategijami in je zaradi kratkovidnosti in celo pogosto spreminjajoče se narave političnih vodstev v zadevnih državah kakršno koli nadnacionalno usklajevanje in sodelovanje na globoki strateški ravni malo verjetno.

Z vidika komercialnih interesnih skupin je bilo ugotovljeno, da jih zanima izključno dobiček in da so pripravljene sodelovati v pobudah, ki naj bi prinesle komercialne koristi. Logistična podjetja v vseh treh državah imajo predstavniška telesa, ki imajo splošne funkcije lobiranja in zastopanja interesov, vendar čezmejno ne sodelujejo. Logistična podjetja, ki delujejo v obeh ali vseh treh državah, bodo sledila strategijam, ki jim prinašajo največ dobička, ne glede na to preko katerega NAPA pristanišča je usmerjen njihov tovor. Železniško-intermodalni prevozniki so izjavili, da preprosto sledijo povpraševanju po tovoru, ki ga usmerjajo ladjarji, in s tega vidika nimajo odločilne moči za ustvarjanje ugodnih pogojev za nobeno od zadevnih pristanišč. Ladjarji sledijo regionalnim navodilom, ki jih izdaja njihova uprava, ki niso pristranska in ne dajejo prednosti nobeni državi. Tisti ladjarji, zlasti MSC, ki imajo lasten interes za Trst, so bolj naklonjeni Trstu v smislu prihodov servisov ladij za NAPA regijo. Ker sta MSC in Maersk del alianse 2M, to enako velja tudi za Maersk. Če povzamemo, podjetja v pristaniških grozdih ne sledijo nekomercialnim strategijam, ne na nacionalni, ne na čezmejni ravni. Komercialne pobude se lahko in tudi se izvajajo, ko se uskladijo finančni interesi. V tem primeru ni razlike med nacionalnim ali čezmejnim kontekstom, ker se podjetja ne ravnavajo po državnih mejah, ampak zgolj po ekonomski motivaciji.

V okviru matrike je večja verjetnost poglobljenega in bolj usklajenega sodelovanja med institucionalnimi in trgovinskimi interesnimi skupinami za Benetke in Trst v primerjavi z NAPA pristanišči kot celoto. Glede možnih prihodnjih gibanj znotraj matrike se predvideva,



da Trst in Benetke lahko napredujeta na komercialno raven sodelovanja, tako za pristaniške organe kot za podjetja v pristaniškem grozdu, NAPA kot celota pa le v smeri komercialne ravni za podjetja v pristaniškem grozdu. Slednje je strnjeno v Sliki 5.

*Slika 5: Pozicija Trsta in Benetk ter NAPA pristanišč v kvadrantih dopolnjene matrike za razvrščanje primerov sodelovanja med pristanišči*



### Vpletenost deležnikov

Zaradi dinamične narave pomorske industrije smo predlagali nadaljnje izboljšave obstoječih modelov za oceno strategij sodelovanja med pristanišči. Priporočili smo tudi nadaljnje raziskave za proučevanje dodatnih skupnih strategij komercialnega pristopa in nadaljnjo analizo uspešnih in neuspešnih primerov sodelovanja med pristanišči, s čimer bi se povečalo razumevanje dejavnikov uspeha in neuspeha pri izvajanju strategij sodelovanja med sosednjimi pristanišči.

## Appendix 2: Interview Questions

### a) Questions for shipping lines

1. Do you see benefits of NAPA as association and if so, can you specially describe them?
2. What could NAPA organization do more in your opinion?
3. Do you agree that NAPA region is a turnaround region?
4. What is minimum vessel utilization level for NAPA
5. Is it different compared to other European regions? If so, how?
6. What is minimum required revenue per container (both ways import-export) assuming average vessel size to NAPA is around 5000-7000 TEU for the deep-sea calls?
7. Do you consider NAPA ports complementary or substitutable?
8. If you had a dedicated terminal (either your own or a preferred partner/alliance), would you consider NAPA region more important than it is right now? If so, what is NAPA region potential compared to the Northern ports?
9. If NAPA ports cooperated by means of assigning one or two strategic ports for container cargo, would you see this as more or less beneficial? Should they do that?
10. What is the main obstacle more cargo is not being routed via NAPA ports? How would NAPA ports convince you to bring larger ships to the region?
11. If NAPA ports assigned one port to handle all region's containers, would this mean any particular changes from your perspective? Would you be able to include this single port in a different type of rotation, where it would be just part of another loop or it would still mean a turnaround point?
12. As a carrier present in all NAPA ports, do you coordinate your commercial activities for each port-market internally? How about within alliance members?
13. Are you part of any local/regional associations, which lobby and cater for better conditions, infrastructure, customs procedures, etc.? If yes, how successful is the organization/association in achieving results? What could be improved?
14. What would you suggest to the ports to do, to protect themselves from rapidly changing dynamics of supply chains in the region (Piraeus, rail connection with China, etc...)?
15. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

### b) Questions for port authorities

16. Do you believe NAPA ports cooperate well, enough? If not, can you advise what is missing?
17. How restricted is the cooperation between NAPA ports given that ports are located and governed by three different countries and also different types of organizational structures (i.e. service port, landlord port, port authorities, etc.)?
18. If any of the members changed this, do you believe it would be easier to cooperate?
19. If we isolate container cargo only, could you describe how far-reaching is the level the level of cooperation between NAPA ports?

20. Do you believe NAPA ports are substitutable or complementary? Please justify your answer.
21. What are your future plans? Are they aligned with the strategies other ports have?
22. Specific: there are criticisms that for example Venice is battling with the issues of shallow sea, while Trieste has a naturally deep sea that there could be better alignment of development strategies? Trieste is also very strong in liquid cargo, while Venice is stronger
23. Could you describe in more details what exactly does NAPA association do?
24. Do you see benefits of NAPA as association and if so, can you specially describe them?
25. What could NAPA organization do more in your opinion?
26. What is in your opinion key obstacle in increasing the level of cooperation level?
27. Do you believe there is more cooperation between for profit stakeholders like forwarders, rail operators etc. than it is on the level of port authorities?
28. Do you believe if all ports lied in the same country such as Shanghai, Ningbo or Guangzhou ports do, would there be more cooperation?
29. Trieste has an advantage on bulk cargo. Koper clearly has advantage of RO-RO cargo. For Rijeka, we cannot emphasize any specific advantage. Do you believe ports could agree on which commodity group to specialize and thus not compete?
30. Academics argue that in the current world, where shipping lines are stronger than ever, cooperation makes more sense than competition, particularly in adjacent ports and particularly in complementary ports. Do you agree with that statement?
31. Would you rather see that major shipping lines divided ports for example Trieste with MSC, Koper with Maersk, Rijeka with Cosco and Venice with CMA and thereby solving the issue of competition between ports?
32. Actually, growth of container cargo in some ports has not been very significant. To what would you attribute that?
33. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

*c) Questions for rail operators*

34. How well are the strategies among rail operators that operate in NAPA region aligned?
35. Would it be better for you if all container cargo for hinterland markets would be consolidated in one single NAPA port?
36. Would this be technically achievable?
37. What do you believe is the key issue preventing more growth in NAPA ports?
38. How could cooperation of rail operators contribute to achieving greater growth? If so, how
39. Is it important for you whether terminal operator in port is private or public?
40. Would it be beneficial if terminals were operated by shipping lines? Would this bring more competition or less?
41. Do you believe NAPA ports are substitutable or complementary? Please justify your answer

42. Are you part of any local/regional associations, which lobby and cater for better conditions, infrastructure, customs procedures, etc.? If yes, how successful is the organization/association in achieving results? What could be improved?
43. What would you suggest to the ports to do, to protect themselves from rapidly changing dynamics of supply chains in the region (Piraeus, rail connection with china, etc...)?
44. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

d) Questions for freight forwarders

45. What is the level of cooperation between freight forwarders in NAPA ports?
46. Could freight forwards facilitate greater cooperation between ports?
47. Do you believe if NAPA ports stakeholders cooperated more, would there be more throughput?
48. What are current activities you engage with other stakeholders?
49. What do you believe is the key issue preventing more growth in NAPA ports?
50. Do you believe NAPA ports are substitutable or complementary? Please justify your answer.
51. Are you part of any local/regional associations, which lobby and cater for better conditions, infrastructure, customs procedures, etc...? If yes, how successful is the organization/association in achieving results? What could be improved?
52. What would you suggest to the ports to do, to protect themselves from rapidly changing dynamics of supply chains in the region (Piraeus, BRI, etc...)?
53. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

### Appendix 3: Deep-sea services (Asia to NAPA)

| DEEP-SEA SERVICES                    | Rijeka | Koper | Trieste | Venice |
|--------------------------------------|--------|-------|---------|--------|
| <b>2010</b>                          |        |       |         |        |
| MAERSK+CMA-CGM                       | X      | X     | X       |        |
| UASC/HMM/HMM/YML                     | X      | X     | X       |        |
| <b>2011</b>                          |        |       |         |        |
| MAERSK+CMA-CGM                       | X      | X     | X       |        |
| UASC+HMM(+YML)                       | X      | X     | X       |        |
| <b>2012</b>                          |        |       |         |        |
| MAERSK+CMA-CGM                       | X      | X     | X       |        |
| EVERGREEN-UAM<br>(+HANJIN, YML, MOL) | X      | X     | X       |        |
| <b>2013</b>                          |        |       |         |        |
| MAERSK+CMA-CGM                       |        |       |         |        |
| EVERGREEN-UAM<br>(+HANJIN, YML, MOL) | X      | X     | X       |        |
| <b>2014</b>                          |        |       |         |        |
| MAERSK+CMA-CGM                       | X      | X     | X       | X*     |
| EVERGREEN-UAM<br>(+HANJIN, YML, MOL) | X      | X     | X       |        |
| <b>2015</b>                          |        |       |         |        |
| 2M                                   | X      | X     | X       |        |
| O3                                   | X      | X     | X       | X      |
| CYKHE                                |        | X     | X       |        |
| <b>2016</b>                          |        |       |         |        |
| 2M                                   | X      | X     | X       |        |
| O3                                   | X      | X     | X       | X      |
| <b>2017</b>                          |        |       |         |        |
| 2M                                   | X      | X     | X       |        |
| Ocean Alliance                       | X      | X     | X       | X      |
| *fortnightly call in Venice          |        |       |         |        |

Source: Port of Koper, 2017c; Port of Venice, 2017b; TMT, 2017a; MDS Transmodal 2013; own records

**Appendix 4: Short-sea and feeder services (Intra-Mediterranean, North Africa, Middle East)**

| <b>SHORT-SEA + FEEDER</b>             | <b>Rijeka</b> | <b>Koper</b> | <b>Trieste</b> | <b>Venice</b> |
|---------------------------------------|---------------|--------------|----------------|---------------|
| <b>2016-2017</b>                      |               |              |                |               |
| COSCO                                 | X             | X            |                | X             |
| ZIM                                   |               | X            |                | X             |
| MAERSK (49T Adriatic)                 | X             | X            |                | X             |
| HAPAG-LLOYD                           | X             | X            |                | X             |
| X-PRESS                               | X             | X            |                | X             |
| COSCO                                 |               | X            |                | X             |
| MSC (Line B)                          |               | X            | X              | X             |
| MSC (Adriatic-Israel-Line A)          |               | X            | X              | X             |
| MAERSK (A10 North Adriatic Shuttle)   |               |              | X              | X             |
| ARKAS                                 |               | X            |                | X             |
| EVERGREEN                             |               | X            | X              | X             |
| MSC (Adriatic to Cyprus-Line D)       |               |              | X              | X             |
| BORCHARD                              |               |              |                | X             |
| MSC (Adriatic to South Turkey-Line C) |               | X            | X              | X             |

*Source: Port of Koper, 2017c; Port of Venice, 2017b; TMT, 2017b*

### Appendix 5: Port pair analysis

|   |    |   |
|---|----|---|
| <b>TOTAL NUMBER OF CONTAINER SERVICES</b> | 16 | % of the total number of container services |
| <b>PORT PAIRS</b>                         |    |   |
| KOPER-TRIESTE                             | 3  | 19%   |
| KOPER-RIJEKA                              | 6  | 38%   |
| KOPER-VENICE                              | 13 | 81%   |
| RIJEKA-TRIESTE                            | 2  | 13%   |
| RIJEKA-VENICE                             | 5  | 31%   |
| TRIESTE-VENICE                            | 7  | 44%   |

*Source: Own elaborations*

## Appendix 6: Hinterland rail services in NAPA

| <b>Port/Country</b> | <b>Austria</b>                      | <b>Hungary</b>                        | <b>Slovakia</b>                         | <b>Czechia</b>                      | <b>Poland</b>      | <b>Germany</b>                                      |
|---------------------|-------------------------------------|---------------------------------------|---|-------------------------------------|--------------------|---|
| <b>KOPER</b>        | 7 train services, 3xdaily, 4 weekly | 3 train services, 2 daily, 1 weekly   | 3 train services, mostly on daily basis | 4 train services, 1 daily, 3 weekly | 1 service, 2/week, | 1 daily service                                     |
| <b>TRIESTE</b>      | 6 train services, 5 daily, 1 weekly | 1 train service almost on daily basis | 1 train service, 2/week                 | 1 train service, 2/week             | N/A                | 5 train services, 4 almost on daily basis, 1 weekly |
| <b>VENICE</b>       | N/A                                 | N/A                                   | N/A                                     | N/A                                 | N/A                | N/A   |
| <b>RIJEKA</b>       | N/A                                 | 1 train service on daily basis        | N/A                                     | N/A                                 | N/A                | N/A   |

*Source: Port of Koper, 2017d; TMT, 2017c*



## **Appendix 7: Interview questions**

### *e) Questions for shipping lines*

54. Do you believe NAPA ports cooperate well enough? If not, can you advise what is missing?
55. How restricted is the cooperation between NAPA ports given that ports are located and governed by three different countries and also different types of organizational structures (i.e. service port, landlord port, port authorities, etc.)?
56. If any of the members changed this, do you believe it would be easier to cooperate?
57. If we isolate container cargo only, could you describe how far-reaching is the level the level of cooperation between NAPA ports?
58. Do you believe NAPA ports are substitutable or complementary?
59. What are your future plans? Are they aligned with the strategies other ports have?
60. Specific: there are criticisms that for example Venice is battling with the issues of shallow sea, while Trieste has a naturally deep sea that there could be better alignment of development strategies? Trieste is also very strong in liquid cargo, while Venice is stronger in dry bulk cargo.
61. Could you describe in more details what exactly does NAPA association do?
62. Do you see benefits of NAPA as association and if so, can you specially describe them?
63. What could NAPA organization do more in your opinion?
64. What is in your opinion key obstacle in increasing the level of cooperation level?
65. Do you believe there is more cooperation between for profit stakeholders like forwarders, rail operators etc. than it is on the level of port authorities?
66. Do you believe if all ports lied in the same country as Shanghai, Ningbo or Guangzhou ports do, would there be more cooperation?
67. Trieste has an advantage on liquid cargo. Koper clearly has advantage of RO-RO cargo. For Rijeka, we cannot emphasize any specific advantage. Do you believe ports could agree on which commodity group to specialize and thus not compete?
68. Academics argue that in the current world, where shipping lines are stronger than ever, cooperation makes more sense than competition, particularly in adjacent ports and particularly in complementary ports. Do you agree with that statement?
69. Would you rather see that major shipping lines divided ports for example Trieste with MSC, Koper with Maersk, Rijeka with Cosco and Venice with CMA and thereby solving the issue of competition between ports?
70. Actually, growth of container cargo in some ports has not been very significant. To what would you attribute that?
71. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

### *f) Questions for port authorities*

72. Do you see benefits of NAPA as association and if so, can you specially describe them?

73. What could NAPA organization do more in your opinion?
74. Do you agree that NAPA region is a turnaround region?
75. Is it different compared to other European regions? If so, how?
76. Do you consider NAPA ports complementary or substitutable?
77. If you had a dedicated terminal (either your own or a preferred partner/alliance), would you consider NAPA region more important than it is right now? If so, what is NAPA region potential compared to the Northern ports?
78. If NAPA ports cooperated by means of assigning one or two strategic ports for container cargo, would you see this as more or less beneficial? Should they do that?
79. What is the main obstacle more cargo is not being routed via NAPA ports? How would NAPA ports convince you to bring larger ships to the region?
80. If NAPA ports assigned one port to handle all region's containers, would this mean any particular changes from your perspective? Would you be able to include this single port in a different type of rotation, where it would be just part of another loop or it would still mean a turnaround point?
81. As a carrier present in all NAPA ports, do you coordinate your commercial activities for each port-market internally? How about within alliance members?
82. Are you part of any local/regional associations, which lobby and cater for better conditions, infrastructure, customs procedures, etc.? If yes, how successful is the organization/association in achieving results? What could be improved?
83. What would you suggest to the ports to do, to protect themselves from rapidly changing dynamics of supply chains in the region (Piraeus, rail connection with china, etc...)?
84. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

*g) Questions for rail operators*

85. How well are the strategies among rail operators that operate in NAPA region aligned?
86. Would it be better for you if all container cargo for hinterland markets would be consolidated in one single NAPA port?
87. Would this be technically achievable?
88. What do you believe is the key issue preventing more growth in NAPA ports?
89. How could cooperation of rail operators contribute to achieving greater growth? If so, how
90. Is it important for you whether terminal operator in port is private or public?
91. Would it be beneficial if terminals were operated by shipping lines? Would this bring more competition or less?
92. Do you believe NAPA ports are substitutable or complementary?
93. Are you part of any local/regional associations, which lobby and cater for better conditions, infrastructure, customs procedures, etc.? If yes, how successful is the organization/association in achieving results? What could be improved?
94. What would you suggest to the ports to do, to protect themselves from rapidly changing dynamics of supply chains in the region (Piraeus, rail connection with china, etc...)?

95. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?

*h) Questions for freight forwarders*

96. What is the level of cooperation between freight forwarders in NAPA ports?

97. Could freight forwards facilitate greater cooperation between ports?

98. Do you believe if NAPA ports stakeholders cooperated more, would there be more throughput?

99. What are current activities you engage with other stakeholders?

100. What do you believe is the key issue preventing more growth in NAPA ports?

101. Do you believe NAPA ports are substitutable or complementary? Please justify your answer.

102. Are you part of any local/regional associations, which lobby and cater for better conditions, infrastructure, customs procedures, etc...? If yes, how successful is the organization/association in achieving results? What could be improved?

103. What would you suggest to the ports to do, to protect themselves from rapidly changing dynamics of supply chains in the region (Piraeus, BRI, etc...)?

104. Is there anything else you would like to tell us that will help us better understand the level of cooperation in NAPA region?