

SPORAZUM O RASPODJELI BRODSKOG PROSTORA

VESSEL SHARING AGREEMENT

SAŽETAK

U radu se obrazlažu potrebe kontejnerskih operatora za različitim oblicima kooperacija. Najčešći oblik sporazuma među operatorima u obavljanju zajedničkog brodskog linijskog servisa je Sporazum o raspodjeli brodskog prostora (engl. Vessel Sharing Agreement – VSA), čiji se temeljni principi detaljno opisuju i navode njegove prednosti. Obraduje se konkretan slučaj zajedničkog servisa između dva brodarka temeljen na Sporazumu o raspodjeli brodskog prostora, uz izračun potrebnih parametara za funkcioniranje linijskog kontejnerskog servisa i trošak slota. Autor nudi opći model izračuna cijene slota.

Ključne riječi: *Sporazum o raspodjeli brodskog prostora, kooperacije, brodarki, slot*

SUMMARY

The paper explains the need faced by operators of container vessels for various forms of cooperation to be established. The Vessel Sharing Agreement (VSA) being the form of the most frequently encountered agreement in the performance of their joint liner service, basic principles of such an agreement as well as its advantages are described in the paper in detail. The paper also comprises a case study dealing with a joint service performed by two owners on the basis of the Vessel Sharing Agreement, with the calculation of parameters relevant for the operation of container liner service and slot costs being included. The author also presents his general slot cost calculation model.

Key words: *vessel sharing agreement, cooperation, operators, slot*

1. UVOD

Kontejnerezacija je snažno djelovala na promjene u tehnologiji, ekonomiji i organizaciji pomorskih linijskih prijevoza. Gledajući zasebno te promjene, ukratko se može reći da u tehnološkom smislu to znači gradnju posve novih tipova brodova, a time i novih sredstava za prekrcaj i manipulaciju kontejnerima na novim kontejnerskim lučkim i kopnenim terminalima. U ekonomskom smislu to znači znatno veća kapitalna ulaganja u brodove, terminale, kontejnersku opremu i sredstva za manipulaciju, kao i u sredstva kopnenog i riječnog prijevoza kontejnera, a u organizacijskom smislu to znači potrebu usklađivanja interesa svih sudionika u logističkom sustavu prijevoza kontejnera "od vrata do vrata" (*door to door*).

S jedne strane potreba za ogromnim kapitalnim ulaganjima u kompletno novu tehnologiju, a s druge strane stalni zahtjevi krcatelja da imaju učestale, brze i jeftine linijske servise te također iznalaženje mogućnosti za smanjenje troškova poslovanja primorala je brodare na razne vidove međusobne kooperacije.¹

Praksa kooperacija pokazuje da je najčešći tip sporazuma među brodarima, na temelju kojeg obavljaju zajednički brodski linijski servis, Sporazum o raspodjeli broskog prostora (engl. *Vessel Sharing Agreement*). Prema podacima Federal Maritime Commission, SAD, od 220 registriranih sporazuma među brodarima, čak se 155 sporazuma ili 70,5% odnosi na Sporazum o raspodjeli broskog prostora.²

Konzorcij pomorskih prijevoznika definiran je i u okviru prava Europske unije, i to Uredbom Komisije (EC) br. 823/2000, izmijenjenoj Uredbom Komisije (EC) 611/2005, i to kao Sporazum između dva ili više brodarskih prijevoznika koji pružaju međunarodne linijske brodarske usluge isključivo za prijevoz tereta, uglavnom u kontejnerima, koji se odnosi na jedan ili više putovanja, a čiji je cilj ostvarenje suradnje kroz zajedničko obavljanje prijevoznike usluge te koji unapređuje uslugu koja bi, da nema konzorcija, bila pružena individualno od strane svakog člana, u svrhu racionalizacije poslovanja sklapanjem tehničkih, operativnih i/ili trgovačkih ugovora, uz izuzetak utvrđivanja fiksnih cijena.³

Cilj je ovoga rada definirati načela, organizacijske karakteristike i ekonomske učinke Sporazuma o raspodjeli broskog prostora, te na

1. INTRODUCTION

Containerization has produced a strong impact on changes introduced in the technology, economics, and organization of maritime liner services. Taken separately, they may be said, in technological terms, to have resulted in the construction of completely new types of vessels, and thence of completely new transshipment and container handling means operating on new port and inland container terminals. In economical terms, they mean a considerably larger capital investments in vessels, terminals, container equipment and means of handling, as well as in the means of container transport by land and river, whereas in organizational terms, they denote the need for all the participants in the logistical system of the door to door container transport to have their interests brought in compliance with each other.

On one part, the need for huge capital investments in completely new technology, and on the other, the shippers' increasing requirements for frequent, swift, and cost-effective liner services and the invention of new strategies for cutting down on operational expenses - have forced operators to resort to various aspects of mutual cooperation.¹

In practice, cooperation has identified the *Vessel Sharing Agreement* as the agreement most frequently used by operators in the performance of their joint liner service. According to the data provided by the Federal Maritime Commission, USA, out of 220 registered agreements between operators, as many as 155 of them or 70.5% refer to the *Vessel Sharing Agreement*.²

The Consortium of maritime transport providers has been defined within the frame of the EU acquis, precisely by the EC Decree No. 823/2000 and its subsequent modifications by the EC Decree No. 611/2005, as a form of agreement between two or more maritime transport providers rendering exclusively liner shipping services in the international transport of cargoes, prevalently containerized, concluded on a voyage basis for one or more voyages, aimed at cooperation to be achieved through a joint maritime transport service and at upgrading of services which would be otherwise rendered by each member on an individual basis, if it were not for the consortium, with the purpose of business rationalization through techni-

konkretnom slučaju obraditi jedan primjer Sporazuma između dva broдача u obavljanju zajedničkog servisa, kao i ponuditi opći model izračuna troška slota (prostor na kontejnerskom brodu potreban da bi se ukrao 1 standardni I.S.O. kontejner od 20`).

Iako se javno objavljuju brojne informacije o raznim oblicima sklopljenih ugovora o kooperacijama između linijskih kontejnerskih broдача, u znanstvenoj literaturi oskudni su objavljeni radovi o organizacijskim i ekonomskim učincima kooperacija na temelju Sporazuma o raspodjeli brodskog prostora, posebice domaćoj.

O Ugovoru o najmu brodskog prostora između naručitelja i broдача prijevoznika (engl. *Slot Charter*) objavljena su specifična pravna pitanja vezana za tu vrstu ugovora (Marin, 2006), a o važnosti upravljanja troškovima kontejnerskih brodova i optimalnoj veličini brodova (Cullinane, Khanna 1999)⁴, te evaluaciji operativnih troškova kontejnerskih brodova u linijskim servisima (McLean, Biles 2008)⁵ objavljeno je više radova.

Imajući u vidu složenost problema i predmeta istraživanja, postavljena je temeljna radna hipoteza: Sporazum o raspodjeli brodskog prostora je način poslovanja u kooperaciji između dva ili više broдача kojim se postižu bolji ekonomski učinci nego da je linijski kontejnerski servis obavljen individualno.

U cilju istraživanja ove teme koristio sam multidisciplinarni pristup, od analize dostupne literature na ovu temu, intervjuja menadžera linijskih kontejnerskih broдача do osobne poslovne prakse u brodarskoj tvrtki koja je imala zaključene Sporazume, kao i u pomorskoj agenciji koja radi u ime i za račun broдача koji obavlja linijski kontejnerski servis s partnerom na osnovi Sporazuma o raspodjeli brodskog prostora.

Rad na istraživanju organizacijskih karakteristika i ekonomskih učinaka poslovanja broдача temeljenim na Sporazumu, kao i modela izračuna cijene slota, utjecao je da se cjelokupna tematika obradi u nekoliko cjelina.

Poslije Uvoda, u drugom dijelu (**Načela Sporazuma o raspodjeli brodskog prostora**) defini- ra se Sporazum i detaljiziraju njegova osnovna načela. Iznose se prednosti ovakvog tipa sporazuma i navode primjeri recentnih sporazuma između svjetskih kontejnerskih broдача.

cal, operational and/or commercial agreements, save the price fixing.³

The aim of this paper is to define the principles, organizational features, and economical effects of the *Vessel Sharing Agreement*, to carry out a case study dealing with an agreement entered into between two operators for the performance of a joint service, and to offer a general model for the slot cost calculation (space on board a container vessel necessary to accommodate one standard 20' I.S.O. container).

Whilst there are numerous pieces of information publicly available on different types of cooperation agreements entered into between container liner operators, published papers on organizational and economical effects of cooperation based on the *Vessel Sharing Agreements* have been in a rather short supply in scientific literature, particularly in the domestic one.

Slot Charter (container space hire agreement between the owner or operator and the slot charterer) has been dealt with within specific legal issues published on the subject (Marin 2006), and the importance of container vessel cost management and vessel optimum size (Cullinane, Khanna 1999)⁴, as well as the evaluation of operational expenses of container vessels in liner service (McLean, Biles 2008)⁵ have been dealt with in several published studies.

Having in mind the complexity of both the problems and the subject of study, the basic working hypothesis established was the following: the *Vessel Sharing Agreement* represents a mode of business cooperation between two or more operators ensuring better economical effects than the container liner service performed on an individual basis.

For the purpose of the study, the author's approach to the subject issue was multidisciplinary, ranging from the analysis of the available literature on the issue, interviews with managers of container liner operators, to his personal business experience first gained with a shipping company which had operated under the *Vessel Sharing Agreements*, and then with a shipping agency which operates with its partner in the container liner service on behalf of the owner on the basis of the *Vessel Sharing Agreement*.

The study involving organizational features and economical effects of the operator's operation based on the *Vessel Sharing Agreement*, as well as the slot cost calculation model, have

U cilju izračuna cijene slota, u trećem dijelu (**Model izračuna cijene slota**) donosi se model izračuna cijene slota za linijski kontejnerski servis, a uzimajući u obzir konkretnu rotaciju/luke ticanja linijskog servisa, lučke troškove, potrošnju goriva, troškove broda i njegov kontejnerski kapacitet.

U četvrtom dijelu (**Primjer Sporazuma o raspodjeli broskog prostora**) obrađuje se konkretan primjer Sporazuma između dva brodara i detaljan izračun troškova putovanja broda, odnosno cijene slota.

U posljednjem dijelu (**Zaključak**) dana je sinteza istraživanja kojima je dokazivana i dokazana postavljena hipoteza.

Na ovome mjestu želim se zahvaliti mentoru prof. dr. sc. Draganu Čišiću za korisne savjete u izradi ovoga rada.

2. NAČELA SPORAZUMA O RASPODJELI BRODSKOG PROSTORA

Sporazum o raspodjeli broskog prostora je dogovor dva ili više brodara u cilju bolje efikasnosti i ekonomičnosti koja se može ostvariti kroz zajedničku kooperaciju i koordinaciju broskog linijskog kontejnerskog servisa.

U obavljanju zajedničkog broskog linijskog kontejnerskog servisa, brodari-partneri usuglašavaju sljedeće parametre:

- zemljopisno područje servisa,
- redosljed luka ticanja (rotaciju servisa),
- frekvenciju servisa,
- ukupni broj brodova u servisu,
- kapacitet brodova u TEU-ima i nosivosti,
- udjele u brodovima svakog pojedinog brodara,
- broj priključaka za frigo kontejnere,
- brzinu brodova u servisu,
- trajanje boravka broda u lukama ticanja,
- ukupno trajanje broskog putovanja,
- vremensku rezervu u plovidbenom redu,
- operativne akcije za održanje integriteta servisa.

prevailed upon all the subject to be elaborated in several parts or units.

Following the **Introduction**, the second part (**Principles of Vessel Sharing Agreement**) gives the definition of the *Vessel Sharing Agreement* with a detailed presentation of its basic principles, sets forth the advantages of this type of agreement, and gives examples of some recent agreements between world-renowned container operators.

For the purpose of the slot cost calculation, the third part (**Slot Cost Calculation Model**) presents us with a container liner service slot cost calculation model, taking into account the given rotation/liner service ports of call, port dues, fuel consumption, vessel's costs and expenses, and container carrying capacity.

The fourth part (**A Vessel Sharing Agreement Case Study**) represents a case study dealing with a *Vessel Sharing Agreement* entered into between two owners and a detailed calculation of the voyage cost and slot cost respectively.

The conclusive part (**Conclusion**) is a synthesis of the investigations carried out to successfully prove the hypothesis established.

By this opportunity, my thanks go to my supervisor, Prof. Dragan Čišić, Ph.D., for his useful pieces of advice which helped me in carrying out the study.

2. PRINCIPLES OF VESSEL SHARING AGREEMENT

The *Vessel Sharing Agreement* has entered into by two or more operators for the purpose of operational efficiencies and economical benefits allowing carriers to offer a better service to their customers, which may be created through a joint cooperation and coordination of a maritime container liner service.

In carrying out their joint container liner service, the following parameters are to be agreed between the operators-partners:

- Geographic coverage of service,
- Rotation of ports of call (service rotation),
- Service frequency,
- Total number of vessels included in the service
- Vessels' TEU capacity and deadweight,

Svaki pojedini brodar sudjeluje s određenim brojem svojih brodova (TEU kapaciteta i nosivosti) u zajedničkom servisu.⁶

Svaki brodar ima pravo korištenja određenog broskog prostora (TEU kapacitet/ nosivost, što se prvo dostigne) na svakom brodu u zajedničkom servisu.

Temeljem izračuna o udjelu vlastitog kapaciteta u ukupnom kapacitetu zajedničkog servisa, svaki brodar ostvaruje pravo na korištenje broskog prostora (TEU kapaciteta i nosivosti) na svim brodovima u zajedničkom servisu (na vlastitim brodovima i na brodovima partnera u zajedničkom servisu) proporcionalno kapacitetu kojim kontribuiru u zajedničkom servisu. Drugim riječima, brodari međusobno izmjenjuju broski prostor (*slot exchange*) na osnovi izračuna alokacije (odnos svakog pojedinog brodarka i njegovog kapaciteta u ukupnom kapacitetu zajedničkog servisa).

U slučajevima kada je smanjen kapacitet broda/ova, TEU-a i nosivosti zbog ograničenja gaza u pojedinim lukama i kanalima, tada se udio svakog pojedinog brodarka proporcionalno smanjuje onoliko koliko je smanjen ukupan kapacitet u TEU-ima, odnosno nosivosti.

Svaki brodar ima pravo prodati drugom brodarku u zajedničkom servisu dio broskog prostora, od svojeg proporcionalnog udjela, po unaprijed dogovorenoj jediničnoj cijeni slota.

Prodaja broskog prostora nije dozvoljena drugim brodarkima koji nisu partneri u zajedničkom servisu, osim u slučajevima kada svi brodarki o tome daju suglasnost.

Svaki pojedini brodar odgovoran je za operativno vođenje svojeg/ih broda/ova, i snosi pripadajuće troškove svojeg broda u zajedničkom servisu, kao što su troškovi:

- najma (pod ovim pojmom podrazumijevaju se troškovi broda kao što su: amortizacija, osiguranje, tekući popravci i održavanje, dokovanje, posada i dr.),
- goriva,
- lučki (sačinjavaju ih troškovi peljara, tegljača, privezivača, odvoza smeća, naknade za sigurnost plovidbe i lučke brodske takse),
- kanalski,
- agencijski (prihvat i otprema broda).

- Participants' individual shares in vessels' spaces,
- Number of reefer plugs,
- Vessels' speed in service,
- Vessels' stay at ports of call,
- Overall duration of the vessel's voyage,
- Sailing schedule spare time (time buffer),
- Operational actions for service integrity.

Each of the carriers participates in the joint service with a certain number of their own vessels (TEU capacity and deadweight).⁶

Each slot charterer has the right to use a specified amount of the vessel's container carrying capacity (TEU capacity / deadweight, whichever is reached first) on board each of the vessels included in the joint service.

Based on the calculation of their individual share in the joint service total capacity, each charterer is allocated the corresponding carrying capacity (TEU capacity or deadweight) on board all the vessels included in the joint service (both on their own vessels and their partners' vessels in the joint service) in proportion with their own capacity contributed to the joint service. In other words, operators share the capacity with each other ("slot exchange") on the basis of their share contribution (the ratio between each individual operator's capacity contribution and the joint service total capacity).

Where the vessels' capacity (TEU or deadweight) is reduced due to draught limitation in certain ports and canals, each operator's individual share is also reduced in proportion with the total TEU or deadweight reduction.

Operators may sell to other operator(s) participating in the joint service any portion of their proportional share in the vessel's capacity, at the slot unit price to be agreed beforehand.

Slots may not be sold to any of the operators outside the joint service, unless approved by all of the operators therein involved.

Each of the operators is responsible for their own vessel(s) operational management and for the corresponding costs of their vessel(s) in the joint service, such as:

- Vessel's charter (vessel's costs including: depreciation, insurance, repairs in hand and maintenance, dockings, crew, etc.),
- fuel,

Troškove premještaja kontejnera (brod – brod, ili brod – obala – brod), uključujući manipulacije s poklopcima grotala skladišta, plaća svaki vlasnik/operator broda.

Svaki pojedini brodar plaća terminalske troškove za vlastiti teret (ukrcaj i iskrcaj kontejnera s broda), kao i za agencijske troškove vlastitih agenata (za teret).

Zajednički terminalski troškovi kao što su: prekovremeni rad, čekanje brodskih ruku, fizičko osiguranje kontejnera, dodatno naručeni rad i slično, plaćaju se proporcionalno prema udjelu svakog brodara u zajedničkom kapacitetu.

Stranke Sporazuma ugovaraju korištenje jednog terminal-operatora u svakoj luci (posebno važno za luke gdje ima više terminal-operatora i gdje već brodari imaju terminalske ugovore s različitim operatorima). Temeljni kriteriji po kojima se odabire jedan, zajednički terminal-operator za svaku luku su:

- produktivnost u komparaciji s drugim konkurentskim terminal-operatorom,
- konkurentni troškovi,
- garancija veza po dolasku (ili u najavljeni dan u tjednu po dugoročnom plovidbenom redu),
- povezanost terminala sa zaleđem (željeznika i cestovna povezanost).

Veoma važno pitanje, po kojem se Sporazum o raspodjeli broskog prostora u temeljnoj definiciji razlikuje od linijske konferencije je pitanje tarifa/vozarina. Dok kod linijskih konferencija članovi utvrđuju i jedinstvene tarife/vozarine, kod Sporazuma o raspodjeli broskog prostora svaki brodar nudi vlastite tarife (vozarine) za prijevoz tereta koje zaključuje s naručiteljima. U komercijalnom smislu između partnera u Sporazumu postoji konkurencija: svatko provodi vlastitu nezavisnu komercijalnu politiku, pod vlastitim komercijalnim nazivom linijskog servisa, zadržavajući vlastiti marketinški identitet, izdaje vlastite teretnice, prijevoze obavlja svojim kontejnerima (vlastitim ili unajmljenim) te vodi eventualne reklamacijske postupke za štete na teretu i kontejnerima sa svojim korisnicima.

Pored naprijed navedenih odredbi, Sporazum o raspodjeli broskog prostora sadrži i odredbe o odgovornosti, višoj sili, generalnoj

- port dues and charges (pilot, tug-boat, wharfage, garbage disposal, light dues, and port dues),
- canal dues,
- agency fee (vessel's accommodation and clearance).

Container shifting charges (vessel – vessel, or vessel – wharf – vessel), inclusive of hatch cover handling costs, are to be borne by each vessel's owner/operator.

Each operator is responsible for the terminal charges referring to their own cargoes (container loading on board / unloading from the ship), as well as for their own agents' agency costs (for the cargo).

Common terminal charges, such as: overtime, ship gang waiting time, container securing, additionally ordered work and the like, are to be borne in proportion with each operator's share in their common capacity.

One terminal operator to be used in common at each of the ports is agreed between the parties to the Agreement (this is particularly important at ports with several terminal operators where terminal agreements have been already in operation between the owners and different operators). Here follow the basic criteria for the selection of one terminal operator to be used in common at each port:

- productivity as compared to another terminal operator with competitive position,
- competitive charges,
- guaranteed connection upon arrival (or on the announced day of the week, in accordance with the long-term sailing schedule),
- terminal connections with the hinterland (railway and road connections).

An issue of great importance, which makes the *Vessel Sharing Agreement* easily distinguishable from a liner conference by the basic definition, refers to tariffs/freight rates. Where liner conferences are concerned, uniform tariffs/freight rates are collectively discussed by their members, whereas in case of the *Vessel Sharing Agreement*, tariffs (freight rates) are offered by each operator on an individual basis for the carriage of cargo booked by them. In commercial terms, partners to the *Vessel Sharing Agreement* enjoy competitive positions: each of them carrying out their own commercial policy independently, under their own liner service com-

havariji i spašavanju, osiguranju, primjeni prava, arbitraži, trajanju i drugim sličnim klauzulama.

U ovakvom tipu kooperacije, pored Sporazuma o raspodjeli brodskog prostora, brodari-partneri međusobno potpisuju još nekoliko različitih ugovora i radnih procedura, kao npr. Ugovor o međusobnoj razmjeni dijela brodskog prostora (engl. *Cross Slot Space Charter Party*), Sporazum o podnajmu kontejnera (engl. *Container Sublease Agreement*), Sporazum o podnajmu prikolica (engl. *Chassis Sublease Agreement*), Sporazum o brodskoj operativi (engl. *Vessel Operational Agreement*), Sporazum o radnim procedurama (engl. *Working Procedure Agreement*), Postupak o naknadi štete (engl. *Claim Procedure*) i dr.

Svrha dodatnih sporazuma je da se osnovni sporazum o zajedničkom brodskom linijskom servisu u potpunosti detaljizira kako bi se u svakom trenutku znala međusobna prava i obveze svakog partnera i načini rješavanja spornih situacija koje se javljaju u praksi. Posebno važna su operativna pitanja, kao što su: računanje alokacije i odnosa 20`ST / 40`ST / 40`HC / 45`HC kontejnera, prihvatanje na prijevoz opasnih i vangabaritnih tereta, održavanje redovitosti plovidbenog reda, planirana dokovanja, popravci brodova i neplanirana dokovanja, ticanja dodatnih luka, ulazak i izlazak brodova iz servisa i sl.

Djelokrug kooperacije najčešće se ne odnosi samo na brodski linijski servis, nego i na puno šire područje: na lučke terminale, kopnene depoe, radionice za popravak kontejnera, interni najam kontejnerske opreme, pregovaranje s operatorima kopnenog transporta i sl., čime brodari-partneri ostvaruju različite sinergijske efekte temeljene na ekonomiji obujma.

Prednosti Sporazuma o raspodjeli brodskog prostora očituju se u ostvarenoj efikasnosti i ekonomičnosti linijskog kontejnerskog servisa na način da svaki brodar obavlja brodski linijski servis s minimalnim kapitalnim ulaganjima (brodski kapacitet kojim kontribuiru u ukupnom kapacitetu servisa u korelaciji je s njegovom poslovnom politikom, odnosno alocirani brodski prostor na svakom od brodova u zajedničkom servisu odgovara njegovoj komercijalnoj snazi na tržištu i mogućnostima da taj prostor proda naručiteljima prijevoza). Ove prednosti dolaze do izražaja i u konjunktornim

mercijal name, keeping their own marketing identity, issuing their own bills of lading, performing the carriage in their own containers (self-owned or hired), and handling on their own their customers' cargo and container claims, if any. Apart from the afore mentioned, the *Vessel Sharing Agreement* also contains provisions governing liability, *Force Majeure*, general average and rescue, insurance, implementation of law, arbitration, duration, and many other similar issues.

In this type of cooperation, apart from the *Vessel Sharing Agreement*, there are several other different agreements and working procedures available for operators-partners, such as the Cross Slot Space Charter Party, Container Sublease Agreement, Chassis Sublease Agreement, Vessel Operational Agreement, Working Procedure Agreement, Claim Procedure, and the like.

The purpose of such additional agreements is to make the joint liner service basic agreement completed with details in order for the partners' mutual rights and duties as well as for procedures for handling various controversies encountered in practice to be clearly determined. Operational issues are particularly important, such as the share contribution computation and the ratio between 20`ST / 40`ST / 40`HC / 45`HC containers, acceptance of dangerous and oversized cargoes, regular sailing schedule maintenance, scheduled dockings, ship repairs and unforeseen dockings, additional port callings, vessels' entering/leaving service.

Most frequently, the cooperation refers not only to vessels' liner service, but has a wider coverage, including: port terminals, inland depots, container repair workshops, internal container equipment lease (interchange), negotiations with land transport operators, and the like, whereby various synergical effects based on the volume economy are achieved by operators-partners.

The advantages produced by the *Vessel Sharing Agreement* are manifested in operational efficiencies and economical benefits for the liner container service, where liner service is performed by each of the carriers with minimal capital investments (vessel's capacity contributed to the total capacity offered by the service being in correlation with their respective busi-

razdobljima kada je moguće s minimalnim kapitalnim ulaganjima, kroz mrežu Sporazuma o raspodjeli broskog prostora na različitim linijskim pravcima nuditi *worldwide* prijevoznu uslugu, a tako i u razdobljima depresije na svjetskom pomorskom tržištu kada kroz Sporazum o raspodjeli broskog prostora brodari ostvaruju znatnu uštedu (manji broj vlastito angažiranih brodova u servisu), a da njihov linijski servis (ponuda) ostane neokrnjen.

Primjer ovakvih racionalizacija, kroz Sporazum o raspodjeli broskog prostora, u 2009. godini (razdoblje velike krize na pomorskom tržištu kada je preko 600 kontejnerskih brodova bilo neuposlano) napravili su brodari CMA CGM i MAERSK na 13 linijskih servisa. Od ukupno 109 brodova uposlenih u 13 zajedničkih servisa temeljenim na Sporazumu o raspodjeli broskog prostora, CMA CGM je operirao 42 broda, a MAERSK 67 brodova. Na isti način zajedničke servise obavljali su brodari CHINA SHIPPING i EVERGREEN, tako da su u 5 zajedničkih servisa uposlili ukupno 35 brodova, od toga CHINA SHIPPING 20 brodova, a EVERGREEN 15 brodova.⁷

Kada se sporazum o zajedničkom obavljanju servisa između dva ili više brodara odnosi na više različitih brodskih linijskih servisa onda se takav vid kooperacije naziva Savez (*Alliance*). Primjeri takvih Saveza (*Alliances*) na linijskim pravcima Istok – Zapad, a koji su temeljeni na VSA-u u 2009. godini su:

- “CHKY Alliance” sačinjavaju brodari: Coscon, Hanjin, K-Line, Yang Ming. Zajednički obavljaju 23 brodska linijska servisa s ukupno 156 brodova.
- “Grand Alliance” sačinjavaju brodari: Hapag Lloyd, NYK i OOCL. Zajednički obavljaju 14 brodskih linijskih servisa s ukupno 96 brodova.
- “New World Alliance” sačinjavaju brodari: APL, Hyundai i MOL. Zajednički obavljaju 15 brodskih linijskih servisa s ukupno 102 broda.⁸

3. MODEL IZRAČUNA CIJENE SLOTA

U svakom Sporazumu o raspodjeli broskog prostora postoji odredba o mogućoj prodaji viška broskog prostora od strane jednog brodarka

ness policies, or else, the allocated space on board each of the vessels included in the joint service being in correspondence with their commercial position on the market and their capability to sell the space to customers). These advantages are also revealed both in conjunctions allowing for minimal capital investments to offer, through the *Vessel Sharing Agreement* network, a *worldwide* liner shipping service on different routes, and in periods of depression on the world trade market making it possible for operators to achieve significant savings through the *Vessel Sharing Agreement* (reduced number of their own vessels included in service) with their liner service (offer) being unaffected.

An example of such a rationalization having been achieved through the *Vessel Sharing Agreement* in 2009 (the period of great crisis on the shipping market, with more than 600 container vessels unemployed) was seen in 13 liner services operated by CMA CGM and MAERSK. Out of the total number of 109 vessels employed in 13 joint services on the *Vessel Sharing Agreement* basis, 42 were operated by CMA CGM, and 67 by MAERSK. Joint services were also operated on the same basis by CHINA SHIPPING and EVERGREEN as owners, with 35 vessels included in their 5 joint services, out of which 20 vessels by CHINA SHIPPING, and 15 by EVERGREEN.⁷

Where a joint service agreement between two or more operators involves several different liner shipping services, such cooperation is called *Alliance*. On the East – West routes, such *Alliances* based on VSA in 2009 were:

- “CHKY Alliance” including: Coscon, Hanjin, K-Line, and Yang Ming. There are 23 liner shipping services performed by their 156 vessels.
- “Grand Alliance” including: Hapag Lloyd, NYK, and OOCL. They have operated 14 liner shipping services performed by 96 vessels altogether.
- “New World Alliance” including: APL, Hyundai, and MOL. They have operated 15 liner shipping services performed by 102 vessels in total.⁸

drugom brodaru u zajedničkom servisu. Stoga se izračunava cijena slota koja služi kao obračunska jedinica za takvu poslovnu operaciju.

Cijena slota za svaki pojedini kontejnerski linijski servis (s točno određenim redoslijedom luka ticanja) izračunava se temeljem:

troškovi broda podrazumijevaju troškove kao što su: amortizacija (kapitalna vrijednost broda) i operativne troškove broda (osiguranje, tekući popravci i održavanje, dokovanja, posada i dr.). Ukupni trošak broda dobiva se množenjem dnevnih troškova broda s ukupnim trajanjem putovanja (T_{PUT});

- izračuna udaljenosti između pojedinih luka (L_{NM}) u linijskom servisu;
- na osnovi dogovorene brzine brodova u servisu i udaljenosti između luka izračunava se vrijeme broda u plovidbi (T_p);
- uzimajući u obzir maritimne karakteristike svake pojedine luke izračunava se vrijeme manovre broda (T_M) (uplovljavanje, privez, odvez i isplavljanje broda), kao i prolaska kanalima;
- zbroj vremena boravka broda u plovidbi i u manovri i prolaska kanalima daje nam ukupno vrijeme broda u plovidbi (T_p^{\wedge}) ($T_p^{\wedge} = T_p + T_M$);
- na osnovi predviđene količine tereta/kontejnera koji će se manipulirati u pojedinoj luci kao i predviđene produktivnosti rada pojedinog kontejnerskog terminala, izračunava se vrijeme boravka broda u luci (T_L);
- zbroj ukupnog vremena u plovidbi i vremena u luci daje nam ukupno trajanje putovanja (T_{PUT}) ($T_{PUT} = T_p^{\wedge} + T_L$);
- troškovi goriva putovanja (S_{GPUT}) izračunavaju se na osnovi izračuna dnevne potrošnje IFO goriva (P_{1P}) i MDO goriva (P_{2P}) u plovidbi i dnevne potrošnje IFO goriva (P_{1L}) i MDO goriva (P_{2L}) u lukama i na osnovi tržišne cijene IFO goriva (C_1) i tržišne cijene MDO goriva (C_2), te se množe s vremenom broda u plovidbi (T_p^{\wedge}) i u lukama (T_L);⁹
- lučki i kanalski troškovi računaju se za svaku luku ticanja, a sadrže troškove peljarenja, upotrebe tegljača, usluge privezivača na dolasku i odlasku broda, usluge odvoza smeća, naknade za sigurnost plovidbe, brodskih lučkih taksa, troškove prolaska kanalom (bazi-

3. SLOT PRICE CALCULATION MODEL

There is a provision contained in any *Vessel Sharing Agreement* providing for holders of the excess ship space to sell it to another operator-partner in the joint service. For this purpose, it is necessary for the slot price to be determined as the unit applicable to such business transaction.

For the purpose of the slot price calculation for each particular container liner service (inclusive of precisely determined rotation of ports of call), the following considerations are to be taken into account:

- Vessel's costs and expenses such as: depreciation (vessel's capital value) and operational costs (insurance, repairs at hand, maintenance, dockings, crew, etc.). Vessel's total costs and expenses are the product of daily costs and the duration of the voyage (T_{PUT}).
- distance between particular ports (L_{NM}) in liner service.
- vessel's time in navigation (T_p) to be calculated on the basis of the agreed speed for vessels in service and the distance between ports
- vessel's manoeuvring time (T_M) (sailing in, berthing, unberthing, sailing out), as well as canal crossing time to be calculated on the basis of the maritime characteristics of each particular port
- vessel's total time in navigation (T_p^{\wedge}) as the sum of the vessel's time in navigation and the vessel's manoeuvring and canal crossing time ($T_p^{\wedge} = T_p + T_M$)
- vessel's time at port (T_L) to be calculated on the basis of the quantity of cargoes/containers envisaged for handling at each particular port and the envisaged productivity of each container terminal
- total voyage time (T_{PUT}) as the sum of the vessel's total time in navigation and the vessel's time at port ($T_{PUT} = T_p^{\wedge} + T_L$)
- voyage fuel consumption (S_{GPUT}) to be calculated on the basis of the daily IFO consumption (P_{1P}) and MDO consumption (P_{2P}) in navigation and the daily IFO consumption (P_{1L}) and MDO consumption (P_{2L}) at ports and on the basis of both the IFO (C_1) and MDO (C_2) market price, to be multiplied by

rane na GT broda) kao i agencijske troškove za prihvat i otpremu broda;

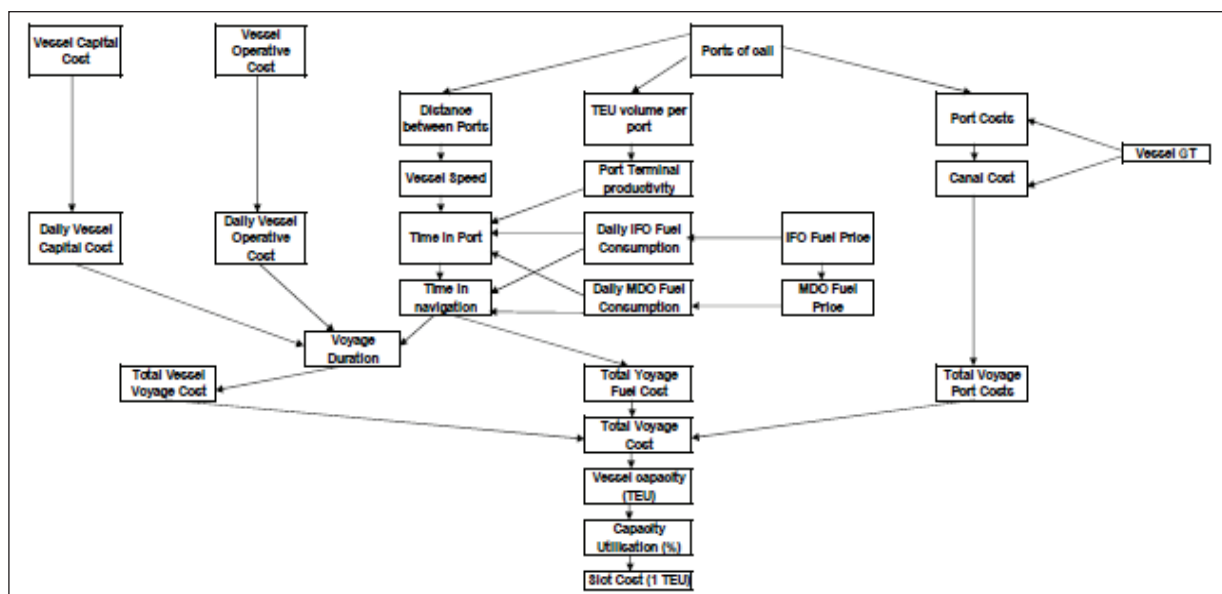
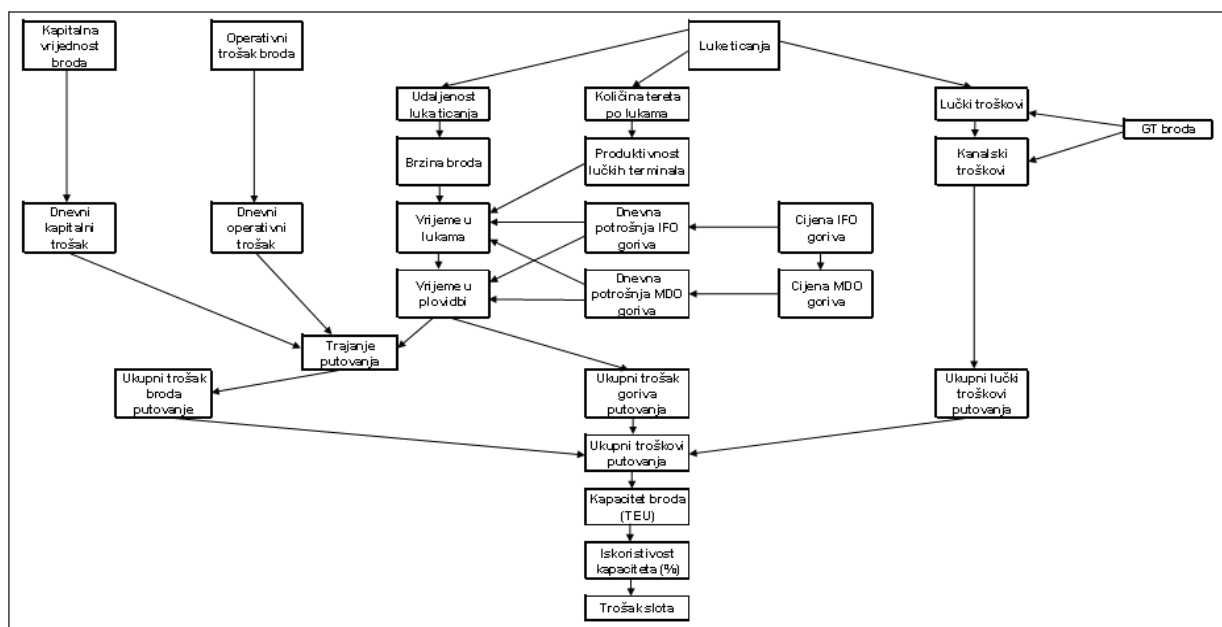
- ukupni zbroj troškova broda, troškova goriva i lučkih troškova podijeljen s kapacitetom broda daje nam cijenu slota na jednom brodskom putovanju.

Osim što je izračun cijene slota bitan za međusobne transakcije između brodara u zajedničkom servisu kada jedan brodar prodaje svoj "višak" brodskog kapaciteta drugom brodaru koji u datom trenutku ima manjak brodskog prostora, to je također kao fiksni trošak neizostavan element, uz varijabilne direktne troško-

the vessel's time in navigation (T_p) and the time at ports (T_L)⁹

- port and canal dues to be calculated in respect of each port of call, including pilotage, tug-boat fees, mooring/unmooring, garbage disposal, light dues, vessel's port dues, canal transit fee (based on vessel's GT), and agency fees for vessel accommodation and clearance services
- vessel's total costs and expenses, fuel consumption, and port dues and charges divided by the vessel's capacity result in the slot price per vessel per voyage.

Tablica 1. Model izračuna troška slota
Table 1 Slot price calculation model



Izvor / Source: Autor / Author

ve (terminalski troškovi punih kontejnera, troškovi prijevoza feeder brodovima, troškovi kopnenog prijevoza, agencijski troškovi za teret) i varijabilne indirektno troškove (troškovi kontejnerske opreme koji podrazumijevaju namjenu kontejnera i prikolica, popravke i održavanje kontejnera i prikolica, troškove ležarina praznih kontejnera, repositioniranja praznih kontejnera, terminalske troškove manipulacija za prazne kontejnere te troškove osoblja brodarske kompanije) i za izračun pomorske vozarine po kontejneru.

4. PRIMJER SPORAZUMA O RASPODJELI BRODSKOG PROSTORA

U sljedećem tekstu obrađuje se primjer zajedničke kooperacije dva brodarka/operatora na jednom brodskom linijskom servisu.¹⁰

Osnovni motivi brodarka za prihvaćanje Sporazuma o raspodjeli brodskog prostora su:

- postizanje veće efikasnosti i ekonomičnosti u odnosu na dotadašnji servis,
- pružanje kvalitetnijeg servisa naručiteljima prijevoza,
- manja kapitalna ulaganja,
- proporcionalni odnos između alociranog brodskog kapaciteta i tržišne snage.

Brodar A i Brodar B usuglasili su osnovne parametre zajedničkog brodskog linijskog servisa:

- zemljopisni djelokrug servisa: Mediteran, Crveno more, Perzijski zaljev i Indijski podkontinent,
- luke ticanja: Genova, Gioia Tauro, Suez, Jeddah, Dubai, Karachi, Nhava Sheva, Jeddah, Suez, Gioia Tauro, Leghorn, Genova,
- ukupni broj brodova u servisu: 3 broda, svaki kapaciteta 1.823 TEU-a, nosivosti 12 t/TEU,
- Brodar A kontribuirao u zajedničkom servisu s 2 broda, a brodar B s 1 brodom,
- frekvencija servisa: 14 dana,
- brzina brodova u servisu 16,5 čv,
- trajanje jednog brodskog putovanja 42 dana,
- tržišna dnevna cijena najma 1 broda (kao ekvivalent ukupnog troška broda) je USD 14.584,

Apart from being crucially important in mutual transactions between operators within a joint service, where one operator sells the “excess” vessel’s capacity to another operator who is short of the vessel’s capacity at the moment, the slot price calculation as a fixed cost is also an inevitable element, beside variable direct costs (full container terminal charges, carriage by feeders, land transport charges, agency charges for cargo) and variable indirect costs (container equipment charges concerning container and trailer lease, container and trailer repairs and maintenance, empty container storage, empty container repositioning, empty container handling terminal charges, and shipping company overhead costs) in the calculation of the shipping freight rate per container.

4. AN EXAMPLE OF THE *VESSEL SHARING AGREEMENT*

Here follows an example of a joint cooperation between two operators in a liner shipping service.¹⁰

The basic motivations for operators to enter the *Vessel Sharing Agreement* are the following ones:

- better operational efficiencies and economical benefits as compared to their previous service operation,
- enhanced service quality offered to customers,
- lower capital investments,
- allocated share contribution in the vessel’s capacity proportional to the market share.

Operator A and Operator B have agreed upon their joint liner shipping service basic parameters:

- Geographic coverage of service: the Mediterranean, Red Sea, Persian Gulf and Indian Subcontinent,
- Ports of call: Genoa, Gioia Tauro, Suez, Jeddah, Dubai, Karachi, Nhava Sheva, Jeddah, Suez, Gioia Tauro, Leghorn, Genoa,
- Total number of vessels in service: 3 vessels of 1823 TEU each, deadweight 12 T/TEU,
- Operator A contributes to the joint service with 2 vessels, and operator B with 1 vessel,
- Service frequency: 14 days,
- Vessels’ speed in service 16.5 kn,
- Duration of one vessel/voyage 42 days,

- dnevna potrošnja goriva je: IFO u plovidbi 52 t i u lukama 2 t, te MDO u plovidbi 5 t i u lukama 4,5 t
- tržišna cijena goriva za 1 tonu je : USD 105 / IFO, USD 205 / MDO.

Brodari ugovaraju mogućnost prodaje slobodnih kapaciteta drugom brodaru na osnovi izračuna cijene slota.

U cilju postizanja sporazuma o zajedničkom obavljanju brodskog linijskog servisa, brodari-partneri trebaju izvršiti nekoliko izračuna:

- izračun alokacije svakog pojedinog brodarka na svakom brodu,
- izračun trajanja/vremena putovanja broda,
- izračun cijene slota.

Osnovne karakteristike brodova koje brodari planiraju uposliti u zajedničkom servisu navedeni su u tablici 2.

Izračun alokacije Brodarka A i Brodarka B na svakom pojedinom brodu temelji se na zadanim karakteristikama kapaciteta (TEU/nosivost). S obzirom da Brodar A participira u zajedničkom servisu s 2 broda, a Brodar B s 1 brodom, to će Brodar A raspolagati s 2/3 kapaciteta (TEU/nosivost) na svakom brodu u zajedničkom brodskom linijskom servisu, a Brodar B s 1/3 kapaciteta (TEU/nosivost). U tablici 3 nalazi se izračun alokacije svakog brodarka na svakom brodu, a koji se temelji na osnovnim dogovorenim načelima zajedničkog servisa.

Brodar A s učešćem 2 broda u zajedničkom servisu izračunao je da će alociranih 2/3 brodskog kapaciteta biti u korelaciji s njegovom komercijalnom snagom na tržištu. Kada bi sam

- Market daily charter price for 1 vessel (as an equivalent of the vessel's total cost) USD 14,584,
- Daily fuel consumption: IFO in navigation 52 T and at ports 2 T, and MDO in navigation 5 T and at ports 4.5 T
- Fuel market price per 1 ton : USD 105 / IFO, USD 205 / MDO

Operators are considering the possibility for free vessel's capacity to be sold to another operator on the basis of the slot price calculation.

With a view to reaching a joint liner shipping service agreement between the operators-partners, several calculations are required:

- Share contribution calculation for each particular operator on each particular vessel,
- Vessel's voyage time calculation,
- Slot price calculation.

The basic features of the vessels envisaged by the operators to be engaged in the joint service are displayed in Table 2.

The Operator's A and the Operator's B share contribution calculation in respect of each vessel is based on the given capacity values (TEU/deadweight). Having in mind the Operator's A participation in the joint service with 2 vessels, and the Operator's B one with 1 vessel, this means that Operator A will be allocated 2/3 of the capacity (TEU/deadweight) per vessel included in the joint liner shipping service, and Operator B 1/3 of the capacity (TEU/deadweight). Table 3 displays the share contribution calculation in respect of each operator on board each vessel, based on the basic principles agreed in respect of the joint service.

Tablica 2. Karakteristike brodova u zajedničkom servisu

Table 2 Joint service vessels' features

	Brodar A / Operator A	Brodar A / Operator A	Brodar B / Operator B
	Brod 1 / Vessel 1	Brod 2 / Vessel 2	Brod 3 / Vessel 3
GT	30 824	30 824	27 103
NT	12 995	12 995	8 131
DWT (t)	31 235	31 235	25 904
Brzina (čv) / Speed (Kn)	18	18	17.5
Geometrijski kapacitet (TEU) <i>Geomet.capacity (TEU)</i>	1 939	1 939	2 098
Kapacitet (TEU) (12t/TEU) <i>Capacity (TEU) (12t/TEU)</i>	1 823	1 823	1 823
Frigo priključci / Reefer plugs	185	185	77

Izvor / Source: Autor / Author

Tablica 3. Izračun alokacije brodara
Table 3 Operators' share contribution calculation

	Brodar A <i>Operator A (TEU / t)</i>	Brodar B <i>Operator B (TEU / t)</i>	Ukupno <i>Total (TEU / t)</i>
Brod 1 / Brodar A <i>Vessel 1 / Operator A</i>	1 215 / 14 580	608 / 7 296	1 823 / 21 876
Brod 2 / Brodar A <i>Vessel 2 / Operator A</i>	1 215 / 14 580	608 / 7 296	1 823 / 21 876
Brod 3 / Brodar B <i>Vessel 3 / Operator B</i>	1 216 / 14 592	607 / 7 284	1 823 / 21 876
Ukupna alokacija <i>Total allocation</i>	3 646 / 43 752	1823 / 21 876	5 469 / 65 628

Izvor / Source: Autor / Author

obavljao linijski servis posljedice bi bile sljedeće:

- ukoliko bi obavljao samostalno servis s 3 broda uz 14-dnevnu frekvenciju servisa, čak bi 1/3 brodskog kapaciteta ostala neiskorištena,
- ukoliko bi obavljao samostalno servis s 2 broda, frekvencija servisa bi bila 21dan i s takvim servisom ne bi mogao biti tržišno konkurentan, te je upitno bi li uopće mogao uz takav servis iskoristiti raspoloživi kapacitet.

Upravo se temeljem Sporazuma o raspodjeli brodskog prostora s drugim brodarom, kojemu komercijalna snaga na tržištu odgovara mogućnostima da na 14-dnevnom servisu iskoristi 1/3 brodskog kapaciteta, pokazuje optimalno ekonomsko rješenje i za Brodara A i Brodara B.

Brodar A će i nadalje obavljati 14-dnevni servis, ali sa samo 2 vlastita broda i u potpunosti će iskoristiti raspoloživi brodski kapacitet. Brodar B će samo s 1 vlastitim brodom biti u mogućnosti nuditi na tržištu 14-dnevni servis, s alokacijom brodskog prostora koja odgovara njegovoj tržišnoj snazi.

U tablici 4 nalazi se izračun vremena putovanja broda, a na osnovi zadanih parametara: rotacije luka ticanja, brzine brodova, vremenu boravka brodova u lukama s obzirom na planiranu količinu iskrcaja/ukrcaja tereta (kontejnera).

- T_p - vrijeme broda u plovidbi
 T_M - vrijeme broda u manovri
 T_p^{\wedge} - ukupno vrijeme broda u plovidbi
 T_L - vrijeme broda u lukama.

$$T_p^{\wedge} = T_p + T_M$$

$$T_{PUT} = T_p^{\wedge} + T_L$$

Operator A, participating with 2 vessels in the joint service, has calculated that his 2/3 share contribution will be in correlation with his commercial position on the market. If liner service were operated by him alone, the consequences would be the following ones:

- Provided service operated by the Operator on his own with 3 vessels and a 14-day service frequency, as much as 1/3 of the vessel's capacity would remain unused,
- Provided service operated by the Operator on his own with 2 vessels, with a 21-day service frequency required, this service would not be competitive on the market and would make it questionable for the available capacity to be deployed at all.

It is the very *Vessel Sharing Agreement* with the other owner, whose commercial position on the market allows for 1/3 of the vessel's capacity to be deployed in a 14-day service, which appears to be an optimal economic solution for both the Operators.

Operator A will continue performing a 14-day service, yet with just 2 of his vessels, and will deploy the whole vessels' capacity available. Operator B, with just 1 own vessel, will be able to offer a 14-day service on the market, with the share contribution appropriate for his commercial position.

Table 4 displays the vessel's voyage time calculation based on the given parameters: rotation of ports, vessels' speed, and vessel's time at port depending on cargo quantities envisaged for loading/discharge (containers).

- T_p - vessel's time in navigation
 T_M - vessel's manoeuvring time
 T_p^{\wedge} - vessel's total time in navigation

Tablica 4. Izračun vremena putovanja broda

Table 4 Vessel's voyage time calculation

Ports of call	Time at port (h)	Relation	Distance (NM)	Speed (Kn)	Time at sea (h)	Time in manouvring (h)	Total time in navigation (h)
Genova	36						
		Genova - Gioia Tauro	478	16,5	29	2	31
Gioia Tauro	24						
		Gioia Tauro - Port Said	958	16,5	58	3	61
Port Said	24						
		Port Said - Suez	87				
Suez	Tranzit Suez Canal						
		Suez - Jeddah	627	16,5	38	3	41
Jeddah	24						
		Jeddah- Dubai	2190	16,5	133	2	135
Dubai	24						
		Dubai - Karachi	709	16,5	43	2	47
Karachi	48						
		Karachi - Nhava Sheva	539	16,5	33	3	36
Nhava Sheva	108						
		Nhava Sheva - Jeddah	2353	16,5	143	1	144
Jeddah	24						
		Jeddah - Suez	636	16,5	39	2	39
Suez	24						
		Suez - Port Said	87				
Port Said	Tranzit Suez kanal						
		Port Said - Gioia Tauro	958	16,5	58	1	59
Gioia Tauro	24						
		Gioia Tauro - Leghorn	405	16,5	25	2	27
Leghorn	20						
		Leghorn - Genova	79	16,5	6	2	8
Genova	0						
Total (h)	380						628
Total (d)	15,83						26,17
Total (d, h)	15d 20h						26d 4h

Izvor / Source: Autor / Author

Kako bi mogli izračunati cijenu troška 1 slo-
ta, potrebno je izvršiti izračun troškova goriva,
a na osnovi zadanih parametara: dnevnoj po-
trošnji IFO i MDO goriva u plovidbi i u luka-
ma, vremenu boravka broda u lukama i u plo-
vidbi i tržišnim cijenama goriva. U tablici 5
nalazi se izračun troškova goriva u USD-u.

- P_{1P} - dnevna potrošnja IFO goriva u plovidbi
- P_{2P} - dnevna potrošnja MDO goriva u plovidbi
- P_{1L} - dnevna potrošnja IFO goriva u lukama
- P_{2L} - dnevna potrošnja MDO goriva u lukama
- C_1 - cijena IFO goriva
- C_2 - cijena MDO goriva
- S_{GP} - dnevni troškovi goriva u plovidbi
- S_{GL} - dnevni troškovi goriva u lukama

$$S_{GP} = P_{1P} \times T_P \times C_1 + P_{2P} \times T_P \times C_2$$

$$S_{GL} = P_{1L} \times T_L \times C_1 + P_{2L} \times T_L \times C_2$$

$$S_{GPUT} = S_{GP} + S_{GL}$$

T_L - vessel's time at port

$$T_P \text{ ` } = T_P + T_M$$

$$T_{PUT} = T_P \text{ ` } + T_L$$

In order for a slot price to be calculated, it is
necessary to make the respective fuel cost cal-
culation, based on the given parameters: daily
IFO and MDO consumption in navigation and
at ports, the vessel's time at ports and in navi-
gation, as well as the fuel market prices. Table 5
displays the fuel cost calculation in USD.

- P_{1P} - daily IFO consumption in navigation
 - P_{2P} - daily MDO consumption in navigation
 - P_{1L} - daily IFO consumption at ports
 - P_{2L} - daily MDO consumption at ports
 - C_1 - IFO price
 - C_2 - MDO price
 - S_{GP} - daily fuel consumption in navigation
 - S_{GL} - daily fuel consumption at ports
- $$S_{GP} = P_{1P} \times T_P \times C_1 + P_{2P} \times T_P \times C_2$$

Tablica 5. Izračun troškova goriva
Table 5 Fuel consumption calculation

	Daily consumption (t)	Time in navigation (d)	Time in ports (d)	Current Price (USD / IFO)	Current Price (USD / MDO)	Total Fuel Cost (USD)
Consumption of IFO in navigation	52	26,17		105		142888
Consumption of MDO in navigation	5	26,17			205	26824
Consumption of IFO in ports	2		15,83	105		3324
Consumption of MDO in ports	4,5		15,83		205	14603
TOTAL						187639

Izvor / Source: Autor / Author

Tablica 6. Izračun lučkih i kanalskih troškova
Table 6 Port costs and canal dues calculation

Luka / Port	Lučki troškovi / Port costs (USD)
Genova	18 000
Gioia Tauro	10 000
Suez (trošak kanala / Canal cost)	160 000
Jeddah	1 000
Dubai	5 000
Karachi	28 000
Nhava Sheva	28 000
Jeddah	1 000
Suez (trošak kanala / Canal cost)	160 000
Gioia Tauro	10 000
Leghorn	18 000
Genova	0
Ukupno / Total	439 000

Izvor / Source: Autor / Author

U tablici 6 nalazi se izračun lučkih troškova za svaku pojedinu luku, a koji se sastoji od troškova: peljara, tegljača, privezivača, odvoza smeća, naknade za sigurnost plovidbe, brodskih lučkih taksa, agencijskih troškova za prihvat i otpremu broda, te troškova prolaska Sueskog kanala. Važno je napomenuti da su troškovi dobavljača u luci bazirani na GT broda, te lučki troškovi proporcionalno rastu s povećanjem GT brodova.

Na osnovi naprijed izvršenih izračuna o trajanju putovanja, troškova goriva, lučkih i kanalskih troškova, kao i na osnovi tržišne cijene najma brodova zadanih karakteristika, moguće je izvršiti izračun troška slota, za različiti postotak iskoristivosti kapaciteta. Izračun cijene slota nalazi se u tablici 7.

Ostvarene uštede Brodara A i Brodara B vide se iz grafikona 1.

Kada bi se predmetni linijski kontejnerski servis s 14-dnevnom frekvencijom obavljao in-

$$S_{GL} = P_{1L} \times T_L \times C_1 + P_{2L} \times T_L \times C_2$$

$$S_{GPUT} = S_{GP} + S_{GL}$$

Table 6 presents port costs in respect of each particular port, consisting of the following items: pilot fees, tug-boat fees, mooring/un-mooring, garbage disposal, light dues, vessel's port dues, agency fees for vessel's accommodation and clearance, and the Suez Canal fee. It is important to mention here that suppliers' charges in ports are based on the vessel's GT, which makes port costs and charges grow in proportion with the vessel's GT.

Based on the above calculations concerning the vessel's voyage time, fuel cost, port and canal costs and charges, as well as the vessel's charter market price for vessels of given features, it is possible to make a slot price calculation for different percentages of capacity deployability. The slot price calculation is presented in Table 7.

Tablica 7. Izračun troška slota
Table 7 Slot cost calculation

	Trajanje putovanja (d) <i>Voyage duration (d)</i>	Dnevna cijena najma (USD) <i>Daily Charter Hire (USD)</i>	Kapacitet broda (TEU) <i>Vessel Capacity (TEU)</i>	Troškovi (USD) <i>Costs (USD)</i>
Trajanje putovanja <i>Voyage duration</i>	42			
Dnevna cijena <i>Daily Charter Hire</i>		14 548		
Kapacitet broda <i>Vessel Capacity</i>			1 823	
Najam broda <i>Charter Hire Cost</i>				612 528
Troškovi goriva <i>Fuel cost</i>				187 639
Lučki troškovi <i>Port Cost</i>				439 000
Ukupni troškovi <i>Total Cost</i>				1 239 167
Trošak po 1 slotu <i>Slot Cost (1 TEU)</i>				679,74

Izvor / Source: Autor / *Author*

dividualno s tri broda, onda bi ukupni godišnji troškovi za 26 putovanja, za jednog brodarka iznosili:

troškovi broda: USD 15.925.728
lučki troškovi: USD 11.414.000
troškovi gorova: USD 4.878.614.

Obavljajući zajednički linijski kontejnerski servis, temeljem Sporazuma o raspodjeli brodskog prostora, Brodar A na svakom od 3 broda u servisu raspolaže s 2/3 brodskog kapaciteta, dok istovremeno ima troškove samo za svoja 2 broda. Na taj način ostvaruje uštedu za pripadajuće troškove 1 broda kojim participira brodar B u zajedničkom servisu, kako slijedi:

troškovi najma broda: USD 5.308.576
lučki troškovi: USD 3.804.666
troškovi gorova: USD 1.626.205.

Na isti način, Brodar B samo s 1 brodom u zajedničkom servisu raspolaže s 1/3 brodskog kapaciteta na svakom od 3 broda u servisu, dok ima pripadajuće troškove samo za 1 vlastiti brod.

Terminalske i agencijske troškove svaki Brodar plaća samo za vlastiti teret/kontejnere, kao i logističke kontejnerske troškove (najam kontejnerske opreme, popravci i održavanje, ležarije i repozicioniranje kontejnera).

Savings achieved by Operator A and Operator B are displayed in Graph 1.

If the subject liner container service were performed on an individual basis with a 14-day frequency and three vessels, the total annual costs of 26 voyages would amount for the single operator as follows:

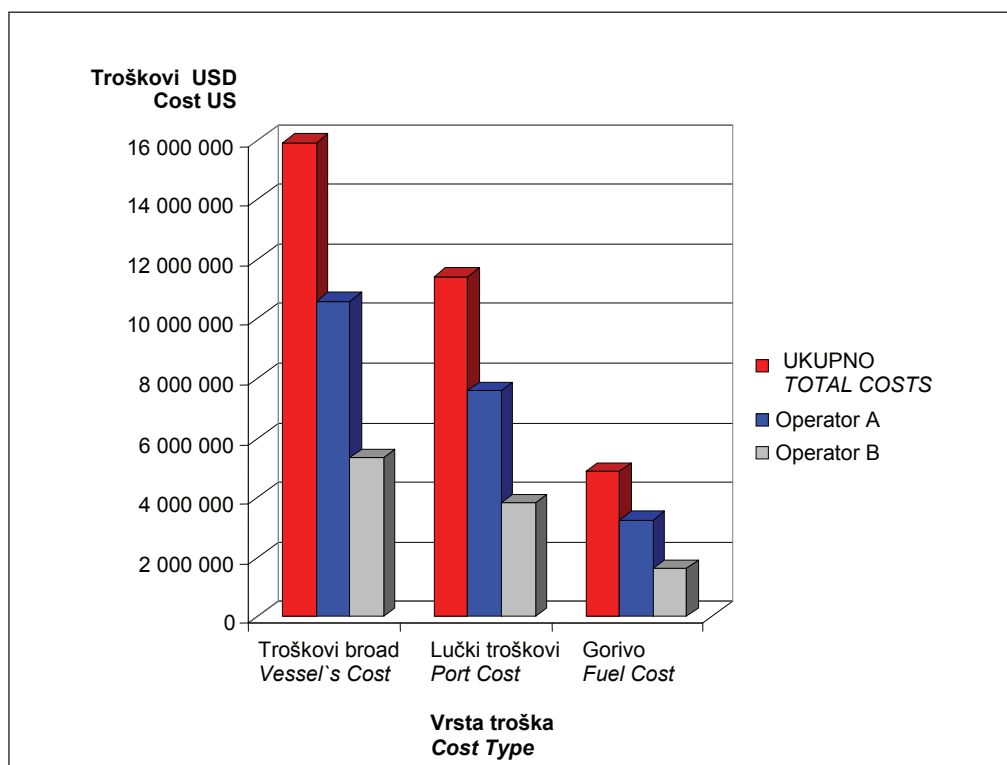
vessel's costs: USD 15,925,728
port costs: USD 11,414,000
fuel consumption: USD 4,878,614

By performing a joint liner container service on the basis of the *Vessel Sharing Agreement*, Operator A is allocated 2/3 of the vessel's capacity on each of the 3 vessels, while bearing costs just in respect of his 2 vessels. In this way, savings are achieved in respect of the apportioned cost for 1 vessel participating in the joint service in favour of Operator B, as follows:

vessel's charter price: USD 5,308,576
port costs: USD 3,804,666
fuel consumption: USD 1,626,205

In the same way, Operator B participates in the joint service with just 1 vessel and is allocated 1/3 of the vessel's capacity on each of the 3 vessels, while bearing costs just in respect of his own 1 vessel.

Dijagram 1. Prikaz vrste i veličine troškova
Graph 1 Cost types and amounts



Izvor / Source: Autor / Author

Sporazumi o raspodjeli brodskog prostora temeljito su promijenili organizaciju brodskih linijskih kontejnerskih servisa i linijskog brodarstva. Od osnovne komercijalne prosudbe o komercijalnoj snazi na tržištu, brodari u međusobnim kooperacijama “dizajniraju” servis i vlastitu alokaciju koja je proporcionalna njihovoj komercijalnoj snazi. Brodari s razvijenim *know-how*, s minimalnim brojem svojih brodova (kapitalnim ulaganjima), razvili su mrežu linijskih servisa na svjetskoj razini. Danas su vrlo rijetki linijski servisi samo jednog broдача čime se najbolje dokazuje da su kooperacije i Sporazum o raspodjeli brodskog prostora opravdali svoje ciljeve.

5. ZAKLJUČAK

Velika kapitalna ulaganja u obavljanje brodskih linijskih kontejnerskih servisa primorala su brodare na razne oblike kooperacija. Najčešći oblik kooperacije baziran je na Sporazumu o raspodjeli brodskog prostora, temeljem kojeg brodari-partneri u zajedničkom servisu izmjenjuju brodski prostor (slotove) na osnovi izračunatog vlastitog udjela u ukupnom kapacitetu servisa. Ovakav Sporazum je rezultat nastoja-

Terminal and agency fees are borne by each Operator in respect of their own cargoes/containers, as well as their logistics container charges (container equipment lease, repairs and maintenance, container demurrage and repositioning).

Vessel Sharing Agreements have introduced radical changes in the organization of container liner shipping services and liner shipping in general. Starting from the basic commercial estimate of the commercial position on the market, in their mutual cooperation operators have grown to “design” services and their own allocation in proportion with their respective commercial positions. Operators with well-developed “*know-how*” and minimal number of their own units (capital investments) have developed a network of liner services on a global level. Nowadays, single-owner liner services are very scarce, and this proves that cooperation and the *Vessel Sharing Agreement* have justified their aims.

5. CONCLUSION

Large capital investments in the maintenance of container liner shipping services have prompted owners/operators to enter different

nja da se kroz zajedničko obavljanje linijskog kontejnerskog servisa ostvare bolji ekonomski učinci nego kada bi linijski servis obavljao individualno samo jedan brodar. Sporazum o raspodjeli broskog prostora omogućava da brodari s minimalnim kapitalnim ulaganjima obavljaju brodske linijske servise i da udio vlastitih kapaciteta u zajedničkom linijskom servisu usklade sa svojom komercijalnom snagom na tržištu, a da pritom usluga korisnicima servisa bude bolja.

types of cooperation. The type of cooperation most frequently used is based on the *Vessel Sharing Agreement*, whereby operators-partners in a joint service exchange their slots on the basis of their own calculated share contribution in the total service capacity. This agreement is the result of efforts toward the achievement of better economical efficiencies through the performance of a joint container liner service as compared to a liner service performed on a single-owner basis. The *Vessel Sharing Agreement* makes it possible for operators to operate liner shipping services with minimal capital investments and to have their own share in the joint liner service brought in line with their respective commercial positions on the market, while securing a better service to their customers.

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- [5] McLean, A., W. Biles, A simulation approach to the evaluation of operational costs and performances in liner shipping operations, *Proceedings of the 2008 Winter Simulation Conference*, 2008, str. 2577-2584.
- [6] Izraz "svoj brod" u ovome tekstu podrazumijeva brodove kojima operira pojedini brodar, koji mogu biti u vlasništvu toga brodarka ili unajmljeni.
- [7] *DynaLiner Trades Review*, Dynamar B.V., Alkmaar, 2010, str. 10
- [8] *Ibidem* 7, str. 26
- [9] Brodovi troše teško gorivo (engl. IFO – Intermediate Fuel Oil) za glavni pogonski stroj, i lako gorivo (engl. MDO - Marine Diesel Oil) za pomoćne strojeve.
- [10] Primjer Sporazuma o obavljanju zajedničkog broskog linijskog servisa između dva brodarka temelji se na podacima iz Sporazuma koji su 1997. godine potpisali brodarki "Croatia Line" i "Lloyd Triestino". Podaci o lučkim troškovima, cijeni najma brodova kao i cijenama goriva odnose se na 1997. godinu.