A RO-RO ENTREPRENEURSHIP AS A TECHNOLOGY START-UP PROJECT

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Abstract - Roadfreight services which are vital part of cargo deliveries in Europe have been sensitive for technological developments. Trucking companies must engage their operations with ferry routes by using high-end technological reservation tools in order to gain a winner role in competition of hard freight markets. There are hundreds of ferry routes within Europe that are being operated by sixty Ro-Ro companies. By the increased demand and quantity of ferry routes trucking companies have faced several difficulties during previous years including cost forecasting, space guarrante on board, chosing the right ferry services with best ticket prices. The aim of this study is to explain the importance of using web based technologies for ferry bookings of transport companies in all over the european routes by focusing on Feribot.com business model. In order to provide a unique, technological, user friendly, multilingual, instant ferry ticketing system that accepts several methods of payment ways a web based platform is built titled as Feribot.com. The software was designed in C# programming language by the support of Microsoft's .Net technology and SQL database that serves in five languages and provides real time ferry booking opportunity. Feribot.com system that works as a B2B platform is connected with the ferry lines by using xlm connection and users are able to check the schedules, prices of over one hundred and thirty Ro-Ro routes on their web browsers. Customers have advantage of buying ferry tickets with upto 45% discount comparing to prices of ticket offices at the ports. Truckers from Turkey, Bulgaria, Romania, Ukraine and Russia which are currently using Feribot.com system obtain their booking confirmations in minutes on their screens. As a conclusion to this research, Feribot.com is a spectacular example of discovering the benefits of technological developments in e-commerce, enterpreneurship for transportation industry, particulary in ferry bookings field.

Keywords - Ferry, Transportation, Technology
JEL Classification: R40, R41, R42

I. INTRODUCTION

Ro-Ro transportation is a floating highway connecting hundreds of points throughout the European continent. Developing market structures, delivery frequencies, product varieties diversified the number of Ro-Ro voyages, the effectiveness of the used ports and the demands of customers using this method of transport. The Ro-Roconnected transportation method, which was originally used as a mandatory requirement, has now become a demanding service. 67% of the road transport to the UK is provided by Ro-Ro voyages and the rest is provided by Eurotunnel. The connection of an island country, such as Ireland, to England and the rest of Europe is made entirely true by Ro-Ro voyages when it comes to road transport.It is possible to call Ro-Ro routes as 'motorways of the sea'(Pau Morales Fusco, 2016).Ro-Ro services which can be classified as a sub-division of short sea shipping in Europe is considered as one of the solutions of congested road networks and one of the driving forces to improve the competitiveness of the EU economy (European Commission DG Mobility and Transport, 2015).
Between the Netherlands, France and Belgium and the UK, more than 30000 trucks and more than 40000 vans, passenger cars and derivatives are shipped from one side to the other on the British Channel. Ro-Ro transport is the most dominant, most economical and most environmentally friendly maritime highway between Germany - Denmark, Germany - Sweden and Poland - Sweden. Ystad-Swinoujscie, Travemünde -Trelleborg, Rostock - Gedser with the help of scheduled voyages organized from the main commercial ports, food, frozen seafood, palletized cargoes, special transport requiring flammable, explosive, hazardous materials and oversized loads can be delivered safely and on time. In addition, the Baltic States (Lithuania, Latvia, Estonia, Russia and Finland) have more than 30 different Ro-Ro voyages between Germany and Sweden. Ro-Ro connections provide efficiency and effectiveness to road transport companies, and carriers can operate more semi-trailers with less tractors. Succesful examples of getting freight off the roads are, as a reliable example, 'motorways of the sea' where lorries or their trailers make part of their north-south or east-west journey across Europe by specialised ferries (European Commission, 2012).
%73 of the Ro-Ro lines considered are mandatory (without alternative routes), out of which approximately %63 connected island regions. This does not mean, however, that they do not contribute in any way to sustainable transport development (Kotowska, 2015). In addition to this it is visible that the share of Ro-Ro shipments among short sea shipments within europe have been significantly increased (European Commission DG Mobility and Transport, 2015)

The freight units, particularly semi-trailers or shipping containers on mafi platforms can be shipped

on a ferry from one port to other without accompanied trucks. Ferry operators have their own hauling machines to haul the trailers on and off the ferry at both ports in departure and destination. This service is a gain of 30% for Ro-Ro customer shipping companies paying freight per meter. A standard truck is 17 meters long (hauling tractor + semi-trailer). When only 13.6 meters of semi-trailers are loaded, the transport company pays 3.4 meters less freight and uses less personnel to manage a greater number of load units.This service saves time, personnel and undeniably money at the end as truckers pay for only 13.6 meters length of semi-trailer instead of 17 meters of complete truck and trailer. They also are be able to haul more cargo units with less quantity of drivers, tractors, less fuel consumption and maintenance fees besides of cheaper ferry ticket fees.

Ro-Ro transport in Northern Europe is a good example of the high number of connected ports and the quality of infrastructure services offered at the port. On the other hand, similar productivity can be observed in the Southern European Ports. Ro-Ro connected voyages were clustered in Italy in cargo transportation. With the Ro-Ro voyages made between Greece - Italy, Italy, Spain, Turkey-Italy and France, 1500000 freight vehicles are transported between the ports such as Igoumenitsa Bari, Pendik - Trieste, Genova - Barcelona, Durres - Bari, Pendik - Toulon with the help of reciprocal scheduled voyages. From a point of view, it is possible to say that Ro-Ro transportation is the most efficient, technologically advanced and environmentally sensitive method in multimodal cargo deliveries. A Ro-Ro short sea vessel can carry considerably larger amounts of cargo than a truck(Andreasson, Louise; Liu, Shan;, 2010) .Thanks to the MARPOL regulation introduced in 1973, it has become imperative for all Ro-Ro vessels serving in Europe to use low sulphur bunker. Vessels operating in the Baltic Sea, the North Sea and the British Channel are obligated to use fuel that has less %0.10 sulphur in it(Grimaldi Group Finnlines, 2017).

The new generation of modern ships equipped with the latest technology and modernized fossil fuel consumption rates have been reduced by 52% due to cargo transport. The vessels providing service accelerated, the number of voyages increased thanks to increasing competition, the ticket fees paid by the trucks decreased and the quality of food, bath and accomodation opportunities offered to the drivers on board increased. Thanks to the medium-sized Ro-Ro vessels, which can carry 4000 lane-meters and more than one load at a time, 200 to 17-meter trucks can be shipped at one departure. Ro-Ro voyages, which are efficient in short distance, 300 nautical mile radius connections, depending on the high efficiency ships built and the changing international market structure, It has also become widely used in relatively long routes such as Norway-England, Germany-Norway, Germany-Finland, Germany-Russia, Turkey-Italy and France. UN RoRo is one of the biggest RoRo companies that operates in European routes that was estabilised in Turkey. The company scored over 180.000 trucks shipped in between Turkey and Italy, France in 2015 with 1100 departures vice versa(U.N. Ro-Ro, 2015).

II. LITERATURE REVIEW

With the elimination of the borders of the European Union for member countries, the quantity and diversity of the cargo-carrying vehicles, which benefit from the Ro-Ro services, have also increased. In addition to freight transportation, intensive movements of passenger cars, especially caravans, between the north and the south, have made it necessary for ship operators to use advanced scale of technology to respond to the number of vehicles booked and handled in the market. Besides of innovative handling technologies, digitalisation has gained importance in combined transport and generally in the logistics sector in the past years(International Union of Railways, 2016).

Since the main task of the ship operators is the management of Ro-Ro ships moving on a certain route, they have transferred most of their sales and marketing activities to the sales agents. At the beginning, these sales agents, which sell tickets at many points of Europe as tourism office, have focused on online sales services with the development of web technologies. As a result of the diversification of the market demand, only B2B platforms have been created to sell tickets for freight vehicles. Available online ticket sales platforms do not sell only Ro-Ro tickets, in addition, they offer enriched and diversified services such as tunnel crossings, highway fees, bridge crossing payments, VAT refunds.

The online B2B Ro-Ro sales agency organizations, which have been previously avaible in England, France and Germany, have spread to Eastern Europe in the last ten years and have started to sell real-time ticket reservations to their customers with low prices and fast response times. Marisa.lt which was one of the good examples of online ferry booking systems that is actively operating in Alytus, Lithuania responds the demand of customers from Baltic States. Marisa founded in Lithuania, is one of the first companies to sell tickets to trucking companies and provide services to Baltic region cargo carriers based on web based reservation system.Marisa has built up their own in-house designed software and continously developed it. They linked theirlocal customers by connecting them with the databases of ship companies and allowing clients to book multiple routes in a short time. Transferry.com is an another reputable company in the ferry booking market which is dealing with the freight bookings since 1980.Motis.com is an Irish ferry agency that also has offices in several places in the U.K. Transconsult-

cz.int is a transport company and also a ferry booking agency with headquarters in Prague. Transconsult is active in central and easter european markets. Czechia, Slovakia, Poland have big quantities of truck in their inventories and Prague is the strategical location to sell tickets in these markets. Transcamion.com is a german ferry operator with online booking services. The company has more than 40 years of experience in ferry ticketing sales and it is considered as one of the well known entities in the industy.

Ship operators do not have sufficient time, personnel and establishment capital to reach a large number of customers with different geographies and various financial credibility.According to building cost, it is stated that the value of a newly built classical, convenional medium sized ship is estimated at approximately 100 million Euros(Fafaliou & Polemis, 2016). Even this information shows that the focal point of Ro-Ro line operators. Truckers, especially those located in Eastern Europe, are usually small and medium-sized enterprises. Many local truckers want to take advantage of discounted ticket fees, late payment options, customer service in the local language, availability of 7x24 support and similar advantages during Ro-Ro reservations. The likelihood of meeting a Ro-Ro operator company in the North Sea that responds such demands as indicated above of a small-business sized trucking company in Turkey or Iran is relatively low compared to the regional sales agent providing local and customer oriented services. The ferry operator prefers to deal more with the big accounts such as regional ferry ticket sales agents or selected transport companies with a large number of bookings which use the ro-ro lines a thousand bookings or more per annum. Small and medium-sized enterprises, which are the largest in number comparing to big accounts, can be contacted by,acquired and managed as customers thanks to their primary sales agents in different countries.

A contract is made between the Ro-Ro Line and the Ferry Agent on the basis of certain sales turnover and / or number of passes per year. This contract provides, -with the effect of letter of bank guarantee provided by the agent, a discounted price table and late payment terms to regional ferry ticket sales company. With the technological opportunities, sales network, regional reputation, personal relations and good control of the market, the sales agents have the opportunity to reach a large number of customers in the countries where they have sales permits. On the other hand, depending on their own initiative, sales agents take the risk of payment collection by offering late payment terms to trucking companies on behalf Ro-Ro lines. This is a transparent system based on win-win for all the ship operator, the agent and the trucker.

The efficient cooperation between the ship operator and the Ro-Ro sales agent is not just financial and marketing-based. The acquisition of a Ro-Ro or Ro-Pax (ships carrying passenger and cargo units), operational cost calculation, and the sustainability of costs in the long run require intensive operational responsibility. Although the fixed costs associated with the Ro-Ro vessel are known, bunker and number of other surcharges vary on a monthly basis changes. Fluctuations in bunker prices are reflected in the cost per meter of tickets and are announced to all customers through regular newsletters. Other than bunker surcharge, such as the Low Sulfur Surcharge used in Baltic & North Sea routes, several variable costs such as the Winter Surcharge (as known as Ice Surcharge by some sources) used in the ports of Finland and Russia cause changes in Ro-Ro ticket prices. For a small trucking company, following up these ever-changing costs, checking current ticket prices, monitoring time-tables, deciding on a feasible Ro-Ro connection and selecting a feasible ship operator require a great time investment. It is a dedicated and a stand alone task at the company. As it is very difficult to implement, its intelligibility is open to errors and misunderstandings because it is based on relatively complex calculations. In this sense, online platforms that provide web-based B2B booking services are effective and valuable solution providers that supply the automation that the industry needs. Thanks to the pricing algorithms they have, on one hand, online ferry booking paltforms can update the surcharges continuously and in real time in big quantity of routes, Ro-Ro lines and variations such as dates, vehicle types and commodity classes. On the other hand, these online platforms simplify the pricing system for an easy understanding of customers so they do not have to deal with jobs such as the surcharge validation, fee calculation. A trucker can submit the basic information such as departure and arrival port, boarding date, time, load type and tonnage, number of drivers, via web screen, screen the price, make reservation, pay, and display the ticket number in seconds. From this point of view, Ro-Ro booking platforms serve as a facilitator with their unique on-lineB2B format.

III. THE NEED

Feribot.com which is designed by Ferco Shipping Llc was established primarily to provide services to Turkey, Bulgaria, Romania, Iran, Ukraine and Russia markets. It is the first online B2B Ro-Ro reservation system in Turkey. The Feribot.com system is intended to provide reliable, fast and affordable ferry reservation services to its customers through its C# software language, SQL database and .Net technology. Thanks to its parametrically designed infrastructure, Feribot.com operates with a software base that makes all business processes dynamically manageable, including country, city, port, route, ship line, cruise, costs, customer roles, user groups, downstream user authorization, credit control, billing and reporting. Feribot.com system acts as an

electronic bridge between the trucker and the Ro-Ro company and connects the customer with the Ro-Ro operator, directly in electronic form. The customer's reservation is processed and finalized by the connection between Feribot.com and Ro-Ro line servers. A typical booking can be confirmed within seconds or due to the lack of space on the ship, it will be backed up as a Waiting List. The customer can view the final confirmation, ticket number, booking status on his / her screen and change the reservation within the defined critical periods on-line. Feribot.com broadcasts its services inTurkish, Bulgarian, Romanian, English and Russian languages thanks to the multilingual interface. According to the contracts with the ship operators represented, the Feribot.com system makes sales in countries such as Turkey, Bulgaria, Romania and also able to collect payments into its local bank accounts in these countries. The operation process of Feribot.com is based on two parts: Back Office and Client Side. In the first step, as a potential customer, the trucker company is visited by the Feribot.com sales representative. During this interviwit is examined about the customer's demands and expectations, the number of vehicles it has, the Ro-Ro lines it wants to use, its financial structure, the monthly or annual Ro-Ro usage numbers. After the meeting, the risk limit of the customer is determined by the Feribot.com management, a quotation is generated about the lines to be used and submitted to the signature of the potential customer. After the e-commerce agreement and the current account agreement are approved and signed along with the price proposal, the customer receives the master username and password. The customer can create multiple user names and passwords for different employees under the main account in Feribot.com. The system defined scales of customer credit limits are in between five thousands and twenty five thousand of Euros. Each time the customer makes a reservation, the system decreases the invoice amount from the pre-defined risk limit. Each booking is a real time decrease on customer's credit limit.Once the customer reaches to the limit of its pre-defined risk limit, the system suspends their booking screen until a certain amount of payment is effected by the client.

Feribot.com system provides simplified interfaces that are specially designed for the users who haven't got advanced level of knowledge on online business. The user firstly selects the port of departure, the port of destination, desired boarding date and time. It completes the reservation by defining the vehicle's license plate(s), vehicle type, cargoweight, number of drivers and dangerous cargo class class (if any). Reservation data is transmitted straight to Ro-Ro Line's web services if the shipping line is linked to Feribot.com and the result of the booking appears on the customer's screen in seconds.

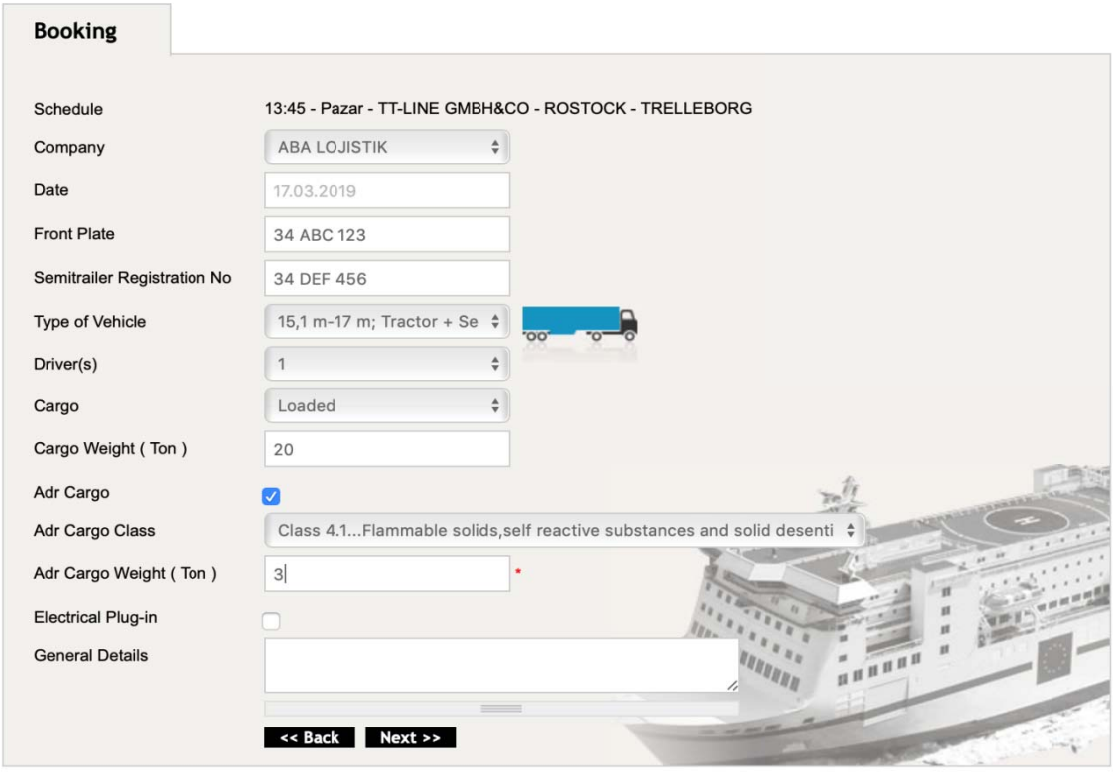

Figure 1: Feribot.com Booking Screen
Source: www.feribot.com

The general results shall be as "reservation confirmed" or "waiting list is approved as vehicle number XX". The driver of the truck company can visit the ticketing office of the Ro-Ro company in the

relevant port with his / her license plate information to obtain the printed ticket if needed. A small number of ship operators can only manually confirm reservations for a variety of reasons (lack of technical infrastructure or inavailabilty of online booking features in their IT systems). The Feribot.com system has solved this situation by using a one-time token link sent on an email to booking office of the Ro-Ro line. Anauthorized personnel at Ro-Ro line clicks on the link in the e-mail and writes the approval status and number directly to the Feribot.com system with a one-time right. In this method, the booking confirmation process takes a period of twoup to five minutes. In the third operational method, Feribot.com sends the online reservation to the ship operator manually by e-mail or fax. This method is preferred by small ship operators that are providing services on a very small scale and it is not an integrated method to the business model of Feribot.com. Manual booking processing method takes less than two percent of the reservations handled by Feribot.com annually.

The booking process and steps are made traceable to both the employees of Feribot.com and the customers with the help of colors. When new booking data is entered into the system it gets a 'New Booking' status and turns in brown color. 'Processing' step is yellow when the data is processed, 'Confirmed' step is green when the reservation is approved, 'Invoiced' step is represented in blue when invoice is created, and it turns red when the 'Booking is Cancelled'. When a customer's payment is received by Feribot.com system related invoices change status as 'Paid' and color becomes gray.

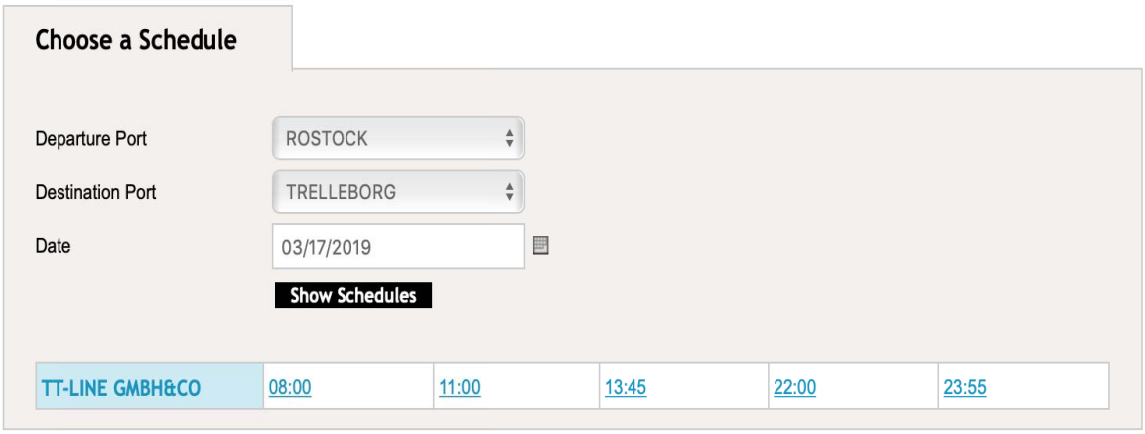

Figure 2 : Feribot.com Booking Screen Port Selection Step
Source: www.feribot.com

Depending on the statistics of 2018, 12500 vehicles are booked by Feribot.com system annually. The average ticket price is 250 Euros. Weekends, specially Friday evenings are most congested and highly demanded days for ferry bookings by truckers. Demand intensities are usually clustered between evening hours starting from 18.00 pm and midnight. The common practise in transport industry is that the commercial transports are consolidated over the last working day of the week, and the transfer of freight vehicles using the last ship hours of the day has an important role in the emergence of this data. Since Feribot.com providesactive service to truck companies in Turkey, on certain routes, that the nature of business flow goes through. The main routes which Turkish truckers are using frequently are Rostock - Trelleborg, Swinoujscie - Ystad, Rostock - Gedser, Calais - Dover, Genoa - Barcelona, Igoumenitsa - Bari. The system also provides services in addition to the sellingof Ro-Ro tickets, such as the Örosund Bridge reservations between Denmark and Sweden, Frejus Tunnel reservations between France and Italy. The system currently has 37 Ro-Ro ferry lines 165 different routes, 2350 different tariffs registered. It is not possible for such a large system to be managed without a technological structure without integrated connections. Considering these figures it is possible to consider Feribot.com as a large online super market for Ro-Ro bookings. Besides of the qualitative benefit of the Feribot.com system, its quantitative utility, is a price advantage. Feribot.com as a wholeseller and wholebuyer of ferry tickets grants access to lower prices scales thanks to its consolidated volume of business. These prices,by adding an affordable profit margin to topare supplied to trucking companies which has much more smaller booking capacitiesin order to create a market segment for such online service provider as Feribot.com. On some ferry routes the advantage of prices that Feribot.com supply and the prices available at ticket offices of Ro-Ro lines might be upto %40 in favour of Feribot.com customers.For example, Rostock - Trelleborg ferry route, which is offered by TT-Line, for a one-way, 17-meter truck ticket with a cash payment at the port costs 535 Euros.The sales price of the Feribot.com for the same is 379 euros and can be paid in 21 days late in case of an aggreement. In this sense, Feribot.com is not only a ticket sales website but also a digital utilizator and a commercial highway between the final consumer and the Ro-Ro line.

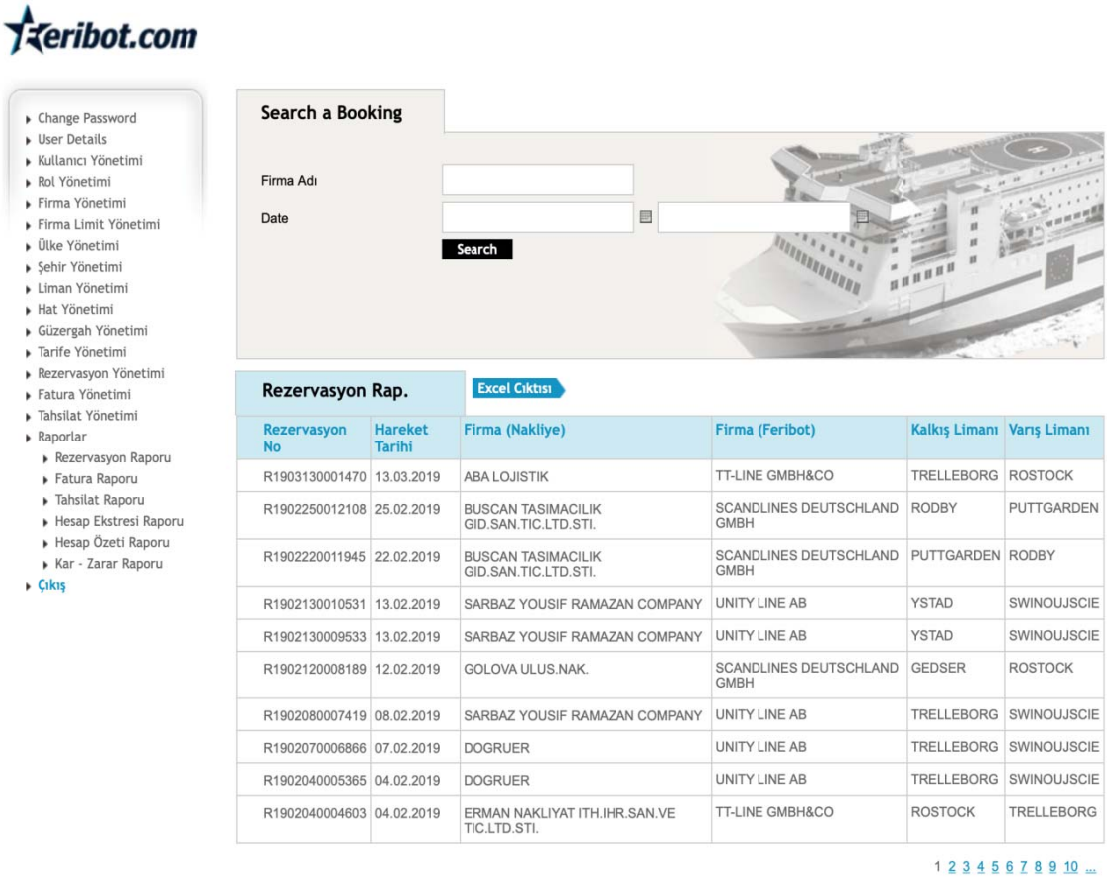

Figure 3 : Feribot.com Reports Screen
Source: www.feribot.com

Feribot.com as a single, complete, fully functionalRo-Ro booking system it also has its own invoicing management and payment collection management modules. The revenue item record (which is an invoice) of the actual reservation is automatically generated by the software and sent to the customer via e-mail. In order to ensure that the profit and loss accounts are healthy, the 'expected' expenses of all bookings are generated by the system at the same time as the income items. In this way, the time spent on checking, approving the invoices from the ship companies and solving the differences if any is minimized. The payment collection system can be managed as a different module in the same system. The payment collections of the customers are recorded in the system based on eachbooking and the receivable is displayed on the relevant screens in the system. For example, the customer can see the invoices, payments, statistics on the account statement on his / her screen.

The status of the relevant bookings is updated as 'Paid' and the credit risk amount of the customer is increased right after the funds are received by Feribot.com. The most important subject for a commercial start-up such as this one is being capable of creating effective reports out of the collected data in the sytem. There are six report types that are grouped under the Reports module in Feribot.com system which are reservation reports, invoice reports, payment reports, accounting reports, customer reports and profit-loss reports. In addition to predefined reports, it is possible to definevarious types of reports by choice which can be related to different parameters. The most important difference of Feribot.com from its competitors is the flexible data structure of the pricing module. There are dozens of different Ro-Ro ship operators in the market and almost the same number of different types of pricing methods they each have. A system must be able to adapt to all these possibilities easily and without error. Feribot.com has solved this problem by dividing the pricing algorithm into two divisions as fixed and dynamic variables. Minimum fixed price, loaded vehicle freight unit per meter price, empty vehicle freight unit per meter price, fixed handling fee, port fees per tonne and such as more than thirty variable can be compiled and used to create one final price with the help of a single screen provides the possibility to produce costs and sales prices on Feribot.com significantly.

The system performs the profit margin calculation by determining the percentage. As the whole cost system changes routinely, the sales prices change the same way by keeping the pre-defined profit margins. The profit margins determined by Feribot.com may vary depending on the variables such as the market situation, the density of the competition, seasonal promotions and the sales prices of the competitors.



Hatlar — Yeni Ekle

Hat Adı	Kalkış Limanı	Varış Limanı	
ALCUDIA - BARCELONA	ALCUDIA	BARCELONA	
AMBARLI - BANDIRMA	AMBARLI	BANDIRMA	
ARHUS - KLAIPEDA	ARHUS	KLAIPEDA	
BANDIRMA - AMBARLI	BANDIRMA	AMBARLI	
BARCELONA - ALCUDIA	BARCELONA	ALCUDIA	
BARCELONA - GENOVA	BARCELONA	GENOVA	
BARCELONA - PALMA	BARCELONA	PALMA	
BARCELONA - TANGIER	BARCELONA	TANGIER	
BARCELONA - TUNIS	BARCELONA	TUNIS	
BARI - DURRES	BARI	DURRES	

1 2 3 4 5 6 7 8 9 10 ...

Figure 4: Feribot.com Route Design Screen
Source: www.feribot.com

Customer satisfaction is the first rule at Feribot.com from coding a software, desigining the screens upto adding new routes into the website. The company has bank accounts in Bulgaria and Romania, as well as in the Turkey, to enable customers to make payments cost-effective and easy way out of booking processes. International customers are able to buy Ro-Ro tickets with the fastest, most advantageous and easiest method with the help of low bank commissions.

CONCLUSION

Ro-Ro shipping industry as an active player in multimodal transportation, particularly shipping of freight units as trucks, tractors-semitrailers, vans, mafi units and such, will keep its position as improving and its importance increasing continously in the future. The European Commission in its transport White Paper in 2011 set a target of getting 30% of freight tonnage moving over distances greater than 300 km onto railr or water by 2030 (McKinnon, 2015).Development will not only be achieved by decreasing the fuel emissions of the vessels, increasing the load capacities, diversifying the types of ports and routes and increasing the frequency of voyages. Also, Ro-Ro link is more competative against variations in the fuel price than road transportation. Equavalent increases in fuel price for all road transportation and the bunker used for the maritime leg, icrease the competitiveness of the ferry services(Pau Morales Fusco, 2016) . The most important role in this process will be technological innovations. The role of Feribot.com and similar start-ups will become more dominant in the future of multimodal transportation as the keyword 'connectivity' is becoming a mainframe rule for all business types besides of transportation itself alone. On the one hand, ship operators will develop their own online reservation infrastructures and customer integration platfroms, while on the other hand, their sales agents will continue to actively participate in this race. It is evident that systems offering a wide range of payment options, accepting remittances in multiple ways, including crypto currencies, offering multilingual digital platforms, parametric and state-of-the-art systems will be the industry's only choice. The dynamics such as increasing competition, increasing trend in fuel prices and the necessity of using environmentally friendly vessels will diversify the technological utilization ratios, demand and investments in multimodal transportation as in all parts of the transportation sector.Promoting sustainable freight transport systems requires a balancing act between economic, social and environmental considerations(United Nations, 2012) .From this point of view, Feribot.com will be among the most preferred e-commerce service providers with its type of business.

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