

Using Seaports in Distribution Logistics of Cars on the Example of the Toyota Company

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ABSTRACT: The maritime transport is an element of the intermodal transport, which makes the distribution process of automotive industry more efficient. The article presents possibilities of using the sea transport and seaports in the logistic chain of car distribution on the example of the Toyota company. Toyota is one of the largest car manufacturers in the world, having (among others) its logistic centers of distribution in seaports of Grimsby (Grimsby Logistic Centre in North East Lincolnshire – England) and Sagunto (Sagunto Logistic Centre in Valencia – Spain).

1 INTRODUCTION

The automotive industry is one of the most important sections of global economy. In 2012 there were 81,1 million vehicles produced and among them there were 63,1 million passenger cars. The production value in 2011 amounted to 718,7 billion euro [1]. Most cars are produced in Japan, Germany and the USA (Table 1).

Table 1. Production of passenger cars (in thousand units)[2]

Country	Year 2012
Japan	8 553,6
Germany	5 377,0
United States	4 106,4

International Organization of Motor Vehicle Manufacturing (OICA) estimates that if the automotive industry was an independent country, it would be the world's sixth largest economy. Approximately 12 million people are directly employed in production of 80 million vehicles, what accounts for 5 percent of total employment level [3].

Japanese company Toyota is one of the biggest car manufacturers in the world. As of the end of December 2012 Toyota conducted its business worldwide with 52 overseas manufacturing companies in 27 countries and regions. Toyota vehicles are sold in more than 160 countries and regions [4]. This is why this company has been chosen as an example of perfect logistic processes realization, in this case distribution logistics utilizing maritime transport and seaports.

2 MARITIME TRANSPORT IN CAR DISTRIBUTION LOGISTICS

The main goal of distribution logistics in the automotive industry is to deliver cars (or spare parts) to the clients in specific place, in specific time, according to agreed upon conditions and for acceptable price. The distribution costs ought to be as small as possible and the quality of service satisfying to the customers.

Transportation of cars requires particular solutions depending on specific characteristics of a transported vehicle. Cars are expensive and heavy goods. During its handling there is usually no packaging (except for cases when the car is coated in thin layer of wax or packed in specialist cover). The changes in model, size and weight of the car occur very often and have significant influence on elements of the distribution logistics system (transportation, storage, handling, customer service etc.). Customers' requirements and minimization of logistic costs forces safe transportation of a larger number of cars in shorter time with adequate selection of transportation means.

Because of the global range of automotive industry, one of the links in the chain of car distribution is maritime transport, which enables a commodity or an object to be transported via the sea from every place in the world to any given destination point. There is also a possibility of composite commissions realization with complex forwarding-transport handling of maritime consignments directly from the manufacturers to final recipients, including the insurance of shipped cargo, customs agency, warehouses and bonded warehouses.

The maritime transport has its advantages but, unfortunately, also has its drawbacks. The advantages include: low costs of transport (in comparison to, for example, air transport), long range, very large capacity, variety of transported commodities, low risk of damaging the cargo or its loss. Among the drawbacks of such means of transport one can point out low speed of carriage, handling only seaside areas, weather dependency, the need of transshipments, the risk of water damage to the cargo and the necessity of building expensive seaports. In order to minimize the negative impact of naval transport on carried cars, special vessels – so called (Pure) Car Carriers are implemented.

In the 1970s cars were transported mainly from Japan (Toyota, Honda, Datsun) to the USA and Europe on upper, open decks of regular ships. However, sea salt damaged the car coating and exterior mechanisms of the vehicles. That is why there has begun the construction of modern and technically advanced ships that are equipped with movable decks, custom ramps and able to carry up to several thousand cars [5].

One of the biggest shipping companies is a logistics company Wallenius Wilhelmsen Logistics. It is a privately owned Norwegian/Swedish shipping company, established in 1999 and co-owned by the two shipping companies Wallenius Lines and Wilh. Wilhelmsen. The company offers a range of logistics services, including supply chain management, ocean transportation, terminal handling, inland distribution and technical services. It is one of the world's largest companies in the transportation of rolling equipment: vehicles, heavy machinery, yachts, trains, power stations and other. Headquartered in Oslo and Stockholm, with main regional offices in New York, Tokyo and Sydney, the company has 3 300 employees worldwide [6].



Figure 1. Wallenius Wilhelmsen Logistics vessel [6]

Ships of this shipowner arrive also to the Polish ports. In 2008 car carrier „Talia“ operated by Wallenius Wilhelmsen Logistics called at the port of Gdańsk Port Free Zone as a part of regular shipping service with Japan. This ship is nearly 20 meters long and 32 meters wide, it has the carrying capacity of 21 thousand DWT taking on board 6 400 motor vehicles. The carrier brought a load of 2 257 Toyota motor vehicles destined for the Russian market [7].

In 2012 the Polish part of international maritime traffic associated with the transport of selected types of vehicles (ro-ro units) amounted to a total of 374 300 units, among them: 327 424 passenger cars and motorcycles, 1 625 buses and 45 251 import/export vehicles [8]. Table 2 shows the share of the largest Polish seaports in the international trade of goods such as cars and motorcycles.

Table 2. The share of Polish seaports in international marine traffic –passenger cars and motorcycles (in numbers) [8]

Ports	Year 2012
Gdańsk	43 543
Gdynia	83 498
Świnoujście	200 383
Total of passenger cars and motorcycles	327 424

3 DISTRIBUTION LOGISTICS OF CARS ON THE EXAMPLE OF THE TOYOTA COMPANY

3.1 Characteristics of the Toyota company - production and sales

The international character of Toyota Motor Corporation is presented by its organizational structure (Figure 2).

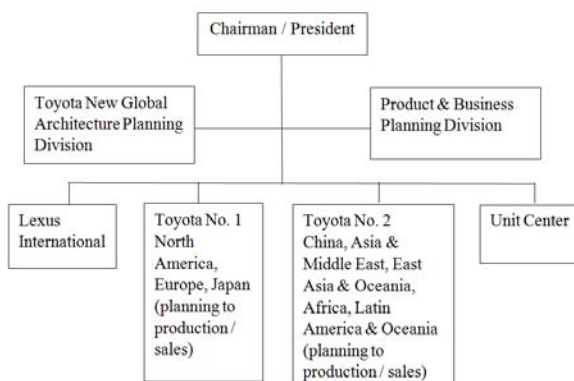


Figure 2. Organizational structure of Toyota Motor Corporation [9]

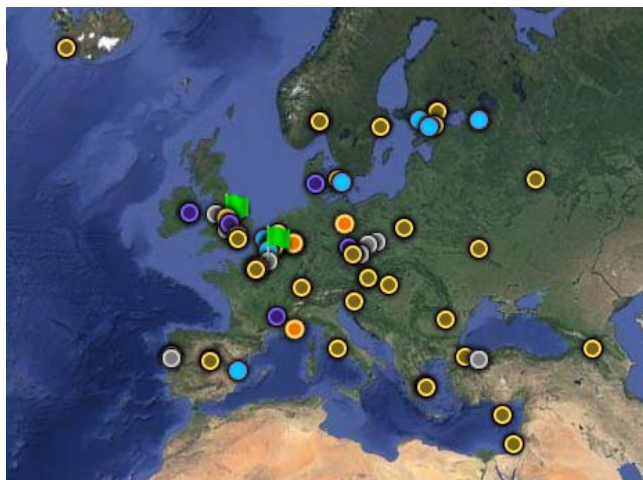
In 2013 total production results of vehicles were 8 698 thousand units and total sales results were 8 871 thousand units (Table 3) [4].

Table 3. Toyota firm vehicles sales in 2013 [4].

Region	Vehicle sales [in thousand units]
Japan	2 279
Overseas Total	6 592
North America	2 469
Europe	799
Asia	1 684
Cental and South America	364
Oceania	271
Africa	259
Middle East	741
Other	5
Consolidated Total	8 871

Apart from passenger cars Toyota Group produces, inter alia: large trucks, buses, small commercial vehicles, engines, spare parts, homes, boats and marine engines.

Toyota Motor Europe (TME) is 100 per cent owned by Toyota Motor Corporation (TMC) and has its headquarters in Brussels, Belgium. TME is responsible for all Western, Central and Eastern European countries including the Canary Island, Turkey and Russia, as well as Israel and number of Central Asian markets (Armenia, Azerbaijan, Georgia, Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan). TME oversees the wholesale sales and marketing of Toyota and Lexus vehicles, parts and accessories and Toyota European manufacturing and engineering operations. Toyota Motor Europe operates in 17 countries with 9 manufacturing plants, 9 vehicle logistics centers and 14 parts distribution centers (Figure 3) [10].



- National Marketing and Sales Companies (NMSCs)
- Vehicle Logistics Centres (VLCs)
- Parts Logistics Centres (PLCs)
- Manufacturing Centres (EMCs)
- Supporting Facilities

Figure 3. Toyota Motor Europe activities [10].

Figure 4 presents logistical process in Toyota firm related to delivery of vehicles and spare parts.

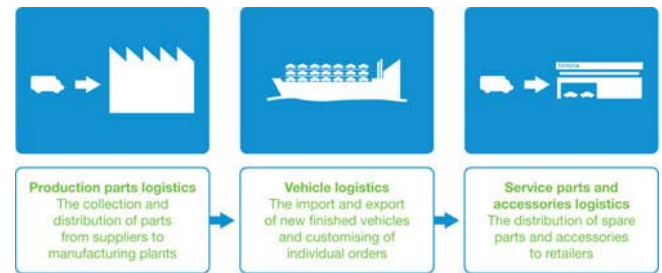


Figure 4. Delivering vehicles and parts in Toyota firm [11]

The paper presents examples of vehicle logistic centers located in European maritime ports and using the potential of maritime transport.

3.2 Selected logistics distribution centers of Toyota company

3.2.1 Grimsby Logistic Centre

Grimsby is the United Kingdom's major car import terminal, although retaining its strong connection with the fishing and food industry. Grimsby is located just seven miles from the open sea, on the South bank of the River Humber and within easy reach of the UK's industrial heartland. The M180/A 180 dual carriageway runs right to the dock entrance, providing fast links to the M18 and M1 motorways. There are also direct quayside rail connections which connect the port to the national railway network. More than 600 000 vehicles are imported through Grimsby each year. Grimsby and Immingham create a unique network of services connected to Northern Europe and Scandinavia by more than 30 roll-on/roll-off (ro-ro) freight sailings each week to ports ranging from Rotterdam to Gothenburg [12].

The Port of Grimsby is the UK's largest port by tonnage. Its prime deep-water location on the Humber Estuary, one of Europe's busiest trade routes, gives companies direct access to mainland Europe and beyond.

In September 2013 the Grimsby River terminal opened, providing ro-ro services. Before the opening of the new terminal, Grimsby Port handled 400 000 ro-ro units per year. This combined with the figures from nearby Immingham, raised the total number of units moved each year to 600 000. The Humber's southern bank has long been a prime marine gateway, comprising as it does the ports of Grimsby, Immingham and Killingholme. Together, these latter two facilities in 2012 handled over 800 000 vehicles (Audi, Toyota, Skoda, Sayer, Seat, Suzuki, Mercedes-Benz, GM, Mini). Grimsby can accommodate ocean car carriers with 3 000 unit capacity. It markedly improves the speed and efficiency of transporting high numbers of finished vehicles [13].

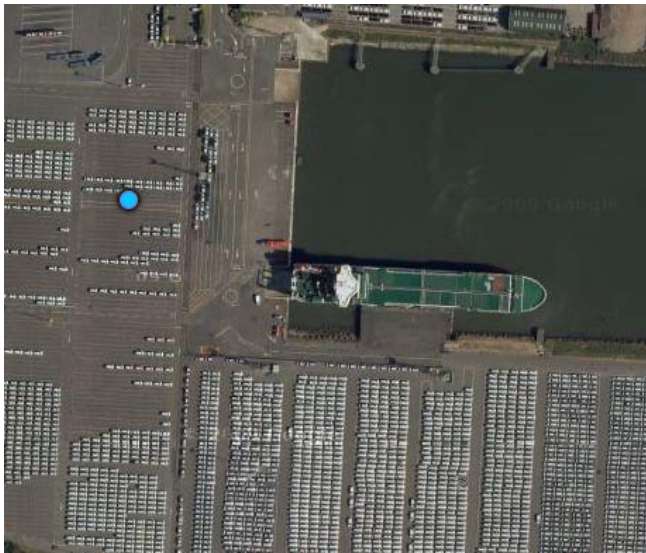


Figure 5. Grimsby Logistics Centre [14].

Toyota's Grimsby Logistic Centre is located in Alexandra Dock North in Grimsby, North East Lincolnshire in England. Its main functions include receiving United Kingdom produced Avensis and Auris passenger cars and transporting them to the ports of export or to destination country, receipt and transportation to UK National Marketing & Sales Company (NMSC) of France built Yaris and Czech build AYGO, central stock and enhancement activity of UK built vehicles destined for Norway. In 2010 export in Grimsby amounted to 62 000 units and import – 32 000 units. Grimsby yard space amounts to 61 000 m² [14].

3.2.2 Toyota Vehicle Logistic Centre in Sagunto

Port Sagunto with Valencia and Gandia ports create Spanish port system. The main technical characteristics of this system are presented in the Table 4.

Table 4. The area of Sagunto, Valencia and Gandia system ports (in thousand m²) [15].

	Port of Valencia	Port of Sagunto	Port of Gandia	Total
Land surface area	5 264	2 350	230	7 844
Surface area available for concessions	4 306	2 137	204	6 647
Sheltered water surface area	4 179	2 194	276	6 649

The Port of Sagunto is linked to the national road network via the CV-309 and the V-23 roads. These roads lead onto the AP-7 toll motorway and the A-23 motorway which connect the port to the rest of the peninsula. The Port of Sagunto has its own private rail network, which belongs to Arcelor firm. This links up to the national rail network via the South Quay.

In 2011, the number of new cars shipped as non-containerised ro-ro traffic was 380,606 (excluding transit traffic). This represented a decrease of 7.2% compared to 2010. 197,841 of these new cars were exported, the main brands being Ford, Opel, Peugeot, Renault and Iveco Pegaso. The other 133,609 imported vehicles were mainly Toyota (Toyota,

Toyota Gibraltar, Lexus), Fiat, Ford and Dacia. The remaining 49,156 cars were domestic traffic to and from the Balearic Islands. This traffic is handled through the ports of Valencia (82%) and Sagunto (18%) [15].

Ro-ro and Vehicle Terminal (Dock 2) has Carport Sagunto S.L. operator. The Carport Sagunto terminal has attracted various automobile brands in a short period of time (6 brands since April 2008), consolidating its position as a reference terminal in Spain and Europe. Sagunto S.L. is the automobile terminal in the port of Sagunto (Valencia) created specifically to address the vehicle traffic needs of the Levante region. With a dock length of 540 meters, two ro-ro ramps, surface area of 275,000 m², a warehouse for customized services and workshop, the necessary equipment for loading and unloading vehicles and storage, this terminal is one of the most modern in Europe [16].

Toyota Vehicle Logistics Centre (VLC) with Toyota Logistics Services España S.L.U. operator handled by Carport. This is Toyota and Lexus Vehicle Logistics Centre for storage, inspection and accessory assembly (Figure 6).



Figure 6. Toyota Vehicle Logistics Centre in Sagunto [17].

Annual Traffic of Toyota and Lexus vehicles was 42 102 units in 2011 [15]. The Sagunto VLC receives vehicles from Toyota's European manufacturing plants in Turkey, France, the United Kingdom, Czech Republic and Portugal. These vehicles arrive by sea and truck, before being transported to locations across Spain [17].

4 SUMMARY

The international character is a basic feature of the automotive industry. This is pertaining to both the automobile production and their use. In contemporary world the car has become a good essential for correct functioning of the economy of the given country and for comfortable life of its citizens. There is strong competition between numerous car manufacturers in the automotive

industry. Each of them wants to direct customers' attention to its product.

One of the elements contributing to the competitive edge is an efficient logistic process, also in the sphere of distribution. The aim of this article was to describe the importance of sea transport and seaports in efficient, minimizing logistic costs and satisfying to the customer world's car distribution process. As an example of one of the largest automotive firms - Toyota Motor Corporation was chosen. It has numerous distribution centres, and among them, the ones in which the sea transport is performing the essential role and is contributing to the sale growth of this brand cars on markets in the entire world, meeting the diverse needs of customers.

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