

Challenges Facing the Cruise Seaports Resulting from Introduction of Giant Cruise Vessels to the Market

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ABSTRACT: For a decade, giant cruise ships have been introduced to the market. Nowadays, the largest cruise ships have the length of over 360 meters, draught up to 10 meters and capacity of 225 000 GT. This type of vessels can only be handled in seaports with appropriate depth of waterways and proper length of berths, large manoeuvring basin and facilities on seacoasts ready to serve thousands of passengers at the same time. The aim of this article is to identify cruise shipowners' requirements regarding seaport infrastructure and analysis of challenges facing port authorities in terms of adapting ports to new trends in the cruise shipping market. In the article, a few research methods were applied: exploration method of data, desk research method and comparative analysis.

1 INTRODUCTION

In recent years, the leading cruise shipowners have been placing orders for increasingly larger cruise ships. Cruise Line International Association (CLIA) reported that in 2019 there were 272 cruise ships on the market (CLIA, 2019, p. 19). Moreover, until 2030, tens of new vessels with gross tonnage exceeding 180 000 GT are planned to be launched.

The cruise shipping market constitutes the subject of numerous studies, related in particular to issues concerning environmental protection and sustainable development [Klein 2010, pp. 113–130; Yunis, 2001, pp. 2–5; Baker & Stockton, 2013, p. 83; Amposta, 2013, pp. 1–10], globalization problems [Wood, 2000, pp. 345–365], or issues related to cruising market development in various parts of the world, and challenges for cruise corporations [Veronneau & Roy, 2009, pp. 128–139], as well as seaport authorities striving for high quality of services for cruise shipowners. In the source literature we can observe a

gap in studies on seaport activities aiming to prepare for the changing trends on the cruise shipping market. The aim of this article is to identify cruise shipowners' requirements regarding seaport infrastructure and analyse challenges facing port authorities in terms of adapting ports to new trends in the cruise shipping market.

2 THEORETICAL APPROACH

Gross registered tonnage of the first cruise ships did not exceed 20 000 GT, as e.g. in 1970, the tonnage of ship, *Song of Norway* totalled 18 400 GT, the length amounted to 168.32 meters, breadth to 23.96 meters and draught to 6.7 meters. In the 1990s, registered tonnage of cruise ships was increased several times nearly up to 80 000 GT. At that time, the construction of ships with the following parameters was commenced, e.g. *Grandeur of the Seas* with tonnage of 74 000 GT, length of 279.8 meters, breadth of 32.2

meters and draught of 7.6 meters. Meanwhile, the carrying capacity of recently built vessels exceed 220 000 GT, such as Oasis of the Seas, with 380 meters in length, 47 meters in breadth and draught of over 9 meters (table 1).

Table 1. The list of chosen top giant cruise ships in the world (2019)

Name of a ship	Cruise Line	Year	GT	Length	Width	PAX
Harmony of the Seas	RCCL Inc.	2016	226,963	362	65.7	6,687
Symphony of the Seas	RCCL Inc.	2018	228,081	361	65.7	6,680
Allure of the Seas	RCCL Inc.	2010	225,282	360	66	6,780
Oasis of the Seas	RCCL Inc.	2009	225,282	360	66	6,780
Spectrum of the Seas	RCCL Inc.	2019	169,379	348	41	4,905
Freedom of the Seas	RCCL Inc.	2006	155,889	339	56	4,375
Disney Fantasy	Disney Cruise Line	2012	129,750	339	37	4,000
Disney Dream	Disney Cruise Line	2011	129,690	339	37	4,000
Independence of the Seas	RCCL Inc.	2008	155,889	338	56	4,560

Source: Own elaboration base on the: List of largest cruise ships Jump up to: Symphony of the Seas Fact Sheet. Royal Caribbean Press Center. Royal Caribbean Cruises Ltd.; Harmony of the Seas Fact Sheet. Royal Caribbean Press Center. RCCL; Allure of the Seas 2011, DNV GL Vessel Register. Det Norske Veritas; Royal Caribbean Press Center. RCCL. Oasis of the Seas 2011: Dimensions DNV GL Vessel Register. Det Norske Veritas, Oasis of the Seas Fact Sheet. Royal Caribbean Press Center. CCL; Independence of the Seas 2011. DNV GL Vessel Register. Det Norske Veritas. Independence of the Seas Fast Facts. Royal Caribbean Press Center; Freedom of the Seas Fast Facts". RCCL.

The cruise shipping market has been controlled by three largest companies, i.e.: 1). Carnival Corporation & PLC (CCL) with 48.1% of world market share, 2). Royal Caribbean Cruises Ltd. (RCCL) with 23.10% of

world market share and 3). Norwegian Cruise Lines (NCL) – 10.4% (Cruise Market Watch 2018). The analysis of largest cruise fleet shipowners indicates that they mainly belong to market leaders. The largest currently operating vessels constitute the fleet of RCCL, namely the second largest shipping company in the world.

3 METHODOLOGY OF RESEARCH

In this article, a few research methods of data collection were applied, i.e. “desk research” method, exploration method, comparative analysis and questionnaire survey. Surveys were conducted among 40 top cruise ports around the world, but only 15 of them declared to take part in the study. The test results may provide interesting cognitive material for seaport authorities, where cruise ships are supported, but also for cruise shipowners, who should take into consideration, whether they are ready to give up famous tourist destinations unable in the future to handle such giant cruise ships. Moreover, for the purpose of statistical analysis, the scoring method was applied. The scoring reads as follows - 1 assigned point means the first place on the scale of significance, and 9 or 10 points – the last place on the scale of significance of the tested factor.

4 RESULTS OF THE STUDY

The first stage of studies involved analysis of available data on the schedule of orders for new cruise ships in shipyards around the world. The available source data was used to select only vessels included in the segment of the so-called “giant cruise vessels” with carrying capacity of over 200 thou. GT.

The analysis of the volume of orders for new cruise ships indicates that by 2025, we may expect several giant vessels to be launched every year, taking on board even 6600 passengers plus crew.

Table 2. The list of cruise ships ordered till 2025

Ship's Name/Year	Cruise Line Operator	GT	Pax/max	Month	Yard	Price Mill. USD
unnamed	Carnival	183 900	6600	2021	Meyer Turku Shipyard	>1000
Iona	P&O Cruises UK	183 900	6600	2020	Meyer Werft, Papenburg	<1100
Unnamed	Dream Cruises	204 000	5000	2020	MV Werften, Wismar and Rostock	1100
Melody of the Seas	RCCL	230 000	5500	2021	Chantiers de l'Atlantique, St. Nazaire	1400
MSC Seashore	MSC Cruises	169 380	5646	2021	Fincantieri, Monfalcone	1100
unnamed	Costa Cruises	183 900	6600	2021	Meyer Turku Shipyard	1100
unnamed	P&O Cruises	183 900	6600	2022	Meyer Werft, Papenburg	1100
unnamed	Carnival	183 900	6600	2022	Meyer Turku Shipyard	1000
unnamed	Meyer Turku Shipyard	205 700	6850	2022	Chantiers de l'Atlantique, St. Nazaire	1125
unnamed	RCCL	200 000	5000	2022	Meyer Turku Shipyard	1600
unnamed	MSC Cruises	169 380	5946	2022	Fincantieri, Monfalcone	1000
unnamed	P&O Cruises	183 900	6600	2022	Meyer Werft	1100
unnamed	Carnival	183 900	6600	2022	Meyer Turku Shipyard	1000
unnamed	MSC Cruises	205 700	6850	2022	Chantiers de l'Atlantique, St. Nazaire	1125
unnamed	RCCL	200 000	5000	2022	Meyer Turku Shipyard	1600
unnamed	MSC Cruises	169 380	5946	2023	Fincantieri, Monfalcone	1000
unnamed	AIDA Cruises	183 900	6600	2023	Meyer Werft	1000
unnamed	MSC Cruises	183 500	6335	2023	Chantiers de l'Atlantique, St. Nazaire	900
unnamed	MSC Cruises	205 000	6850	2024	Chantiers de l'Atlantique, St. Nazaire	1125
unnamed	MSC Cruises	205 700	6850	2025	Chantiers de l'Atlantique, St. Nazaire	1125
unnamed	MSC Cruises	205 700	6850	2026	Chantiers de l'Atlantique, St. Nazaire	1125

Source: Cruise ships on order 2016-2027, 172nd Revision, May 15, Amem Communication, 2019, pp. 7-20.

The purchase costs related to such vessels sometimes exceed a billion USD, and such expenditure can be incurred only by large shipping companies.

In the second stage of studies the preparation of selected worldwide seaports was analysed as for the technical requirements they are obliged to meet as a result of increased tonnage of cruise fleet, and consequently, the increase in ship's length, breadth and draught.

The competitive advantage on the market can be achieved only by ports prepared to provide high quality of service for cruise ships, appropriate hydrotechnical as well as organizational, technical and logistic facilities at berths.

Upon analysing the Baltic ports technical data as for the length and depth of berths used for handling cruise ships, it should be noted that seaport in Gdynia at French Quay offers perfect conditions since shipowners are provided with the quay of 512 m in length and draught up to 12.5 m, offering conditions to receive the world largest cruise ships, such as for example *Oasis of the Seas*, with the length of 360 meters, breadth of 47 meters and draught of 9.3 meters, taking on board 6630 passengers and 2160 members of crew; or *Allure of the Seas*, with 360.05 meters in length, 47 meters in breadth, draught of 9.3 meters, 72 meters in height, taking on board 6296 passengers and over 2384 members of crew [RCCL 2013]. While analysing the technical parameters of the world largest cruise ships it is clear that few Baltic ports satisfy the technical conditions to handle such vessels (table 3.).

Table 3. Technical parameters of berths dedicated to handle cruise ships in selected ports in the Baltic Sea

Parameters of berths Name of a port	Name of a berth	Immersion	Length of a berth
Gdańsk	Westerplatte Berth	9,3 m	1300 m
Gdynia	French Berth	12,5 m	512 m
Rostock	P 8	7,8 - 9 m	465 m
Tallinn	Pier no 25	10,7 m	339 m
Klaipeda	Quay nr 80	10 m	297 m
Copenhagen Malmö Port	Ndr. Toldbod 177	7,4 m	240 m
Helsinki	LV 7	11 m	240 m
Sztockholm	Väartanhamnen 523	7,4 m	220 m
Visby	Pier no 7	8 m	200 m

Source: own elaboration based on own studies and [Kowalewska 2011]; [Cruise Baltic 2013 p.1.].

The analysis of port infrastructure technical parameters in the Baltic ports reveals that unfortunately most of the ports are unable to receive the largest cruise ships due to the berth technical parameters. At present, in such situations the harbour master's office directs ships to berths dedicated to cargo vessels and tankers, which are usually located under the decision of port authorities outside the port, i.e. open to the sea. Such situation can be observed e.g. in Gdańsk, where smaller cruise ships are directed to inner port to Westerplatte Quay, whereas giant cruises make use of the berth in the Northern Port, the so-called universal berth, located at Naftoport and dedicated to tankers. From the

perspective of tourist attractiveness of the port, appealing qualities and the feeling of safety such solutions are not welcome by shipowners, which leads to their decision not to call at the port. Shipowners are able to accept such situations only in places where the world unique tourist attractions are located, and tourists accept the hardships of travel in exchange for exceptional tourist attractions. Certainly, there are few of such places in the world, and it refers mainly to cruise trips to unspoilt remote places.

The conducted analysis proves that in this respect seaports in Poland are very competitive, taking into account infrastructure facilities dedicated to cruise ship handling. The seaport in Gdynia can receive the world largest cruise ships, offering the quay of 512 meters in length and draught of 12.5 meters. In recent years, the port has invested in enlarging the ship manoeuvring basin, which increases the attractiveness of the port offer. These qualities are appreciated by cruise shipowners; therefore, the seaport in Gdynia, for years, has been the leader on the Polish market in handling largest cruise ships visiting Poland.

Unfortunately, in general the investment policy in the Polish seaports is focused on investments in infrastructure increasing the handling capacity of larger and larger ships, but mainly cargo vessels, including: tankers, bulk carriers, general cargo ships, container and other ships, as well as investments in developing the logistics centres. According to port authorities the state of berth infrastructure has little impact on the number of cruise ships calling at the Polish ports.

It should also be noted that for cruise shipowners the location of port relative to attractive tourist places is an important feature exerting impact on seaport attractiveness. The conducted analysis confirms that the majority of Polish seaports in the Baltic are located in direct vicinity of attractive tourist places and regions, which is indispensable for shipowners to even plan calling at a given seaport in their itineraries.

The port authorities who appreciate benefits resulting from handling cruise ship actively advocate for improving port infrastructure and obtain funds for its development from various sources, including the World Bank, the European Bank for Reconstruction and Development, the EU funds, as well as state budget and local authority resources. The investments in port infrastructure, in particular hydrotechnical infrastructure are capital-intensive and without external support many seaports would not be able to incur such costs.

Certainly, while analysing the scale of investments implemented in seaports that are the leaders on the cruising market in the world, i.e. cruise port in Miami and in Everglades, Florida (USA), or in Barcelona (Spain), we can see that the scale is impressive. Whereas, in the Baltic ports investments are dedicated to handling all types of vessels, both cargo and passenger ships.

Table 4. Investment in seaports in various cruise ports to prepare the berths dedicated to support cruise ships

The name of a cruise port	Capital expenditure for the development of berths	Investors/Owners
Miami (Floryda)	58 million \$	Port Miami, Miami-Dade County local government
Everglades (Floryda)	153 million \$	Broward County Port Everglades
Kopenhaga (Dania)	87 million €	4 territorial governments, By & Havn, Copenhagen
Barcelona (Spain)	56,5 million €	Malmo Port A/B, architects Creuers del Port de Barcelona S.A. with a private Concessionaire

Source: own study Port de Barcelona (2013) Barcelona Cruise Facilities 2013, Europe's Leading Cruise Port, Barcelona, s. 5.; Port Miami (2012) Preparing for 2015, Port of Miami, Florida, p.1.; Port of Everglades (2014) Powerful Milestones New Records, Fiscal Year 2014 Commerce Report, Broward County, Florida, p.9.; Kizielewicz J., (2016), Regional experiences in management of development of cruise ship ports in coastal destinations, [w:] Proceedings of the 12th European Conference on Management Leadership and Governance– ECMLG 2016, Bucharest, Academic Conferences and Publishing International Limited, UK. s. 125 – 132.

In the above mentioned most important cruise ports in the world (table 4.) all investments are dedicated to improving the quality and efficiency of service, passengers' comfort, safety of service and travel, etc.

For port authorities focusing their activity on handling cruise ships, information from cruise shipowners on their expectations in this respect is crucial in taking decisions on investments within the port.

The questionnaire survey conducted among the boards of largest cruise ports in the world and in Europe, i.e.: Miami and Everglades (Florida USA), Melbourne (Australia), Stavanger (Norway), Kopenhaga (Denmark), A Coruña (Spain), Dubrownik (Croatia), Kłajpeda (Latvia), Valletta (Malta), Rønne (Denmark), Rotterdam (The Netherlands), Tallin (Latvia), Gdańsk, Gdynia, Szczecin-Świnoujście (Poland) (Kizielewicz 2016, p. 283-284) proves that for cruise shipowners the most important factor which determines the choice of port in their itinerary includes, first of all, the geographic location of coastal tourist destination and unique natural and cultural values as well as their location relative to seaports. They also place high value on the safety of passengers and ship's crew at the destination. Whereas, less important are climatic conditions at tourist destinations and accessibility of commercial services on land.

Table 5. Ranking of factors affecting the choice of seaports by cruise shipowners according to the port management boards

Variables	Factor	Sum of points	Ranking 1 (the highest), 10 (the lowest)
X ₂₀	Geographical location	46	1
X ₂₆	Proximity to tourist attractions	59	2
X ₂₄	Cultural heritage	65	3
X ₂₃	Natural values	70	4
X ₂₁	Political situation in the visited area	73	5
X ₂₂	Climate	75	6
X ₂₅	Cultural&entertainment events	75	7
X ₂₇	Travle agencies and toruoperators	81	8
X ₂₈	Shopping centres	116	9
X ₂₉	Catering services	117	10

Source: J. Kizielewicz: Konsumpcja podróżyjących morskimi statkami wycieczkowymi w nadmorskich obszarach recepcji turystycznej, Wydawnictwo Naukowe Akademii Morskiej w Gdyni, pp. 283-284.

It is also surprising that the port management boards failed to indicate that cruise shipowners resign from calling at their ports due to technical limitations. Perhaps it results from the fact that the survey was conducted among the leading cruise ports in the world, having significant experience in handling cruise ships. Certainly, in case of technical issues they direct ships to the port cargo area to meet the requirements as for the length of berth and depth of port basin indispensable for the ship. Numerous tourist destinations in the world seek to be included in the group of ports selected by cruise shipowners. [Lekakou et al., 2006. p. 240.

5 DISCUSSION

The significant increase in gross registered tonnage observed for several decades constitutes a serious challenge, on the one hand, for port authorities who have to look into the future and plan the adaptation of port infrastructure to receive larger and larger vessels. Whereas, on the other, local authorities at coastal tourist destinations are also facing challenges, since taking into account the sustainable development, they should analyse how to manage the development of inbound tourism not to allow the degradation of natural and cultural environment by mass tourists coming on board the ships. It is worth mentioning an example of the city of Dubrovnik, where in uncontrolled way the flow of tourists from cruise ships totally blocked the city and made it impossible to move around within the old town. Therefore, the authorities of Dubrovnik together with port authorities decided to limit the number of ships calling at the port at the same time during 24 hours to maximum 8 vessels to reduce the adverse impact of mass tourism. In the past it happened that as many as 20 cruise ships would enter the port and even 40 thousand tourists would come ashore at the same time. The solution facilitated the tourist traffic and made it possible to eliminate adverse effects of seasonality since shipowners were forced to look for

other open slots in the port calendar to call at the port. Due to exhaust fumes emitted to the atmosphere from cruise ships, as well as accidents related to collisions between larger ships in ports, the city authorities intend to limit access to the city for giant cruise ships.

This phenomenon is rather peculiar. On the one hand, cruise shipowners collect enormous resources and order larger and larger cruise ships, and on the other, the city authorities in famous tourist destinations turn their backs on them and intend to limit access to their cities to protect cultural and natural environment and provide peace for local inhabitants. Whereas, the authorities of other seaports worry they will not be able to meet the technical requirements to handle such large vessels.

It should be emphasized that investments in hydrotechnical infrastructure in the ports and berths are capital-intensive and frequently exceed the port financial capacity.

In terms of main reasons to launch larger and larger cruise ships, shipowners indicate first of all:

- construction of enormous luxury apartments on board the ships (over 200 m²);
- development of catering infrastructure on board the ships, including: bars, restaurants, pubs, cafés, fast food, etc.
- improved cultural and entertainment offer, including: construction of large entertainment and theatre halls, night clubs, discos, casinos, etc.;
- development of active recreation offer for passengers on board the ships, including the introduction of new devices and facilities such as: golf courses, climbing walls, swimming pools with waterfalls, gyms, tennis courts, fitness clubs, etc.,
- introduction of modern ecological solutions in order to reduce air and water pollution in seas and oceans

Moreover, shipowners indicate that another factor affecting the decision to order more “giant cruise vessels” involves the reduction of fixed costs of voyage, and consequently the reduction of unit costs of cruise tickets – the so-called effect of scale. All these factors lead to the increase in gross registered tonnage.

It is worth emphasizing that launching such vessels involves significant costs, which makes shipowners obtain financial means from various sources

Large cruise ships require appropriate preparation of the port and supraport infrastructure so that the ship with passengers and crew could safely moor in the port. This infrastructure includes:

- length of berths;
- depth of port waterways.
- size of manoeuvring basin;
- depth of water basins at berths.

Proper logistics facilities at berths are also significant. These include sufficient number of parking places for buses and taxis, local transport for passengers, as well as service and commercial facilities at berths making it possible to handle thousands of passengers coming ashore at the same time. Touroperators rendering services for shipowners complain in high tourist season about the shortage of staff (tour guides, tourist guides).

It represents a huge challenge for port authorities in coastal tourist destinations of how to meet these requirements and attract cruise shipowners for cooperation. This involves high level of capital investments, but unfortunately, most port authorities are not able to cover high cost of infrastructure investments. In addition, there are also restricted physico-geographical conditions, which may prevent the expansion of ports or advancing the track. In the future this may change the schedules of cruise routes and increase the competitive advantage of cruise seaports located at open sea.

6 CONCLUSIONS

For more than a decade, following the increased demand for cruise trips, cruise shipowners order larger and larger vessels able to accommodate even 10000 people in total, including passengers and crew.

The conducted analysis indicates that as a reaction to these activities, the authorities of some seaports in the world and in Europe focus on infrastructure investments improving both, the hydrotechnical facilities and berths in the port. Looking into the future, the ports endeavour to adapt to new trends and take efforts to adapt the berths to receive larger ships, invest in deepening port basins and decide to provide access to outer port berths to handle larger vessels. Longer berths are built, dedicated to cruise ships, waterways are deepened, manoeuvring basins are enlarged etc. Moreover, passenger terminals are built in the vicinity of nature or in city centres to ensure passengers pleasant experience.

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