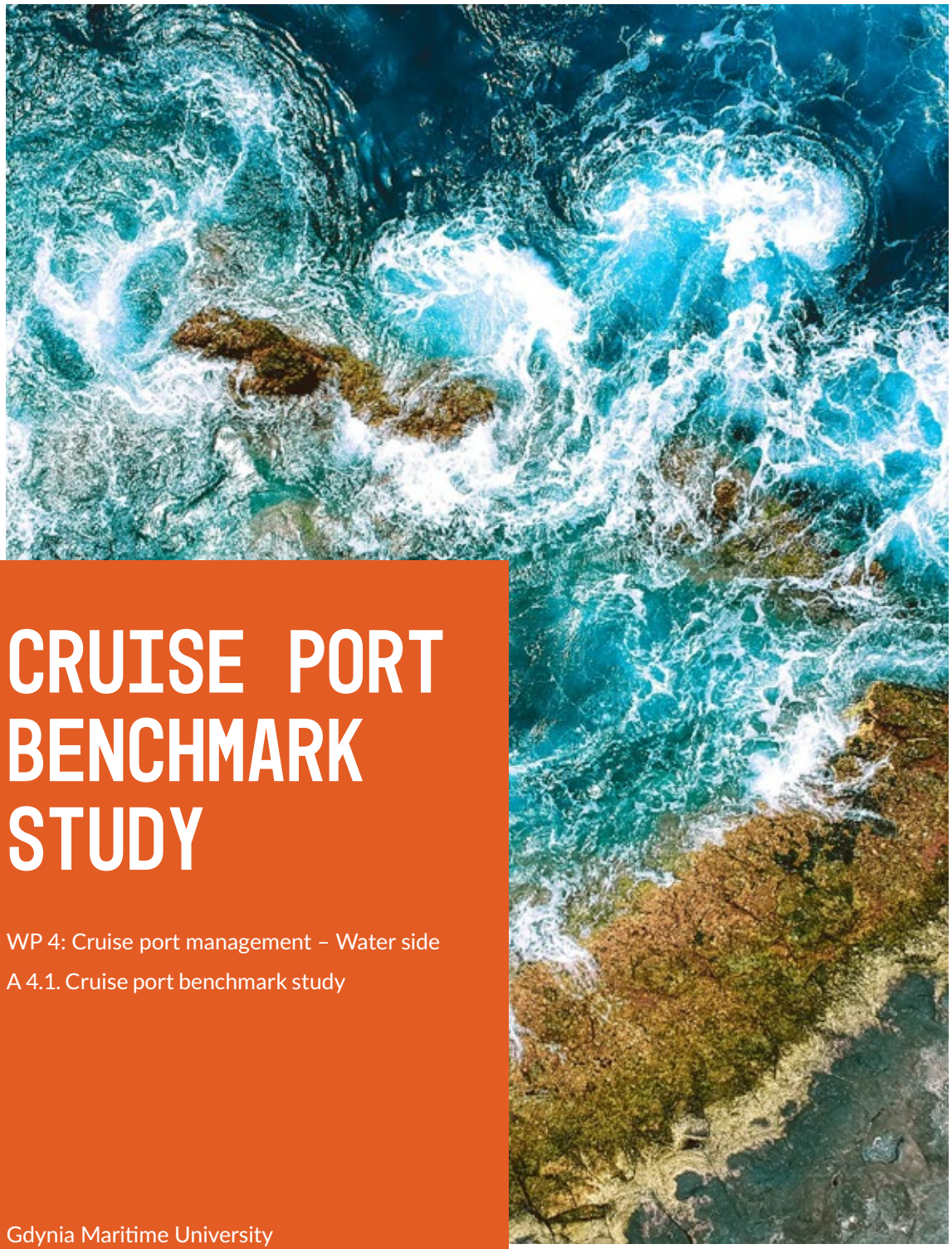
Small Cruise Ships in South Baltic Destinations

Interreg South Baltic

EUROPEAN UNION

European Regional Development Fund



CRUISE PORT BENCHMARK STUDY

WP 4: Cruise port management – Water side

A 4.1. Cruise port benchmark study

Gdynia Maritime University

1

DEFINITION OF THE SMALL CRUISE SHIP (SCS) CONCEPT

1.1. FUNCTIONAL FEATURES OF THE SMALL CRUISE TOURISM CONCEPT

Development of the **Cruise port benchmark study** for the Small Cruise Ship concept (SCS), within the framework of the Johann project requires comprehensive identification of its specific features. As per the initial assumption, the basic idea for SCS development is to bring the cruise tourist closer to the centres of Baltic cities and encourage them to stay longer in the place and explore local attractions. The following conditions should therefore be adopted during the research:

- direct call of cruise vessels to the berth located in short distance to the city centres,
- navigational restrictions for embarking cruise vessel in the centre locations limit the size of vessels, so a relevant fleet of small cruises is necessary,
- central location should offer a full scope of service toward vessel and its passengers, thus trade-off between tourist and industry functions can occur,
- smaller vessels require a specific sort of clients, more prosperous and prepared for detailed exploration of local attractions, therefore, a high-quality offer is a must.

Implementation of the SCS concept requires comprehensive activity within the whole value chain, covering waterside, landside as well as tourism management. Considering the main area of interest of the study (water side), three main issues should be identified as crucial restrictions referred to the concept implementation: infrastructure parameters, vessels availability and offered service (Fig. 1).

The technical parameters of port infrastructure, like depth and length of berth, should be identified as a main challenge for the SCS concept development. What's more, a walking distance between the city centre and the SCS embarking

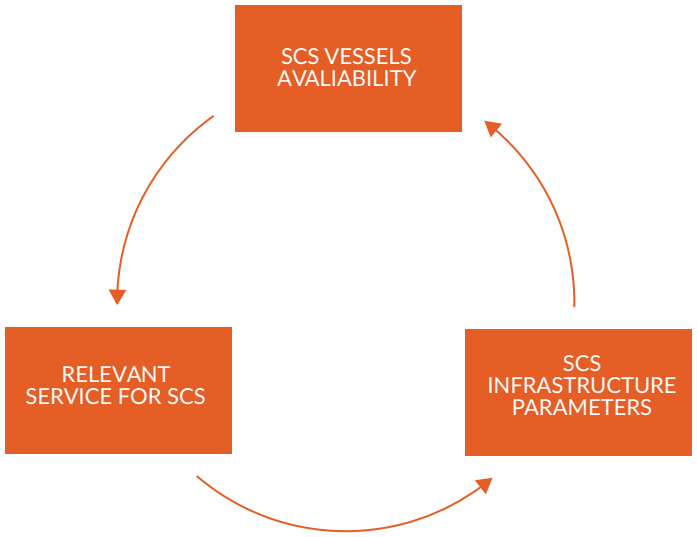


Figure 1. Relation between the key elements of SCS concept – water side

place is one of the requirements defined for the concept. In many cases, nautical parameters of such places do not allow for handling of large or even medium size modern cruise ships, so it is desirable to seek alternatives. Excluding costly infrastructure investments in the city centres, being often historical, development of small cruise ferry traffic could be a solution. Identification of the SCS suitable places for berthing in ports of the Johann partnership as well as its technical parameters and locations is significantly important.

Availability of 'small' cruise vessels on the market is another important feature, remarkably corresponding to the concept implementation. Based on the global cruise fleet review, identification of a small Baltic cruise ship should be completed. In the following part, investigation of the activity of vessels of specified size will be developed.

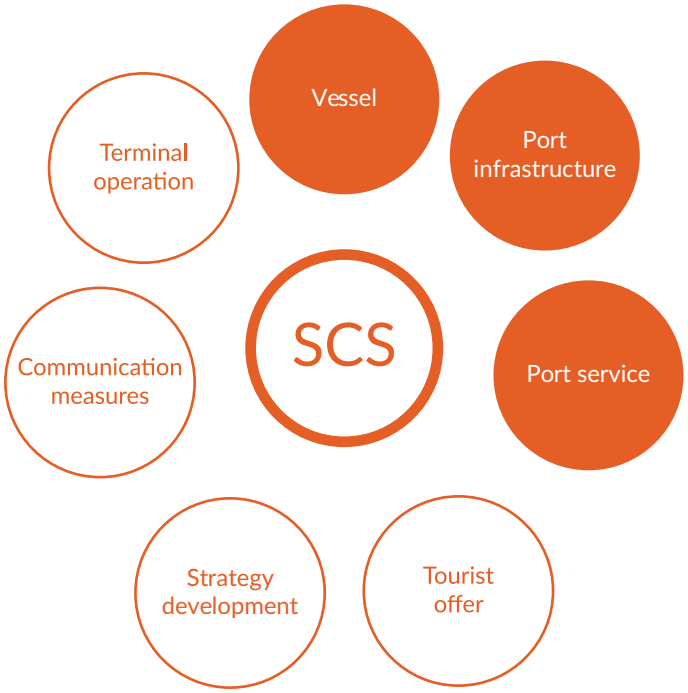
What is more, dedicated service for both the SC vessel and its passengers should be provided in maritime ports. Referring to the vessel, a comprehensive scope of maintenance or repair service should be available in the berthing space. Considering critical requirements and formal regulation, some specific installations (e.g. energy supply, waste reception facilities) or processes (like: waste disposal, food & beverages supply) ned to be available. From that point of view, a significant conflict between 'clean' historical & tourist centres of the cities and the 'industry kind' service provided for vessels can be created.

Another issue beyond the main focus is the need to prepare a specific offer for SCS passengers. An entertainment offer, especially in respect of such elements, like: casinos, theatre productions or other shows, on SCS vessels is limited, so relevant attractions need to be available on land. On the other hand, small ships can provide enrichment seminars considering local culture and heritage, making it easy for cruisers to immerse themselves in their surroundings and learn a lot about the places on which they call. In result, the main focus of passengers is the destinations of visit, rather than the vessel. Thus, an extensive offer of local or regional excursions focused on the history and culture of a region is necessary. Many small ships, due to their limited space, also have only one main dining room for meals. In result, the menu options can be poor, so a wide selection of local restaurants, bars, pubs or cafeterias is another compulsory element of the city offer for SCS tourists.

1.2. THE SCS WATERSIDE VALUE CHAIN, DIMENSIONS, INDICATORS AND STAKEHOLDERS

A model structure of the SCS value chain covers seven elements related to the water or land side as well as tourism management (Fig 2). All the elements presented affect the functioning and development of cruise business, so identification of basic requirements and their characteristics is necessary.

Figure 2. Value chain determinants for the SCS concept



Limiting the area of interest of the study to issues related to the water side, following parameters, indicators or measures can be distinguished:

1. SCS vessel:
   - passenger capacity,
   - length & draft,
   - scope of service on-board: accommodation, restaurants, leisure facilities on-board,
   - nautical and technical specification (e.g. ice-class),
   - propulsion and fuelling systems (eco-friendly solutions).
2. SCS port infrastructure:
   - characteristics and parameters of infrastructure (depth & length of berth),
   - location of port facilities with relation to the city centre (walking

distance),

- land access, parking space and available transport service,
- fences and security facilities.

3. SCS port service:
    - maintenance and technical service for vessels,
    - seaports offer & requirements: pilotage, tugs, bunkering,
    - security service,
    - custom and border service,
    - port reception facilities (solid, toxic, bilge, sludge, black & grey water, etc.),
    - eco-effective solutions for seaports, e.g. energy supply,
    - tourist information points,
    - first aid equipment.

The above-mentioned breakdown of issues should be considered both as exemplary and initial. The use of particular elements in the study will depend on the availability of information and data, as well as on the final structure of research.

In regard to stakeholders engaged into the cruise business, relevant types of companies or authorities may be mentioned, respectively:

- ship owners and cruise vessels operators,
- port authorities, port administration and local governments,
- port service companies and other entities involved in the cruise business.

From an analytical point of view, other equally important players representing the land side or tourist sector should be considered as a potential source of information.

1.3. IDENTIFICATION OF THE STANDARD VESSEL FOR SCS

As was already mentioned, identification of a 'small' cruise vessel suitable for the Baltic seaports or their relevant parts located in the city centres, is a crucial step of the benchmarking study. Investigation of the global cruise fleet (279 vessels) shows that the average capacity of the cruise vessel is about 1,950 persons, worldwide. Similarly, the capacity differs from only 16 persons (Celebrity Xploration) up to 5,488 persons (Harmony of the Seas). According to classifications, the small cruise vessel is able to serve up to 500 persons in 150-300 passenger cabins (Tab. 1). Worth noting here is the fact, that global cruise business defines

also a 'small' cruise vessel as a ship being able to serve up to 1,000 passengers[1] or even 1,599 passengers[2]. From that perspective, the whole Baltic cruise market should be considered as the SCS kind. For that reason, a more specific attitude towards identification of the Baltic small cruise is required.

Table 1. Basic classification of the sizes of cruise vessels

Source: Own elaboration

Size	M. Sanchez[1]	JDB Market Analysis[2]	Landry&Kling[3]
Very small/Compact	Not exceeding 200	0-99	Fewer than 150
Small	200-500	100-499	150-300
Medium	500-1,200	500-1,199	300-800
Large	1,200-2,000	1,200-1,999	800-1,500
Megaship/Very Large	More than 2,000	2,000-2,999	+1,500
Ultra Large		+3000	

Taking into consideration the navigational characteristics of Johann ports, a crucial limitation of the Baltic SCS vessel is a draft. As per the initial review, the level of 6 meters has been adopted. Statistics reveal (sample based on a selection of 69 cruise ships), that a draft of up to 6 meters is characteristic for ships with a passenger capacity up to 2,000 people but the capacity of the majority of researched vessels does not exceed 1,000 persons (Fig. 3).

The second important parameter is vessel length. A detailed analysis of vessel sizes shows that the length of vessels with a draft up to 6 meters reaches the level of about 200 meters in length (Fig. 4). Thus, a dedicated berth for SCS traffic, located close to the city centre, should have the length of about 250 meters.

All in all, the standard small cruise vessel dedicated for the Baltic ports is characterised by three main dimensions:

1) Passenger capacity up to 1,000 people,
2) Total length up to 200 meters,
3) Maximum draft up to 6 meters.

Those parameters will be implemented for further research provided in the following parts of the study.

1 *https://cruiseline.com/advice/how-to-book/pick-a-line/smackdown-big-cruise-ships-vs-small-ships*
2 *https://www.cruisecritic.com/articles.cfm?ID=1646*

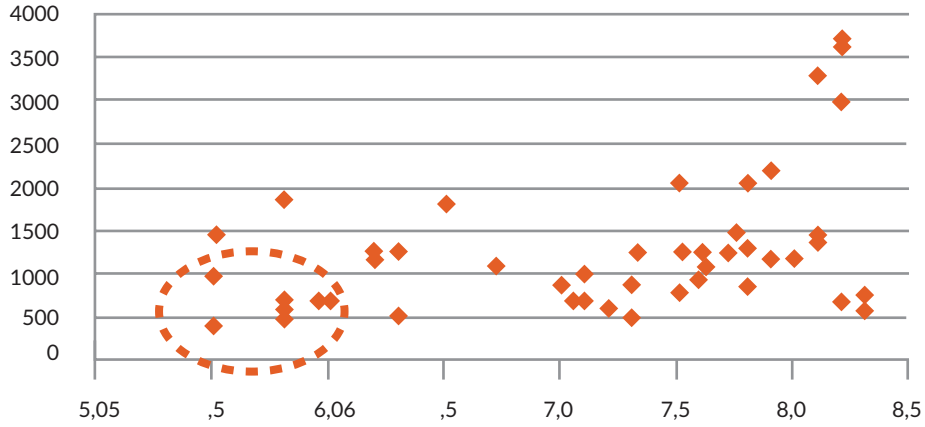


Figure 3. Correlation between draft and passenger capacity of the cruise vessels

Source: Own elaboration based on http://www.cruisemapper.com/wiki/753-cruise-ship-sizes-comparison-dimensions-length-weight-draft

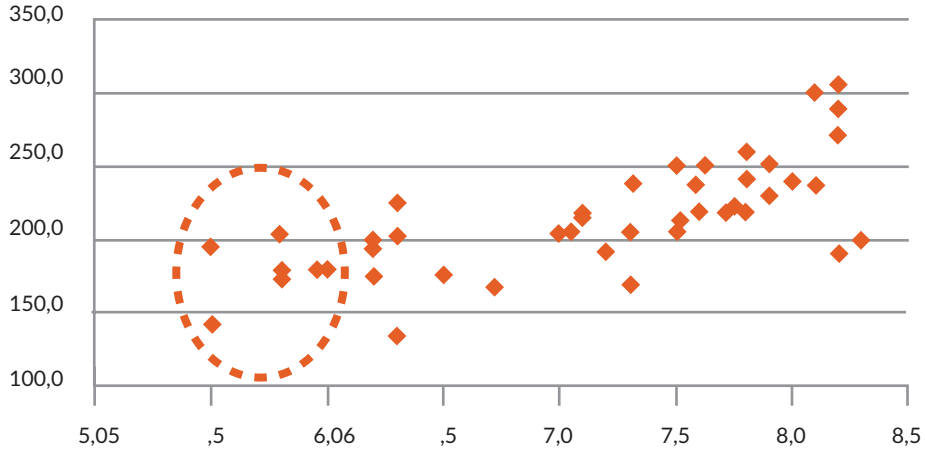


Figure 4. Correlation between draft and length of the cruise vessels

Source: Own elaboration based on http://www.cruisemapper.com/wiki/753-cruise-ship-sizes-comparison-dimensions-length-weight-dr

IMPLEMENTATION OF BENCHMARKING TOOLS INTO SCS DEVELOPMENT

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2.1. APPLICABILITY OF BENCHMARKING TOOL FOR JOHANN PROJECT

Modern management tools are no longer the domain of large corporations, industrial or service enterprises, but are also increasingly used for optimisation of operation of organisations, institutions and public entities, or for efficiency improvement of local, national or international policy and strategies. Benchmarking is one of those modern management tools, increasingly used in the transport sector. Implementation of the SCS concept in selected Baltic ports could therefore be supported by comprehensive assistance of the benchmarking process. Successful benchmarking, in which gaps in performance are bridged by improvements, assists organisations (seaports, local authorities, shipping operators, etc.) to achieve positive results in both hard (infrastructural or service development) and soft (promotion strategies) aspects of performance.

Considering the nature of benchmarking, a clear definition is difficult to provide. One of the reasons is great flexibility of the tool and multiplicity of its types. Benchmarking applies both to the investigation of transport companies, particular transport systems or solutions as well as customer satisfaction with the transport service. In case of the Johann project, the benchmarking tool will be used for development of the Small Cruise Ship concept as well as for identification of best practices/excellence in the SCS activity. Based on the selected benchmarks, best-in-class solutions and standards will be proposed for further implementation in Baltic ports. As was previously mentioned, different definitions of benchmarking may be presented:

- Benchmarking is simply about making comparisons with other organisations and then learning the lessons that those comparisons provide - *The European Benchmarking Code of Conduct*.

- Benchmarking is a continuous process for measuring products, services and practices against the toughest competitors or those companies recognised as the industry leaders (best in class) - *The Xerox Corporation*

- Benchmarking is a structural process for learning from the practices of others, internally or externally, who are leaders in a field or with whom legitimate comparisons can be made - *Royal Mail*.

The definition proposed by A. G. Kamande, commonly considered as relevantly complex as well as necessarily general reads, that ‘Benchmarking is a systematic and constant process of finding, measuring and implementing the best solutions. In this process, the most important business processes in a given organization are compared with world-leading processes with the intention of obtaining information in order to use or adopt the best solution to improve the performance of the organization’s products, services and processes to the level achieved by reference organizations.’

Looking for the most suitable benchmarking exercise for the Johann project, the main types of benchmarking need to be presented and described. Criterions of the standard and objective could be considered as a key division of benchmarking (Fig. 5). In the first case, there emerge two forms of the best practice search : internal benchmarking and external benchmarking.

Internal benchmarking mainly focuses on the research and evaluation of methods and processes currently used in an organisation with numerous branches and subsidiaries. Due to the fact, that Johann's partner ports are not places with SCS traffic, this type of benchmarking is of limited importance to the study.

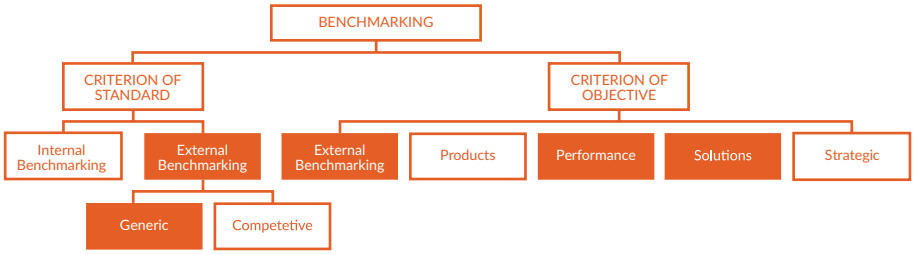

Figure 5. Types of benchmarking

Source: Own elaboration

External benchmarking is a technique of benchmarking that is directed at the outside, meaning, for the purpose of comparing one organisation with others that are independent of it. The best pattern is found in the surroundings of an organisation, both among competitors and independent companies (general benchmarking). As per research within the Johann project, it focuses on other European ports serving SCS type cruise traffic; generic external benchmarking remains the main type of investigation.

While analysing benchmarking in terms of the objective criterion, the following types can be distinguished: products, performance, processes, practical solutions and strategic benchmarking. In the first case, the study subject is the product, its characteristics and manufacturing process, together with an assessment of the current and future strengths and weaknesses of alternative solutions. Identification of the value chain in the SCS concept and further investigation of elements related to the water side could be classified as the product benchmarking procedure.

Performance benchmarking is based on comparison with the most effective organisation, both in economic and operational terms. It is often used as a method of classifying companies and determining their position against competitors. Its suitability for the Johann study is limited, however, a comprehensive review of the European cruise ports and global cruise operators (market leaders) constitutes an initial step of the research process.

The third variant of benchmarking (according to the item criterion) is the comparison of procedures and processes used by companies, their effective organisation and execution. Such a type should be regarded as critical for the study, especially in regard to the seaports service rendered for the SCS vessels or clients.

In the benchmarking of practical solutions, the area of research is extended to the sphere of management, and the process is considered a result of conducting a particular practice. In this case, the best execution of the already designed processes became examples of good practice alone.

The broadest area of interest occurs when a strategic variation of benchmarking is implemented. This study not only covers the present and on-going processes in the organisation, but also takes into account perspectives and methods of their use. So, development of a complex and comprehensive strategy for expansion of SCS traffic could be supported by strategic benchmarking.

Transport is one of the sectors in which benchmarking is becoming more and more applicable. Even though the study developed within the Johann project is not fully related to the transport activity (it also covers tourism), relevant possibilities of application of benchmarking should be examined. In order to systematise benchmarking in transport, three levels of benchmarking may be distinguished: macroeconomic, microeconomic and user level. In the first case, transport is considered as a comprehensive system composed of many elements that affect its functioning. Its performance can be shaped mostly by public authorities (e.g. infrastructural investments, transport regulations). Benchmarking also has a great potential for use at the microeconomic level, because providing services is determined by transport companies themselves. Seeking fresh approaches to bring about improvements in maritime ports performance, especially in cruise traffic service, should be considered as a crucial challenge of the study. At the level of transport users, certain standards may be in place for the quality requirements of transport services. It should be noted, that users in the SCS concept are both cruise shipping operators, tourist organisations and cruise passengers.

Due to the extensive number of factors that need to be taken into account to build a complete picture of transport system development, exercise of benchmarking in the sector is very challenging. In addition to its complexity, consideration should be given to such issues as:

- impact of structural factors beyond the reach of transport policy;
- impact of other sectorial policies, in addition to transport, on the functioning of transport systems (e.g. tourism);
- limited availability, quality and comparability of data in transport;
- autonomous nature of demand for transport (and tourism as well);
- possible errors in transport statistics, which may be much greater than the impact of specific policies or strategies.

On the other hand, none of the transport systems are fully effective in solving the existing problems and cannot be considered as a model. So, creating a collection of individual components of the benchmarking system is required. Nevertheless, the mosaic of solutions from different countries, with no reference to the framework conditions of the system, will only be a laboratory model, that is not helpful in real-life management.

Referring to the definition, crucial elements of the benchmarking process may be distinguished (Fig. 6).

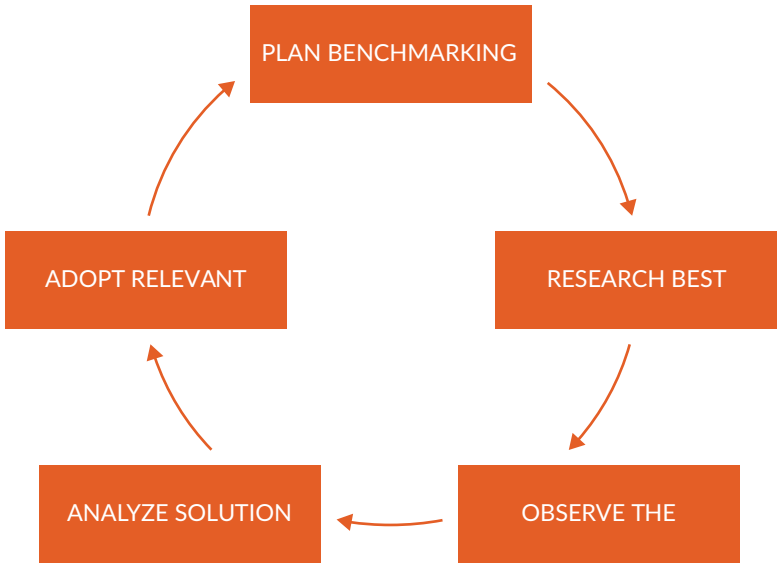

Figure 6. The process of benchmarking

As per the above-presented definitions, development of **the Cruise port benchmark** within the Johann project should consider the following steps:

1) detailed planning of the benchmarking exercise including relevant elements, requirements and processes of SCS development in the Baltic maritime ports,

2) investigation of the best-in-class maritime ports serving SCS vessels; so, identification of SCS type vessels as well as network of maritime ports of calling is necessary,

3) detailed investigation of benchmarks, their processes, practices and performance could create a collection of potential solutions for Baltic seaports,

4) verification of suitability of proposed action will help to indicate the best, effective and applicable solutions,

5) future implementation and development of SCS traffic should be regarded as a final step.

In practice, successful benchmarking usually involves several elements, like:

- High-level commitment to improvement supported by identification and a relevant decision process for the target issue.
- Analytic support structure based on specific performance indicators, analysis of best-in-class practices, products and solutions.
- Comparison of own practice against best practices.
- Improvement and learning mechanism including identification of the potential for improvement and further implementation of changes.
- Monitoring mechanism – reporting on progress made.

Although benchmarking involves comparing performance with others, it is not merely competitor analysis, comparison of league tables, copying or catching up, spying or industrial tourism. Finally, benchmarking should assist with performance improvement in implementation of positive changes. Best practice supported by own experiences and solutions has to create synergy effects for companies or sectors.

2.2. BENCHMARKING PROCESS FOR THE SMALL CRUISE SHIP CONCEPT

Referring to the theoretical scope of benchmarking investigation and the implementation process as well as the main areas of interest of the Johann project (Work Package 4.2), crucial stages of development of the **Cruise port benchmark study** have been defined (Fig. 7).

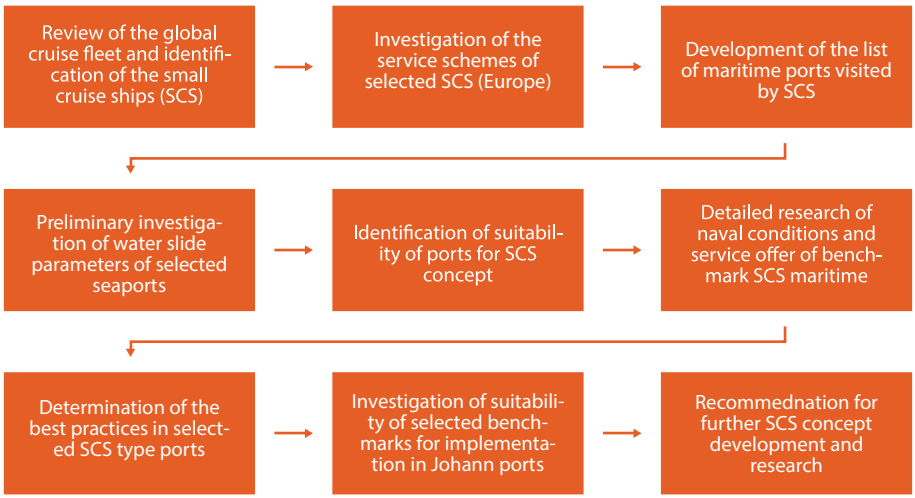

Figure 7. Research process for Cruise Port Benchmark Study

The initial stage of research consists of comprehensive investigation of parameters of the global cruise fleet. Based on the previously defined standard size of the small cruise Baltic vessel (incl. passenger capacity, draft, length), the relevant selection will be completed. Research will be based on available sources of information, including reports and analysis of cruise market, issued by cruise associations, professional organisations or shipping operators.

Regions of operation and service scheme of selected small cruises constitute the main area of research during the second stage. For that purpose, offers of cruise lines will be tested. At the end of the stage, selection of maritime ports visited by small cruises in Europe will be developed.

Due to the fact that many ports of SCS destination are also maritime tourists hubs (e.g. Barcelona, Civitavecchia, Genoa), elimination of such places is a must. Thus, a comprehensive list of SCS suitable ports will be created at this stage of research.

Referring to the main assumption of the SCS concept (*bring the cruise tourist closer to centres of Baltic cities*), another review of the list of small cruise ports is required. Investigation of the location and naval parameters of cruise berths, will eliminate ports serving all kinds of vessels, far from the city centre. So, the outcome of investigation will be a short list of SCS type ports (approx. 10 locations).

Selected locations (SCS suitable ports) will be analysed in detail. Despite comprehensive information concerning technical parameters of berth and embarking conditions, additional information referring to the offered service will be collected (see Chapter 1.2). Comparison of practices and solutions identified in analysed ports should allow for definition of best practices for small cruise ports.

Applicability of the benchmarks created as a result of research should be tested in Baltic ports engaged in the Johann project. So, identification of the existing development gaps supported by discussion concerning framework conditions of selected locations (attractiveness and development of tourists & transport sector) should provide a breakdown of useful solutions for SCS ports.

Finally, recommendations for Johann partners, the Baltic cruise sector as well as further research will be defined and presented.

IDENTIFICAT SMALL CRUIS FOR BENCHMA EXERCISE

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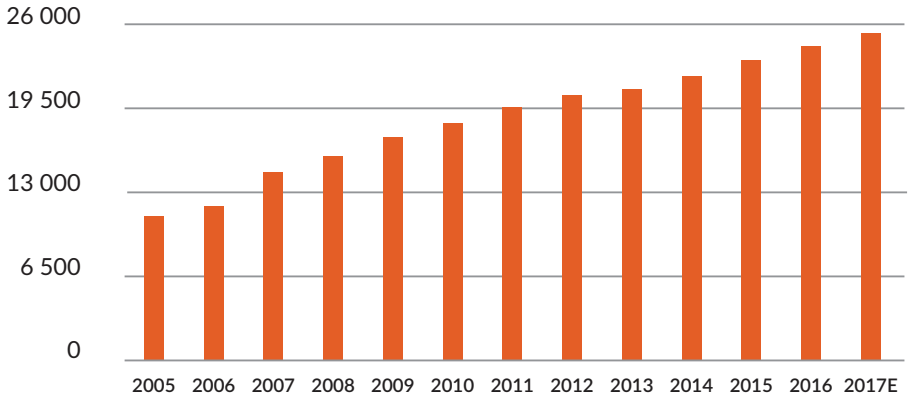
3.1. SMALL CRUISES ON THE GLOBAL MARKET

The cruise industry has been the fastest growing category in the leisure travel market over the past ten years. According to CLIA, global cruise passenger turnover amounted to more than 24 million in 2016. Since 2013 the number of cruise passengers has been growing at rate of about 1 million per year. This trend is predicted to continue and estimates show the level of 31,5 million cruise passengers in 2022.

Figure 8. Growth in the number of cruise passengers in the years 2005-2017 (in millions)

Source: own elaboration based on ShippaxMarket 15, Halmstad 2015, ShippaxMarket 16, Halmstad 2016, ShippaxMarket 17, Halmstad 2017,



The fleet of ocean cruise vessels has been growing through decades. In 1980 about 140 ships operated in cruise markets; until 2000, the cruise fleet has increased to 243 units. During the next decade, the number of ocean cruisers has almost doubled and grown to 410 registered vessels in 2010.

In the period of 2010-2017, the number of ocean cruise ships registered worldwide continued to grow (Table 2). At the same time, the number of ships in service has remained stable over the years at a level of 383-389 active vessels. The rest includes non-active passenger ships, laid up or permanent floating accommodation.

Table 2. Number of cruise ships (as of 15 Jan. each year)

Source: own elaboration based on ShippaxGuide 15, Halmstad 2015, ShippaxGuide 16, Halmstad 2016, ShippaxGuide 17, Halmstad 2017, ShippaxMarket 15, Halmstad 2015, ShippaxMarket 16, Halmstad 2016, ShippaxMarket 17, Halmstad 2017

	2010	2011	2012	2013	2014	2015	2016	2017
Registered	410	414	413	412	422	439	459	465
Active	383	380	384	390	384	386	387	393
Small cruisers	153	155	155	153	156	159	158	159

The number of small cruisers is stable and reaches the level of 159 registered ships (Fig. 9).

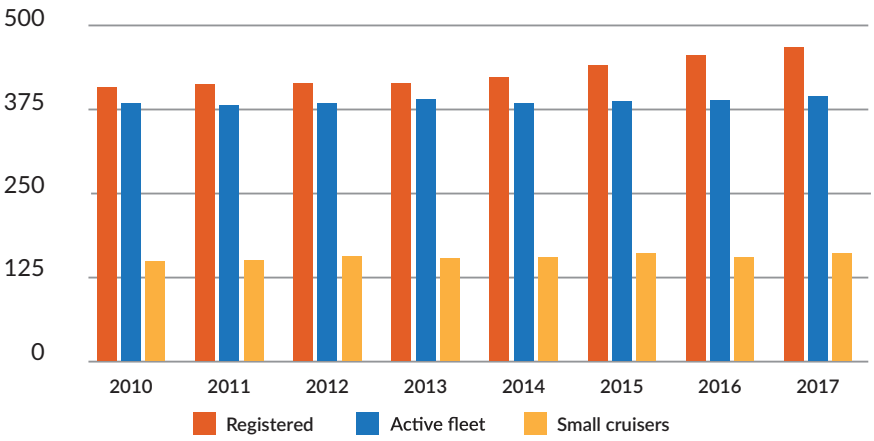


Figure 9. Number of cruise ships by segment

Source: own elaboration based on ShippaxGuide 15, Halmstad 2015, ShippaxGuide 16, Halmstad 2016, ShippaxGuide 17, Halmstad 2017, ShippaxMarket 15, Halmstad 2015, ShippaxMarket 16, Halmstad 2016, ShippaxMarket 17, Halmstad 2017

The gross tonnage of cruise ships registered worldwide amounted to nearly 26 million GT in 2017 and has increased by 33% since 2010 (Table 3).

	2011	2012	2013	2014	2015	2016
Registered ocean cruise fleet capacity development; GT						
Global	19 534 140	18 849 252	20 146 573	22 108 973	23 916 238	25 981 573
Average	88 901	110 531	137 197	114 308	105 300	110 567
Registered ocean cruise fleet capacity development; lower berth						
Global	611 752	624 965	628 706	666 123	714 965	754 587
Average	2 318	2 739	3 596	2 997	2 614	2 737

Table 3. Development of cruise fleet registered worldwide

Source: own elaboration based on ShippaxMarket 15, Halmstad 2015, ShippaxMarket 16, Halmstad 2016, ShippaxMarket 17, Halmstad 2017. Halmstad 2017

The average size of new buildings in ocean cruise has grown from 74,205 GT in 2010 to 110,567 in 2016. The average passenger capacity has increased from 2,046 lower berths up to 2,737, respectively. The large new mega-cruise vessels that entered into service in 2016 can carry up to 3,250 – 3,954 passengers and the largest Harmony of the Seas (Royal Caribbean International) is able to embark 5400 cruise pax.

3.2. DEVELOPMENT OF THE SCS FLEET DATABASE

According to the SCS concept, a fleet of 159 small cruise vessels was registered worldwide at the beginning of 2017. A part of 17 ships were not active in the market, laid up or used as accommodation vessels. The number of ships in service amounted to 143.

Table 4. Structure of small cruise fleet (as of 15 January 2017)

Source: own elaboration based on ShippaxGuide 17, Halmstad 2017

Fleet	service	Number
Active	Worldwide	69
	Expedition	25
	Norwegian coast	12
	Local markets outside Europe	31
	Sail	5
Non active	Laid up	13
	Accommodation	4

Three prime segments can be distinguished in the fleet's active structure:

- Worldwide small cruise markets,
- Expedition markets,
- Local markets.

The expedition segment comprises 25 ships servicing destinations such as the Arctic and Antarctic regions, North America and some areas in the Pacific and Indian Oceans. The vessels are built according to specifics of the regions, e.g. ice requirements and are operated only in expedition cruises. The prime operators of this segments are: National Geographic Expeditions, Quark Expeditions, Oceanwide Expeditions, Alaskan Dream Cruises.

Altogether, there are 43 small cruisers which operate in the local markets. Hurtigruten company operates in the Norwegian coast with a fleet of 12 vessels. The other ships of this group are in service outside Europe and carry out cruises in specific regions as Galapagos, Fiji, China or the Pacific Ocean. Small cruisers from local markets do not operate in other destinations.

Expedition ships as well as the fleet dedicated to local markets are not relevant in the context of the study as they operate in specific cruises.

	Operator	Ship	LOA	Beam	Draft	PaxCruise	PaxMed
1	Azamara Club Cruises	Azamara Journey	181	25,5	5,8	694	702
2	Azamara Club Cruises	Azamara Quest	181	25,5	5,8	694	702
3	Azamara Club Cruises	Azamara Pursuit	181	25,5	5,8	694	702
4	Celestyal Cruises	Celestyal Crystal	161,8	25,6	5,9	960	1200
5	Celestyal Cruises	Celestyal Nefeli	163,8	22,5	5,5	800	1076
6	CroisiEurope	La Belle de L'adriatique	110	12,5	2,4	198	200
7	Crystal Cruises	Crystal Esprit	82,2	14	3,4	62	75
8	Cruise Maritime Voyages	Astor	176,5	22,6	6,1	570	578
9	Cruise Maritime Voyages	Astoria	160,0	21,0	7,6	492	580
10	Cruise Maritime Voyages	Marco Polo	176,3	23,6	8,2	848	922
11	Fred Olsen Cruise Lines	Braemar	195,9	22,5	5,5	970	1090
12	FTI Cruises	Berlin	139,3	17,5	4,8	352	412
13	Grand Cruise Corporation	Arethusa	58,8	10,7	3,0	52	52
14	Grand Cruise Corporation	Artemis	58,8	10,7	3,0	52	52
15	Grand Cruise Corporation	Athenia	58,8	10,7	3,0	52	52
16	Grand Cruise Corporation	Corinthian	88,3	15,3	4,0	100	110
17	Hapag Lloyd Cruises	Bremen	111,5	17,0	4,1	155	155
18	Hapag Lloyd Cruises	Europa	198,6	24,0	6,0	408	408
19	Hapag Lloyd Cruises	Hanseatic	128,8	18,0	4,9	179	179
20	Maduro Shipping	Freewinds	143,3	21,0	5,5	540	540
21	Mano Marine	Golden Iris	163,3	22,8	8,3	756	850
22	Noble Caledonia LTD	Serenissima	87,4	13,3	4,6	117	117
23	Noble Caledonia LTD	Hebridean Sky	90,6	15,3	3,9	114	114
24	Noble Caledonia LTD	Island Sky	90,6	15,3	3,9	114	114
25	Noble Caledonia LTD	Caledonian Sky	90,6	15,3	3,9	114	114
26	Noble Caledonia LTD	Aegean Odyssey	140,5	20,5	6,2	378	720
27	Noble Caledonia LTD	Princess Eleganza	47,0	8,8	2,4	36	36
28	Noble Caledonia LTD	Queen Eleganza	47,0	8,8	2,4	36	36
29	Oceania Cruises	Insignia	181,0	25,5	6,0	684	702
30	Oceania Cruises	Nautica	181	25,5	5,8	684	702
31	Oceania Cruises	Regatta	181	25,5	5,8	684	702
32	Oceania Cruises	Sirena	181	25,5	5,8	684	702
33	Phoenix Reisen	Albatros	205,5	25,5	7,5	824	1000
34	Phoenix Reisen	Amadea	192,8	24,7	6,2	584	624
35	Phoenix Reisen	Deuchland	174,4	23,0	5,8	604	613
36	Plantours & Partner	Hamburg	144,0	21,5	5,1	420	420
37	Ponant Cruises	L Austral	142,1	18,0	4,7	264	264
38	Ponant Cruises	Le Boreal	142,1	18,0	4,7	264	264
39	Ponant Cruises	Le Ponant	88,0	0,0	0,0	64	64
40	Ponant Cruises	Le Lyrial	142,1	18,0	4,7	264	264
41	Ponant Cruises	Le Soleal	142,1	18,0	4,7	264	264
42	Princess Cruises	Pacific Princess	181,0	25,5	5,8	702	702
43	Regent Seven Seas	SS Mariner	216,0	28,8	6,8	708	730
44	Regent Seven Seas	SS Navigator	174,0	24,8	6,8	504	510
45	Regent Seven Seas	SS Voyager	206,5	28,8	7,0	706	730
46	Saga Shipping	Saga Pearl II	164,4	22,6	6,1	448	448
47	Saga Shipping	Saga Sapphire	199,6	28,5	8,4	752	758
48	Salamis Lines	Salamis Filoxenia	157,0	21,8	6,0	505	550
49	Sea Cloud Crouses	Seal Cloud	109,9	14,9	5,1	64	64
50	Sea Cloud Crouses	Seal Cloud II	117,1	16,0	5,7	94	94
51	Seabourn	Seabourn Odyssey	198,2	25,6	6,4	450	450
52	Seabourn	Seabourn Quest	198,2	25,6	6,4	450	450
53	Seabourn	Seabourn Sojaurn	198,2	25,6	6,4	450	450
54	SeaDream Yacht Club	Seadream I	104,8	14,6	4,0	112	112
55	SeaDream Yacht Club	Seadream II	104,8	14,6	4,0	112	112
56	Silversea Cruises	Silver Cloud	155,8	21,4	5,3	296	296
57	Silversea Cruises	Silver Discoverer	102,9	15,4	4,3	124	129
58	Silversea Cruises	Silver Explorer	108,0	15,6	4,4	132	132
59	Silversea Cruises	Silver Galapagos	88,2	15,3	4,0	100	100
60	Silversea Cruises	Silver Shadow	186,0	24,8	6,1	388	388
61	Silversea Cruises	Silver Spirit	195,8	26,5	6,4	540	540
62	Silversea Cruises	Silver Whisper	186,0	24,8	6,1	388	382
63	Silversea Cruises	Silver Wind	155,8	21,4	5,3	296	298
64	Swan Hellenic	Minerwa	135,1	16,6	4,5	362	263
65	Tropicana Cruises	Adriana	103,7	14,0	4,5	264	302
66	Voyages of Discovery	Voyager	152,5	20,6	5,4	508	556
67	Windstar Cruises	Star Breeze	133,8	19,0	5,2	208	208
68	Windstar Cruises	Star Legend	135,0	19,0	5,2	208	214
69	Windstar Cruises	Star Pride	133,8	19,0	5,2	208	208

Table 5. Global fleet of small cruise ships (2017)

Source: own elaboration based on ShippaxGuide 17, Halmstad 2017, ShippaxMarket 17, Halmstad 2017.

The prime segment of small cruise fleet includes 69 vessels in service. Operators, names of ships and data are presented in table 5.

Considering the capacity, the largest number of vessels represents the segment of 101-300 lower berth (21 vessels), the next is group of ships with passenger capacity of 501-700 (15 units). Larger vessels up to 1000 lower berth include 10 cruisers (Table 6).

Table 6. The structure of small cruise fleet by capacity and age

Source: own elaboration based on ShippaxGuide 17, Halmstad 2017, ShippaxMarket 17,Halmstad 2017

Capacity						
Number of lover berth	To 100	101-300	301-500	501-700	701-900	90-1000
Number of ships	11	21	12	15	8	2
Age						
Year of building	<1979	1980 - 1989	1990 - 1999	2000 - 2009	> 2010	
Number of ships	10	10	25	16	8	

A stable number of vessels in the small segment for worldwide trades resulted from the balancing between new buildings and demolitions in the past decade. As of November 2017, there are 14 units on the cruise order book for worldwide markets due to entrance into service till 2021. Moreover, 7 cruisers with a capacity of 800 – 1,000 passengers are under construction but their dimensions (LOA up to 236 m) exceed the SCS concept. For expedition and local trades, 12 new buildings are also in order. It is expected that the number of small cruise ships will not increase significantly; the oldest will be scrapped.

The largest number of small cruise vessels has entered service in the nineties of the twentieth century, so they operated more than 20 years. Twenty vessels have been on the market for more than 30 years. Both segments constitute 65% of the small cruise fleet. The number of units built after 2010 amounts to 8.

Small cruise markets are served by several operators. Its specific feature is that the largest players (e.g. Carnival Cruise Lines, Royal Caribbean, Norwegian Cruise Lines Costa Crociere or MSC Cruise) do not enter this segment. The prime operators in small cruise are:

- Azamara Club Cruises – 3 ships,
- Hapag Lloyd Cruises – 3 ships,
- Noble Caledonia LTD – 7 ships,
- Seabourn – 3 ships,

- Silversea Cruises – 7 ships,
- Regent Seven Seas – 3 ships.

Few brands, like Grand Cruise Corporation or Noble Caledonia LTD operate only small cruisers. Most, however, apart from small ships, also operate larger vessels of the medium segment. Hapag Lloyd, Seabourn, Crystal Cruises, Azamara, Silversea Cruises are the best examples. The brands of small and medium size ships do not enter the large cruise market.

3.3. INVESTIGATION OF THE AREAS OF ACTIVITY OF SC SHIPS – REGIONS AND MAIN ROUTES

The prime areas of cruise fleet operations are as follows:

- Caribbean,
- Mediterranean,
- West Europe and Baltic,
- Far East – East and South East Asia,

The Caribbean is the largest destination with a share of 33.7% of ocean cruise ship capacity in 2016. This region shows a decrease in capacity deployment during the last 5 years. In 2013, the Caribbean market constituted 38% in cruise fleet capacity, however, its share dropped down to 35% in 2015. Large cruise vessels dominate in Caribbean.

The next large destination of the Mediterranean is stable in fleet capacity deployment and its share fluctuates around 19%, but the region also demonstrates a decrease in share. North Europe with two sub-markets, West Europe and the Baltic, has constituted around 11-12% of capacity during the last 5 years. There was a marginal growth (+1%) in North Europe in 2016. The growth in capacity deployment has been visible in Asia, when it rose from 4.4% in 2014 to 9.2% in 2016.

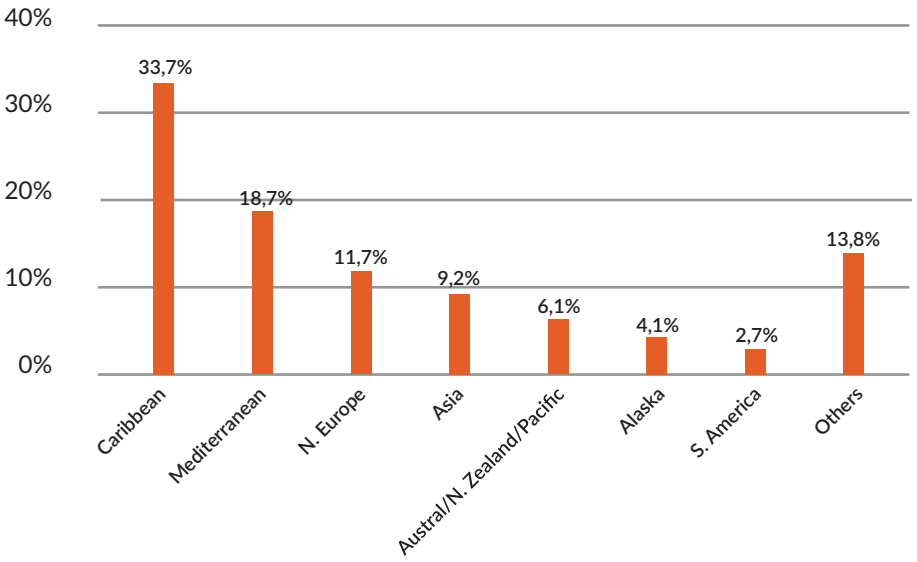
Other markets are Australia/New Zealand/Pacific with a share of 6.1%, Alaska 4.1% and South America 2.7% (Figure 10).

The dominance of Caribbean and Mediterranean is predicted to decrease in the coming years, as major large deployments of new buildings are expected in Asia.

Figure 10. Destinations of deployment in cruise ships capacity (lover berths) in 2017

Source: own elaboration based on ShippaxMarket 17, Halmstad 2017.

ShippaxMarket 17,Halmstad 2017



Considering the worldwide small cruise market, the main spatial segments can be distinguished as follows:

- Europe – North Europe and Mediterranean,
- Caribbean,
- Asia,
- Arctic and subarctic regions – polar shipping,
- Other destinations – Galapagos, Pacific. Australia, Chile, Middle East.

Three latter destinations operated by expedition vessels and small cruisers deployed in these markets do not serve any other areas.

In North Europe, Mediterranean and Caribbean cruises are offered both on large and small ships analysed above. The latter fleet is deployed primary in Europe. In the Caribbean, a couple of small cruisers operate round the year, and additionally in winter, several ships from European markets are shifted to this destination.

In Europe, trips on small cruisers differ in time and number of ports of call. The Baltic Sea Region as a cruise destination is seasonal. Voyages last approx. 10-14 days and ships visit most of the Baltic ports. It should be mentioned, that some of them are not listed within large cruisers offer. Typical Baltic cruises of the small segment are as follows:

1. Azamara Club Cruises:
   - Copenhagen, Warnemunde, Gdańsk, Tallinn, St. Petersburg, Helsinki, Stockholm,
   - Stockholm, St. Petersburg, Helsinki, Riga, Klaipeda, Gdynia, Ronne, Copenhagen,

2. Hapag Lloyd:
    - Hamburg, Ruegen, Bornholm, Klaipeda, Riga, St. Petersburg, Helsinki, Stockholm,
    - St Petersburg, Tallinn, Stockholm, Goltand/Visby, Gdansk, Karlskrona, Hamburg,
3. Noble Caledonia LTD
    - Helsinki,
    - Helsinki, Kotka, St. Petersburg, Tallinn, Saaremaa, Pärnu, Riga, Ventspils, Visby, Stockholm
4. Saga Shipping:
    - Aarhus, Tallinn, St. Petersburg, Helsinki, Stockholm, Rostock, Copenhagen
    - Kiel, Visby, Riga, Tallinn, St. Petersburg, Kotka, Stockholm
    - Kiel, Gdynia, Liepaja, Riga, St. Petersburg, Helsinki, Karlskrona
5. Phoenix Reisen:
    - Bremerhaven, Nord-Ostsee-Kanal, Stettin, Gdansk, Tallinn, St. Petersburg, Helsinki , Stockholm, Bornholm
    - Bremerhaven, Oslo, Oslofjord, Aalborg, Copenhagen, Stettin, Wismar, Nord-Ostsee-Kanal,

West Europe comprises the North Sea, Biscay Bay and Irish Sea. This region represents a year-round destination. Similarly to the Baltic, several ports are visited by large, medium and small ships. Some ports can be distinguished as being visited only by small units, particularly at the Irish Sea and English Channel. Examples of cruises in such areas are:

1. Hapag Lloyd:
    - Kiel, Hamburg, Greenwich, Dartmouth, Milford, Falmouth, Sark, Channel Islands,
    - Hamburg, St.Malo, Brest, Rouen, Nantes, La Palais, Bordeaux, Bilbao.
2. Azamara Club Cruises:
    - Lisbon, Leixoes, Cherburg, Ostende, Amsterdam, Greenwich,
    - Greenwich, Bordeaux, Bilbao, Gijón, La Coruna, Lisbon.
3. Phoenix Reisen:
    - Bremerhaven, Portsmouth, Bordeaux, Bilbao, Lisbon,
    - Hamburg - Dover (London) - Le Havre - Portland - Zeebrügge - Ijmuiden (Amsterdam)
4. Ponant Cruises:
    - Belfast, Douglas, Liverpool, Dublin, Cork, Portsmouth,

- Lorent, Ile-d`Aix, Bordeaux, Pauillac, Bilbao, Leixoes, Lisbon
- Saint Malo, Quessant , Lorent, Concarneau, Navalo, Belle-Ile-en-Mer

The Mediterranean is the next cruise area. Cruises last from 5 till 21 days, depending on the number of ports of call and subregions. The offer of cruises is very rich and includes the most known place and cities in the Mediterranean area as well as smaller island ports. The West Med typical destinations are as follows:

1. Azamara Club Cruises:
    - Civitavecchia, Amalfi, Giardini Naxos. Valletta, Olbia, Ajaccio, Monte-Carlo, Barcelona,
    - Barcelona, Civitavecchia, Livorno , Saint-Tropez, Cannes, Monte-Carlo, Nice,
    - Civitavecchia, Amalfi, Giardini Naxos, Valletta, Xlendi, Gozo, Porto-Vecchio, Alghero, Mahon, Menorca, Palma De Mallorca, Barcelona
2. Hapag Lloyd
    - Nice, Cannes, St. Tropez, Portofino
    - Mallorca, Barcelona, Marseille, St. Tropez, Calvi, Livorno, Portofino, Nice, Monte Carlo,
    - Mallorca, Menorca, Valencia, Malaga, Cardiz, Lisbon,
    - Nice, Portoferraio, Alghero, Bonifacio, Monte Carlo
3. Ponant Cruises:
    - Nice, Cannes, Bonifacio, Porto Cervo, Villasimius, Trapani, Valletta
    - Nice, Girolata, Roccapina, Bonifacio,Porto Cevro, Palombaggia, Ile Rousse

East Med with Adriatic is the next subregion. Examples of destinations are as follows:

1. Azamara Club Cruises:
    - Piraeus, Mykonos, Kusadasi, Patmos, Kos, Chania, Santorini
2. Ponant Cruises:
    - Athens, Patmos, Rhodes, Alexandria, Suez Canal,
    - Athens, Parga, Dubrovnik, Hvar, Rab, Venice,
    - Venice, Kotor, Dubrovnik, Split, Pula-Rovinj.
3. Phoenix Reisen:
    - Split, Brac, Hvar, Korcula, Dubrovnik, Mljet.

A lot of cruises compose west and east ports, e.g.:

1. Phoenix Reisen:
    - Genua, Barcelona, Alicante, Cagliari, Neapel, Messina, Gozo, Valletta, Patras, Korfu, Kotor, Split, Zadar, Venice,
    - Venedig, Koper, Zadar, Dubrovnik, Kotor, Brindisi, Messina, Salerno, Olbia, Civitavecchia, Genua.
2. HapagLloyd
    - Venice, Opatija, Split, Dubrovnik, Otranto, Giardini Naxos, Valletta, Trapani, Calvi, Nice,
    - Venice, Hvar, Dubrovnik, Messina, Lipari, Capri, Civitavecchia, Alghero, Menorca, Mallorca,
    - Barcelona, Marseille, Bastia, Civitavecchia, Palermo, Dubrovnik, Kotor, Corfu, Santarini, Piraeus.
3. Azamara Club Cruises
    - Piraeus, Chania, Valletta, Syracuse, Giardini Naxos, Amalfi, Sorrento, Civitavecchia,
    - Venice, Split, Dubrovnik, Sorrento, Civitavecchia, Livorno, Monte Carlo, Cassis, Barcelona.

The network of ports of call where small vessels are deployed is wide (Table 7). Destinations compose typical tourist destinations as well as niche places that are interesting for cruise passengers.

Table 7. List of maritime ports serving small cruise traffic

Baltic	North Sea	Biscay	West Med	East Med	Atlanic WC	Irish Sea	Adriatic	Black Sea	Inne
Stockholm Helsinki St Petersburg Tallinn Copenhagen	Cherburg Ostende Amsterdam Greenwich Portsmouth	Lisbon(E) Portimao Cadiz Leixoes Bilbao Gijón St. Jean d L	Giblartar Malaga Valecia Barcelona	Izmir Istambul Greek Islands	Montreal Quebec Charlottetown Boston Newport New York Portland Halifax EU	St. Peter Port, Cork Dublin Belfast Glasgow Kirkwall Dundee Leith	Venice Koper Hvar Dubrovnik Kotor	Constanza Varna Burgas	Fiordy, Orkady Szetland y
Riga Klaipeda Gdynia Ronne Visby	Southampton Bremerhaven Honfleur		Valletta Giardini Naxos Sorrento Amalfi Civitavecchia (Rome)	Lavrion Santorini Nafplion Rhodos Patmos Herakion Chania Pireus	Savannh Charleston	Waterford Glengarriff Galway Londonderry Douglas Liverpool Holyhead	Zadar Split Koper Durres Bandol Piran Rijeka		
Warnemunde Gdansk	Zeebrugge Borkum Helgoland Sylt		Livorno Monte-Carlo Almeria Ibiza Ajaccio, Corsica Palamos Tarragona	Limassol Korfu Thessaloniki Mykonos			Otranto Argostolion Brindisi Bari		
Aarhus Skagen Oslo Arendal	Scheveningen Immuiden Vlissingen		Nice Taulon San Remo Portovenere Olbia						
Kiel Aalborg Goteborg	Kristiansand Esbjerg Newcastle		Palma dM Cartagena Marseille Livorno Portovenere						
Wismar Szczecin	Zeebrugge Borkum Helgoland Sylt		Vlora Palermo Neapol Bastia						
Turku Saaremaa	Hamburg Dartmouth Milford Hav Falmouth Sark Channel Islands								
	St.Malo Brest Rouen Nantes La Palais								
	Lorent Quessant								
	Le Havr Bergen								

SUITABLE PORTS OUTSIDE JOHANN FOR DETERMINATION OF BEST PRACTICES

36–73

4

4.1. MARITIME PORTS SERVING SMALL CRUISE SHIPS IN EUROPE – SELECTION AND DEVELOPMENT OF REGIONAL LISTS

Baltic Sea

The Baltic Sea is an inland sea located in Northern Europe. The surface area of Baltic with Kattegat amounts to about 415 thous. km², it is about 1,600 km long with an average depth of about 55 metres. The coastline amounts to 8,100 km. The Baltic Sea is connected with the North Sea by Danish Straits (Oresund, Great Belt, Little Belt) and Kattegat.

The region is distinguished by temperate climate. The feature of the Baltic climate is seasonality and some differences between the regions are observed. In Northern countries, winters are longer and colder compared with the South, with a mean temperature in the Gulf of Finland and Gulf of Bothnia at about -10°C. Much of the Baltic – Gulfs of Bothnia, Finland and Riga ices over in winter. Summers are short and comparatively warm, the average temperature in summer in the southern region is 17°C.

The Baltic Sea Region includes the following countries: Germany, Poland, Denmark, Sweden, Finland, Russia, Estonia, Latvia and Lithuania. All of them are maritime tourist destinations. The cruise industry in the Baltic Sea is seasonal, the activity of cruise lines lasts from April/May till September/October with most calls in summer months. The region is not an all-year-round destination due to climate and ice conditions.

The number of cruise passengers visiting the BSR amounted to 4,333 million in 2016 and the total number increased by 1.2% y/y., while the number of calls was stable. In 2017 the total number of passengers, according to estimates will rise by 13% and the number of calls by 15.2%.

More Baltic ports are typical ports of calls, where ships visit chosen ports during cruise voyages. There are, e.g. St. Petersburg, Klaipeda, Riga, Gdańsk, Gdynia, Mariehamn, Visby, Arendal. The others, like Copenhagen, Kiel, Rostock and partly Helsinki and Stockholm, apart from being ports of call, are also turnaround ports, where passengers embark and disembark. Most cruise trips in the Baltic Sea last 7 days and include 5-6 ports of call.

According to Cruise Baltic, in terms of the number of calls, Baltic cruise ports may be classified as small, medium, large and X large (see Table 8)

Segment	Ports
Small call up to 24	Aalborg (21), Ronne (20), Travemunde (14), Skagen (13), Mariehamn (9), Helsingborg (8), Turku (8), Arendal (4), Kalmar (4), Frederica (4), Saaremaa (2), Karlskrona (2), Malmo (2), Kemi (1)
Medium 25-49 calls	Visby (43), Goteborg (34), Gdansk (32), Aarhus (29)
Large 50-199 calls	Rostock (181), Kiel (147), Oslo (82), Kristiansand (66), Riga (63), Klaipeda (52)
X Large 200+ calls	Copenhagen (306), St. Petersburg (272), Tallinn (271), Helsinki (240), Stockholm (230)

Table 8. The number of calls to prime Baltic cruise destination in 2016

Source: Cruise Market Review 2017, Cruise Baltic.

Capitals of Nordic countries as well as Russian St. Petersburg and Estonian Tallinn are prime destinations in the BSR. In all these ports, cruise lines use dedicated infrastructure.

Copenhagen is the largest port in terms of cruise passengers in the region, 740 thousand tourists visited the Danish capital in 2016. Cruise ships are served in three wharves. Langelinie Quay is 700-m long with depth of about 10 m. This terminal is located 4 km to the city centre. Ocean Quay is the newest and biggest passenger terminal, the quay is 1,100-m long, with a depth of 10.5 m, the distance to the city centre is 8 km. The closest to the city centre is Nordre Toldbod, only 3 km, the quay may serve ships of LOA up to 210 m. The latter terminal serves smaller ships. There is no shuttle bus from terminals to the city, but all of them are connected well by public transport.

In St. Petersburg, cruise vessels moored in special cruise port Marine Façade, outside the city with a distance up to 10 km to the centre. Ships of maximum 340 LOA and draft of 8.8 can access the port. Smaller ships may dock at the English Embankment or Lieutenant Schmidt Embankment in the city centre, but this waterfront is very rarely used. St. Petersburg was the fourth Baltic destination with 485 thousand cruise passengers and 275 calls in 2016.

Stockholm was visited by about 0.5 million cruise passengers in 2016. In this port, cruise ships are docked in 8 quays. Six of them are located at a distance of 3,5 - 1 km to the centre and may handle ships up to 340 LOA. All piers are well-connected with the centre by public transport. Two piers Nybroviken and Skeppsbron located just in the city centre close to Gamla Stan are for smaller ships up to 100 and 150-m long with a draft of 5 and 6 m, respectively.

Similarly in Helsinki (409 thousand cruise visitors), cruise ships are handled in 7 dedicated quays located in West and South Harbours at a distance of 2 – 0.8 km to the centre. Large ships are docked in West Harbour, while smaller cruises

may (130-215 m of LOA) use 3 piers in South Harbour - Olympia Quay, Pahhahuone Quay and Katajanokka Quay located less than 1 km from the centre.

Tallinn is the next important cruise destination with a dedicated passenger port - Old City Harbour. It is located close to the city centre and old town. Ferry traffic is concentrated in the inner port, ferry and smaller cruise ships are moored. Two outside piers are intended for large cruisers. The maximum LOA is 320 m.

The other segments – large and medium ports offer wharfs for cruise vessels as well. In Riga, cruise facilities concern three berths for vessels of LOA from 110 up to 290 m, which are located about 0.5 km from the centre. Klaipeda may call cruisers up to LOA of 330 m and a draught of 8.5 m. The Cruise terminal is located close to the city centre at a distance of about 2 km. The other is Gothenburg with 4 berth for cruise ships. The Arendal Cruise Terminal and Scandiahamnen have facilities for ships of LOA 300-400 m, but they are located far from the city centre – 11-10 km. Two others, Frihamnen Cruise Terminal and Stigbergskajen located close to the centre (2 km) are for smaller ships with LOA of 200 and 175 m, respectively.

Arendal represents a small segment. The two cruise berths are located just in the city centre. Vessels with a length up to 280 m (Batterikaien) and 200 m (Hotellbryggen) may be moored at quays. Turku is the next small segment representative. It is one of the prime ferry ports in the Baltic, with 5 wharfs for passenger vessels. Two quays located on River Aura are for small cruise ships with LOA up to 150 m. The others are dedicated for bigger ships up to 317-m long.

Most Baltic ports being destinations for cruise ships offer dedicated port facilities for this segment. In prime ports with a large number of calls, cruise ships are handled in dedicated terminals located in the port area at a distance of a couple of kilometres from the centres. In some ports, where the port area is closer to the centre and access (depth) is sufficient for bigger ships, terminals are located nearer the city. Such ports handle both large and small cruisers in the same terminals.

Several ports, like Stockholm, Helsinki, Gothenburg or Copenhagen accommodate large vessels in terminals or quays located further away, while small ones are docked on berths close to the centres.

There are few ports in the Baltic Sea, where only medium and small cruise vessels are accepted. Turku, Mariehamn, Visby, Ronne are examples of ports where access to the port and port infrastructure is limited by ship size.

North Sea

The North Sea is a shallow, north-eastern arm of the Atlantic Ocean, located between the British Isles and the mainland of north-western Europe and covering an area of 570,000 square km. The sea is bordered by the island of Great Britain to the southwest and west, the Orkney and Shetland islands to the northwest, Norway to the northeast, Denmark to the east, Germany and the Netherlands to the southeast, and Belgium and France to the south. It is connected to the Atlantic by the Strait of Dover and the English Channel and opens directly onto the ocean between the Orkney and Shetland islands and between the Shetland Islands and Norway. The Skagerrak, an eastward extension of the North Sea between Norway and Denmark, connects the North and Baltic seas via the Kattegat and the Danish straits. For the most part, the sea lies on the European continental shelf with a mean depth of 90 metres. The only exception is the Norwegian trench, which extends parallel to the Norwegian shoreline from Oslo to an area north of Bergen. It is between 20 and 30 kilometres wide and has a maximum depth of 725 metres.

The North Sea waters are affected by the warm North Atlantic Current, which moves northward along the western side of the British Isles and enters the Norwegian Sea. Salinities of the North Sea generally range between 34 and 35 parts per thousand, with higher readings occurring off the coast of Great Britain and lower readings off Norway. Large quantities of fresh water also enter through the Rhine, Thames, and other rivers. Average air temperatures vary in January from 0 to 4 °C and in July from 13 to 18 °C. Winters are stormy and gales are frequent. Tidal ranges average between 4 and 6 meters along the coasts of Britain and in the southern estuaries, while the range to the north and east is less than 3 meters.

Average January temperatures of North Sea surface waters range from 2°C to the east of Denmark to 8°C between the Shetland Islands and Norway. In July, coastal water temperatures from the Strait of Dover to Denmark exceed 59°F (15°C), while in the Orkney-Shetland region they reach only 54°F (12°C).

There is a number of harbours in the North Sea area, which are suitable for cruisers' service. Ports in countries like Belgium, Denmark, France, Germany, Great Britain, and Norway can provide the facility to safely navigate, berth, service and to communicate port with attractive tourist areas. A few smaller ports from this group have been selected for identification of best practices in Small Cruise Ships (SCS) service.

Since the North Sea is a rather shallow water region, the maximum depth of vessel, which can enter a harbour, is one of the most important feature of ports, which has to be taken into account. There are 21 of 33 investigated harbours which can accept vessels with draught bigger than 10 meters. Ports like Cherbourg, Lorient and Le Havre in France, Hamburg, Scheveningen in Germany and

Southampton and Falmouth in Great Britain can offer a maximum depth of fairway which exceeds 10 meters of water. Ports like Bergen, Kristiansand, Portsmouth, Honfleur in France, Immuiden in the Netherlands offer depth of water close to 7 m which is the most suitable depth for further analysis.

Another important factor which has to be considered, is the length of berth in particular ports. Selected harbours can provide a place for berthing from 140 meters, up to 880 meters in Zeebrugge in Belgium. Sixteen of analysed ports have a maximum berth length longer than 300 meters and 5 of them like Amsterdam, Bergen, Cherbourg, Hamburg and Zeebrugge more than 600 meters. Ports can service vessels with a different length overall (LOA). Six ports handled vessels with LOA less than 200 meters, 5 with LOA between 200 and 300 meters and 7 with LOA exceeds 300 meters.

It is obvious that due to the different size of ports, capacity of handling passengers is various in particular harbours. But not only the size of port facility determines the numbers of passengers handled annually. It has to be remembered that the town and countryside has to be attractive to encourage cruisers operators to visit the port. Statistics show, that ports in the North Sea area, have handled from a couple thousands of passengers per year, up to 1,000,000. A good example of this is the French port Saint Malo. This relatively small town has handled approximately 1,000,000 passengers per year.

Nearly all of investigated ports accept cruisers, but the number of visiting vessels, as it was mentioned above, depends on how tourist-attractive the visited port is., How easy is to get to city centre, And how much time it takes, as well as What kind of attractions can be offered. Taking this into consideration, and the fact that passengers of SCS would probably not want to use public transport or rent cars to visit tourist attractions, ports with a berthing place, in walking distance to the centre, seem to be the best examples for further analysis. A couple of ports, like Portsmouth and Dartmouth in Great Britain and Honfleur and Saint Malo in France as well as Bergen and Kristiansand and Oostende in Belgium can host cruisers in the heart of the town or city. In 10 of investigated ports, the distance form berthing place to centre does not exceed 3 km.

Taking into consideration all the mentioned factors, for further development of the Cruise port benchmark study for SCS, North Sea ports in Norwayvhave been selected like *Bergen* and *Kristiansand* as well as *Dartmouth* and *Portsmouth* in UK and *Oostende* in Belgium. All those cruise destinations can provide a berthing place in LOA with about 200 meters in length, with water about 7 meters deep, and in walking distance from tourist attractions.

Mediterranean & Adriatic

The Mediterranean Sea is a continental sea with an area of about 2.5 million km^2, located between three continents: Europe, Asia and Africa. The Mediterranean countries are: Gibraltar, Spain, France, Monaco, Italy, Malta, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Cyprus (including North Cyprus and Akrotiri and Dhekelia), Turkey, Syria, Lebanon, Israel (including the Gaza Strip), Egypt, Libya, Tunisia, Algeria and Morocco. The climate of the Mediterranean is subtropical, with warm and dry summers with temperatures of over 20^{0}C and very mild and short winters during which it is never less than 0^{0}C and usually above 10^{0}C. In summer it rarely rains . It occurs mainly during cold months, more precisely from November to April. Climatic conditions make the Mediterranean Sea an extremely desirable destination for cruises, the cruising season lasts from February to December. It is estimated that particular ports of the Mediterranean are visited annually from tens of thousands to several million passengers on cruisers.

The biggest number of cruises, especially those lasting around a week (they are the most common), concentrate on particular regions of Mediterranean sea. They generally spend a much higher percentage of time in ports and do the majority of their port-to-port sailing overnight. Area cruises in this region may be divided into two or three major subregions:

1. Western Mediterranean – this covers Spain's coast and Mediterranean islands on the French Riviera, west coast of Italian peninsula, islands of Sicily, Sardinia and Malta. The eastern Italian coast incorporates Venice and many cruises also stop in some ports of the Adriatic.
2. Eastern Mediterranean – Greece, Greek islands and the Aegean portion of Turkey, including Istanbul. Many of the longer eastern area cruises combine different sections of this subregion, especially the Adriatic.
3. Adriatic and Ionian seas – eastern Italian coast, Croatia coast. In fact, the Adriatic and the Ionian Sea are part of the eastern Mediterranean, but due to the popularity of cruises only in this area, they can be separated as a separate subregion.

In all analysed regions, there are both large ports, with special facilities for cruisers and small ports, without these facilities. The size and number of ports are determined primarily by shape of the coastline and depth of water. Most ports in the Western Mediterranean region are large, modern, with wharf-dedicated for cruisers and passenger terminals. Exceptions are small ports in Nice, Monaco and San Remo, which do not have special cruiser facilities, but take them to the commercial waterfront. The largest port in this region is Barcelona, leading European cruiser port and a Mediterranean turnaround base, which provides easy access even for the largest cruisers (berthing line 1,400 m, max. draught 11 m). There are 7-passenger terminals and a specially dedicated waterfront in the port. Mediterranean itineraries on cruises out of the Barcelona port visit the largest ports

of Italy, France, Greece and Turkey. The featured destinations are also the French Riviera and the Italian Riviera (coastal regions with top-luxury resorts). The most commonly operated are 7-day round-trips. One-way itineraries from Barcelona end up in Civitavecchia-Rome, Genoa, Piraeus-Athens, Venice, Istanbul. Another large port in the region is Marseille - the 5th largest among the Mediterranean turnaround ports (for roundtrip itineraries), France's leading cruise port (and the country's largest seaport, max draught 22.2, max LOA 250 m) and the world's 16th largest. In 2013, the cruise port handled over 1 million passenger. During high season, the city is visited by over 16,000 cruise tourists per day.

As in the western part, in the Eastern Mediterranean, there are large ports (mainly inland, in Greece, Turkey), with facilities for cruisers and small ports (mainly islands), without these facilities. The most important port in this region is Piraeus - the main port for Athens, it is also the largest port of Greece and one of the largest ports in the Mediterranean Sea today (max. draught 12.5 m, more than 22 million passengers handled annually). It is both a departure (turnaround) port and also a port of call on numerous Eastern Mediterranean itineraries to Italy, Greece and Turkey. The Aegean Sea operates roundtrip cruises to the largest Greek Isles - Crete, Santorini, Rhodes, Lesbos, Chíos, Cephalonia, Samos, Naxos, Zakynthos. Most cruise itineraries are one-way between Athens and Istanbul (Turkey) and Venice (Italy). Athens is also among the ports included in Holy Land cruises to Israel, Egypt, Greece and Turkey, mainly with departures from Rome.

Just several ports on the Adriatic Sea accept small cruisers. Most of these ports are small, mainly for yachts and very small ships, with no special quays / berths for cruisers or passenger terminals. Exceptions are Venice, Koper, Dubrovnik, Rijeka and Zadar, which have quays/berths dedicated to cruisers and passenger/cruise terminals. The biggest one - port Venice (officially Porto di Venezia) is a seaport serving northeastern Italy. The port is the country's 8th largest commercial port and also among the largest and most important in southern Europe (Mediterranean Sea) concerning the cruise tourism sector - port Venice is the largest Mediterranean cruise port by passenger volumes. In turn, the most famous Croatian port in this region is Dubrovnik – it handles around 600 cruise ship calls and around 900,000 passengers annually. These numbers rank the cruise port as the Mediterranean's 10th largest (following Barcelona, Rome-Civitavecchia, Venice, Marseille, Naples, Piraeus, Genoa, and Savona).

However, most of the above-described large ports, due to the length of berthing line and max. depth, are capable of receiving even the largest cruisers. From the perspective of this benchmark study more interesting are the ports that have limitations not allowing the entrance of large cruisers. It is also important that the town and countryside has to be attractive to encourage cruise operators to visit the port. These conditions are fulfilled by the majority of ports located in the Adriatic Sea and ports of the eastern part of the Mediterranean, mainly Greek islands. The ports that seem to be particularly suitable as preliminary areas of best practices identifications are:

- on the Adriatic sea: Hvar (max draught 5.2), Kotor (max LOA 300 m, max draught 8.5 m), Zadar old port (max LOA 100 m, max draught 6.0 m), Split (max draught 10.3 m), Rijeka (berth length 450 m, max draught 6.0 m), Durres (max LOA 220 m, max draught 8.5 m), Argostolion (max draught 6.4 m), Vlore (max draught 7.5 m)
- on the western Mediterranean: San Remo (quay length 200 m, max. draught 6.0), Nice (max. LOA 215 m, max draught 7.8 m), Bastia (berth length 160 m, max draught 5.0-6.7 m), Palamos (max. LOA 220 m)
- on the eastern Mediterranean: Nauplia (max. LOA 160 m, beam 35 m, draught 6.5 m), Rhodos (max draught 9.8 m), Patmos (max draught 8.0 m), Thessaloniki (max. draught 5.5-8.0), Lavrion (max. LOA 130 m, draught 6.1 m), Izmir (max. LOA 220 m, max draught 10.5 m)

On the basis of the above data, it can be concluded that all mentioned ports are adapted to handle vessels with maximum LOA varying between 100 and 300 m, and maximum draught from 5.0 to 10 m, wherein in most of them the maximum LOA does not exceed 200 m, and maximum draught 6.0 m. Most of them are situated next to the city centre, but only a few have passenger/cruiser terminals (Izmir, Lavrion), and these ports will be subjected to further analysis. Most of the above mentioned ports are ports of call, but practically none of them are departures ports.

Detailed information on the facilities for small cruisers in individual ports of the Mediterranean are included in the tables attached.

Bay of Biscay

The Bay of Biscay is a gulf of the northeast Atlantic Ocean, with an area of about 200 thou sq. km. It is located along the western coast of France from Point Penmarc'h to the Spanish border, and the northern coast of Spain west to Cape Ortegal. The climate of Biscay is Mediterranean, but a bit more humid, with a mild but very rainy winter, when the temperature is about 10°C and a warm but very windy summer, with an average temperature about 19°C.

The cruising season starts first in April and lasts till November. The most frequently visited ports in Bay of Biscay are: Lisbon, Portimao, Leixoes in Portugal, Cadiz, Bilbao, Gijon in Spain, and Saint Jean de Luz in France. The aforementioned ports are modern and provided with passengers facilities for vessels of a maximum LOA from 105 to 414 and maximum draught from 5 to 12.5 meters. Below there is a brief information about selected ports. All detailed information about small cruises in the Bay of Biscay Region are included in the attached tables.

The most important city for the cruise is Lisbon, with three passenger terminals and about 400,000 passengers handled annually. The docks are located about 5 km from city centre. The maximum length of berth is 465 meters and maximum depth is 10 meters. Cruise facilities allow to operate about 3,500 vessels per year.

The next port of Portugal is Leixões with a capacity of 25,000 passengers annually.

Another Portuguese passenger terminal of city Portimao is located about 1.5 km from the heart of town. Recently it was renovated and now all renewed cruise facilities are available for passengers.

The biggest passenger terminal of the Bay of Biscay is located in Spain in the port of Bilbao. The maximum depth of this port is 25 meters. The berth length is 720 meters. The terminal is located about 20 km from town, however, it is very well-communicated. There is shuttle transport provided by the cruise lines and also underground to the city centre.

Another Spanish port that should be considered is La Coruna. The passenger terminal is located right in the city centre. The only limit is draught. Vessels up to 11 m draft are allowed to enter the port.

French city Saint Jean de Luz is a small city which offers many attractions. The cruisers anchor in the bay not far from the city centre.

In the Bay of Biscay Region there are only two ports for small cruise that should be taken under consideration – La Coruna in Spain and Saint Jean de Luz in France.

Irish Sea

The Irish Sea is part of the North Atlantic that separates the islands of Great Britain and Ireland. The surface area of the Irish Sea is about 46,000 km². The climate is mild oceanic, with average air temperatures ranging between 4 and 7°C in January and February (the coldest months in the year) and in the warmest months (July and August) are between 14 and 16°C. The annual average temperature is 10°C).

The following cities were subject to analysis: Saint Peter Port, Cork, Dublin, and Waterford in Ireland, Glasgow, Kirkwall, Dundee, Leith, Londonderry, Douglas, Liverpool and Holyhead in United Kingdom. All mentioned ports are adopted to handle vessels with maximum dimensions LOA 145 m, draft 7.5 m in St. Peter Port and LOA 140 m, draft 6 m in Douglas; in the remaining ports, the average LOA is about 300 m.

Saint Peter Port is the only deep water port on the island's cargo produce and passenger trade. Approximately 450 vessels and numerous passenger ferries are handled at the port annually. Max size: LOA: 131 m, draught: 7.5 m. Vessels up to 88 m length and 1.3 m draft may berth in the city centre.

Cork is the principal port of Ireland, being a natural, sheltered deep water harbour and is favoured with an ideal location close to the main shipping lanes to northern Europe. Passenger facilities operate 54 cruise ships carrying over 90 thou passengers annually. The vessels' maximum dimensions are LOA 340 m and draft 12.9 m.

Dublin is another Irish port that handles 1.27 million passengers annually and is adopted to accommodate vessels up to LOA 263 m and draft 10.2 m.

Kirkwall harbour accommodates vessels with maximum dimensions LOA 295 m and draft 10 m. There is also a possibility for passenger vessels up to 119 m in length and 6.1 m draught to berth in the city centre.

The Liverpool port provides about 47 km of quays with accommodation for any type of vessels. Passenger facilities with the main Pier Head Cruise Terminal operate vessels of LOA 300 m bringing 83 thou passengers annually.

The biggest number of passengers in the Irish Sea region – 2.5 million – is handled in Holyhead. Vessel size is limited to draft – 7 m.

To sum up, there are only two ports in the Irish Sea Region – Saint Peter Port in Ireland and Kirkwall in UK– where small vessels are allowed to berth in the heart of the city.

4.2. INVESTIGATION OF SUITABILITY OF SELECTED PORTS FOR THE SCS CONCEPT, INCL. LOCATION AND BASIC NAUTICAL PARAMETERS OF SEAPORTS

On the basis of the general review provided between the analysed sea areas, selected ports that offer specific conditions (see Chapter 1) for serving small cruise traffic have been recognised. In regard to the research, the following number of small cruise suitable ports has been selected:

- Baltic Sea (23),
- North Sea (37),
- Mediterranean & Adriatic (46 + 16),
- Bay of Biscay (7),
- Irish Sea (16),

In the next stage of research, investigation of these ports has focused on the locations designated strictly for small cruise vessels ONLY. The key issue regarded during analysis was the draft and length of pier serving the SCS as well as the distance between the berthing place and city centre. In result, a selection of maritime ports has been defined:

Helsinki (FI),

1) Holyhead (UK),
2) Kirkwall (UK),
3) Kotor (HR),
4) Kristiansand (NO),
5) La Coruna (ES),
6) Lavrion (EL),
7) Mariehamn (SE),
8) Nauplia (EL),
9) Rodos (EL),
10) San Remo (IT),
11) Stockholm (SE),
12) Turku (FI),
13) Zadar (HR).

Detailed investigation of both naval conditions within the ports and specific services rendered to small cruise vessels is included in the next stage of research.

4.3. DETAILED STUDY OF LOCAL DATA AND INFORMATION

Helsinki

The port of Helsinki is situated in the Gulf of Finland. As a capital of Finland, it is recognised as one of prime Baltic destinations (see Table 9).

	2010	2011	2012	2013	2014	2015	2016	2017 E
Pax	342 000	385 000	368 000	420 000	420 000	436 500	409 000	440 000
Calls	247	258	265	282	261	254	240	265

Table 9. Cruise traffic in Helsinki in 2010-2017

Source: Passengers, calls and turn-arounds per destination 2000-2017, Cruise Baltic (23 Nov 2017).

The port of Helsinki is composed of the following main harbour areas: West Harbour, South Harbour, Katajanokka Harbour and Vuosaari Harbour. The latter serves container and RoRo /ferry traffic.

Cruise ships are handled at 8 wharfs in the West and South Harbours as well as at Katajanokka.

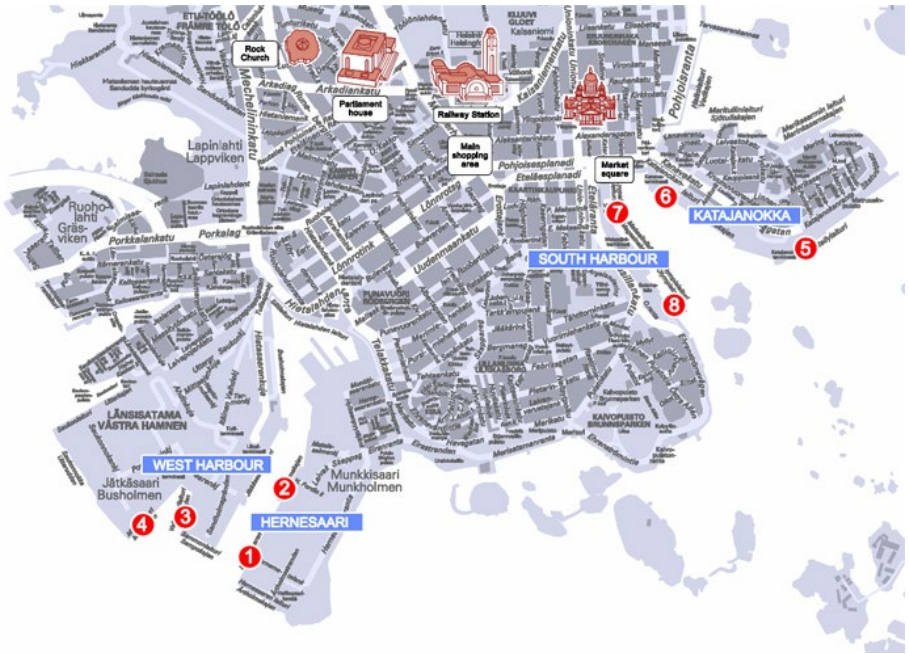


Figure 11. Map of the Port of Helsinki

Source: www.portofhelsinki.fi (23 Nov 2017).

Large cruisers are have piers available in West Harbour - 1 and 2 Hernesaari, Valtameri Quay, Melkki Quay and one at Katajanokka Quay for cruisers. All of them are dedicated to vessels of LOA 215-330 and 8.9-10.8 draft. The distance to city centre is 1.3 – 2 km.

Small ships can enter two piers in South Harbour – Olimpia Quay (max LOA 180 m) and Pakkahuone Quay (max LOA 130 m), as well as Katajanokka Quay (max LOA 200 m). All these wharfs are close to the city centre – less than 1 km.

Small cruises have the following services available at all three piers:

- Pilotage service
- Tug
- Bunkers
- Fresh water
- Solid waste disposal
- Toxic waste disposal
- Bilge and Sludge disposal facilities
- Black and grey water disposal facilities
- Necessary space, facilities and labour to handling ship's stores and provision (ship chandler services)
- Cleared and well-signalled entrance / exit to/from the pier
- ISPS certification - compulsory

Holyhead

Holyhead is located on the Isle of Anglesey in North Wales. The port is centrally located on the Irish Sea coast within easy reach of several major conurbations both in the UK and Ireland.

As per Sea Passenger Statistics: Final 2016 published by UK Department of Transport says that in 2016, the port handled about 1.9 million passengers, the number of which has decreased by 2 per cent compared with 2015. The most popular route was Holyhead – Dublin.

The Holyhead port is situated at the end of the A55 dual carriageway, right in the city centre. The port has very good transportation connections – bus and train.

The port is operated by Stena Line Ports Ltd. There are four berths for cruise vessels:

- Terminal 3 of 190 m length and 8.0 m draft,
- Terminal 4 of 180 m length and 6.0 m draft,
- Terminal 5 of 180 m length and 8.0 m draft,
- South Quay of 80 m length and 2.4 m draft

Figure 12. Map of the Port of Holyhead

Source: http://www.holyheadport.com/

Services available at the Holyhead port:

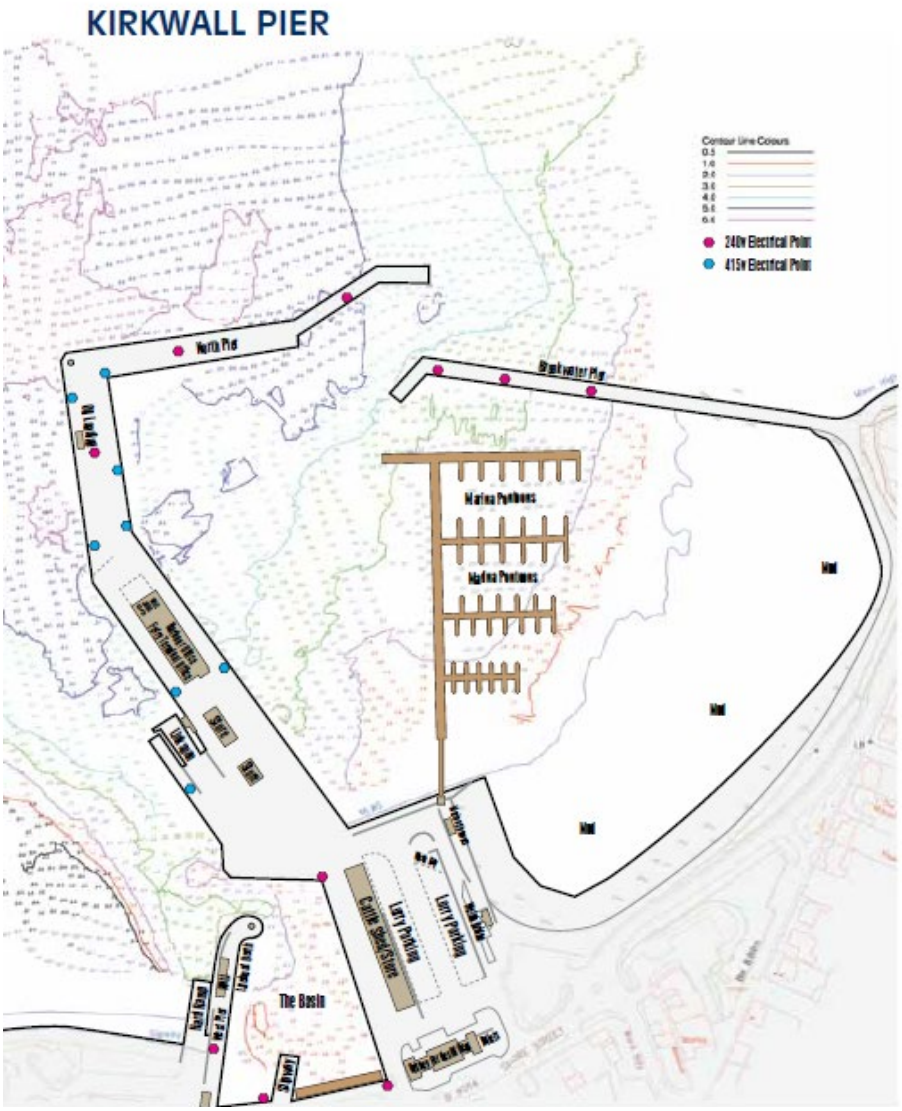
- Pilotage service compulsory for all vessels over LOA 40 m, the notice should be given at least 24h before entrance
- Tag service is available but not compulsory
- Waste disposal – by private constructors – a notice is required
- Slops disposal
- Water supply
- Fuel supply – by road tanker

Kirkwall

Kirkwall lays on the northern part of Isthmus, with Scapa (of Scapa Flow fame) in the south. It is the capital of the Orkney archipelago, the Royal Burgh of Kirkwall sits almost exactly in the centre of Mainland, dividing the island into East and West.

Most cruisers either berth at the Hatston Ferry Terminal just north of the town or anchor in the bay and tender in. Some of the smaller cruisers may berth in the town's harbour. Hatston terminal, located 2-3 miles from Kirkwall centre, has berthing facilities to accommodate ships LOA 225 m and draught 10 m alongside. Kirkwall Town has berth for ships up to 125 m LOA, draught 5 m and no beam restriction. In most cases, the port will provide a shuttle service into town.

Figure 13. Kirkwall pier



Kirkwall is recognized as one of prime Orkney Island destinations (Table 10).

Table 10. Kirkwall – comparative data on cruise ships

Source: Annual Performance Report 2016-17, Orkney Islands Council Harbour Authority, Shippax Statistics

	2010	2011	2012	2013	2014	2015	2016
Pax	24 272	29 172	40 091	49 786	63 038	80 611	95 240
Calls	55	54	61	61	72	82	98

Figure 13. Kirkwall pier and Hastson terminal.

For small cruises at all piers, the following services are available:

- Pilotage service
- Tug
- Bunkers
- Fresh water
- Solid waste disposal

Kotor

Kotor lies on the East side of the head of the Gulf of Kotor. The harbour is well-sheltered from winds and sea, which can blow particularly hard from North. The port of Kotor is mostly used by passenger/cruise vessels as a port of call. The port, like other ports in the Adriatic Sea, has recently been recording an increase in cruise ships visits (Figure 14).

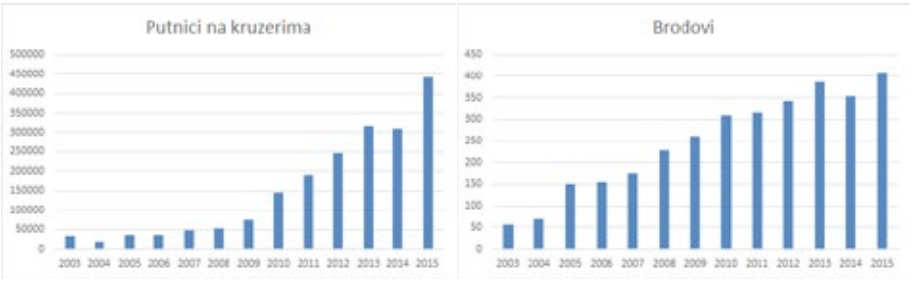


Figure 14. Increase in the number of ships (brodovi) and passengers (putnici) at the Port of Kotor in recent years

Source: http://www.portofkotor.co.me/O-luci/statisticki-podaci.html

In 2009, there arrived 262 foreign cruisers at the port of Kotor, which is 9.38% higher than the previous year, with 74,177 tourists on board, as much as 39.94% compared to year 2008. In 2015, there were more than 400 ships and nearly 450,000 passengers.

The Kotor Cruise Ship Terminal is conveniently situated directly across from the pedestrian-friendly walled city (Fig. 15). It can handle smaller ships only. Bigger ships usually anchor in the middle of the gulf and it is necessary to use a tender ride.

Figure 15. Map of port Kotor

The length of operating banks, which the Port of Kotor owns in the harbour is 665 m, of which 512 m is located in the western part while the 153 m faces the river Skurda. The coast can be functionally divided into 5 berths as follows:

- Riva I, length 150 m, depth 12.8 m. The coast in this connection is equipped with 11 bollards
- Riva II, length 100 m, depth 10.0. The coast is only a narrow strip width of 6 to 9 m, which ships may use.
- Riva III, length 250 m depth 6.0-8.0 m,.
- River I is a berth in the northern part of the river Skurda with about 80 m in length.
- River II is a berth with about 70 m in length.

Operating river banks and river I and II are equipped with 10 bollards. The coast has a total of 61 rubber fenders. In the southern part of the coast towards the sea, there are connections to the water, telephone and electricity available to vessels:

- Electrical supply – small vessels only,
- Water supply – 24 h,
- Garbage disposal – no limitation on sorted garbage, it is preferred to be disposed at night-time. Larger quantities of garbage required to be sorted.

Bunkering operation is performed only in night hours. Operation of fuel supply for smaller quantities and smaller vessels is possible on berth, larger quantities are supplied outside the port.

Kristiansand

The Port of Kristiansand is the second largest ferry terminal in Norway, and has several daily departures between Hirtshals, Denmark and Kristiansand operated by the ferry liners Color Line and Fjord Line. Aside the ferry traffic, the port also services container vessels, bulk and general cargo ships as well as offshore units. The maximum LOA of served ships is 361 m. Compulsory pilotage is available 24 hours daily. The cruisers call to the cruise pier (berth no. 13 and 20) located right next to the Kilden Performing Arts Centre. The city centre is located at a walking distance of 300 m from the pier. A little road-train that allows for commuting from the pier and centre is also available.

	2010	2013	2014	2015	2016
Pax	37 700	101 757	120 369	69 759	109 866
Calls	19	59	77	40	62

Table 11. Cruise passengers traffic and number of calls in the port of Kristiansand

Considering cruise traffic, the main Berth no. 20, called 'Lagmannsholmen', is 268 m long with a depth of 9.00 m.

The passenger terminal features baggage handling, rest rooms, telephone connection and parking facilities. Covered walkways link the main building to cruise and ferry berths.

Figure 16. Map of Kristiansand

Source: https://www.whatsinport.com/Bykart_vannmerket.jpg

The following services are available:

- Tugs: (1x20 ton).
- Bunkers - by tank trucks,
- Supplies – via ship chandlers,
- Waste handling,
- Fresh water – available from hydrants,
- Waste by tank trucks,
- Garbage disposal, grey / black water.

La Coruna

La Coruna is located on a peninsula on the northwest part of Spain, the western side of the Bay of Biscay. The location is privileged –la Coruna lies on the main international maritime routes between the north of Europe, the Mediterranean and Africa, and between Western Europe and both Americas. The A Coruna port is divided into two zones – inner port and outer port.

Figure 17. Entrance map to the Cruise Pier in La Coruna

Source: tttp://www.puertocoruna.com/en/cruceros/cruceros/plano.html

The terminal is located at the heart of the city and gives very easy access to the local attractions, old city – touristic place worth visiting, leisure, shopping areas, and many other places within walking distance. A Coruna is the perfect spot to get on a bicycle and explore the area in an active way. There are several spots where you can rent bicycles. There are also buses at a close distance. Bus no. 3 is great for sightseeing, the bus stop is located outside the port on the left side in the main street.

The train station is about 2.5 km away from the ship. There is a possibility to catch the train to Santiago de Compostela. These trains leave every half hour. The nearest airport (LCG / LECO A Coruña Airport) is 7 km from the port.

The table below shows traffic of passenger vessels in La Coruna port in years 2016 and 2017.

	2010	2011	2012	2013	2014	2015	2016
Pax	70 698	128 393	140 725	156 890	129 587	140 417	126 735
Calls	62	78	93	108	87	92	94

Table 12. Passenger vessels traffic in La Coruna

Source:http://www.puertocoruna.com/es/puerto-servicios/trafico-portuarios/mercancias.html

A crew list is a document that is obligatory to enter La Coruna. There is also compulsory pilotage service for vessels exceeding 60 m LOA. Vessels may berth in the Transatlantic Quay of 484 m in length and 11 m in draft.

Figure 18. Inner Port - Applications and infrastructure

Source: http://www.puertocoruna.com/es/puerto-servicios/infraestructura/interior/puerto-interior-infra.html

Services available at the port:

- garbage disposal - requested to place garbage in plastic or paper bags before disposal, solid waste disposal , black waste disposal;
- fuel: easiest fuel docks to access are at the new marina and at Darsena. Dedicated yacht service company with dry winter storage, workshops, 30-ton travel lift and fuel berth, also for LPG fuel;
- water – can be applied by pipeline and the rate is 30-150 tons per hour.

Lavrion

Lavrion is the only real port on the southern tip of mainland Greece. It is situated at the head of Limenas Lavrion, a natural harbour protected by breakwaters, about 10NM from Sounion and it is a suburb of Athens. It is a commercial and fishing harbour which is open to SE winds, but otherwise sheltered and safe.

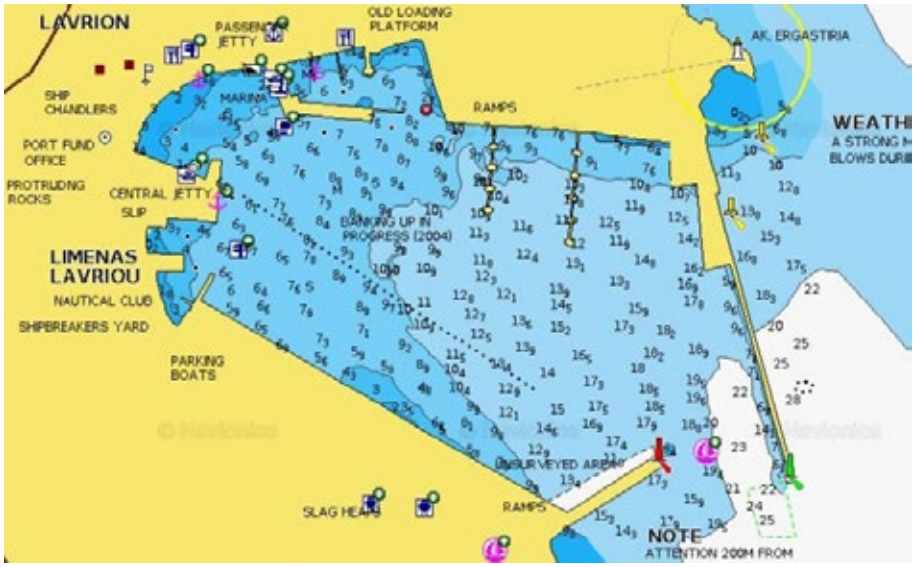


Figure 19. Port of Lavrion – schema of depth

Source: https://webapp.navionics.com/?lang=en#boating@13&key=ubdeFuizqC

The maximum size of vessel handled in the port is 140-m long with draught of up to 6.1 m. The berthing places are as follow:

- Car Ferry Jetty has quayage of 120 m and depth about 3.3 m;
- Central Jetty has 150 m quayage and depth 5.0 m;
- Passenger Jetty which is an angled pier, with depths of water between 5.3 and 6.9 m and over 700 m length;
- Ore pier 45-m long with depth less than 5 m;

The city centre is within walking distance from the port (15 min.). Cruise lines often offer shuttle buses. A new terminal building has just been completed, anticipating more cruise ships in the future.

Service of cruise passengers in the port of Lavrion became intensive in years 2013-2016, with a maximum level of 22 thou cruise clients (Table 13). So, it is an example of a new player on the market engaged into small cruise vessels service.

	2012	2013	2014	2015	2016
Pax	0	9 000	22 000	20 000	10 000

Table 13. Cruise traffic in Lavrion in 2012-2016

Source: Eurostat

Services available at the port:

- Waste disposal - drums provided alongside
- Fuel - available by tanker trucks from Piraeus or by fuel barges from Piraeus.
- Fresh water in small quantities carried by tanker trucks.
- Provisions of all kinds in small quantities

Mariehamn

The Port of Mariehamn is situated in the Aland archipelago and is one of the prime ferry destinations at the Baltic Sea. Mariehamn is a capital of Aland Islands. It is also a cruise destination. In 2017, 19 calls were recorded. Most ships (7) were small cruisers, further 3 may be classified as medium.

	2010	2011	2012	2013	2014	2015	2016	2017 E
Pax	5 312	3 500	6 742	4 851	6 537	5 500	7 513	16 600
Calls	19	18	20	22	15	7	9	19

Table 14. Cruise traffic in Mariehamn in 2010-2017

Source: Passengers, calls and turn-arounds per destination 2000-2017, Cruise Baltic (23 Nov 2017).

Cruise vessels are handled at one pier located in Western Harbour.
The maximum LOA of ships is 220 m. The following services are available:

- Pilotage service
- Tug
- Bunkers
- Fresh water
- Solid waste disposal
- Toxic waste disposal
- Bilge and Sludge disposal facilities
- Black and grey water disposal facilities
- Necessary space, facilities and labour to handle ship's stores and provision (ship chandler services)
- Cleared and well-signalled entrance / exit to/from the pier
- ISPS certification - compulsory

Nauplia

Nauplia is a seaport placed in the northeast Peloponnese in Greece, in the Argolic Gulf. The port's main profiles are transportation, fishing and tourism. The harbour lies within walking distance from the town centre, where there are many attractions, old town, cafes, restaurants.

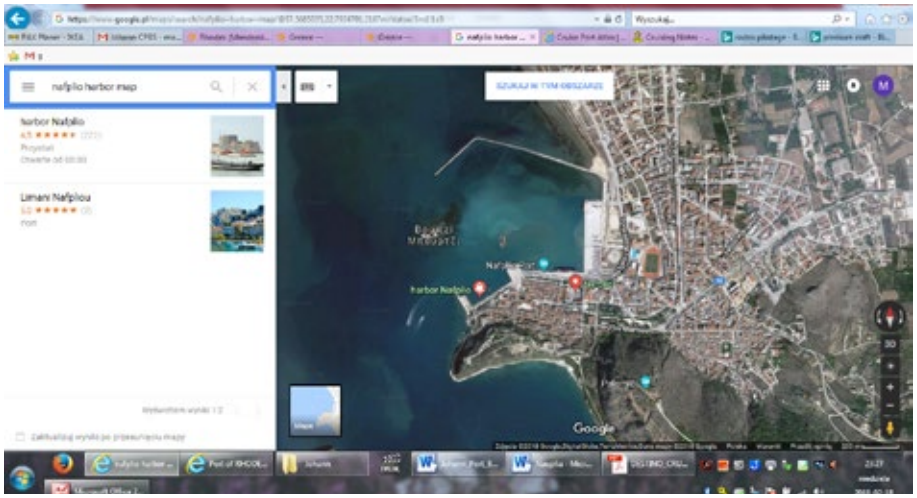


Figure 20. Map of the Nauplia Harbor.

Source:https://www.google.pl/maps/search/nafplio+harbor+map/@37.5685335,22.7924791,2187m/data=!3m1!1e3

The length of berth is approximately 1100 m. Vessels with a draft of 6 m may tether.

Services available:

- Fuel - filling up with fuel is accomplished by external entities, it has to be carried from the town in jerry cans.
- Water - on the quay, but in the charge of a waterman
- Garbage disposal
- Some light repairs
- Strong cellular signal
- Wi-Fi is available from local restaurants and bars

Rhodes

Rhodes is the largest of the Dodecanese islands of Greece and lies in the eastern Aegean of the southern Turkey coast. Rhodes is a very popular destination. Cruises start in March and passenger vessels fly there till December.

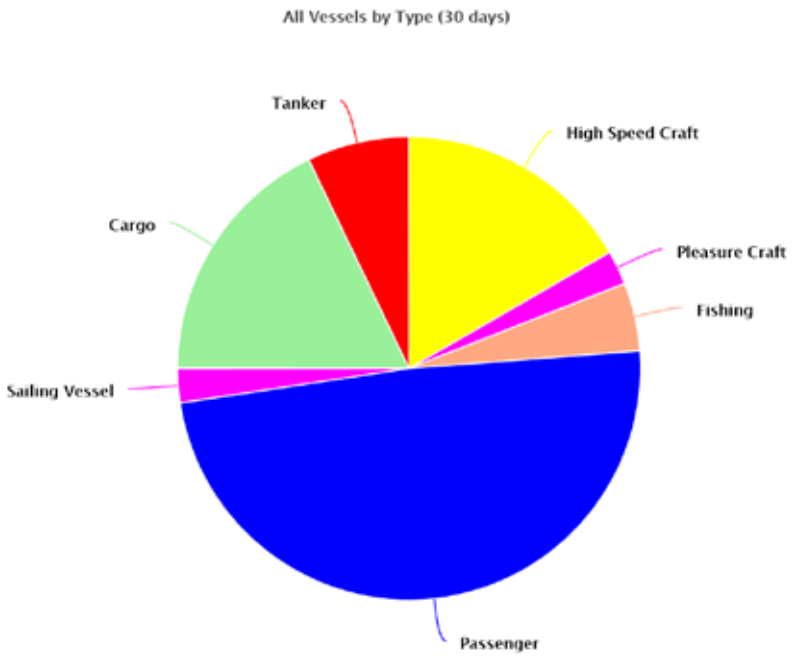


Figure 21. Arrivals in Rhodes by vessel types from January 20 till February 18, 2018

Source: https://www.marinetraffic.com/en/ais/details/ports/59/Greece_port:RHODES

The port is located within a very short, walking distance from the city centre – old Rhodes. There are four cruise ships berths: West Pier –295 m length and 7-10 m draft, North Pier – of 140m length and 10m draft, East Pier –375 m length and 7-10 m draft and Gamma Pier –95 m length and 7 m draft.

Figure 22. Map of the Rhodes Port.

Source: http://www.alanjoanhere.com/CNotes%20website/Greece_Rhodes.html

In the period of 2011-2016, the cruise passenger traffic in the port of Rhodes varies significantly (Table 15). The maximum level of 29 thou passengers was reached in 2012.

Table 15. Cruise traffic in Rhodes in 2011-2016

Source: Eurostat

	2011	2012	2013	2014	2015	2016
Pax	1 000	29 000	26 000	12 000	2 000	17 000

Services available:

- Fuel - delivered by a tanker
- Water supply
- Electric power
- Connection fees for electric and water supply
- Phone Service: FREE Smart Phone App., VOIP Phone Set
- WiFi basic connection: FREE OF CHARGE
- Car Parking : FREE OF CHARGE
- Communal Services 24/7 (Security, Mooring Cleaning, Solid Waste Removal, Courtesy Car): FREE OF CHARGE
- CATV (Cinema, OTE Sports, International & Local)
- Pilot (Captain) Charges to and from Berth up to 1 mile from port: Free Of Charge
- Liquid Waste removal (at five (5) designated areas only)
- Liquid Waste removal (at Berth location with mobile unit):
- Bildge & Grey Water removal (at two (2) designated areas only)
- Bildge & Grey Water removal (at Berth location with mobile unit)

San Remo

San Remo lies on the Mediterranean coast of western Liguria in north-western Italy. It was founded in Roman times and is now best known for being a tourist destination on the Italian Riviera and the host of several cultural events such as the San Remo Music Festival. The max size of served vessels is: length: 200 m, draft 6.0 m. Smaller ships are able to dock in the centre of town. Larger ships anchor and will use tenders also to the centre of town.

Figure 23. Port of San Remo

Source: http://www.google.com/maps/

The following services are available:

- Pilotage service
- Tug
- Bunkers
- Fresh water
- Solid waste disposal
- Toxic waste disposal
- Bilge and Sludge disposal facilities
- Black and grey water disposal facilities
- Necessary space, facilities and labour to handling ship's stores and provision (ship chandler services)
- Cleared and well signalled entrance / exit to/from the pier
- ISPS certification – compulsory

Stockholm

Port of Stockholm is located in the northern part of the Baltic Sea at the east coast of Sweden. The port is accessible 24 hours a day all year round, pending winter ice restrictions. The port is situated in the Stockholm archipelago, about 60 kilometres west from the high sea.

Stockholm is one of the largest cruise destination in the Baltic Sea Region. Table 16 presents the level of cruise passengers visiting the capital of Sweden.

Table 16. Cruise traffic in Stockholm in 2010-2017

Source: Passengers, calls and turn-arounds per destination 2000-2017, Cruise Baltic (23 Nov 2017).

	2010	2011	2012	2013	2014	2015	2016	2017 E
Pax	415 000	452 000	470 000	485 581	470 000	530 229	500 000	670 000
Calls	261	263	274	278	275	247	230	263

The port of Stockholm includes a number of port areas of which Värtahamnen, Frihamnen and Loudden, as well as Stadsgården and Skeppsbron are the most important. Cruise ships are docked at 8 piers. Large vessels are moored primary in Frihamnen (3 berth), Värtahamnen (1 pier) and Stadsgården (2 piers), where ships of LOA up to 350 m and draft to 9 m are handled.

Small cruisers of LOA to 155 m and draft to 6 m are docked in Skeppsbron and Nybrokajen. Skeppsdbron is located in the city centre, close to the old town. Nybrokajen is placed in the city centre as well, in the distance of 0.5 km to the Gamla Stan. Both piers are dedicated for small cruises and local passengers ships.

Figure 24. Map of the Port of Stockholm

Source: http://cruise-portwiki.com/Stockholm (23 Nov 2017).

The Port of Stockholm Authority provides all services for cruise ships moored in quays located in the centre. Both at Skeppsbron and Nybrokajen, the following essentials are accessible to small cruise ships:

- Pilotage service
- Tug
- Bunkers
- Fresh water - supply rate at Skeppsbron 100 m^3/h, supply rate at Nybrokajen, no information
- Solid waste disposal
- Toxic waste disposal
- Bilge and Sludge disposal facilities
- Black and gray water disposal facilities
- Necessary space, facilities and labour to handling ship's stores and provision (ship chandler services)
- Cleared and well signalled entrance / exit to/from the pier (not available at Nybrokajen)
- ISPS certification - compulsory

Other facilities dedicated to passengers available at Skeppsbron: restrooms, facilities for handicaps (ramps, toilettes), tourism information.

Turku

Turku is a city located at the south-west coast of Finland at the mouth of the Aura River. It is the second biggest passenger harbour in Finland due to ferry turnover. Over 4 million passengers travel via port by ferries annually. As the destination of cruise lines, Turku is placed in small segment cruise ports. In 2017, 8 cruise vessels visited this port, all classified as small ones.

Table 17. Cruise traffic in Turku in 2010-2017

Source: Passengers, calls and turn-arounds per destination 2000-2017, Cruise Baltic (23 Nov 2017).

	2010	2011	2012	2013	2014	2015	2016	2017 E
Pax	2 000	5 456	2 600	1 300	0	7 500	4 325	3 730
Calls	6	7	4	4	0	8	8	8

In the Turku harbour, small cruises of LOA 140-200 m are moored at 3 piers (River Aura Pier 9-11, River Aura Pier 12 and pier 23). All are located in a distance of 3 kilometres to the city centre. Large cruisers wharf in West Harbour in the container area. The following services are available for small cruises at all three piers:

- Pilotage service
- Tug
- Bunkers
- Fresh water
- Solid waste disposal
- Toxic waste disposal
- Bilge and Sludge disposal facilities
- Black and grey water disposal facilities
- Necessary space, facilities and labour to handling ship's stores and provision (shi pchandler services)
- Cleared and well signalled entrance / exit to/from the pier
- ISPS certificaion - compulsory

Zadar

Zadar lies on a peninsula on the northern part of the Adriatic coast. It is more and more frequently part of the eastern Mediterranean cruises, together with other Croatian ports of Dubrovnik, Split, Korčula and Hvar. Besides the intense local, coastal and international traffic connections with Italy, for the past few years Port of Zadar has been recording an increase of cruise ships visits (Table 18).

Year	2010	2011	2012	2013	2014	2015	2016
Arrivals	80	72	57	69	77	92	114
Passen-gers	17 157	28 677	20 958	33 647	53 791	70 366	136 462

Table 18. Arrivals of cruising ships from 2010 to 2016

Source: http://www.port-authority-zadar.hr/statistike_en.php

The port of Zadar consist of two areas: Luka Zadar, an artificially improved natural inlet formed between mainland and nearby peninsula, on which stands the town of Zadar, with 969 m of wharfage and 10 moorings, mainly used by coastal and passenger vessels of 6.7 m (small cruisers). The second part is Luka Gazanica – a modern deep-water harbour, handling dry and liquid cargoes and bigger cruisers.

Luka Zadar is placed in the city centre (figure 25). Ships dock at the northwest corner of the old city at the end of the 1-km long peninsula that contains the most historic sights of the city. This position provides direct access to shopping places, sightseeing and other contents in the town. Passenger transfer to the port is fast and easy, as the walking distance between different localities is no more than 15 min. Luka Gazenica is on the outskirts of Zadar, between Zadar and the village of Bibinje. The distance from Zadar is around 5-6 km (3-4 miles). However, there are shuttle buses provided by the port.

Figure 25. Luka Zadar

Source: www.port-authority-zadar.hr

Berth No	Lenght [m]	Characteristics
1	110,0	Passenger ferries in international maritime traffic as also scheduled and unscheduled passenger ferry lines.
1B	146,0	Passenger ferries in international maritime traffic as also scheduled and unscheduled passenger ferry lines.
2	119,1	Scheduled and unscheduled passenger ferry lines, local ferry lines, excursion boats and water supply ship (only during the night on berth 3)
3	174,7	Scheduled and unscheduled passenger ferry lines, local ferry lines, excursion boats and water supply ship (only during the night on berth 3)
4	80,2	Local ferry lines, excursion boats
5	61,5	Local ferry lines, excursion boats
6	75,1	Local ferry lines, excursion boats
7	80,0	Fishing boats, excursion boats, yachts
8	70,0	Fishing boats, excursion boats, yachts

Available services:

- Bunkering,
- Garbage disposal
- Sewage disposal,
- Water supply – fresh water available at a rate of 10-15 m^3/h,
- Shore gangways,
- Emergency service,
- Security.

5

CRUISE PORT BENCHMARK FOR SCS DEVELOPMENT – WATER SIDE

5.1. BEST TECHNICAL STANDARD FOR EFFICIENT SERVICE OF THE SCS

A detailed study of selected European ports serving small cruiser traffic provides comprehensive information concerning the available waterside infrastructure and facilities within ports. Fourteen locations with 34 berths for cruisers have been identified and investigated (Table 18).

Considering technical issues, two key dimensions of waterside infrastructure can be compared between ports – length of berths and depth. In some cases, the maximum length of served vessels was revealed.

In all researched ports, the maximum length of vessel does not exceed 240 meters, so it is fully in line with initial assumptions for the SCS concept. It could be stated, that the average length of SC vessel (based on available data) is 164 meters.

Similarly, the depth of quays differs between 5.00 m to 12.80 m, however, depth in the majority of locations (23) does not overstep the level of 8 meters. The average level of depth can be calculated at 7.2 m.

An interesting feature of research locations, included in the SCS concept is the distance between berths and city centres. The majority of location has less than 1 km between those two places, so the cities are fully available to reach by foot.

In result, the standard berthing location for development of the SCS concept, regarding waterside technical features, should be available for serving a vessel with a length of 160 m and approx. 7m in depth, and should be centrally located towards the centre of the city.

Table 19. Waterside technical standards for small cruiser service

Port		Quays	LOA max [m]	Draft/ Depth [m]	Length of berth [m]	Distance to city centre [km]
Helsinki	FI	Olimpia Quay	180	7.9	185	1.0
		Pakkahuone Quay	130	6.0	130	1.0
		Katajanokka Quay	200	7.9	210	1.0
Holyhead	UK	Terminal 3	.	8.0	190	0.0
		Terminal 4	.	6.0	180	0.0
		Terminal 5	.	8.0	180	0.0
		South Quay	.	2.4	80	0.0
Kikrwall	UK	Hatston Ferry terminal	225	10.0	.	4.0
		Kirkwall Centre	125	5.0	124	0.0
Kotor	HR	Riva I	.	12.8	150	0.0
		Riva II	.	10.0	100	0.0
		Riva III	.	8.0	250	0.0
		River I	.	7.0	80	0.0
		River II	.	5.0	70	0.0
Kristiansand	NO	Lagmannsholmen (No. 20)	120	7.9	268	0.3
Lavrion	EL	Car Ferry Jetty		3.3	120	
		Central Jetty		5.0	150	
		Passenger Jetty		6.9	700	
		Ore pier		5.0	45	
La Coruna	ES	Transatlantic Quay	.	11.0	484	0.0
Mariehamn	SE	Mariehamn Port	240	8.0	250	0.0
Nauplia	EL	Nauplia Port	160	6.0	1000	0.0
Rhodes	EL	West Pier	.	7.0-10.0	295	0.0
		North Pier	.	7.0	140	0.0
		East Pier	.	7.0-10.0	375	0.0
		Gamma Pier	.	7.0	95	0.0
San Remo	IT	City Centre	200	6.0	.	0.0
Stockholm	SE	Skeppsbron	155	6.3	155	0.5
		Nybrokajen	100	5.5	100	0.5
Turku	FI	River Aura Pier 9-11	140	8.0	140	3.0
		River Aura Pier 12	150	7.5	120	3.0
		River Aura Pier 23	200	8.5	200	3.0
Zadar	HR	Luka Zadar	100	6.0	969	1.0
		Luka Gazenica	200	10.0	.	6.0

5.2. OPERATING STANDARDS FOR SMALL CRUISES IDENTIFIED IN THE BENCHMARK PORTS

The second investigated issue was the scope of services rendered for the SC vessels (Table 20). Thorough research of the selected location shows that the range of available services depends on the technical parameters and also on port activity. In larger ports, which not only serve cruise traffic but also other types of maritime vessels, a full scope of services is usually offered. It does not mean, that SC vessels need to use all selected services (e.g. pilotage, tugs).

Considering the area of main shortages in the service provided between investigated seaports, waste disposal facilities are not fully available (or information of their availability is not communicated enough).

All in all, it is very difficult to establish the operation standard for SCS ports, however, common elements of this type of location can be found. Bunkering and fresh water supply should be considered as a core element. Ports for SCS traffic should also provide the possibility for solid waste disposal and, if necessary, provide relevant pilotage and tug service.

Table 20. Waterside operational standard in researched SCS ports outside Johann

	Helsinki	Holyhead	Kirkwall	Kotor	Kristiansand	La Coruna	Lavrion	Mariehamn	Nauplia	Rhodes	San Remo	Stockholm	Turku	Zadar	
Pilotage service	1	1	1		1	1		1		1	1	1	1		7
Tug	1	1	1		1	1		1		1	1	1	1		6
Bunkers	1		1	1	1	1	1	1	1	1	1	1	1	1	11
Fresh water	1	1	1	1	1	1	1	1	1	1	1	1	1		9
Solid waste disposal	1	1	1	1	1	1	1	1	1		1	1	1		9
Toxic waste disposal	1							1			1	1	1		4
Bilge and sludge disposal facilities	1	1				1		1		1	1	1	1		5
Black and grey water disposal facilities	1				1	1		1		1	1	1	1		5
Necessary space for ship chandler services	1	1			1	1		1			1	1	1		4
Cleared and well-signalled entrance to pier	1				1	1		1			1	1	1		5
ISPS certification – compulsory	1	1			1			1			1	1	1		4
Shore electric supply				1	1					1	1				2
	11	7	5	4	0	9	3	11	3	7	0	11	11	1	7

The crucial issue, which could not be verified on the basis of publicly available sources of information were trade-offs between SCS technical service (e.g. bunkering, waste disposal) and city centre location of berths with intensive pedestrian traffic along the vessel. Relevant traffic management as well as excellent logistics for supply and service operation are required. It should be noted that these types of issues are more important for SCS clients who are very sensitive to the quality of service offered.

5.3. ENVIRONMENTAL EXCELLENCE REQUIREMENTS FOR SCS CONCEPT

Oceans are getting more and more polluted nowadays, therefore the marine environment needs prevention from the negative influence of transport activity. Vessel traffic should be considered as the main pollutant of the marine environment. Special attention is required by special, sensitive marine areas. Their specific oceanographic and ecological condition, need dedicated, mandatory methods of protection. One of those special areas are the Baltic and North Seas.

Those two maritime areas are specially treated by the main conventions that regard prevention of pollution from ships – MARPOL and HELCOM (Convention on the Protection of the Marine Environment of the Baltic Sea Area). The MARPOL Convention on preventing pollution from ships, as a global act, presents requirements for ships, that need to be fulfilled and also rules on how to act to prevent pollution. The second one, HELCOM Baltic Sea Action Plan is a regional programme focused on keeping a favourable status of Baltic Sea biodiversity, natural and balanced communities of plants and animals and viable populations of species. This plan support implementation of the Ballast Water Management and Sediments Convention.

A specific part of maritime transport market are cruise vessels, with an outstanding level of garbage or sewage production. Considering the MARPOL Convention, cruise ships are obligated to fill rules under annexes: 4 – Prevention from sewage pollution, 5 – Prevention from garbage pollution and 6 – Prevention from atmospheric pollution.

Considering garbage, cruisers need to be equipped with squeezers and other equipment for its better and safer storage and disposal. Sewage is another very important issue. Because sewage is produced by cruisers in a big amount, a vessel should be equipped with a special, on-board sewage treatment plant, approved by administration. What is more, the HELCOM Convention has just introduced a new regulation concerning discharge of sewage in seaports. The act covers the Baltic Sea area, including inland waters as well as sea water and seabed. As per the regulation, compulsory discharge of sewage in the Baltic ports shall be applied to:

– ships of 200 tons of gross tonnage and above,

– ships less than 200 tons of gross tonnage, which are certified to carry more than 10 persons,

– ships which do not have measured gross tonnage and are certified to carry more than 10 persons.

In result, the port handling cruise traffic has to develop a relevant installation or facilities for sewage discharge. It could be problematic in city centre locations, recommended by the SCS concept.

Another issue is the water consumed by passengers of cruise ships on a mass scale. Water needs to be conditioned in approved equipment. This requires greater use of energy, so additional emission is provided.

Extra consumption of energy is also carried out by thrusters. The thruster allows to avoid using tug assistance during manoeuvres in ports and finally, decrease the level of port fees. Regarding the high power of motors, not only is the energy consumption higher but also this may cause disintegration of the seabed in ports.

A new challenge for the maritime transport, cruise business included, is the Ballast Water Management Convention. It is a regulation preventing transfer of invasive species between sea areas. All ships are to implement a ballast water management plan, carry a record book and procedures to decrease migration of invasive species, bacteria and viruses.

Not only seafarers and owners of vessels are obligated to care about environmental protection, also countries – parties of particular conventions are to fulfil requirements connected to marine environment protection issues.

Governments of particular conventions are working on legal acts (laws, ordinances) for marine environmental protection, that are coming into force in each country. In regard to them, vessels:

– are being subjected to surveys by flag state inspectors,

– are getting endorsements of certificates of maritime environment protection,

– are being subjected to inspections by authorised port state inspectors,

for compliance with the requirements of marine environment protection regulations.

Another very important tool is co-operating between parties to detect violations of rules of conventions and severely punishing any illegal acts to prevent future violations by others seafarers or vessel owners.

All ports mentioned in the project are to implement rules and requirements under MARPOL and HELCOM Conventions. On behalf of this, port authorities are obligated to ensure reception facilities of oily mixtures, noxious substances, sewage, garbage and substances polluting atmosphere.

All ports in the project are offering services required by legal acts. In most locations, waste reception facilities are ensured by port authorities; in other, by private constructors.

A special, interesting attitude towards environmental protection can be found in elaborated ports.

The Rhodes port is an example where, beside applying rules of legal acts, there are other treatments for environmental protection. The port offers pro-ecological actions such as ensuring electricity for vessels from renewal energy sources.

The environmental activity of Baltic ports researched mentioned in section 5.2 is based on 'Guide to good practice for port reception facility providers and users' issued by IMO (MEPC.1/Circ.671/Rev.1, 1 July 2013). Instructions for cruise operators include waste handling instructions and environmental protection.

The Port of Stockholm and Port of Helsinki provide shore electricity supply (onshore power supply). However, the system is dedicated to ferries and is available on ferry terminals in both harbours. The cruise ship may be moored in a ferry area and use the system upon agreement with the terminal operator.

CONCLUSIONS AND RECOMMENDATIONS

6

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Development of SCS traffic within the network of Johann's partner maritime ports requires a full understanding of the concept as well as extensive knowledge on water and landside operations within this specific part of the cruise business. Considering vessel activities strictly connected with the waterside, comprehensive research aimed to reflect the main features as well as requirements for SC traffic development was completed.

The first step of research was focused on the basic features of SCS concept with special attention to its functional aspects. The idea of 'bringing the cruise tourist closer to the centres of the Baltic cities' was considered as the initial assumption of the concept. To make it possible, relevant elements, both on water and landside should be available in cities. As per the navigational restrictions for embarking cruise vessels in the centre locations, the size of such vessels is limited, so a relevant fleet of the so-called small cruises is necessary. Moreover, small cruise ships and their clients require relevant service offered within the specific, high-quality value chain. Thus, identification of such issues was provided.

Particularly important for concept development as well as for further process of research was identification of the main features of the small cruise vessel. A review of available classifications supported by investigation of technical parameters of existing cruise fleet determinates the main characteristics of small cruises, such as:

- passenger capacity up to 1,000 people,
- total length till 200 meters,
- maximum draft up to 6 meters.

Investigation of the benchmarking tool and its suitability for the study was researched in the second chapter. Considering the wide scope of benchmarking types as well as tool flexibility, a full recommendation for its further implementation was provided. Similarly, the process of benchmarking research for Johann was designed and presented.

A comprehensive part of the process of the study development was detailed research of the global cruise fleet, with selection of the small cruise fleet. According to the SCS concept, a group of 159 small cruise vessels was registered worldwide at the beginning of 2017. However, the number of ships in service amounted to 143. Identification of the owners of those vessels as well as schedules of their journeys, provides information about the ports of call. The scope of research has been limited to European ports and covers the following areas: Baltic Sea (23 seaports), North Sea (37), Bay of Biscay (7), Mediterranean Sea & Adriatic (46+16) and Irish Sea (16).

Another part of the study focused on determination and investigation of suitable ports for benchmark development for the SCS concept. Thus, the group of specified ports (145 locations) has been investigated in terms of requirements of the

SCS concept. The majority of researched maritime ports served both small cruise traffic as well as big cruisers without specific, dedicated areas for only SCS, so they did not comply with requirements of the study. In result, a group of 14 ports strictly designed for SCS traffic service was selected.

A detailed study of local data and information concerning waterside conditions and offered service was introduced. Based on the publicly available information, the main features of SCS ports' infrastructure, scope of service rendered as well as port performance were researched. Considering the results, strong similarities between the location can be noticed. The maximum length of vessel did not exceed 240 meters, with an average length up to 164 meters, so fully in line with the initial assumptions for the SCS concept. Similarly, the depth of quays differs between 5.00 m up to 12.80 m, however in the majority of locations (23), it does not exceed 8.00 meters. The average level of depth can be calculated at 7.2 meters.

In respect to the waterside service, the relation between the size of port and its offer was revealed. In larger ports, serving not only cruise traffic but also other types of maritime vessels, a full scope of service is usually offered.

All in all, it is very difficult to establish the operation standard for SCS ports, however common elements of this type of location can be found. Bunkering and fresh water supply should be considered a core element. Ports for SCS traffic should also provide the possibility for solid waste disposal and, if necessary, provide relevant pilotage and tug service.

On the basis on the above research, the following recommendations can be defined:

- the Small Cruise Ships sector constituted a minor part of the global cruise fleet,
- the SCS service is offered by main players as a specific, high-quality offer on the market, therefore, they are key decision makers for traffic development within the Johann ports,
- waterside conditions and service are of secondary importance with the development of SCS traffic in selected ports (domination of landside offer), however, relevant nautical parameters are necessary,
- SCS traffic should be located on existing infrastructural elements (berths or piers), but relevant facilities (e.g. energy supply, solid waste or sewage disposal) should be developed and offered,
- the ship's service must also take into account intense pedestrian traffic on the quay, so relevant management of traffic and logistics support should be efficiently managed,
- accurate knowledge of the best practices in ports examined is impossi-

ble using publicly available sources of information, because they often result from the experience and knowledge of local employees,

- direct contact with representatives of selected ports and detailed consultation considering specific requirements of SCS operators as well as best practices or experiences of ports staff are therefore necessary.
- The studied trips being an integral part of the Johann project will create a perfect opportunity for further discussion between project partners and representatives of selected ports.

ABBREVIATIONS

SCS	Small Cruise Ship
GT	Gross Tonnage
LOA	Length Overall
BSR	Baltic Sea Region
PAX	Passengers
MARPOL	The International Convention for the Prevention of Pollution from Ships
HELCOM	Baltic Marine Environmental Protection Commission

TABLES

FIGURES

TEAM OF AUTHORS

Maciej Matczak (study coordinator), Associate Professor, currently working at the Gdynia Maritime University, graduated from the Faculty of Economy at the University of Gdańsk. During studies, he began working at the Department of Development of the Port of Gdańsk Authority S.A. In 2004, he received a Ph.D. in economics. Since 2005, he has been working at the Faculty of Logistics and Transport Systems at the Gdynia Maritime University. Since 2016 employed as a Professor ,and holding the duty of Deputy Dean for Cooperation & Development. His scientific interests are focused on the functioning of transport markets, with particular focus on the evolution of their competitive structures. He has participated in international research projects, including European framework programmes (Ecoports, Catrin, Grace, Spectrum, RCMS) and regional programmes (Matros, NeLoC, LogVAS, PortNet, TransBaltic). Author of publications, reports and expertise for Transport & Logistics companies and public administration engaged in the T&L sector. He also evaluates research and development projects (DG MOVE, INEA, EACI, TEN-TEA). Since 2005, he has been cooperating with Actia Forum from Gdynia.

Ilona Urbanyi-Popiołek, she has studied maritime economy at Gdańsk University. In 1998, she obtained her Ph.D. in Economics. She is a lecturer at the Gdynia Maritime University, Department of Logistics and Transport Systems. Her research work is related to economics of maritime transport, with special focus on ferry and cruise shipping industry. She was involved in European projects concerning ferry shipping, ex 'Interface' and Interface Plus. She is an author of a selection of market reports on Short Sea Shipping, Motorways of the Seas as well as ferry market for public authorities (e.g. Polish Ministry of Infrastructure) and business. She is a member of the International Association of Maritime Economists (IAME).

Aleksandra Wilczyńska, Associate Professor, is currently working as a lecturer at the Gdynia Maritime University, Department of Commodity Science and Quality Management. She received her science degree at the Krakow University of Economics with a speciality in quality of food stuff. She has been conducting various research and projects related to quality of food products and

raw materials and the pro-ecological activities in communes of the Pomerania province. Recently, she has become involved in projects concerning development of the Baltic Sea Region, especially development of the culinary heritage of the Baltic Sea countries, as well as development of Small Cruise Ship heritage.

Katarzyna Muszyńska, Manager in the Shipowners Office of the Gdynia Maritime University since 2004. Two training vessels of the Gdynia Maritime University, Dar Młodzieży & Horyzont II remain under her management and supervision. She graduated in the field of Management and Marketing at the Faculty of Business Administration of the University. Currently she is preparing a doctoral dissertation on quality aspects of ship management, based on a strong theoretical foundations as well as extensive professional experience.

Magda Śniegocka-Dworak, Master of Commodity Science, Engineer, Master of Law, since 2012 has been working as a lecturer at the Marine Environmental Protection and Maritime Law at Officer Training Centre of Gdynia Maritime University Ltd. She is a fourth-year student of doctoral studies at the Gdynia Maritime University in Department of Commodity Science and Quality Management. She received her Master's degree in Commodity Science at the Gdynia Maritime University with a specialty in Tourism and Hospitality, Master's degree in Law at the Gdańsk University. During studies, she got her practice in s/v Dar Młodzieży and was involved in organization of The Tall Ships' Races in Bremerhaven.

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