MED CRUISE TOURISM FORESIGHT

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Abbreviations

CAGR	Compound annual growth rate
SECAs	Sulphur Emission Control Areas
IMO	International Maritime Organization
MED	Mediterranean
pa	per annum
Pax	Passengers

1 | Report aim

The aim of this report is to identify the key factors that influence the evolution of cruise maritime tourism and to present plausible future scenarios.

The report is structured in the following chapters. In Chapter 2, the approach followed is presented and is linked to other (previous or follow-up) outputs of the project. In Chapter 3, the main factors to influence the evolution of cruise tourism as presented, either as current established trends or as emerging issues for the future. Finally, in Chapter 4, plausible future scenarios for the development of cruise tourism in the MED, are presented.

2 | Approach

A number of definitions have been proposed to clarify the aim and boundaries of foresight activities. Among those, one can identify the following:

- Foresight is the process of developing a range of views of possible ways in which the future could develop, and understanding these sufficiently well to be able to decide what decisions can be taken today to create the best possible tomorrow[1].

- Foresight is the capacity to think systematically about the future to inform decision making today[2].

- Foresight is the ability to create and maintain a high-quality, coherent and functional forward view, and to use the insights arising in useful organizational ways. It represents a fusion of futures methods with those of strategic management[3].

Following the above logic, the aim of the SIROCCO foresight is to depict possible future conditions of the cruise industry in the Mediterranean in order to influence decisions taken today for enhancing the sustainability of cruise tourism in the MED. The approach used is depicted in *Figure 1*.

Figure 1: SIROCCO foresight approach in context
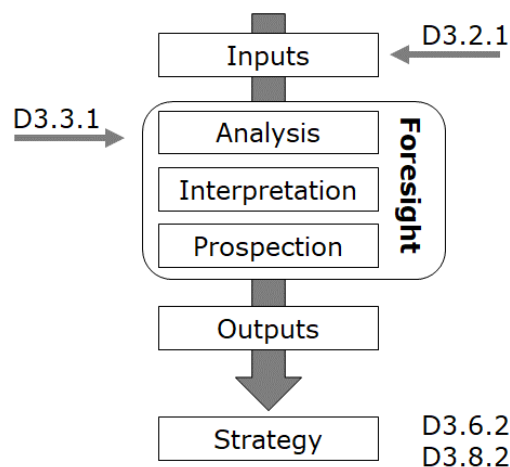
Source: Based on Voros, 2003

Translating *Figure 1* into the SIROCCO work, the 'inputs' component consists of the work presented in D3.2.1 (MED Cruise Maritime Tourism Database), identifying or relevant data and information sources and components, to be used throughout the project.

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[1] HORTON, A. (1999) A Simple Guide to Successful Foresight, *Foresight*, 1 (1), pp.5-9)
[2] CONWAY, M. (2015) *Foresight: an introduction*, A Thinking Futures Reference Guide
[3] SLAUGHTER, R.A. (1995) *Futures for the Third Millennium*, Prospect Media, St. Leonards, NSW, Australia

The 'foresight' part comprises of three major phases: analysis, interpretation and prospection. It follows the initial gathering of inputs and is succeeded by the presentation of its results and the selection of strategic actions. The analysis phase aims at creating some order out of the wide spectrum of data gathered as part of the 'inputs' stage. The main question asked is: 'what seems to be happening?'[4]. The results of the analysis phase are then fed into the interpretation phase which seeks to probe deeper into the issues aiming at providing answers to the question: 'what is really happening?'. Finally, in the prospection phase, various views of alternative futures are developed, aiming at addressing the question: 'what might happen?'.

The 'analysis' phase was presented in D3.3.1 (Current State & Future Challenges of Cruise Maritime Tourism in the MED), while the 'strategy' component will be reflected in D3.6.2 and D3.8.2, taking into account additional project outputs, among which the results of value chain analysis and policy coherence analysis.

An environmental scanning exercise was undertaken to feed and validate the overall approach, from the analysis to the prospection stage. This involved three consecutive decisions[5]:

- which environments to scan (i.e. focus areas)
- which factor categories to monitor
- which sources to use for identifying and monitoring specific factors.

The environmental scanning was undertaken by focusing on five main areas:

- natural environment
- social/cultural environment
- technological environment
- political environment
- economic environment

During scanning it became evident that the lines separating those areas are in practice vague, as many of the issues do not relate to only one area and influence (and are influenced) by more than one of them. Therefore, this categorisation served more as a way of ensuring that no major area is missing rather than as a strict categorisation framework.

Factor categories monitored in relation to the five environments, were:

- trends
- emerging issues
- uncertainties (i.e. important occurrences)

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[4] VOROS, K. (2003) A Generic Foresight Process Framework, *Foresight*, 5 (3), pp.10-21
[5] NEUBAUER, F. and SOLOMON, B. (1977) A Managerial Approach to Environmental Assessment, *Long Range Planning*, 10(2), pp.13-20

Sources used for identifying and monitoring specific factors, include:

- authoritative, peer-reviewed scientific academic journals
- policy documents
- industry/company reports, conference proceedings, commercial magazine articles, etc.

3 | Interpretation

Going deeper into the results of D3.3.1, and to interpret them into understanding what is really happening, involves two issues: first, drawing an overall picture of the current trends (focusing mainly on quantitative aspects), and second, identifying the emerging trends (mainly qualitative) that will shape cruise tourism in the following decade. Both current trends and emerging issues will influence the evolution of cruise tourism.

3.1 Cruise tourism trends

In D3.3.1[6] a number of trends have been identified in relation to cruise tourism. These are presented in Table 1.

Table 1: Main trend data related to cruise tourism (as reported in D3.3.1)

Category	Trend	Time period	Data source
Global cruise tourism demand (pax)	4.8% CAGR 5.1% CAGR	2009-16 2014-16	CLIA
European cruise tourism demand (pax)	3.1% CAGR 2.2% CAGR	2010-16 2014-16	CLIA Europe
Global ocean cruise ship capacity (ships)	28%	2017-25	SeatradeCruise
Global ocean cruise ship capacity (lower berths)	45%	2017-25	SeatradeCruise
Economic contribution of cruise tourism to the European economies (billion €)	3.1% CAGR	2010-15	CLIA Europe
Share of MED in the European cruise market	-1.0%	2014-16	CLIA Europe
Cruise passenger visits in Mediterranean Ports	0.69% CAGR 3.19% CAGR	2012-16 2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities
Cruise ship calls in Mediterranean Ports	-1.22% CAGR 0.44% CAGR	2012-16 2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities
Cruise passenger visits in large Mediterranean Ports[7]	4.78% CAGR	2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities
Cruise passenger visits in medium Mediterranean Ports[8]	-1.50% CAGR	2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities

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[6] SIROCCO (2017) *Current State & Future Challenges of Cruise Maritime Tourism in the MED*, Deliverable D3.3.1
[7] Group A ≥ 500,000 pax pa (rounded up in relation to the figures in D3.3.1)
[8] Group B 275,000≤<500,000 pax pa (rounded up in relation to the figures in D3.3.1)

Category	Trend	Time period	Data source
Cruise passenger visits in small Mediterranean Ports[9]	-7.33% CAGR	2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities
Cruise ship calls in large Mediterranean Ports[10]	1.72% CAGR	2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities
Cruise ship calls in medium Mediterranean Ports[11]	0.80% CAGR	2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities
Cruise ship calls in small Mediterranean Ports[12]	-8.30% CAGR	2014-16	MedCruise; Greek Cruise Cluster; Puertos del Estado & Ports de Balears; Individual Port Authorities

Source: SIROCCO, 2017

Looking at the above quantitative data, one can draw a list of (more general) trend messages, to serve as the starting point of any attempt to draw plausible future scenarios for cruise tourism. These trend messages are presented in Table 2.

Table 2: Main trend messages related to cruise tourism

T1	Global cruise tourism demand has shown a consistent growth in the past 7 years, becoming stronger in the last couple years
T2	Global cruise ship capacity is expected to increase considerably in the following decade
T3	Cruise tourism in Europe has shown considerably lower growth trends compared to the global ones in the past 7 years
T4	The Economic contribution of cruise tourism to the European economies has followed the cruise demand growth rates, therefore no significant changes in expenditure patterns of companies or passengers has been observed
T5	The share of the Mediterranean destinations in the European cruise market has slightly decreased in the last couple of years
T6	Cruise passenger visits in Mediterranean Ports showed a slight increase in the past 4 years, however growth has become stronger in the last 2 years
T7	Cruise passenger calls in Mediterranean Ports showed a decrease in the past 4 years, however slight growth became evident in the last 2 years
T8	Significant growth of cruise passenger visits is observed only at the large Mediterranean cruise ports, while on the other side, a significant decrease has been experienced at the small ones

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[9] Group C < 275,000 pax pa (rounded up in relation to the figures in D3.3.1)

[10] Group A ≥ 278 calls pa (see explanation in D3.3.1)

[11] Group B 174≤<278 pax pa (see explanation in D3.3.1)

[12] Group C < 174 pax pa (see explanation in D3.3.1)

T9   Significant decrease of cruise ship calls is observed at the small Mediterranean cruise ports.

3.2   Cruise tourism emerging issues

The recognition of an issue as an 'emerging' one is based on its 'newness'. Newness does not necessarily mean that the specific issue is unheard of or that comes as a surprise, but rather it could be the result of[13]:

- new scientific knowledge, which could be in form of new data, evidence, theory or model
- new technological developments
- new scales or accelerated rates of impact
- a heightened level of awareness, or
- new ways of responding to a known issue

The following questions have been used for filtering emerging issues:

- Does the issue in question relate closely to cruise tourism sustainability (either economic, environmental or social)?
- Is the issue a potential threat or opportunity of global, or at least international relevance?
- Does management of the risk or harnessing of the opportunity depend on international action and cooperation?
- Is the issue expected to persist (non-transient) and/or does it have a clear increasing trend?

Based on the above, a number of emerging issues have been identified. These are presented in Table 3 and discussed in the following sections.

Table 3: Main emerging issues related to cruise tourism

E1	Cruise tourism is increasingly perceived as another form of mass tourism
E2	Cruise tourism environmental sustainability concerns are increasing, leading in some cases to local confrontations
E3	IMO's proposed new global sulphur limit of 0.5% by 2020 will have a significant impact on the cruise business, considerably increasing fuel costs (especially for cruise lines operating older ships) and promoting the adoption of LNG.
E4	The cruise industry tries to respond to environmental concerns by investing in new technologies on ships, including the exploitation of the advantages of alternative fuels and other energy sources.

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[13] United Nations (2016) *Global Sustainable Development Report 201*6

E5   The port industry tries to promote the environmental sustainability of the cruise sector by exploring the provision of environmentally friendly energy and by providing incentives for a more environmentally friendly cruise tourism while at berth.

E6   Cruise tourism will increasingly address a wider spectrum of income levels

E7   Millennials are emerging as one of the most valuable cruise population segment, influencing cruise tourism future development with their specific characteristics, i.e. their need for authentic experiences and their willingness to share their personal data through mobile apps to gain individualised travel experiences

E8   Although China is expected to fuel the future growth in cruise tourism globally, in the near-term though, the Chinese market seems to be entering a period of adjustment, showing signs of maturation.

E9   Cruise tourism's emerging value proposition is shifting towards providing a sense of accomplishment gained from a wide variety of activities from cultural immersion and voluntourism, to extreme adventures.

E10   Smaller, independent cruise brands are going to play an increasingly important role in the upscale and diversified segments.

E11   Terrorism and geopolitical unrest will most probably remain as a critical issue although difficult to predict where and when they will emerge again.

E12   Technology is playing an increasingly important role in facilitating sustainable and responsible cruise tourism operations

3.2.1 Increasing environmental sustainability concerns & responses

The concerns on the environmental sustainability of the cruise sector are increasingly becoming more intense, especially concerning their direct and indirect impacts on the cities of call. As cruise ships become bigger (and therefore the number of passengers unboarding), cruise tourism becomes synonymous to mass tourism for the city. This resulted to a number of anti-tourism demonstrations in 2017 taking place in cities like Palma de Majorca, Venice, Barcelona[14] and Dubrovnik[15]. In November 2017, the Italian government decided to ban the largest cruise ships from Venice's Giudecca Canal, as a result to criticism from local residents and from UNESCO, the latter having warned that it may list the city as a "threatened" site. The new plan will divert larger vessels around the historic canal to Venice's commercial sea part and will become operational in 2-3 years after the new channel and docks are ready. UNESCO has called for limits on tankers and large cruise ships in the area, and cruise lines have already complied with voluntary measures (self-imposed limits of 96,000 tonnes)[16].

Looking at the regulatory level, IMO's stricter regulations on ship emissions (most prominently restrictions on sulphur oxide – SOx) will come into force in 2020. Currently in SECAs[17] (including the Baltic Sea, the North Sea and most of the US and Canada

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[14] Today Online (2017) *Barcelona tourists hit by eggs as protests mount over crowds* [online] Available at: http://www.todayonline.com/lifestyle/travel/barcelona-tourists-hit-eggs-protests-mount-over-crowds [Accessed Dec 2017]

[15] Scotti, A. (2017) *European citizens railing against tourism,* New York Daily News [online] Available at: http://www.nydailynews.com/news/world/european-citizens-railing-tourism-article-1.3393891 [Accessed Dec 2017]

[16] Maritime Executive (2017) *Italy Restricts Cruise Ship Traffic in Venice* [online] Available at: https://www.maritime-executive.com/article/italy-restricts-cruise-ship-traffic-in-venice [Accessed Dec 2017]

[17] Sulphur Emission Control Areas, as defined by IMO under Annex VI to MARPOL

coastlines) the SOx limit in fuel is 0.10%, and will remain as is. For the remaining areas though (the Mediterranean included), from the beginning of 2020 the current 3.50% (by mass) limit will be reduced to 0.50%. An additional sulphur cap of 0.10% by mass applies to ships at berth in EU ports[18]. Until now, the lower sulphur caps in the SECAs had a limited impact on cruise business especially taking into account the low fuel prices. However, the 2020 transition will most likely result in elevated fuel costs for the industry, by up to 40% for some cruise lines operating older ships[19]. It is also expected that LNG will gain a more favourable position as marine fuel mainly for newbuilds[20].

To address the environmental (and resultant operational) concerns, the cruise industry is responding by introducing new technologies on ships, and by exploiting alternative fuels. The Carnival Corporation for example, currently has a total of seven fully-LNG powered cruise ships on order, with the first one, AIDAnova, to enter service in December 2018. In 2016, AIDAprima became the first cruise ship to use LNG to fuel an auxiliary motor that produces the energy used by the ship while at port[21]. Other firms that are adopting LNG-power include Royal Caribbean International and MSC Cruises. The maritime industry expects the number of LNG-powered ships to more than double by 2020 with the cruise lines being among the early adopters of this technology. In October 2017 there were already 16 confirmed orders for large LNG-powered cruise ships, representing a quarter of all the cruise tonnage on order[22]. The main challenges though, will be to prove out the technology in practice and to develop a supply line that can successfully fuel cruise ships around the world. Other means of addressing environmental concerns, include solar panels, exhaust 'scrubber' systems to minimise emissions, more efficient hull designs and energy-efficient appliances. Collaboration of cruise lines with nonprofit organizations and government agencies to collect data about the ocean's health and climate changes, is also another way to address environmental concerns[23]. Looking into the future, recent developments suggest additional improvements could come from considering new energy storage techniques (electrical or thermal) or from reclaiming efficiencies from existing systems. There are ship types that have been natural candidates for battery power, typically ferries and shortsea vessels requiring power in short bursts, or spending a lot of time idling. The main problem with battery technology in the cruise market has always been based on space and cost, however both are now decreasing. Early cruise adopters of battery technology most probably will include ship operators calling in sensitive areas or during port entry and hoteling. Also, it is becoming increasingly possible to fit small steam turbines on cruise ships, to reclaim the waste heat generated by the engines, as waste heat energy recovery systems are constantly improving[24].

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[18] Directive (EU) 2016/802 relating to a reduction in the sulphur content of certain liquid fuels
[19] Shippax Market 2017
[20] Roussanoglou, N. (2017) *Ship owners should start planning for the 2020 sulphur cap, as time frame is closing rapidly says DNV GL*, Hellenic Shipping News Worldwide [online] Available at:
http://www.hellenicshippingnews.com/ship-owners-should-start-planning-for-the-2020-sulphur-cap-as-time-frame-is-closing-rapidly-says-dnv-gl/ [Accessed Dec 2017]
[21] Jordan, A. (2017) *The Thinking Behind Carnival's LNG Strategy* [online] Available at: https://maritime-executive.com/features/interview-the-thinking-behind-carnivals-lng-strategy [Accessed Dec 2017]
[22] Jordan, A. (2017) *LNG-Powered Cruise Ships Lead the Way* [online] Available at: https://www.maritime-executive.com/article/lng-powered-cruise-ships-lead-the-way [Accessed Dec 2017]
[23] Paloti, M. (2017) Green Cruising [online] Available at: https://www.cruisecritic.com/articles.cfm?ID=528 [Accessed Dec 2017]
[24] Maritime Executive (2017) *New Technologies Could Boost Cruise Ship Energy Efficiency* [online] Available at: https://maritime-executive.com/features/new-technologies-could-boost-cruise-ship-energy-efficiency [Accessed Dec 2017]

At the same time, ports are also undertaking actions to respond to the environmental concerns regarding cruise tourism. At the infrastructural level, many ports are exploring the opportunities for providing LNG bunkering. At the institutional level, initatives for promoting environmental sustainability are emerging. For example, the Norwegian ports have recently launched the Environmental Port Index (EPI) initiative, aiming at providing economic incentives to ships with the lowest environmental footprint. The difference with the already established Environmental Ship Index (ESI)[25], is that EPI focuses on emissions from ships while at berth[26].

3.2.2 Emerging cruise customer profile

While cruise tourism was initially addressing the needs of affluent consumers, evidence suggest that increasingly all levels of income will enjoy cruise vacations. It is estimated that 1/3 of those who have taken a cruise within the past three years, have a household income less than $80,000[27]. Also, multigenerational cruising is projected to increase in popularity, including 'skip-generation' trips, with grandparents and grandchildren traveling together without their parents.

Millennials are emerging as one of the most valuable cruise population segment, based on their travel behaviours and attitudes. For example, Royal Caribbean over the past several years has been carrying about 30-33% more millennials than it did several years ago[28]. This is also reflected to the results of the 29th annual EquiTrend[29] Study, having found that cruise brand equity increased 3 points among millennials compared to the previous year. Since brand equity tends to resist movement, the equity gains and declines among travel categories are considered significant[30]. Millennials also have specific characteristics in terms of tourism preferences. They want to experience new cultures, blend experiences across different types of trips, encounter and engage with local people and have authentic experiences. At the same time, they are happy to share their personal data through mobile apps in order to gain individualised travel experiences[31].

3.2.3 Emerging markets & market segments

3.2.1.1 China as the main emerging market

Between 2012 and 2016 cruise tourism in China experienced a 76% CAGR growth, with mainland China sourcing more than 2.1 million cruise passengers. While the current estimates vary widely, industry analysts believe China will fuel the future growth in cruise tourism globally. The forecasts project between 7 and 10 million outbound passengers by 2030, giving China the potential to rival the U.S. as the world's largest cruise market. In the near-term though, the Chinese market seems to be entering a

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[25] http://www.environmentalshipindex.org

[26] Cruise Industry News (2017) *Norwegian Ports Launch Environmental Port Index* [online] Available at: https://www.cruiseindustrynews.com/cruise-news/17965-norwegian-po [Accessed Dec 2017]

[27] CLIA (2017) *2018 Cruise Industry Outlook*

[28] Royal Caribbean (2017) *Royal Caribbean talks changes to ship design, cultural shifts, millennials and more* [online] Available at: https://www.royalcaribbeanblog.com/2017/11/07/royal-caribbean-talks-changes-ship-design-cultural-shifts-millennials-and-more [Accessed Dec 2017]

[29] The EquiTrend Brand Equity Index is comprised of three factors—familiarity, quality and purchase consideration

[30] Kalosh, A. (2017) *Millennials push Royal Caribbean to top cruise brand in Harris Poll,* Seatrade Cruise News [online] Available at: http://www.seatrade-cruise.com/news/news-headlines/millennials-push-royal-caribbean-to-top-cruise-brand-in-harris-poll.html [Accessed Dec 2017]

[31] IPK (2017) *ITB World Travel Trends Report 2016/17*

period of adjustment, showing signs of maturation[32]. Because of rising cost and price competition due to supply-demand imbalance in China, cruise lines are not incentivized to open up new products or itineraries, so the competition is increasingly generic[33].

3.2.1.2 Emerging value proposition and market segments

Cruise tourism increasingly adds new service offerings going beyond the notion of a pleasurable vacation and towards providing a transformational experience. The new value proposition is shifting cruisers' life perspective and providing them with a sense of accomplishment gained from a wide variety of activities from cultural immersion and voluntourism, to extreme adventures. As the industry evolves and differentiates, smaller, independent cruise brands are finding new opportunities to develop their businesses achieving disproportionate growths in the upscale and expedition segments.

The Arctic and the Antarctica are two of the main destinations of cruise expeditions, with cruise lines such as Hurtigruten[34], Windstar Cruises[35] and Poseidon Expeditions[36] among the cruise operators operating in these two regions. There is virtually no competition from other forms of tourism in this market segment, therefore the operators can enjoy healthy margins. This is also reflected to the significant number of expedition ships on order (22 in November 2017, with 18 to be delivered in the following 18 months)[37].

3.2.4 Increasing terrorism incidents and geopolitical unrest

Large parts of the Eastern Mediterranean and North Africa have been taken out of the cruise tourism map following recent attacks, on-going wars and political unrest. This will most probably remain as a main issue and difficult to predict where and when it will emerge again.

3.2.5 Increasing importance of tourists-focused technologies

The cruise industry is among the forerunners in introducing technology to enhance onboard experience in return for sharing tourists' personal data. The Ocean Medallion for example, is a free, wearable device that facilitates making cruising more personal and simple. The Medallion holds cruisers' unique digital identity which is encrypted and communicates with sensors onboard and in port, letting the ship's crew see information they can use to serve cruisers better. That's in addition to using the Medallion for payments, unlocking stateroom doors, speeding up embarkation, tracking children and much more.[38]. Cruisers can create a virtual avatar called a "tagalong" that follows them throughout the ship, offering reminders of things to do or interacting with other people's

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[32] Jordan, A. (2017) *Chinese Cruise Market's Growth Slows* [online] Available at: https://maritime-executive.com/article/chinese-cruise-markets-growth-slows [Accessed Dec 2017]

[33] Mathisen, M. (2017) *Chinese Market 'Increasingly Generic',* Cruise Industry News [online] Available at: https://www.cruiseindustrynews.com/cruise-news/18086-chinese-marke [Accessed Dec 2017]

[34] Cruise Industry News (2017) *Hurtigruten Going Big in Arctic in 2019* [online] Available at: https://www.cruiseindustrynews.com/cruise-news/18198-hurtigruten-g [Accessed Dec 2017]

[35] Cruise Industry News (2017) *Windstar: 'Best of Adventure' with Alaska Expedition Program* [online] Available at: https://www.cruiseindustrynews.com/cruise-news/18162-windstar-best [Accessed Dec 2017]

[36] Cruise Industry News (2017) *Poseidon Expeditions: 'Strong' Antarctic Season Expected* [online] Available at: https://www.cruiseindustrynews.com/cruise-news/18120-poseidon-exp [Accessed Dec 2017]

[37] Mathisen, M. (2017) *22 Expedition ships on Order; 18 Deliveries in 18 Months,* Cruise Industry News [online] Available at: https://www.cruiseindustrynews.com/cruise-news/18126-22-expeditio [Accessed Dec 2017]

[38] Princess Cruises (2017) *O·C·E·A·N™ FAQ* [online] Available at: https://www.princess.com/ships-and-experience/ocean-medallion/ocean-faq [Accessed Dec 2017]

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tagalongs[39]. Facial recognition is another example. In the near future, cruise lines will let guests access a website or app that will use facial recognition software to determine how many people are in each location, thus decreasing traffic jams and relieve some guest stress when it comes to meal times[40].

Technology at the same time can promote safety and responsible tourism behaviour, by being a useful resource and learning tool. For example, the International Association of Antarctica Tour Operators (IAATO) has launched a free iOS and Android app for staff guiding visitors in Antarctica, allowing users to access essential information without the need for a phone signal, including existing operational procedures and guidelines for wildlife watching, visiting specific sites, being a responsible Antarctic visitor, preventing the introduction of alien species and more[41].

3.3   Cruise tourism uncertainties

Emerging issues though, have one main thing in common: the uncertainty on whether they are to be translated into future trends that will shape cruise tourism in the following decade. This uncertainty can be used in order to develop plausible scenarios for the future that deviate from a simple projection of the current trends. Therefore, the results of the analysis of emerging issues are further decomposed into a number of more detailed uncertainties, presented in Table 4.

Table 4: Main uncertainties related to cruise tourism

U1	Will the MED continue to play a major role in the global cruise tourism or it will be overtaken by other destinations?
U2	Is environmental sustainability to become a major confrontational issue in the MED destinations?
U3	Will cruise lines' technological innovation adequately address the environmental concerns of local communities?
U4	Will the cruise lines' emerging initiatives towards a more sustainable and responsible tourism become the industry's norm?
U5	Will the top-5 cruise lines continue to dominate the cruise industry or an alternative market of niche cruise tourism will become a major part of it?
U6	Will the different development trends of large and small destinations converge?
U7	Will port developments manage to keep pace with cruise ship newbuilding service requirements?
U8	Are conflicts in the MED to intensify and spread?

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[39] Cruise Critic (2017) *Full Rollout of Carnival Corp.'s "Ocean Medallion" Wearable Cruise Technology Delayed* [online] Available at: https://www.cruisecritic.com/news/news.cfm?ID=8150/ [Accessed Dec 2017]
[40] DigitalYcia (2017) *Innovative Technology Trends in the Cruise Industry* [online] Available at: https://www.digitalycia.com/innovative-technology-trends-cruise-industry [Accessed Dec 2017]
[41] Cruise Industry News (2017) *IAATO: New App for Antarctic Staff and Visitors* [online] Available at: https://www.cruiseindustrynews.com/cruise-news/18177-iaato-new-ap [Accessed Dec 2017]

4 | Prospection

4.1 Scenario building

The prospection stage involves the development of various views of alternative futures by using scenario planning. Scenarios are an internally consistent view of what the future might turn out to be - not a forecast, but possible future outcomes[42]. Therefore, their emphasis falls on possibility rather than forecasting.

The approach employed for developing alternative scenarios is Morphological Analysis[43], which incorporates the following steps:

- the main factors (critical elements) to influence future development are identified
- for each factor, a number of conceivable development variations (states) are defined
- the main factors and the corresponding development variations are entered into a table referred as 'morphological box' or 'Zwicky Box' (after its inventor Fritz Zwicky)
- the development variations are combined into plausible strands
- each strand forms the core cell for a scenario.

The identification of the critical factors derives from the main uncertainties as these were presented in Table 4. These are either used as they are, or are derived from the consolidation of more than one uncertainties (Table 5).

Table 5: Main factors to influence the future development of cruise tourism

Uncertainties		Factors influencing the future
U1. Will the MED continue to play a major role in the global cruise tourism or it will be overtaken by other destinations?	-->	I. Role of MED in global cruise tourism
U2. Is environmental sustainability to become a major confrontational issue in the MED destinations?	-->	II. Environmental concerns
U3. Will cruise lines' technological innovation adequately address the environmental concerns of local communities?	-->	II. Environmental concerns
U4. Will the cruise lines' emerging initiatives towards a more sustainable and responsible tourism become the industry's norm?	-->	II. Environmental concerns
U5. Will the top-5 cruise lines continue to dominate the cruise industry or an	-->	III. Cruise tourism identity

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[42] Porter, M. (1985) *Competitive Advantage*, Free Press
[43] Pillkahn, U. (2008) *Using Trends and Scenarios as Tools for Strategy Development*, Publicis Corporate Publishing; Johansen, I. (2018) Scenario modelling with morphological analysis, *Technological Forecasting & Social Change*, 126, pp. 116-125

Uncertainties		Factors influencing the future
alternative market of niche cruise tourism will become a major part of it?		
U6. Will the different infrastructure development trends of large and small destinations converge?	-->	IV. Infrastructure development
U7. Will port infrastructure developments manage to keep pace with cruise ship newbuilding service requirements?	-->	IV. Infrastructure development
U8. Are conflicts in the MED to intensify and spread?	-->	V. Regional conflicts

To derive to the states of the influencing factor 'I. Role of MED in global cruise tourism', a matrix approach has been used, combining the possible outcomes of cruise tourism demand at the global and MED level, as shown in *Figure 2*. The text in each cell corresponds to the codification of the 1st column items of Table 6.

Figure 2: States of influencing factor 'Role of MED in global cruise tourism'

To derive to the states of the influencing factor 'II. Environmental concerns', the environmental concerns at the destinations are combined with the response levels of the industry and the regulators, as shown in *Figure 3*. The text in each cell corresponds to the codification of the 2nd column items of Table 6.

Figure 3: States of influencing factor 'Environmental concerns'

To derive to the states of the influencing factor 'III. Cruise tourism identity', the industry consolidation level is combined with the service focus, as shown in *Figure 4*. The text in each cell corresponds to the codification of the 3rd column items of Table 6.

Figure 4: States of influencing factor 'Cruise tourism identity'

	mass commodity	no change	authentic experience
increase	III.3	III.6	III.9
no change	III.2	III.5	III.8
decrease	III.1	III.4	III.7

Industry consolidation (vertical axis)

Service focus (horizontal axis)

To derive to the states of the influencing factor 'IV. Infrastructure development', the port infrastructure investment is combined with the size of the ports to which it is mainly directed, as shown in *Figure 5*. The text in each cell corresponds to the codification of the 4th column items of Table 6.

Figure 5: States of influencing factor 'Infrastructure development'

	Large ports	Large & medium size ports	All ports
in line with ship size increases	IV.3	IV.6	IV.9
lagging behind ship size increases	IV.2	IV.5	IV.8
unchanged	IV.1	IV.4	IV.7

Port infrastructure investment (vertical axis)

Main port category focus (horizontal axis)

To derive to the states of the influencing factor 'V. Regional conflicts', the conflict intensity is combined with the main regions where it occurs, as shown in *Figure 6*. The text in each cell corresponds to the codification of the 4th column items of Table 6.

Figure 6: States of influencing factor 'Regional conflicts'

Conflict intensity	N. Africa	N. Africa & M. East	MED
increase	V.3	V.6	V.9
no change	V.2	V.5	V.8
decrease	V.1	V.4	V.7

Main conflict regions

The influencing factors with their corresponding states are depicted in the 'morphological box' of Table 6, in which:

- the first row includes the main factors to influence the future development of cruise tourism.

- under each main factor, its respective development variations (states) are depicted. These are codified using a letter of the Latin alphabet (corresponding to the respective uncertainty) and a number (corresponding to its respective state)

*Table 6: Morphological table of cruise tourism*

I. Role of MED in global cruise tourism (U1)	II. Environmental concerns (U2-U4)	III. Cruise tourism identity (U5)	IV. Infrastructure development (U6-U7)	V. Regional conflicts (U8)
I.1 Cruise tourism enters a decline phase at both global and MED level	II.1 The importance placed on cruise tourism environmental concerns declines, while both the industry's and the legislators' response to environmental issues is weak.	III.1 The industry consolidation decreases, while at the same time cruise tourism is transformed into a mass, commodity service.	IV.1 Investments levels in port infrastructure remain largely unchanged, directed mainly at large MED ports	V.1 Conflict intensity in general decreases, while it is focused mainly in N. Africa
I.2 Demand for global cruise tourism continues to increase with the same rate as today, while the MED experiences a decline, as emerging markets become stronger attractors.	II.2 The importance placed on cruise tourism environmental concerns remains unchanged, while both the industry's and the legislators' response to environmental issues is weak.	III.2 The industry consolidation remains unchanged, while at the same time cruise tourism is transformed into a mass, commodity service.	IV.2 Investments levels in port infrastructure although increase, remain to some extent behind the requirements of the newbuild ship sizes, while directed mainly at large MED ports	V.2 Conflict intensity in general remains unchanged, while it is focused mainly in N. Africa
I.3 Demand for global cruise tourism increases at a faster pace than today, while the MED experiences a decline, as emerging markets are the ones attracting	II.3 The importance placed on cruise tourism environmental concerns is heightened, while both the industry's and the legislators' response to	III.3 The industry consolidation further increases, while at the same time cruise tourism is transformed into a mass,	IV.3 Investments levels in port infrastructure increase in line with the requirements of the newbuild ship sizes, while directed mainly	V.3 Conflict intensity in general increases, while it is focused mainly in N. Africa

I. Role of MED in global cruise tourism (U1)	II. Environmental concerns (U2-U4)	III. Cruise tourism identity (U5)	IV. Infrastructure development (U6-U7)	V. Regional conflicts (U8)
the main part of the global increase.	environmental issues is weak.	commodity service.	at large MED ports	
I.4 Demand for cruise tourism enters a decline phase at global level, while the MED manages to keep its current development rates	II.4 The importance placed on cruise tourism environmental concerns declines, while the industry's response is confined in complying with increased regulatory requirements.	III.4 The industry consolidation decreases, while the current balance between 'traditional' and niche services remains unchanged.	IV.4 Investments levels in port infrastructure remain largely unchanged, directed mainly at large & medium MED ports	V.4 Conflict intensity in general decreases, while it is focused mainly in N. Africa & M. East
I.5 Both global and MED cruise tourism demand continue to increase with the same rates as today	II.5 The importance placed on cruise tourism environmental concerns remains unchanged, while the industry's response is confined in complying with increased regulatory requirements.	III.5 Both the industry consolidation and the current balance between 'traditional' and niche services remain unchanged.	IV.5 Investments levels in port infrastructure although increase, remain to some extent behind the requirements of the newbuild ship sizes, while directed mainly at large & medium MED ports	V.5 Conflict intensity in general remains unchanged, while it is focused mainly in N. Africa & M. East
I.6 Demand for global cruise tourism increases at a faster pace than today, however this is not reflected in the MED where things remain more or less unchanged	II.6 The importance placed on cruise tourism environmental concerns is heightened, while the industry's response is confined in complying with increased regulatory requirements.	III.6 The industry consolidation further increases, while the current balance between 'traditional' and niche services remains unchanged.	IV.6 Investments levels in port infrastructure increase in line with the requirements of the newbuild ship sizes, while directed mainly at large & medium MED ports	V.6 Conflict intensity in general increases, while it is focused mainly in N. Africa & M. East
I.7 Although cruise tourism demand enters a decline phase, the MED is	II.7 The importance placed on cruise tourism environmental	III.7 The industry consolidation decreases, while at the same	IV.7 Investments levels in port infrastructure remain largely	V.7 Conflict intensity in general decreases, while it is spread

I. Role of MED in global cruise tourism (U1)	II. Environmental concerns (U2-U4)	III. Cruise tourism identity (U5)	IV. Infrastructure development (U6-U7)	V. Regional conflicts (U8)
capable of attracting increasing interest in relation to other regions	concerns declines, while both the industry's and the legislators' response to environmental issues is strong.	time cruise tourism is transformed into an 'authentic experience' service.	unchanged, directed mainly at all MED ports	throughout the MED
I.8 Demand for global cruise tourism continues to increase with the same rate as today, while the the MED experiences an increasing interest in relation to other regions	II.8 The importance placed on cruise tourism environmental concerns remains unchanged, while both the industry's and the legislators' response to environmental issues is strong.	III.8 The industry consolidation remains unchanged, while at the same time cruise tourism is transformed into an 'authentic experience' service.	IV.8 Investments levels in port infrastructure although increase, remain to some extent behind the requirements of the newbuild ship sizes, while directed mainly at all MED ports	V.8 Conflict intensity in general remains unchanged, while it is spread throughout the MED
I.9 Demand for global cruise tourism is increasing at a faster pace, and this is also reflected in the MED	II.9 The importance placed on cruise tourism environmental concerns is heightened, while both the industry's and the legislators' response to environmental issues is strong.	III.9 The industry consolidation further increases, while at the same time cruise tourism is transformed into an 'authentic experience' service.	IV.9 Investments levels in port infrastructure increase in line with the requirements of the newbuild ship sizes, while directed mainly at all MED ports	V.9 Conflict intensity in general increases, while it is spread throughout the MED

Using the contents of the morphological table, three scenarios are formulated using selected combinations of the influencing factor states. These are shown in *Figure 7*. Each scenario is further described in the following sections and an assumptions-based quantification is presented for each one. It should be noted that the quantification is provided as a way of more clearly depicting potential consequences of each scenario and not as a forecast per se.

Figure 7: Plausible cruise tourism scenarios
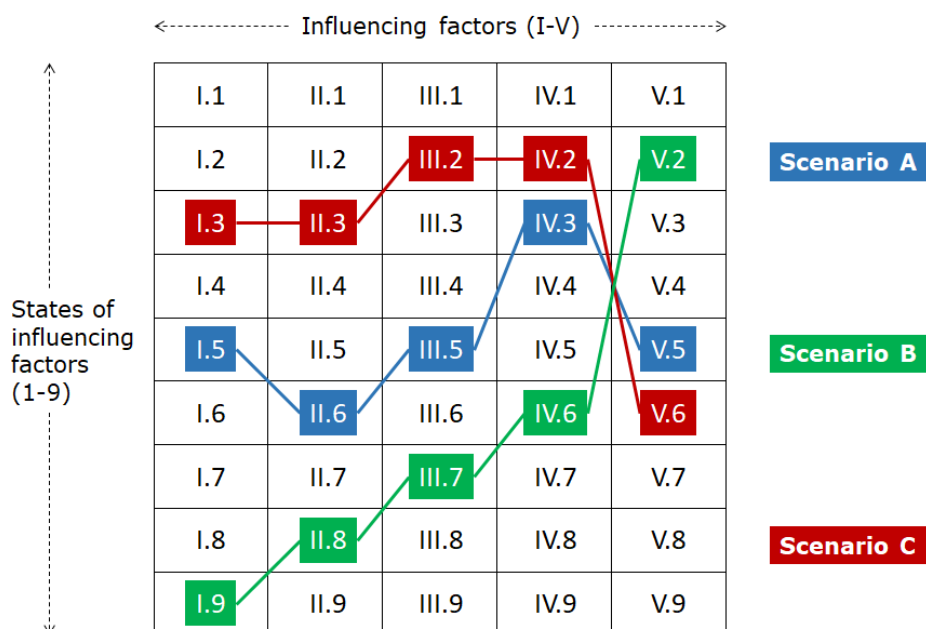
4.2 Scenario A

Both global and MED cruise tourism demand continues to increase with the same rates as today. The MED remains one of the main preferred destinations worldwide.

However, the importance placed on cruise tourism environmental concerns is heightened, especially in the large cruise ports where demonstrations while the industry's response is confined in complying to regulatory requirements.

Both the industry consolidation and the current balance between 'traditional' and niche services remain unchanged.

Investments levels in port infrastructure increase in line with the requirements of the newbuild ship sizes, while directed mainly at large MED ports.

Conflict intensity in general remains unchanged, while it is focused mainly in N. Africa & the M. East.

A depiction of Scenario A is shown in Figure 8. The three port (destination) segments are the ones defined in Deliverable D3.3.1, i.e.:

- large ports are considered the ones with a lower limit of 505,111 pax in 2016 (Katakolo)

- medium ports are the ones with a lower limit of 255,873 pax (Cagliari) and an upper limit of 442,931 pax (Malaga) in 2016

- small ports are the ones with an upper limit of 247,348 pax in 2016 (Ibiza - Eivissa).

The main assumptions for deriving to *Figure 8*, were the following:

- For large MED ports (destinations), although cruise demand continues to increase, actual traffic will slow down from the current 4.66% (CAGR 2014-16) to 3% as a result of increasing demonstrations by the local populations over environmental issues.

- Medium-size MED ports (destinations) gain some of the traffic diverted from large ports due to environmental opposition, therefore their current trend (+0.54% CAGR 2014-16) is significantly increased at 2% CAGR until 2025 when it is dropped back at 1% CAGR as a result of the gap of their port infrastructure and the increasing ship sizes.

- Small MED ports (destinations) continue their downward trend (-9.74% CAGR 2014-16) as a niche cruise tourism market that could benefit them remains only a small proportion of the total market. Lacking infrastructural investments at small ports also add to this downward trend.

Figure 8: Scenario A
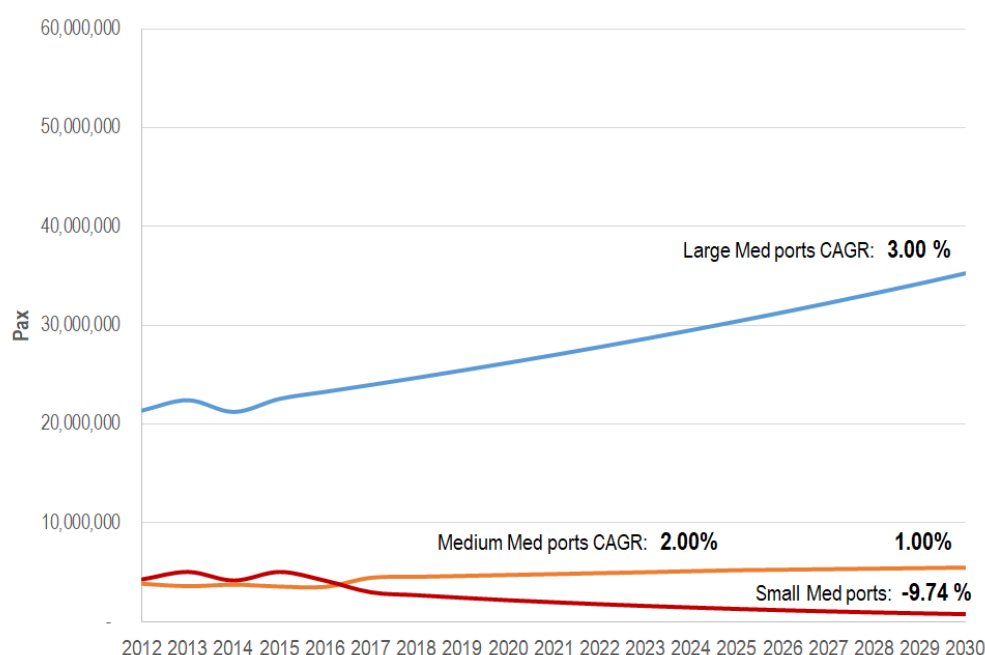
4.3   Scenario B

Demand for global cruise tourism is increasing at a faster pace, and this is also reflected in the MED.

The importance placed on cruise tourism environmental concerns remains unchanged, while both the industry's and the legislators' response to environmental issues is strong.

The industry consolidation decreases, while at the same time cruise tourism is transformed into an 'authentic experience' service.
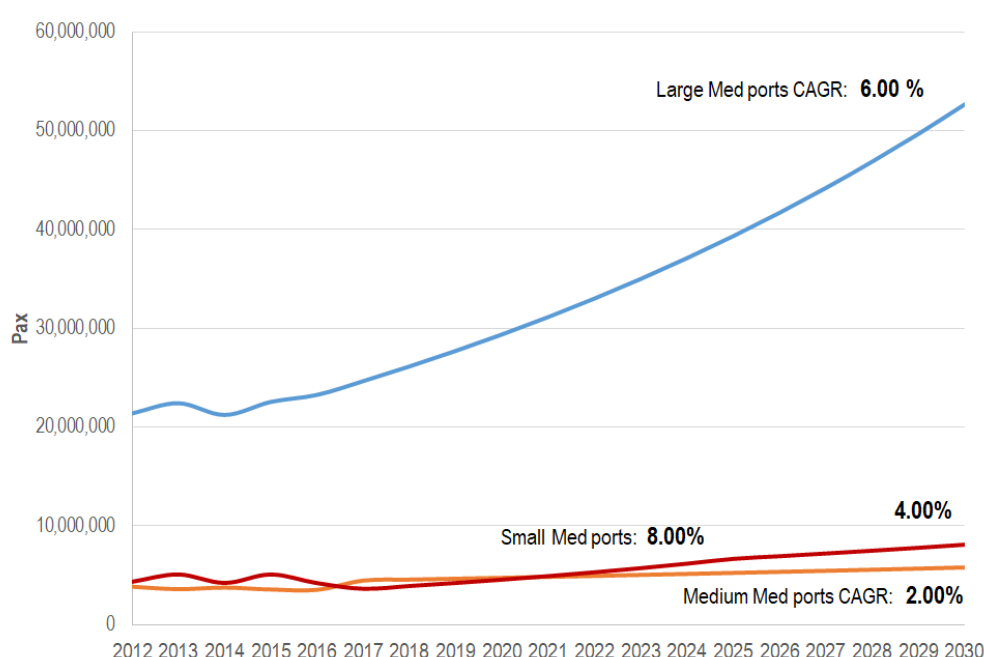
Investments levels in port infrastructure increase in line with the requirements of the newbuild ship sizes, while directed mainly at large & medium MED ports.

Conflict intensity in general remains unchanged, while it is focused mainly in N. Africa.

A depiction of Scenario B is shown in Figure 8. The main assumptions used, were the following:

- For large MED ports (destinations), increased cruise demand combined with the strong response on environmental issues from both the industry and the regulators, leads to cruise traffic increasing from the current 4.66% (CAGR 2014-16) to 6%. Increased port infrastructure investments also contribute to that.

- Medium-size MED ports (destinations) enjoy the same beneficial external effects as the large ones (increased demand, strong environmental response, investments in infrastructure) resulting in an increased traffic trend from the current 0.54% (CAGR 2014-16) to 2% CAGR.

- Small MED ports (destinations) become the main beneficiaries of cruise tourism's shift towards trend towards providing 'authentic experiences', reversing their downward trend (-9.74% CAGR 2014-16) to a strong increase of 8%. As 'authentic experience' cruise tourism is mainly based on the use of significantly smaller ship sizes, small destinations can keep up with the increased traffic until 2025. After that, the lack of significant port investments leads to a decrease of the traffic trend to 4%.

Figure 9: Scenario B

4.4 Scenario C

Demand for global cruise tourism increases at a faster pace than today, while the MED experiences a decline, as emerging markets are the ones attracting the main part of the global increase.

The importance placed on cruise tourism environmental concerns is heightened, while both the industry's and the legislators' response to environmental issues is weak.

The industry consolidation remains unchanged, while at the same time cruise tourism is transformed into a mass, commodity service.

Investments levels in port infrastructure although increase, remain to some extent behind the requirements of the newbuild ship sizes, while directed mainly at large MED ports.

Conflict intensity in general increases, while it is focused mainly in N. Africa & M. East.

A depiction of Scenario C is shown in *Figure 10*. The main assumptions used, were the following:

- For large MED ports (destinations), decreased cruise demand combined with the heightened environmental opposition from local populations, leads to cruise traffic decrease of -4%.

- Medium-size MED ports (destinations) experience the same challenges and resultant traffic decrease with large ports (-4% CAGR) while after 2025 this decreases further (-5% CAGR) as a result of the larger average ship sizes in the MED and the lacking infrastructural investments.

- Small MED ports (destinations) become the ones to experience the hardest hit from both the overall demand for cruise services in the MED and from the industry's transformation into a mass, commodity service, leading together to a sharp decrease of -15% CAGR.

- North Africa and East MED ports are penalised with a trend deterioration by 30% due to increasing conflicts in N. Africa & the M. East, i.e. large East MED ports traffic -5.2% CAGR, medium East MED ports traffic -5.2% & -6.5% CAGR, small East MED ports traffic -19.5% CAGR.

Figure 10: Scenario C
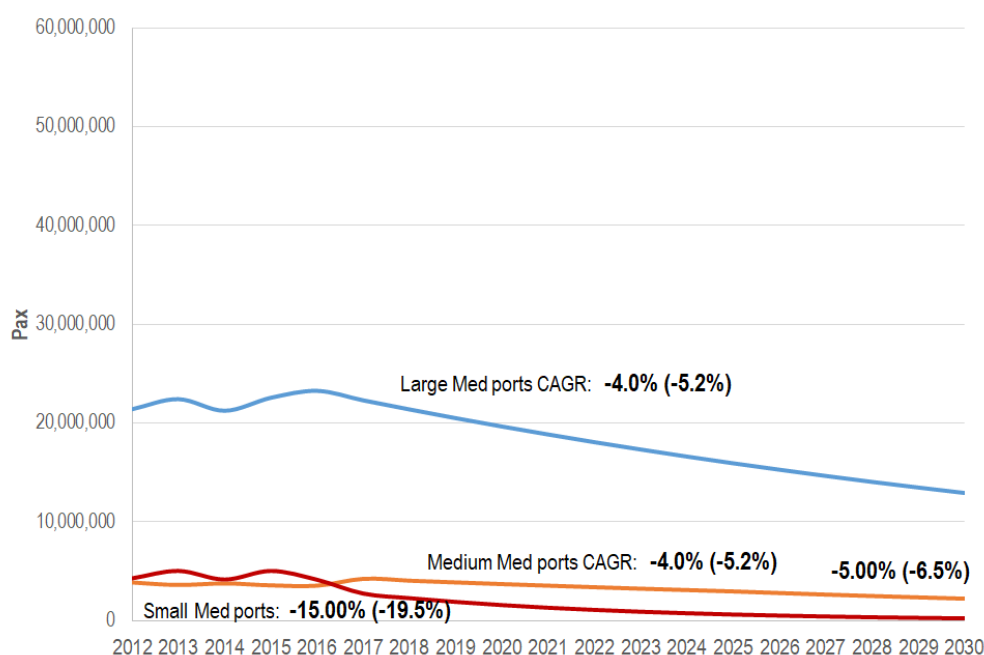
4.5 Scenario overview & response issues

The results of the scenarios discussed in the previous sections are summarised in Table 7, including the main factors that have shaped them. Furthermore, in the same Table are drawn the main issues that are required to provide a response to the negative effects of each scenario or to take full advantage of the respective opportunities.

Table 7: Scenarios and respective response issues

Scenario A				
	Pax 2025	**Pax 2030**	**Main influencing factors**	**Main response issues**
Large ports (destinations)	30,419,256	39,338,220	• heightened environmental concerns of local residents	• Push stronger response actions to environmental concerns by both the cruise industry & the regulators • Establish environmental assessment mechanisms at destinations
Medium ports (destinations)	5,232,560	5,232,560	• gaining traffic from large ports • Infrastructural gaps	• Invest in infrastructural upgrades

Small ports (destinations)	1,322,779	6,650,329	• marginal role of niche cruise segment • infrastructural gaps	• explore investment sources and financing business models for infrastructural upgrades
Total MED	**36,974,595**	**51,271,109**		

Scenario B				
	Pax 2025	**Pax 2030**	**Main influencing drivers**	**Main response issues**
Large ports (destinations)	39,388,220	52,710,324	• increased cruise demand • strong response on environmental issues • adequate port infrastructure investments	-
Medium ports (destinations)	5,232,560	5,777,169	• increased cruise demand • strong response on environmental issues	-
Small ports (destinations)	6,650,329	8,091,142	• cruise tourism's shift towards 'authentic experiences'	• explore investment sources and financing business models for infrastructural upgrades
Total MED	**51,271,109**	**66,578,634**		

Scenario C				
	Pax 2025	**Pax 2030**	**Main influencing factors**	**Main response issues**
Large ports (destinations)	15,915,408	12,881,532	• decreased cruise demand • heightened environmental concerns of local residents	• explore the opportunities of establishing the MED as an 'authentic experience' cruise destination • push stronger response actions to environmental concerns by both the cruise industry & the regulators • establish environmental assessment mechanisms at destinations
Medium ports (destinations)	2,975,920	2,274,934	• decreased cruise demand • infrastructural gaps	• explore the opportunities of establishing the MED as an 'authentic

				• experience' cruise destination • push stronger response actions to environmental concerns by both the cruise industry & the regulators • establish environmental assessment mechanisms at destinations • invest in infrastructural upgrades
Small ports (destinations)	664,958	277,381	• decreased cruise demand • industry's transformation into a mass, commodity service	• establish the destinations as 'authentic experience' cruise destinations • establish environmental assessment mechanisms at destinations • explore investment sources and financing business models for infrastructural upgrades
Total MED	**19,556,286**	**15,433,847**		