

MARITIME

The Cruise Industry

Overview of the industry seen with DNV GL's eyes

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Agenda

The Cruise industry - Seen from DNVGL

- DNV GL
- Mega trends
- Historical view
- Current status
- Some key trends in the cruise industry

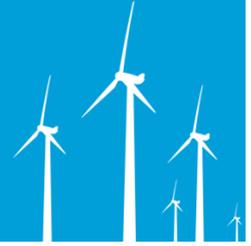
MARITIME

- **Maritime** is our core industry
- **12,300 ships & mobile offshore units** in DNV GL class, 280 mGT
- **Strong presence** in all ship segments
- **Dedicated ship type expert teams** support our clients worldwide
- **Among top performing** class societies in Port State Control statistics

OIL & GAS



ENERGY



BUSINESS ASSURANCE



LIFE SCIENCES



DIGITAL SOLUTIONS



200

Maritime offices globally



3,900

Maritime staff worldwide



13,000

employees groupwide

5%

revenue invested in R&D activities

Mega trends shaping the future of Shipping



World economy and population to grow



The centre of gravity is shifting East



Societal and regulatory pressure



Technology & Connectivity

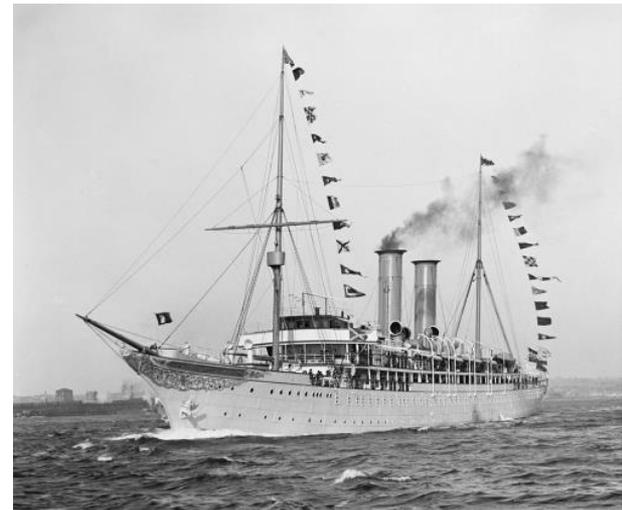
Historical view

The innovators created this business

The innovators will develop it further

The early days....

- The idea of leisure cruising was born as early as 1822, and can be traced back to the ancestries of P&O cruises
- Liner companies main purpose was transport people e.g cross Atlantic, but due to the transit time you also needed comfort and entertainment on-board for the one that could afford it.
- The early ideas and visions for leisure cruising, the way we understand it today, didn't materialize before in the 60's
- The first vessel built exclusively for luxury cruising:
 - Prinzessin Viktoria Luise launched in 1900 by Hamburg-America Line
- 4 409 GT
- Short life, after a total loss outside Jamaica, Dec 1906



What is cooking now....

The cruise industry's many faces...



The cruise industry in short...

World Fleet approx.
370 vessels *)

Average age of world
fleet 21 years

Average age of world
fleet 21 years, for the
majors 14 years

Vessel size increases

Dominated by four players: Carnival
corporation, Royal Caribbean Cruises,
Norwegian Cruise Holding and MSC Cruises
(90% of the passenger capacity)

LNG is the next fuel of
the cruise ships – but
not necessarily the
fuel of the future

Market vice China is
seen as key for
growth, both as
destination and PAX
sourcing, but...

The yards are full until
2024/25. vessels in
order, representing more
than 60% of the majors
capacity.

New yards are
entering

Expedition market is
in a major
revitalization with
new tonnage, other
niches will come

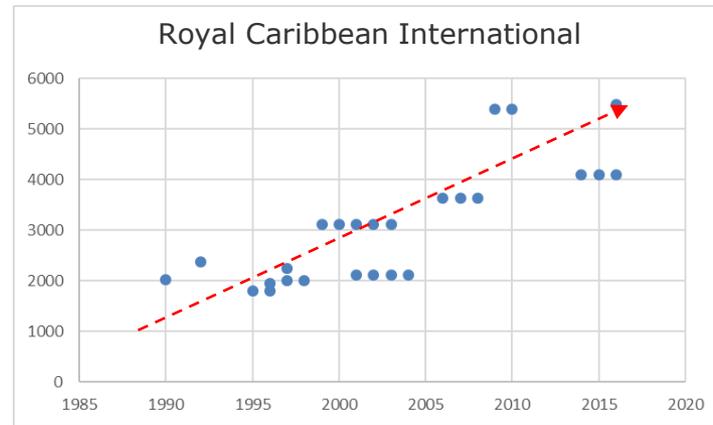
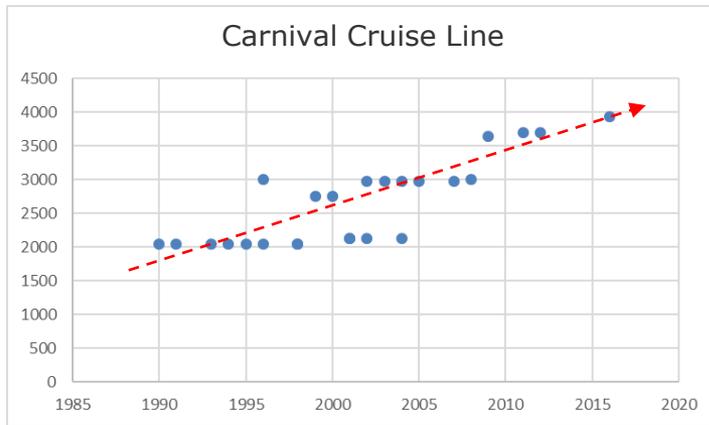
New entrances are
coming, e.g. Virgin
Voyages, Ritz
Carlton, And other if
finance is in place

Size and Innovation

Size will increase

Innovation is key

The importance of vessel size



- If looking at two of the majors we see a significant growth in average size over the last 30 years
 - Some say we are at a limit.
 - We believe this is wrong. Our point of view is that we will see even larger vessels in the future, and the average size might grow at a slower phase
 - The key driver here is economy of scale

Cruise ships are changing...



- Generally the ship has not changed much the last 20 years
=>The next 20 years we will see a major change
- Historically older tonnage have been deployed to emerging markets, this not necessary the way to do it in the future
- We believe the need for revitalizations and newbuilding is a critical success factor for long term survival.



The need for innovations



North Star,
creating a new
attraction on-
board



More energy
efficient vessels

Passenger experience

- The majors will lead the development of new passenger experiences, it is probably the creativity that sets the limit.
- A key challenge here is to ensure that the new wow can be implemented on the maritime platform in a maritime regulatory framework

Maritime platform

- The maritime platforms will further be improved with respect to efficiency and safety. The majors with strong tech teams will take the lead here.
- The maritime platforms will in the future fit into a digital world to reduce cost of operation and drive towards a Zero Accident ambition.

Innovation is key for future success and business performance

Innovation...



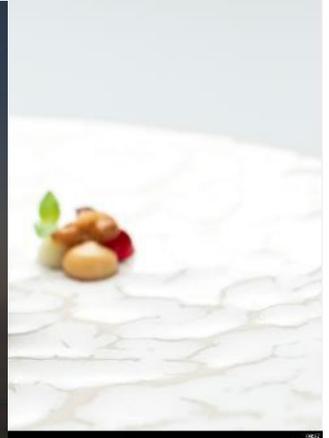
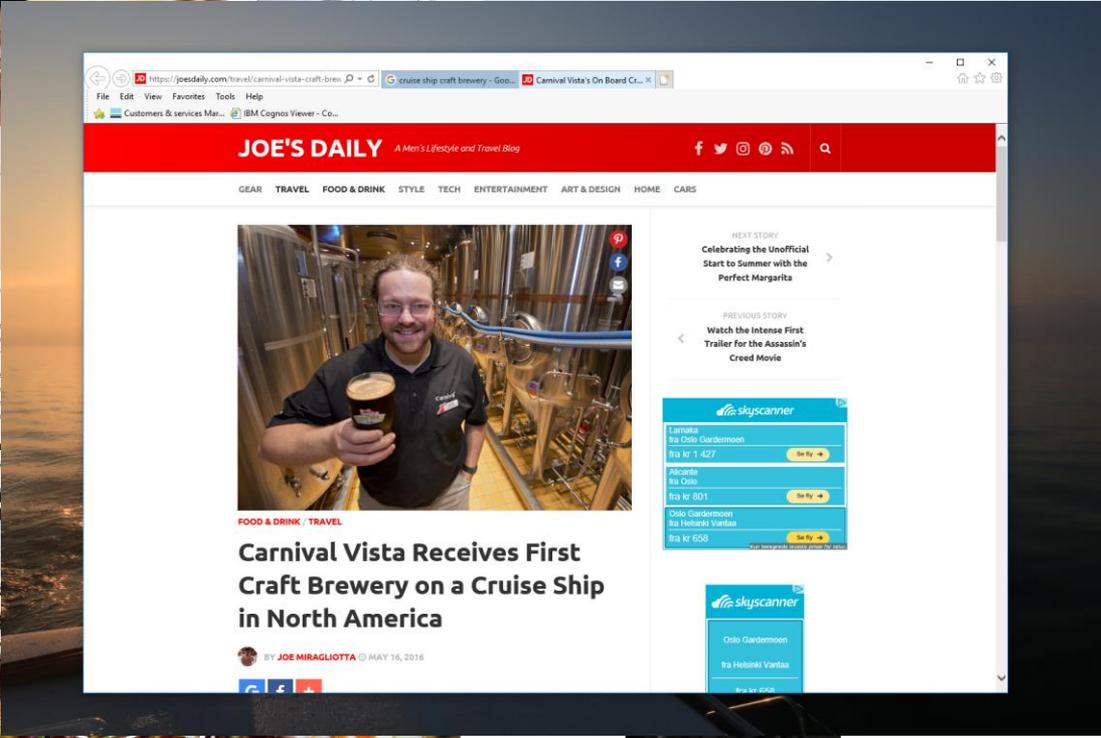
Innovation is not only technical...



Crystal Cruises announced that chef Nobu Matsuhisa is sailing from Stockholm to London. The company is planning a number of unique features, book signings and other celebrations hosted by the Serenity and Umi Uma (on Crystal Symphony) are the Two Omakase (meaning "chef's choice") dinners will be prepared by Nobu and his personally trained chefs, in an intimate "Ultimate Omakase Sushi Bar and Connoisseur prepared by Nobu, paired with rare sake and wines selected by a sommelier. The special dinner will accommodate just



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Modern design important in innovation

Norwegian Yacht Voyages design, upgraded by Einar Hareid (Former Chief Designer SAAB)



▲ MEGA-YACHT: Ambisjonene er at "Caroline" skal bli verdens mest luksuriøse mega-yacht i cruisemarkedet, og samtidig en av de mest miljøvennlige.

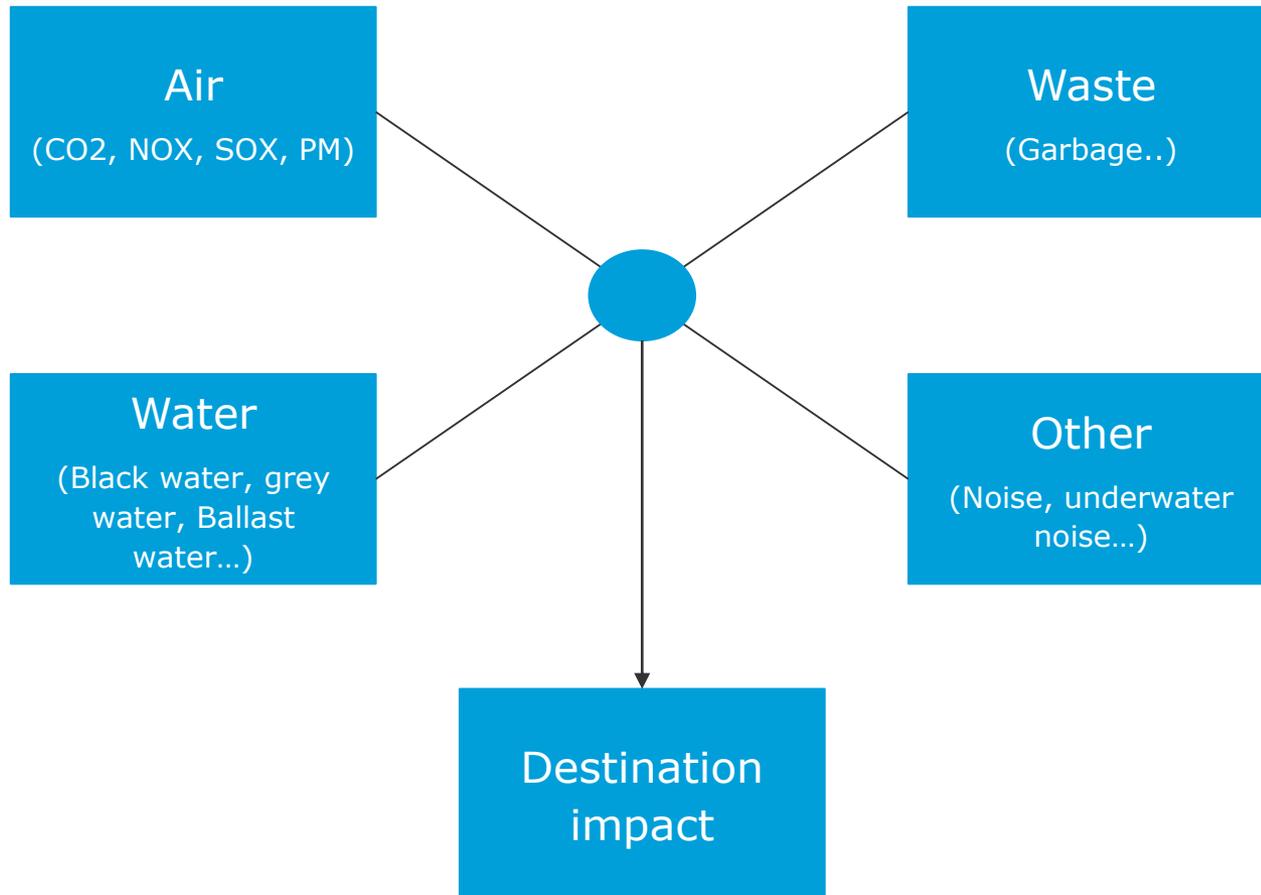


On which ship would you want to spend your vacation?

Environmental performance and GHG emission

Can be a gamechanger

The environmental challenge can be framed like this



Two areas needs attention in making the cruise industry more environmental friendly on air emission...

Tuning

- Improve efficiency of producers and consumer
- A lot is done, and more will come
 - Hull
 - Propeller & rudder
 - Engine efficiency
 - Waste heat recovery
 - System efficiency
 - Optimization
 - Operational measures
- Critical for short and medium term, but doesn't address the big challenge

Engine & Fuel

- A cruise ship needs power for propulsion and hotel operation.
- Tuning is important, but the big ticket items will not be solved unless we are able to produce energy for propulsion and hotel operation closer to a carbon free or carbon neutral way.

The drivers for improving environmental performance might change....

Past truth:

- Historically regulation has been the driver
- Increased fuel cost increased the attention to the opportunities for cost savings

Potential future truth:

- Passenger preferences, NGOs or non regulatory stakeholders might be a stronger driver than the regulatory framework

The challenge with a potential future is that Passenger preferences can change way faster than IMO regulation

New operational models – enabled with
digitalization

Office



New technology will enable step changes with respect to operational cost and safety performance....



Digitalization of shipping

- Digitalization will spur automation and positively impact safety and environmental performance.
- Ships are becoming sophisticated sensor hubs and data generators, with advances in satellite communications improving ship connectivity.
- Onshore, new cloud technologies will dramatically effect how vessels and their components are designed, built, and tested.



In the future.....

We will see real time monitoring from shore (Both by persons and algorithms)

- Navigation
 - Enabling quality assurance and minimizing nautical accident close to zero
- Technical integrity
 - Enabling maintaining technical integrity of all system, minimizing major maritime accidents close to zero
 - Minimizing maintenance cost based on facts and data
- Operational parameter
 - Enabling optimisation in real time, making step change in cost performance
- Moving tasks from shipboard to shore
 - Reducing OPEX

Not all players have the capabilities or resources to take advantage of new technology. However the one that gets this right will win the cost game. There are however opportunities for ship managers to specialise providing the same benefits.

Thank you for your attention!

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