The Weeping Philosopher: How Sustainable is the Global Cruise Market?

Prof. Dr. Alexis Papathanassis

19th World Travel Monitor Forum - Pisa – 4th November 2011
# Understanding Sustainable Growth
- Why is the philosopher weeping?

# Sustainability and Cruise Operators

# Critical Views

# Status Quo & the Way Forward

# In a Nutshell...
Some Cruise Brochure Covers
What is the Hidden Meaning?
Source Market Perspective:
Cruise Sector Growth & Pax Developments

- **European Pax Development (‘000)**
  - **UK:** 1622
  - **Germany:** 1219
  - **Italy:** 889
  - **Spain:** 645
  - **France:** 387

- **Source data:** European Cruise Council (2010a: Online)
  - *River Cruises are not included in the data*

- **Total Volume Outbound Cruise Holidays:**
  - 6.5 million
  - 2% of all European Holiday Travel

- **Volume Trend 2005 – 2010:**
  - +35% cumulative growth
  - Holiday Sector: +15%

- **Top Destinations:**
  - Spain,
  - Italy,
  - France,
  - Sweden,
  - Greece,
  - Turkey,
  - Egypt

- **Mean Expenditure per Night:**
  - € 191
  - Holiday Sector: € 98

- **Mean Age 54**
  - Holidays Sector: 43

**European Average Growth Rate**
- 2006-2010 = 11.8%
- 2009-2010 = 10%
τὰ ὁντα ἴναι τε πάντα καὶ μένειν οὐδέν
Translation: All things move and nothing remains still
(Heraclitus, 535 BC - 475 BC)

ὁδὸς ἄνω κάτω
Translation: The upward-downward path
(Heraclitus, 535 BC - 475 BC)
A Critical View on Growth: Time Series Forecasting

**Linear Extrapolation**
- Least data fit (R² = 94%)
- 30 Million Pax by 2041
- Indefinite growth assumption

**Quadratic Extrapolation**
- Second best data fit (R² = 98%)
- 69 Million Pax by 2041
- Indefinite growth assumption

**Cubic Extrapolation**
- Best data fit (R² = 99%)
- Compatible with the Product Life Cycle concept
- Historically applicable for tourist destinations (Butler 1980, 2006) and
- Tourism segments (Zimmermann 1997)

Forecast Implications?
**Weak signals (e.g. ticket price reductions; mega-ships / onboard revenue)**
Validity of forecasting demand on the basis of supply?

Source data: CLIA (2010)
The Sustainability Point of View:
The Bubble Analogy

Soap Bubbles:

- ... Are very pretty, colourful and entertaining for humans of all ages
- ... Are very sensitive to environmental changes (e.g. wind, dry air and sun) and pressure
- ... Last longer when:
  - Everything they come in contact is wet (preferably with the same bubble solution)
  - Adding the right ingredients (e.g. corn syrup)
- ... Do not pop; they EVENTUALLY ALL actually dissolve!
Extended Sustainability & the Cruise Lifecycle

**Ship Building**
- Modification of the natural environment to build, deliver and maintain a cruise vessel

**Cruise Operations**
- Goods & services to operate the cruise vessel

**Maritime Transport**
- Passengers, goods & services from one port to the next

**Use & Consumption**
- Use and consumption patterns whilst onboard

**Disposal**
- Waste generated by the consumption on board

**Employment?**
- Regional Dependency? Economic Cycles?

**Ecological externalities, Waste & emissions**

**Living Conditions?**
- Exploitation?

**Economic Sustainability**
- Pax Expenditure? Income Leakages? Local Leverage?

**Environmental Sustainability**
- Ecological externalities, Natural resource depletion

**Socio-Cultural Sustainability**
- Crime? Overcrowding?

**Port / Destination Infrastructure**
- Modification of the natural environment to develop tourist infrastructure at a location (to form a holiday destination)

**Destination Operations**
- Goods & services to operate the holiday infrastructure at the destination

**Land Transport**
- Passengers, goods & services at the destination

**Use & Consumption**
- Use and consumption patterns whilst visiting the destination

**Disposal**
- Waste generated by the consumption of tourists whilst resident at the destination

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SUSTAINABILITY AND CRUISE OPERATORS

... Responsibility?
Holland America Line: Sustainability Report
A Holistic Approach

All of our business decisions are made on the basis of certain fundamental principles. Ensuring safety and protecting the environment are two of the most important of these principles. Whenever we act or choose not to act, we need to ask ourselves whether doing so will maintain safety and prevent damage to the environment. This philosophy underlies our Safety and Environmental Policy. As stated in the policy:

Safeguarding our guests, crews, ships and the environment in which we live and operate is not only the right thing to do, it is essential to the successful conduct of our business.

We take care of the Planet

Our award winning ships are as environmentally sound as they are beautiful. Here are just a few of our environmental efforts:

- Environmental Management System: All of our ships are ISO 14001 certified by Lloyd’s Register Quality Assurance (LRQA).
- Environmental Officers: Stationed onboard every ship to provide environmental training and oversee shipboard compliance with environmental requirements.
- Advanced Waste Water Purification Systems: These systems treat wastewater to a higher quality than most municipal treatment systems and the discharge is clean enough to meet the drinking water standards in many communities.
- Shore Power: The Noordam, Westerdam, Oosterdam and Amsterdam have been modified to connect to shore power in Seattle and where compatible facilities are available.
- Cleaning Supplies: All ships use cleaning products specifically designed for environmentally friendly application onboard ships.
- Waste Management and Recycling: All ships have waste and recycling programs that address bottles, cans, paper, cardboard, plastic, solid and hazardous waste.
- Dry Cleaning Machines: Perchloroethylene based dry cleaning equipment is being replaced by machines using non-hazardous detergents formulated with soy, banana and orange extracts.
- X-ray Facilities: Digital technology has been implemented onboard to eliminate the chemicals used by traditional x-ray machines.
- Soy LInks: All onboard materials are printed with environmentally friendly soy based ink.
- Water Conservation: All staterooms have low flow systems for toilets and showers installed.
- Ship-to-Shelter Donation Program: Rather than being thrown away, unneeded beds, furniture, electronics, linens, individual-sized toiletries and other items from our ships are donated around the world to worthy charitable organizations.
AIDA Cares: 2010 Sustainability Report
Focus on Environmental Dialogue

Objectives and achievements of sustainable corporate management

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Issue</th>
<th>Type of contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Politics and administration</td>
<td>Environmental policy</td>
<td>Information sharing, implementation, cooperation</td>
</tr>
<tr>
<td>German Federal Government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State government of Mecklenburg West Pomerania</td>
<td>Environmental policy</td>
<td>Information sharing, implementation</td>
</tr>
<tr>
<td>United Nations Environmental Programme (UNEP)</td>
<td>2010 International Year of Biodiversity, Regional Seas Program</td>
<td>Information sharing</td>
</tr>
<tr>
<td>Port authorities</td>
<td>Disposal</td>
<td>Implementation</td>
</tr>
<tr>
<td>International organizations and non-governmental organizations (NGOs)</td>
<td>Route management</td>
<td>Continual dialog</td>
</tr>
<tr>
<td>IFM-GEOMAR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Maritime Organization (IMO)</td>
<td>MAIFPOL, SOLAS</td>
<td>Implementation</td>
</tr>
<tr>
<td>Helsinki Commission (HILCOM)</td>
<td>Baltic Sea Action Plan</td>
<td>Continual dialog and cooperation</td>
</tr>
<tr>
<td>Trade associations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Cruise Council (ECC)</td>
<td>Maritime policies: explanation – no waste water in the Baltic Sea</td>
<td>Member</td>
</tr>
<tr>
<td>Deutscher RoatVerband eV, (DVR)</td>
<td>Environmental protection</td>
<td>Member</td>
</tr>
<tr>
<td>Verband Deutscher Reedere (VDR)</td>
<td>Reduction of CO₂ emissions</td>
<td>Consultations, member</td>
</tr>
<tr>
<td>Companies</td>
<td>Route management</td>
<td>Continual dialog</td>
</tr>
<tr>
<td>WetterWelt GmbH</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Environment

Objectives 2008/2009
- Make low friction underwater silicone paint coating standard for fleet in the medium term
- Reduce specific fresh water consumption by a further 5% per guest
- Reduce our specific emissions during ship’s operation

Implementation in 2009
- AIDAaqua and AIDAaqua were coated with silicone paint
- Specific fresh water consumption reduced
- Maintain consumption at current levels

Objectives for 2010
- Silicone paint coating for all newbuildings in the fleet
- AIDAaqua to follow in 2011
- Reducing water consumption, sewage (CO₂) –3.8%,
  nitrogen oxides (NOₓ) –3.8%.
- AIDA ships (CO₂), further reduction expected in development of saving technologies
- AIDAaqua’s average emissions of our company
  +10% +2% average emissions of our company
- To around 135% by 2013

Ten golden rules for shore excursions

1. We ensure that all participants stick to the paths during the tour.
2. Our group sizes are ideally designed to keep the number of vehicles on site to a minimum.
3. We use the best vehicles available on site so as to keep emissions as low as possible.
4. We either take our waste back to the ship or dispose of it properly ashore.
5. We do not drop anchor near reefs.
6. We advise our guests on the best way to behave in order to preserve their natural surroundings when snorkeling or diving.
7. We ensure that our guests only swim on public beaches.
8. Throughout the tour, we advocate the protection of the natural environment and make sure that our guests also abide by the rules.
9. We observe regional differences and cultural rules when sightseeing.
10. We take immediate action if we notice that a tour is having a negative impact on nature or on cultural attractions.

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* Source: Aida Cruises – http://www.aida.de/b2b-corporate-site/responsibility/sustainability.20190.html
Our approach to sustainability

P&O Cruises’ business is about providing passengers with memorable cruise holidays in some of the world’s most idyllic and hard-to-reach locations. We understand that to continue to do that, we need to operate in an environmentally, socially and financially responsible way.

To us, sustainable management means remaining a strong and successful business that fulfils our obligations as a responsible employer, business partner, customer and neighbour in the Pacific Islands.

However, it is also much more than that. We want to contribute to communities in our ‘backyard’ in the Pacific Islands in ways that deliver jobs and opportunities for those communities. It also means working within our own business to reduce our environmental footprint as part of being a responsible citizen in a global community.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Consumption</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>432,049.2 tonnes</td>
</tr>
<tr>
<td>Sourced from land (bunkered)</td>
<td>124,764.5 tonnes (29%)</td>
</tr>
<tr>
<td>Produced from sea water (withdrawn)</td>
<td>307,284.7 tonnes (71%)</td>
</tr>
<tr>
<td>Water used per person (guests and crew)</td>
<td>252 litres per person</td>
</tr>
<tr>
<td>Water Discharge</td>
<td></td>
</tr>
<tr>
<td>Total water discharged</td>
<td>711,337 tonnes</td>
</tr>
<tr>
<td>Discharged at Sea</td>
<td></td>
</tr>
<tr>
<td>* Untreated black water</td>
<td>0.3 - Litres/person</td>
</tr>
<tr>
<td>* Treated black water and greywater</td>
<td>94 - Litres/person</td>
</tr>
</tbody>
</table>

Aim     | Action                                                                 |
--------|------------------------------------------------------------------------|
Increase the amount of waste recycled | Sorting and processing of garbage and special waste ready for recycling. |
Generate waste with reduced environmental impact | Use on board of plates, cups, straws and other disposable items made of biodegradable material. Use on board of wooden cutlery, olive picks and cocktail stirers instead of plastic products. |
Reduce the amount of waste produced | Use of sauce dispensers and jam & honey bowls in place of sachets and plastic packaging. Replace throw-away plastic bottles in cabin bathrooms with liquid soap and shampoo dispensers. |

# Costa Cruises: Sustainability Report

## Green Management by Objectives

### Social Objectives
<table>
<thead>
<tr>
<th>Objective 2009</th>
<th>Activity</th>
<th>Status of implementation November 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of website for the Costa Campus management.</td>
<td>Implementation of the website.</td>
<td>In progress - The site has been prepared but is still awaiting internal approval.</td>
</tr>
<tr>
<td>Definition of an on-the-job training model as completion of the “Ready for Excellence” program.</td>
<td></td>
<td>In progress - The project is still in progress and will be revised before moving on to the next phase.</td>
</tr>
<tr>
<td>Implementation of the Accenture plan for the rationalization of the shipboard payroll process.</td>
<td>Start-up of detailed analysis of the variable compensation on board and the definition of the Basic Balance.</td>
<td>In progress - The project has been validated by the Top Management and is now in the pilot phase.</td>
</tr>
<tr>
<td>Increase in the presence on board of Coast Deck Officers (increasing the current number), with the aim of promoting careers in Costa.</td>
<td></td>
<td>In progress - The presence of Coast Deck Officers increased in the Engine Department in July 2009. The project is still in progress for the other departments.</td>
</tr>
<tr>
<td>Completion of objective: Review the “Family &amp; Friends” policy for shipboard personnel.</td>
<td>Updating the policy.</td>
<td>In progress - The policy has been updated.</td>
</tr>
<tr>
<td>Completion of objective: Building of career paths.</td>
<td>Definition of career paths for all shipboard positions and functions.</td>
<td>Completed - The career paths for shipboard personnel have been defined and implemented in the MISTRAL software.</td>
</tr>
<tr>
<td>Association of training path with Company positions.</td>
<td>Training path.</td>
<td>In progress - The training path is under development.</td>
</tr>
<tr>
<td>Implementation of incentive system for the sales force.</td>
<td></td>
<td>Completed - The new incentive system was implemented in July 2009.</td>
</tr>
</tbody>
</table>

* December 2008 - November 2009

### Environmental Objectives
<table>
<thead>
<tr>
<th>Objective 2009</th>
<th>Activity</th>
<th>Status of implementation November 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension of waste recycling program to other materials in other ports.</td>
<td>Investigation of new possibilities for recycling waste.</td>
<td>Completed - The recycling program for glass, aluminum and cooking oils was extended to all ships deployed in Brazil.</td>
</tr>
<tr>
<td>Maintenance or reduction of the amount of potable water consumed on board.</td>
<td>Monitoring of consumption and verification that actions aimed at limiting water consumption introduced in past years are still effective.</td>
<td>Completed - Water consumption per person increased in comparison with 2008, but is still well below the figure recorded in 2007. During FY 2009 there were no irregular patterns of consumption across the fleets such as to require further measures.</td>
</tr>
<tr>
<td>Elimination of overboard discharge of garbage other than food waste.</td>
<td>In spite of the requirements in force allowing overboard discharge of garbage of other types, the discharge of a negligible quantity of garbage other than food waste.</td>
<td>Completed - The ships only discharge food waste at sea (in full compliance with the laws in force); the Company’s instructions have been updated accordingly.</td>
</tr>
<tr>
<td>Completion of objective: 10% reduction in the amount of garbage per person landed each day (objective already achieved in 2007, but retained in 2008 to obtain a further improvement).</td>
<td>Replacement of obsolete machinery, where necessary, and optimization of the personnel to the needs of the current management.</td>
<td>Completed - The garbage produced per day per person fell from 8.5 kg in 2007 to 7.6 kg in 2008 and 7.5 kg in 2009.</td>
</tr>
<tr>
<td>Completion of objective: Feasibility study for the reduction of energy demand and fuel consumption across the fleet.</td>
<td>Feasibility study for the introduction on board the ships of equipment and measures aimed at minimizing fuel consumption.</td>
<td>Completed - Measures have been introduced on the ships in order to optimize their stability and trim at sea and thereby reduce fuel consumption. Regular planned cleaning of the propulsion systems and the hull to reduce resistance.</td>
</tr>
<tr>
<td>Completion of objective: Implementation of a recycling collection program at the Savona Palacriocciere cruise terminal.</td>
<td>Selection of the methods of collection and removal of separate waste streams.</td>
<td>Completed - Recycling collection has been introduced at the Savona Palacriocciere cruise terminal.</td>
</tr>
</tbody>
</table>

* December 2008 - November 2009

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CRUISE SECTOR SUSTAINABILITY: CRITICAL VIEWS

*Friends of the Earth*
Some Interesting Facts... Emissions

Main Sources:
- Incinerators
- Engines

An average cruise ship’s daily emissions
- = 12,000 automobiles

401g of CO2 is emitted per Cruise Pax / Km
- 36 times more than a Eurostar Pax / Km
- 3 times more than a Boeing 747 Pax / Km
- An estimated 60,000 people die worldwide each year as a result of under-regulated shipping air emissions
- This estimated to grow by 40 percent by 2012

* Source: Ross (2009)
### Some Interesting Facts... Discharges

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Black Water:** | - Human Waste (Toilets, Medical Facilities)  
- 30 Litres per Cruise Pax / day                                                                                                                     |
| **Gray Water:**  | - Wastewater from sinks, showers, galleys, laundry, and cleaning activities  
- 340 Litres per Cruise Pax / Day                                                                                                                   |
| **Solid Waste:** | - Plastic, paper, wood, cardboard, food waste, cans, glass, etc.  
- 1990s: 3.5 Kg per Cruise Pax / Day  
- 2010: 1.7 Kg per Cruise Pax / Day                                                                                                                |
| **Oily Bilge Water** | - Water containing fuel, oil, wastewater from engines and other machinery  
- Average cruise ship produces 8 tons in 24 hours of operation                                                                                            |

**Ballast Water:**
- To stabilize the vessel during transport  
- Often taken on in one location after a ship discharges wastewater or unloads cargo and then discharged at the next port of call  
- Contains a variety of biological materials, including non-native plants, animals, viruses and bacteria

*Source: Ross (2009)*
<table>
<thead>
<tr>
<th>Cruise Lines</th>
<th>Sewage Treatment</th>
<th>Air Pollution Reduction</th>
<th>Water Quality Compliance</th>
<th>Web Enviro Info*</th>
<th>Change From 2009</th>
<th>2010 Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holland America Line</td>
<td>B+</td>
<td>C-</td>
<td>B+</td>
<td>✓</td>
<td>↓</td>
<td>B-</td>
</tr>
<tr>
<td>Norwegian Cruise Lines</td>
<td>A</td>
<td>C-</td>
<td>C+</td>
<td>✓</td>
<td></td>
<td>B-</td>
</tr>
<tr>
<td>Princess Cruises</td>
<td>C+</td>
<td>A-</td>
<td>D+</td>
<td></td>
<td></td>
<td>C+</td>
</tr>
<tr>
<td>Cunard Cruise Line</td>
<td>A</td>
<td>F</td>
<td>no Alaska voyages</td>
<td>X</td>
<td></td>
<td>C-</td>
</tr>
<tr>
<td>Disney Cruise Line</td>
<td>A</td>
<td>F</td>
<td>no Alaska voyages</td>
<td>X</td>
<td></td>
<td>C-</td>
</tr>
<tr>
<td>Regent Seven Seas Cruises</td>
<td>C+</td>
<td>F</td>
<td>A</td>
<td>X</td>
<td></td>
<td>C-</td>
</tr>
<tr>
<td>Celebrity Cruises</td>
<td>A</td>
<td>F</td>
<td>n/a</td>
<td>✓</td>
<td></td>
<td>D+</td>
</tr>
<tr>
<td>Royal Caribbean Int’l</td>
<td>D+</td>
<td>F</td>
<td>A-</td>
<td>✓</td>
<td>↑</td>
<td>D+</td>
</tr>
<tr>
<td>Carnival Cruise Lines</td>
<td>F</td>
<td>F</td>
<td>A</td>
<td>X</td>
<td></td>
<td>D-</td>
</tr>
<tr>
<td>Silversea Cruises</td>
<td>F</td>
<td>F</td>
<td>B-</td>
<td>X</td>
<td></td>
<td>D-</td>
</tr>
<tr>
<td>Crystal Cruises</td>
<td>F</td>
<td>F</td>
<td>no Alaska voyages</td>
<td>X</td>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

Whether a cruise line has installed the most advanced sewage and wastewater treatment systems available instead of dumping raw or minimally treated sewage directly into the water.

Whether a cruise line has retrofitted its ships to “plug in” to available shore-side electrical grids instead of running polluting engines when docked.

To what degree cruise ships violated 2009 water pollution standards designed to better protect the Alaskan coast.

How easy the cruise lines have made it for the average consumer to find information on their websites about cruise industry environmental practices and technology.

* Source: Friends of the Earth – http://www.foe.org/cruisereportcard

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STATUS QUO & THE WAY FORWARD

*Triple E*\(^4\) Strategy
Since 1998, the cruise sector has paid over $55 million in fines for environmental violations

- Need for better controls / environmental policing (e.g. discharge transponders – informing land authorities, onboard observers, speed-limits)

- MARPOL (Maritime Organization’s Convention for the Prevention of Pollution from Ships)
  - Flag states (MARPOL signatories) are responsible for its enforcement
  - Need deal with the structural issue (Patchwork Issue)

Adoption of Advanced Wastewater Treatment Systems (AWTS)
- Phase-out Type II Marine Sanitation Devices (MSDs)

‘Cleaner’ fuels (Marine Gas Oil, Marine Diesel)

Hull design / Coating

Larger Vessels (Scale economies on Energy?)

Open Innovation Initiatives?
- Soy Ink for onboard printed materials
- Tinted windows to reduce need for Air Conditioning
- Using empty cabins to transport cargo
- Waste2Biofuel, Solar Panels

Sustainability Reports / Rankings / GRI

Guest Education / Participation (e.g. HAL - Guest Invitation to Env/tal Excellence:
- Guest Presentations, Towel Re-Use Option, Turn Off Cabin Lights and TV When Not in Use, Close Exterior Doors, No Garbage Overboard, Use the Proper Waste Container, Protect Wildlife, No Litter Ashore)

Green Shore Excursions (e.g. Crystal Cruises)
- Cruise passengers helping local community

The Missing E
Sustainable Responsibility...

Economies, societies, markets, sectors and nature are interdependent complex systems
Systemic complexity cannot be controlled... it can only be acknowledged!
‘Sustainability’ requires full control of developments... Unrealistic?!
‘Responsibility’ requires consideration of the common good and an ethical predisposition... Pragmatic?!

• Expectation / Incentive Creation
• Pull Strategy – Proactive Character
• End-Customers – Responsible Consumption
• Governments - Incentives
• Media Responsibility - Positive Reinforcement Reporting
• NGOs / Academia – Awards, Transparency, Innovation

• Push Strategy – Reactive Character
  • Sanctions / enforcement
  • Exposure
  • Legislation
The sustainability challenge accompanies every development

- Sustainability goes hand in hand with complexity
- Is development controllable?
- Is sustainability pragmatic?

Cruise Operators have been reacting to public pressure for environmental and social concerns... But not sufficiently

- Sustainability reports and GRI standards are being adopted
- There are quite a few good examples and initiatives
- Critics – Paper2Practice Gap

Sustainable cruising is a systemic / complex problem that requires a multitude of measures:

- Legislative structures and enforcement
- Technological innovation
- Educational initiatives / awareness training
- Responsibility development
διὸ δεῖ ἐπεσθαί τῷ ξυνῷ. τοῦ λόγου δ᾽ ἐόντος ξυνοῦ
ζώουσιν οἱ πολλοὶ ὡς ἰδίαν ἔχοντες φρόνησιν

Translation:
one needs to surrender oneself to the common. But although the word is common, the majority live as if they owned their thinking.
(Heraclitus, 535 BC - 475 BC)
Research Functions:
- Founder & Chairman of the Cruise Research Society (http://www.cruiseresearchsociety.com)
- Co-Director of the Institute for Maritime Tourism (IMT) (http://www.imt.hs-bremerhaven.de/)
- Editorial Board Member of the Journal of the European Journal of Tourism, Hospitality and Recreation (EJTHR) – (http://www.ejthr.com/)
- Reviewer of the Tourism Management Journal (http://journals.elsevier.com/02615177/tourism-management/)

Administrative Functions:
- Dean of Studies – Faculty of Business & Economics
- Chairman of the CIM Examinations Committee
- Member of the CIM Study Affairs Committee
• References
References

- Aida Cruises (http://www.aida.de/b2b-corporate-site/responsibility/sustainability.20190.html)
- Global Reporting Initiative (http://www.globalreporting.org/Home)
- Holland America Line (http://www.hollandamerica.com/about-best-cruise-lines/Main.action?tabName=Sustainability)
- WiseGeek (http://www.wisegeek.com/what-is-a-green-cruise.htm)