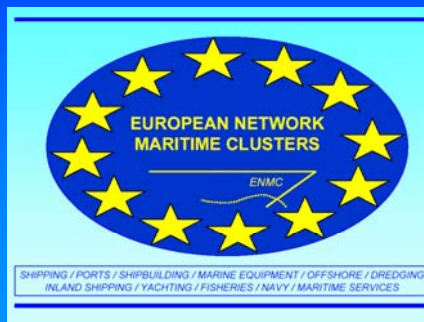
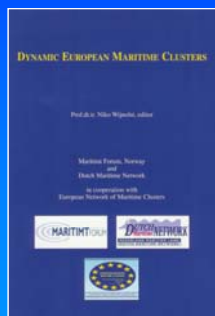




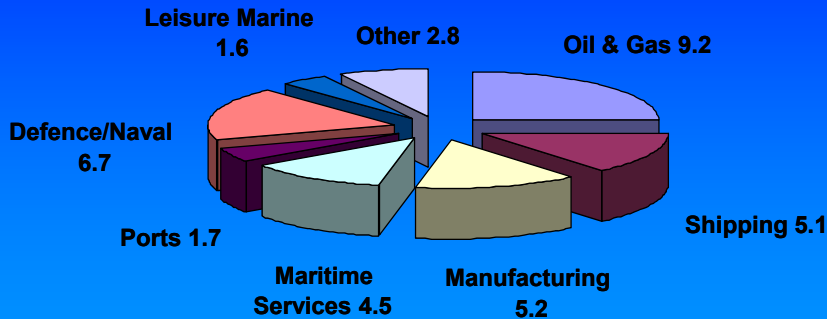
European Maritime Clusters, Open Innovation and European Research Policy

Prof.dr.ir. Niko Wijnolst
Chairman Dutch Maritime Network
info@dutch-maritime-network.nl
ECMAR Conference
Amsterdam, 31 May 2007

Europe's Maritime Clusters are prominent



United Kingdom Maritime Cluster Turnover £ 37bn (€55 bn)



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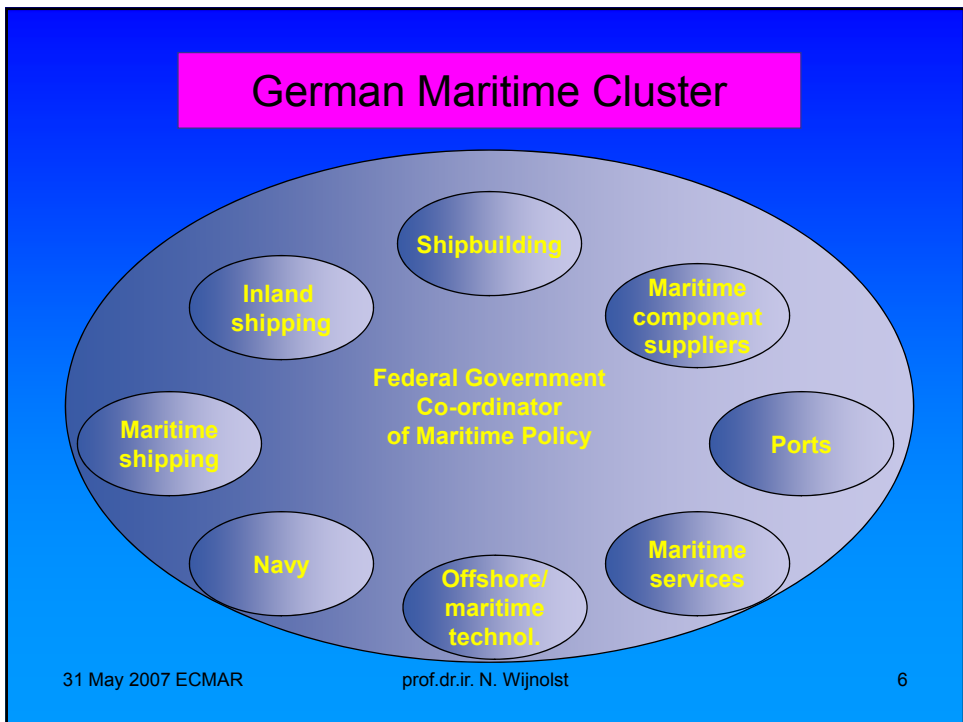
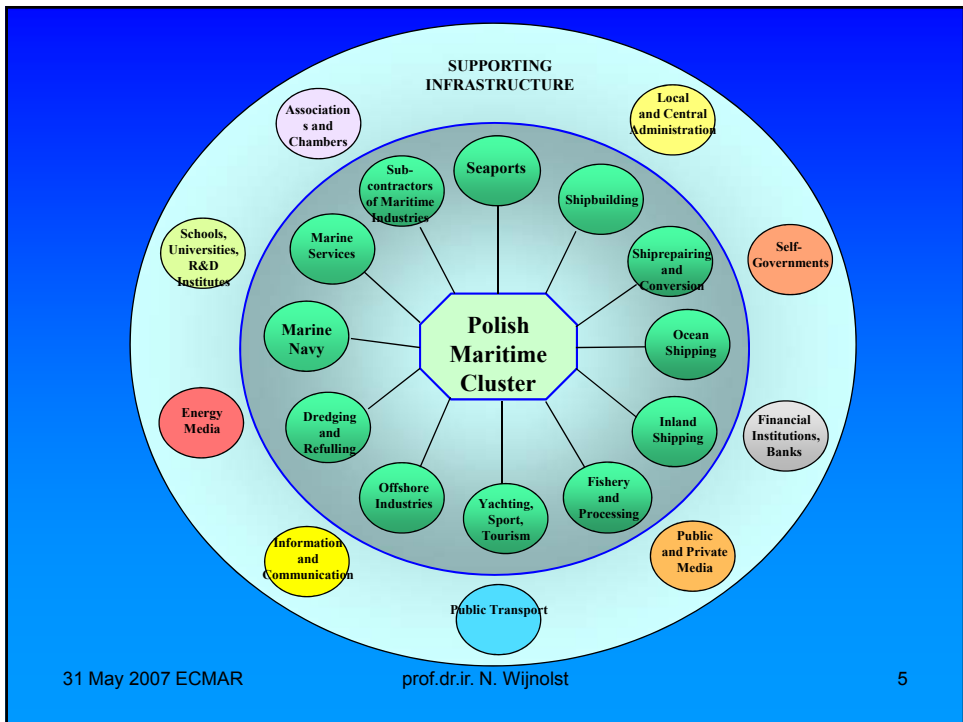
French Maritime Cluster Turnover €35 bn; employment 315,000

<i>Sector</i>	<i>Rev (bns €)</i>	<i>workforce</i>	<i>Main features</i>
Shipping	6.6	20 000	100 million tons, 14 million passengers per year
Ports	4.5	44 000	50 % of external trade (75 % toward outside EU)
Shipyards and marine eqpmt	4.5	41 000	Specialized in knowledge-based vessels
Offshore oil & gas	5.5	25 500	Up to 2 000 m depth.
Boat industry	3	50 000	93 000 units produced in 2003.
Fishing	5.7	55 000	5 600 ships / 800 000 tons + 2400 ships overseas
Navy and coast guards	6	60 000	From the patrol boat to the aircraft carrier
Research Institutes	0.6	4 000	From the North pole down to extreme depth
Training	0.6	6 000	In preparation for the future
Others(class,banks, brokers..)	1.8	9 500	They support the above sectors
TOTAL	35	315 000	1,5 % active population 2-2,5% GNP

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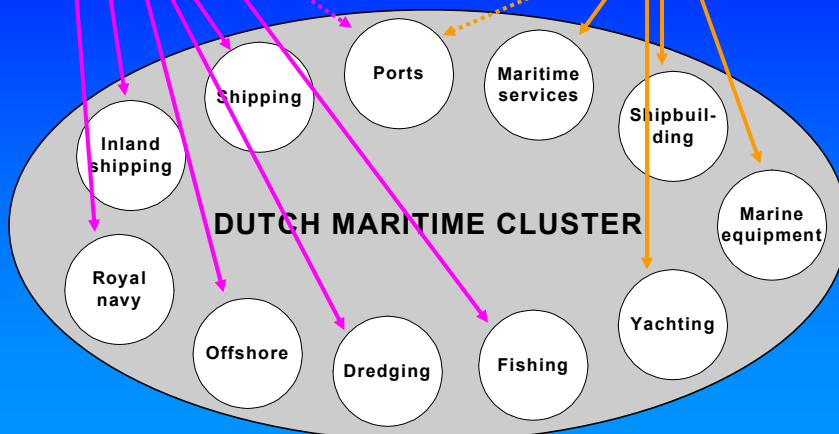


Enablers of maritime cluster dynamics

1. Define cluster, establish its significance and promote visibility, strengthen networks
2. Define an economic policy (and stick to it)
3. Strengthen demand pull sectors
4. Monitor and maintain a level playing field
5. Promote exports and internationalisation
6. Strengthen RD&I, open business models
7. (maritime) Education and labour market

A holistic European Maritime Policy should include these “enablers”

6 demand pull sectors and 5 supply push sectors



Shipping is the main driver of maritime clusters



Maritime Clusters facilitate Open Innovation Networks



- Clusters can be characterized as networks of production of strongly interdependent firms linked to each other in a value adding chain.
- Michael Porter: *Competitive advantage of nations*.
- Clusters of industries create sustainable competitive advantage.
- Identify sectors and understand their interaction.
- Reinforce cluster at various policy levels.
- Look for the *enablers* that reinforce clusters.

Clusters Increase Productivity / Efficiency

- Efficient access to specialized inputs, employees, information, institutions, and "public goods" such as training programs and training institutions
- Ease of coordination across firms
- Rapid diffusion of best practices
- Ongoing, visible performance comparisons and strong incentives to improve vs. local rivals

Clusters Stimulate and Enable Innovations

- Better ability to perceive innovation opportunities
- Presence of multiple suppliers and institutions to assist in knowledge creation
- Ease of experimentation given locally available resources

Clusters Facilitate Commercialization

- Opportunities for new companies and new lines of established business are more apparent
- Lower barriers to entry into cluster related businesses because of available skills, supplies, etc



- Competition is fundamentally enhanced by externalities, linkages, and relationships across firms, industries and associated institutions

Contrasting Principles of Closed and Open Innovation

Closed Innovation Principles

The smart people in our field work for us.

To profit from R&D, we must discover it, develop it, and ship it ourselves.

If we discover it ourselves, we will get it to market first.

The company that gets an innovation to market first will win.

If we create the most and the best ideas in the industry, we will win.

We should control our IP, so that our competitors don't profit from our ideas.

Open Innovation Principles

Not all the smart people work for us. We need to work with smart people inside and outside our company.

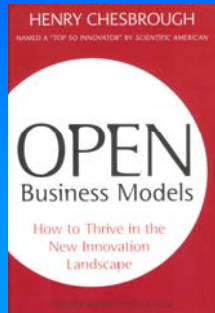
External R&D can create significant value; internal R&D is needed to claim some portion of that value.

We don't have to originate the research to profit from it.

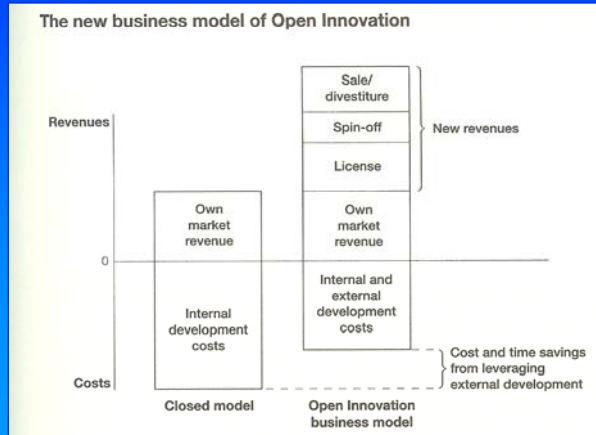
Building a better business model is better than getting to market first.

If we make the best use of internal and external ideas, we will win.

We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.



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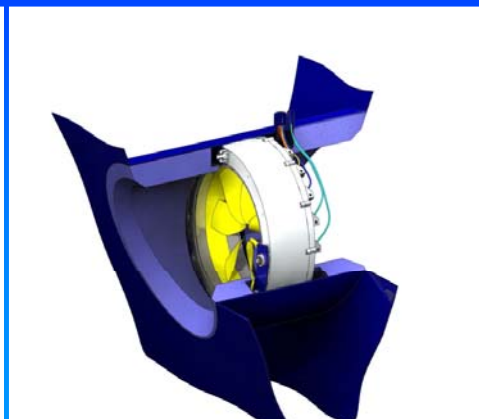


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Example of Dutch Open Innovation marine equipment product

Innovative bow thruster without axel
Low noise, high power, 1/3 conventional size



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Stimulating RD&I

Focus on Maritime Innovation Triggers

6 classes of maritime innovation triggers

1. *laws of physics triggers*
2. *geographical conditions triggers*
3. *economic parameters triggers*
4. *rules and regulations triggers*
5. *related sectors triggers*
6. *design process methodology triggers*

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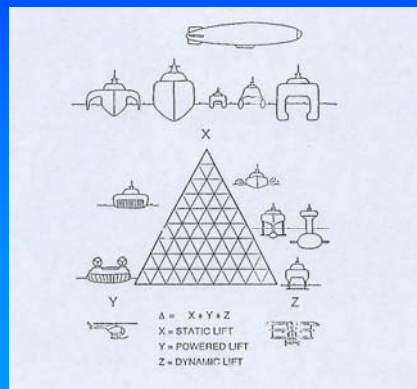
Trigger 1: Laws of physics triggers

defy nature....

Defy nature:

- water and wave resistance
- specific gravity of fresh and salt water (deadweight)
- gravity (acceleration forces)
- air pressure (engine performance)
- wind resistance
- temperature (density)

lift triangle: reducing resistance in water or how to overcome constraints of nature



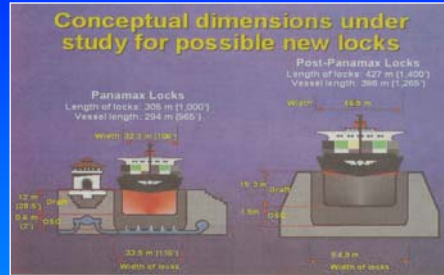
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Trigger 2: Geographical conditions triggers *constraints, posing restrictions on ship size and trading range*

- *canals and straits* (Panama Canal, Suez Canal 1869, Strait of Malacca)
- ports access (draught, turning basin)
- terminal limitations (quay length)
- *ice* (winter passage)
- waves (North Atlantic), or rivers (low wash), currents



*New Panama Canal locks:
increase in scale and economy*



*Suez Canal 1869:
death of the sailing ship*

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Ice-Trigger



Double acting oil tanker



Oblique icebreaker assists Suezmax tankers



Double acting supply vessels

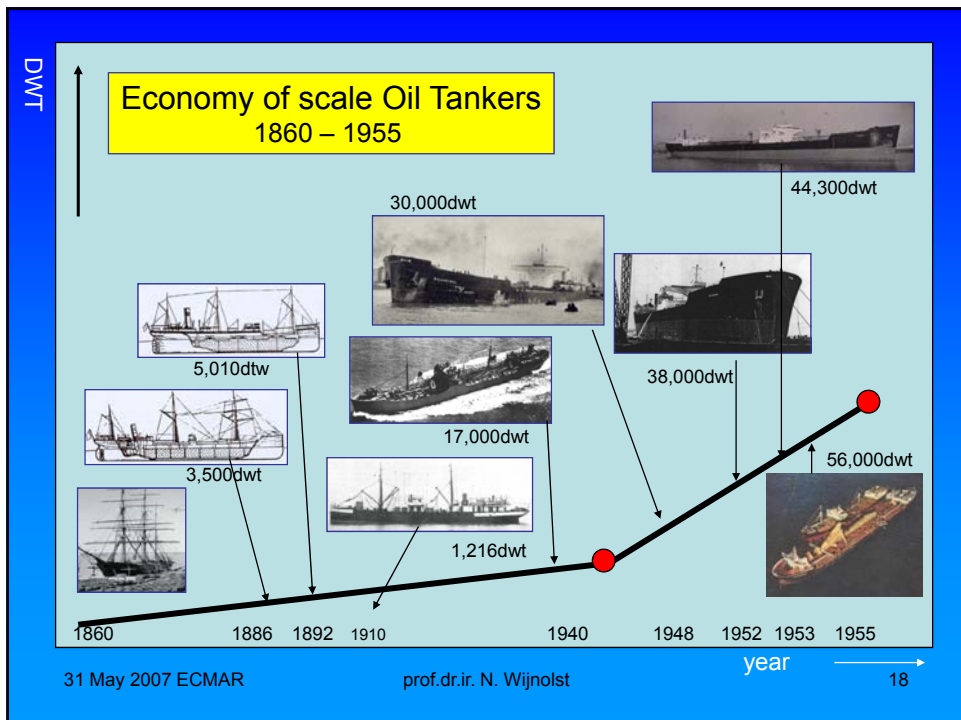
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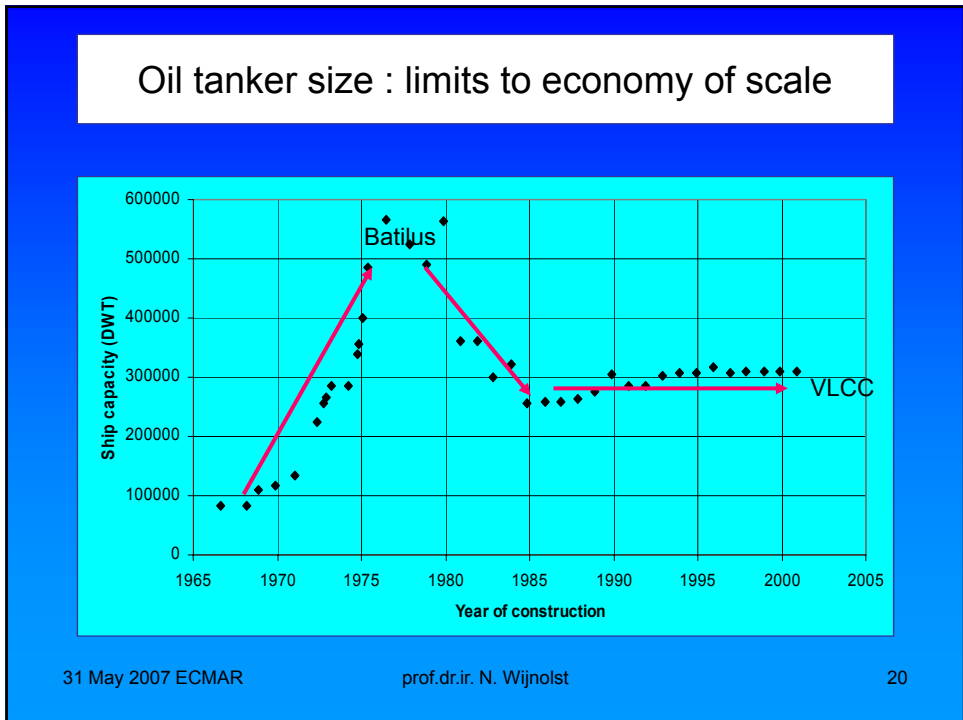
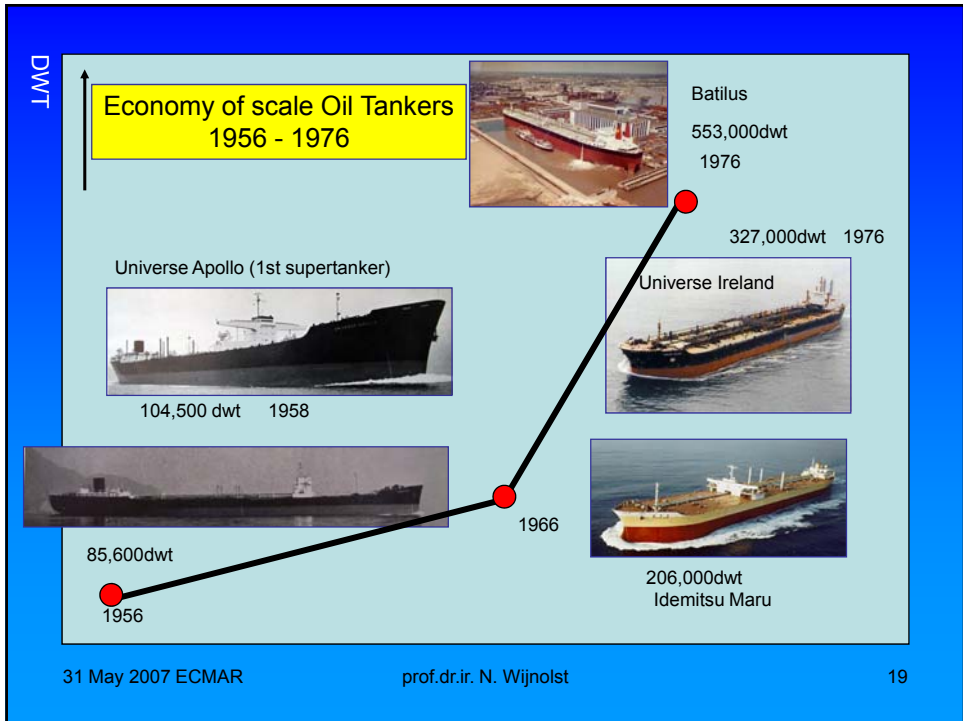
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Trigger 3: Economic triggers

1. maximizing revenues (combination carriers)
2. economies of scale (bigger and faster ships)
3. reducing costs:
 - *capital costs* (reducing lightship weight)
 - *running costs* (manning)
 - *voyage costs* (low gross tonnage measurement)
 - *cargo handling costs* (self-unloaders)
 - *logistical costs*





Economy of Scale Containerships



Wärtsilä's 14-cylinder RT-flex96C engine has a maximum power output of 96,000 kW

World's most powerful engine



World's largest screw propeller

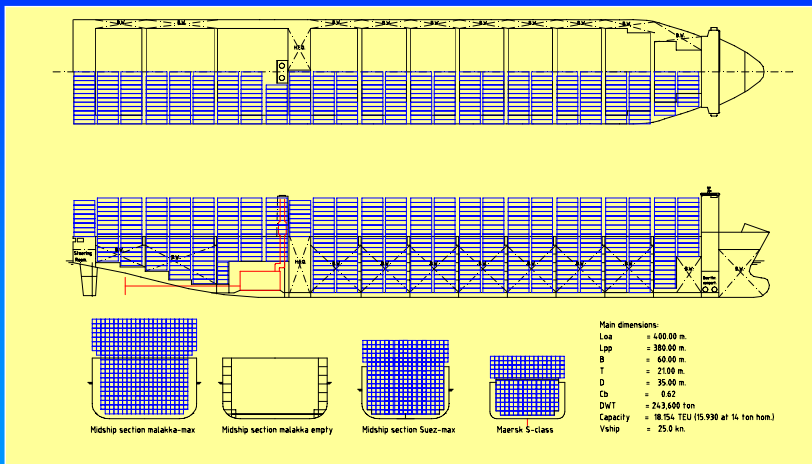


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Design Malacca-max container carrier 18.000 teu (Netherlands, 1999)



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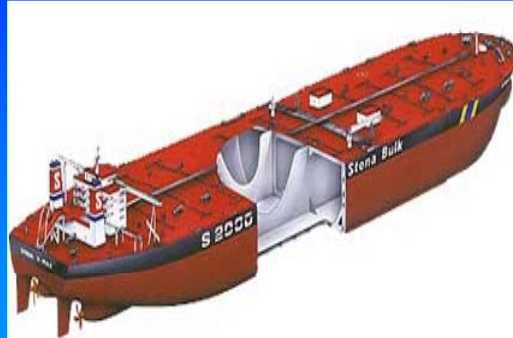
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Trigger 4: Rules and regulations triggers

Constraints and challenges imposed by international conventions:

- Solas, STCW, ISM, Marpol, Loadline, tonnage measurement (London 1969),
- OPA 90 (*double hull*)

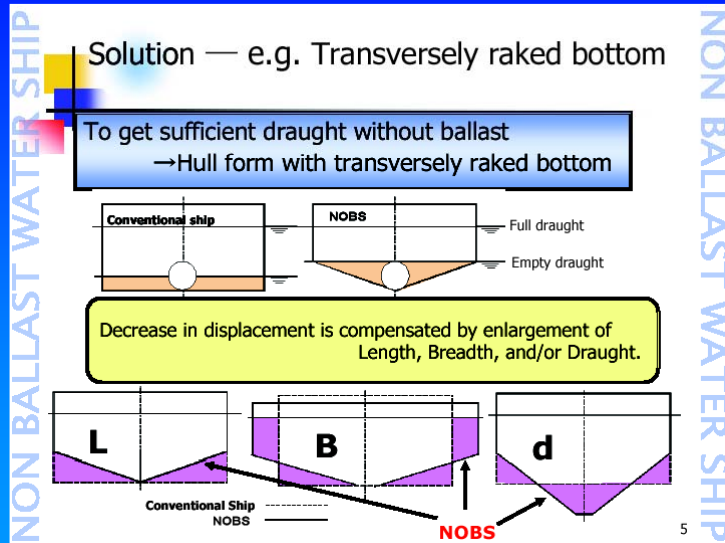


double hull tankers

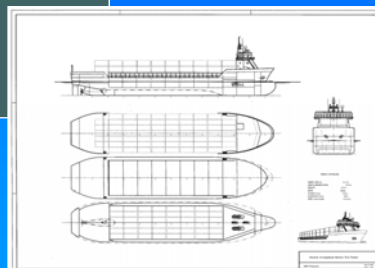
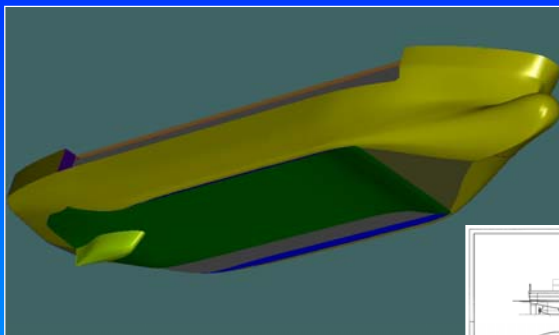
Regulations trigger: IMO Ballast Water Regulation and PSSA

- New ships will have to clean ballast water as from 2009 (<5000m³) and as from 2012 (>5000m³)
- Existing ships will have to exchange ballast water until 2014; ships with BW <1500 m³ and >5000 m³ until 2016
- BW exchange >200 or >50 nm from coast, in >200m deep water
- PSSA can set their own rules: Baltic Sea!
- **SENSITIVE SEAS GRANTED SPECIAL PROTECTION FROM SHIPPING:** At a meeting in London from 29 March to 2 April [2004], the Marine Environment Protection Committee of the International Maritime Organisation (IMO) -- a UN agency concerned with the safety of shipping and cleaner oceans -- agreed to designate the Baltic sea, as well as the waters around the Galapagos Islands and the Canary Islands, as '*particularly sensitive sea areas*' (PSSAs). The PSSA designation allows coastal states to adopt additional protective measures to deal with risks of international shipping.

Radical innovation – Non-Ballast Water Oil Tanker Design (Japan 2006)

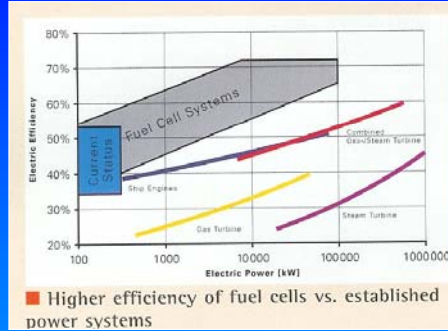


General arrangement of a 4,000 dwt ballast free general cargo ship (Netherlands, 2005)



5. Related sectors triggers

- Innovations in related sectors may influence and trigger innovations in shipping.
- Example from the past: diesel engine
- Example for the future: (hydrogen) fuel cells



First marine diesel engine Shell tanker Vulcanus 1910

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Rudolf Diesel - Patent 1892

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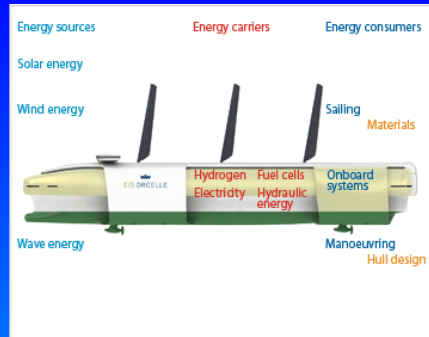
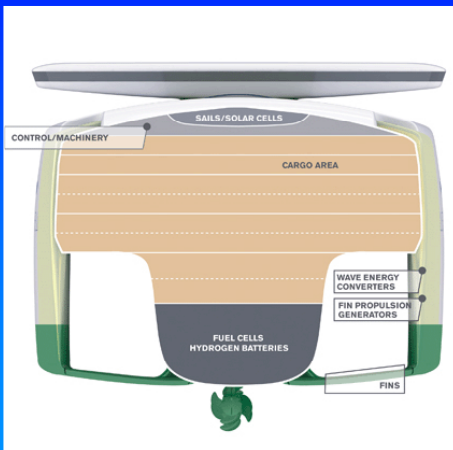


Hydrogen-fueled Concept Vessel

Vessel design includes four gas turbines for propulsion, 65 knot speed capability

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Sustainable Ship of the Future?



www.2wglobal.com/orcelle

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European Maritime Innovation a bird's eye view

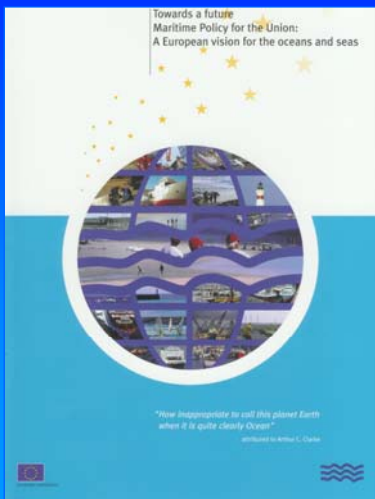
- EU Maritime Policy
- EU Technology Platforms
- EU 7th Framework Programme
- Lead markets and EU Risk-Sharing Finance Facility
- EU Transport Advisory Group
- Dutch Maritime Innovation Programmes

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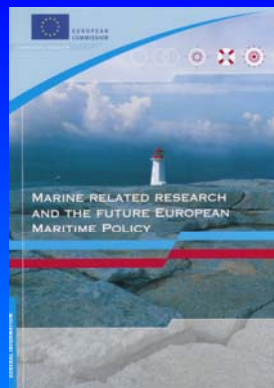
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European Maritime Policy and maritime clusters



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Main Questions of the Maritime Policy Green Paper

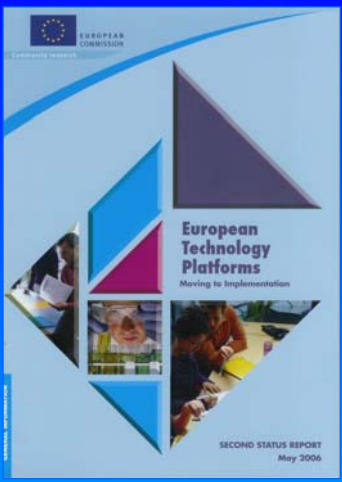
1. Should the EU have an integrated maritime policy?
2. How can the EU add value to the many national, local and private initiatives which already exist in the maritime field?

Main Themes of the Maritime Policy Green Paper

1. Retaining Europe's leadership in sustainable maritime development.
2. Maximizing quality of life in coastal regions.
3. Providing the tools to manage our relations with the oceans.
4. Maritime Governance.
5. Retaining Europe's maritime heritage and reaffirming Europe's maritime identity.

Europe's maritime sectors are global market- and technology leaders, create jobs and value added through continuous innovation

- European ports handle 25% of world seaborne trade
- European shipowners own 40% of the world fleet
- 4 European containerlines are in the Top-5
- European shortsea shipping is 50% of world total
- European inland shipping has a modern fleet of 9,400 ships
- European shipbuilders have the highest turnover
- European shipowners order 40% of new buildings
- European marine equipment manufacturers produce 35% of the world market
- European offshore companies are world leaders
- European yachtbuilders produce 60% of the mega-yachts
- European dredging companies have 80% of the open market
- European maritime services, maritime research, inland shipping, fisheries, and navies are world leading



European Technology Platforms
Moving to Implementation

SECOND STATUS REPORT
May 2006

Stakeholders, led by industry, come together to agree a common vision for the technology.

➔

Stakeholders define a Strategic Research Agenda setting out the necessary medium- to long-term objectives for the technology.

➔

Stakeholders implement the Strategic Research Agenda with the mobilization of significant human and financial resources.

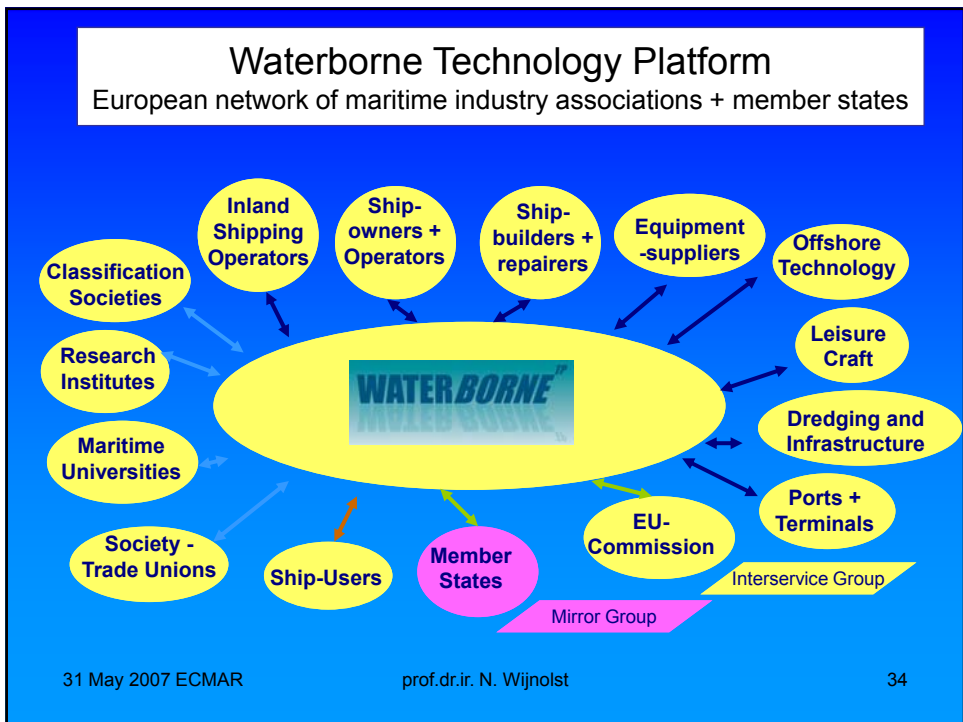
Technology platforms: Individual Platforms: the result Internet Explorer

Home | Further Information | Individual Platforms | Meetings and Events | What's New

1. The European Hydrogen and Fuel Cell Technology Platform (H2F) | 2. eBrain - European Neuroinformatics Initiative Advisory Council | 3. NanoMedicine - Nanotechnologies for Medical Applications | 4. Robots for the Future | 5. Smart, Secure and Sustainable Technology Platform (SSSTP) | 6. The European Technology Platform on Transatlantic | 7. Technology Platform on Sustainable Chemistry | 8. Context Based Doctor Technology Platform | 9. European Technology Platform for Global Animal Health (GAH) | 10. EIT/AC European Road Transport Research Advisory Council | 11. eMMA European E-Mobility Research Advisory Council | 12. the ATLAS/2010 Technology Platform (supported by eMMA Advisory Council) | 13. The Mobile and Wireless Communications Technology Platform (MobiW) | 14. Innovative Medicines for Europe | 15. Embedded Systems (EMTS) | 16. e-Health - Advisory Council for e-Health Research in Europe | 17. The European Space Technology Platform (ESTP) | 18. eSUS - The European Smart Technology Platform | 19. The European Technology Platform for the Future of Textiles and Clothing (ETP-FTC) | 20. eMMA/2010 - Platform on Future Manufacturing Technologies | 21. The European Construction Technology Platform (ECTP) | 22. eMMA/2010 - European Technology Platform for Advanced Engineering Materials and Technologies | 23. The European Technology Platform on Industrial Surface

<http://cordis.europa.eu.int/technology-platforms>

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Implementation Plan

Waterborne TP and the European Network of Maritime Clusters should promote: *Open Innovation and Open Business Models*



EU 7th Framework RTD Programme

Theme 7: Transport (including Aeronautics)

Draft Work Programme 2007

The 7th Framework Programme will be organised in 4 specific programmes, corresponding to 4 major objectives of European research policy

Objective 1: Cooperation

Support will be given to the whole range of research activities carried out in transnational cooperation, from collaborative projects and networks to the coordination of research programmes. International cooperation between the EU and third countries is an integral part of this action.

Objective 2: Ideas

An autonomous European Research Council will be created to support investigator-driven “frontier research” carried out by individual teams competing at the European level, in all scientific and technological fields, including engineering, socio-economic sciences and the humanities.

Objectives of European research policy (continued)

Objective 3: People

The activities supporting training and career development of researchers, referred to as “Marie Curie” actions, will be reinforced with a better focus on the key aspects of skills and career development and strengthened links with national systems,

Objective 4: Capacities

Key aspects of European research and innovation capacities will be supported: research infrastructures; research for the benefit of SMEs; regional research driven clusters; unlocking the full research potential in the EU’s “convergence” regions; “Science in Society” issues; “horizontal” activities of international cooperation.

Cooperation – 9 themes

1. Health
2. Food, Agriculture and Biotechnology
3. Information and Communication Technologies
4. Nansciences, Nanotechnologies, Materials and new Production Technologies
5. Energy
6. Environment (including Climate Change)
- 7. Transport (including Aeronautics)**
8. Socio-economic Sciences and the Humanities
9. Security and Space

EU Financial participation in 7th Framework Programme: €50,521 million

- **Cooperation:** **32,292 million**
- Ideas: 7,460 million
- People 4,727 million
- Capacities 4,291 million
- Other 1,751 million

Theme 7: Transport (including Aeronautics)

Objective

Based on technological and operational advances and on the European transport policy, develop integrated, safer, “greener” and “smarter” pan-European transport systems for the benefit of all citizens and society, respecting the environment and natural resources; and securing and further developing the competitiveness attained by the European industries in the global market.

Total Budget for 2007-2013 is €4,200 million, of which €3,000 million for aeronautics, €1,200 million for surface transport, of which 1/3 or €400 million for Waterborne.

Sustainable Surface Transport Context

Five activities are addressed

- The greening of surface transport
- Encouraging modal shift and decongesting transport corridors
- Ensuring sustainable urban mobility
- Improving safety and security
- Strengthening competitiveness

Transport Advisory Group

DG TREN

DG RTD

Aeronautics TP
ACARE

Road TP
ERTRAC

Transport
Committee
Member States

Rail TP
ERRAC

Waterborne TP

Intermodal
EIRAC

Galileo
Services

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EU Transport Advisory Group



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6 Themes Work Programme 2008 Draft!!

Encouraging modal shift and decongesting transport corridors

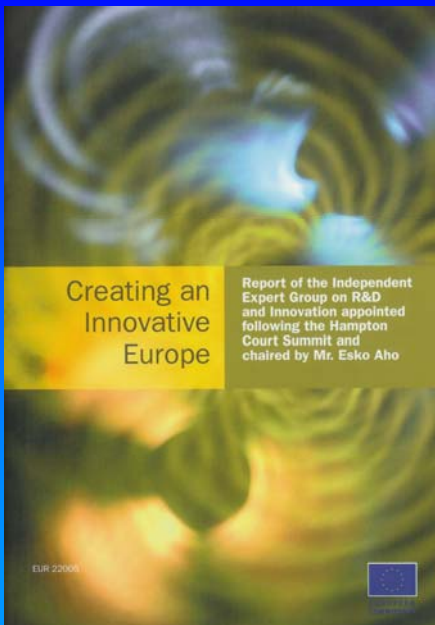
Sustainability of transport

Defining future customer expectations

Strengthening competitiveness

Galileo transport applications

Horizontal activities supporting integration in transport



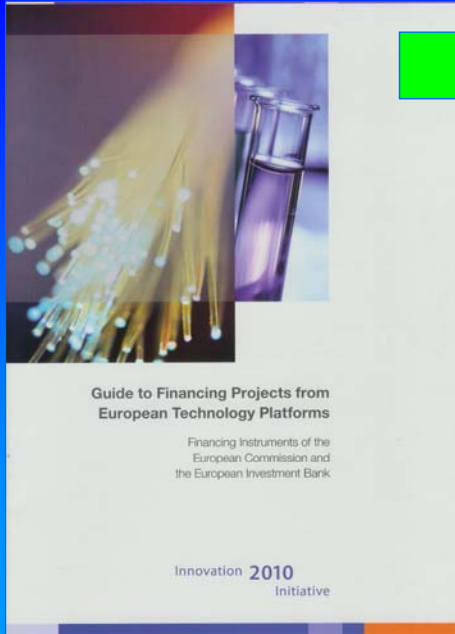
New Concept:

Lead Markets

European Investment Bank

Higher Risk Financing initiative for innovative projects of European Technology Platforms

€ 2 billion fund EC/EIB
€ 10 billion finance capacity



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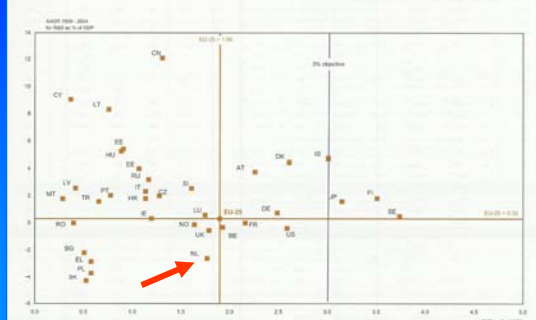
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Strengthening RD&I in the Netherlands



Figure 2.5 R&D as a percentage of GDP in 2004 and annual average growth rate (AAGR) 1999 - 2004, all sectors, EU-25 and selected countries



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Dutch Maritime Innovation Programmes

- Shipping - € 10 million (4 years)
- Inland Shipping - € 10 million (4 years)
- Fisheries - € 48 million (5 years)

- Maritime Manufacturing Industry and Offshore Services - € 82,5 million?? (5 years)



Europe has the ambition to maintain global leadership in the maritime markets through an integrated innovation strategy based on:

- *open innovation business models*
- *strong European maritime clusters*
- *a holistic European Maritime Policy*