

MarineBiotech



5. Future Research and innovation opportunities

European Perspectives

Laura Giuliano

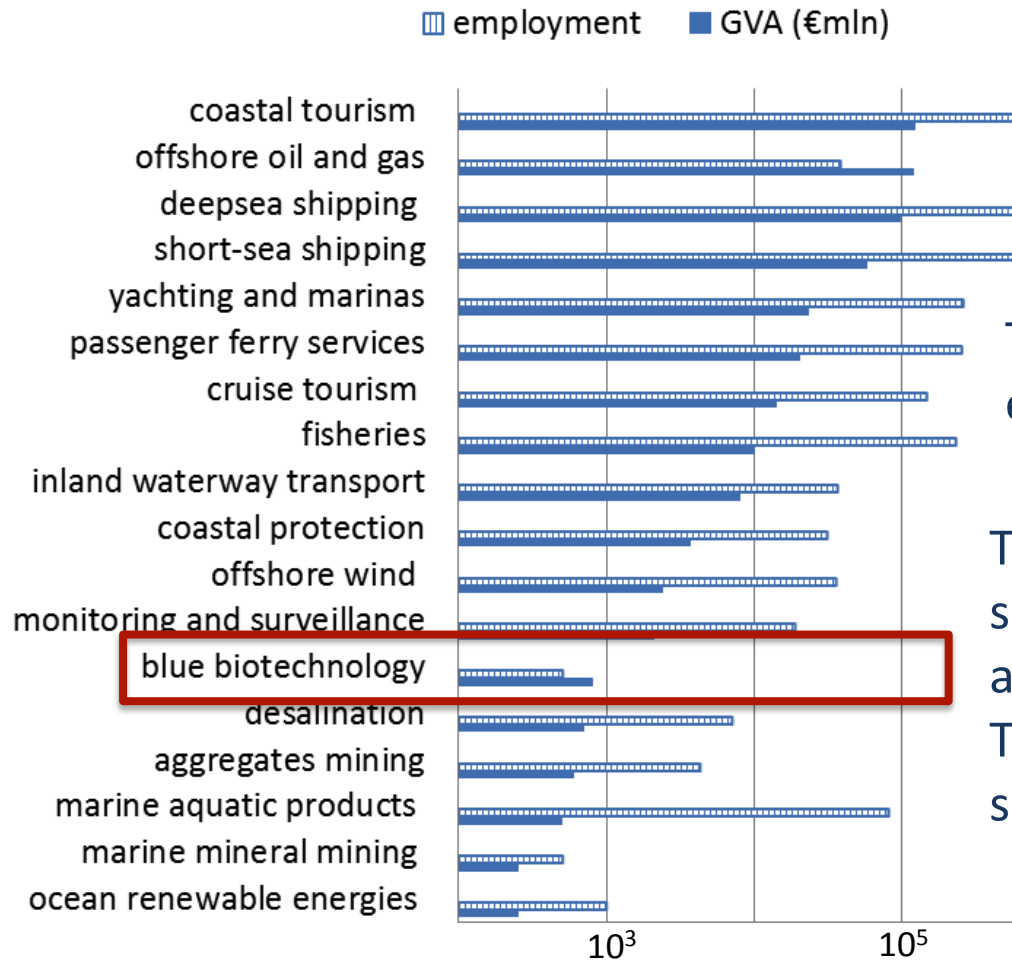


Director of Science, CIESM
The Mediterranean Science Commission



Brussels, 13.9.2012
COM(2012) 494 final

Blue Growth opportunities for marine and maritime sustainable growth (2012)



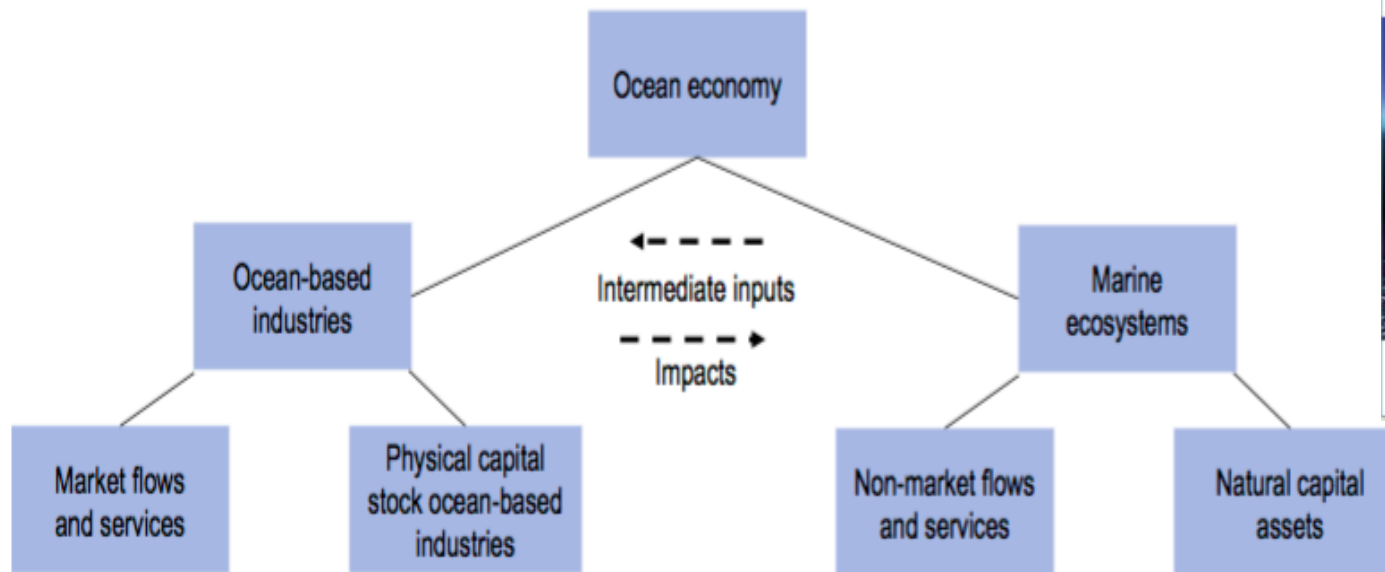
The individual sectors of the blue economy are interdependent.

They rely on common skills and shared infrastructure such as ports and electricity distribution networks. They depend on others using the sea sustainably.



THE FUTURE OF THE OCEAN ECONOMY

Exploring the prospects for emerging ocean industries to 2030



The ocean economy is understood as the sum of the economic activities of emerging and established ocean-based industries, together with the assets, goods and services of marine ecosystems.



THE FUTURE OF THE OCEAN ECONOMY

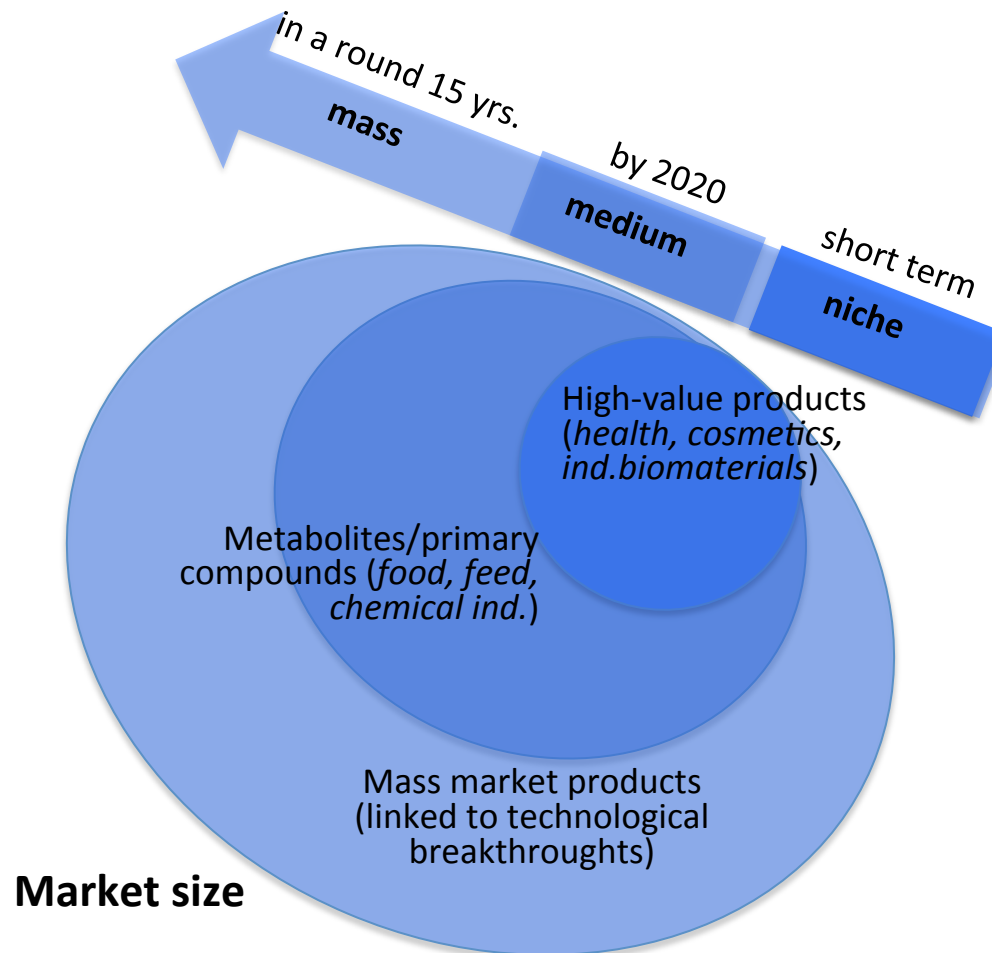
Exploring the prospects for emerging ocean industries to 2030

Established ocean-based industries	Emerging ocean-based industries
Capture fisheries	Marine aquaculture
Seafood processing	Deep- and ultra-deep water oil and gas
Shipping	Offshore wind energy
Ports	Ocean renewable energy
Shipbuilding and repair	Marine and seabed mining
Offshore oil and gas (shallow water)	Maritime safety and surveillance
Marine manufacturing and construction	Marine biotechnology
Maritime and coastal tourism	High-tech marine products and services
Marine business services	Others
Marine R&D and education	
Dredging	

Modules

- (A) Current & future contribution of ocean based activities to economic growth
- (B) Drivers & uncertainties of emerging ocean industry development
- (C) Sectorial interdependencies
- (D) MSP potential constraints on emerging ocean industries
- (E) Policy chart for emerging ocean activities

Marine Biotechnology: an expanding trend



While estimated current employment in EU is still relatively low, and a GVA of 0.8 billion, the growth of the sector will offer **HIGH SKILLED EMPLOYMENT** and significant downstream opportunities

Forging ahead: from sugar to plastic (mass product)



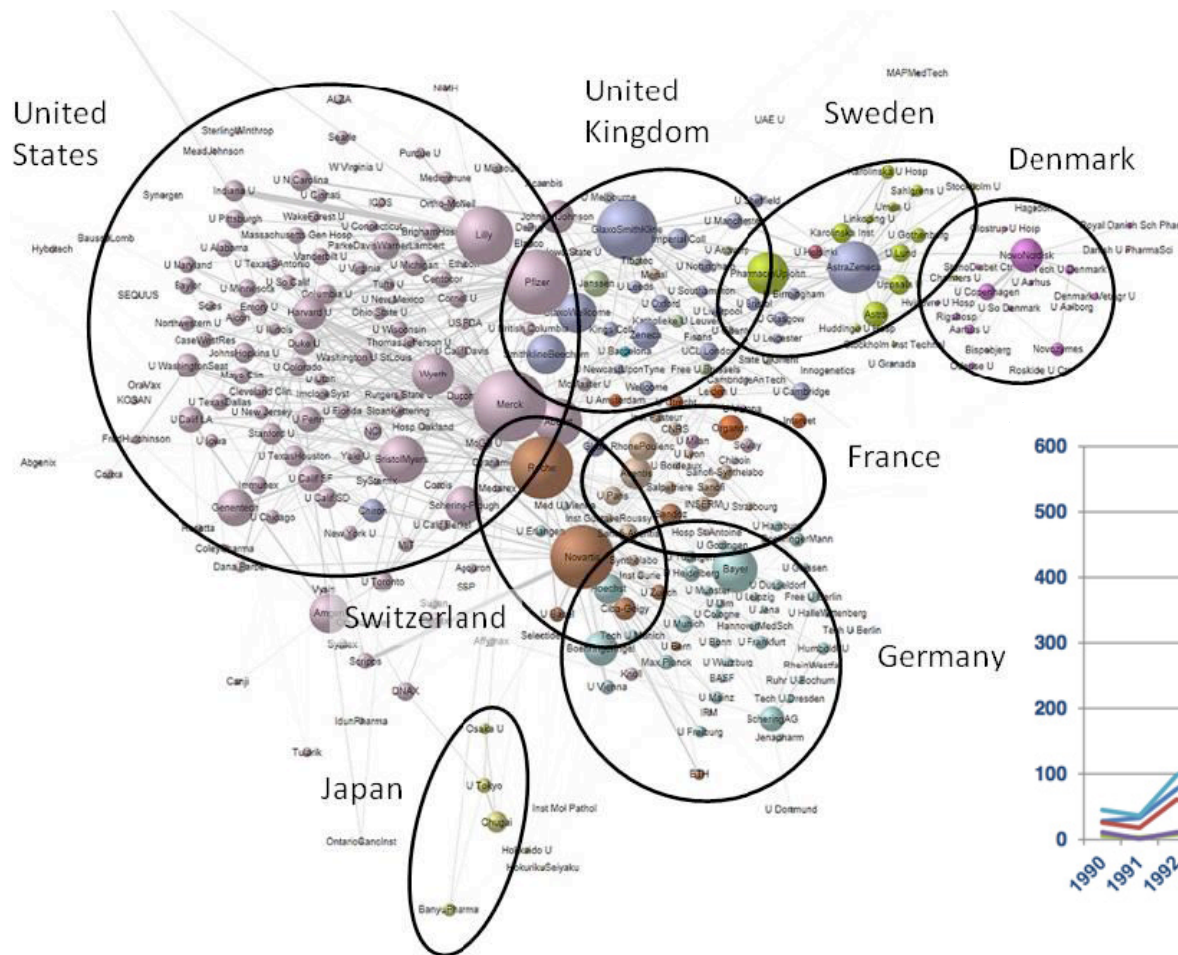
Italian polymer producer Novamont has opened the world's first commercial plant for the biobased production of 30,000 metric tons per year of 1,4-butanediol (BDO).

The company has licensed the process—and its engineered *E. coli* microbe— from Genomatica (US) which had also licensed the process from BASF (DE).

How to accelerate?

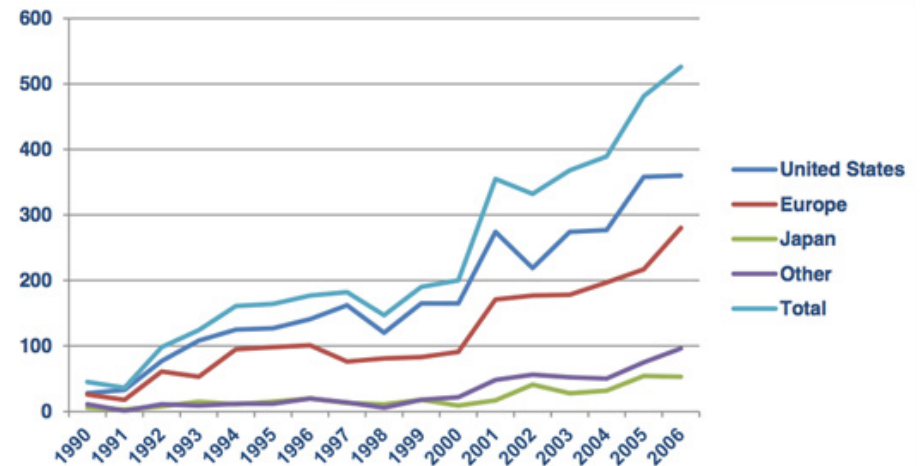


Pharmaceutical: outsourcing research

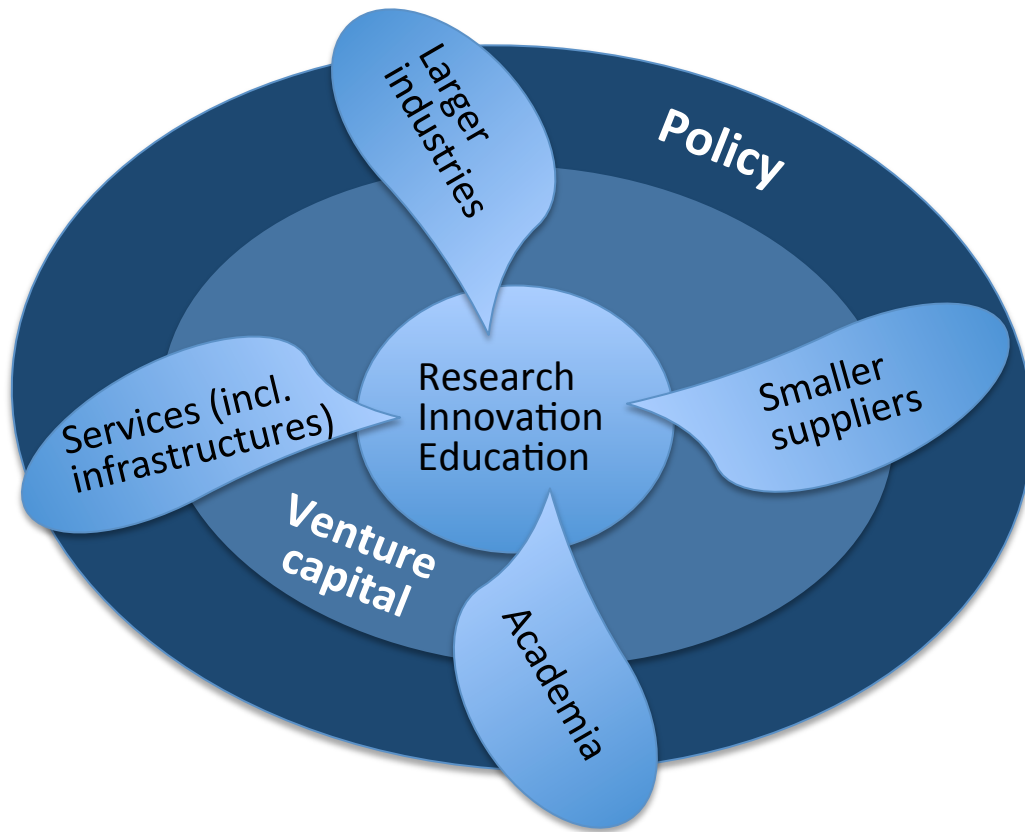


Alliance networks with small firms and academic laboratories

Biotech alliances



Maritime Clusters



Geographic proximity helps educational courses and research to meet the needs of local industry while suppliers can understand the market and predict the future trends.

Some examples

- Offshore energy industry (Scotland)
- Pole Compétitivité Mer (Brest, FR)
- Smart Bay (Galway, IR)

Marine Biotech at CIESM



41° CIESM Congress
Kiel (DE) 12-16 September 2016



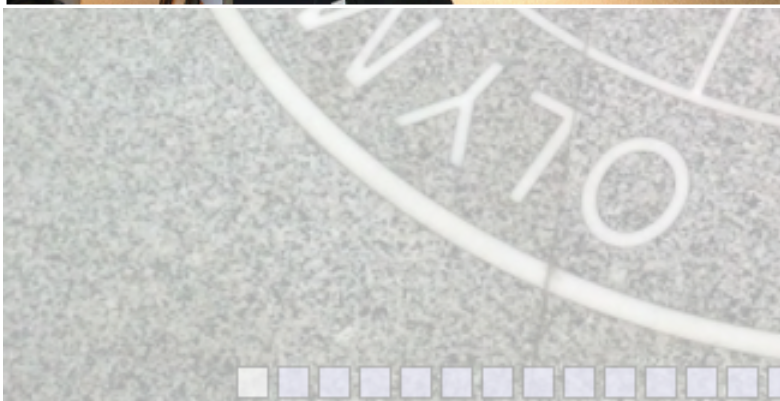
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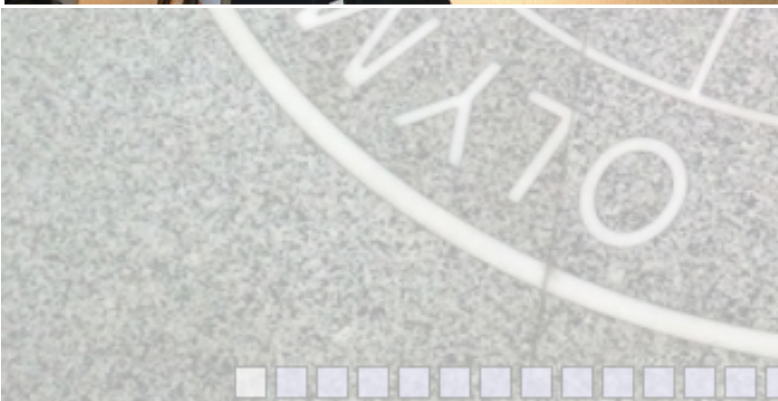
CIESM International Conference on East - West Cooperation in Marine Sciences



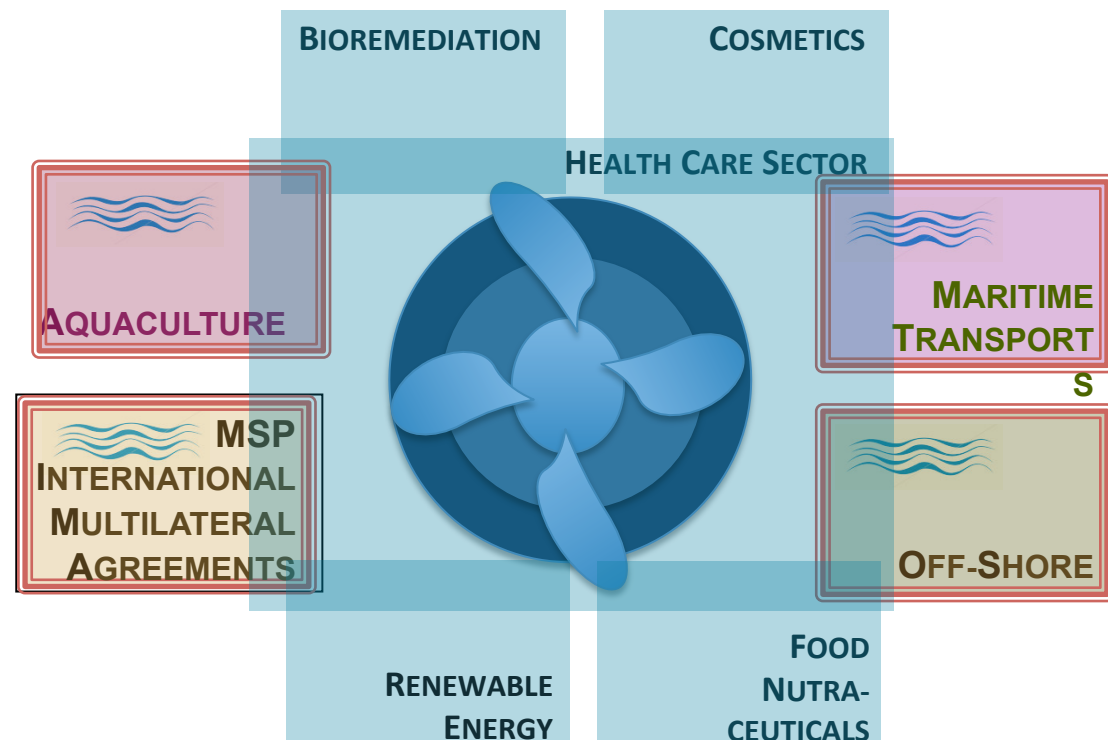
CIESM International Conference on **East - West** Cooperation in Marine Sciences



**Sochi (RU),
1-3 Dec. 2014**



Towards a market diversification





Bullet points for a Marine Biotech Strategic Research Agenda

FISHERY



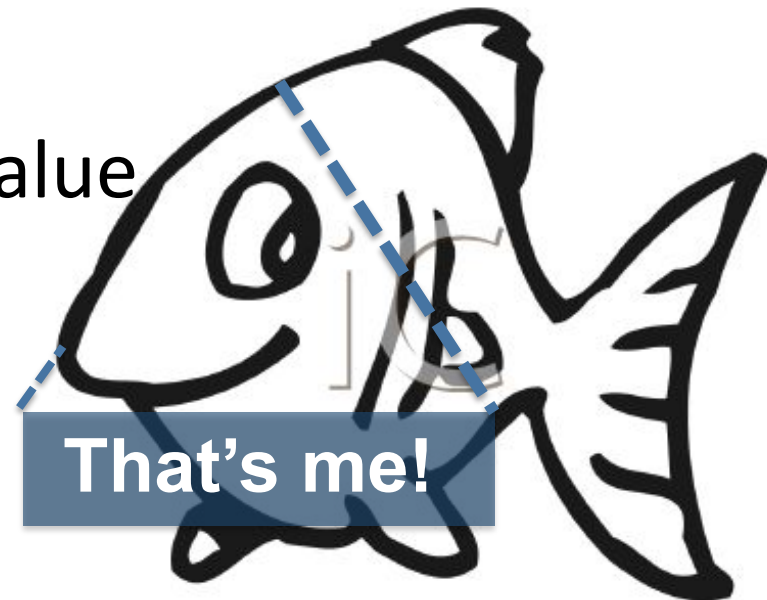
- Molecular based tools for surveys

PRIORITY 1: Genetic markers to track species during restoration activities (*i.e.* sturgeon)

*ADDITIONAL APPLICATION-
Tracking escapees from
aquaculture cages*

- Improve storage and transportation, increase value

PRIORITY 2: cryopreservation enhancers, taste protectants etc.



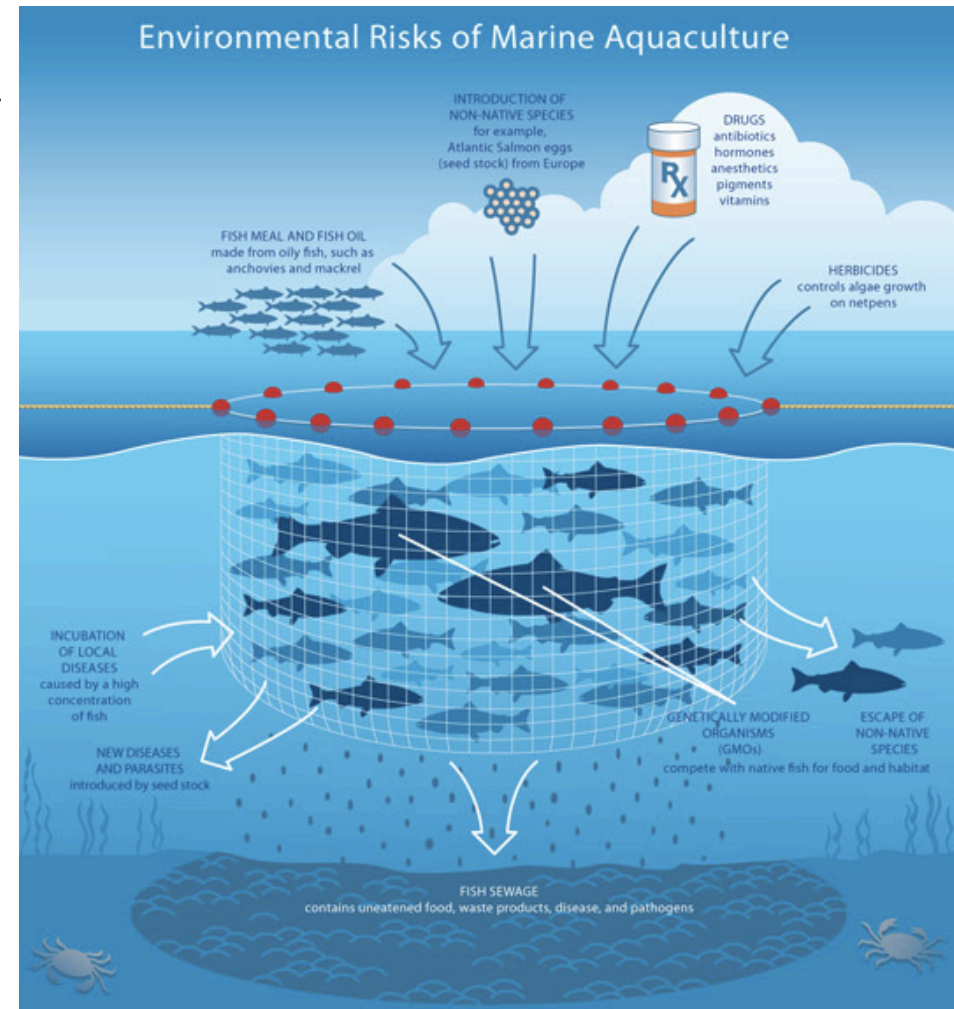
AQUACULTURE



- Bioactive molecules / processes

PRIORITY 3: Optimising low-environmental-impact aquaculture systems (incl. probiotics, growth factors)*

*ADDITIONAL APPLICATION-
waste recycling (i.e. chitin)*



* Proposed strategy : joint selection of target species, comparative efforts

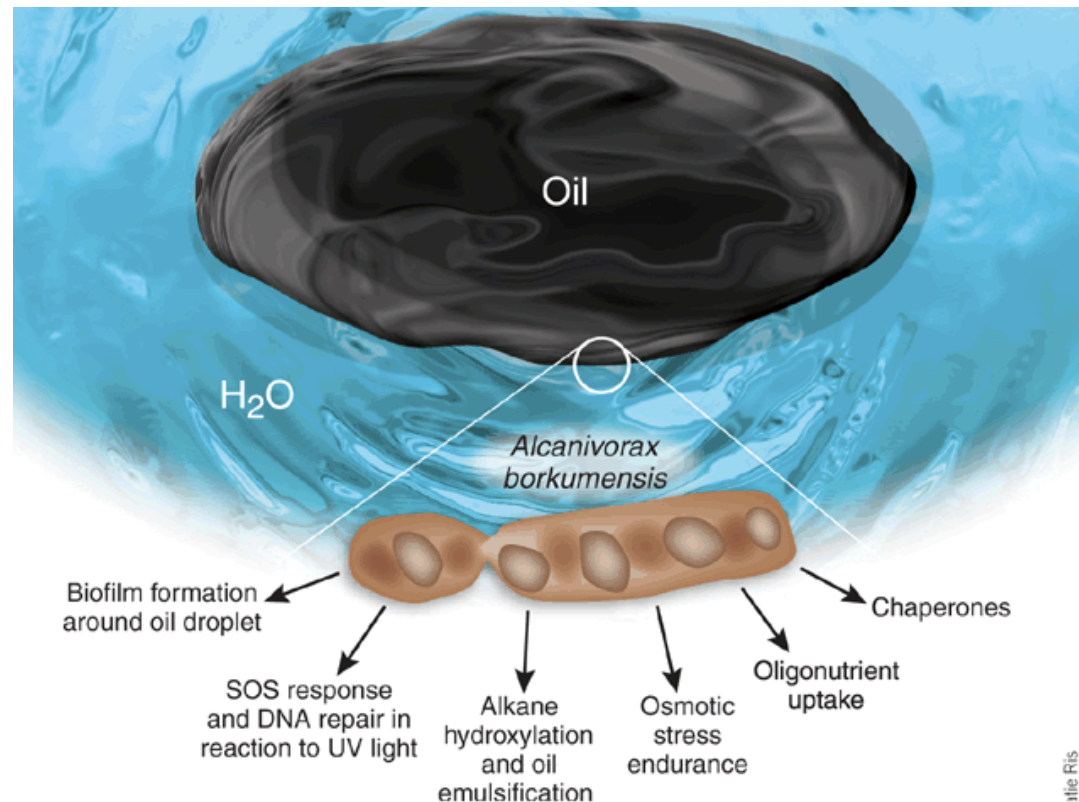
OIL BIOREMEDIATION



- Improving use of oil degrading marine bacteria

PRIORITY 4: Anoxic oil degradation

PRIORITY 5: New culture methods (*i.e.* for mutualistic-symbiotic species)



MARINE ENZYMES



- Exploratory oceanographic cruises

PRIORITY 6: Joint exploratory efforts for microbiological sampling (bioprospecting)

- Research to shorten experimental paths

PRIORITY 7: New cloning / expression vectors etc.



HORIZONTAL THEMES



- Chemistry of bioactive molecules

PRIORITY 8: Fucoidan - structural peculiarities (of active centres), molecular recognition mechanisms

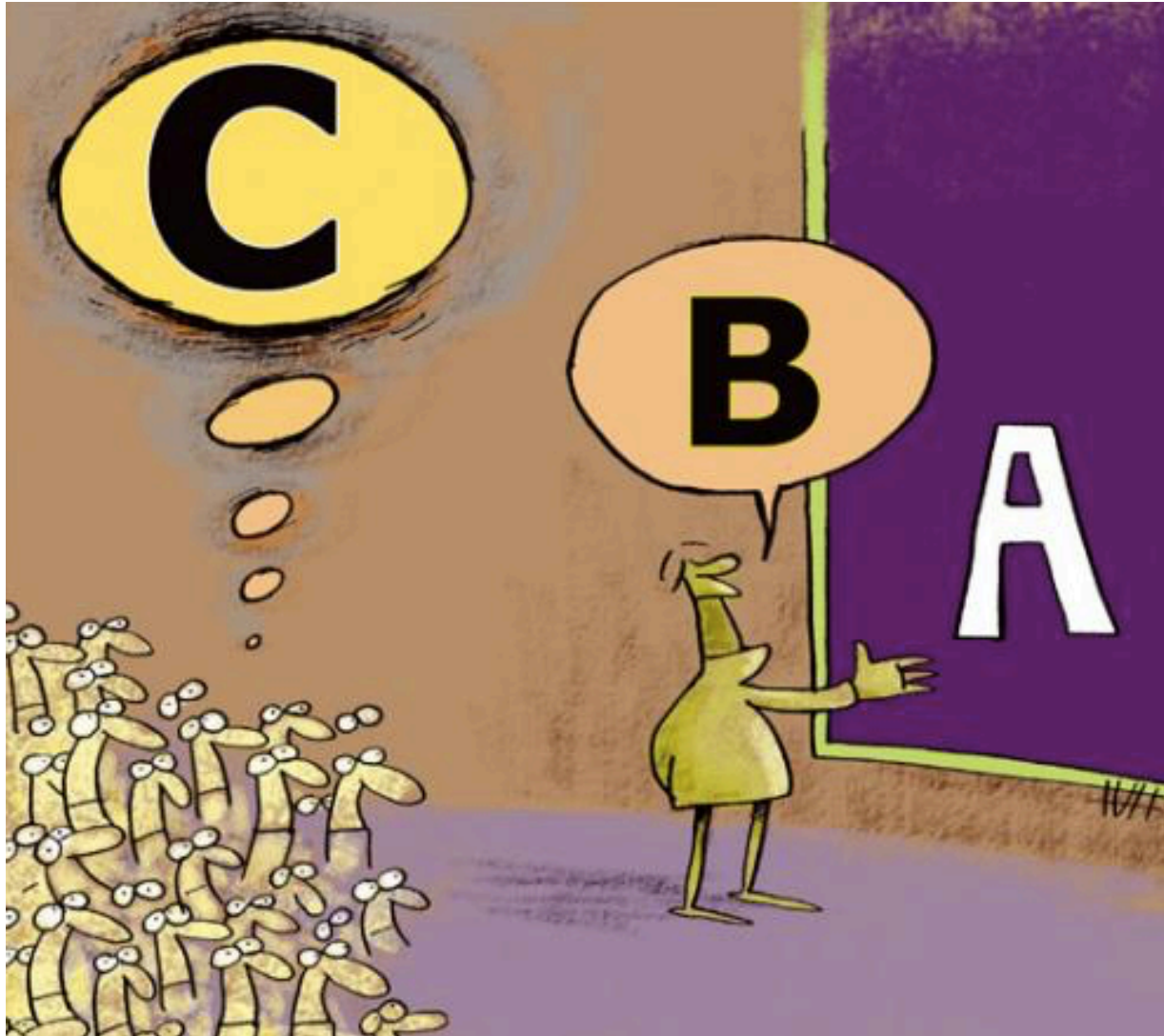
- New Market Solutions for marine biotech products

PRIORITY 9: Chitosan – from Vodka to radio-protective solutions (i.e. long term preservation of nuclear plants)

- Support actions

PRIORITY 10: Joint legal support service for patent solutions

Back to EU for seeking clarity



Industrial needs

Risk abatement, industrial supply, market extension (incl. China)

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The most valuable research

- New Processes (enzymes)
- New expression systems
- Biomass conversion / Bio-refinery
- High throughput screening
- Biomimicry

EU funded research

- MicroMBT
- INMARE
- MicroB3
- PharmaSea, MicroB3
- EU Biomimicry Alliance

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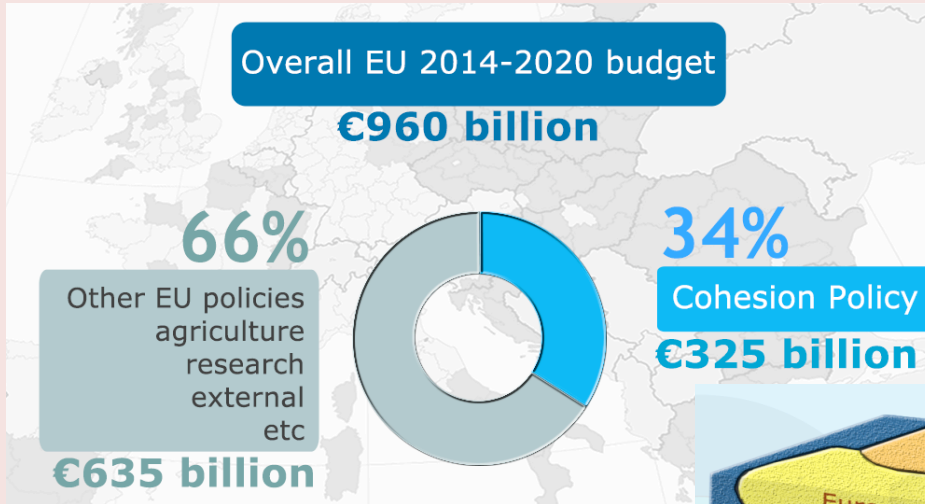
From research to market

- Access to finance (*collaborative funding models/platforms*)
- Infrastructure & Facilities (*i.e. scale-up plants; ToK platforms*)
- Policy strategies (*i.e. spin-off/ start-up companies; valorising IPR in particular with regard to patents*)

EU initiative

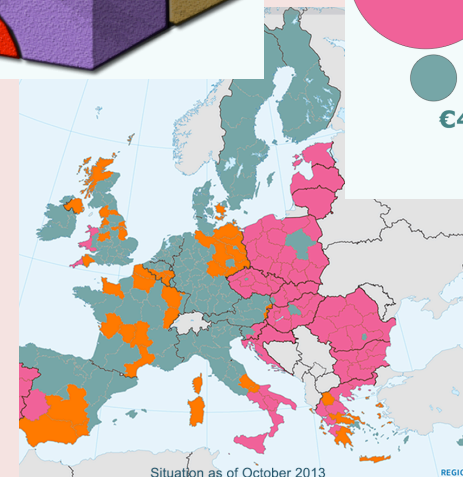
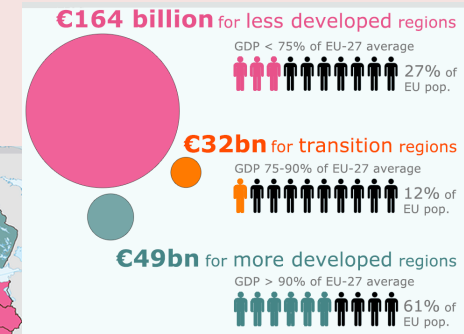
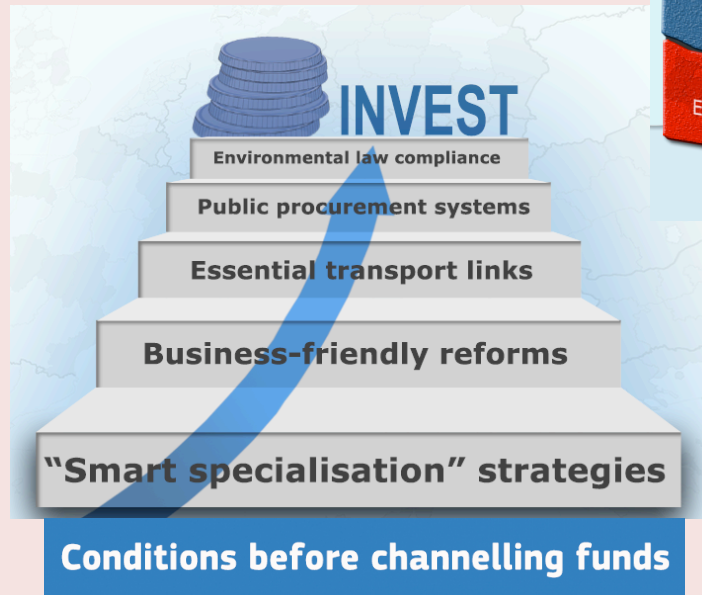
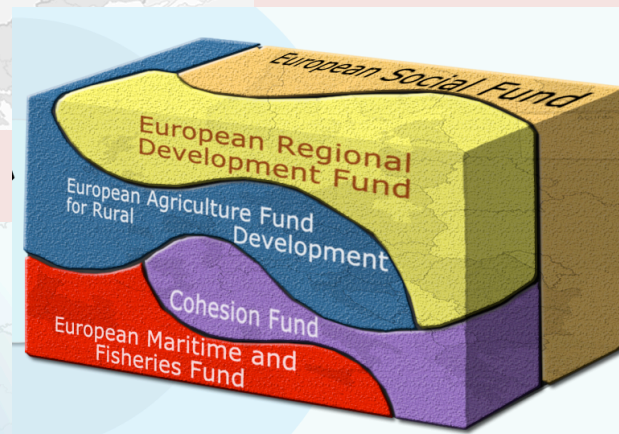
- EU Action Plan on building a capital market union (2015)
- KBBE (Fp7, Horizon 2020), “Erasmus for All Programme”
- EU proposal “Towards modernisation of IPR” (2016) within the “Digital Single Market Strategy for Europe”

EU Cohesion Policy (2014-2020)



Supporting Research & Innovation

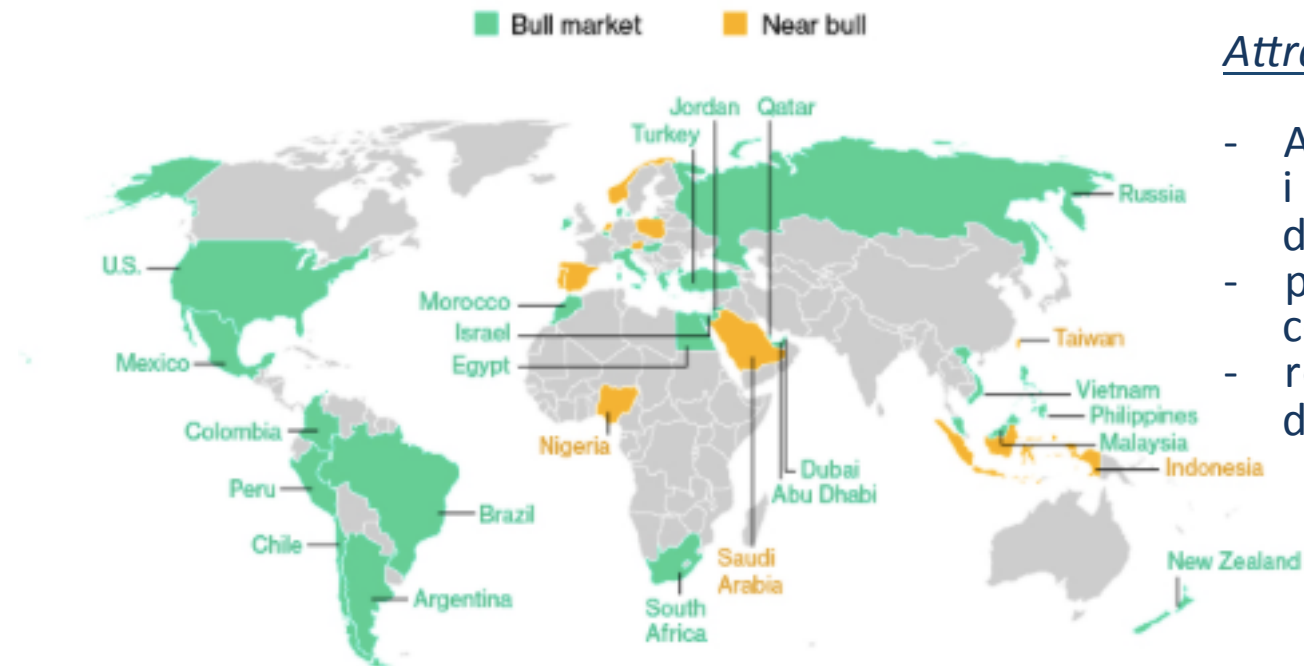
- Direct support (financial instruments, advise etc.)
- Infrastructure (*incl.* Pilot lines) & manufacturing
- Partnership (academy, R&T, SMEs , large firms)
- Training of researchers



Beyond EU

Global Emerging Markets rebound

After some years of uncertainty, investors have been pouring money into emerging markets—to the tune of \$50 billion last year.



Attractiveness:

- Adequate policy (lowering inflation, decreased dependency from export)
- profitable stock market costs
- relative autonomy from dollar.

data from Bloomberg's own financial-market statistics, IMF forecasts, and the World Bank (2016)

SUMMARY

- Marine Biotechnology (MB) figures among the blue growth priority areas in EU (and beyond) policy agenda and it is tightly linked to the other blue growth sectors.
- MB research is being producing very innovative, highly promising results of which economic impact is also subject to technological breakthroughs.
- Some research lines have been identified as particularly valuable by industry (and investors).
- EU MB strategy still lacks clear shaping as to the industry vs. research boundaries.
- Political instruments should better serve EU enterprises (also considering emerging market economies).

