



# SPACE & OCEAN: NEW ECONOMIC FRONTIERS?

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# Space and Ocean Today...

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Exploration  
Exploitation



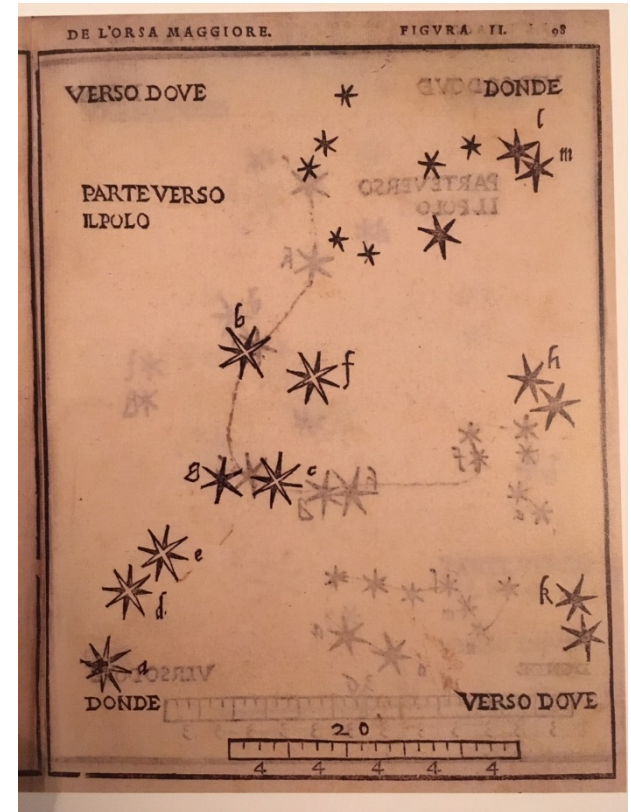


# But this all started by mapping the stars...

what ordre shall I obserue, for then there is no shadowe,  
which will do pleasure. Philo. Therefore wyth some  
Quadrāt, Astrolabe, or Ptolomæus ruler (the fation of  
whiche I do here place, and the makinge you shall finde  
amonge th'other Instrumentes) and marke what hys



It is made of 3. peaces, beynge 4. square:  
As in the Picture where A. F. is the  
first peace or rule.  
A. D. The seconde.  
G. D. the third rule.  
E. The Foote of the  
Staffe.  
C. F. The Plumrule.  
C. B. The ioyntes, in  
which the second &  
third Rulers are mo-  
ued.  
K. L. The sighte ho-  
les.  
I. The Sonne.  
H. The Zenit, or ver-  
ticall pointe.  
M. N. The Noone-  
stead Lyne.

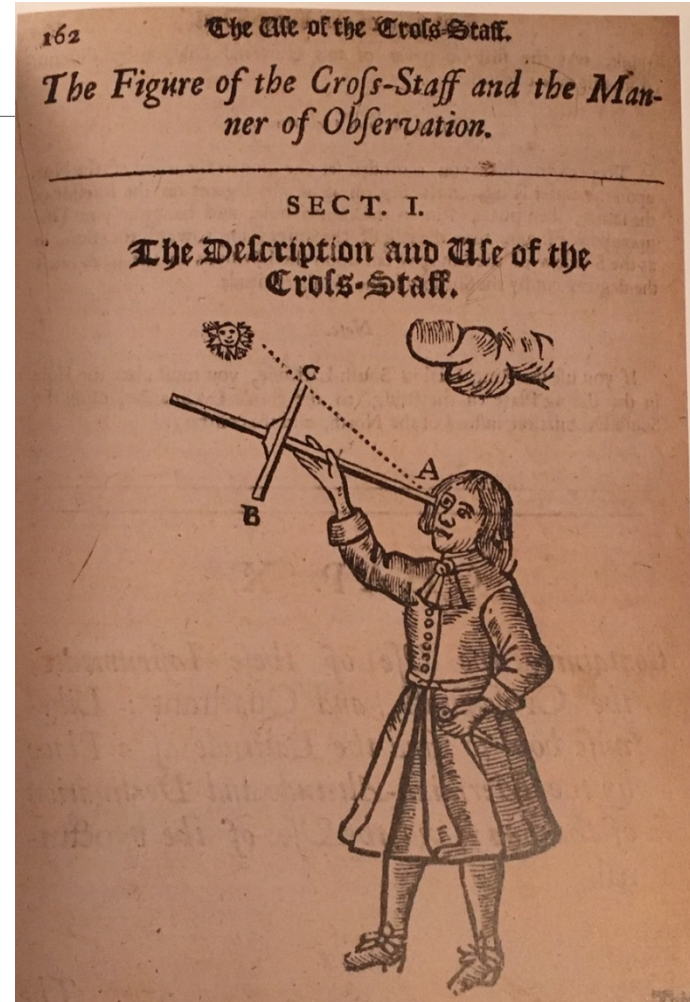


Pedro de Medina (1555), *L'Arte del Navigar*

William Cunningham (1559),  
*The Cosmographical,*



# Space and Ocean...

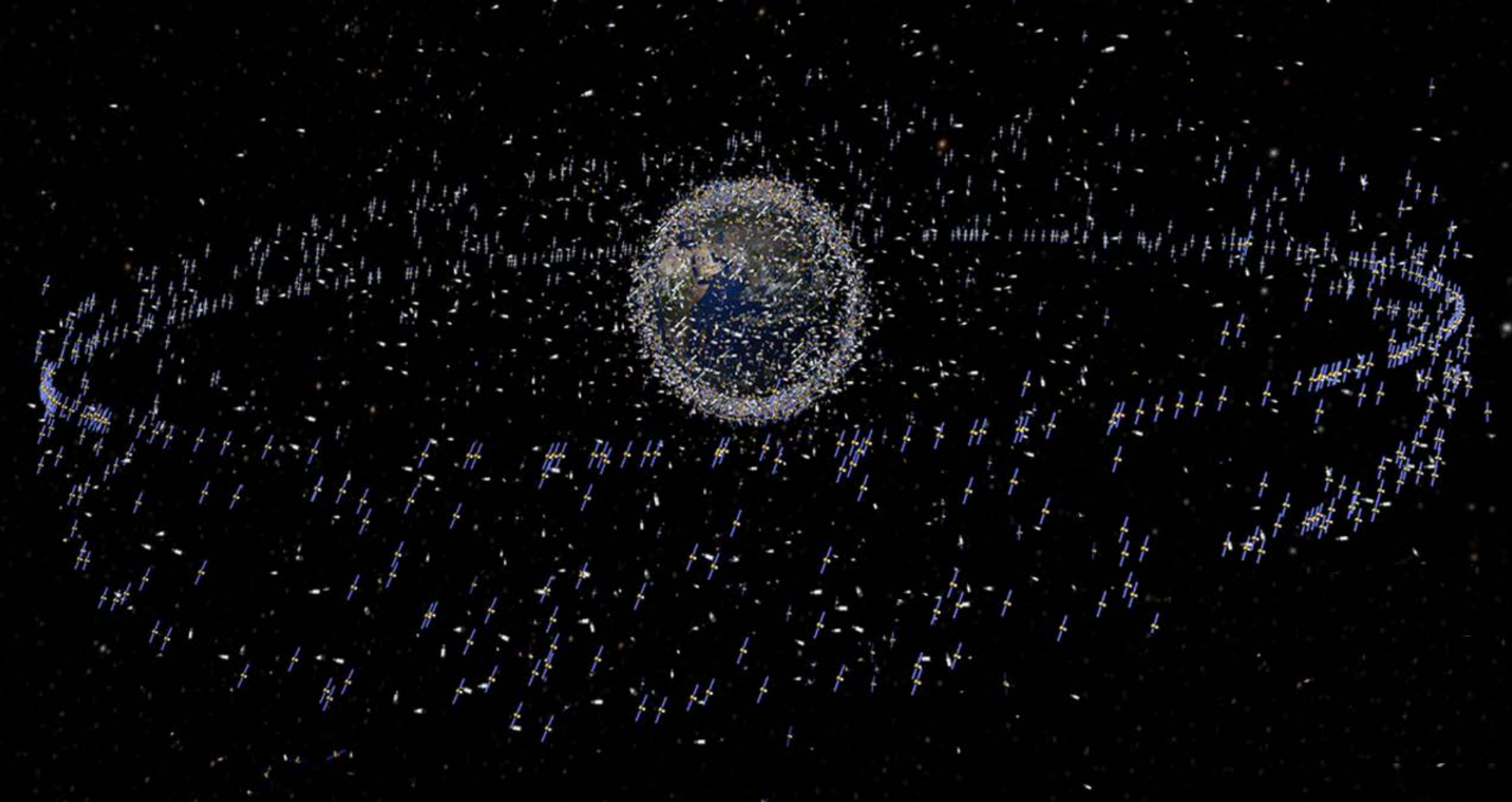


John Sellar (1694), *Practical Navigation*  
An Introduction to the Whole Art

Fra Mauro da Firenze (1534), *Sphera Volgare*  
Novamente Tradotta



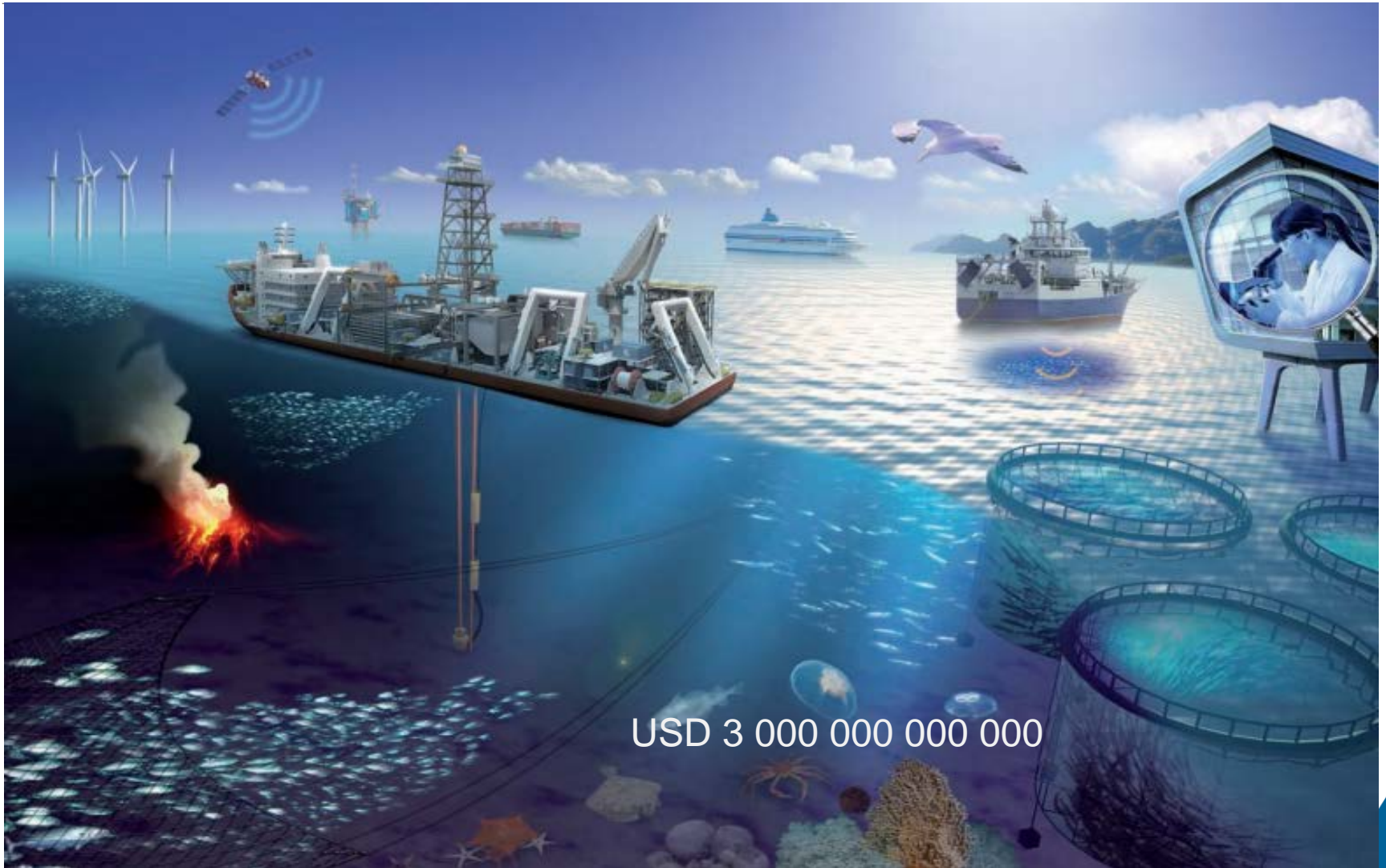
Today's space economy:  
Around USD 280 billion



...With a transformation of the sector



Ocean-based industries' value-added to double (from USD 1.5 to 3 trillion) by 2030





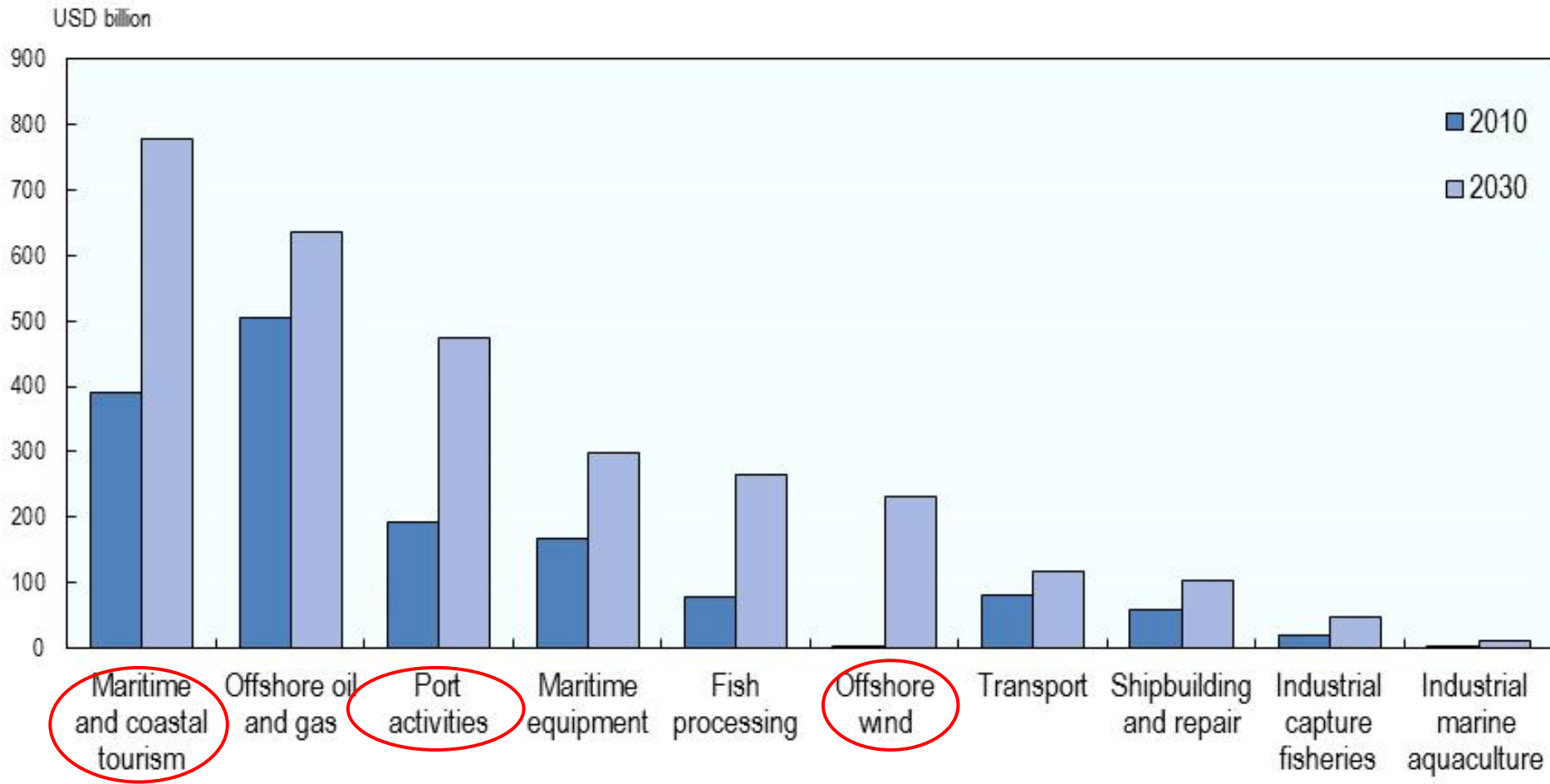
# Vibrant ocean-based industries

Established ocean-based industries	Emerging ocean-based industries
Industrial capture fisheries	Industrial marine aquaculture
Industrial seafood processing	Deep- and ultra-deep water oil and gas
Shipping	Offshore wind energy
Port activities	Ocean renewable energy
Shipbuilding	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	

Source: OECD (2016), *The Ocean Economy in 2030*, OECD Publishing.



# Ocean-based industries' value-added to double (from USD 1.5 to 3 trillion) by 2030

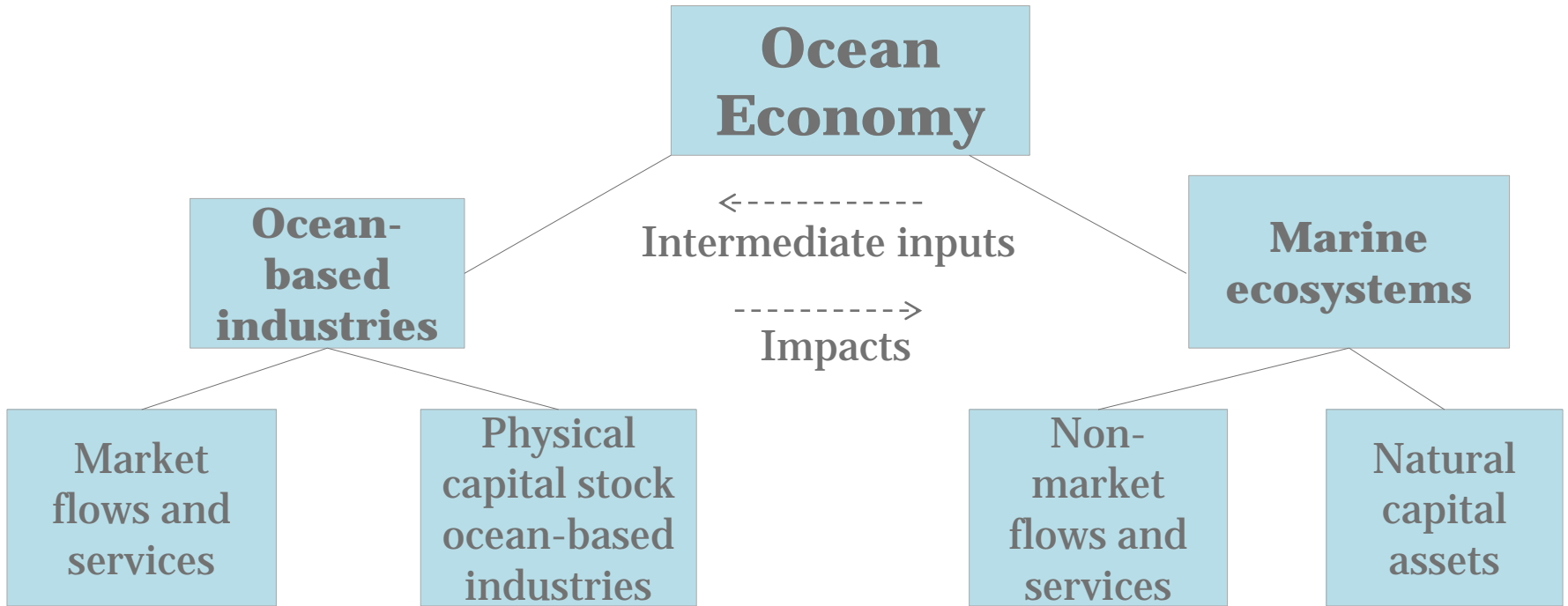


Source: OECD (2016), *The Ocean Economy in 2030*, OECD Publishing.





# Today's Ocean Economy: An Interactive, Interdependent System

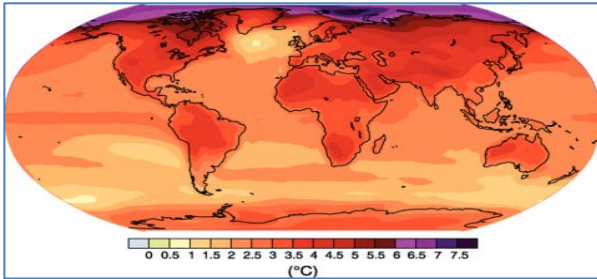


Source: OECD (2016), *The Ocean Economy in 2030*, OECD Publishing.

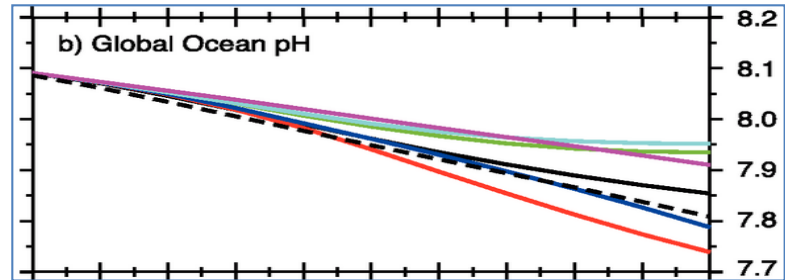


... “business-as-usual growth of economic activities in the ocean is not an option for the future”

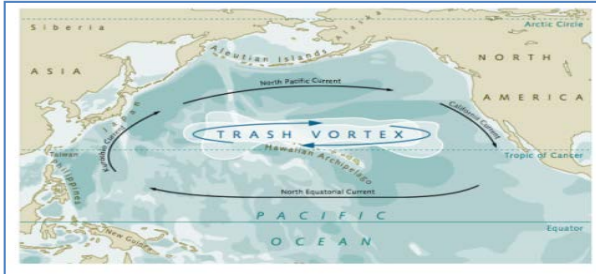
### Climate



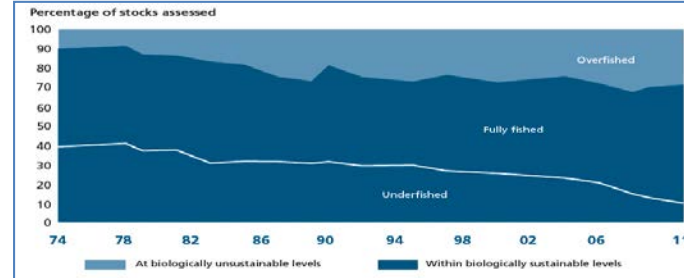
### Acidification



### Pollution



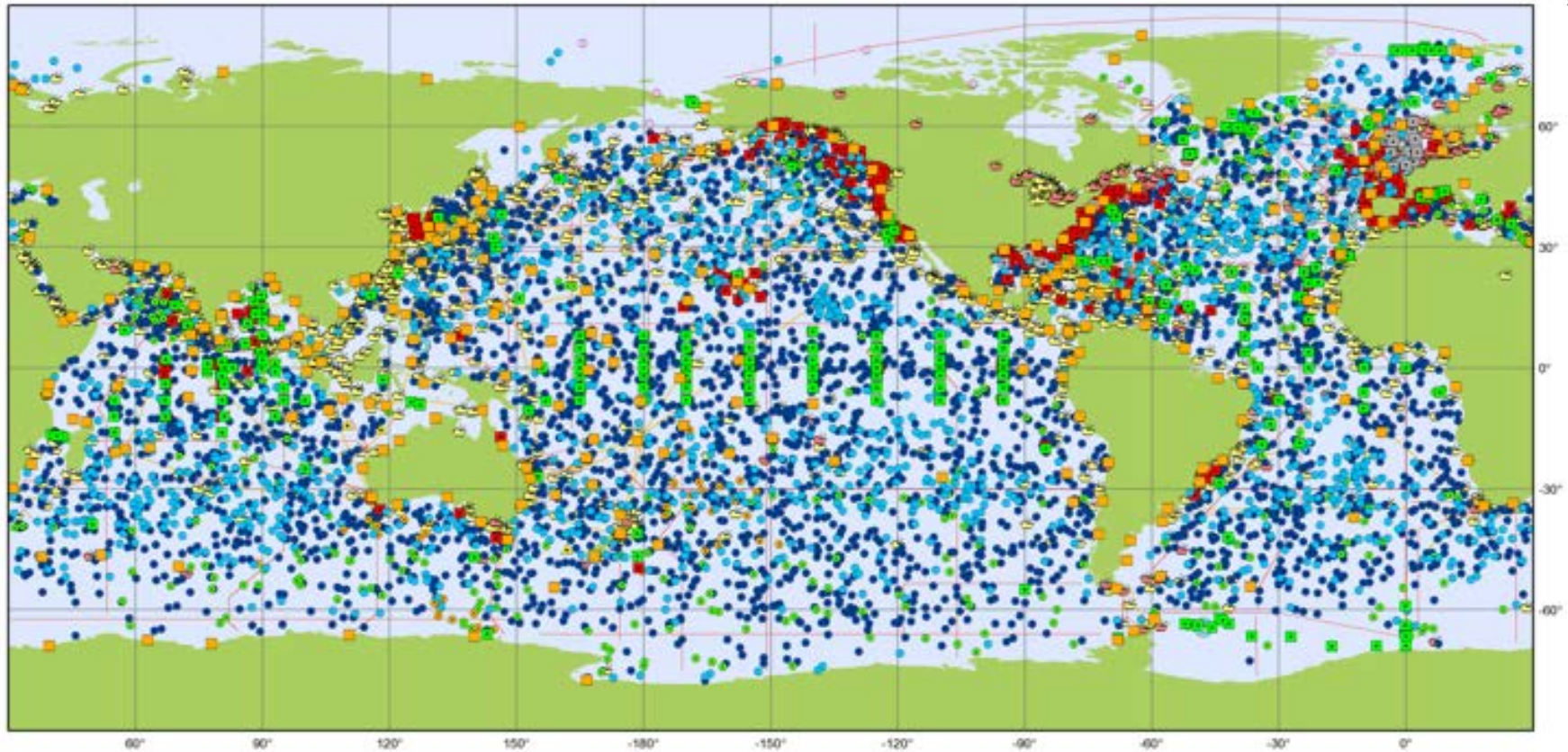
### Overfishing



**We need to know more!**



# Global Ocean Observing System: Operational and funding sustainability



Main in situ Elements of the Global Ocean Observing System

February 2018

**Profiling Floats (Argo)**

- Core (3858)
- Deep (50)
- BioGeoChemical (305)

**Data Buoys (DBCP)**

- Surface Drifters (1401)
- Offshore Platforms (96)
- Ice Buoys (14)
- Moored Buoys (374)
- ▲ Tsunameters (3)

**Timeseries (OceanSITES)**

- Interdisciplinary Moorings (340)
- **Repeated Hydrography (GO-SHIP)**
- Research Vessel Lines (61)
- **Sea Level (GLOSS)**
- Tide Gauges (252)

**Ship based Measurements (SOT)**

- Automated Weather Stations (258)
- Manned Weather Stations (1754)
- Radiosondes (13)
- eXpendable BathyThermographs (37)





# Disruptive innovations that fundamentally shift knowledge acquisition and industry practices...

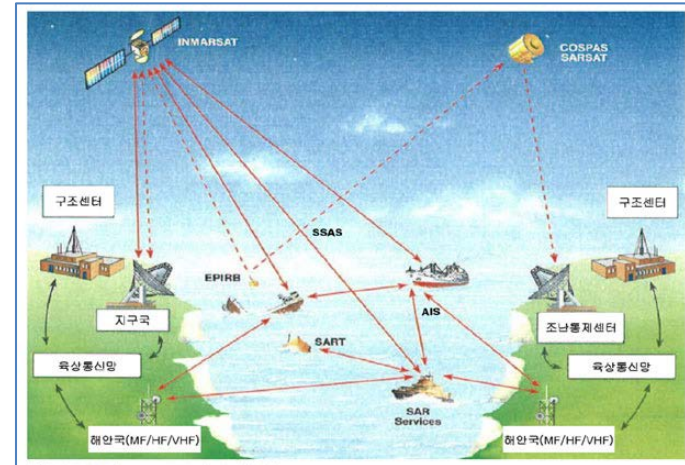
## Tomorrow's intelligent ship



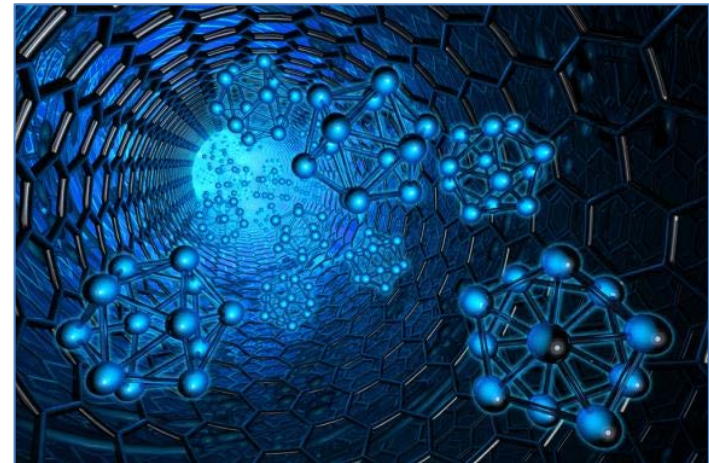
## Subsea robotics



## E-navigation

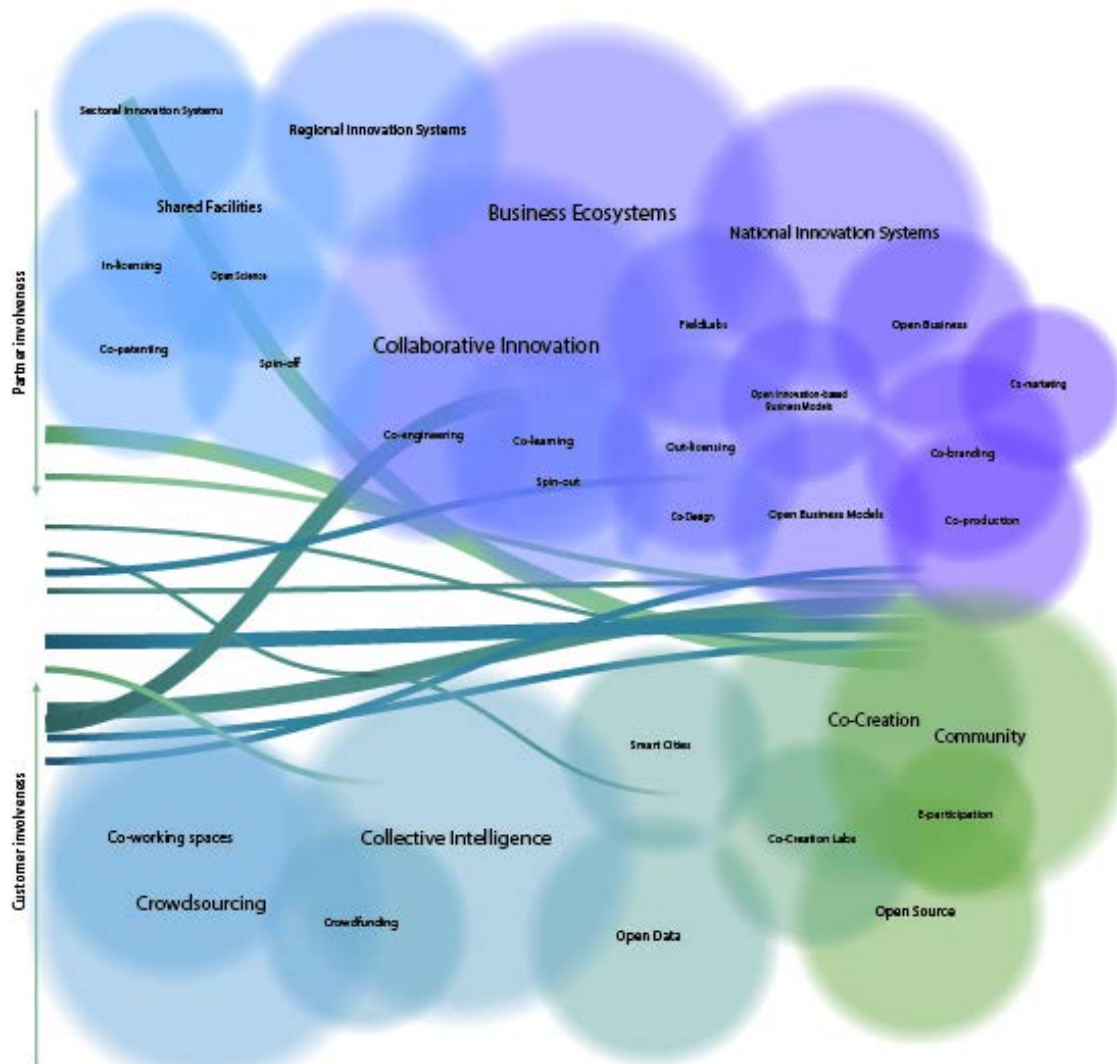


## Bio- & nanotechnology





... And emerging and new patterns of collaboration in ocean R&D appearing...



Ongoing OECD exploration of innovation networks in the ocean economy



# New OECD report on the Ocean Economy (Launch in Lisbon, on 14 Feb. 2019)



Three areas for action based on a number of in-depth case studies:

- 1) approaches that could produce win-win outcomes for ocean business and the ocean environment across a range of marine and maritime applications;
- 2) the creation of ocean-economy innovation networks;
- 3) new initiatives to improve measurement of the ocean economy.



# Ocean – Space

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- New Economic frontiers?
  - Numerous challenges but also opportunities
  - Still a need to reinforce the links between the space and marine/maritime communities...
- Improved ocean management and governance –including in the Atlantic– require ever more science... and adequate sustained observing tools

