



MARITIM 21

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Content

- Norwegian maritime industry
- Forecast, trends and drivers
- Maritim21



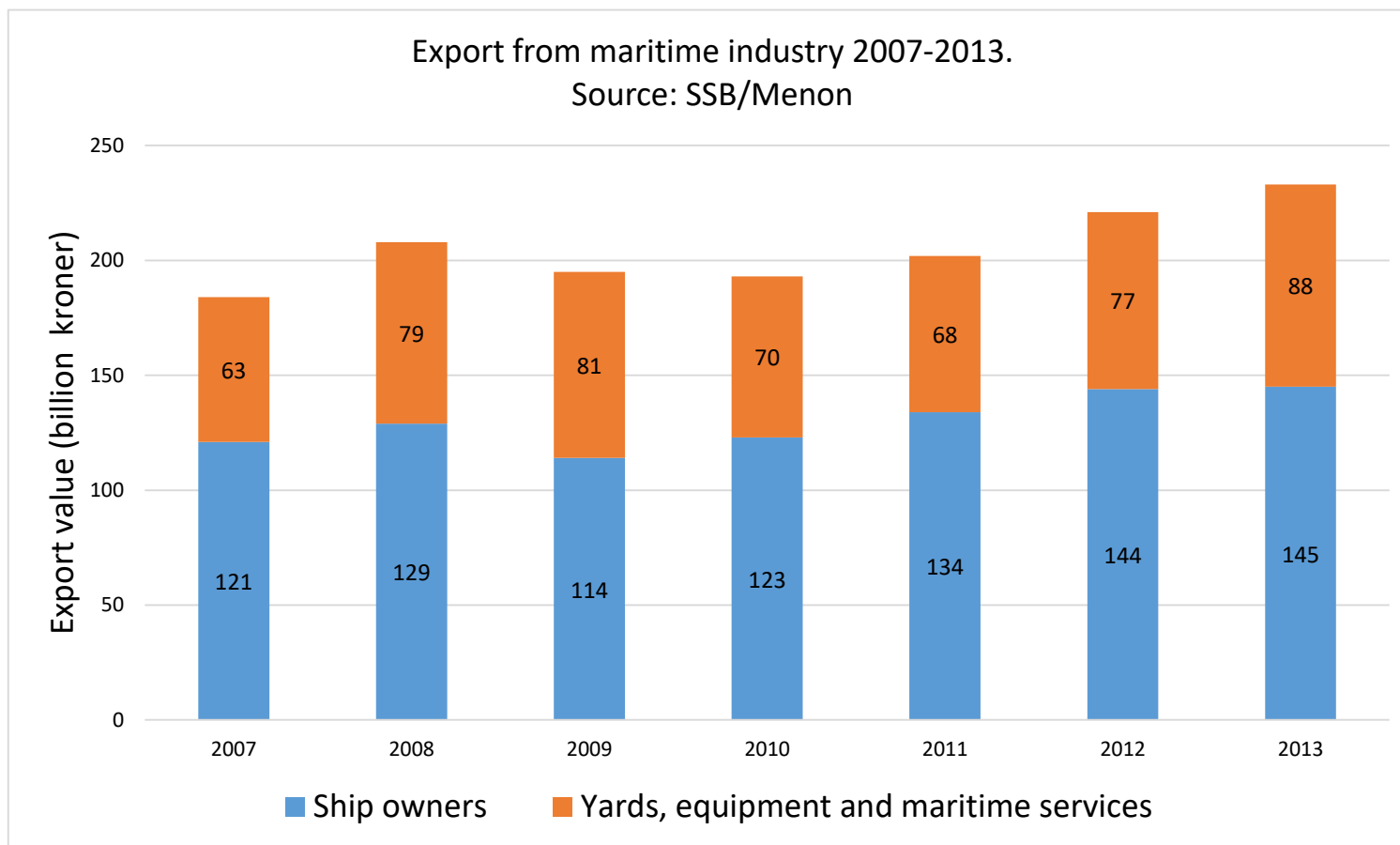
Key figures

	Employment	Value creation	Turnover
Maritime - total	109 506	188	551
By main groups			
Ship owners	45 420	110	291
Services	27 767	37	102
Equipment	25 953	33	119
Yards	10 366	8	39

Value creation, turnover (in billion kroner) and employment (2014), Source Menon



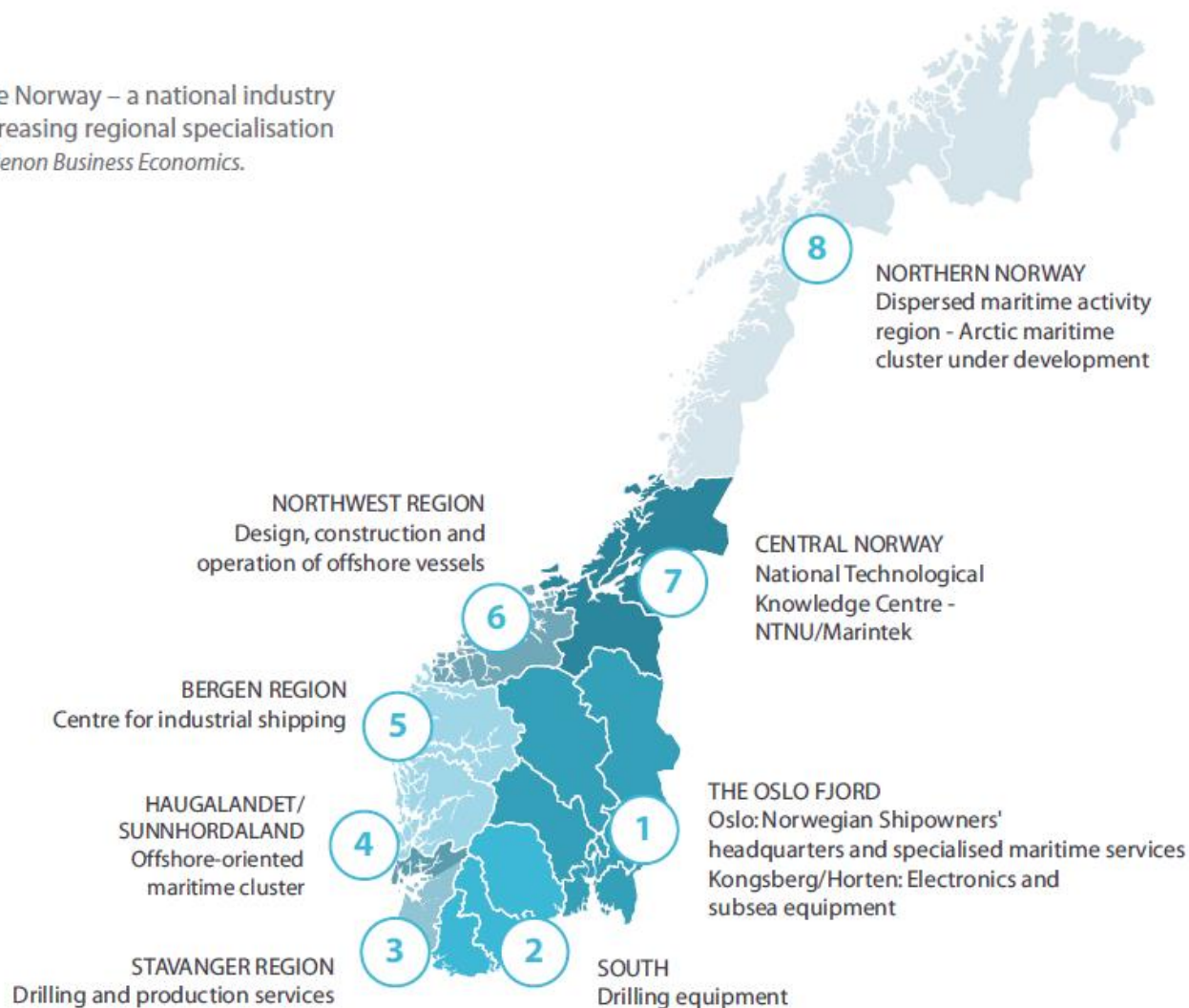
Maritime exports





Regional specialisation

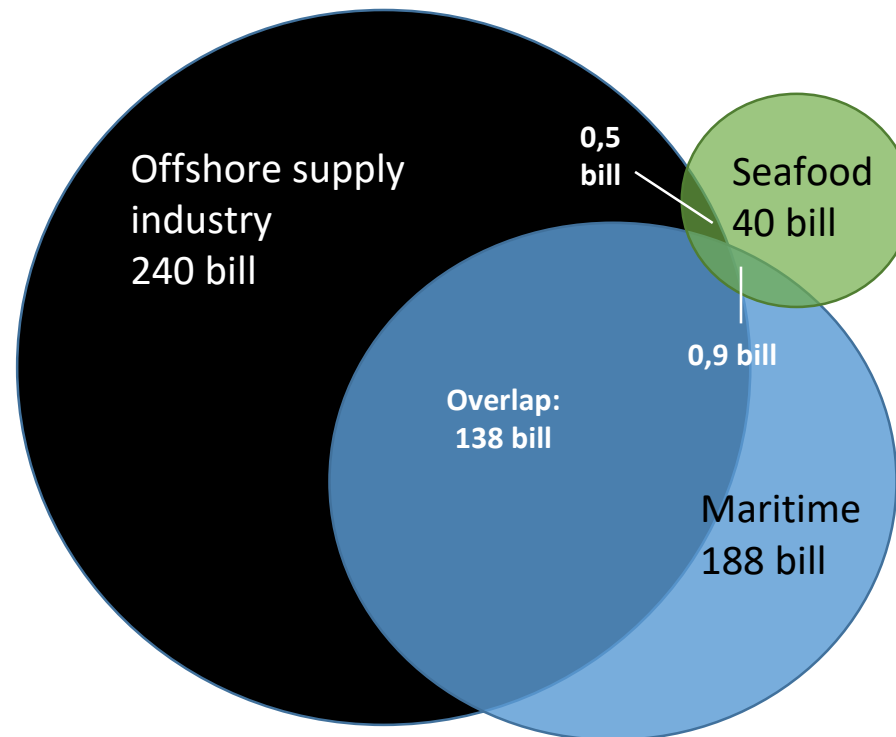
Maritime Norway – a national industry with increasing regional specialisation
Source: Menon Business Economics.



Overlap among Norwegian ocean industries



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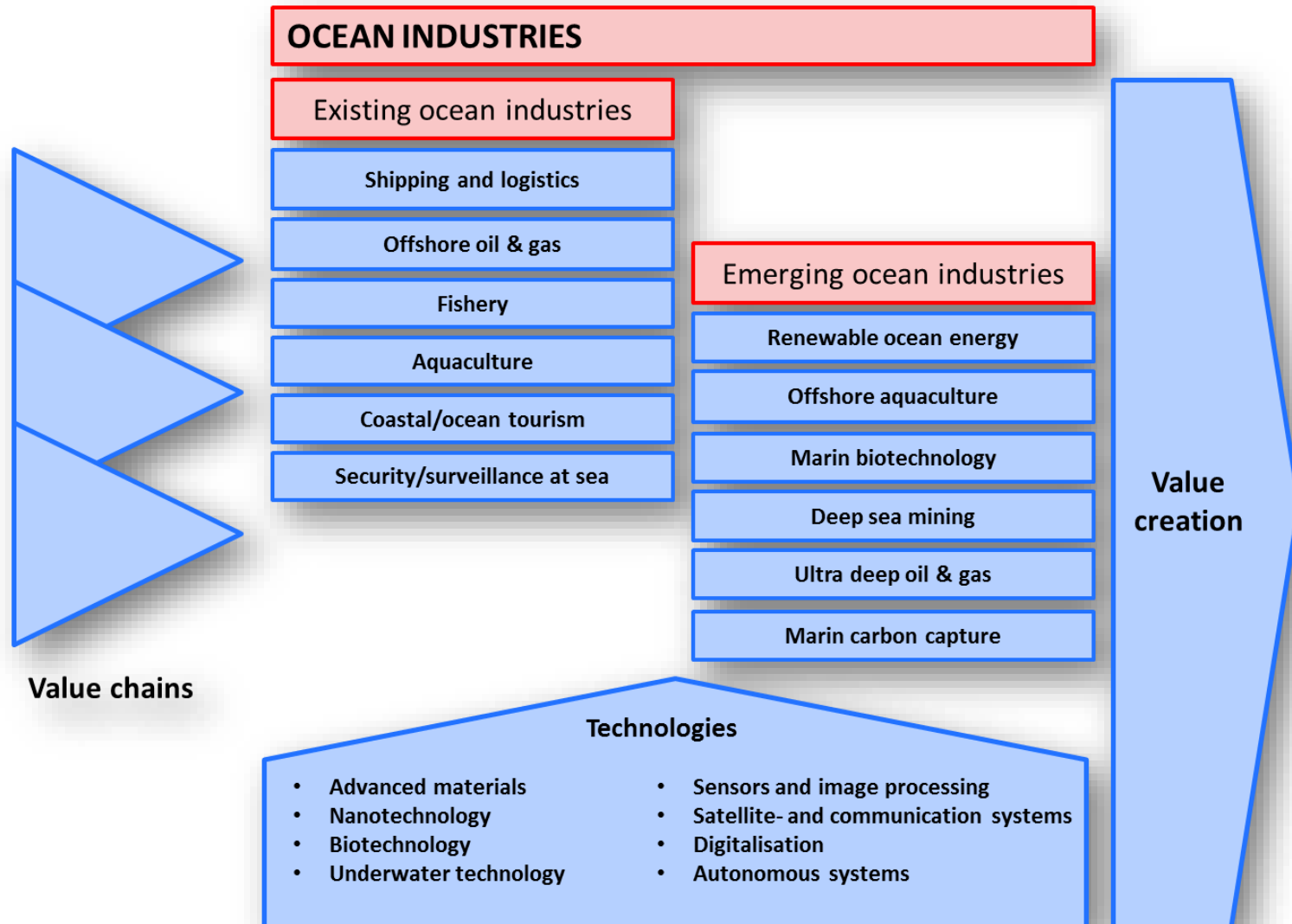
Value creation and overlap (billion kroner) among Norwegian ocean industries (2014), Source Menon

Ocean industries

Another view

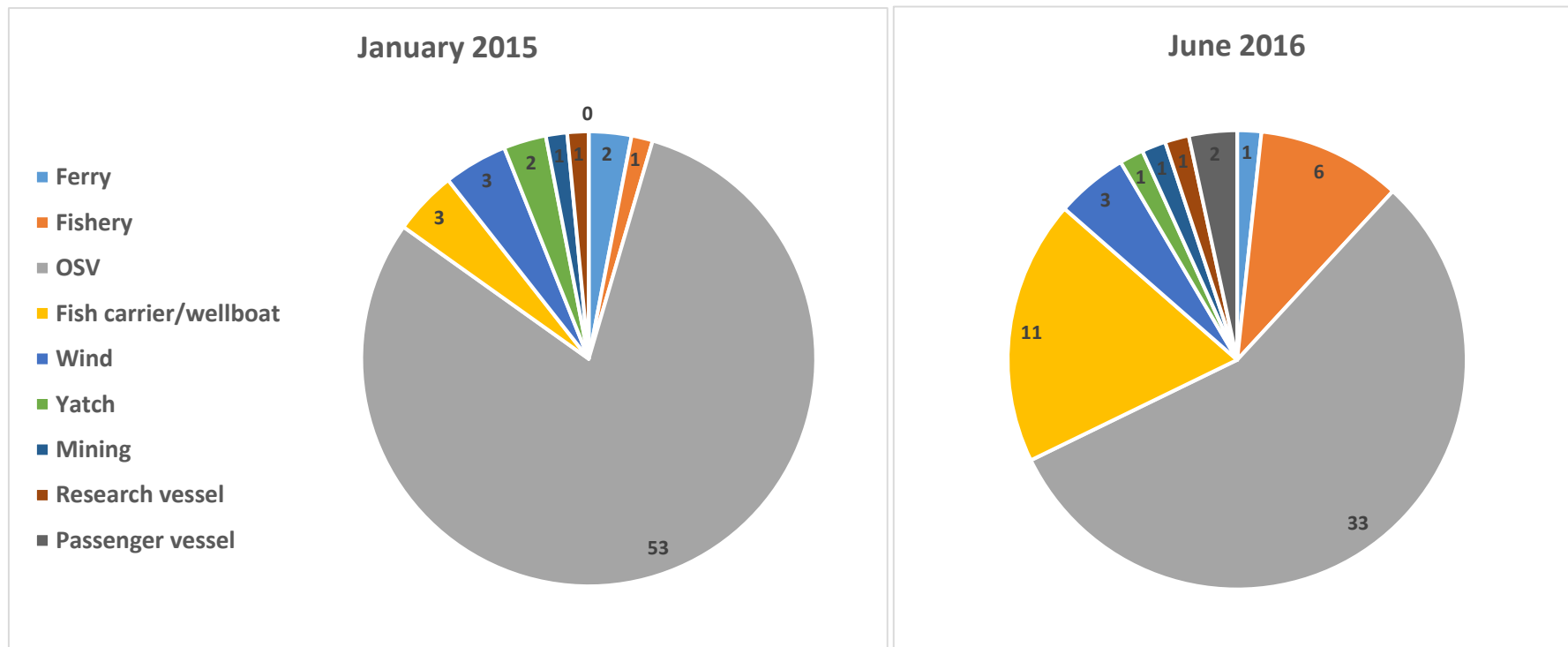


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Order reserve Norwegian shipyards



Forecasts, trends and drivers



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- Transport and logistics
 - World trade development, new markets
 - Short sea shipping fleet renewal and regulation
- Seafood
 - Lower growth rate ahead, offshore farms
- Offshore oil & gas and offshore wind
 - Offshore oil & gas still down 2017-2018
 - Offshore wind, strong growth, small volume
- Long term
 - Deep sea mining, wave and tidal energy, fishing at lower trophic levels



Forecasts, trends and drivers



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- Innovation ability
 - Digitalisation for Innovation - and disruption
 - Faster innovation and restructuring
 - Competition for talent
- Climate and environmental concerns and stricter regulations
- The world economy
 - Demography (and food)
 - Oil price
 - Southeast Asia remains important for world economy





Objective

- *Encourage **research, development and innovation** activities that **promote sustainable growth and value creation**, boost the competitiveness of the maritime industry and realise the potential of the maritime industry through **synergies with marine industries**.*





Purpose

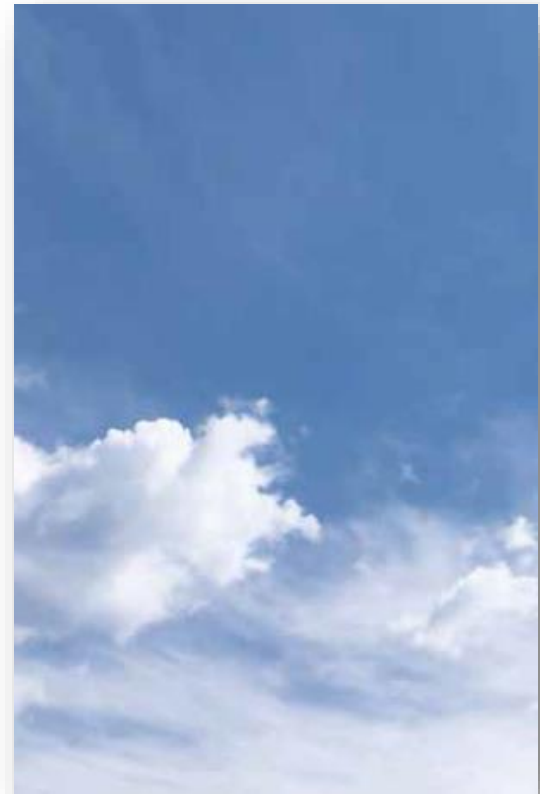
- *Develop a **broad-based, unified, stakeholder-inclusive** strategy for **research, development and innovation** for the **maritime industry***



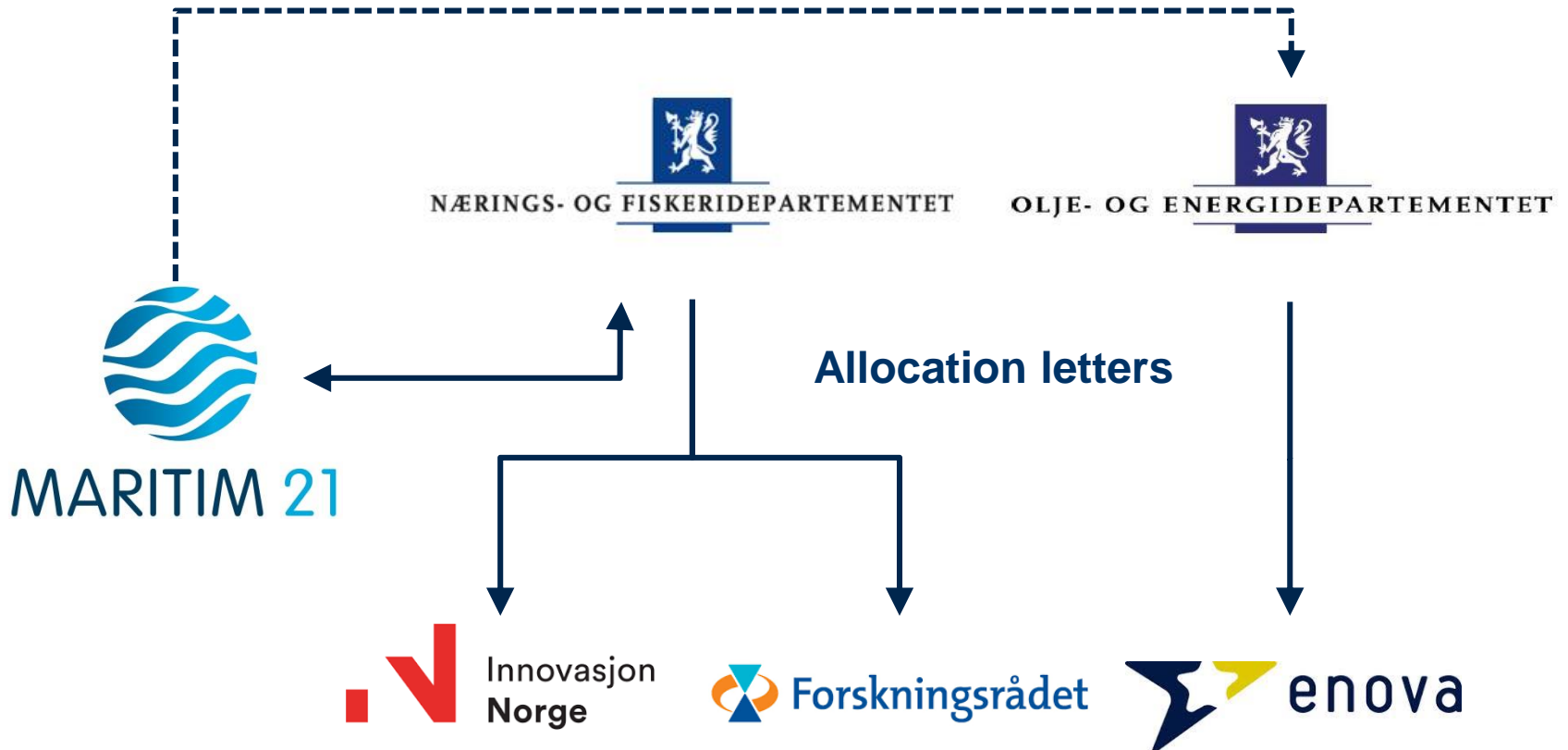


Background and timeline

- Maritim21 is a part of the Government's maritime strategy
- The strategy group was appointed by the Minister of Trade and Industry
- Project started January 2016
- Maritim21 report delivered November 1st 2016
- Carried out as an open process



Role of Maritim21





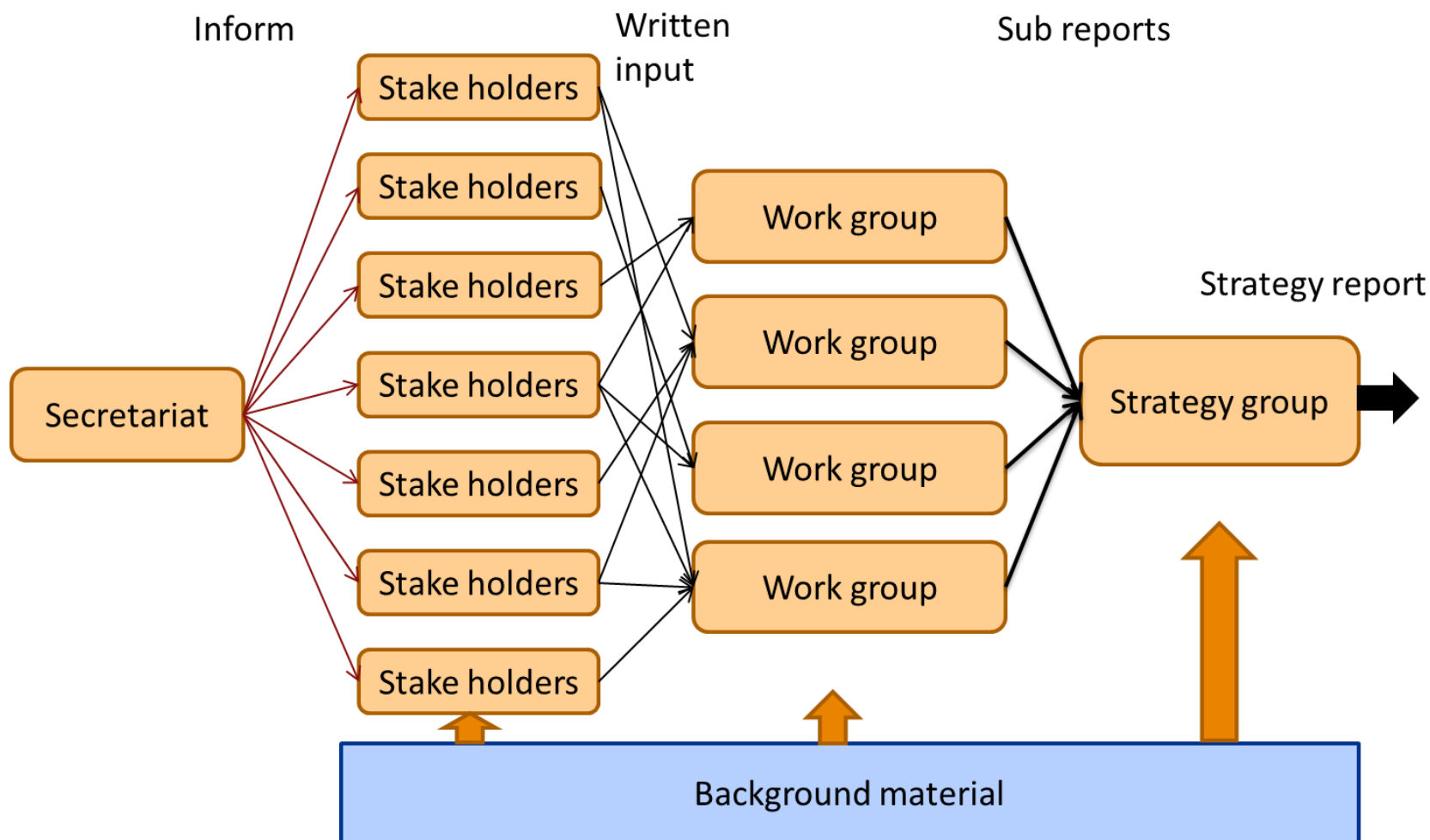
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Structure of Maritim21



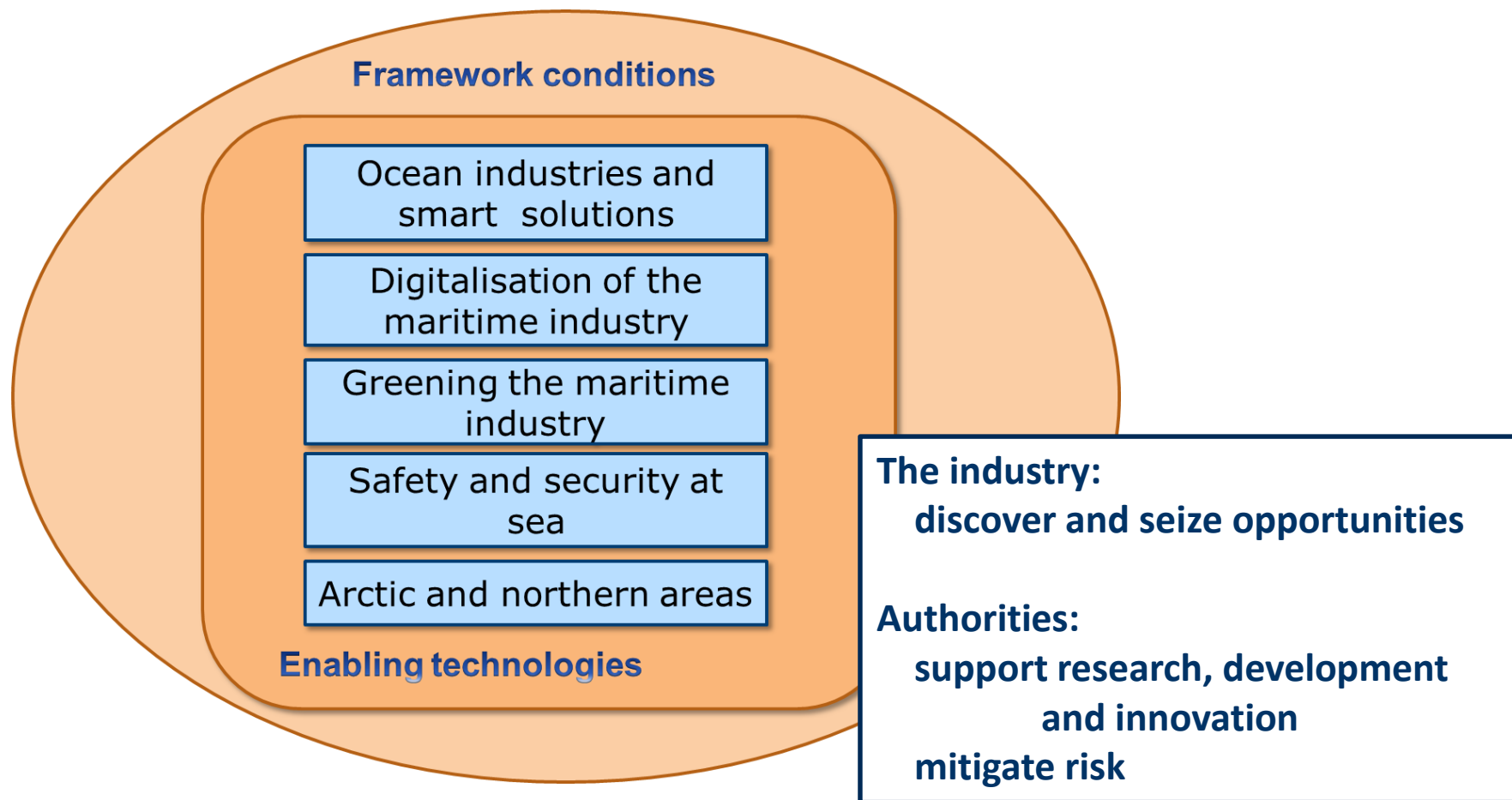


Maritim21 process





Main priorities Maritim21





Enabling technologies

- Information Technology
- Nanotechnology and Advanced Materials
- Biotechnology
- Advanced production



RD&I to

- Stay technologically in front
- Expand expert knowledge to seize the opportunities
- Cooperate with other countries



Ocean industries and smart solutions



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- Innovate and adapt to emerging markets
- Knowledge of new technologies and business models to provide opportunities

In existing markets and emerging ocean industries



Photo: Ulstein Group / Marius Beck Dahle



Illustration: Rolls Royce

Ocean industries and smart solutions – New markets and industries



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- Norway is well positioned with strong ocean clusters
- Collaborate across ocean industries



Ocean industries and smart solutions – New technologies and business models



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- RD&I for
Autonomous and remote
controlled vessels
- Services that contribute to
added value
- Significant potential through
connecting new markets,
technologies and business
models



Photo: Maritime Robotics / Andreas Misje



Illustration : DNV GL



Digitalisation of the maritime industry

- Develop a digital “thread” throughout the value chain
- Increase efficiency and optimize technical and commercial operations
- Maximise cost benefits
- Knowledge areas
 - Design and production
 - Operations and logistics
 - Observations and monitoring



Photo: Brunvoll



Photo: Offshore Simulation Centre

Digitalisation – Design and production



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- Objective
 - Design and produce ships and equipment cost effectively
 - Developing a digital value chain
- RD&I for
 - Simulation, virtual testing, automation and robotics
 - Interfaces and standards



Photo: Kleven



Digitalisation – Operations and logistics

- Objective
 - Cost effective, safe and environmentally friendly operation and logistics
- RD&I in
 - Sensors, information and optimization
 - Communication
 - Decision support
- Build infrastructure, components and equipment



Illustration : Ulstein



Digitalisation – Observations and monitoring

- Understand and monitor the sea
- Data to improve design and operation
- RD&I in
 - Instrumentation
 - Sensors
 - Handling and analysis of large amounts of data





Greening the maritime industry

- Contribute to reaching climate goals
- Increased opportunities for industry
- RD&I in
 - New energy carriers
 - Low- and zero emissions
 - Battery, LNG and hydrogen
 - Energy efficiency
 - Important incremental improvements
 - Efficiency improvement "from tank to propeller"
 - Emissions reductions
 - Incentives and regulations



Photo: Enova



Illustration : IM Skaugen



Arctic and northern areas

- Increasing activity and challenging conditions
- Norway leads in technology and operational expertise
- RD&I for:
 - Technology, operational systems and logistics adapted to demanding conditions
 - Improving safety and emergency preparedness





Safety and security at sea

- Both preventive measures and emergency preparedness
- RD&I for increased knowledge
 - Different and new risks, new solutions
 - Human/machine Interaction affects safety



Photo: Karsten Pedersen





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Proposed actions and recommendations

- Strengthen investments in RD&I
- Include from basic research to demonstration
 - Large, long-term research projects
 - Strengthen RD&I infrastructure
 - Demonstration and verification activities
 - Infrastructure and full-scale testing projects
- More seamless and less fragmented funding instruments
- Cooperation between research and industry and across sectors and disciplines
- Coordinated efforts on major challenges and opportunities
- Strengthen international cooperation





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[MARITIM21. EN HELHETLIG MARITIM STRATEGI
FOR FORSKNING, UTVIKLING OG INNOVASJON]

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**Thank you for your
attention**