Empower Academia for Knowledge Transfer for Value Creation in the Atlantic Area

National Bootcamp: UK

Partner: Liverpool John Moores University (LJMU)

Date: 30/11/2019

This project has received funding from the European Union's Interreg Atlantic Area programme through the European Regional Development Fund, project code: EAPA_842/2018. This output reflects only the author's view and the European Union cannot be held responsible for any use that may be made of the information contained therein.

a) Profile relevant Blue Economy (BE) sectors at national level, enabling benchmarking and future comparisons

According to the European Commission's Blue Economy report (EC, 2019), the relevant Blue Economy sectors in the UK mainly include coastal tourism, marine living resources, port activities, shipbuilding and repair and maritime transport.

United Kingdom: Evolution of the established Blue Economy sectors

Persons employed *(thousand)*	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal tourism	247.0	243.4	243.7	219.6	233.5	195.9	175.0	191.8	201.3
Marine living resources	46.5	46.4	46.1	45.9	46.2	47.2	46.7	46.6	46.2
Marine non-living resources	40.0	44.4	44.5	48.1	44.4	44.5	44.7	43.5	43.5
Port activities	76.3	80.7	74.8	97.9	101.4	101.0	109.8	158.5	158.5
Shipbuilding and repair	45.4	41.0	38.0	42.0	40.4	44.5	42.9	50.0	50.5
Maritime transport	17.2	17.1	16.7	17.7	16.6	17.7	19.2	16.1	16.1
Blue economy	**472.4**	**473.1**	**463.8**	**471.4**	**482.5**	**450.7**	**438.3**	**506.4**	**516.2**
National employment	*28,319*	*28,290*	*28,404*	*28,650*	*28,917*	*29,559*	*30,016*	*30,424*	*30,783*
Blue economy *(% of national jobs)*	**1.7%**	**1.7%**	**1.6%**	**1.6%**	**1.7%**	**1.5%**	**1.5%**	**1.7%**	**1.7%**

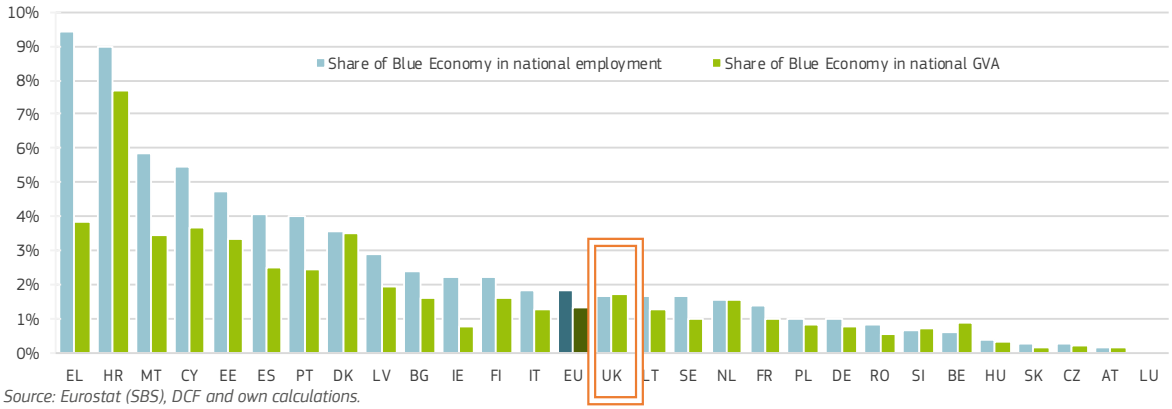
GVA *(EUR million)*	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal tourism	7,105	7,098	7,108	7,073	7,577	7,622	7,529	7,784	8,114
Marine living resources	2,057	1,858	1,930	2,060	2,064	2,538	2,658	2,847	2,778
Marine non-living resources	17,013	17,803	17,273	18,177	18,257	17,691	16,391	11,860	11,860
Port activities	5,262	5,127	5,050	5,405	5,665	6,208	8,246	7,466	7,466
Shipbuilding and repair	1,788	2,272	2,104	2,914	2,415	3,112	3,272	2,897	2,908
Maritime transport	2,601	2,791	2,355	2,621	2,539	3,202	3,961	2,984	2,984
Blue economy	35,825	36,949	35,820	38,249	38,516	40,373	42,057	35,838	36,111
National GVA (EUR billion)	*1,571.4*	*1,666.5*	*1,691.9*	*1,868.3*	*1,852.5*	*2,041.8*	*2,331.1*	*2,142.9*	*2,082.7*
Blue economy *(% of GVA)*	**2.3%**	**2.2%**	**2.1%**	**2.0%**	**2.1%**	**2.0%**	**1.8%**	**1.7%**	**1.7%**

Source: Eurostat, DCF and own calculations.

Figure 1 – UK: Evolution of Blue Economy
Source: EC (2019)

According to the same report, the contribution of the established Blue Economy sectors to the UK economy is below the EU average (Fig. 2). To that extent, it is obvious that there is much room for improvement, and the EMPORIA4KT project is timely at the national level.

Figure 8 Size of the Blue Economy compared to the total per Member State, 2017, percentage



Source: Eurostat (SBS), DCF and own calculations.

Figure 2 – Size of the BE compared to the total per Member State (percentages, 2017)
Source: EC (2019)

An interesting finding though is that the UK makes the largest contribution to the total EU-BE GVA (Fig. 3). The main reasons are probably the facts that the UK has a leading role in (a) the EU marine extraction of minerals, oil and gas, which generated 52% of the GVA and 27% of jobs in 2017, and (b) EU port activities, which accounted for 21% of the GVA and generated 28% of the jobs. The United Kingdom is the also the main EU salmon producer, with Greece and Spain producing mostly seabass and seabream.

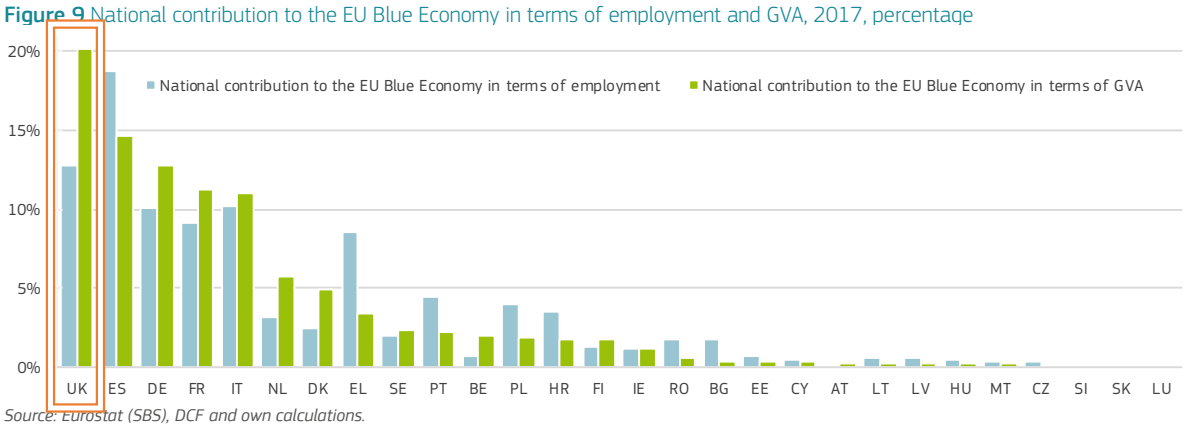


Figure 3 – National contribution to the EU Blue Economy (percentages, 2017)
Source: EC (2019)

A report produced by the Centre for Economics and Business Research (Cebr) for Maritime UK reports similar figures for the UK Blue Economy, focusing though on maritime activities and thus excluding sectors like coastal tourism. The report presents also some regional statistics (Fig.4), which illustrate the importance of the Blue Economy to the UK Atlantic Area regions, especially those of North-West England, South-West England, and Scotland.

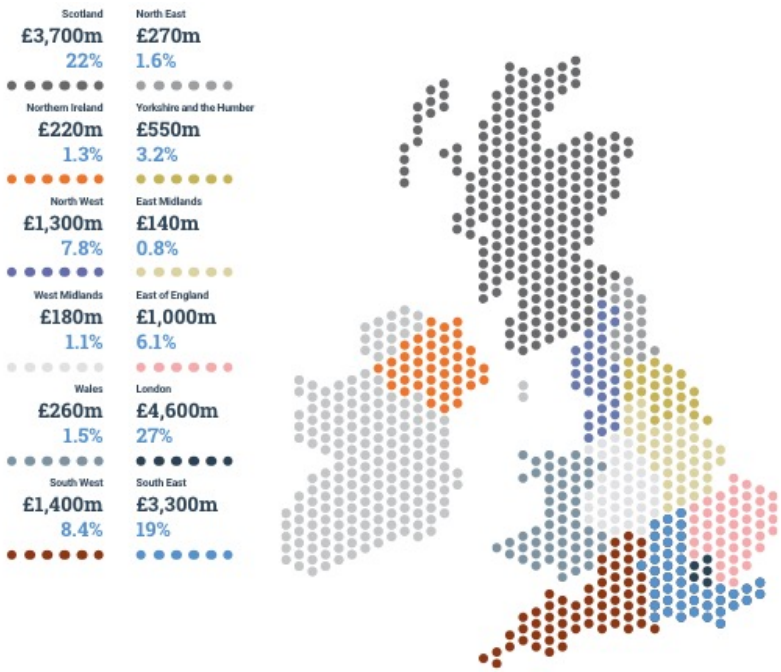


Figure 4 – Regional breakdown of GVA directly contributed by the Sector, £ million, 2017
Source: Cebr (2019)

Several of the UK Bootcamp participants mentioned Brexit uncertainty as a factor that might affect the UK Blue Economy. Some highlighted the negative consequences due to reduced trade (e.g. imports), the demand for services (e.g. insurance) and reduced EU funding opportunities, whereas others mentioned that it might have a positive impact in the Atlantic Area regions as cargo might have to shift from other modes or areas to the UK west coast (e.g. Merseyside) due to the proximity to Ireland and Northern Ireland.

The maritime transport and offshore renewable energy sector are considered to be very promising sectors, especially for the Atlantic Area.

b) Identify needs, market opportunities and trends

Needs:

A framework to represent and coordinate the achievements (existing knowledge) is needed. Trade and travel by sea remains a significant part of the UK modern economy, and the UK Government recognises that this is a pivotal period for the maritime sector, one of change and potential (Maritime 2050). Yet, the link between policy-research-practice is not visible and several projects are fragmented. Therefore, **joined up policy and interconnected infrastructure development** are crucial in order to coordinate modal interchanges rather than pitting one mode against another. One attendee of the UK bootcamp mentioned that Catapult centres have the physical infrastructure to develop project demonstrations, with testing facilities for the partner organisations in the cluster. Accessing to physical facilities and wide expertise possessed by the Catapult networks is crucial.

Decarbonisation is another big challenge for the maritime economy and we need to promote the large-scale conversion of the maritime sector and of all modes of transport to zero emission / zero carbon transport to meet climate emergency and air quality challenges. With an ageing workforce there is a need to boost maritime skills through the universities and colleges and create the next generation workforce and raise awareness of maritime sector in future generations. Like aviation, maritime can seem quite an intangible and remote industry to the ordinary person who has more direct contact with cars, buses and trains on a day-to-day basis. We must raise awareness about maritime, how it works, its importance to the UK economy, and the wide range of careers available if we are to foster interest in future generations.

The clear definition of objectives in a research partnership and **broader awareness of available innovation incentives** are the common needs to the triple helix sectors on the maritime sector. Low-level vouchers (e.g. £10,000) would encourage companies to engage with universities or RTOs.

Other needs mentioned in the bootcamp, included:

- Requirement to engage with SMEs.
- Requirement to optimise the performance of multimodal logistic chains and links with other modes.
- Requirement to reduce the administrative burden and harmonize reporting and customs requirements across the EU (building on NSW).
- Requirement to significantly reduce GHG emissions, including reduced road transportation of goods and the need to decongest cities.

Opportunities:

Technology innovation is both a challenge and an opportunity for the maritime industry. Recently, new technology (or disruptive technology) has largely changed the business operations in the transport industry (e.g. blockchain, big data, Internet of thing (IoT), automation and autonomous vehicles). These changes, seen across transport and the wider economy, have the potential to generate a significant impact on how the maritime sector operates and the business model of companies. The maritime industry would benefit from adopting emerging technologies by decreasing operational costs and increasing efficiency simultaneously. **Digitalisation and maritime**

autonomy is another opportunity that the shipyard and wider maritime sector should explore. The emerging ShipTech sector is a new development that needs fostering. Tech industries have expertise that is applicable across many sectors, including the maritime sector, but they often find the sector difficult to break into. A future phase of the Port City Liverpool innovation hub (an innovative concept proposed by the UK Government) is looking into the potential of creating a future mobility / maritime autonomy / drone testbed, to facilitate tech industry-maritime sector relationship-building.

Reinvigorating shipbuilding at Cammell Laird is a big opportunity regionally, especially with the transition to zero emission shipping (e.g. hydrogen fuelcell powered ships, battery electric ships) and transport to tackle the climate emergency. This shipyard, which is one of the most famous names in the history of this nation's shipbuilding and ship repairing, was founded almost 200 years ago in Birkenhead (Merseyside). According to Cebr (2019), which presents Cammell Laird as one of the main case studies, the firm supports 1500 core and supply chain workers at peak times and 300 small business suppliers. In addition, **industry clusters connected with academic skills and sector-focused programmes** are identified as capable of creating market opportunities. Shipyards have expertise in modular construction that is transferable to other sectors too. However, often they lack the innovation and ability to diversity and be more flexible.

The UK Government is looking into the possibility of creating Freeport Zones at ports and airports in the UK post-**Brexit era**. The Liverpool City Region local authority is open to this opportunity and is currently working on a possible scope. The new Liverpool 2 Container Terminal at the Port of Liverpool presents a major opportunity to attract deep sea container routes to Liverpool, help rebalance the UK economy and relieve pressure on the congested South Coast ports and the transport networks that link them to the hinterland. However, there is a need to address capacity constraints on the Transpennine rail network Corridor in order to maximise the potential of the Port of Liverpool and the emergence of new container train flows in the future. Our ports can be the foundation of new industrial and economic clusters. In addition, Brexit could accelerate business with the US on deep sea shipping and offshore renewables, as this is a recent market and therefore, an opportunity for the UK.

Trends:

Linking back to the need to optimise the performance of multimodal logistic chains and links with other modes, future trade will require a platform for an efficient intermodal model.

The offshore industry is driving towards cost efficiency and larger, more capable turbines. At present, turbines tend to be built in relatively shallow waters and use varying type of foundations to ensure stability. The next generation are likely to be floating structures, which enables use in deeper waters.

The application of technology has been mentioned many times in previous discussions, yet there remain many challenges regarding how to specifically apply these technologies into the Triple Helix players. However, the trend of applying these technologies is inevitable.

c) Profile main barriers of communication and relationship between the Triple Helix (TH) players in order to determine the most suitable subjects and materials that should be provided to Academia researchers, so that they will be capacitated to mitigate such barriers and foster cooperation

During the bootcamp, many attendees mentioned the **lack of integration** between TH players, more specific, **fragmentation of regional strategies in England** and a **lack of coherent authority**. Lack of available industry-academic networks with a regional focus was highlighted as a barrier to proper communication. This includes an integrated platform for discussion and knowledge exchange, different procedures for cooperation, etc. The Northern Powerhouse strategy has not been effective in tackling these barriers. The UK Government should take the lead to overcome this barrier with the other two players to facilitate cooperation within the TH.

Different goals based on different TH roles were mentioned several times during the bootcamp. The cultural gap between the interests of academia (publications/attracting research funding) and industry (profit) is a common issue when seeking for cooperation. There have been several studies that have attempted to find and fill this gap between academy and industry. For instance, Lin and Chang (2018) compared skills requirements between logistics operation practitioners and academia and found that there are some existing gaps. The findings suggest that there should be more communication between academia and industry to eliminate the gap. In this case, industry should take the lead to brief researchers on the practical requirements that industry wants or the critical issues that industry are dealing with.

Many attendees mentioned **different timescales.** For instance, short-term engagement and quick results are needed when industry is involved. **Unrealistic timescales** and **lack of time** are issues that influence the cooperation between the TH players. The demand on a quick solution often drives industry to choose consultant companies. Poor project management could be a reason that leads to time pressures, thus the time-cost relationship should be measured and implemented well to overcome this barrier.

Academia has conducted many research studies to solve some of the problems occurring in the industry, but there has been **little visibility of research outcomes** for the industry. Attendees from industry also mentioned (1) the need for a clear presentation of data, in an industry-relevant and easy to understand format; (2) academics lack the ability to “sell” their work; and (3) the lack of real experience by academics leading to communication difficulties and to unrealistic proposals to industry. In contrast, academia mentioned the **difficulty of accessing information** from industry.

Some attendees mentioned the **reticence of companies to change their operating model and cultural change**. Sometimes, inflexibility of the T&L sector to invest in and/or adopt change owed to competing business pressures. Silo thinking, inflexibility and a lack of collaboration among partners will be a barrier for cooperation between the TH players. One attendee also mentioned that the balance between competitive advantage and the sharing of safety-related information is identified as a barrier to transferring knowledge and innovation.

d) Best practices on R&D, tech transfer and innovation promotion initiatives (financial and policy) in order to get information on concrete tech transfer activities we should look at when preparing our learning materials and the acceleration methodology.

Attendees shared several experiences in the bootcamp. One mentioned the experience of working with a project called Initiative Towards sustAinable Kerosene for Aviation (ITAKA). The overall objective of ITAKA was to develop a full value-chain in Europe to produce sustainable aviation biofuels addressing challenges for the development of the production at large-scale. The beauty of this project was the value chain involved from feedstock to refinery and aircraft, involving aspects of sustainability, economic competitiveness and technology readiness, in order to identify and address barriers to innovation. Being the first of its kind collaborative project in the EU, ITAKA aimed to link supply and demand by establishing a relationship under guaranteed conditions between feedstock grower, biofuel producer, distributor and final user. This involved a large value chain and complex, multidisciplinary research. ITAKA was based on an initial small but ambitious project on aviation biofuels sponsored by AIRBUS: the Romanian Camelina Value Chain. She also mentioned the UK Catapult framework as an example – to link innovation from research to the market – bringing the knowledge together under an umbrella. Build on the strengths of the UK, encourage start-ups, look for ideas. Build up knowledge across different countries. Finding a way to get the message across and accessing support is key to help build the bridge between academia and industry.

Another attendee also shared her experience. SELIS represents a good example, as the technology was transferred and used in several industry labs (e.g. DHL, Sonae, Andria Combi and others). Some suggested that Government could have virtual research centres and bring together numerous academic institutions under one umbrella to make them less competitive. Apart from this, funders – thinkers – linkers – doers – help to build knowledge on how to link academic projects with moving forward to commercialisation.

Within the context of TH, the UK Research Councils and Catapults collaborating with Government Science Office and different governmental departments and authorities (e.g. Department for Transport), encourage the unknown to the established. Examples of best tools for ice breaking include 1) Researcher in Residence programme allowing the researchers to work with Catapults and industrial partners on the selected topics which deems important for TH players; 2) Business Fellowship programme in which the heads of research offices from the UK universities are invited to work with Catapults centres to address the industrial and governmental research needs by using their university research strengths in an individual or a collaborative way; 3) Research councils and Catapults industrial case PhD programme; and 4) Research network events by research councils and Catapults including research café by catapults and research roadshows by research councils.

e) Identify innovation policies and R&D&I capacity to support development, as well as current constraints for innovation, including key areas requiring funding intervention, so that the consortium can provide information and suggestions to improve such policies at national level.

An attendee from industry mentioned several current constraints to innovation, including (1) the reticence of companies to change their operating model and cultural practices; (2) lack of financial investment; (3) availability of grants and support varies, Brexit adding to the uncertainty; and (4) sometimes, the inflexibility of the T&L sector to invest in and/or adopt change owed to competing business pressures. Another industrial attendee mentioned that the academic environment should stress impact-orientated results and be less concerned about publishing. Also, academia should have a better understanding of how things work to link theory to the practical operations.

An attendee from the Government mentioned that more funding for maritime-related will be available to support the relevant R&D and innovation technology transfer. For instance, DfT funding through Maritime Research and Innovation UK (MarRI UK) becomes regular and frequent.

An attendee from academia mentioned that SMEs need to be supported by policy, as they usually lack resources, skills and time. He also mentioned the importance of fairness and transparency.

SWOT ANALYSIS (of the national TH stakeholders' ecosystem)

STRENGHTS	WEAKNESSES
• Good maritime research base • Established maritime industry base – major energetic independence or other tangible example could be added • Good support to access funding and/or commercialise technology • Some good local networks around ports • Cross-sectoral expertise/talent base in emerging technologies (e.g sensors) • Already existent physical infrastructure to develop project demonstrations	• Lack of investment in UK maritime • Lack of human resources • Difference objectives (e.g companies driven by profit, academia focuses on attracting funding and producing publications) • Different timescales (i.e. companies want fast results) • Little visibility of research outcomes (i.e industry not much aware of academic research) • Issues around IP rights and exploitation of results
OPPORTUNITIES	**THREATS**
• Existing KTI infrastructure (e.g. Mari UK) • Major maritime organisations HQ (e.g. IMO) are in the UK • Cross-sectoral expertise/talent base in emerging technologies (e.g sensors) • Brexit: changing logistics patterns that may shift cargo to sea; Liverpool being strategically located (gateway to Ireland) • Government focus on sustainability from circular economy, driving the transformation of the economy • Development of ecological consciousness • New jobs opportunities • Knowledge transfer among Atlantic area R&D/Academic centres	• Risk/change averse shipping companies • Maritime image nationally: public don't appreciate size-breath-importance • Economic downturns (maybe also as a result of Brexit) and resulting government policy • Brexit brings a lot of uncertainties that reduce the collaboration between the UK and EU • European funding available

SWOT analysis of the Blue Economy

STRENGHTS	WEAKNESSES
• Long history of maritime organizations • Long tradition and strong expertise in the maritime sector • UK as an island, largely relies on maritime for international trade • Competitive and open market • Good geographic position	• Global market and procedures are not easy to change • Smaller economy sector compared to others (e.g. manufacturing, distribution) • Lack of integration/fragmented decision centres at national level • Not always observable to the UK public
OPPORTUNITIES	**THREATS**
• Technology changes • High proportion of goods moved by sea • Digitalization / need for innovative solutions • Low carbon future (e.g. cargo might swift to maritime as the mode is more environmental friendly compared to others – such as road) • Last mile logistics (e.g. inland waterways)	• Recent trends of moving activities (e.g. shipbuilding and services) out of the UK • Financially-driven market • Lack of training • Possible unemployment caused by automated technologies • Competition from main EU sea ports • Brexit-related (e.g. reduced funding, difficulty to access to services/products, difficulties in exporting, possible economic downturn) • The trend of climate change cause more opportunity cost in operations

GENERAL CONCLUSIONS

The UK National Bootcamp invited experts from the triple helix to discuss the potential for innovations and collaboration between the TH players. Barriers to collaborative projects between TH players in the UK were firstly discussed. Many valuable ideas and constructive suggestions were proposed to mitigate the gaps between the TH players and improve the efficiency and effectiveness of collaborative projects.

The main barrier is the different cultures between the TH players, especially between industry and academia. Due to the different goals of industry (profit orientation) and academia (education/research orientation), various aspects to collaboration were discussed. It is found that communication plays an important role in mitigating the gap and facilitating the discussion during the bootcamp and in practical collaboration. Several successful collaborative projects and the strategies were also discussed.

Lack of integration was also considered as a main barrier to collaboration between TH players, including lack of strategies and coherent authority. This has also been mentioned in a report of WWF (2015, p.18) related to the Baltic Sea: *"…it is a commonly recognised fact that decisions in our region are still mostly taken sector-by-sector, ministry-by-ministry, country-by-country, without a holistic, integrated approach, resulting in uncoordinated, conflicting, and inefficient and policy objectives and implementation".* Government should take the lead role in providing an integrated platform to encourage effective and productive collaboration between TH players.

Finally, a SWOT analysis for both the national TH stakeholders' ecosystem and the blue economy itself was discussed, and listed in the end of the report.

References:

European Commission (2019), "The EU Blue Economy Report", prepared by the Directorate-General Maritime Affairs and Fisheries jointly with the Joint Research Centre 2019.
Available online at : https://op.europa.eu/en/publication-detail/-/publication/676bbd4a-7dd9-11e9-9f05-01aa75ed71a1/language-en

Cebr (2019), "State of the maritime nation", Commissioned by Maritime UK in partnership with the Centre for Economics and Business Research.
Available online at https://www.maritimeuk.org/media-centre/publications/state-maritime-nation-report-2019/

WWF (2015), All Hands on Deck: Setting Course Towards a Sustainable Blue Economy. Available online at: http://wwf.panda.org/?254101