

Great South West Blue Economy

Cite as: Nelles, Jen, Kevin Walsh, Michalis Papazoglou, Elvis Nyanzu, Syahirah Abdul Rahman, and Tim Vorley. 2023. *Great South West Blue Economy - Understanding Cluster Growth Potential Case Study*. Oxford, UK: Innovation Caucus.

Case Study Overview

Characteristics and history: The Blue Economy in the Great South West is centred around and has derived from the long maritime history of the coastal parts of the area. The maritime economy initially developed around ports with deep sea littoral access in Plymouth and South Devon focused on shipping and naval activities. These maritime assets and activities spawned the development of a broader infrastructural, research, and institutional landscape that includes the Met Office (Exeter); UK Hydrographic Office (Taunton); Falmouth Marine School (Falmouth); Centre for Environment, Fisheries and Aquaculture Science (Weymouth); HMNB Devonport (Plymouth); National Marine Aquarium (Plymouth); Plymouth Marine Laboratory (Plymouth); and several world class research programmes at universities around the coast (discussed in more detail below).

While marine and maritime generally comprises a mature set of industries, what is emerging in the area under the umbrella of the Blue Economy revolves around the application of new technologies and their deployment on established infrastructure. Areas of expertise are emerging and consolidating around *offshore wind, oceanic environment monitoring, autonomous vessels, surveillance and maritime security, and marine science* and research. While these may be regarded as core competencies, other related industries are as diverse as boat building (specifically race and pleasure craft) and fitting, satellite applications, digital and data, and logistics.

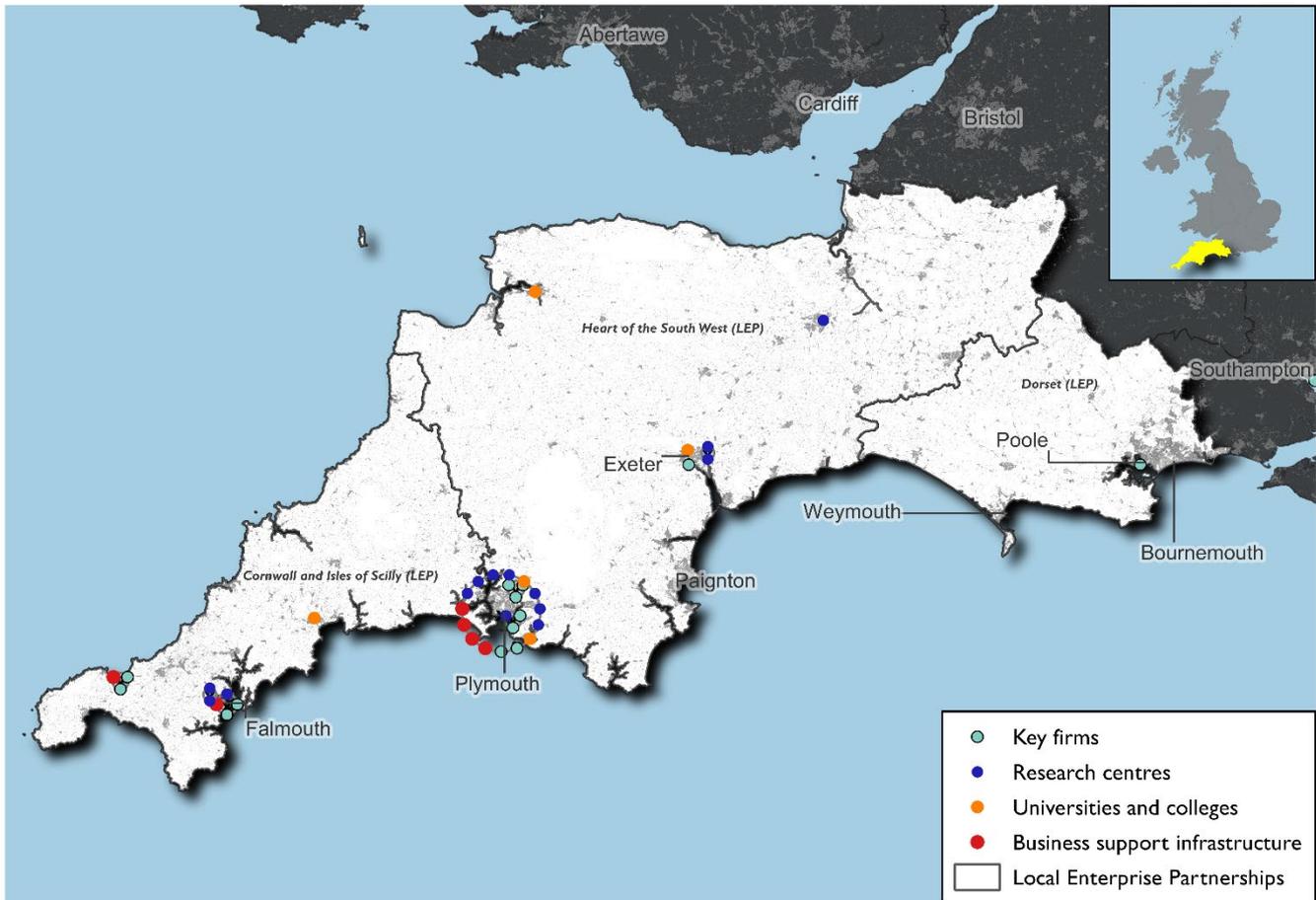


Figure 1: Great South West Blue Economy map.

Geography and size: For the purpose of this study, we have adopted the geography of the Great South West. This geography is an amalgam of three Local Enterprise Partnerships (LEPs) in the South West: Cornwall and Isles of Scilly LEP, Heart of the South West LEP, and Dorset LEP. The area boasts almost 700 miles of coastline, although the Blue Economy activity discussed in this report is located primarily along the south coast with concentrations around Plymouth, Exeter, Falmouth, and Weymouth.

It is notable that “the Great South West” is the most recent geography associated with the Blue Economy, and that it is not the only one. For instance, both Ocean Futures and Maritime UK SW expand the region to include Bristol. However, a previous initiative, the South Coast Marine Cluster (SCMC) extended the area to include the Solent to the east. The SCMC previously united partners across the south coast area but did not include the Solent LEP, which chose to partner with Maritime UK instead. Ultimately, the LEPs in the South West opted to organise around the current geography. While actors in the South West and in the Solent recognise that the other has Blue Economy ambitions they maintain that synergies are currently weak and that activities and strengths are different enough to support independent USPs.

Areas of potential future growth:

Currently, the Blue Economy is in a growth phase with notable activities in three core areas:

- Offshore renewable energy - The area hosts a variety of offshore renewable energy projects centred primarily on tidal/wave and wind. The Celtic Sea off the coast of Cornwall will be the site of a large floating offshore wind (FLOW) project and is expected to produce 5.0GW by 2030 (rising to 20.0GW by 2045).
- Marine autonomy and robotics - The construction of autonomous maritime autonomous systems to function as platforms (for sensors or other robotics) or crew transfer vehicles is an emerging area of innovation.
- Digital oceans - This involves hardware, such as sensors and communication systems, to improve connectivity between systems active in marine environments, transmit data, and software to process data and ensure systems are secure.

It is worth noting the degree to which these activities can be complementary. As one observer commented:

Floating offshore wind requires autonomy and geospatial data to exist and to bring down costs, which is the major challenge for offshore floating offshore wind at the moment as a nascent industry. The biggest, early adopter of hydrogen powered vessels and electrical powered vessels is likely to be offshore wind. So, we're in a position where we have expertise around clean maritime potential port facilities around clean maritime and a key customer.

Other areas that may have strong growth potential, but that emerged less clearly in the course of this research, include aquaculture (fish and shellfish farming) and maritime net zero (clean ocean technologies such as charging infrastructure, synthetic and e-maritime fuels, blue hydrogen, batteries and alternative fuel programmes, low-carbon vessel design, etc.). The suite of activities classified as maritime net zero are featured prominently in the Ocean Futures visioning documents (Ocean Futures 2022). However, only offshore renewables (which they include in this category) appeared to be sufficiently advanced. Given that other studies show that marine and maritime clusters around the country are also focusing on alternative fuel and vessel design and blue hydrogen, including their neighbours in the Solent, it might be worth concentrating on the specific areas where industry has evolved sufficient critical mass to be competitive.

Reflections: Spatially, Blue Economy activities are distributed across a broad geography with notable concentrations in and around major urban areas and port facilities. Additionally, given the diversity of Blue Economy activities and industries it is hard to describe the current configuration as a cluster in the technical sense. There are, however, synergies that seem to be evolving between different Blue Economy subsectors described here and it is not too difficult to imagine that with further evolution these industries may converge further and create meaningful spillovers that will act as innovation multipliers. For instance, sensors are going to be critical for monitoring and securing offshore wind. Floating offshore wind assets are moored far from shore and so autonomous monitoring, using drones or marine vessels, will also be useful for maintaining turbines. Sensors and robotics are critical to autonomous vessel operation. Communicating across long distances and harsh maritime environments, defending assets from cyber attacks, and processing data from sensors will all require advanced digital capabilities. At this point, these kinds of synergies are evident and increasing, but it is unclear how much collaboration is currently happening between firms in the area, how ready existing technologies are for deployment, or whether connections are being made effectively. This is also complicated by the fact that collocation between different centres of excellence appears to be relatively weak. For instance, floating offshore wind is centred in Cornwall while the development and testing of autonomous vessels and robotics predominantly happens in Plymouth. That said, there are several initiatives that are trying to bring Blue Economy stakeholders together to forge those

connections and develop a vision. The Great South West group of LEPs and Maritime UK SW are leading organisations that are coalescing around the Ocean Futures vision. Celtic Sea FLOW envisions a floating offshore wind cluster, and presents a slightly more targeted proposal. While progress is being made, it appears as though geographic dispersion, governance complexity, and industrial silos remain barriers to unlocking the greater potential of the Blue Economy in this region.

Core Assets

Market structure and anchor firms: The nature of Blue Economy activities means that there are few anchors that genuinely underpin the entire breadth of the sector. Large marine and maritime firms tend to be connected to the defence industry such as Babcock, BMT, and Thales. A&P/Appledore shipyards and Pendennis shipyards concentrate on commercial ship building and maintenance activities, while firms like Princess and Sunseeker build smaller pleasure craft. A large offshore wind consortium, Celtic Sea Flow, currently dominates the offshore wind industry.

A variety of firms smaller to medium sized firms were mentioned in our research, predominantly in the realms of marine engineering, surveying, and autonomous vessel development: Frontier Technical (sustainable energy technologies), M Subs Ltd (manned and unmanned underwater vehicles), Mayflower Autonomous Ship (automated research vessel), Silicon Sensing (inertial sensors), Marine Tech Systems (autonomous offshore survey), Hydro Surv (marine data processing systems), USS Unmanned (unmanned surface vessels), Sulmara Subsea, Fugro (marine survey training), AutoNaut (unmanned surface vessels), Blue Screen IT (maritime cybersecurity), and Sonardyne (underwater acoustics). This list is by no means exhaustive, but captures many of the firms that are most active in partnering in governance networks and for innovation.

Higher education and training institutions: The Great South West has several important universities and further education colleges that feed into the Blue Economy in the area:

- **University of Exeter** has a strong programme in marine education, training, and research. Exeter Marine unites researchers interested in marine environments and science and has several partnerships with stakeholders in the area. It also hosts specialised infrastructure such as the **Dynamic Marine Component Test Facility (DMaC)**, offshore and marine energy facilities such as **FaBTest** (a nursery and test facility), offshore wave buoys that provide data to researchers and test facilities, and a high-performance computer cluster for data analysis. It is a partner in **Marine-i**, an EU-funded programme designed to help germinate the marine technology sector in Cornwall and the Isles of Scilly and includes partners such the ORE Catapult, Cornwall Council, University of Plymouth, Cornwall Marine Network and Falmouth Marine School. Other partnerships include work with the Plymouth Marine Laboratory on microplastic pollution, with the Met Office on predictability of extreme weather events (PREDEX), and Cefas on aquaculture topics and doctoral training partnerships. The university is also home to the **Centre of Future Clean Mobility**, committed to leading on the next generation of clean mobility across all modes of transport. It is also a partner in the planned **Marine and Environmental Science Accelerator** (see below).
- **University of Plymouth** also has a strong research, education, and training offering in marine and maritime. It hosts maritime studies and navigation, marine autonomy, and maritime science degree programmes as well as the world-leading research at the **Marine Institute** with over 3000 researchers and students. This research is largely focused on the sustainable use of the marine environment with thematic emphasis on topics as diverse as marine biology and biogeochemistry to shipping and maritime business. The Marine Institute is one of the partners in the Marine Research Plymouth group (see below). It hosts the **Supergen Offshore**

Renewable Energy Hub (an EPSRC-funded project on innovation in offshore renewables), the **One Ocean Hub** (a marine conservation research group), and **Cyber-SHIP Lab** (a hardware-based, fully configurable maritime IT&OT cyber security research platform), among other initiatives.

- **Cornwall College** hosts the **Falmouth Marine School** delivering courses in boatbuilding, marine engineering, marine science, and watersports. As part of the Marine-i partnership, the school is coordinating a marine technology focused graduate placement scheme and provides mentoring support.
- **Plymouth City College** provides the only foundation degree in marine autonomous systems.
- **Petroc College** hosts the South West Institute of Technology centre, which houses two state-of-the-art facilities – the Engineering facility includes cleanroom fabrication capabilities; electronics design, manufacture and testing laboratories; additive technologies (3D); and production robotics; whilst the Digital Science suite contains a bespoke area for developing virtual environments; a large space for drone experimentation; and the latest specification networking, software, and data engineering facilities.

Other research and anchor organisations: The area has a rich array of other research engaged institutions across a wide range of Blue Economy themes. While it is tempting to divide these into silos focused on aspects of marine environment/biology and other marine technologies (autonomy, energy, digital, etc.) there appear to be strong partnerships across those divides - a phenomenon that is particularly evident in the Marine Research Plymouth partnership.

- **National Physical Laboratory (NPL)** is the UK's national metrology institute and has partnered with Lloyd's Register to establish the **Maritime Assured Autonomous Testbed (MAAT)** (see below).
- **Plymouth Marine Laboratory (PML)** is widely regarded as a world-leading research organisation in the area of marine research. It hosts the **Smart Sound Laboratory** - a facility for testing autonomous vessels, buoys, and other monitoring devices - as well as marine biological lab and observatory facilities. It also maintains a state-of-the-art research vessel. It is a core member of Marine Research Plymouth.
- **Marine Biological Association (MBA)** conducts marine biology research "from the seashore to the seafloor". The organisation has a strong track record of delivering projects for industry, government agencies, and other stakeholders and provides advice and services to a wide range of industries.
- **UK Hydrographic Office** is a world-leading centre for hydrography, specialising in marine geospatial data to support safe, secure and thriving oceans. It partners frequently on marine and maritime projects and hosts students from university programmes from around the region.
- **Met Office** provides data and expertise to firms in the area that are working in the maritime environment. Ocean Futures described the Met Office's contribution to stakeholders in the area as facilitating the management of an interface between emerging maritime capabilities and the marine environment (Ocean Futures 2022).
- **Thales Centre for Marine Autonomy** was established by Thales UK for the development, assessment and certification of autonomous systems at a waterfront facility in Plymouth. It offers a secure location to conduct a full evaluation cycle for multi domain platforms.
- **Marine Research Plymouth** is a partnership between the Marine Biological Association, Plymouth Marine Laboratory, and the University of Plymouth. The partnership is built around a shared vision to harness the expertise of the UK's largest concentration of marine science researchers and cutting-edge facilities.

Support structures and infrastructure: The area is also home to a wide range of support structures and infrastructure, often supported by joint investments between universities, research organisations, and local government authorities. The degree of co-investment in facilities, initiatives, and projects can make it somewhat difficult to determine who leads these initiatives and how they relate to one another.

- **Cornwall Floating Offshore Wind Accelerator (Cornwall FLOW)** is a partnership between Celtic Sea Power, the ORE Catapult, and universities of Plymouth and Exeter to reduce the carbon intensity of floating offshore wind projects, generate evidence to shorten project timelines, and build a sustainable industry.
- **Oceansgate Marine Enterprise Zone** is a world class hub for marine industries located in Devonport, Plymouth, with opportunities for research, innovation and production in a collaborative environment. It has been envisioned as the site for the ***Ocean Futures Innovation Centre***, which will house the Smart Sound Plymouth and Connect control centre as well as Maritime Assured Autonomous Testbed (MAAT) and Requirements for Operational Assurance of Data Standards (ROADS) project teams, and the ***Ocean Futures Prototyping Centre***. The site already hosts the Marine Business Technology Centre (MBTC).
- **Marine Business Technology Centre (MBTC)** is an ERDF-funded gateway for firms hoping to access and develop leading edge marine technology based at the Oceansgate Marine Enterprise Zone. Its focuses include marine autonomy, clean propulsion, advanced materials/manufacturing, environmental modelling and monitoring, and digital ocean technologies. Led by Plymouth City Council, it partners closely with the universities of Plymouth and Exeter, PML, and MBA. Among other projects, the MBTC coordinates access to the ***Smart Sound Laboratory*** test facilities. Within the Smart Sound envelope also sits the ***Future Autonomous at Sea Technologies (FAST)*** infrastructure cluster.
- **Cornwall Marine Network** was established in 2002 by local marine businesses to give identity to, and improve the economic prosperity of, businesses in the marine sector. The organisation provides expert specialist support which helps member companies to grow, by improving marketing, skills, bringing innovation to market and improving productivity in the workplace.
- **Marine and Environmental Science Accelerator** is a partnership between the universities of Exeter and Plymouth which brings together three projects and has a proposed £128.3m plan to level up and supercharge the economy: the Environmental Intelligence and Net Zero Solutions Hub, Maritime Autonomy Testbed (MAAT), and the South West Technopole.
- **Plymouth and South Devon Freeport** is a planned development that will leverage investment and the world class manufacturing, marine and defence innovation assets to support further innovation and research.
- **ORE Catapult** is involved in supporting firms developing offshore renewables and is a partner in several research projects.

Finance: Blue Economy firms face many of the same issues as those in other places: a lack of angel investors and early stage funding, a lack of funding sensitive to the particularities of the industry (e.g., longer development and return on investment timelines), wariness about engaging in commercial or private sources of finance, and a weakness of knowledge about skills to access different funding streams. An additional set of constraints in the Great South West are its peripheral location relative to centres of funding and finance and uncertainty related to the transition away from European funding.

On access to angel investment, one respondent noted that while the British Business Bank has resources to support angel networks, only existing networks are eligible. Since there are none in the South West, this funding doesn't benefit firms in the area.

Challenges vary by different subsectors in the Blue Economy. Firms in the offshore renewables supply chain find it particularly difficult to secure sustained investment:

Yeah, I suppose for small companies, it's finding investment. So, you know, finding the right angel investors, finding the right sort of entrepreneurs, who are prepared to make those commitments, because often those investors want a very quick return. And, you know, renewables is not a quick return market.

One respondent commented that support will often come from high net worth individuals, but that they rarely have the resources to continue the needed levels of investment over the longer term. As interest in renewables increases, there is a hope that institutional investors will begin to take an interest in these projects (and their ecosystems).

One university, which was heavily involved in collaborative projects supported by ERDF funding, noted some pros and cons to shifting to SDF and other UK sources of funding. While they celebrated that some of the more onerous eligibility requirements attached to European funding would liberate them to do more interdisciplinary projects they also noted that they were anticipating far less support than in the past.

Given the centrality of higher education institutions in leading bids and partnering in networks supporting research, innovation, and firms, the potential for a contraction in supporting resources could be a threat to growth.

Reflections: The Blue Economy in the Great South West has a very rich pool of assets. While marine and maritime is dominated in some ways by large defence primes and boatyards, this obscures a broad and growing ecosystem of firms emerging and coalescing around the themes of offshore renewables, automation, and digital. There is incredibly strong research capacity, both in higher education and other research organisations, doing world-renowned work in a wide range of areas. While the more recent work on robotics, automation, data, and materials is starting to translate to the market it was unclear from our research whether and how a similar process was underway for marine biology and sciences. There is no shortage of stakeholders with an interest in and capabilities to engage in cluster growth and, as the networks section reflects, no shortage of initiatives to leverage synergies and drive firm development. However, resources appear to be a constraint - both in fuelling firm growth and collaborative programmes, and in creating a sustained revenue stream to fund governance activities.

Skills

Talent pool: Most respondents characterised the area as having a strong foundation of marine and maritime skills, but also some emerging areas of need. Workforce surveys have identified issues with recruitment, with key anchor firms including Babcock International and Princess Yachts indicating areas of high demand in engineering and non-engineering roles and SMEs reporting difficulty in scaling because of recruiting challenges.

Sectoral surveys such as the State of the Maritime Nation (Maritime UK 2022) highlight skills challenges across the sector, many of which hold true in the Great South West: An ageing workforce, an increase in demand for engineering and digital skills across the economy, and recruiting challenges have exacerbated these difficulties. These are largely echoed in the local skills strategies (see, for example, Heart of the South West 2022). Skills shortages are likely to be particularly acute in the offshore renewables sector, where the Celtic Sea Power project is slated to expand rapidly increasing demand

for labour across its supply chain. It, along with other maritime firms in the area, reports difficulties recruiting people with key skills, from welders to project engineering.

One respondent drove home the diversity of skills needed, stating:

Really, we don't need PhDs. But master's degrees would not be unhelpful. But it's also going to be from engineering, environmental, environmentalists, marine biologists, operations, mariners, and I could go on and on. So it's sort of quite broad. But in terms of more precision of what kinds of skills we're going to need, we don't know yet.

Celtic Sea Power is aware of the potential limits that skills shortages may place on its growth and reports working closely with local further and higher education providers to plan for the future. They noted that given project timelines, they need people in school now developing the qualifications and skills so that they are online when they are needed in the future.

Against this background it is also important to note that attraction and retention are an issue both for Blue Economy sectors and the Great South West economy as a whole. Young people graduating from university or college often don't stay (or don't stay long) and rising housing costs make it more difficult to attract external talent. These are important factors to consider when investing in local skills pipelines.

Local skills provision: Colleges and universities in the area have increasingly developed training programmes to support emerging Blue Economy industries. Ocean Futures lists some of the core offerings that will provide graduates to fuel growth (summarised briefly here):

- **City College Plymouth** is developing facilities to deliver new university- level courses on marine autonomy with higher-level pathways.
- **South Devon Marine Academy** forms part of South Devon College and is a state-of-the-art facility providing many full-time courses on offer from Level 2 and 3 courses in Marine Engineering, Maritime Skills alongside apprenticeships in Boat Building, Warehousing and Composites to degree-level qualifications in Marine Technologies, Coastal Engineering and more. It also offers short courses aimed at adults for reskilling or updating training.
- **University of Exeter** provides courses at undergraduate and postgraduate levels across science and engineering disciplines relevant to the marine and maritime sectors, such as ecology, data technologies, engineering, renewable energy and materials technologies.
- **University of Plymouth** has the first and largest Marine Institute in the UK, representing over 3000 researchers and students.
- **Bournemouth University** offers courses in Engineering Marine Technologies and Marine Ecology which build on Foundation courses in marine, coastal or freshwater conservation.
- **Falmouth Marine School** has training programmes in boatbuilding, marine engineering, marine science, and watersports.

These programmes also feature industry partnerships, work placement opportunities, access to shared infrastructure for learners, and apprenticeship offerings. However, skills gaps persist, sparking discussion about the responsiveness of the FE and HE sectors to industry needs, with even universities acknowledging that they can do better. While each of the LEPs has published LSIPs and action plans involving consultations with HE, FE, and industry there is still a sense that these efforts are currently falling short, have not yet borne fruit, or, as the previous commentator suggests, are not effective mechanisms to address local skills provision challenges.

Reflections: Despite a strong marine and maritime heritage and a number of skills pipelines through local FE and HE, skills shortages are likely to constrain growth in Blue Economy industries. These shortages will be particularly pronounced in the skill sets, such as engineering and digital, that are in high demand across sectors in the Great South West in which the Blue Economy is competing with manufacturing and aerospace. This is partly a qualification supply issue that can be alleviated with increased investment in a development of tailored training offerings and enhanced access to industrial experience. However, the twin problems of human capital retention and the attractiveness of employment in the Blue Economy also remain challenges.

Knowledge Exchange

Firm research and development practices: Since floating offshore wind, marine robotics and autonomy, maritime defence, and digital oceans industries are currently in a period of rapid development, firms in the area tend to be highly research active. While it is difficult to make statements across the entire spectrum of activities in the Blue Economy, the trend appears to be that research, science, and development is relatively strong and occurring in firms (from tiny micro enterprises to large primes), there may be more difficulties in translating those innovations into the market, scaling production, and fueling the next generation of innovations. Similarly, while the world-class research organisations in the area are very active in partnering with and supporting firms, it is unclear how many discoveries are effectively commercialised. There appears to be great potential, given the area's research strengths, but there may be challenges involved in unlocking it for economic growth.

Knowledge sharing and flows: There are many partnerships between world-class research labs and centres on collaborative research projects to support business in the area. The Marine Research Plymouth consortium is one localised research and knowledge exchange network. All of the universities and many major labs are members of governance networks such as Ocean Futures, the MBTC, and Oceansgate projects. Again, the perception is that there are strong partnerships between universities and labs on research but that they are less effective at working together on commercialisation and industry support.

That inter-university/research centre collaboration on economic development may not be as strong as some observers would like may have geographical dimensions. All of the major universities are highly engaged in their localities and have strong track records, and continuing intentions, to support the industries in their ecosystems. As one university described their relationships with firms:

The work that we do with businesses it's all the stuff that you would expect. We sometimes will get [firms saying] we have a pretty good idea of what the problem is, and we need help with the solution. And that's then connecting them with an academic to help them develop that technical solution. Sometimes it's about the university being aware of new technologies, or new innovations, and then holding events and kind of quasi training events to bring businesses together, to help to explain to them what the new, you know, kind of what the opportunities, you know, through this new technology or innovation might be. And there's a big part of that, because, again, if you're an SME, you might have less time to spend on that kind of innovation. So sometimes it's about [generating a demonstration effect]. So we've run [the immersive technologies] project for a year and a half. And it's only when we've written the case studies of how we've helped the first tranche of businesses that the other businesses start saying I didn't really understand what immersive was or could do for me, but now I understand it, can you help me? And then that then grows, it creates that ecosystem between the university and the businesses because you then have academics that have created relationships with businesses. That then sparks an idea in an academic to say, actually, I've got a research question, which I need an industry partner to help with. Would you like to be part of that? They say yes. And then you know, it kind of

grows from there and, you know, goes into knowledge transfer partnerships, and it goes into industrial research. And, and, you know, there's definitely evidence of that.

Many of the projects and facilities listed as flagship Blue Economy programmes for the universities above (Marine-i, FaBTest, etc.) were created to provide infrastructure and services to support local firms, increase knowledge exchange from researchers to the market, and to enhance innovation. Notably, many of these programmes have been supported by ERDF funds which, once depleted, will need to be replaced to sustain this degree of activity.

In sum, there appears to be scope to strengthen jointly supported commercialisation activities that link stakeholders across the area and integrate more localised projects to reach firms across the geography. However, this activity may be contingent on continued public investment in established infrastructures.

Knowledge access and cultures: The knowledge exchange environment is relatively open. While firms certainly guard their proprietary information, there appears to be a willingness to collaborate and share knowledge as evidenced by relatively high levels of firm participation in various accelerator and business development initiatives (such as the MBTC). The fact that Thales has opened a marine autonomy testing facility is further evidence of firms', even large primes, commitment to sharing resources and supporting innovation more broadly.

Firm network relationships: While it is difficult to comment on firm network relationships across such a diverse range of industries and activities, there are at least increasing opportunities for firms to meet, interact, and share knowledge. Accelerator and business development programmes, shared infrastructure, and evolving network activities all multiply the potential for interaction and opportunities to collaborate. Activities convened by industry leaders (see the following section) are increasing around the Ocean Futures initiative, the development of the Freeports, and in the development of the Celtic Sea Power cluster (value chain).

One commentator reflected that the large firms in the area appear to have well-established lines of communication:

It's very clear that those sorts of communication links were already there, or they were quite strong. So whether that's with the Navy with the likes of Babcock, or Thales, or these other sort of larger organisations, it was already there. So that communication path was already established, which I think is quite rare. And certainly, those businesses were also the ones that were helping to build the demand.

It is likely that this is less true across the breadth of the SMEs in the area - who are less likely to be collaborating or competing for large government contracts or as deeply engaged in governance networks because of their long tenure in the area and status as large employers. While this research did not reveal a lack of interfirm partnerships to be a particular weakness, there was a perception that these could be further encouraged and reinforced where possible.

Reflections: Knowledge exchange in the Blue Economy industries studied happens predominantly around university and public research labs and their associated public-facing projects. This process appears to work quite well with two caveats. First, it is unclear how well the commercialisation pipeline is working as a result of those partnerships and whether that success is shared evenly across Blue Economy subsectors. There may be scope for support to improve those results and increase interdisciplinary/intersectoral synergies. Secondly, because of that orientation, the R&D landscape appears to be relatively fragmented. While university and public research from different parts of the Great South West come together in a few locations it is unclear how well knowledge flows between places. This has resulted in the emergence of local specialisms, which is positive, but may be limiting knowledge exchange between subsectors with potential for synergies (e.g., automation and offshore energy). That much of the visible knowledge exchange in Blue Economy industries is driven by universities and labs is an asset, but one that may be challenged as the EU funding that has supported it to date is running out. Whether partnerships will continue with new funding streams, find ways to sustain themselves, or peter out remains uncertain.

Networks of Coordination

Aside from the LEPs, which all have an interest (to varying degrees) in the marine and maritime, there are four main governance networks dedicated to developing a vision for and strategies for growing the Blue Economy in the Great South West.

- **Great South West** is the 'powerhouse' brand to promote the LEP areas of Cornwall and the Isles of Scilly, Heart of the South West and Dorset. It aims to deliver £45bn of economic benefit and become the leading region for the green and blue economy in the UK.
- **Maritime UK South West** is a public-business-research partnership which brings together the breadth of ocean economy to create a world leading ocean technology cluster. It enables innovation and collaboration, provides business and skills support, and drives strategic development and investment.
- **Ocean Futures** is a private-public-research partnership that has a united goal to create a global centre of excellence and supercluster in testing, development and manufacture of autonomy, digital and clean ocean technologies for the rapidly growing global ocean economy.
- **Celtic Sea Cluster** is this initiative of Celtic Sea Power, a consortium of Welsh Government and Cornwall & Isles of Scilly Local Enterprise Partnership (CIOSLEP), Celtic Sea Power, Marine Energy Wales, and the Offshore Renewable Energy Catapult (ORE). Celtic Sea Cluster has set out a clear regional strategy in consultation with a wide-range of regional stakeholders to deliver social and economic benefits to Cornwall, South Wales and the greater South West through working groups on: Supply Chain, Innovation, Workforce, Grid and Ports. The Cluster also provides a hub for regional activity and invites local businesses and stakeholders to sign up for updates on floating offshore wind as it develops.

These are just some of the most prominent initiatives that have explicitly stated a desire to seed, support, develop, and/or grow the Blue Economy (cluster) in the South West. These initiatives are coloured by the recurring theme of mild regional fragmentation, which has meant that stakeholders have not yet coalesced around a single dominant strategy. For the most part, these initiatives do not compete with one another conceptually. They all seem to embrace a pan-South West geography and champion the idea of working across LEP boundaries. However, they also do not appear to speak to or engage with one another explicitly. For example, Ocean Futures has emerged as an offshoot of Maritime UK South West and has a proposal for Blue Economy development that is meant to both

galvanise actors in the region and attract the attention of, and funding from, Government. While name recognition is high, only the Heart of the South West LEP is listed as a partner and core documents from other networks do not mention it. This may be because it is relatively new, but some respondents suggested that it was seen as more of a Plymouth initiative. The nascent **Marine and Environmental Science Accelerator** seeking funding for a suite of business support and R&D solutions similarly only lists the Heart of the South West LEP in its documentation as a partner (alongside universities).

The Celtic Sea Cluster (CSC) initiative has also proposed a regional strategy focused on the development of a value chain for the floating offshore wind industry. Notably, CSC styles what they are doing as “cluster development” but sees its efforts as separate from other initiatives in the region:

The short answer is no, we don't see ourselves as part of a Blue Economy cluster, we see ourselves as an energy cluster. And we just happen to be the closest I would say, to us to the offshore oil and gas sector. And that's because really, we've got the same, we've got the same skill sets required and similar sort of mentalities, build big things offshore, we see the maritime and marine supply chains and the businesses as key elements of our supply chain.

This rejection of the Blue Economy framing for the area sets CSC apart. Other respondents described Celtic Sea Flow as a significant development but one that is not (currently) very well integrated with other governance networks.

Reflections: The abundance of governance initiatives demonstrates that there is both a lot of interest in and leadership around the Blue Economy. A core challenge for growth will be to bring partners together to integrate visions and establish complementary objectives and/or divisions of labour. Another challenge will be to ensure that partnerships are not in name only and that synergies translate across subsectoral and geographical boundaries. What emerges in the future will be in no small measure determined by which initiatives are successful in securing funding, and how sustained those flows of resources are.

Discussion: Innovation opportunities and support needs

Evolution and market opportunities: The area has proven and emerging strengths across a range of Blue Economy activities that will continue to offer opportunities for innovation and growth. Each of the core areas - *offshore wind*; *oceanic environment monitoring*; *autonomous vessels*; *surveillance and maritime security*; and *marine science* - are independently plugged into growing markets but also have great potential for cross-sectoral synergies (as described above). From this perspective, if it can encourage these connections, the region is well-positioned to multiply innovation capacity and develop world-leading industries.

Resilience: Blue Economy industries look to have a good growth trajectory generally, and those in the Great South West are no exception. With increased and sustained interest in Net Zero and environmental stewardship agendas, the likelihood of increased ocean-based activity (e.g., aquaculture), and rising labour costs, higher demand for alternative energies, automation, and environmental protection skills seem likely. Key challenges for this area include (1) skills shortages, which can constrain growth; (2) a contraction in funding related to lapsing EU support; and (3) competition from other areas of the UK on core competencies. Several other coastal areas in the UK have or are building out strategies around Blue Economy industries. Activities around automation, alternative fuels, and blue hydrogen are particularly common. Focusing on key strengths rather than trying to support every type of activity can help mitigate this risk.

Areas of potential support and intervention: Overall, the Blue Economy in the Great South West appears to have a bright future. With support in the following areas, it can increase its growth potential.

- Ensuring that businesses have the skills they need to succeed: stakeholders should build on efforts already underway to anticipate the skills needed in the medium and long term and establish programmes to provide them. This is not just about qualifications, but ensuring that graduates (and those being retrained) have industry-ready skills. Another part of the equation is attraction and retention, which involves providing high quality of life to workers through affordable housing and vibrant communities.
- Replacing and growing funding streams for R&D and collaborative innovation: many of the region's successes have been publicly funded through EU resources. As those wane, it will be important to replace these with UK funding streams to ensure that existing collaborations can continue and grow. Currently, domestic and local funding is not expected to be able to sustain existing initiatives, creating a risk that successful programmes will lapse and progress will be stalled. The region has a wealth of ambitions and has mobilised the partnerships to progress them, but will require significant investment to translate those ambitions into reality.
- Coming together around a common vision for the Blue Economy: many visions and many leaders have emerged to drive Blue Economy initiatives. While there are many commonalities and overlaps between them, it does not yet appear as though there is a clear leader or division of labour. As each one seeks funding for its programming, there is a risk of confusion about who does what and how support will be distributed, as well as of competition spreading resources too thinly. There is an opportunity for stakeholders to come together to clarify how each initiative relates to others and set up clear partnerships between them - or else consolidate efforts.
- Building links between subsectors: partnerships between universities and research labs appear to be quite strong, but there is considerable scope to prioritise building links between the subsectors of the Blue Economy in both research and practice. While this is likely happening already, more effort could be made to link activities across geographies and across specialisms to seek unique synergies that will underpin the region's competitive advantage. Ocean Futures has already outlined the link between automation, offshore energy, and digital communications - these connections should be further encouraged and expanded where possible.
- Focusing on areas of strength: the Blue Economy is gaining popularity around the world and is seen as a strategic asset by many (frequently disadvantaged) coastal communities. The region should work to define, publicise, and grow areas of unique expertise rather than compete with other coastal areas (such as the Solent). This effort is already underway through Ocean Futures and others' planning processes. As part of this process, the region should seek to coordinate with neighbours and competitors around the country to discover how connections might complement and strengthen each other's efforts and build the UK Blue Economy into a world leader.

Reflections: The Blue Economy in the Great South West is well-positioned to grow and, if supported, has great innovation potential. It has developed a strong reputation for research excellence in marine and maritime and is in the process of successfully pivoting to take advantage of a confluence of expertise in related Blue Economy industries. Governance across subsectoral and geographical boundaries remains an important challenge and will be instrumental in securing public support at the levels needed to sustain growth.

References

Heart of the South West (2022) Local Skills Report 2022-2024.

Keen, M. R., Schwarz, A.-M., & Wini-Simeon, L. (2018). Towards defining the Blue Economy: Practical lessons from pacific ocean governance. *Marine Policy*, 88, 333-341. Available at: doi:<https://doi.org/10.1016/j.marpol.2017.03.002>

Maritime UK (2022) State of the Maritime Nation 2022.

Ocean Futures (2022). Ocean Futures 10 Year Business Plan 2022-2032.

Voyer, M., Quirk, G., McIlgorm, A., & Azmi, K. (2018). Shades of blue: what do competing interpretations of the Blue Economy mean for oceans governance? *Journal of Environmental Policy & Planning*, 20(5), 595-616. doi:10.1080/1523908X.2018.1473153

Authors

Dr Jen Nelles (Innovation Caucus, Oxford Brookes University)

Dr Kevin Walsh (Innovation Caucus, Oxford Brookes University)

Dr Michalis Papazoglou (Innovation Caucus, Oxford Brookes University) Dr Elvis Nyanzu (Innovation Caucus, Oxford Brookes University)

Dr Syahirah Abdul Rahman (Innovation Caucus, Oxford Brookes University) Professor Tim Vorley (Innovation Caucus, Oxford Brookes University)

Research note

This research is a case study prepared as part of the Understanding Cluster Growth Potential project conducted in partnership with Innovate UK. To receive a copy of the main reports and additional case studies please contact info@innovationcaucus.

Acknowledgements

This research was commissioned by Innovate UK. We are very grateful to the project sponsors at Innovate UK for their input into this research. The interpretations and opinions within this report are those of the authors and may not reflect the policy positions of Innovate UK.

About the Innovation Caucus

The Innovation Caucus supports sustainable innovation-led growth by promoting engagement between the social sciences and the innovation ecosystem. Our members are leading academics from across the social science community, who are engaged in different aspects of innovation research. We connect the social sciences, Innovate UK and the Economic and Social Research Council (ESRC), by providing research insights to inform policy and practice. Professor Tim Vorley is the Academic Lead. The initiative is funded and co-developed by the ESRC and Innovate UK, part of UK Research and Innovation (UKRI). The support of the funders is acknowledged. The views expressed in this piece are those of the authors and do not necessarily represent those of the funders.