



MARITIME
UK

STATE OF THE MARITIME NATION **2019**

#maritimenation



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For over 25 years the Centre for Economics and Business Research (Cebr) has supplied independent economic forecasting and analysis to hundreds of private firms and public organisations. Cebr's macroeconomics consultancy team delivers award-winning forecasts of the UK and global economies, helping our clients stay ahead of the game in anticipating future economic developments. Our microeconomics consultancy team is currently one of the UK's strongest and has advised several government departments as well as FTSE and multi-national firms on a range of topics.

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Authorship and acknowledgements

This report has been produced by Cebr, an independent economics and business research consultancy established in 1992. The views expressed herein are those of the authors only and are based upon independent research by them.

The industry figures making up the broad Maritime Sector are however not always additive because some of the reports have been customised to cater for the overlap between certain industries. Simply adding together the industries would therefore produce a degree of double counting. Nonetheless, the broad Maritime report has had this double counting stripped out. Cebr believes fundamentally in the thoroughness and robustness of its approach and, as such, we stand by our own unbiased and fresh examination of the role of the Maritime Sector and its constituent industries in the UK.

The report does not necessarily reflect the views of Maritime UK.

Foreword

I am delighted to present Maritime UK's 'State of the maritime nation' report, delivered by the Centre for Economics and Business Research (Cebr).

Maritime is hardwired into the life of our island, maritime nation. Its profile has been raised significantly in recent years as our country's role as a global, trading nation has been in the headlines and centre of national debate.

For centuries the UK has been at the forefront of developments in the maritime world – across the shipping, ports, services, engineering and leisure marine industries. Whether that's inventing the Plimsoll Line, the hovercraft, the lifeboat, the sextant or screw propeller. So much of our history is intertwined with the sea.

But that maritime tradition does not mean that today we are stuck in the past. Today, maritime is the fundamental enabler of British global trade – 95% of all goods are moved by ship and through ports – totalling over £500bn. The sector also innovates and manufactures its own products and services. With cutting-edge technology, high-quality design & manufacturing, unparalleled expertise in services and major investment opportunities, the UK is a globally competitive maritime centre.

The sector is a vital part of our island nation's heritage and of our modern economy – supporting jobs, driving innovation and enabling trade. We also enable millions of people to enjoy the recreational benefits of the UK's coastal and inland waterways.

This report shows that maritime is one of Britain's biggest industries; bigger than rail, air, agriculture and the creative industries. In 2017, the maritime sector contributed over £46bn in GVA, and supported 1.1 million jobs. I am particularly pleased that at a time when the country is working to boost productivity, our sector's productivity is 42% higher than the national average. We also contribute £5.3bn to the exchequer in tax and export £12.4bn worth of goods and services.

Maritime makes a contribution to every nation and region of the UK, and we are convinced that the sector can play an even greater role in driving growth in coastal communities across the country.

As we look to the future the report forecasts ambitious investments in infrastructure, technology, education and environmental sustainability that will lead to major gains in efficiency and productivity over the longer term. Whilst there is increasing competition from across the world, we believe that the future is bright for UK maritime. The OECD forecast the global maritime economy to double in size to \$3 trillion in the next ten years, and we are determined to position the UK to benefit from this growth.

In this report we set out the key national priorities for the sector to ensure our competitiveness and global position into the future (people, environment, competitiveness, innovation and regional growth). Aided by the first long-term strategy for the sector, Maritime 2050, industry is committed to working with government to steer a golden maritime future.

Most clearly, the report really demonstrates that maritime is one of Britain's true national success stories. And as a country, we should back our success stories.

Harry Theochari
Chair, Maritime UK

Executive Summary



Report Purpose

The Centre for Economics and Business Research (Cebr) has been commissioned by Maritime UK to quantify the **economic contribution of the Maritime Sector to the UK economy**. This report forms one of ten reports assessing the contribution of the Maritime Sector as a whole, at an industry-level, in Scotland, Wales, the Liverpool City Region and the Solent LEP region.



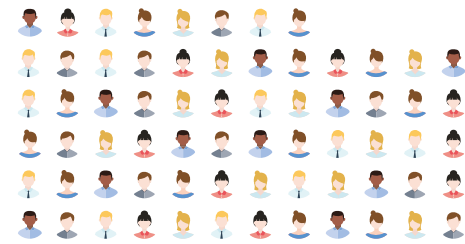
Defining the Maritime Sector

The Maritime Sector is defined as consisting of the individual shipping, ports, leisure marine, marine engineering and scientific and Maritime Business Services industries, each of which comprise a diverse array of activities. This report draws upon a combination of data sources, including company financial database FAME, industry sources and publicly-available data to quantify both the direct and aggregate economic impact of Maritime Sector activities in the UK economy in the years 2010 to 2017.



Economic contribution of the Maritime Sector

The Maritime Sector makes a substantive macroeconomic contribution to the UK through turnover, Gross Value Added (GVA), employment and through the compensation of employees. **It is estimated that the sector directly supported just over £47 billion in business turnover, £17 billion in GVA and 220,100 jobs for UK employees in 2017. The marine engineering and scientific (MES) and shipping industries are the largest constituent industries in terms of economic activity, contributing £5.1 billion and £6.1 billion in GVA respectively, and directly supporting around 81,900 jobs and 59,400 jobs in 2017.**



1,066,000 jobs supported in 2017

The substantial direct economic contribution of the Maritime Sector exceeds those of other comparable industries. For example, the sector's direct turnover contribution of £47 billion compares to £43 billion from the entire Manufacture of Other Transport Equipment industry in 2017; similarly, the sector's direct GVA contribution of £17 billion compares favourably to £10 billion from the Manufacture of Other Transport Equipment industry.

The direct contribution of the Maritime Sector through turnover, GVA and employment has increased since 2010, when turnover, GVA and employment are estimated to have been £37.8 billion, £13.6 billion and 195,400 jobs respectively. Average productivity in the Maritime Sector – as measured through the GVA generated by each job – exceeds that of the national average. Average productivity in each maritime industry also exceeded the national average in each year from 2010 to 2017.

The Maritime Sector also helped to raise billions of pounds each year to the UK Exchequer and made a sizeable contribution to UK trade through exports of goods and services. The sector contributed an estimated total of just under £5.3 billion in tax revenues in 2017, or 0.7% of total UK tax revenues, spread across Income Tax, NICs, VAT, Corporation Tax and Business Rates. The Maritime Sector exported £12.4 billion of goods and services in 2017, or around 2.0% of the UK total.



After quantifying the indirect economic impacts through the industry supply chains and induced effects on expenditures, **it is estimated that the Maritime Sector helped to support a total of £46.1 billion of GVA in 2017.** This implies that, for every £1 in GVA directly contributed on average by the sector, a total of £2.71 in GVA was supported across the UK economy.

These aggregate economic impacts associated with the Maritime Sector also extend to turnover, employment and the compensation of employees. **It is estimated that the Maritime Sector helped to support a total of £108.8 billion in turnover, 1,066,000 jobs and £21.6 billion through the compensation of employees in 2017.**

While the economic contribution of the industry is spread across all UK regions, London contributes the most to GVA and employment, both directly and more widely. In 2017, it is estimated that the industry in London directly contributed £4.6 billion of GVA (27% of the industry) and 42,400 jobs (19%). After indirect and induced effects are considered, the aggregate contribution from London rises to £10.7 billion of GVA (26%) and 216,100 jobs (22%).



Forward look

We have modelled the Maritime economy as a function of its macroeconomic drivers and industry features to produce projections of GVA and Turnover over the next 5 years. Our model shows that the **sector is set to grow at a Compounded Annual Growth rate (CAGR) of 2.8% which translates into cumulative growth of 15% for 2019-2023.**

Within the considered horizon, **moderate growth** is resulting from the combination of sluggish GDP growth projections, slow growing seaborne trade and high costs reflecting ambitious investments in infrastructure, technology, education and environmental sustainability. **Nonetheless, we do expect these investments to lead to major gains in efficiency and productivity over the longer term.**

Maritime UK National Priorities



People

Our aim is to understand and meet future skills and employee needs through promoting maritime careers with our new #MaritimeCareers campaign, enhancing diversity by building upon the Women in Maritime programme and investing in the workforce.



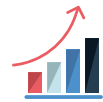
Environment

Our aim is to minimise the sector's impact upon the environment, to help other industries to minimise their impact, take advantages of new technological opportunities such as decarbonisation and encourage modal shift to coastal and inland shipping.



Innovation

Our aim is to position the UK as a leader in innovation across decarbonisation, automation and digitisation by facilitating collaboration across the sector and securing government investment for Maritime Research & Innovation UK.



Competitiveness

Our aim is to attract new maritime businesses to the UK by working with government to enhance the competitiveness of the UK's business environment and to grow the export of maritime products and services by supporting companies to export and promoting the sector across the UK's diplomatic and commercial network.



Regional Growth

Our aim is to support economic development in coastal communities by working with government to create the conditions to encourage further private investment by ports and create a network of regional maritime cluster organisations to foster collaboration and drive growth.



Industry insight

The cruise industry in the UK is flourishing

The UK cruise industry in the UK is flourishing – record investment from cruise lines, record numbers of British holidaymakers taking a cruise and a strong increase in those choosing a British Isles cruise for their holiday. The economic contribution of the UK cruise industry was £3.5 billion (direct) and £9.4 billion (total) in 2017*, and continues to grow. The key economic activities of Britain's cruise industry include corporate management, ship management, distribution and marketing, supply chain services, repairs and refurbishment and inbound cruise tourism. The world's largest cruise corporations have major bases in the UK and provide significant business to the UK's maritime services sector.

Each year more passengers embark on a cruise from a UK port and calls at British ports during a cruise continue to grow. These activities provide ever more UK employment, with over 82,000 jobs dependent on the cruise industry in 2017.

The annual CLIA (Cruise Lines International Association) Cruise Review reported that last year 2,009,000 ocean cruises were taken by British passengers, surpassing the two million mark two years earlier than predicted. Add this to the 232,000 river cruises taken in 2018 – a growth of over 10 per cent from the previous year. Cruising has become a mainstream holiday product in the UK, and a leading contributor to the nation's leisure and maritime economies.

The number of cruise passengers embarking on a cruise from a UK port has steadily risen over the last 25 years. A UK cruise port survey found the number of embarkations from a UK port reached almost 1.2 million in 2018, compared with around 1.1 million in 2017. From 2008 to 2018, embarkation numbers in the UK have risen by almost 500,000, a 68% increase. Southampton is now Europe's leading cruise embarkation port

At the same time, over 1.64 million passengers visiting a UK port during the course of their cruise in 2018, and the five-year annual growth rate of this activity is 17%, with no sign of slowing down. This brings welcome income to Britain's coastal economies, often in remote parts of the country, and the cruise industry with paly a key role in the UK's Coastal Powerhouse.

The UK cruise industry is committed to sustainable growth and places equal emphasis on both business growth and environmental improvement. The industry has pledged its full support for achieving and exceeding IMO decarbonisation targets and welcomes the UK Government's Net Zero challenge. It has made and continues to make significant operational and technical advancements to raise air quality standards, and next P&O Cruises' new Iona will be Britain's first LNG-powered cruise ship. At the same time the cruise industry has achieved major reductions in its vessels' carbon footprints through speed optimization, technical enhancements and operating procedures.

Whilst parts of the travel industry cite negative impacts of Brexit uncertainty, the cruise industry appears well insulated, based both upon its continued strength and growth, and may well see positive gains once Brexit is resolved. In a country with a rich maritime history, and at a time where the cruise holiday experience is reaching new demographics, the UK cruise is well placed to continue to benefit from the growing popularity of cruise holidays.

* Findings from a report conducted by the Business Research & Economic Advisors (BREA) on behalf of Cruise Lines International Association (CLIA)

David Dingle
CLIA UK & Ireland

Sponsored content

Ports: engines of regional growth

At a challenging time for international trade, both in the UK and beyond, the importance of our ports and the maritime sector has come into clearer focus. Nevertheless, the environment of uncertainty has also acted as a catalyst for the shared ambition of industry and government to drive sustainable economic growth through increased trade and exports. At ABP we are committed to investing in our infrastructure, people and services to ensure our ports are prepared to deliver on this ambitious agenda.

Since 2016, we have invested more than £250 million in new facilities to support growing trade with the European Union and the rest of the world. On the Humber, our investment to double container capacity in Hull and Immingham means the UK's busiest trading estuary will be even better equipped to support businesses across the North of England and the Midlands. In Southampton, already the UK's number one export port, our £55 million investment in automotive handling and cruise facilities further enhances the ability of British manufacturers to reach global markets and to accommodate the larger, lower carbon cruise vessels of tomorrow. This investment will ensure Southampton continues to serve as Britain's Gateway to the World in the years ahead.

Ports can also serve as engines for regional economic growth. By connecting British industry and manufacturers to global markets, ABP's ports support 119,000 jobs and contribute £7.5 billion to the UK economy every year. Their integral part in the supply chain means ports also support jobs in sectors located well beyond their immediate hinterlands. Ports therefore have a particularly vital role to play in delivering regional development and the shared ambition of rebalancing the economy.

In addition to facilitating the free flow of goods, ports also provide opportunities to boost trade and economic growth by providing sites for new manufacturing activity. Several of our ports offer ideal locations for the import of raw materials and components, and the export of finished products, as well as sites ready for development. A policy of free ports or enhanced enterprise zones could further bolster the ability of ports to drive growth in coastal regions around the country.

Ports are at the forefront of the decarbonisation agenda, facilitating the clean transport of freight by short sea shipping and rail while supporting the burgeoning offshore wind and renewable energy sector. New research from the University of Hull illustrates the potential for the Humber to offer further reductions in emissions by offering shippers an alternative route to market through ports on the Humber, saving thousands of lorry miles and reducing congestion in the south east. By embracing new technologies and adopting new ways of working, our ports are delivering ever greater efficiencies for customers and supporting their sustainable growth.

Delivering on this ambition and harnessing the full potential of our nation's ports will require a concerted effort across government and industry. The launch in January of Maritime 2050, the Government's long-term strategy for the future of the UK maritime sector, shows how this can be achieved. The current market-led approach to port development has been hugely successful in attracting investment in port infrastructure and continued support for this policy is essential. Improving road and rail links to ports, as recognised in the 2018 Port Connectivity Study, has the potential to further unlock the ability of ports to facilitate a growth in trade.

Our historic success as a trading nation was built on our maritime strength. By embracing bold policies that encourage trade and growth, the sector can make an even greater contribution in future.

David Leighton
Associated British Ports

Supporting
Manufacturers

1

Introduction

Cebr is pleased to present this report to Maritime UK on the economic impact of the Maritime Sector on the UK economy. For the purposes of this study, the Maritime Sector is broadly defined as comprising of the individual shipping, ports, marine engineering and scientific (MES), marine leisure and Maritime Business Services (MBS) industries; each of these industries comprises numerous and diverse activities which are reflected in the study.

This report forms one of ten reports on the economic contribution of the Maritime Sector. The other reports focus on the economic contribution of each of the five constituent Maritime Sector industries at UK level, and the economic contribution of the sector in Scotland, Wales, the Solent LEP and the Liverpool City Region. It is therefore important to consider this report as part of the wider framework set out in the ten reports, which set out the impact of the Maritime Sector both at a national and regional level.

Our examination spans the period from 2010 to 2017 (inclusive), with the latter being the latest year for which full data are available, and endeavours to capture the full economic 'footprint' of the shipping industry. As such, our report is not confined to direct ongoing contributions to GDP and employment through the shipping industry's operations and activities in the UK, but also provides assessments of the associated indirect and induced multiplier impacts.

1.1 | About Maritime UK

Maritime UK is the umbrella body for the UK's maritime sector, representing companies and partner organisations in the shipping, ports, services, engineering and leisure marine industries. It acts to promote the sector, influence government and drive growth.

1.2 | Purpose of this report

This study seeks to equip Maritime UK with statistics and figures on the value of the Maritime Sector to the UK economy, within the context of the value of the Maritime Sector. As such, Cebr has focused on the following key economic indicators: business turnover, employment, Gross Value Added (GVA), the compensation of employees, the Exchequer contribution (through tax revenues raised) and exports of goods and services.

The study also seeks to identify the contribution of the Maritime Sector at regional level (across the former Government Office Regions), after accounting for the relatively high concentration of economic activity taking place in the City of London.



1.3 | Overview of the study and methodology

Purpose of the study

This report provides a thorough and comprehensive examination of the role of the Maritime Sector in the UK and its constituent sub-regional economies. It presents a range of analyses demonstrating different aspects of the value contributed by the overall sector, including direct contributions to GDP and employment, indirect and induced multiplier impacts and the Maritime Sector's contribution to the UK Exchequer through tax revenues raised.

An important task has been to develop an in-depth understanding of the Maritime Sector. To produce a robust study, it is necessary to analyse the available data to ensure that it captures the full range of activities that should be included in establishing the total economic 'footprint' of the industry.

Following the collation of the necessary data capturing these activities, the values of key economic indicators were established to demonstrate the impact of the sector. The key macroeconomic indicators include:

- GVA¹ contributions to UK and regional GDP generated by the Maritime Sector, directly and through indirect and induced multiplier impacts.
- Jobs supported by the sector, including direct, indirect and induced jobs through multiplier impacts.
- The value of the turnover of Maritime Sector and, again, the turnover supported in the UK and regional economies through multiplier impacts.
- The value of employee compensation² generated by the Maritime Sector, representing the total remuneration of employees operating in the sector.
- The contribution of the Maritime Sector through revenues raised for the Exchequer.
- The value of goods and services exported by the industries comprising the Maritime Sector.



Mapping the UK Maritime Sector

Here we set out how the Maritime Sector has been defined for the purposes of the study. On a holistic level, the wider sector can be disaggregated into the shipping, ports, leisure marine, marine engineering and scientific and Maritime Business Services industries, which in themselves are formed of numerous individual and distinct activities.

Cebr has subsequently undertaken a mapping exercise using this list to identify how each of these four industries aligns with the national accounts. For most industry activities, a corresponding Standard Industrial Classification (SIC) code exists which enables the identification and quantification of the direct economic impacts using publicly-available data sources. A minority of activities do not map neatly against the SIC framework, necessitating the use of industry or local-level data for quantification purposes.

Shipping industry

- International passenger transport (cruise and ferry);
- Domestic and inland waterway passenger transport;
- International freight transport (bulk, container, gas and tanker);
- Domestic & inland waterway freight transport;"

Ports industry

- Warehousing and storage;
- Port activities and management;
- Stevedores, cargo and passenger handling;
- Border agency, HMRC and public sector employees operating in ports.

Leisure marine industry

- Recreational marine activities, marine finance and legal activities and general marine services;
- Boatbuilding (marine leisure vessels);

Marine engineering and scientific industry

- Shipbuilding;
- Marine renewable energy;
- Marine support activities for offshore oil and gas, engineering and mining;
- Marine science and academic activities, including government vessels and technical consulting;

Maritime Business Services industry

- Shipbroking services;
- Maritime Insurance services;
- Maritime Financial services;
- Maritime Legal services;
- Ship Surveying and Classification activities;
- Maritime Education (including Maritime university courses and cadetships);
- Maritime Consultancy; and
- Maritime Accountancy.

Here we focus solely on the Maritime Sector on a holistic basis; a full description of how the direct, aggregate and regional economic impacts of each industry has been measured can be found in Cebr's separate reports for each industry.



Quantifying the direct economic impacts of the Maritime Sector and data sources

The first stage of the study, discussed in more detail in Cebr's separate reports on the shipping, ports, leisure marine, marine engineering and scientific and Maritime Business Services industries, has involved mapping the activities of each industry against the National Accounts framework, in order to establish clarity on the precise definition of activities as they map against the Standard Industrial Classification (SIC) framework³.

In essence therefore, this involves taking each of the sector's and industry's activities, and mapping these to the most relevant Standard Industrial Classification (SIC) code in order to identify the activity's economic data. It is clear from Cebr's analysis that the majority of activities do map neatly onto the National Accounts framework. As a result, Cebr have been able to exploit company financials data in addition to publicly-available data sources such as the Annual Business Survey to gather data for some constituent activities of the sector. Cebr has therefore drawn upon a combination of publicly-available data, desk research and industry data to quantify the economic contribution from the Maritime Sector.

In order to quantify the direct economic impacts of the Maritime Sector, a number of different approaches have been taken which reflect the degree of alignment (or otherwise) for each activity against the National Accounts framework.

They are as follows:

- The major source of data used to quantify the direct economic contribution of the Maritime Sector is the Financial Accounts Made Easy (FAME) database, which provides business demography and financial accounts data for companies operating in the UK Maritime Sector. The FAME database has been used to generate estimates for the business turnover, GVA, employment, the compensation of employees and profitability of the shipping industry.
- For those industries and constituent activities which do not map neatly against the national accounts framework, a combination of industry sources (such as the British Marine Key Performance Indicators) and publicly-available data sources have been used to generate direct economic impact estimates.
- As FAME does not provide data on exports of goods and services, data have instead been sourced from both the ONS Pink Book or industry sources such as the UK Chamber of Shipping's (UKCoS) Annual Sea Inquiry. In some instance the ONS Supply Use Tables have been used to generate estimates.

- Data for the direct economic contribution of each industry have by extension been then used to quantify the contribution that the Maritime Sector makes to the UK Exchequer, and the productivity of the sector in terms of GVA per job.

Again, a more detailed description of sources used for each industry and their constituent activities can be found in Cebr's separate industry reports, which quantify the economic contribution of each industry.



Quantifying the aggregate economic impacts of the Maritime Sector

After collation and interrogation, the direct economic impacts for the Maritime Sector have then been embedded within Cebr's economic impacts models of the UK economy. For each of the activity groups, the direct impacts are then combined with the bespoke economic multipliers to generate indirect, induced and so aggregate impacts. These multipliers were calculated by Cebr using our input-output modelling approaches, as these activities are not 'standard' sectors reported in the ONS' input-output tables. Cebr's models establish the relationships between industries through supply chain linkages, as well as industries' linkages with government, capital investors and the rest of the world (through trade).

The models produce three types of impact for four indicators – turnover, GVA, employment and the compensation of employees. The three types of impact are:

- **Direct impact:** this is the value generated and jobs supported directly by the economic activities of the UK Maritime Sector.
- **Indirect impact:** this is the value and jobs supported in industries that supply inputs to the UK Maritime Sector industry.

- **Induced impact:** this is the value and jobs supported in the wider economy when the direct and indirect employees of the sector spend their wages and salaries on final goods and services.

These three impacts are then combined to convey the aggregate impact associated with each industry and activity within the Maritime Sector in terms of turnover, GVA, employment, and the compensation of employees.



Removal of "double-counting" effects

As this report considers the activities of the entire Maritime Sector (as defined above), when quantifying the associated aggregate economic impacts it is necessary to consider and account for the crossovers or interlinkages that will exist between each of the constituent industries. For example, the UK shipping industry will purchase a significant amount of services from either the UK ports or UK Maritime Business Services industries. So if we were to simply apply multipliers to each of the four maritime industries and combine the resulting aggregate impacts, we would in effect be double-counting some of the economic contributions, and would by extension overstate the aggregate impacts of the sector.

To avoid double-counting it has therefore been necessary to remove these surplus interlinkages from our analysis. In practice, this involves removing coefficients relating to affected industries within Cebr's input-output models which would otherwise feature as part of the maritime industry multipliers. For example, the coefficient reflecting the additional activity generated when the shipping industry consumes ports services has been removed. As a result, the summation of the aggregate economic impacts taken from Cebr's individual industry reports will not align with the aggregate economic impacts for the Maritime Sector as presented in this report (and the Maritime Sector aggregate impacts will necessarily be lower.)

1.4 | Structure of the report

The remainder of the report is structured as follows:

- **Section 2** outlines the direct economic impacts of the Maritime Sector. We consider the direct impacts through turnover, GVA, employment, the compensation of employees, the contribution to the UK Exchequer through tax revenues contributed by the industry, and the contribution through exports.
- **Section 3** considers the multiplier impacts of the Maritime Sector through the activities it stimulates in local supply chains and in the wider economy when employees directly and indirectly employed by the different industries spend their wages and salaries in the local and wider economy.
- **Section 4** examines the direct and multiplier impacts of the Maritime Sector at regional level, as disaggregated by the 12 former Government Office Regions (GORS)⁴.
- **Section 5** provides forecasting analysis for the Maritime Sector in the context of the current economic climate.
- **Section 6** provides case studies on each of the industries that make up the Maritime Sector.
- **Annex A** sets out the full set of direct economic impacts by region.

¹ GVA, or gross value added, is a measure of the value from production in the national accounts and can be thought of as the value of industrial output less intermediate consumption. That is, the value of what is produced less the value of the intermediate goods and services used as inputs to produce it. GVA is also commonly known as income from production and is distributed in three directions – to employees, to shareholders and to government. GVA is linked as a measurement to GDP – both being a measure of economic output. That relationship is (GVA + Taxes on products - Subsidies on products = GDP). Because taxes and subsidies on individual product categories are only available at the whole economy level (rather than at the sectoral or regional level), GVA tends to be used for measuring things like gross regional domestic product and other measures of economic output of entities that are smaller than the whole economy.

² Compensation of employees is the total remuneration, in cash or in kind, payable by an employer to an employee in return for employers' social contributions, mainly consisting of employers' actual social contributions (excluding apprentices), employers' imputed social contributions (excluding apprentices) and employers' social contributions for apprentices.

³ The United Kingdom Standard Industrial Classification of Economic Activities (SIC) is used to classify business establishments and other standard units by the type of economic activity in which they are engaged.

⁴ These are: Scotland, Wales, Northern Ireland, the East of England, the East Midlands, London, the North East, the North West, the South East, the South West, the West Midlands, and Yorkshire and the Humber.

Industry insight

A bright future for shipbroking

Shipbroking has long been an important pillar of the UK maritime sector, but does it have a future in a digitally connected AI world? Are shipbrokers prepared for the challenges of increased regulatory scrutiny? Can shipbroking adapt, thrive and grow as an industry changes around it? I strongly believe that shipbroking has a bright future.

Shipbroking is big business in the UK, particularly in London. Around a quarter of all shipping transactions are handled by several hundred large and small shipbroking firms. Some cover every market, others specialise in one particular area.

But what they all have in common is the need to add value to the deal. Competitive chartering brokers, sale & purchase brokers and freight derivative brokers all vie for the business of international shipowners, charterers, trading houses. The successful broker is the broker who brings new ideas and intelligence to the client.

The shipbroking sector is currently investing in a second wave of digital technologies. The first wave saw progressive brokers invest in AIS data, fixture and process management software as well as post-fixture commercial voyage management systems. The shipbroking industry has long recognised that simply matching ships and cargoes is not enough. Now the opportunities of machine learning and algorithm technologies are being exploited by the most forward-thinking brokers. Teams of IT experts are being hired to develop new systems and processes.

By speeding up manual processes, harnessing and scaling the information at their fingertips, shipbrokers are able to add significant extra value to their principals.

But there is one vital element which cannot be digitalised. Trust. Without trust that the broker will always act ethically and in the principal's best interest, no amount of digital investment will deliver the client's business.

For trust to exist, there needs to be confidence in a fair and competitive market. This is where the Baltic Exchange comes in.

Physical shipbroking has never been government regulated, but the 2008 financial market crash, and the manipulation of the London Interbank Offered Rate (LIBOR) in particular, has led the Bank of England to give its support to Codes of Conduct produced by unregulated markets such as shipping. The Bank sees standards and codes as an integral part of a much broader effort by UK authorities and market participants to ensure fair markets.

Of course, the shipping markets have not seen the ethical drift that led to the huge breaches of trust and rigging in the financial markets. But nevertheless, it is vital that proper behaviour is codified and built around an accepted set of principles. The Baltic Exchange is about to release a new Code of Conduct, updated and written in the language of compliance. It underpins the ethical approach taken by Baltic members globally in dry cargo, tanker, gas, container, sale & purchase, demolition and freight derivative markets. Crucially, it helps maintain trust in the market.

Shipbrokers will continue to adapt to a fast-changing business environment, but not all will survive. Some will be acquired by bigger rivals, others will simply fall by the wayside. But new firms continue to emerge and successful firms continue to go from strength to strength. Backed by technology and a trusted marketplace, I believe that shipbroking has a long and prosperous future ahead of it.

Mark Jackson
The Baltic Exchange

Industry insight

Ports have been working intensively to prepare for Brexit

The UK's ports sector continues play its historic and fundamental role as our main global gateways for trade, handling 95% of the UK's trade in goods with the world. This trade, for example, puts half the food we all need on shelves and in fridges. The gateways role is also absolutely essential for other industries to survive and prosper – for example virtually all of the £100 billion of global trade value of the automotive sector passes through our ports.

But ports are so much more than points of transit for goods and people. The UK's ports continue to evolve and growth the sustainable value they generate for their customers, the UK economy and communities all around our coast.

The ports sector continues to invest ambitiously in its capacity and capabilities. Huge projects are underway in ports such as Aberdeen, Dover and Tilbury. Multi-million pound investments are happening all around the UK. And we anticipate further major investments in the pipeline as well as the sector maintaining its admirable drum beat of more than £600 million of capital expenditure a year.

To focus only on volume would be misleading. The sector continues to grow its focus on 'value' rather than just tonnage. This comes through fast growing but tonne-light maritime activities such as cruise and servicing the offshore renewable energy markets. It comes through offering demanding services, such as complex lift capabilities. And it comes through growing the land-side port-centric models of value creation, offering spaces and service for logistics and manufacturing demands.

Ports are making real progress on the true foundations on long term success – innovation and sustainability. 2019 has seen the opening of the first Port Innovation Hub with more to follow. We've seen ports introduce autonomous and remotely operated equipment and further deliver their digital capabilities and services. Ports are increasing the electrification of their activities as a key means of improving their sustainability footprint – reducing emissions and improving air quality. This is a journey we as a sector are committed to and look forward to making further progress.

Finally, no one can escape mention of Brexit. The ports sector has been working intensively to prepare for Brexit, both on its own operations but also in broader partnership with Governments, customers and other sectors. None of us can confidently predict what Brexit will bring. But the UK's ports sector has proved itself time and again to be resilient and adaptable. The UK can be assured that the ports sector will be doing all it can to keep trade flowing and Britain open to the world whatever Brexit scenario transpires.

The UK ports sector is rightly proud of the huge contribution it makes to the UK, customers and communities. We are ambitious to do more and are excited about what the future holds.

Richard Ballantyne
and **Tim Morris**,
British Ports Association
and UK Major Ports Group

2

The direct economic impact of the Maritime Sector in the UK

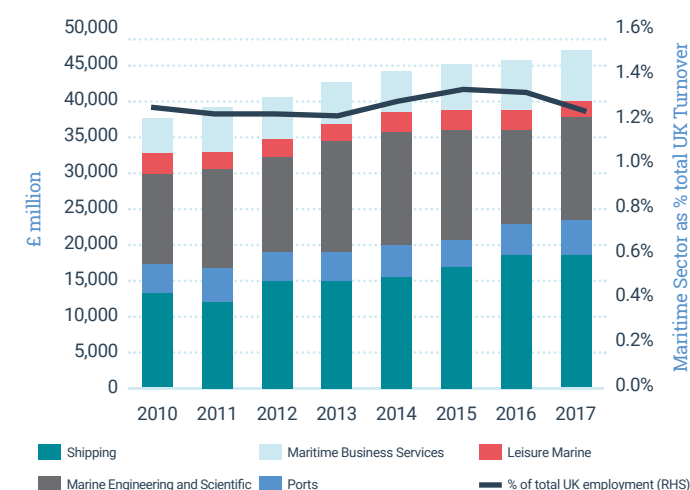
The direct contribution of the Maritime Sector is measured in terms of the following key macroeconomic indicators: turnover, GVA, employment, the compensation of employees, the Exchequer contribution through tax revenues raised and exports.

2.1 | The direct economic impact through turnover

Figure 1 below shows the breakdown of business generated by the Maritime Sector and its constituent industries between 2010 and 2017, and expressed as a share of the total UK Non-Financial Business Economy⁵. Overall, the Maritime Sector contributed an estimated £47 billion in turnover in 2017, or 1.23% of total UK turnover.

This is an increase of £9.6 billion on the 2010 level of turnover (£39.6 billion), although 0.02% below the 2010 percentage. In nominal terms, Maritime Sector turnover increased every period.

Figure 1: The estimated turnover of the Maritime Sector, and expressed as a share of total UK turnover from the non-Financial Business Population, 2010 to 2017



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The largest constituent industry within the Maritime Sector in terms of turnover directly generated was the shipping industry, with £18.9 billion of business turnover in 2017, with marine engineering and scientific second, contributing £14.2 billion. Shipping also grew by the most over the period considered, both in nominal terms (£5.5 billion) and as a percentage (40% growth since 2010). This growth is largely driven by turnover for international passenger transport (cruise and ferry), which grew by £3.7 billion (almost 40% of the total growth of the sector) over the assessed period. This is consistent with very solid growth in the global cruise industry over similar timeframes, with The Cruise Lines International Association reporting growth of over 20% from 2011 to 2016⁶.

Combined, the shipping and MES industries contributed 70% of total Maritime Sector turnover in 2017. This joint percentage contribution is relatively consistent over the period, although down slightly from the 2015 peak of 72%.

In line with increases in turnover directly generated by the Maritime Sector, average profitability (as measured using the ratio of gross profits to turnover) in the Maritime Sector is estimated to have grown since 2010. Table 1 shows trends in profitability for the sector and across each industry. The overall average profitability of the industry rose from 17% to 20%; in other words, for every £1 in turnover generated by a business in the Maritime Sector in 2017, an estimated 20 pence was generated in gross profit, compared to 17 pence in 2010. However this growth over the assessed period was actually driven by strong increases in profitability from 2010 to 2014. Since, profitability has actually fallen slightly, by 1.4 percentage points from the 2014 peak of 21.6%.

Table 1: Estimated average profitability (gross profit ratio) of the Maritime Sector and constituent industries

Profitability	2010	2011	2012	2013	2014	2015	2016	2017
UK Maritime sector	17.3%	17.0%	18.7%	19.7%	21.6%	20.0%	20.5%	20.2%
Shipping industry	16.4%	17.3%	19.6%	19.8%	22.9%	24.1%	25.6%	24.1%
Ports industry	25.4%	23.3%	25.1%	25.5%	25.2%	25.1%	24.2%	25.5%
Leisure Marine industry	26.3%	20.2%	17.2%	17.4%	16.3%	16.4%	15.4%	15.4%
MES industry	32.1%	30.7%	32.1%	31.1%	29.6%	28.9%	23.8%	33.7%
MBS industry	12.8%	13.4%	16.3%	17.7%	21.1%	15.9%	18.8%	18.2%

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

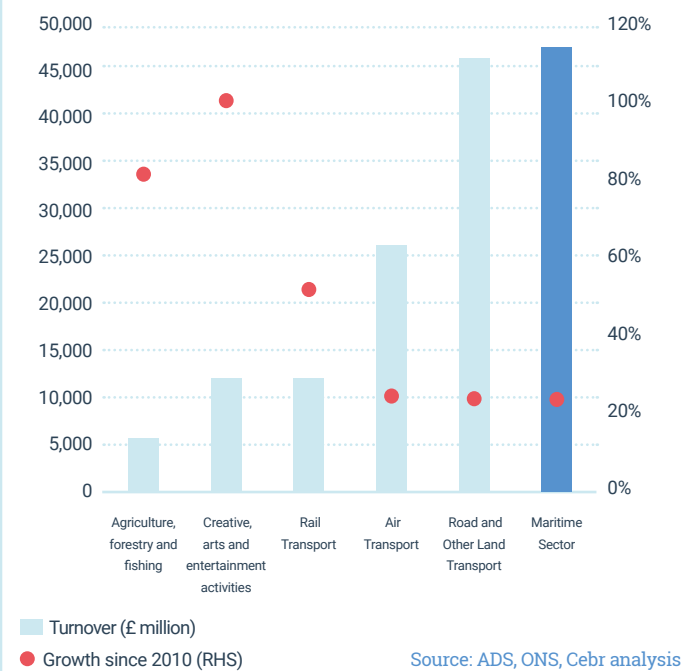
Over the majority of the period (every year bar 2016), the most profitable industry was MES. Weighting each year equally, it had an average profitability of 30%. Ports and the shipping industry were second and third respectively, with average rates of 25% and 21%. Average profitability increased in every industry over the period, except for leisure marine, where profitability fell by 10.9%. Leisure marine went from the second most profitable industry in 2010, to the least profitable in 2017. By the same metric, average profitability increased by the most in the shipping industry, with a 7.7 percentage point rise.

Maintaining the UK's competitive advantage as a leading maritime nation is also a key theme in the UK's Maritime 2050 strategy report⁷. This is targeted through a series of themes, setting out the overall vision for the sector, with those of particular pertinence to firm profitability including maintaining fiscal attractiveness, the efficiencies available through the UK's maritime cluster, government support of maritime innovation and a modern regulatory framework. All this is promising for a continued trend of strong business profitability in the Maritime Sector.

To place the Maritime Sector's direct contribution through turnover in context, Figure 2 below compares turnover in the Agriculture, Forestry and Fishing; Creative, Arts and Entertainment; Rail Transport; Air Transport; and Road and Other Land Transport industries with that of the Maritime

Sector; both in absolute levels and the growth since 2010. Turnover data for the comparable industries has been sourced from ADS Group⁸ and the Annual Business Survey (ABS).

Figure 2: The direct contribution through turnover of the Maritime Sector against comparable sectors in 2017, and growth against the 2010 level



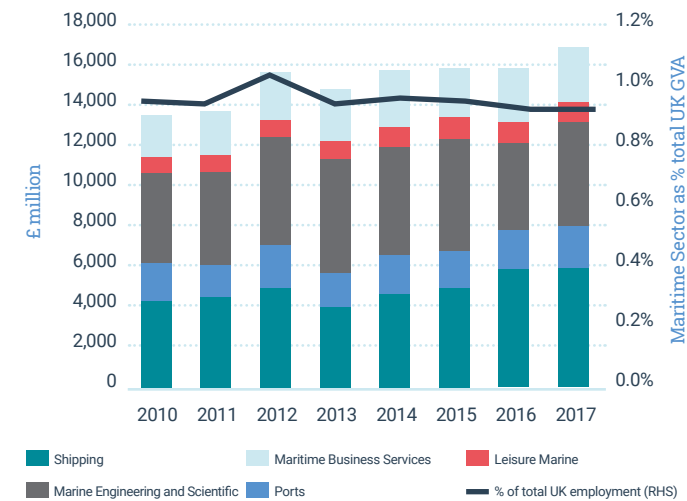
Source: ADS, ONS, Cebr analysis

In 2017, Maritime Sector turnover exceeded that of all the other sectors considered, although Road and Other Land Transport was within £2 billion. Turnover generated by the Maritime Sector in 2017 is estimated to have increased by approximately 25% since 2010, with this outturn also comparing favourably to the other two industries with the highest 2017 level of turnover (Road and Other Land Transport and Air Transport).

2.2 | The direct economic impact through Gross Value Added (GVA)

This subsection illustrates the contributions in terms of the GVA from the Maritime Sector to UK GVA. Figure 3 shows this direct impact, disaggregated by industry in the years 2010 to 2017, as well as the Maritime Sector's share of total GVA in the UK. It is estimated that the Maritime Sector directly contributed a total of £17.0 billion in GVA in 2017, an increase of 25% from £13.7 billion in 2010.

Figure 3: The direct contribution of the Maritime Sector through GVA, and the sector's share of total UK GVA, 2010 to 2017



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The majority of this net 25% increase occurred in three year-on-year jumps. GVA increased by £2.0 billion, £0.9 billion and £1.1 billion in 2012, 2014 and 2017 respectively, with GVA growth relatively flat in the other years, or declining (GVA fell by £0.9 billion in 2013). As a percentage of UK GVA, Maritime Sector GVA is down very slightly (0.03%) over the assessed period. This peaked at 1.04% in 2012, and as of 2017 was at 0.92%.

These three different increases occurred for differing reasons, and are worth examining separately. The GVA increase in 2014 was primarily driven by the 17% GVA growth of the shipping industry, although the GVA contribution from Maritime Business Services also grew by £0.3 billion – the most the industry grew by in a single year over the period we considered.

The largest increase, occurring in 2012, was driven by strong growth in the shipping (£0.5 billion), ports (£0.4 billion) and marine engineering and scientific (£0.8 billion) industries. Within each of these constituent industries, the most significant factors were increases again in the GVA generated from the Transport of Passengers (International) and Sea Faring (associated with similar trends as discussed in the previous subsection), and a rise of over £0.5 billion in GVA associated with marine oil and gas support activities.

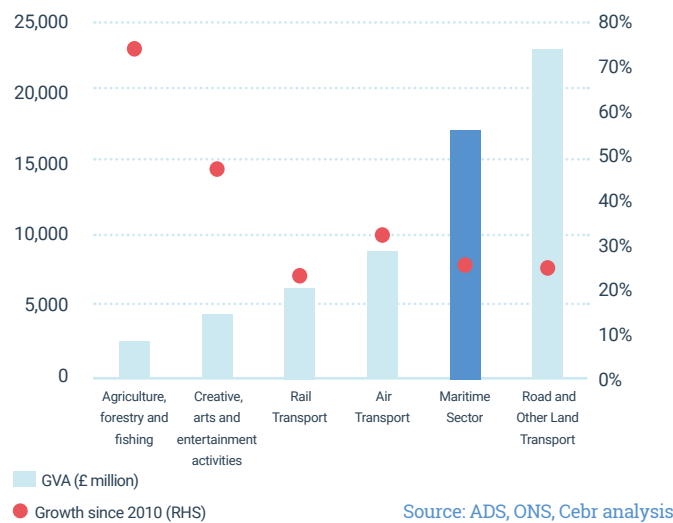
This intuitively is likely to be linked to UK natural gas prices, with the demand for support services derived from the demand for oil and gas itself. Looking at trends in the UK National Balancing Point (NBP) price⁹, this does seem correlated with economic activity associated with marine oil and gas support activities, albeit with a slight lag (which makes sense, as the level of support activity required would be expected to have a degree of stickiness, as market changes take time to filter through supply chains). The level of economic activity supported by these support activities are very volatile, particularly over the second half of the assessed period. The GVA impact generated here increased from £1.3 billion in 2016 to £2.1 billion in 2017, a rise of 63%. This £0.8 billion increase alone is responsible for 73% of the total Maritime Sector GVA increase in 2017.

What is even more striking, is the cause of the very minor decline in GVA (£3.2 million) observed from 2015 to 2016. At face value this may seem like a down year, however GVA essentially remained constant, despite the GVA contribution from the marine oil and gas support activities declining by £1.2 billion, following a near two year period of declining natural gas prices. Stripping out this sector (with the aim of eliminating the effect of this extreme one-year drop, and thus giving a better proxy for the overall performance of the rest of the Maritime Sector), the Maritime Sector actually grew by £1.2 billion in 2016, but just £0.3 billion in 2017.

As for turnover, the majority (66% in 2017) of GVA was contributed by the shipping and marine engineering and scientific industries. In terms of the observed £3.4 billion GVA growth for the entire sector, £1.7 billion (49%) was due to increasing GVA in the shipping industry. MBS and the marine engineering and scientific industry contributed £0.7 billion each in GVA growth. In percentage terms, GVA in the shipping industry grew by the most from 2010 to 2017 (38%), with Maritime Business Services second (33%). All five of the constituent industries saw a GVA growth of at least 10% from 2010 to 2017.

Following Figure 2, Figure 4 below compares Maritime Sector GVA against those of comparable activities in 2017.

Figure 4: The estimated GVA of the Maritime Sector against comparable industries in 2017, and growth against the 2010 level

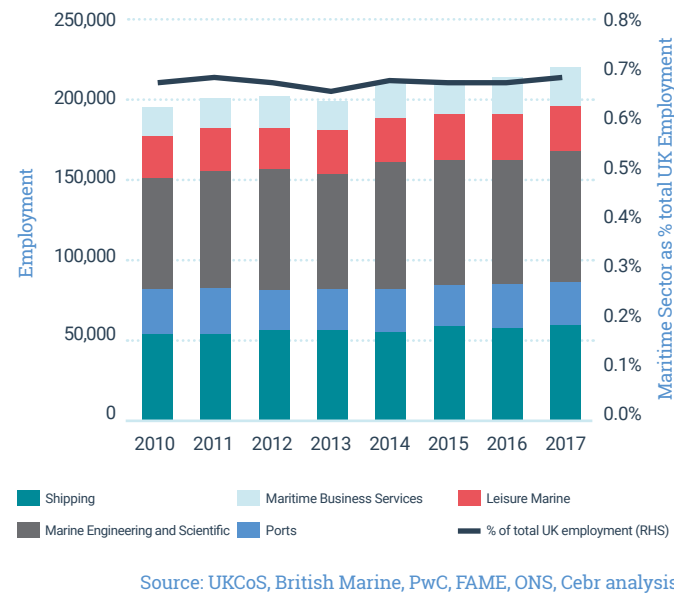


The Maritime Sector is larger than the entire Rail and Air Transport Sectors, along with the Creative, Arts and Entertainment activities and Agriculture, Forestry and Fishing sectors. In 2017, only GVA from Road and Other Land Transport (£22.2 billion) exceeds that of the Maritime Sector.

2.3 | The direct economic impact through employment

In addition to its contribution through GVA, the Maritime Sector also directly supports a significant number of jobs. Figure 5 below highlights the direct contribution of the Maritime Sector to UK employment, again disaggregated by individual industry.

Figure 5: The direct contribution of the Maritime Sector through employment, and the sector's share of total UK employment, 2010 to 2017



It is estimated that the Maritime Sector directly supported around 220,000 jobs for UK employees in 2017, an increase of 24,000 jobs (12%) on the 196,000 provided in 2010. The sector's share of total UK employment remained broadly stable over this period, on average around 0.67%. As with turnover and GVA, in each year the MES and shipping industries contributed the lion's share of employment, equating to 64% in 2017. Employment over the period increased for ever constituent industry except ports, where employment fell 7%.

Based on trends in GVA and employment presented in Figure 2 and Figure 4, employees operating in the Maritime Sector are highly productive, as measured by GVA per job. Table 2 below shows the estimated productivity of jobs in the sector and across each industry across the years 2010 to 2017, and compared against the UK economy as a whole.

Table 2: Productivity (GVA per job) in the Maritime Sector and constituent industries

GVA per job	2010	2011	2012	2013	2014	2015	2016	2017
UK economy	£46,215	£47,176	£48,355	£49,691	£50,877	£51,619	£53,013	£54,330
UK Maritime sector	£69,760	£68,554	£78,170	£74,721	£75,599	£75,209	£74,609	£77,358
Shipping industry	£84,132	£84,291	£91,852	£73,355	£86,987	£87,524	£104,994	£102,589
Ports industry	£64,594	£58,616	£80,931	£66,589	£70,942	£66,859	£67,725	£77,225
Leisure Marine industry	£30,285	£29,986	£32,260	£34,524	£34,984	£34,706	£33,799	£34,127
MES industry	£64,370	£62,117	£70,822	£78,267	£67,440	£72,459	£56,692	£62,602
MBS industry	£115,334	£118,760	£127,112	£134,049	£136,625	£116,112	£117,503	£117,632

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

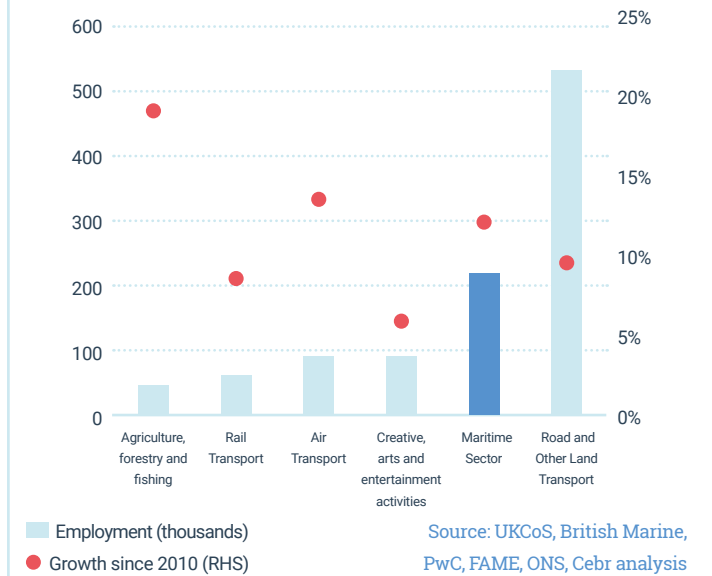
The average job in the Maritime Sector in 2017 raised approximately £77,400 in GVA, and so compares favourably to the UK average of £54,300. The average job in each consistent industry bar leisure marine was more productive than the UK average in each year, with those operating in the Maritime Business Services industry and shipping industry averaging over £100,000 of GVA produced per job in 2017. Every industry except MES increased in productivity over the period, although productivity in the Maritime Business Services industry is significantly (12%) lower than the 2014 peak of £136,600.

Maintaining and improving this impressive productivity record is also a focus moving forwards. Investment in technology such as autonomous vessels and autonomous freight movement through ports has the potential to be beneficial in this regard, and is targeted in the Maritime 2050 strategy report¹⁰. Additionally, focus has been placed on arresting the declining productivity in the MES industry, with long-term support of the Maritime Enterprise Working Group committed to. This is a body set up following the publication of the National Shipbuilding Strategy in 2017, and the Maritime 2050 strategy highlights the importance of working with the group to raise productivity and secure a sustainable and globally successful UK shipbuilding sector – one of the constituent activities in the marine engineering and scientific industry.

Further focusing in on MES, it is encouraging that despite the slight headline decrease, GVA per worker in the marine renewable energy sub-industry has increased substantially (52% from 2010 to 2017). This is particularly pertinent given the potential move in this direction, particularly in the light of the recent government commitment to cut greenhouse gas emissions to almost zero by 2050¹¹.

Figure 6 compares the direct contribution that the Maritime Sector made through UK employment in 2017 against comparable industries. Employment in the Maritime Sector compares favourably, with 2017 employment and growth since 2010 second and third respectively out of the six considered industries.

Figure 6: The estimated employment of the Maritime Sector against comparable industries in 2017, and growth against 2010 level

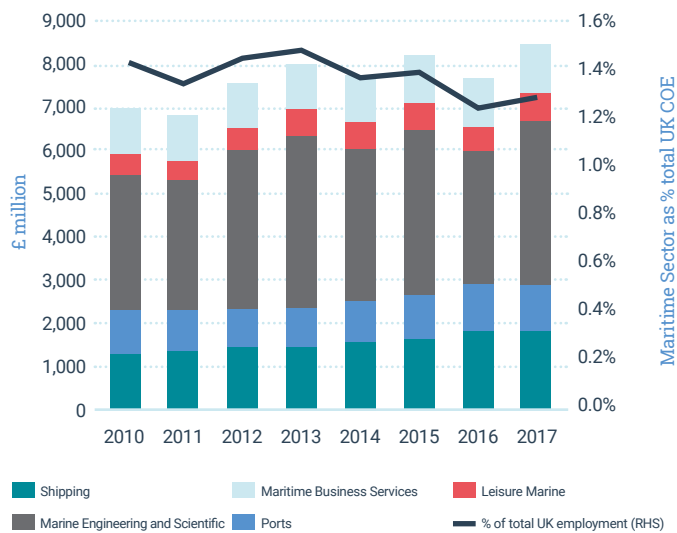


Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

2.4 | The direct economic impact through the compensation of employees

Figure 7 opposite illustrates the compensation of employees which is directly supported by the Maritime Sector in 2017, disaggregated by industry. It also illustrates the proportion of all direct employee compensation in the Maritime Sector which is directly supported by the industry.

Figure 7: The direct contribution of the Maritime Sector through the compensation of employees, and the sector's share of total UK employee compensation, 2010 to 2017



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

It is estimated that the Maritime Sector directly contributed just under £8.5 billion through the compensation of employees in 2017; equivalent to around 1.3% of the total employment costs of the total UK Non-Financial Business Economy. Overall the sector increased its direct employee compensation by £1.5 billion over the assessed period, although as a share of total UK employee compensation this was down 0.14%.

Due to both its high direct employment contribution (37% of the Marine Sector total), and high average employee compensation, the MES industry contributed the highest share (around 45% in 2017). The total growth in Marine

Sector employee compensation was also driven the most by the £0.7 billion increase in MES industry, although in percentage terms shipping industry employee compensation increased the most (40% higher in 2-17 than in 2010). Together, these two industries contributed 67% of employee compensation, and 80% of the growth since 2010.

2.5 | The direct contribution of the Maritime Sector to the UK Exchequer

This subsection discusses the contribution of the Maritime Sector to the UK Exchequer through tax revenues. For each industry and constituent activity, Cebr have calculated the contributions in terms of the tax heads listed below:

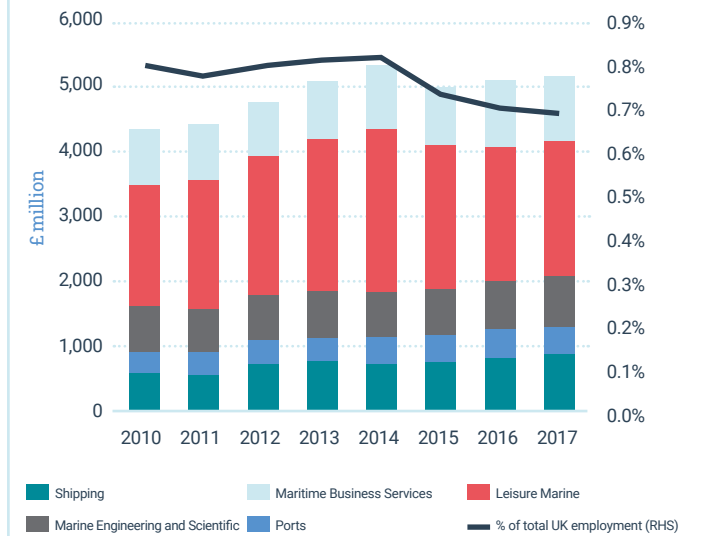
- Income Tax;
- National Insurance Contributions (NICs) – from both employees and employers;
- Value-Added Tax (VAT);
- Corporation Tax;
- National Non-Domestic Rates (Business Rates).

For the personal taxes listed above, Income Tax and NICs revenues have been calculated by applying tax rates to the estimated wages and salaries paid to employees operating in each industry; rates and thresholds have been sourced from HMRC for the years 2010 to 2017. Wages and salaries for employees have been sourced from FAME and the Annual Survey for Hours and Earnings (ASHE)¹².

For the business taxes listed above and aside from revenues raised from the Tonnage Tax regime applied to the shipping industry (discussed in Cebr's separate report on the economic contribution of the shipping industry), Corporation Tax revenues have been estimated by combining the revenues raised through the Tonnage Tax regime, Corporation Tax revenues have been estimated by applying HMRC estimates for Average Effective Tax Rates (AETRs) to the estimated Gross Profit of each industry activity. Business Rates have been estimated using the average level of Business Rates paid as a proportion of GVA, drawing upon the ONS Annual Business Survey (ABS).

Figure 8 shows the direct contribution of the Maritime Sector to the UK Exchequer across the years 2010 to 2017, disaggregated by industry and expressed as a share of total UK tax revenues.

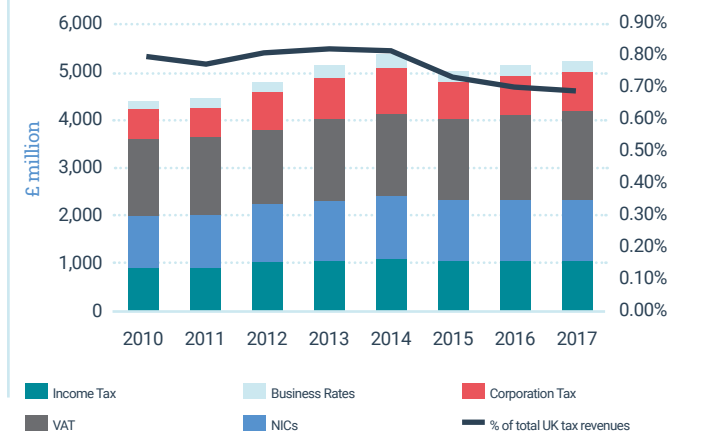
Figure 8: The direct contribution of the Maritime Sector to the UK Exchequer, and the share of total UK tax revenues, 2010 to 2017



Source: UKCoS, British Marine, PwC, FAME, ONS, HMRC, Cebr analysis

The Maritime Sector is estimated to have directly generated £5.3 billion in tax revenues for the UK Exchequer in 2017, 20% higher than the £4.4 billion in 2010. In all years, the MES industry contributed the most, with on average 44% of the total sectoral contribution. Shipping benefits from the tonnage tax regime, hence the lower tax contributions. Exchequer contributions increased over the period for every constituent industry, however as a share of total UK tax revenue, Maritime Sector Exchequer contributions fell slightly, from 0.79% of the total UK revenue (and a 2014 peak of 0.82%), to 0.70% in 2017. Figure 9 disaggregates the Exchequer contribution of the Maritime Sector by tax head.

Figure 9: The direct contribution of the Maritime Sector to the UK Exchequer, by tax head, 2010 to 2017



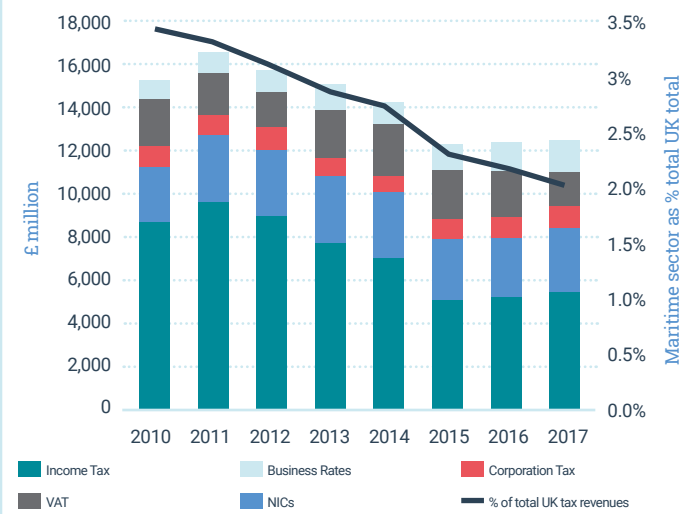
Source: UKCoS, British Marine, PwC, FAME, ONS, HMRC, Cebr analysis

VAT formed the largest component of Exchequer contributions, with £1.9 billion in 2017 and constituting almost 35% of total revenues from the sector from 2010 to 2017; this is despite the assumed zero contribution from those businesses undertaking shipping, ports and shipbuilding activities (among others). The sector also contributed over £1 billion each in Income Tax and NICs in 2017, although in percentage terms, Corporation Tax revenue increased the most over the period (34% higher in 2017 than 2010).

2.6 The direct contribution to the UK's exports of products and services

In this subsection we consider the contribution that the Maritime Sector makes to goods and services exported from the UK. We compare this total value to the total value of products and services exported from the UK¹³. Figure 10 shows trends in the value of services exports from the Maritime Sector between 2010 and 2017, with exports then expressed as a share of the total value of UK exports across the same period.

Figure 10: Exports of goods and services from the Maritime Sector, and the share of total UK exports, 2010 to 2017



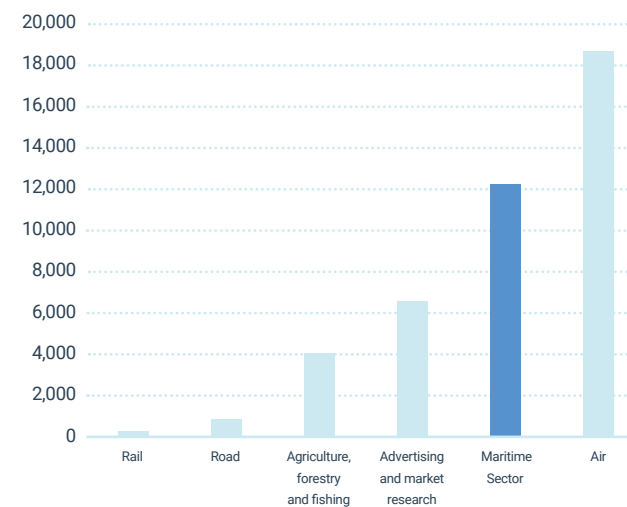
Source: UKCoS, British Marine, PwC, FAME, ONS, HMRC, Cebr analysis

The Maritime Sector is estimated to have exported services valued at £12.4 billion in 2017. This is 18% lower than the £15.2 billion in 2010, and 25% below the 2011 peak of £16.6 billion. However in recent years this decline has stabilised, with the value of exports in 2017 marginally above (1.3% higher) than the 2015 trough. As a consequence, the proportion of UK exports supported by the Maritime Sector has fallen from 3.4% in 2010 to 2.0% in 2017. This decline is primarily driven by a £3.3 billion decline in the value of exports from the shipping industry. Stripping this out, the value of exports actually increased by £0.4 billion over the period.

There are targeted ways in which the Maritime Sector can arrest the declining exports. One of the impacts of Brexit already being felt, is a decline in the value of the pound, which as of August 2019 is 18% lower (against the US dollar) than June 2016. This has the potential to help UK exporters, as UK goods and services become more competitive. Additionally, an awareness of changing population trends, and the impact this may have on the demand for UK exports is key. Some of these are set out in the Maritime Sector's 2050 strategy report, including the increased role of the African market, and the Port of Djibouti part of a new free trade zone. The potential through the increased spending power of Asia's middle class is also noted: this demographic is expected to grow by two billion people (153%) by 2030, and spend an estimated \$30 trillion more per year than in 2017¹⁴.

Figure 11 compares exports from the Maritime Sector against those from other comparable sectors. We observe that the value of exports of products and services from the Maritime Sector in 2017 was substantially larger than that of the Rail, Road, Agriculture, forestry and fishing and Advertising and market research sectors, but lower than the value of exports from the Air Travel sectors.

Figure 11: Exports of services from the Maritime Sector in 2017 against comparable activities, £ million



Source: ADS, ONS, Cebr analysis

⁵ This is the total level of turnover for businesses not in the Financial Services industry as taken from the Annual Business Survey; The Annual Business Survey covers only the UK Non-Financial Business Economy, which accounts for approximately two thirds of the UK economy in terms of Gross Value Added (GVA). Simply put, this is the turnover for businesses that do not trade in financial/investment-related goods and services.

⁶ Maritime Executive. (2018). 'Cruise Industry Poised for Growth'.

⁷ Department for Transport. (2019). 'Maritime 2050'.

⁸ <https://www.adsgroup.org.uk/about/>

⁹ ERCE. (2019). 'UK Natural Gas NBP Spot Price'.

¹⁰ Department for Transport. (2019). 'Maritime 2050: Navigating the Future'.

¹¹ BBC News. (2019). 'Climate change: UK government to commit to 2050 target'.

¹² The Annual Survey of Hours and Earnings (ASHE) provides data on the levels, distribution and make-up of earnings and hours worked for UK employees by sex and full-time or part-time status in all industries and occupations.

¹³ A full description of how the value of industry exports have been calculated can be found in each of Cebr's reports for the Shipping, Ports, Marine and Maritime Business Services industries.

¹⁴ Kharas, H. (2017). 'The unprecedented expansion of the global middle class'.

Industry insight

Brexit, the Sino American trade war

Brexit, the Sino-American trade war, events in the Gulf, the 2020 global sulphur cap on marine fuel and the IMO's 2050 greenhouse gas strategy all present great challenges for our industry. It will be impossible for shipowners to solve these problems in isolation. Corporate innovation is too slow, risky and expensive to be effective in today's world. If the UK is to take a lead in the transformation of the maritime sector, we need to embrace startup-driven innovation and learn to work with fast-moving entrepreneurs and innovators. While startups won't solve every problem our industry faces, this approach will open up new opportunities, create new business paradigms and make others extinct. If the UK is to retain its position as a major maritime nation, we need to create the change the industry needs.

In January 2019 Maritime 2050 was published. Produced by the government, in collaboration with industry, it is the first long term vision and strategy for the whole maritime sector. It provides an encouraging and ambitious template for improving economic growth with the aspiration to champion our maritime competitive advantage. It also provides a truly unique opportunity for the maritime industry to work closely with government to shape the future direction of travel with agreed short, medium and long term goals to achieve the targets being set for 2050. These cover seven high level themes: the UK's competitive advantage, environment, infrastructure, people, security, technology and trade. One of the first tangible outcomes from this strategy has been the publication of the Clean Maritime Plan. Our members have consistently led the market's efforts to improve environmental performance and are committed to the IMO target of a 50% reduction of carbon emissions by 2050. The Clean Maritime Plan will be an important lever in assisting these efforts and advancing this important theme within the strategy.

On sulphur, whilst shipping broadly supports the global 2020 standard, fuel oil non-availability, testing and fuel safety remain a concern and need to be addressed by the IMO as soon as possible prior to the entry into force of the regulation.

The Chamber has positioned the UK shipping industry at the forefront of a sustained campaign to protect our industry's interests throughout the Brexit process. Following the Referendum, the Chamber identified and has maintained three overarching priorities; the preservation of frictionless trade, access to talented employees and domestic reform. The shipping sector has been collaborating closely with the government, the ports and the wider industry, working hard to mitigate the potential impact that Brexit, and no-deal in particular, will have on trade. Shipping is an innately agile and adaptable sector, and we will continue to adjust to the needs and wants of businesses and consumers. But a scenario in which we leave the EU without a deal nonetheless remains the most disruptive of all possible Brexit outcomes; the complex logistics network that has allowed the economies of Britain and Europe to develop is at risk, but our greatest threat is the loss of trade volumes in the longer term.

Shipping has obviously been deeply concerned by events in the Gulf including attacks on vessels underway and at anchor and the illegal actions of the Iranian authorities. Whilst safety of seafarers remains our top priority, the restoration of security and confidence in the region is imperative, so that normal trading can be resumed in a safe environment. This is a complex international problem that therefore requires an international solution and whilst we prefer a diplomatic way forward, if the solution has to be underpinned by military support with a de-escalatory mandate as a deterrence, then so be it.

Bob Sanguinetti
UK Chamber of Shipping

Sponsored content

Forget 'revolution' ... let's go for evolution

Disruption. Revolution. Quantum leap. We have got used to hearing sensational language in discussions around digitalisation and the way in which it will 'transform' our industry.

Digital tech specialists and geeks apart, such claims may not inspire confidence or reassurance in businesses as they consider their next steps.

I believe that there is potential to misunderstand 'disruption'. Yes, one company might disrupt another company – for example, if it starts selling a service that is that is 20% cheaper/faster than its competitors. But in the mainstream, maritime businesses seek certainty and real, practical information and solutions. They don't want to create turmoil in their working environment and practices. They certainly don't want 'revolution'.

My message to organisations big and small would be this: there is nothing to fear from digitalisation. Companies looking for advice and support should be confident that they don't have to change everything dramatically overnight – they can evolve into it by working with specialists providing expert and relevant solutions.

'Disruptive' technology is more about evolution, not revolution. Technology is changing rapidly, especially in data management, which is a critical resource to the maritime sector in meeting its goals, so that, for example, security, efficiency and navigation can be improved for business, safety and training purposes.

As sponsors of Maritime UK as well as Mersey Maritime, we at DONMAC Data see our role as supporters, collaborators and partners. Our focus is on practical solutions to deliver the aspirations of the maritime industry and the Maritime 2050 agenda.

We have a programme, S.T.A.R.T., a five-step system approach for working through the various stages under control: Strategy, Tactics, Align, Renew, Transformation.

One of the most important aspects is the human factor. Changes should be implemented in a considered way, because it's crucial to keep everyone involved at each stage. A programmed approach increases the odds of success, so that problems can be identified and solutions found early. Ensuring that goals match the strategy and that appropriate technology is deployed under control, with testing and training, ensures a good outcome.

There are technologies available today that meet every one of the Maritime 2050 goals. In every area there are proven technical solutions available now which over time will be improved and with increased functionality will support your business objectives.

There will be challenges, from operations to training – but none of them are insurmountable. The maritime sector has a long history of strength and resilience, with fantastic, talented technology people working within it. As technological advances help maritime pursue its strategy, we need to attract people to the sector and train them appropriately.

Responding to markets that change rapidly naturally requires innovation. There are many opportunities and we have, as Maritime UK, the vision and drive to meet the worldwide competitive challenges with confidence.

I spent 30 years working for tech companies, including in telecoms, personal computing, software development and mobile telephony. I have witnessed how change that looks extraordinary now in hindsight becomes mainstream and accepted readily when implemented properly with practical solutions.

So, let's get ready for transformation. With a measured, planned approach supported by amazing people, the collaborative efforts of everyone in maritime and rapidly emerging technologies, we can be ready now and on track for 2050.

Donald MacMillan
DONMAC Data



3

The aggregate economic impact of the Maritime Sector

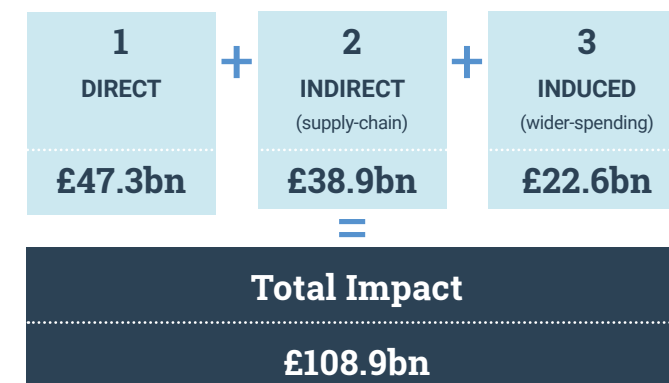
This section sets out the aggregate economic impacts of the Maritime Sector, by taking into account the indirect (or supply chain) and induced (employee spending) impacts that arise from the activities of firms within this industry. The four macroeconomic indicators for which the aggregate economic impact have been calculated are as follows: business turnover; GVA; employment; and the compensation of employees. Multipliers have been generated from Cebr's economic impact model for the UK.

3.1 | The aggregate economic impacts through turnover

Figure 12 below illustrates the turnover multipliers for the Maritime Sector within the UK. Combined, the shipping, ports, leisure marine, marine engineering and scientific and Maritime Business Services industries contributed £47.3 billion in direct turnover. However considering the turnover supported in the industries' supply chains (indirect impact) and when employees (and supply chain employees) spend their earnings (induced impact), a total aggregate turnover footprint of £108.9 billion is supported. £38.9 billion of this is due to the indirect impact, and £22.6 billion due to the induced impact.

Figure 12: Turnover multiplier impacts of the UK Maritime Sector, 2017

Turnover



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Another way of conceptualising this is the additional value of the turnover supported, for every pound earned in the Maritime Sector. Based on these figures,

for every £1 of turnover initially generated by the Maritime Sector in 2017, a total aggregate turnover of £2.30 was supported in the UK economy.

Table 3 shows the breakdown of this estimated aggregate turnover impact, by considering the impacts from the individual industries in the Maritime Sector.

Table 3: Turnover impact of the Maritime Sector by industry, £ million, 2017

Turnover in 2017	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	47,372	38,878	22,591	108,842
Shipping	18,936	16,546	9,481	44,963
Ports	4,768	4,790	2,780	12,338
Leisure Marine	2,807	2,294	1,407	6,508
Marine Engineering and Scientific	14,239	9,861	6,111	30,212
Maritime Business Services	6,608	5,375	2,805	14,789

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Within this aggregate economic contribution, the activities of the shipping industry supported the largest turnover impact, with £45.0 billion in 2017. After shipping, the MES industry supported the most in aggregate turnover, with £30.2 billion in 2017. The ports industry had the highest aggregate multiplier, with every £1 of direct turnover supporting a total aggregate turnover footprint of £2.59 in the UK economy.

Table 4 below presents in each year the direct contribution to turnover from the Maritime Sector, alongside our estimate of the composite turnover multiplier that applies to the entire sector. The aggregate turnover impact grew from £85.8 billion in 2010 to £108.9 billion in 2017.

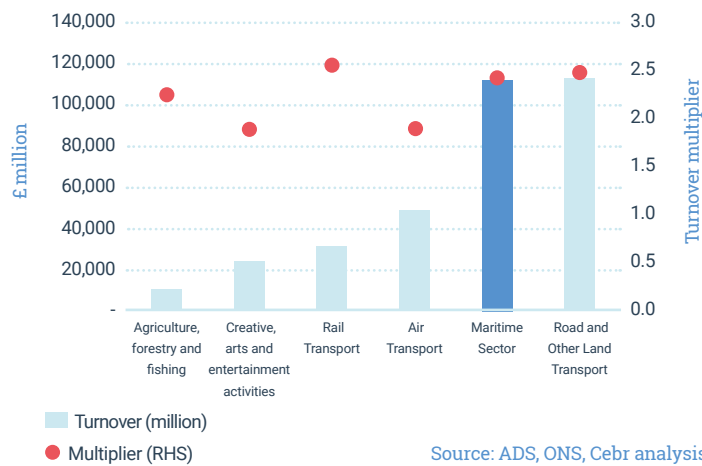
Table 4: Direct and total turnover impact of the Maritime Sector, £ million, 2010 to 2017

	Direct Impact	Composite multiplier	Aggregate Impact
2010	37,785	2.27	85,794
2011	39,629	2.27	90,034
2012	40,833	2.26	92,482
2013	43,058	2.26	97,200
2014	44,604	2.26	101,006
2015	44,455	2.27	102,543
2016	46,050	2.30	105,756
2017	47,358	2.30	108,809

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

To place these results in context, Figure 13 below compares the total turnover impact of the Maritime Sector against the comparable sectors identified in the previous section. In addition, the turnover multipliers associated with each activity are also presented.

Figure 13: The aggregate turnover impact and turnover multiplier of the Maritime Sector against comparable industries, 2017



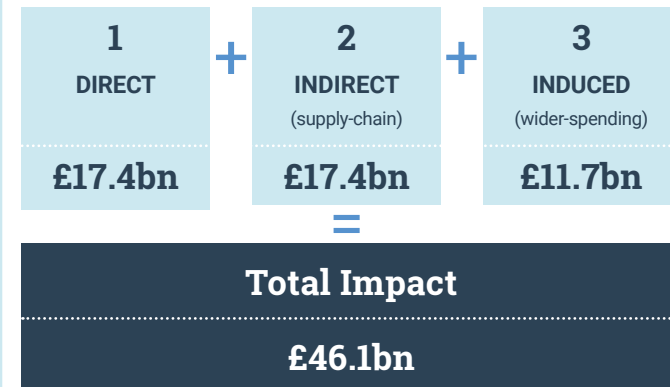
Source: ADS, ONS, Cebr analysis

3.2 | The aggregate economic impacts through GVA

Figure 14 below illustrates the GVA multipliers for the Maritime Sector within the UK. As for turnover, the direct impact is augmented by the indirect (supply-chain) and induced (wider employee spending) impacts, to estimate the aggregate economic footprint of the sector.

Figure 14: GVA multiplier impacts of the UK Maritime Sector, 2017

Gross Value Added (GVA)



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The Maritime Sector directly contributed £17.0 billion in GVA in 2017, and once the indirect and induced economic channels are taken into consideration the sector supported £46.1 billion in GVA.

Therefore, for every £1 of GVA initially generated by the Maritime Sector in 2015, a total GVA impact of £2.71 was supported in the UK economy.

Table 5 below shows the estimated direct and total GVA impacts from the individual industry activities when taken in isolation. Within the aggregate economic contribution of £46.1 billion, the shipping, then MES industries made the largest aggregate contributions, with £17.9 billion and £11.7 billion respectively in 2017.

Table 5: GVA impact of the Maritime Sector by industry activity, £ million, 2017

GVA in 2017	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	17,019	17,411	11,679	46,110
Shipping	6,090	7,120	4,655	17,865
Ports	2,063	2,676	1,794	6,534
Leisure Marine	974	1,050	733	2,756
Marine Engineering and Scientific	5,128	3,706	2,893	11,727
Maritime Business Services	2,764	2,859	1,604	7,227

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 6 below presents in each year the direct contribution to GVA from the Maritime Sector, alongside our estimate of the composite GVA multiplier that applies to the entire industry. The total GVA impact has increased by 28.4% from £35.9 billion in 2010 to £46.1 billion in 2017. This has been supported by the composite multiplier increasing slightly over the period. This is slightly higher than total UK GVA growth over the same period, which increased by 27.7%, per ONS data.

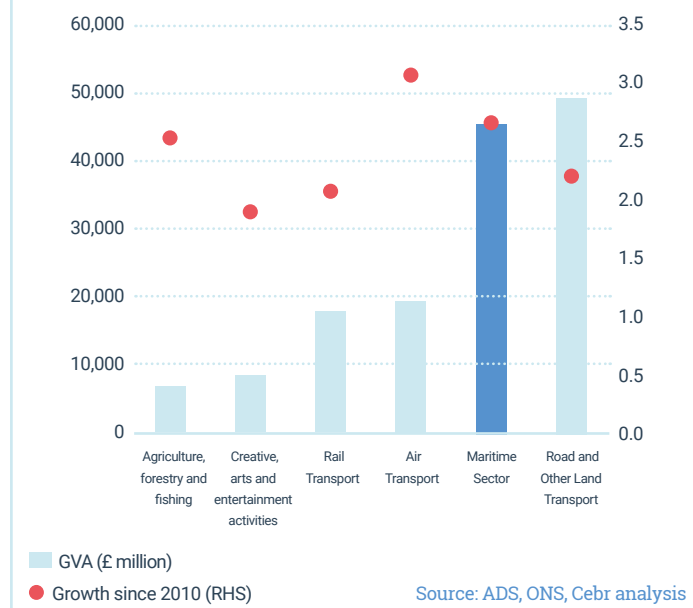
Table 6: Direct and total GVA impact of the Maritime Sector, £ million, 2010 to 2017

	Direct Impact	Composite multiplier	Aggregate Impact
2010	13,642	2.63	35,910
2011	13,796	2.66	36,760
2012	15,782	2.67	42,066
2013	14,865	2.63	39,153
2014	15,808	2.68	42,386
2015	15,939	2.66	42,367
2016	15,930	2.75	43,852
2017	17,019	2.71	46,110

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

To place these results in context, Figure 15 below compares the total GVA impact of the Maritime Sector against the comparable activities identified in the previous section. In addition, the GVA multipliers associated with each activity are also presented.

Figure 15: The aggregate GVA impact and GVA multiplier of the Maritime Sector against comparable industries, 2017



Source: ADS, ONS, Cebr analysis

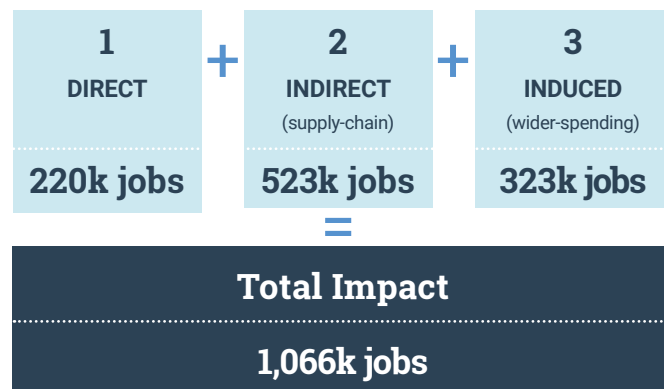
The total GVA impact of the Maritime Sector in 2017 exceeded that of all of the comparative sectors except Road and Other Land, and Support Activities for Transportation. Considering just the size of the GVA multiplier, the Maritime Sector again exceeded all bar one sectors (Rail Transport). The implication of this latter point is that for every £1 of GVA supported in each of the sectors, only Rail Transport contributes a greater level of aggregate economic support to the UK economy.

3.3 | The aggregate economic impacts through employment

Figure 16 illustrates the aggregate employment impacts for the Maritime Sector, in 2017.

Figure 16: Employment multiplier impacts of the UK Maritime Sector, 2017

Employment



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

In addition to the 220,000 jobs directly provided by the Maritime Sector, a cumulative 846,000 are supported by the indirect and induced effects. Notably this means that the Maritime Sector supports over a million jobs, when considering the direct and multiplier effects. Additionally,

for every job directly provided by the Maritime Sector in 2017, a total of 4.85 jobs were supported in the UK economy.

Table 7 below shows the estimated aggregate employment impacts from the individual industries when taken in isolation. The very high employment multiplier (11.5) associated with the shipping industry in the UK accentuates the aggregate impact employment impact across the sector. As a result, the shipping industry is responsible for around 64% of the Marine Sector's aggregate employment impact.

Table 7: UK Employment impact of the Maritime Sector by industry activity, thousands of jobs, 2017

GVA in 2017	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	220	523	323	1,066
Shipping	59	376	246	682
Ports	27	30	15	72
Leisure Marine	29	17	10	56
Marine Engineering and Scientific	82	61	34	177
Maritime Business Services	24	40	17	81

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The very high multiplier associated with the shipping industry is driven by the intermediate consumption trends of water transport services. Examination of the ONS Supply Use Tables shows that this industry's intermediate consumption is predominantly from other industries which are very labour-intensive. These include employment services, construction, warehousing and storage, and legal services. As such, the indirect and induced output supported in these industries, are associated with high levels of employment, for a given level of economic activity.

Table 8 below presents in each year the direct employment from the Maritime Sector, alongside the domestic employment multiplier that applies to the entire sector.

Table 8: Direct and aggregate UK employment impact of the Maritime Sector, thousands of jobs, 2017

	Direct Impact	Composite multiplier	Aggregate Impact
2010	195	4.83	943
2011	201	4.81	967
2012	202	4.87	982
2013	199	4.92	978
2014	209	4.76	995
2015	212	4.88	1,033
2016	213	4.85	1,035
2017	220	4.85	1,066

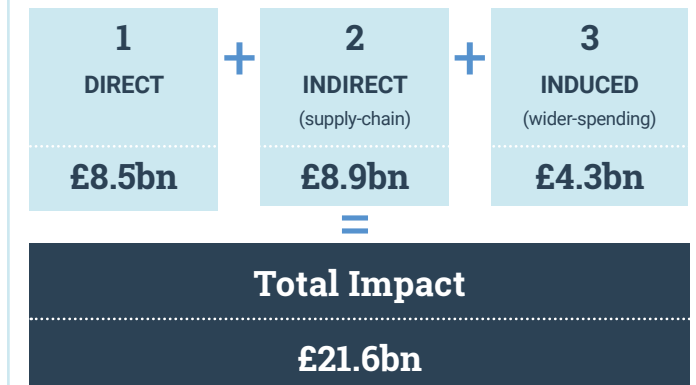
Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

3.4 | The aggregate economic impacts through the compensation of employees

In this final subsection we consider the aggregate economic impact of the Maritime Sector through the compensation of employees. Figure 18 illustrates the direct, indirect and induced compensation of employee impacts associated with the sector.

Figure 18: Multiplier impacts for the compensation of employees for the UK Maritime Sector, 2017

Employment



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

In addition to the £8.5 billion in direct employee compensation provided, £8.9 billion in employee compensation is supported in the supply-chains of the Maritime Sector, and £4.3 billion due to wider employee spending. Overall, the Maritime Sector supports a total of £21.6 billion in employee compensation.

For every £1 directly raised in the compensation of employees in 2017, a total of £2.56 in employee compensation was supported in the UK economy.

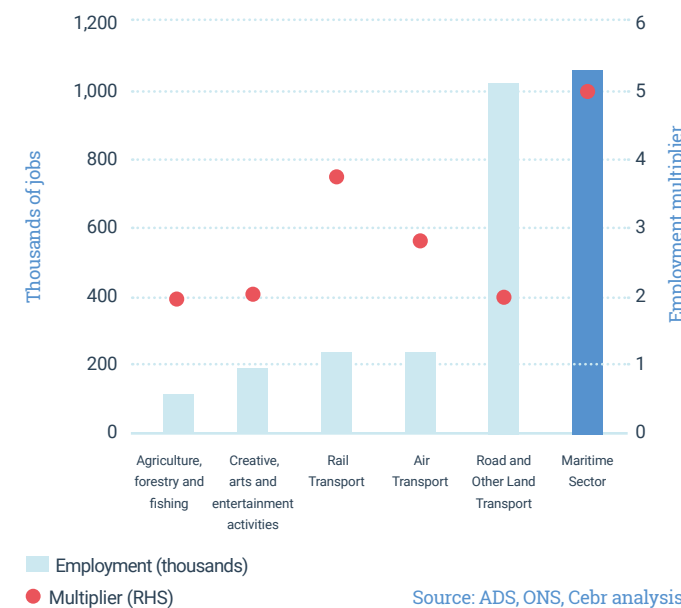
Table 9 below shows the direct and aggregate impact through the compensation of employees across each industry. Of the £21.6 billion aggregate economic impact for the Maritime Sector, the largest impact (£9.2 billion) was supported by the marine engineering and scientific industry.

The total employment impact has grown from around 944,000 jobs in 2010 to 1.07 million jobs in 2017, an increase of 13%.

The composite multiplier has fluctuated slightly over the period, however as of 2017 it is marginally higher than in 2010. This compares favourably to an increase in UK employment of 9% over the same period, per the Office of National Statistics' Annual Population Survey.

To place these results in context, Figure 17 compares the total employment impact of the Maritime Sector in 2017 to the comparable sectors identified in the previous section. In addition, the employment multipliers associated with each activity are also presented.

Figure 17: The aggregate employment impact and employment multiplier of the Maritime Sector against other industries, 2017



Source: ADS, ONS, Cebr analysis

Driven by the highest employment multiplier (4.85, with no other sector above 4), the Maritime Sector also has the highest aggregate employment impact in 2017. The total 1.07 million jobs supported is slightly higher than the 1.02 million supported by the Road and Other Land Transport Sector. This again is primarily a function of the much higher calculated multiplier (4.85, compared to 1.97).

Table 9: Impact through the compensation of employees of the Maritime Sector by industry activity, £ million, 2017

Compensation of Employees in 2017	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	8,469	8,864	4,312	21,645
Shipping	1,820	2,021	975	4,816
Ports	1,052	1,113	550	2,715
Leisure Marine	642	693	339	1,674
Marine Engineering and Scientific	3,820	3,573	1,787	9,180
Maritime Business Services	1,135	1,464	660	3,259

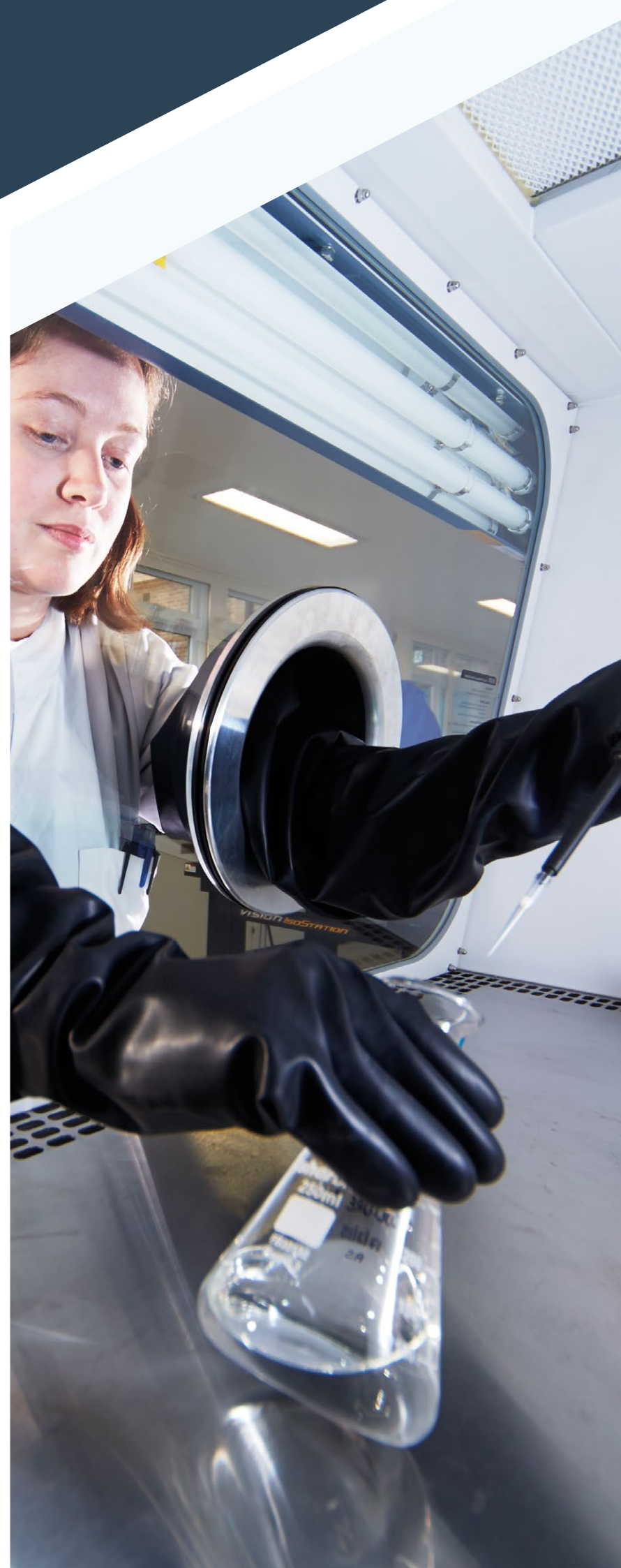
Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Finally, Table 10 below shows the trend in the direct impact and aggregate support from the Maritime Sector, from 2010 to 2017. The aggregate impact through the compensation of employees has grown from £18.1 billion in 2010 to £21.6 billion in 2017. This has been driven by an increasing direct impact, with the size of the composite multiplier relatively stable over the period.

Table 10: Direct and aggregate impact through the compensation of employees of the Maritime Sector, £ million, 2010 to 2017

	Direct Impact	Composite multiplier	Aggregate Impact
2010	7,003	2.58	18,095
2011	6,822	2.57	17,547
2012	7,558	2.56	19,380
2013	7,999	2.54	20,354
2014	7,743	2.56	19,787
2015	8,237	2.56	21,119
2016	7,704	2.57	19,808
2017	8,469	2.56	21,645

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis



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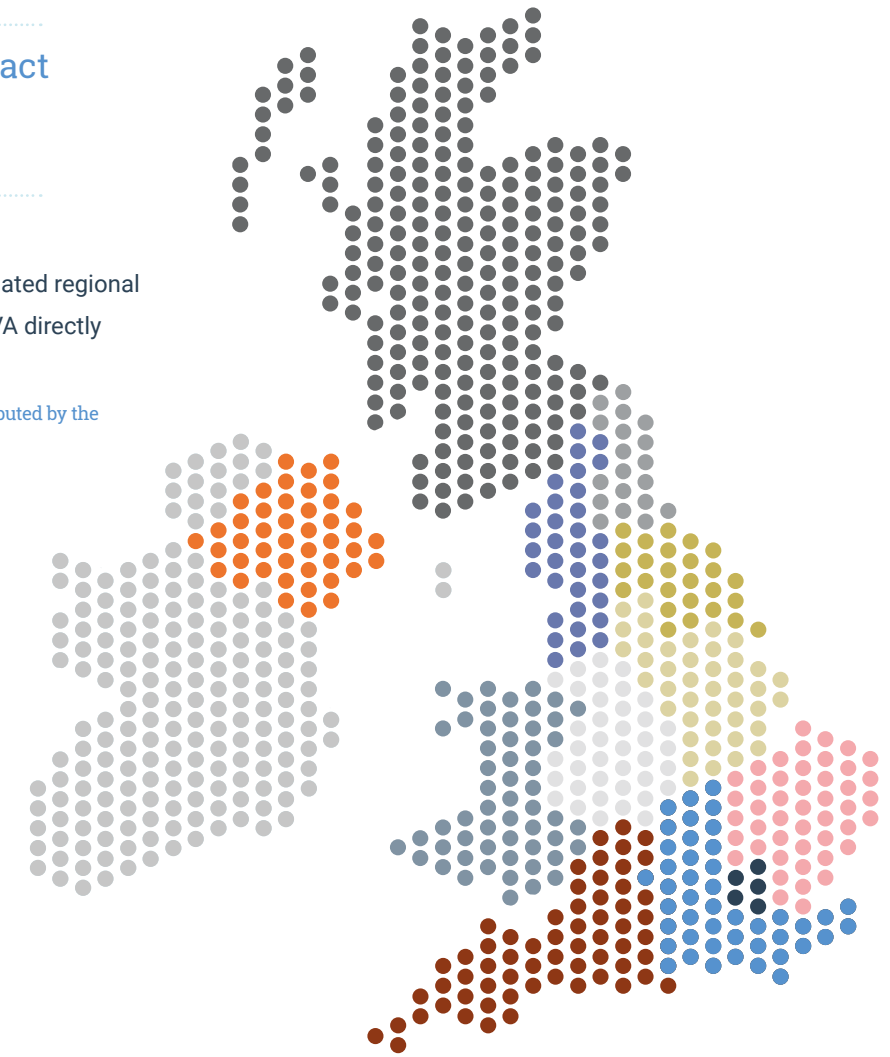
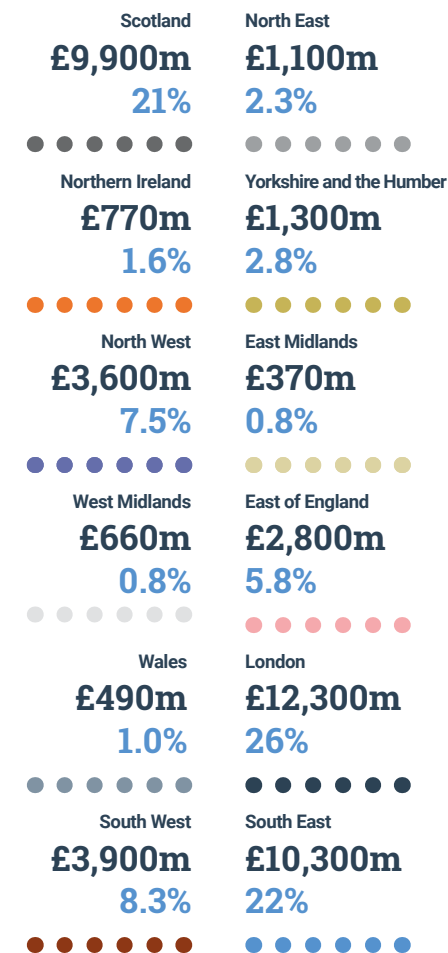
The regional economic impact of the Maritime Sector

4.1 | The direct economic impact of the Maritime Sector by UK region

Business turnover and GVA

Figure 19 and Figure 20 below show the estimated regional breakdown of direct business turnover and GVA directly supported by the Maritime Sector in 2017.

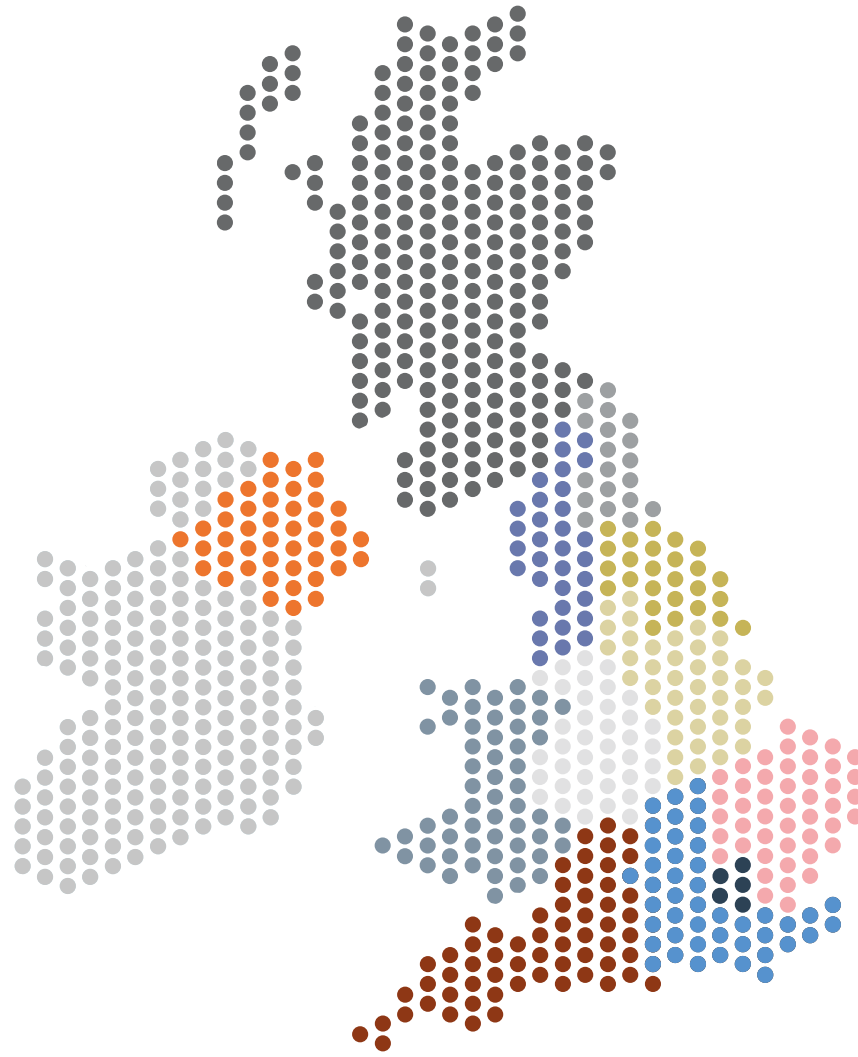
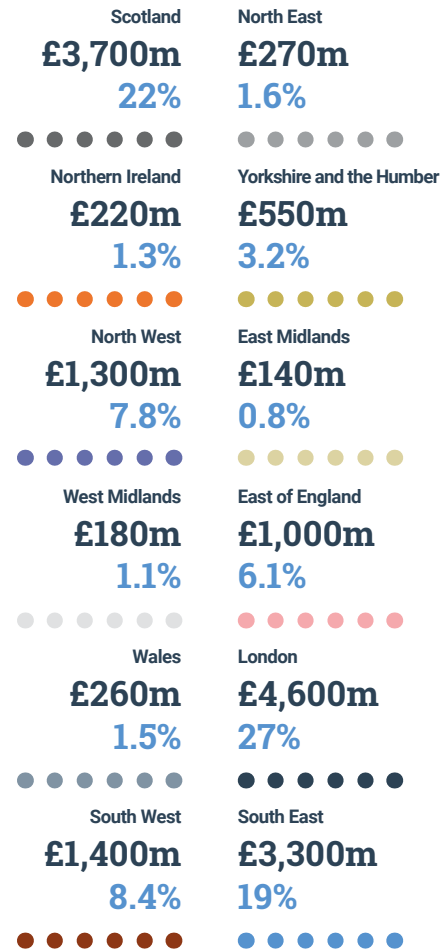
Figure 19: Regional breakdown of turnover directly contributed by the Maritime Sector, £ million, 2017



The highest concentrations of business turnover directly generated in 2017 were in London (£12.3 billion, 26%), the South East (£10.3 billion, 22%) and Scotland (£9.9 billion, 21%).

Note: Figures subject to rounding to nearest £100 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Figure 20: Regional breakdown of GVA directly contributed by the Maritime Sector, £ million, 2017



An inspection of the regional breakdown of GVA yields similar results, with London, Scotland and the South East making the largest direct contributions to GVA in 2017.

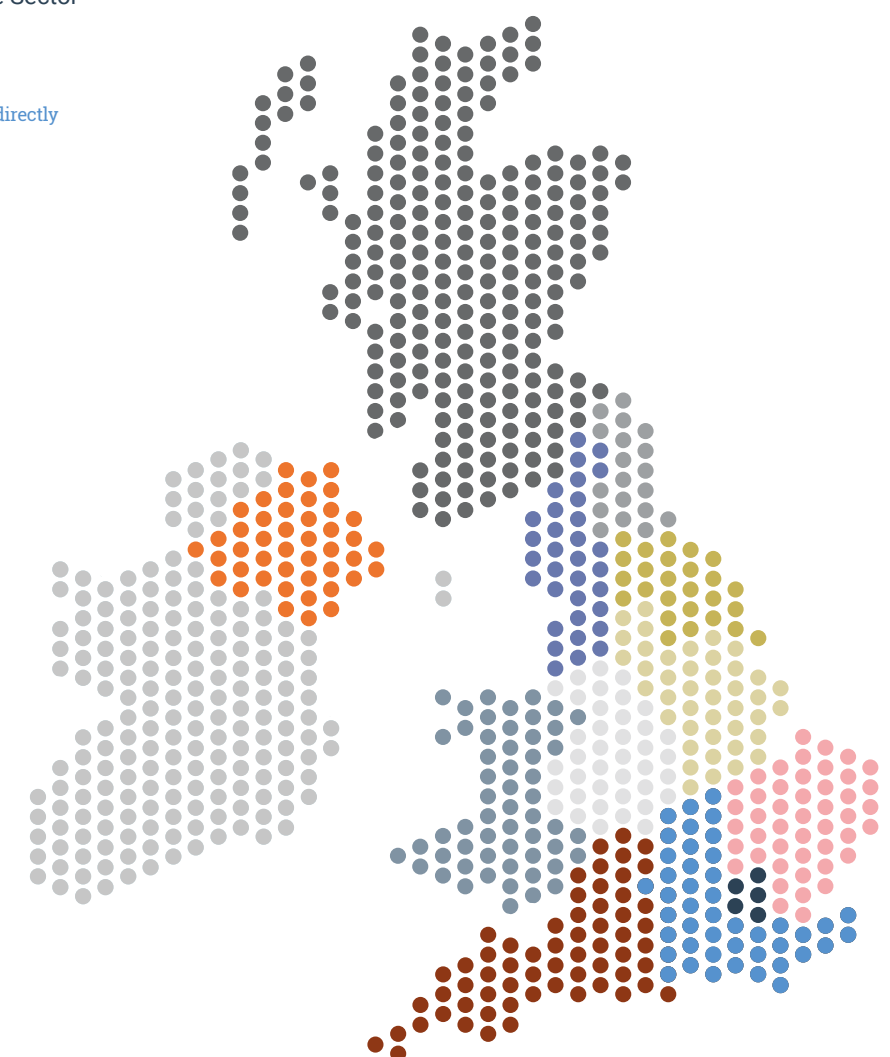
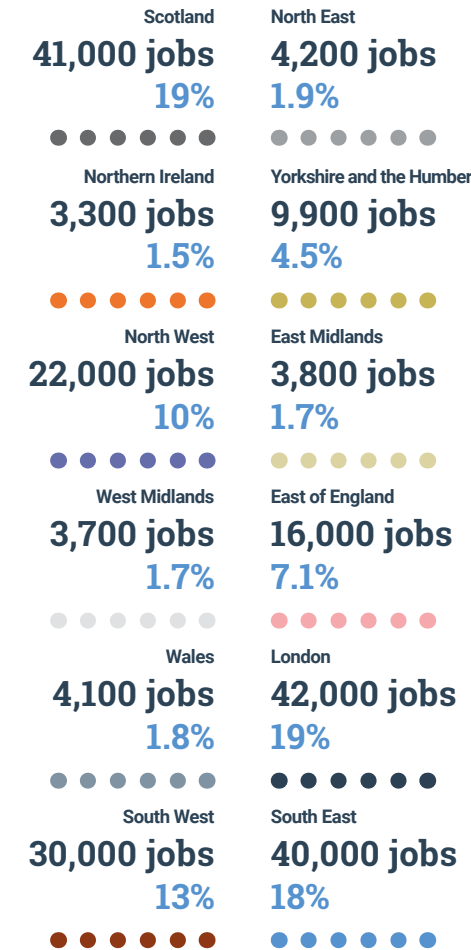
Combined, the three regions contribute 68% of total UK GVA.

Note: Figures subject to rounding to nearest £100 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Employment and the Compensation of Employees

Figure 21 and Figure 22 below show the estimated regional breakdown of employment and the compensation of employees directly supported by the Maritime Sector industry in 2017.

Figure 21: Regional breakdown through the employment directly contributed by the Maritime Sector, 2017

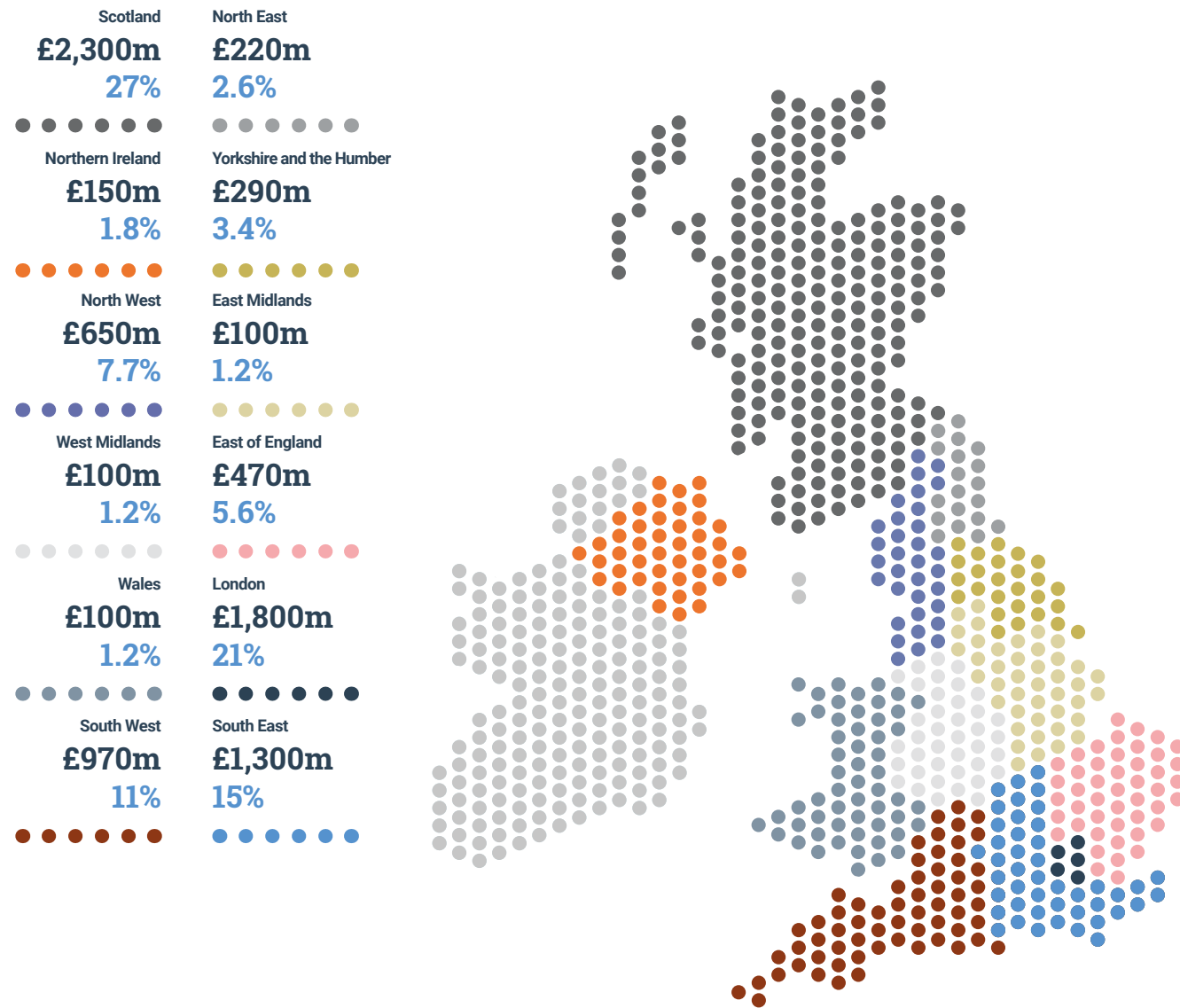


Once again, the majority of the direct employment is concentrated in Scotland, London and the South East, although the trend is slightly different. London's share of employment (19%) is lower than GVA (27%), with the three regions all contributing similar amounts.

The South West and North West also contribute significantly, with 13% and 10% respectively.

Note: Figures subject to rounding to nearest 1000 jobs. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Figure 22: Regional breakdown through the compensation of employees directly contributed by the Maritime Sector, £ million, 2017



Driven by a high proportion of employment and higher average wages and salaries than most other UK regions, Scotland directly contributes the highest proportion of the total compensation paid to employees (£2.3 billion in 2017, or 27% of the sector total.) Part of this can be attributed to the offshore sector.

After Scotland, London had the second largest contribution (£1.8 billion, or 21%).

Note: Figures subject to rounding to nearest £100 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

4.2 | The aggregate economic impact of the Maritime Sector by UK region

This final subsection examines the aggregate economic impact of the Maritime Sector across each region for the four macroeconomic indicators covered in the previous subsection.

In order to estimate the aggregate economic impact of the sector at regional level, the direct economic impacts as already estimated were combined with Cebr's regional economic impact models, within which the activities of the Maritime Sector were separately identified and isolated. It should be noted that the economic impact multipliers as estimated for each region are necessarily lower than the equivalent multiplier for the sector as a whole, reflecting the leakage of impacts when the activity of the sector in a particular region imports inputs from elsewhere in the UK outside that region.

The aggregate economic impacts for business turnover and GVA by region

Per Sections 2 and 3, it is estimated that from a total of £47 billion in turnover and £17 billion in GVA was directly contributed by the Maritime Sector in 2017, and £84 billion and £35 billion respectively supported in aggregate across the UK regions. Table 11 shows the breakdown of direct and aggregate economic impacts for business turnover and GVA in 2017, alongside the composite sector multiplier for each region. For GVA, the highest multipliers are associated with the South East, the South West and the East of England.

Table 11: Regional breakdown of business turnover and GVA supported by the Maritime Sector, £ million, 2017

Region	Turnover			GVA		
	Direct Impact	Sector Multiplier	Aggregate impact	Direct Impact	Sector Multiplier	Aggregate impact
Scotland	9,876	1.98	19,524	3,714	2.11	7,849
Wales	493	2.06	1,016	256	2.50	638
Northern Ireland	770	2.08	1,598	217	2.47	534
East of England	2,760	2.22	6,126	1,033	2.70	2,792
East Midlands	373	2.00	744	143	2.27	324
London	12,263	1.93	23,691	4,588	2.32	10,655
North East	1,077	2.09	2,248	274	2.52	689
North West	3,550	2.11	7,483	1,330	2.45	3,262
South East	10,293	2.24	23,011	3,304	2.74	9,039
South West	3,940	2.24	8,842	1,434	2.67	3,825
West Midlands	655	1.88	1,234	183	2.15	394
Yorkshire and the Humber	1,324	2.22	2,934	550	2.64	1,454

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

For both turnover and GVA, the highest level of direct support is generated in Scotland, London and the South East. Given the relatively higher variance in direct impact size compared to multiplier size, the highest levels of aggregate support are also in these same three regions. Just considering the multipliers, the highest turnover multiplier is in the South West, while the highest GVA multiplier is in the South East.

For contextual purposes, by comparing the aggregate impacts with regional GVA data from ONS, we can estimate the percentage of economic activity in a region that is supported by the Maritime Sector. This is estimated to be highest in Scotland, where 5.6% of total GVA is supported by the Maritime Sector. In second and third are the South East and South West, with 3.4% and 2.9% respectively.

The aggregate economic impacts for employment and the compensation of employees by region

Finally, Table 12 shows the breakdown of direct and aggregate economic impacts for employment and the compensation of employees in 2017, alongside the respective multipliers for each region.

Table 12: Regional breakdown of employment and employee compensation supported by the Maritime Sector, 2017

Region	Employment (thousands of jobs)			Compensation of Employees (£ million)		
	Direct Impact	Sector Multiplier	Aggregate impact	Direct Impact	Sector Multiplier	Aggregate impact
Scotland	41.0	3.79	155.3	2,299	2.21	5,073
Wales	4.1	4.89	19.9	105	2.15	226
Northern Ireland	3.3	5.53	18.2	153	2.02	309
East of England	15.6	4.43	69.2	472	2.45	1,158
East Midlands	3.8	1.90	7.2	99	2.02	200
London	42.4	5.06	214.2	1,806	2.35	4,236
North East	4.2	2.57	10.9	224	2.22	497
North West	22.4	4.09	91.7	653	2.07	1,354
South East	40.2	6.61	265.4	1,296	2.42	3,140
South West	29.6	3.66	108.5	965	2.20	2,126
West Midlands	3.7	2.90	10.8	105	2.06	216
Yorkshire and the Humber	9.9	2.99	29.5	291	2.28	664

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The region with the largest aggregate impacts through employment in 2017 was the South East, with 265,400 jobs, while the largest for employee compensation was Scotland, with an aggregate impact of £5.1 billion. The highest employment multiplier was in the South East (contributing to the highest aggregate impact, despite a lower direct impact than London and Scotland) and the highest employee compensation multiplier was in the East of England.

As for GVA, we can estimate the percentage of total regional employment that is supported by the Maritime Sector. This is highest in the South West, with 5.9% of all employment supported by the Maritime Sector. In Scotland, London and the South East, the Maritime Sector also makes significant employment contributions, with 5.8%, 4.7% and 4.0% of all employment supported by this sector.

5

The UK Maritime Sector: A Forward Look

In this final section of the report we present projections of the Maritime economy for the period 2019-2023. The section starts off by discussing the key trends and themes that will be shaping the future of the Maritime Sector in the UK and in the rest of the world. We then describe the conceptual approach that we have developed to produce projections of the direct economic impacts after 2017. Finally, we present our forecasts of Maritime turnover and GVA over the period 2019-2023.

Maritime worldwide trends and key themes shaping future UK Maritime economy

This section provides a summary of the trends and events set to shape the future of the Maritime Sector in the UK and in the rest of the world. A number of policy documents, in particular the Department for Transport's "Maritime 2050: Navigating the Future" and in the UNCTAD's "Review of Maritime Transport 2018", underpins this section.

We highlight below the worldwide trends that will influence the evolution of the Maritime Sector:

- **Growth in trade is likely to represent the main opportunity, facilitating a favourable outlook for the Maritime Sector.** The volume of goods transported by ships and demand for maritime services has grown steadily with no sign of significant change as shown by global containerised trade, which tripled to 148 million twenty-foot equivalent units (TEUs) in the past 10 years. The growth is set to maintain current levels with containerized and dry bulk commodities expected to experience the strongest growth.
- **Strong economic and population growth in Africa and Asia** is likely to shift trading patterns opening new

opportunities for the UK. On the other hand, an ageing population in many developed countries might lead to decreasing demand for some products and create challenges for the UK workforce.

- **The world's economic centre is moving eastwards** with Asia's middle class forecast to grow by 153% by 2030 adding 2 billion additional consumers. Implications for the Maritime Sector include the need for UK ports to stay ahead of the curve in terms of efficiency and for suppliers to the manufacturing sector to position themselves well to meet future demand.
- **Climate change and significant climatic events are likely to change the patterns of trade** while amplifying the need to protect the marine ecosystem. Aside from massive economic impacts through a variety of channels, increasing sea levels are likely to have direct disruptive consequences on port operations.

Alongside these trends, we focus on the key development areas within Maritime in the UK, drawing particular emphasis on the objectives and initiatives set out by the government and the industry as part of the Maritime 2050 Strategy document. The below section provides a summary of these themes as key drivers of the UK Maritime Sector.

- **One main objective for the sector will be retaining its competitive advantage, with the UK as a leading maritime nation.** It is the UK government's intention to work alongside the Maritime Sector to retain the best possible fiscal regime as already demonstrated by the introduction of the Tonnage Tax in 2000. Alongside this, the UK regime will be promoted to domestic SMEs and international companies as a prime location for business. The UK aiming to be one of the top shipping 10 registers is another example of how the country is building its competitiveness. With this objective in mind, the UK Ship Register (UKSR) has already opened up the flag considerably and now accepts ship owners from Commonwealth countries and 20 other nations.

Industry insight

A new national maritime research centre

Maritime engineering cuts across many aspects of UK economic life, providing the backbone for shipping, ports and terminals, maritime defence and security, offshore resource exploitation and renewable energy, monitoring the marine environment, marine science, and, increasingly, the development of autonomous systems. The key to this is the technology and innovation the sector brings to the market from its world-class academic institutions and advanced engineering businesses.

The recent creation of a new national maritime research centre, MarRI-UK, will provide a collaborative eco-system to research and seek solutions for some of society's grand challenges, such as decarbonisation, ensuring the UK remains at the forefront of world-leading maritime technology. Many of the survey subsea and surface craft monitoring the performance of the oceans for climate change studies contain UK sensors including the heart of tsunami detection systems.

The last quarter of 2019 will see the second of the Royal Navy's new aircraft carriers, HMS Prince of Wales, set sail on its maiden voyage, reminding us that the ambition articulated in the government's National Shipbuilding Strategy, has brought about a step-change in the country's ability to design and build complex ships. The announcements last year that Australia and Canada will purchase the Type 26 frigate design is a reminder that the UK is at the forefront of this technology. This is further reflected in the non-military field with the naming and launch of RRS Sir David Attenborough in the autumn of 2019, one of the world's most capable polar research ships which will serve the UK's strategic requirements in both Antarctica and the Arctic.

Hardly a month goes by without an announcement of another ground-breaking milestone in maritime autonomy and the UK is one of the leading nations in this exciting technology. In collaboration with Belgium, a UK vessel completed a totally autonomous journey across the English Channel to deliver fresh oysters, returning with Belgian beer, of course! This is just one example of the onward march of this innovative sector as users seek to reduce their operational costs in a wide range of applications. Maritime 2050 envisages the creation of an autonomous low carbon coastal ship to reduce the pressure on the UK's crowded roads and the maritime engineering sector is well placed to deliver on this ambition in the not too distant future.

John Murray
Society of Maritime Industries

Industry insight

The UK remains dominant

At a time when the zeitgeist is dominated by Brexit, trade wars and reduced growth forecasts, this report demonstrates the welcome news that the maritime professional services in the UK have been remarkably and reassuringly resilient. A clear illustration, if ever there was one, of the globalised nature of our offer and the expertise that exists within our market. The UK remains dominant in shipbroking, marine law, insurance and the ecosystem that supports these three pillars of the UK's commercial shipping offer. The UK is central to the facilitation of global trade from the fixing of the ship, the contract law, the insurances and when things go wrong the dispute resolution, facts that we all should be justly proud of.

Of course, so much of our strength comes from our history in shipping, however, we are not a legacy industry, our past provides assurance, systems, and institutions that create an unparalleled legal and commercial framework to conduct shipping business. However, the future success of the market will be defined by how the market adapts to the fundamental political, economic and technological developments driving change in the sector. This report is being published during London International Shipping Week (LISW) – a cursory look at the events calendar demonstrates that the UK maritime services sector is not burying its head in the sand, relying on history and reputation to see us through, but actively demonstrating how the market is adapting to changes and debating what more needs to be done to ensure London and the UK remain world-beating in the future.

In response to Maritime 2050 the UK governments central maritime strategy, Maritime London has produced a competitiveness study objectively assessing how the UK compares with other leading maritime centres and extensive recommendations citing what the market needs to grow and win new business. I am also a proud participant of the Clean

Maritime Council, bringing industry and government together to provide answers to how the sector can respond to the need to decarbonise. Further evidence, that we are not sitting on our hands rather actively providing strategies on how the UK can capitalise on the changing nature of global shipping.

A pessimist could paint a picture of a perfect storm in shipping as the powers of the environmental agenda, the rise of protectionism and a perceived conservative sector that is resilient to change converge. I am not denying that there are choppy waters ahead, and we have some big questions to find answers to. But, it will be the clusters that actively seek answers, understand the changing nature of the industry, but have the benefit of hindsight to learn and provide a stable base to implement innovation and are open for business in this most international of industries that will win out. I believe there is the perfect mix of experience, innovation and capacity to ensure the UK market will come through the storm stronger, more resilient and better able to provide the services that the shipping industry rely on to conduct global trade.

Jos Standerwick
Maritime London

- **Technology will act as a driver of change within all Maritime industries.** Technological advancements will directly drive the output of the MES industry, but also act as an enabler or a driver for other key themes within the 2050 strategy. We have already observed this in the past with respect to the emergence of autonomous vessels and we expect technology to be a growing need in the future. We note, for instance, that the aim to reduce emissions by 50% by 2050 and the movement towards 'Smart Ports' can be only be successfully achieved if technology enables it.
- **The UK is a major hub for maritime education** as demonstrated by its leading maritime training programmes and apprenticeships. This is an area that the government, alongside the industry, want to maintain and boost by 2050. Skills are vitally important in the Maritime Sector and, with the emergence of international competitors such as Singapore, it is increasingly important to retain the UK's skill advantage. This is the rationale behind the various initiatives launched by the sector, amongst which we note the £30m a year invested from 2018 in SMarT plus training.
- **A number of initiatives in the UK and worldwide have been launched to reduce the economy's environmental impact**, with some directly targeting the Maritime Sector. The primary target for will be the reduction in carbon emissions worldwide by at least 50% by 2050, although recent UK government policy has gone further in calling for a 100% reduction by 2050. Accordingly, the IMO Strategy on reduction of Greenhouse gas (GHG) emissions from ships aims to bring emissions down least 50% by 2050 compared to 2008. Other IMO's initiatives include the 2020 sulphur regulation, entering into force on 1 January 2020, will impose a 0.50% sulphur limit for marine fuels in use on ships operating outside sulphur emissions control area. The UK government is committed to increase public and private R&D spending to 2.4% of GDP. As noted above, the driver of this change to a cleaner industry will be technological advancement.

- **The Maritime Sector is the main facilitator of trade, borne out in the fact that 95% of UK internationally traded goods are transported via ships.** Seaborne trade provides 25% of the country's energy supply and 48% of the food supply. We note that shipping has experienced a stronger performance over the period 2010-2015 amongst the other Maritime industries. As such, the evolution of the Maritime Sector will heavily depend on trade prospects. Although trade reliance on shipping may decline somewhat as a result of new technologies such as 3D printing and other modes of transport expanding, the Maritime Sector will still be the primary mode of transport for international trade in the foreseeable future. Furthermore, the UK's need to establish a post-Brexit trading framework with the rest of the world is also becoming increasingly important. Linking this is the emergence of Africa and Asia, where there will likely be large opportunities to expand trade beyond the already established trading partners. Government and industry are already committed to fostering UK exports through a number of short-, medium- and long-term initiatives that have been detailed in a Trade Route Map¹⁷. In the short-term, the government has committed to conducting an industry competitiveness study, considering the case for free ports, creating a network of UK Export Champions, starting engagement for establishing new shipping routes in the Arctic and seeking continuity for the existing EU FTAs.
- **Investment in infrastructure will be needed in conjunction with technological advancements** to begin establishing 'Smart Ports' throughout the UK through investment in infrastructure and opening new opportunities such as an increase in offshore wind generation.
- **The industry and government aim to maintain the security and resilience** of UK waters and overseas territories while also investing in the technology to tackle the emerging threat of cybercrime. This is increasingly important when considering the Royal Navy has responsibility for all UK and Red Ensign Group Vessels globally¹⁸.

The Maritime Sector Forecast (2019-2023)

Modelling approach

We investigate the relationship between the maritime economy and a number economic variables through an econometric approach. Our findings show that the UK Maritime Sector is primarily linked to national GDP and energy (oil and gas) production. After having established Maritime economy's elasticities to GDP and energy production, we project these historical relationships forward to produce a forecast of Maritime turnover and GVA. The output of this model constitutes our baseline forecast.

Forecast models rely on macroeconomic variables, for example, GDP, which are generally more suitable for long term horizon while the focus of our analysis is in the short-medium term (5 years). For this reason, we build on the baseline forecast, introducing more sector-specific assumptions which are used to flex the relation to the drivers previously identified. This approach also enables us to address deterministic expectations about the sector.

To identify the sector-specific assumptions, we drew on the trends and key themes identified in the previous subsection. Each assumption has been assigned a specific weight reflecting its relevance to the wider Maritime Sector and a set of adjustment factors have been produced.

Applying the adjustments to the baseline forecast, we obtain our central forecast of the Maritime Sector turnover and GVA over the period 2019-2023. To note also that our historical analysis of maritime ends in 2017. This requires us to produce a "now-cast" for the first two year (2018) for which we know the actual value of the drivers but not of Maritime turnover and GVA and a forecast for the following period.

Modelling Assumptions

UK GDP

Cebr's macroeconomics department produces regular forecasts of key economic indicators for the UK national and regional economies which can directly inform our analysis. We therefore rely on our own forecast of UK national GDP. Cebr expects UK GDP to grow at a moderate Compounded Annual Growth rate (CAGR) of 1.6% over 2018-2023 in real terms. This rate is lower than the 2.1% CAGR observed during the past 5 years. A high level of uncertainty characterises the forecast as the outcome of Brexit negotiations could easily shift the projections.

Seaborne trade

As previously outlined, seaborne trade represents the main opportunity for the Maritime Sector over the near future. We consider both worldwide and UK-specific trade projections within our modelling framework.

Worldwide trends indicate a sustained growth in trade. UNCTAD¹⁹ sees positive prospects for world seaborne trade forecasting a 3.8% compound annual growth rate between 2018 and 2023 with strongest growth in volumes for containerized and dry bulk commodities. Seaborne trade projections are in line with recent trends showing an average growth rate of 3.5% between 2005 and 2017. These figures are broadly in line with forecasts published by other organisations. DNV GL (an internationally accredited registrar and classification society) projected a 39% increase in seaborne trade tonnage over 2016-2030²⁰. According to the OECD, global trade is forecast to grow at a higher rate than the economy and specifically a 1% increase in GDP is expected to correspond to a 1.1% growth in seaborne trade (tonnes)²¹.

UK prospects are slightly less optimistic than the aforementioned forecasts, as demonstrated by the 2019 DfT's projections of UK port freight traffic covering the years 2017 through to 2050. DfT reports that overall port traffic is forecast to remain relatively flat over the short term, but then grow over the long term, with tonnage 39% higher in 2050 compared to 2016.

Production of energy: Oil & Gas

We rely upon the Oil and Gas Authority (OGA)'s latest projections, which show a constant decline in oil and gas production for the period up to 2035. Energy production can have an ambiguous effect on the Maritime Sector. While it directly contributes to its direct economic impact through what we have defined as "Marine Engineering and Scientific", it can negatively affect trade. An increase in domestic production leads the country to relying less on imported energy, hence implying a reduction in total UK trade. Noting that 25% of the country's energy supply is imported by ship, a negative relationship between the Maritime economy and energy production can be explained.

Sea passengers

The Maritime Sector also plays a key role in tourism and leisure with nearly 2 million cruise passengers passing through UK ports and more generally in sea transportation of passengers. In 2017, 20 million international ferry passengers travelled on UK short sea routes and 44 million domestic sea passengers.

Using UK GDP as main driver, we projected forward the number of sea passengers obtaining a cumulative growth of 1% over 2018-2023. This figure is in line with historical trends of this sector.

High investment

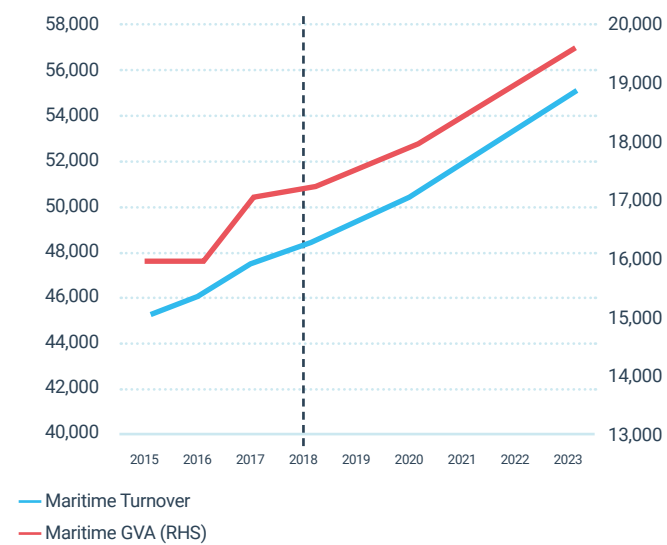
The Maritime 2050 strategy document outlines a large number of recent or planned investments in infrastructure, technology and education as well as ambitious environmental targets. We expect the UK Maritime Sector to experience major improvements over the longer term thanks to greater level of efficiency and productivity, however higher short-term costs might contribute to flatter growth trends.

The 2019-2023 forecast

Figure 23 shows the Maritime Sector experiencing steady growth over the five year horizon. Our forecast indicates that maritime turnover and GVA are set to grow at a Compounded Annual Growth rate (CAGR) of 2.8% over the considered period. This translates into a cumulative growth of 15% for 2019-2023, which is in a comparable range to the trajectory experienced over recent years.

In line with the rest of the analysis, turnover and GVA have been projected in nominal terms. When the forecast is considered alongside projected inflation, cumulative growth is about 5%.

Figure 23: Maritime Sector turnover and GVA trends and projections, £ million, 2015 to 2023



Source: UKCoS, British Marine, PwC, FAME, ONS, Oil and Gas Authority, DfT, Cebr analysis

¹⁵Department for Transport. (2019). 'Maritime 2050: Navigating the Future'.

¹⁶United Nations Conference on Trade and Development. (2018). 'Review of Marine Transport 2018'.

¹⁷Department for Transport. (2019). 'Maritime 2050: Trade Route Map'.

¹⁸The Red Ensign Group (REG) is a group of British shipping registers. The registers are operated by the UK, the Crown Dependencies (Isle of Man, Guernsey and Jersey) and

UK Overseas Territories (Anguilla, Bermuda, British Virgin Islands; Cayman Islands, Falkland Islands, Gibraltar, Montserrat, St Helena, Turks & Caicos Islands).

¹⁹United Nations Conference on Trade and Development. (2018). 'Review of Marine Transport 2018'.

²⁰DNV GL. (2018). 'Energy Transition Outlook'.

²¹OECD. (2018). 'Growth prospects, challenges and uncertainties for selected ocean industries'.

6

Case studies

6.1 | Anglo Eastern

Anglo Eastern is a maritime consultancy and global ship management company. Established in 1974 in Hong Kong, the company has expanded to become one of the world's largest ship management companies with 25 offices worldwide²². Anglo Eastern's current operations include complete third-party management of 600 vessels – 300 bulk carriers, 200 tankers and 100 container ships – and employ 27,000 seafarers and 1,700 shore staff²³.

Anglo Eastern is globally renowned for its training and commitment to the career goals of seafarers. It operates dedicated training centres in India, the Philippines, China and Ukraine which offer courses such as cadet training, cargo operations, engineering, nautical institute accreditations and environmental management²⁴. In addition to this, Anglo Eastern also offer over 50 courses for experienced officers to upgrade their skills beyond the mandatory requirements with the intention to maintain Anglo Eastern as one of the front runners of ship management²⁵.

Anglo Eastern's current operations include complete third-party management of 600 vessels – 300 bulk carriers, 200 tankers and 100 container ships – and employ 27,000 seafarers and 1,700 shore staff²³.

Anglo Eastern's services are significant, they provide third party management of bulk carriers, container ships, tankers, offshore vessels and semi-submersibles. In addition to this, they also deliver technical services such as conceptual design and new build supervision²⁶. However, Anglo Eastern is not solely a business operator, but also provides services within the Leisure

Marine sector focusing on yacht management. This emphasises that Anglo Eastern is a broad maritime company encompassing Shipping, Leisure Marine and Marine engineering and scientific as well as Maritime Business Services.

Anglo Eastern's UK office is based in Glasgow and is slightly differentiated from the parent company in that it is 'Anglo Eastern Offshore'. This slight difference refers to the fact that Anglo Eastern's UK operations take the form of the broad ship management the global company is distinguished for as well as additional consultancy in offshore markets²⁷. This additional consultancy refers to the oil and gas industry and renewable energies.

Anglo Eastern's UK office focusing on the additional consultancy of oil and gas and renewables is well suited within Scotland. In 2017, 89% of the UKs support activities in Oil and Gas were situated within Scotland. Moreover, a 2013 governmental study on the low carbon economy found that 15% of offshore wind employees and 32% of marine renewables employees were located in Scotland²⁸, emphasising the regions importance to the renewables sector.

In 2017, 89% of the UKs support activities in Oil and Gas were situated within Scotland

More recently, the Managing Director of Anglo Eastern Offshore in Glasgow has, along with a range of other maritime companies, formed the Scottish Maritime Cluster. This organisation currently has over 40 members within the Maritime Sector and its aim is to enhance Scotland's global maritime market share²⁹. The focus of this organisation is on commercial shipping, military contracts, Maritime Business Services, legislation and training.

Scotland is currently the UKs second largest maritime cluster, providing significant resources to the UK maritime industry. The Scottish Maritime Cluster organisation is hoping to

provide a way to enhance opportunities for the region and drive economic growth for the industry as a whole. A key objective for the Scottish Maritime Cluster is to expand membership to beyond traditional maritime companies so as to bring in new expertise and skills to the sector³⁰.

The Scottish Maritime Cluster's objectives align with the government's broader Maritime 2050 goals. The government is particularly keen on maintaining the UK's competitive advantage within the Maritime Sector in terms of training, its fiscal regime and the business services it provides³¹. Institutions like the Scottish Maritime Cluster and Anglo Eastern who are stimulating these areas will be key players in the UKs objective to maintain its position as one of the strongest maritime hubs globally.



6.2 | Carnival Corporation & PLC

Carnival Corporation & PLC is a large multinational company with its UK headquarters based in Southampton. It is the largest leisure travel company in the world comprising of operations in the UK, USA, Mainland Europe, China and Australia among others. Made up of notable brands such as Carnival, P&O Cruise (UK and Australia), Princess Cruises, Cunard, Costa Cruises and Holland America Line, their portfolio contains 102 ships that visit more than 700 ports worldwide³².

Carnival accounts for approximately 50% of the global market, providing service to 12.1 million guests in 2017²³. This amounted to a revenue of \$12.9 billion where 74% came through the sale of tickets alone. The remaining 26% came through on-board purchases which include things like day excursions, souvenirs, select dining and spa treatments³⁴.

Carnival's UK operations in the form of P&O Cruises are significant for the Solent region as they primarily operate out of Southampton: 2017 alone saw 800,000 individuals travel on UK P&O Cruises. This significant activity is supported by approximately 39,000 employees where 87% reside on-board the cruises themselves³⁵.

Carnival accounts for approximately 50% of the global market, providing service to 12.1 million guests in 2017²³. This amounted to a revenue of \$12.9 billion where 74% came through the sale of tickets alone.

Southampton has a rich history with P&O Cruises, dating back to 1837 where cruises began with tours to Egypt, expanding to India in 1842³⁶. The 175th anniversary was celebrated in 2012 which was marked by all seven cruise liners docking in Southampton for the first time³⁷.

Industry insight

The value in reviewing Tonnage Tax

Figures release by the UK Department for Transport (DfT) earlier this year showed that, while the number of UK seafarers on tonnage tax vessels had grown slightly over the past 12 months, the trend overall has been a steady decline since the tax and training scheme was launched in 2000.

In 2003/4, when the first complete figures were issued by the DfT, there were 6,091 officers employed on tonnage tax vessels, 48% of whom were British (2,951 UK officers). However, in 2018/19 a total of 7,836 officers were employed on tonnage tax vessels but only 26% came from the UK (2,066 officers), with 33% being EEA/EU nationals and 40% coming from the rest of the world. That's a 30% decline in the number of UK officers in the tonnage tax fleet.

The position for British ratings is worse. Over the same period the number of UK ratings has fallen from 28% in 2003/4 to 13% in '18/'19, with three quarters being from outside the EU/EEA.

The proportion of UK flagged vessels in the tonnage tax has also fallen. At its peak, around 95 companies had joined the scheme and most vessels were UK flagged. Today only 71 company groups remain, with a total of 713 vessels and only 268 (38%) of these are UK registered.

Nautilus has long held the view that the Tonnage Tax scheme did much to reverse the sharp decline in the size of the UK registered fleet and the number of UK cadets in training. It is easy to forget that in the late 1990s, training levels had plummeted to almost nothing and the fleet was in sharp decline. Today, thanks to the Tonnage Tax, we train on average about 750 cadets per year. It is therefore beyond argument that government support has rejuvenated UK cadet training, encouraged inward investment and supported flag growth. But in terms of maritime skills, at best it prevented a total collapse.

With the Support for Maritime Training (SMarT) and the additional support of SMarT Plus the industry pledged to increase training levels significantly to around 1200 officer trainees per year. However, the early signs are that the industry will struggle to meet those targets with the lack of any direction coming from the Maritime and Coastguard Agency being already cited by owners as a hinderance. The uncertainty created by Brexit has also reduced the size of the UK fleet by a third in the past 12 months alone. Some the companies that have flagged out employed and trained UK seafarers.

The Nautilus Charter for Jobs, launched following the Brexit referendum result, included a call for a review of the Tonnage Tax scheme, and the government is now actively considering this and seeking industry input. Like Nautilus the UK Chamber of Shipping is also eager for the review. They have been actively consulting their members and lobbying the government

Mark Dickinson
Nautilus International

Sponsored content

The future of maritime skills in the UK

As we welcome the world to London International Shipping Week - a beacon of pride and an opportunity to posture to our neighbours that we, as we have in the past, will continue to lead the way in Maritime – it is a time for reflection and self-criticism.

Amongst the pomp and promise, we need to look at ourselves in the mirror and be honest about where we are and where we are going.

While the Maritime 2050 strategy throws down the gauntlet on where to begin, is it yet visionary enough to bridge the skills gap in time?

At a time when we are looking for inspiration, we require that the people and skills vision reflect the enthusiasm and proactivity that the actions of Maritime UK and others responsible for implementing the strategy have shown in recent months.

It is no secret that the maritime skill pool, particularly for ship-owners and ship managers based in the UK, as well as ancillary businesses and organisations supporting their operations, is shrinking. This ultimately relates to a lack of drive from government and industry to push the shared agenda of attracting school-leavers and university graduates towards the sector, as well a failure to recognise the magnitude of the problem for too long.

We are at a point where we simply cannot sustain our own maritime economy with home-grown talent. Is it getting any better? Not really. Is it likely to get worse? Unless something radical happens, yes.

As it stands, we are barely papering over the cracks in terms of plugging the skills gap. Cadet intake numbers are increasing but at nowhere near the levels required. The bathtub is emptying, and the tap isn't running.

With the spectre of Brexit looming, we are on a knife-edge as far being a realistic option for ship-owners to continue to do business in the UK is concerned.

However, among the gloom and despair, there are positives that give me immense hope for the future. For the first time in a long time, we know we have a problem and we want to do something about it. The energy that the team at Maritime UK are putting behind talent attraction is immense and unprecedented, with defined options aimed at a diverse workforce for a variety of skills.

From a diversity perspective, a once-conservative and traditional sector has embraced modern views of what a workforce should look like, putting more emphasis on nurturing talent from varied backgrounds and skillsets of all shapes and sizes. Key employers in the industry are setting the standard for driving change and with the Women in Maritime agenda gathering pace, we are seeing not just a more balanced workforce but new ideas and methods to challenge the status quo, furthering these advancements.

The UK has always punched above its weight due to innovation and determination. In this "brave new world" of digitalisation and ever-evolving technology, we are uniquely positioned to gain a competitive edge over our neighbours. Whilst our seafaring demographic may not be at the numbers to compete with other nations, we can offset this with our clear advantage in technology and by being a centre of excellence for digital transformation.

Whilst Brexit itself is an unknown risk, it is also an unknown prospect. We have a funny knack, in this country, of making the most of what we have - keeping calm and carrying on.

It is clear that as a nation, we are on the shores of an ocean of opportunity.

Alasdair MacMillan
Stellamar

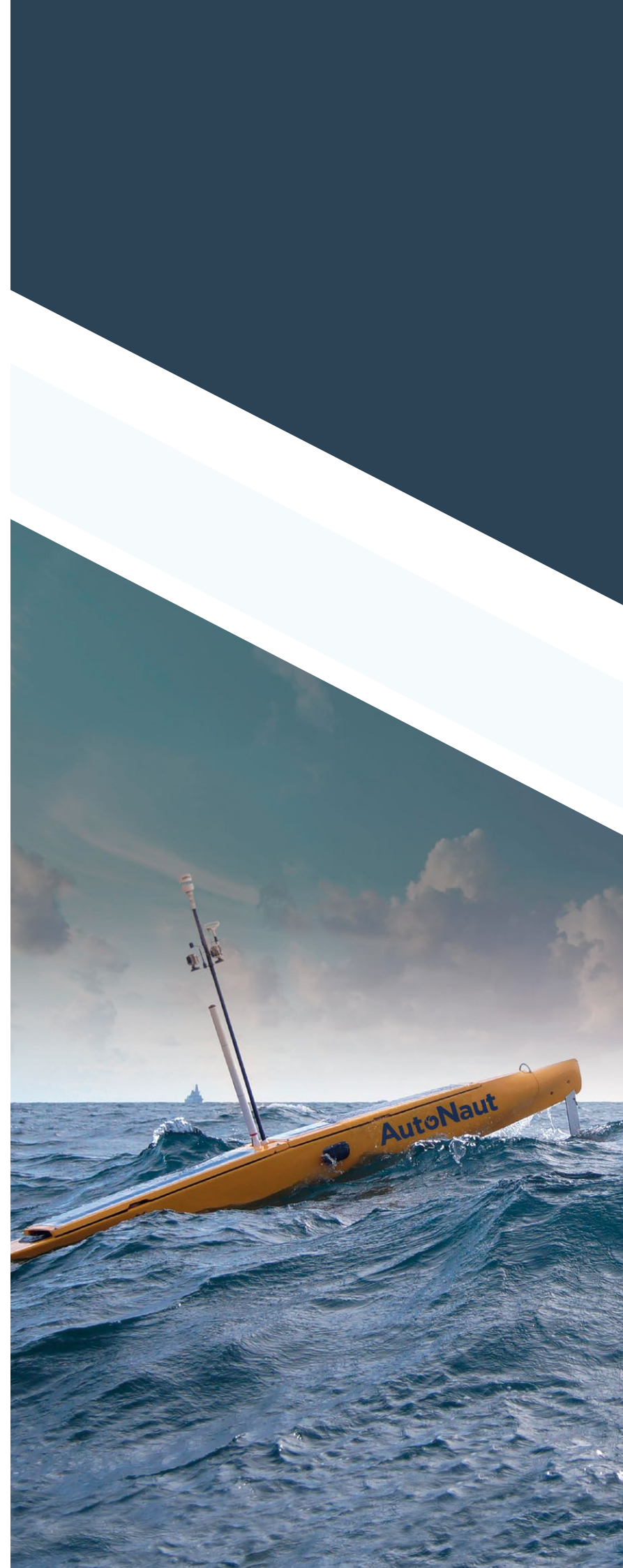
Since then, Carnival has established its 2020 Sustainability Goals stimulating significant investment in Marine Technology to the point where they are market leaders in some maritime environmental technologies. The Sustainability Goals revolve around carbon emissions, general efficiency and environmental impact. Carnival's \$400 million investment into Exhaust Gas Cleaning Systems has led to 59% of their 102 ship fleet being covered and are leading the way in this technology. They have also invested in reducing waste from ships, producing a 5% reduction relative to the 2010 baseline and increased their water efficiency by 5% through investments in technologies like reverse osmosis. They have also pledged the removal of single use plastics to be replaced by recyclable or biodegradable alternatives³⁹.

Carnival's \$400 million investment into Exhaust Gas Cleaning Systems has led to 59% of their 102 ship fleet being covered and are leading the way in this technology

These technologies have been particularly effective at reducing the company's carbon footprint. One of the Sustainability Goals was to reduce their CO2 footprint by 25% relative to 2005 levels by 2020. By 2018, Carnival had achieved a reduction of 24.8% implying that reductions will exceed target. This is particularly relevant as a key target of the UK Maritime 2050 report is reducing carbon emissions by 50%⁴⁰. Cruise Shipping accounts for just over a third of direct revenue of the broader UK shipping industry emphasising the scale of effect investments into greener technologies could produce.

Cunard, another subsidiary of Carnival, has recently announced the introduction of a fourth ship to its fleet. This ship will have a capacity of 3,000 passengers and will be the first time since 1998 that the company has four ships operating simultaneously⁴¹.

Southampton is the only UK port from which Cunard and P&O Cruises operate out of. This highlights the region's importance to the UK cruise tourism industry.



6.3 | Autonomous Vessels

Autonomous Vessels is a fast emerging sub-industry in the Maritime Sector with projections that it will be worth \$136bn globally by 2030⁴². Its success relies on continuous investments within the Marine Engineering and Scientific Sector as well as the viability of moving into commercial shipping. Rolls-Royce have already stated that it is not a matter of 'if the technology is available', but rather how the technology can be utilised in the most cost-efficient manner⁴³. The technology for automation, such as fusion sensors (sensors comprised of HD cameras, thermal imaging and LIDAR) are readily available in autonomous cars and drones⁴⁴.

One of the crucial factors that will determine the viability and success of autonomous vessels in the case of international shipping, passenger ferries and military operations is the vessel's safety. To have a chance of regulatory approval and commercial feasibility, the vessels need to be at least as safe as current operations⁴⁵. However, this may not be as large an issue as it seems – autonomous vessels will benefit from reducing the amount of human error that is made. Human error currently accounts for between 75 to 95% of all insured losses from shipping⁴⁶. Moreover, it is quite possible that unmanned vessels will be able to navigate areas that are too risky for manned vessels, creating opportunities and increasing efficiency beyond current operations.

Human error currently accounts for between 75 to 95% of all insured losses from shipping⁴⁶

The technology is advancing rapidly. In 2018, Rolls-Royce in partnership with Finferries completed the world's first fully autonomous ferry crossing in Finland. Although a crew were on-board, the journey between Parainen and Nauvo was completed autonomously, including the docking, using latest collision avoidance technology⁴⁷. Similar advancements are being made in the UK from L3 ASV and AutoNaut, both

leading the way for commercial use, research and military use of autonomous vessels.

L3 ASV provides autonomous vessels for commercial activities relating to Oil and Gas, Marine Science, Geophysical Surveying and Offshore Renewables. Its military operations include Marine Targets, Marine Countermeasures, Anti-Submarine Warfare and Security and Surveillance⁴⁸. This wide scope of operations employ 83 individuals in the UK and had a turnover in 2017 of £9.78m⁴⁹. Leading work has included operations for the National Oceanic Atmospheric Administration's Office of Coast Survey and discovery of shipwrecks in the Great Lakes of the US and Canada⁵⁰.

In a similar vein, AutoNaut has also significantly developed autonomous vessels for commercial operations. Their speciality falls to Metocean, Water Quality Testing, Passive Acoustic Monitoring, Surveillance, Marine Surveying, Commination gateways and Marine Life Monitoring⁵¹. One of the key properties of AutoNaut is its use of renewable energy. It is powered by the motion of the waves and the sensory equipment through solar energy. This means it can survive weeks on end without any carbon-based fuel⁵².

This wide scope of operations employ 83 individuals in the UK and had a turnover in 2017 of £9.78m⁴⁹

Companies like Rolls-Royce, L3 ASV and AutoNaut have illustrated their importance to the Marine Engineering and Scientific Sector through their continual investment into this emerging area of maritime. L3 ASV was awarded, alongside nine other companies, £3 million by Innovate UK to research and develop Maritime Autonomous Systems⁵³. This emphasises the view that autonomous vessels are an important emerging sub-sector to the wider Maritime Sector and to the UK as a whole.

Autonomous vessels are likely to become increasingly utilised in the future. As it stands, 95% of UK trade volume is transported via ships⁵⁴ and is not expected to decline significantly by 2050. Thus, if autonomous vessels can increase the efficiency of this trade, it will have a significant positive impact on the economy.

Moreover, a key target of the Maritime 2050 Strategy is to reduce carbon emissions by 50%⁵⁵. AutoNaut has already shown the ability to operate for weeks on end without the need for carbon-based fuels, relying on wave movement and solar energy to power its operations. This can, in theory, be scaled up such that a larger part of the ship-based Maritime Sector relies more heavily on renewable energies than the heavy sulphur based fuels.



6.4 | Cammell Laird⁵⁶

Cammell Laird, one of the most famous names in the history of British shipbuilding and ship repairing, was founded over 190 years ago in Birkenhead. Its fortunes have mirrored those of the wider economy in which it is located, centred on the River Mersey. Following several decades of decline both the firm itself and the Liverpool City Region have seen a recovery in recent years and are now poised to build on their new found confidence with increasingly ambitious growth plans.

Annual turnover was almost £95m in 2018 and has remained above £90m since 2012. The firm supports 1500 core and supply chain workers at peak times and 300 small business suppliers. As of mid-2019, there were around 1200 jobs maintained on site. Following a pause in growth from 2015, the firm is now raising its ambitions. It expects its on-site workforce to expand by 20% during the second half of 2019 and has growth plans that will see the scope and sophistication of its activities expand over the next five years or so.

Annual turnover was almost £95m in 2018 and has remained above £90m since 2012. The firm supports 1500 core and supply chain workers at peak times and 300 small business suppliers

The company is now at the heart of a modern marine cluster that plays a significant role in the economy of the Liverpool City Region. This provides it with access to a range of support services and also the deep pool of specialist skills that are critical to its success. It is active in planning for future workforce needs, investing £18m in 250 apprentices since 2008. A further success factor is the quality of Cammell Laird's facilities. The company claims to have some of the UK's most comprehensive facilities for heavy fabrication and specialist engineering in its sector. These include a flexible range of four dry-docks, a non-tidal wet basin, one of the

largest modular construction halls in Europe and a network of covered workshops. These occupy a 120 acre site next to the River Mersey, offering direct access to the sea. The facilities have been upgraded in recent years, with £93m invested in the company and its infrastructure and equipment since 2008.

The firm's current success is all the more impressive when considered in the context of its recent history. Having driven the Birkenhead economy during the nineteenth and early twentieth century, the firm experienced a sustained period of decline and upheaval after World War II, including nationalisation and subsequent privatisation within the ten years from 1977, and then closure in 1993. The business was revived in 1997 as a ship repair operation and the current owners⁵⁷ acquired it in 2005. Since then it has worked to rebuild its position as a leader in its sector, taking on a wide variety of projects that include specialist offshore conversions and fabrication, commercial ship-repair and the refit and upgrade of highly complex naval and naval auxiliary vessels.

In 2008 Cammell Laird 'Through-Life Support' contract for the Royal Fleet Auxiliary (RFA), under which the £44m refit of one of the Ministry of Defence's largest vessels, the RFA Fort Victoria, was recently completed. This included upgrading the ship to a double-hull tanker in a way that complied with the International Convention for the Prevention of Pollution from Ships (MARPOL).

The quality and efficiency of the firm's work on the project have been cited by the MOD's procurement organisation, with very good collaborative working relationships with Cammell Laird and its main subcontractors, ships' staff and other stakeholders noted as key success factors. This refit was the last major package to be carried out under the contract. Cammell Laird has, however, won two new 10-year Through-Life Support contracts to support RFA ships worth £619 million, beginning in March 2019. These will sustain 300 jobs and enable the creation of 100 apprenticeships – and they represent votes of confidence in the firm's performance and capability.

In 2012, Cammell Laird successfully re-entered the ship

building market and it now has a growing reputation as a supplier of specialist ferries, military and military support vessels and scientific research ships. A notable recent commission was the state of the art arctic exploration ship, RRS 'Sir David Attenborough', worth £150m, which proved the firm's polar capability and is expected to act as a springboard for new export markets.

The business is also active in the energy sector, acting as a hub in the off shore wind industry and it also offers its facilities and highly trained workforce for work in the civil nuclear sector and the off shore oil and gas sector. An example of a recent energy related contract was the manufacture and installation of 400 tonnes of steelwork for fitting on board the A2SEA Sea Installer for its deployment works on the Burbo 2 wind farm extension⁵⁸.

Cammell Laird is currently bidding for two contracts worth a total of £2bn that would set it on a course of sustained expansion to 2025, by when there could be 2000 workers on-site. It is part of a consortium bidding for a further RFA contract for new Fleet Solid Support (FSS) vessels and also part of a joint bid with BAE Systems to manufacture the Royal Navy's Type 31e Frigates, which has involved building up a network of more than 2,000 suppliers.

Cammell Laird is currently bidding for two contracts worth a total of £2bn that would set it on a course of sustained expansion to 2025, by when there could be 2000 workers on-site

The Government has expressed a desire to see the British shipbuilding industry aggressively pursue export markets and the company is well placed to act on this. The recommendations made by Sir John Parker in his National Shipbuilding Strategy stand to create greater opportunities for shipyards such as Cammell Laird, particularly in the naval new

build sector. The promotion of the Leander design, developed by BAE Systems for the Type 31e frigate competition, in potential export markets reflects this initiative. In addition to those referred to above, there are further prospects for domestic and overseas orders in the coming years, building on markets in which the company has a proven recent track record. These include:

- Further naval construction projects following the successful commissions for flight deck blocks for the Queen Elizabeth Class aircraft carriers and blocks for Astute Submarines;
- New build commissions in the specialist ferry market, which is expected to strengthen as the World's existing fleet ages. Cammell Laird has recently delivered a number of new ferries including a £10m Ro-Pax freight vessel for Isle of Wight ferry operator, Red Funnel⁵⁹;
- Continuing routine and non-planned drydockings⁶⁰ and repairs for the strong Irish Sea market and new business from overseas markets, taking advantage of a more favourable exchange rate;
- Green projects ranging from LNG Floating Power Stations and wave power generation to rigid foil wind propulsion technology.

Cammell Laird's reputation, the growing scale and scope of its ambition and the strength of prospects in its sector augur well for its future. As it grows and prospers over the coming years it will support the success not only of the specialist marine cluster that has formed around it but also the wider economy. As a result it will make an increasingly prominent contribution to the innovation and growth that will ensure the Liverpool City Region's remarkable renaissance continues.

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²³Anglo Eastern. (2019). 'Setting the standard'.

²⁴Anglo Eastern. (2019). 'Anglo Eastern Maritime Training Centre'.

²⁵Anglo Eastern. (2019). 'Training'.

²⁶Anglo Eastern Offshore. (2019). 'About Anglo Eastern'.

²⁷Ibid.

²⁸UK Government. (2013). 'Low-carbon economy: size and performance'.

²⁹Scottish Maritime Cluster. (2019). 'About Us'.

³⁰Scottish Maritime Cluster. (2019). 'Membership'.

³¹Department for Transport. (2019). 'Maritime 2050: navigating the future'.

³²Carnival Corporation. (2019).

'Corporate Information'.

³³Carnival PLC. (2018). 'Annual Report' – Companies House.

³⁴P&O Cruises. (2019). 'What's included in your cruise?'

³⁵Ibid.

³⁶Arnott, A. (2010). 'Southampton, Gateway to the World'. The History Press. p. 68.

³⁷Cruise. (2012). '175 years of P&O Cruises in Pictures'.

³⁸P&O Cruises. (2019). 'Carnival's 2020 Sustainability Goals'.

³⁹Ibid.

⁴⁰Department for Transport. (2019). 'Maritime 2050'.

⁴¹Cunard. (2019). 'Our fourth ship'.

⁴²HWF. (2018). 'Autonomous Ships: Shipping 4.0'.

⁴³Rolls-Royce. (2016). 'Autonomous Ships. The next step'.

⁴⁴Ibid.

⁴⁵Ibid.

⁴⁶HWF. (2018). 'Autonomous Ships: Shipping 4.0'.

⁴⁷Rolls-Royce. (2018). 'Rolls-Royce and Finferries demonstrate world's first Fully Autonomous Ferry'.

⁴⁸L3HARRIS ASV. (2019). 'Redefining the way the world works at sea'.

⁴⁹Financial Accounts from Bureau van Dijk's FAME database.

⁵⁰L3HARRIS ASV. (2019). 'The Autonomous Boat that's redefining Coastal Hydrographic Survey'.

⁵¹AutoNaut. (2019). 'AutoNaut'.

⁵²Ibid.

⁵³L3HARRIS ASV. (2015). 'ASV Wins Maritime Autonomy R&D Funding'.

⁵⁴Department for Transport. (2019). 'Maritime 2050 Navigating the Future'.

⁵⁵Ibid.

⁵⁶The data for this case study was produced from publicly available sources together with information from Cammell Laird

⁵⁷Northwestern Ship Repairers & Shipbuilders. This company is 50% owned by Peel Holdings, owners of the Mersey Docks and Harbour Company. Peel Holdings purchased the shipyard site and surrounding land in 2007 to facilitate the proposed Wirral Waters development. Northwestern Ship Repairers & Shipbuilders continue to maintain a long-term lease on the shipyard facilities, which will form an integral part of Peel's regeneration scheme.

⁵⁸This involved the manufacturing of three main structures, two to support 12 giant wind turbine blades and the other to support four turbine towers. A range of deck fittings were also manufactured to enable four nacelle hubs to be transported and installed offshore.

⁵⁹The project used 45 British supply chain businesses and generated 3,000-man hours of work for Cammell Laird's apprentices. The firm further employed 200 direct workers, 200 sub-contractors and 10 apprentices on the contract.

⁶⁰In 2016 more than 150 drydockings and repairs were undertaken at the yard.

Industry insight

Brexit is hampering the UK leisure marine industry

British Marine's latest UK Marine Industry Trends report highlights the sentiment and risks affecting the sector

The number of UK marine companies reporting an increase in revenue is falling and business confidence within the sector is at its lowest recorded level – but action can be taken to turn the situation around.

These were the key findings from British Marine's twice-yearly survey of businesses it represents within the UK leisure, superyacht and small commercial marine industry in June.

The survey's outcomes have been published in the trade organisation's latest UK Marine Industry Trends report.

Only 22% of the businesses surveyed by Maritime UK member association British Marine reported an increase in revenue during the six months up to June 2019.

This is 10% less than in the last survey in November 2018 and 15% lower than the level seen five years ago, before the Brexit referendum.

Just 6% of the companies surveyed are seeing their profits increase, which is 6% less than in the previous survey and 23% lower than in 2014.

This stagnation in revenue and profit is worrying, given that direct revenue from the marine industry is worth £3.17bn a year to the UK economy, based on figures for 2017-18.

The sector employs 33,000 people and directly contributed over £1.1bn of gross value added to the UK economy during 2017-18.

UK marine businesses that focus on the domestic market have been hardest hit by the uncertain environment as Brexit draws nearer.

Only 7% of these companies saw revenue increase during the six months prior to British Marine's June survey.

The domestic market has previously benefited from Brexit, with a weaker pound causing more Brits to holiday at home.

But continued political uncertainty is taking its toll on consumer confidence and has caused a reduction in leisure spending, which is impacting marine businesses in the UK.

Fewer customers are out on the water, so businesses are slashing their prices to stay competitive.

This has resulted in leisure boat hire, charter and passenger boat prices dropping to their lowest level in over five years, British Marine has found.

Pricing of hire and charter boats has dropped significantly since last summer with only 28% of businesses increasing their prices, compared to just over half of those surveyed in 2018.

Meanwhile, brokerages are experiencing less activity and reduced stock, due to weak value of the pound and low domestic demand.

UK-based boat fleets have shrunk in size due to an increase in overseas sales and "end of life" challenges when vessels are no longer used or have been abandoned.

Price competition is further driving down sales revenue for brokerages too.

Business confidence within the sector has also taken a knock and is at its lowest level since autumn 2016, according to the survey in June. But British Marine believes that there are things the sector can do to turn the situation around, according to Lesley Robinson, its chief executive.

“ Whilst Brexit uncertainty and a potential recession are factors completely out of our control, increasing participation is not, she says.

“ It is crucial that the industry turns its focus to attracting new customers both old and young from a variety of backgrounds.

Building the future generation of boating enthusiasts is key to the future sustainability of the industry.

British Marine is encouraging the industry to adapt to changing consumer spending habits, embrace different business models and produce new offerings to stay competitive.

Borrow A Boat, the UK's fastest-growing boat charter platform and a British Marine member company, is just one example of the forward-thinking businesses emerging within the sector.

“ We aspire to make boating a more flexible and affordable activity – in turn helping the industry to grow, comments Matt Ovenden, Borrow A Boat's chief executive.

“ Giving consumers more choice, variety and better value will help attract watersport and boating lovers in the making, whilst ensuring current audiences continue to participate, which is vital for future growth.

Borrow a Boat was title sponsor of the Southampton International Boat Show 2019 and collaborated with British Marine to get over 10,000 people out on the water throughout the 10-day show.





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