

16 November 2020

Ocean Satellite Account  
2016-2018

**Ocean economy more dynamic than the national economy in the 2016-2018 triennium**

The scope of the Ocean Satellite Account (OSA) includes approximately 53 thousand kind of activity units, whose activity represented, on average, 3.9% of Gross Value Added (GVA) in the 2016-2018 triennium and 4.0% of employment (Full Time Equivalent - FTE) of the Portuguese economy, in the period 2016-2017. The performance of the economic activities considered in the OSA was above the overall national economy: between 2016 and 2018, the GVA grew 18.5% (the national GVA increased 9.6%) and, between 2016 and 2017, employment grew 8.3% (in the national economy the change was 3.4% in the same period).

Applying the Integrated System of Symmetric Input-Output Tables of 2017, which enables to obtain an expanded picture of the inter-sectoral relations of the economy allowing to capture indirect effects, it is estimated that, in 2018, the direct and indirect impact of the ocean economy on the national economy has been translated into 5.4% of GVA and 5.1% of the Gross Domestic Product (GDP).

In this edition of the OSA, results for the Autonomous Regions (Azores and Madeira) are available for the first time. In 2016-2017, 10.7% of the GVA of the ocean economy was generated in these regions, 6.1 percentage points more than the relative weight that these regions have globally in the national GVA.

Despite the circumstances determined by the COVID-19 pandemic, Statistics Portugal calls for better collaboration by corporations, households and public entities in responding to their requests. The quality of official statistics, particularly its ability to identify the impacts of the COVID-19 pandemic, depends crucially on this collaboration that Statistics Portugal is grateful for in advance.



On the occasion of the National Day of the Sea (November 16), Statistics Portugal discloses, in this press release, the results of the second edition of the Ocean Satellite Account (OSA) for the period 2016-2018, which are consistent with the National Accounts (base 2016). Data presented for 2016 and 2017 are final and data for 2018 are provisional.

The OSA was developed by Statistics Portugal in partnership with the Directorate-General for Maritime Policy (DGPM), under a protocol established between the two entities. It should also be noted that this edition of the OSA was compiled in close cooperation with the Regional Statistics Service of the Azores and the Regional Directorate of Statistics of Madeira.

The press release is organized as follows:

- Main economic indicators for the country;
- Main indicators for the Autonomous Regions (Azores and Madeira);

- International comparison with other Member-States of European Union;
- Application of the Integrated Input-Output Tables to the OSA results, to estimate the indirect impact of ocean activities on the national economy, another innovative item compared with the previous edition;
- Comparison of the main aggregates of OSA with the previous edition;
- Methodological notes.

[Tables](#) with additional information and an infographic are available on Statistics Portugal website.

## 1. Main Results

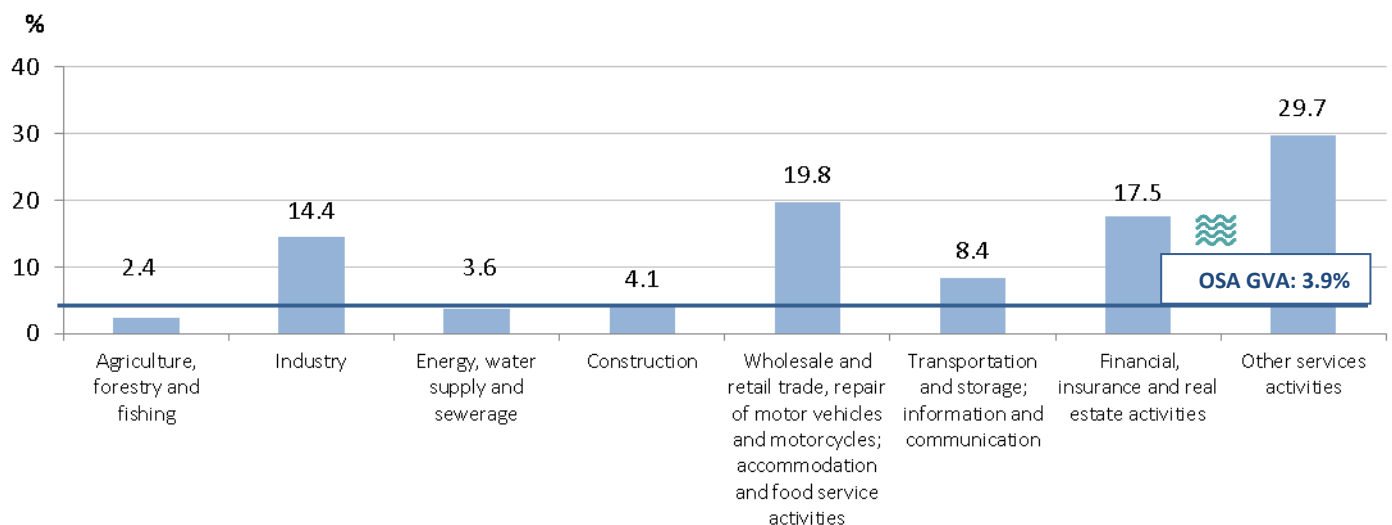
### 1.1. Analysis by industries (national economy)

The ocean economy (mentioned in this press release as OE) represented 3.9% of national GVA in the 2016-2018 triennium and 4.0% of national employment in 2016-2017. Between 2016 and 2018, the OE GVA registered an increase of 18.5%, while the national GVA increased 9.6%. Between 2016 and 2017, OE compensation of employees increased 8.8% and employment by 8.3%, both above that observed in the national economy (6.0% and 3.4%, respectively).



Comparing the relative importance of the OE GVA in the national economy with other industries of the National Accounts (NA), it was observed that, in the 2016-2018 triennium, its relevance was higher than agriculture, forestry and fishing (2.4%) and energy, water supply and sewerage (3.6%), being almost equivalent to that of construction (4.1%).

**Picture 1 – Distribution of National GVA by industries vs OSA GVA (average 2016-2018 Po)**



The compensation of employees for the OE represented more than 4% of the total national compensation of employees, in 2016 and 2017. The average compensation by FTE was higher than that observed in the national economy (+7.8% in 2016 and +6.3% in 2017). The ratio of GVA to Employment (ETC) was slightly lower than that recorded in the national economy (approximately 95%).

**Picture 2 – Main results of the OSA, with reference to the total economy**

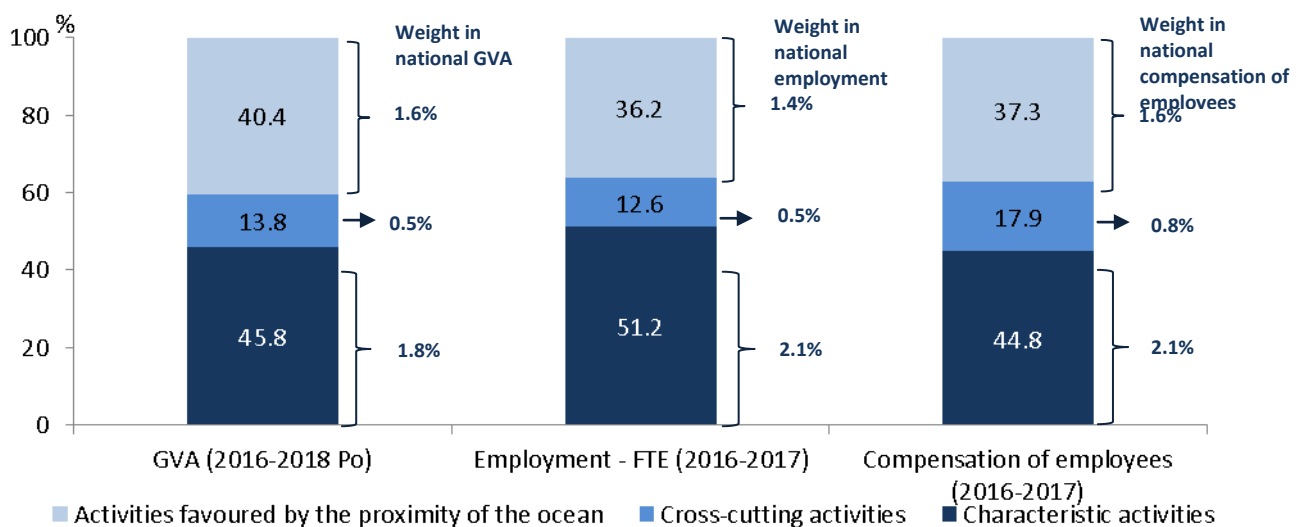
	Unit	Levels	Levels			Change rate. (%)		OSA/NA (%)		
			2016	2017	2018Po	2017	2018Po	2016	2017	2018Po
GVA	10 <sup>6</sup> euros	OSA	6,059	6,688	7,177	10.4	7.3	3.7	3.9	4.0
		NA	161,993	169,642	177,466	4.7	4.6			
Employment (FTE)	No	OSA	174,755	189,236	//	8.3	//	3.9	4.1	//
		NA	4,426,856	4,579,158	4,720,439	3.4	3.1			
GVA/FTE	10 <sup>3</sup> euros	OSA	34.7	35.3	//	1.9	//	94.7	95.4	//
		NA	36.6	37.0	//	1.2	//			
Compensation of employees	10 <sup>6</sup> euros	OSA	3,554	3,866	//	8.8	//	4.4	4.5	//
		NA	81,213	86,097	91,633	6.0	6.4			
Employees (FTE)	No	OSA	155,945	168,552	//	8.1	//	4.1	4.2	//
		NA	3,842,836	3,991,067	//	3.9	//			
Average compensation of employees	10 <sup>3</sup> euros	OSA	22.8	22.9	//	0.6	//	107.8	106.3	//
		NA	21.1	21.6	//	2.1	//			
Compensation of employees/GVA	%	OSA	58.7	57.8	//	-1.5	//	117.0	113.9	//
		NA	50.1	50.8	52.0	1.2	1.7			
Private consumption (households)	10 <sup>6</sup> euros	OSA	7,054	7,631	//	8.2	//	6.0	6.2	//
		NA	118,274	122,556	//	3.6	//			
Public consumption	10 <sup>6</sup> euros	OSA	771	801	//	3.8	//	2.4	2.4	//
		NA	32,800	33,673	//	2.7	//			
GFCF (products)	10 <sup>6</sup> euros	OSA	412	460	//	11.7	//	1.4	1.4	//
		NA	28,893	32,888	//	13.8	//			
Exports	10 <sup>6</sup> euros	OSA	3,693	4,100	4,498	11.0	9.7	4.9	4.9	5.0
		NA	74,989	83,717	89,144	11.6	6.5			
Imports	10 <sup>6</sup> euros	OSA	2,512	2,555	2,688	1.7	5.2	3.4	3.1	3.0
		NA	72,849	81,739	88,194	12.2	7.9			
External balance	10 <sup>6</sup> euros	OSA	1,180	1,545	1,810	30.9	17.2	55.2	78.1	190.7
		NA	2,140	1,978	949	-7.6	-52.0			

## 1.2. By observation levels

- The **characteristic activities**, such as fishing and aquaculture, extraction of salt, shipbuilding, port activity, maritime transport, coastal works, recreational and sporting boating etc. represented 45.8% of OE GVA and more than half of OE employment (51.2%);
- **Cross-cutting activities**, that is, maritime equipment and services, were responsible for 13.8% of OE GVA and 12.6% of OE employment;

- Activities favored by proximity to the sea**, that is, activities associated with coastal tourism, corresponded to 40.4% of the OE GVA and 36.2% of the OE employment. The relative importance of these activities has increased significantly compared with the first OSA edition (they represented 26.1% of GVA and 27.2% of employment, in 2013), reflecting the growth of tourism activity at national level in 2016-2018 triennium.

**Picture 3 – OSA GVA, employment and compensation of employees, by observation levels**













### 1.3. By groups

Statistics Portugal and the Directorate-General for Maritime Policy designed a specific typology by groups of activities (see Picture 27, Methodological Notes), from the perspective of identifying value chains.



Picture 4 – Key indicators, by group

Classification by group	Kind of activity units	Gross value added (GVA)	Employment	GVA/ FTE
	2016-2017	2016-2018Po	2016-2017	2016-2017
	No	10 <sup>4</sup> euro	FTE	10 <sup>3</sup> euro
1. Fisheries, aquaculture, processing, wholesale and retail of its products 	8,531	1,667	61,595	26.3
2. Non-living marine resources 	115	57	1,635	33.9
3. Ports, transports and logistics 	1,052	707	12,307	55.9
4. Recreation, sports, culture and tourism 	39,487	2,860	72,147	37.4
5. Shipbuilding, maintenance and repair 	411	156	4,869	31.3
6. Maritime equipment 	422	206	6,636	30.2
7. Infrastructures and maritime works 	738	270	6,203	42.4
8. Maritime services 	1,755	711	16,265	42.3
9. New uses and resources of the ocean 	81	8	340	23.6
<b>Total of ocean satellite account (OSA)</b> 	52,589	6,641	181,996	35.0
<b>National economy</b>	-	169,700	4,503,007	36.8
<b>OSA/ National economy</b>	-	<b>3.9</b>	<b>4.0</b>	<b>95.1</b>

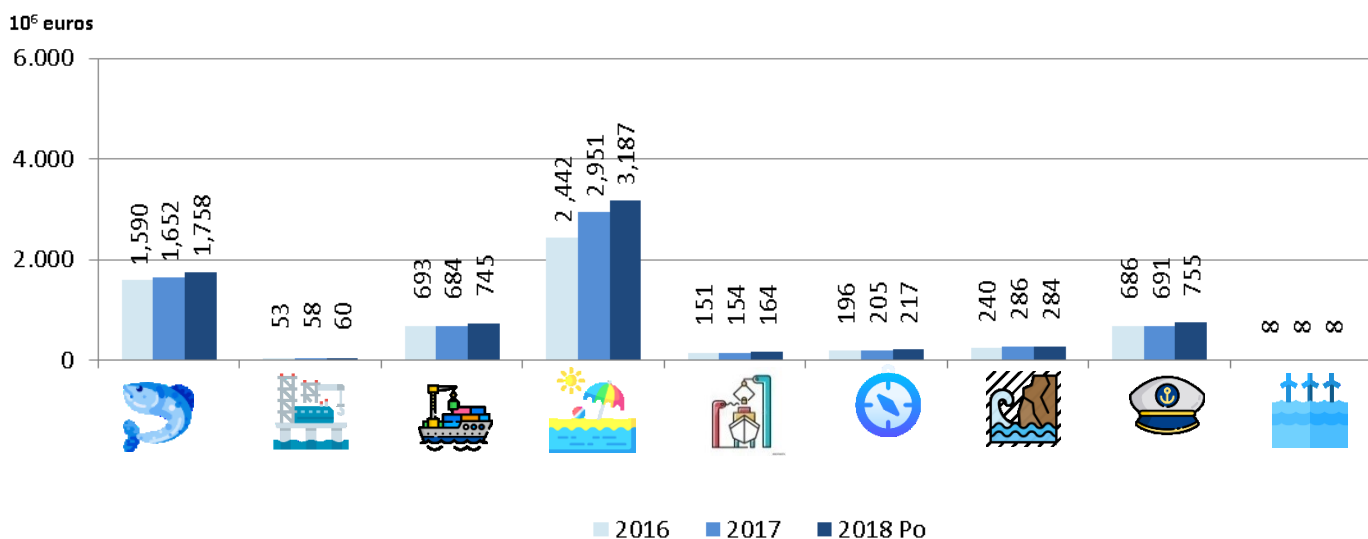
### 1.3.1. Units

Group 4 - Recreation, sport, culture and tourism led in number of units, bringing together, on average, 75.1% of the total kind of activity units selected, in 2016 and 2017. Group 1 – Fisheries and aquaculture, processing and wholesale and retail of its products comes in second place, with 16.2% of the total units.

### 1.3.2. GVA

In the 2016-2018 period, group 4 - Recreation, sport, culture and tourism was the most relevant, followed by group 1 – Fisheries and aquaculture, processing and wholesale and retail of its products and groups 3 - Ports, transport and logistics and 8 – Maritime services. In the three-year period under analysis, the 30.5% growth in GVA of group 4 stands out.

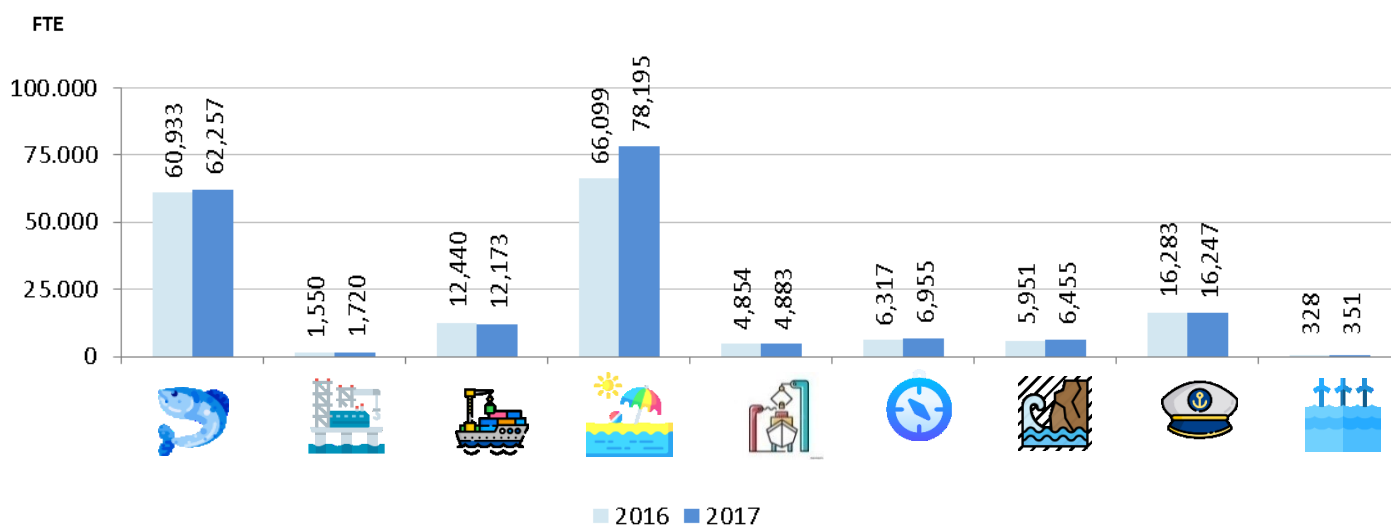
**Picture 5 – Distribution of OE GVA, by group**



### 1.3.3. Employment and compensation of employees

In the case of employment, a similar hierarchy is observed to that verified of GVA. In fact, in 2016 and 2017, group 4 - Recreation, sport, culture and tourism, concentrated almost 40% of OSA employment, followed by group 1 – Fisheries and aquaculture, processing and wholesale and retail of its products, with more than 30% of total OE employment. Once again, the increase observed in group 4 (18.3%) stands out.

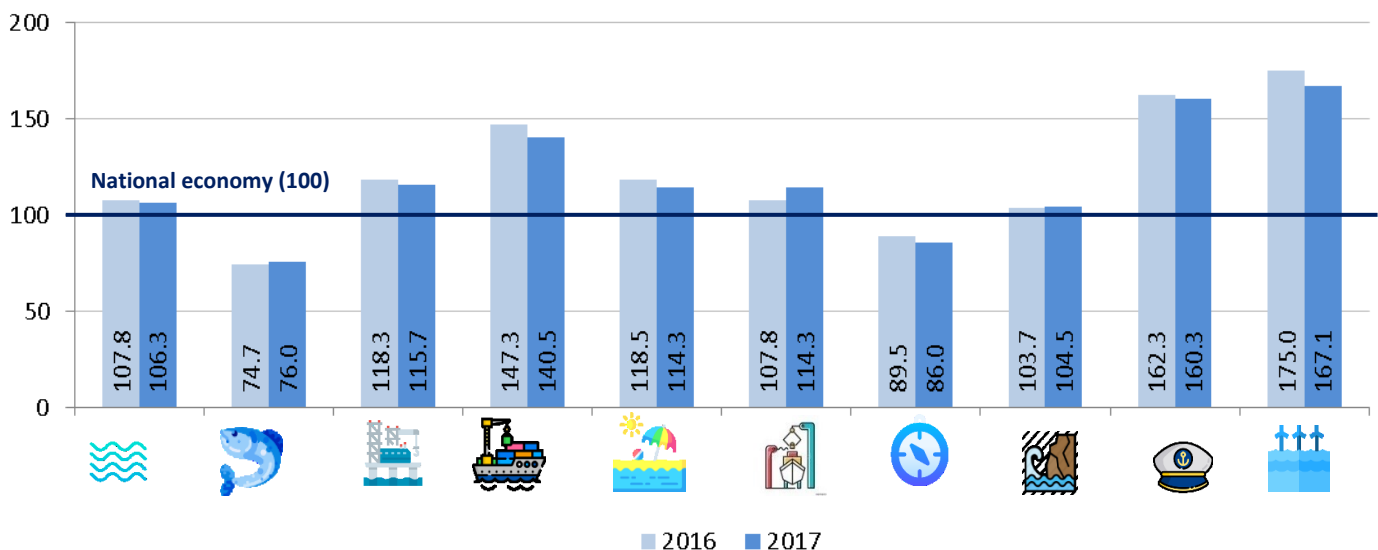
**Picture 6 – Distribution of OE Employment, in FTE, by group**



The compensation of employees in 2016-2017 concentrated in groups 4 - Recreation, sport, culture and tourism (more than 40% of the total) and 1 – Fisheries and aquaculture, processing and wholesale and retail of its products (24.0% of the total).

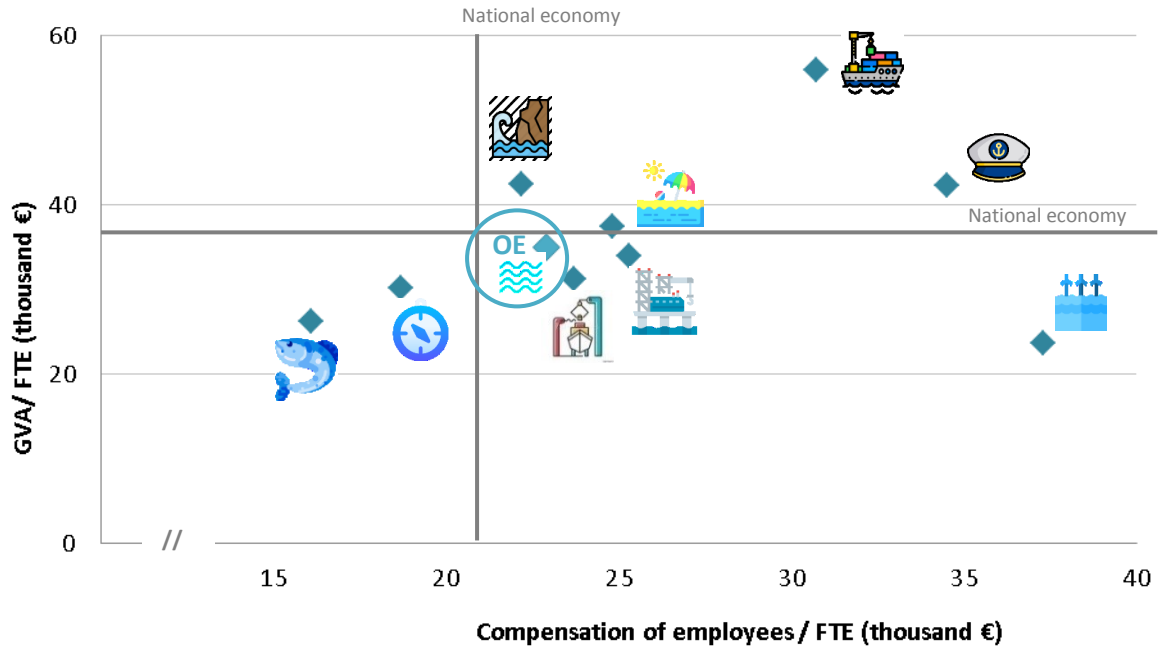
The average compensation of employees per FTE showed a significant dispersion, with groups 8 - Maritime services and 9 - New uses and resources of the sea registering the highest average compensation of employees. At the opposite extreme were groups 1 - Fishing, aquaculture, wholesale and retail of its products and 6 - Maritime equipment, with an average compensation of employees below the national average. To a large extent, this high dispersion may reflect the heterogeneity of the qualifications of human resources associated with the different groups.

**Picture 7 – Average Compensation of employees by FTE, by group**  
**(national economy = 100)**



Analyzing the distribution of the compensation of employees and the labor productivity (GVA/ FTE) of the OE, by group, it can be observed that not all groups with the highest compensation of employees correspond to those with the highest productivity. Group 9 - New uses and resources of the ocean illustrates this situation, which can be explained by the fact of including fundamentally emergent activities, with highly specialized skills.

**Picture 8 – Distribution of the compensation of employees by FTE and of productivity of the OE, by group**



#### 1.4. Uses and Resources of OE products

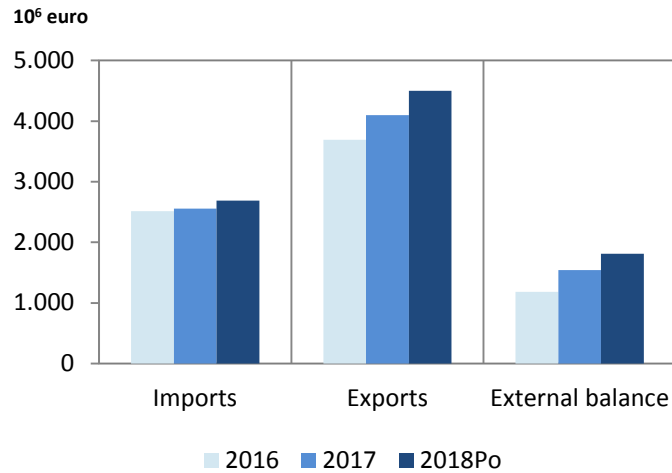
Between 2016 and 2018, imports of OE products corresponded to about 3% of total imports from the national economy, having increased by 7.0% in that period, while total imports grew by 21.1%.

Exports of OE products represented approximately 5% of total exports, having grown 21.8%, 2.9 p.p. more than national exports.

As a result of the evolution of OE imports and exports, the external balance of goods and services was positive, having increased by 30.9% in 2017 and 17.2% in 2018.



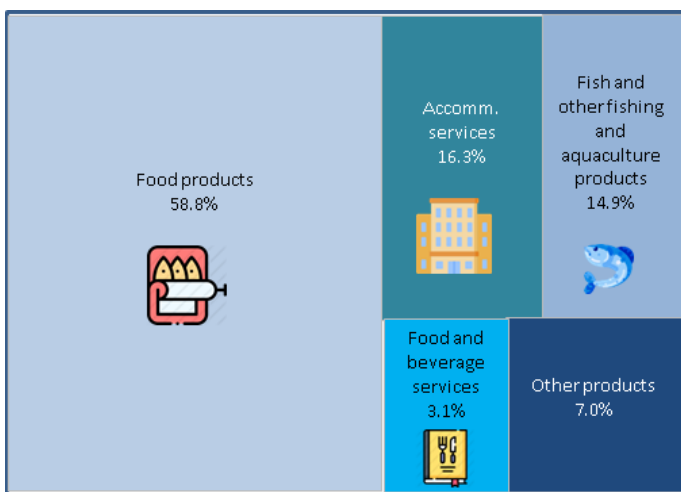
**Picture 9 – Imports, Exports and External balance of OE products**



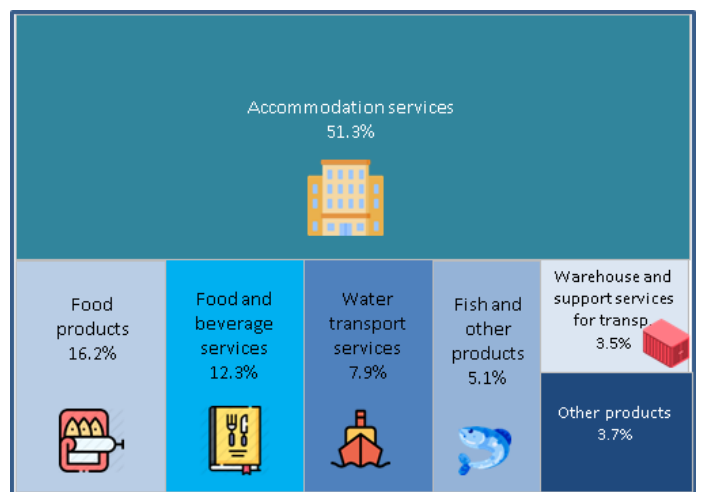
The most relevant products in the structure of OE imports were food products (processed products, especially fresh, chilled or frozen fish and crustaceans, dried, salted or salted fish; smoked fish and, still, preserves and other fish preparations), followed by accommodation services and fish and other fishing and aquaculture products.

Regarding exports of OE products, the prevalence of accommodation services stands out. Food products come in second place, followed by restaurant services. It should be noted that in the previous edition of the OSA food products occupied the first position in the structure of exports, between 2010 and 2013, while accommodation services occupied the second position (representing, respectively, 32.0% and 24.7% of the total OE exports).

**Picture 10 – Structure of OE imports (average 2016-2018Po)**

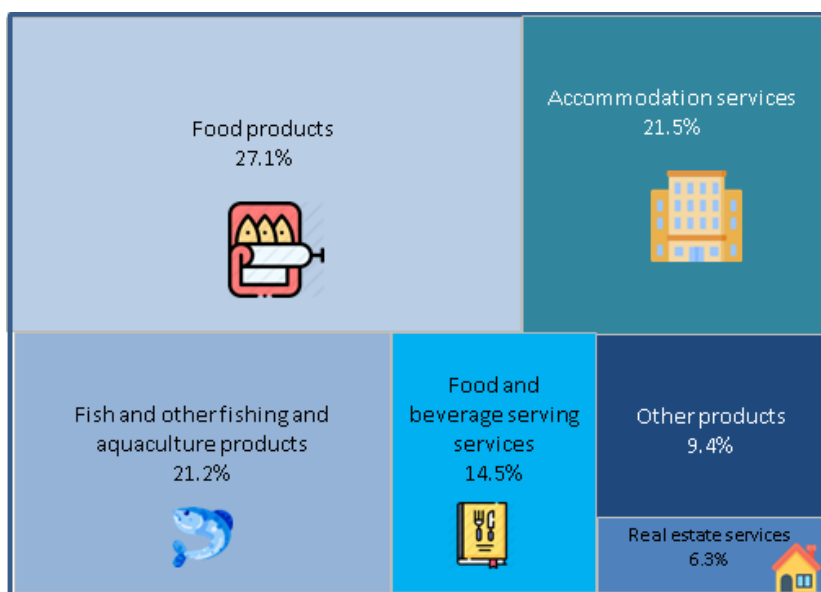


**Picture 11 – Structure of OE exports (average 2016-2018 Po)**



Households final consumption expenditure in OE products registered a nominal increase of 8.2% in 2017, with the respective relative weight increasing from 6.0% to 6.2%. For the average of the 2016-2017 period Households expenditures on OE products mainly focused on food products, followed by accommodation services and fish and other fishing and aquaculture products.

**Picture 12 – Households final consumption expenditure structure in OE products  
(average 2016-2017)**



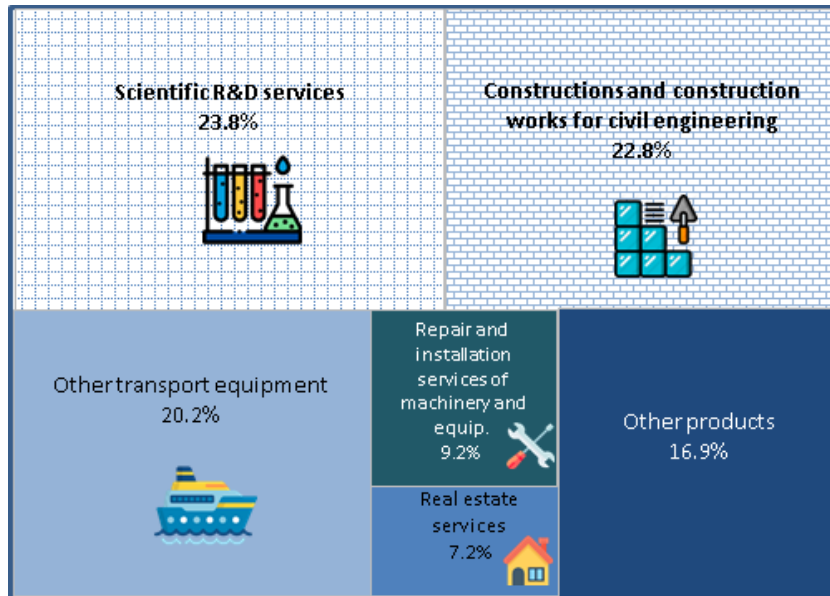
The General Government final consumption expenditure (public consumption) in OE products increased 3.8% in 2017, slightly more pronounced than in the national economy (2.7%). The relative importance remained at around 2.4% of total public consumption.

In 2016-2017, the public consumption of OE products was mostly on public administration services (87.1%), followed by scientific research and development services (6.0%) and water transport services (4.8%).

Gross Fixed Capital Formation (GFCF) in OE products represented 1.4% of total GFCF in the national economy, in 2016 and 2017. There was an increase of 11.7% in 2017, explained by the higher investment in coastal works and by entities of water transport auxiliary activities. The most relevant products were scientific research and development services, construction and civil engineering services and other transport material.

**Picture 13– Gross Fixed Capital Formation (GFCF) in OE products**

**(average 2016-2017)**

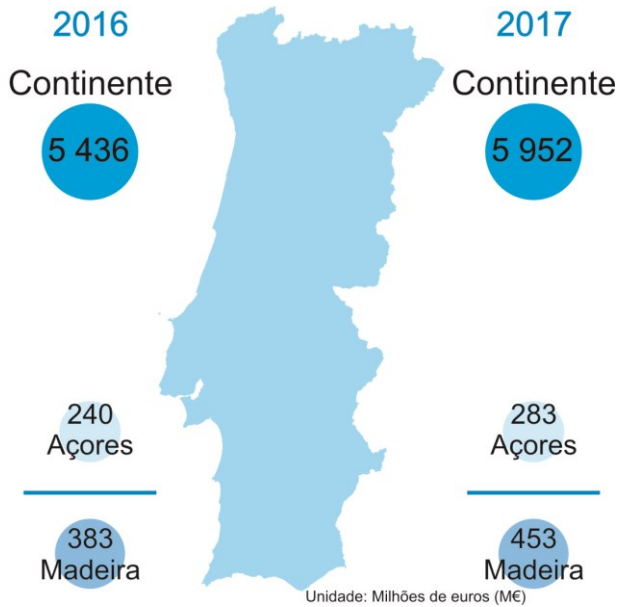


## 2. Main results by NUTS 1

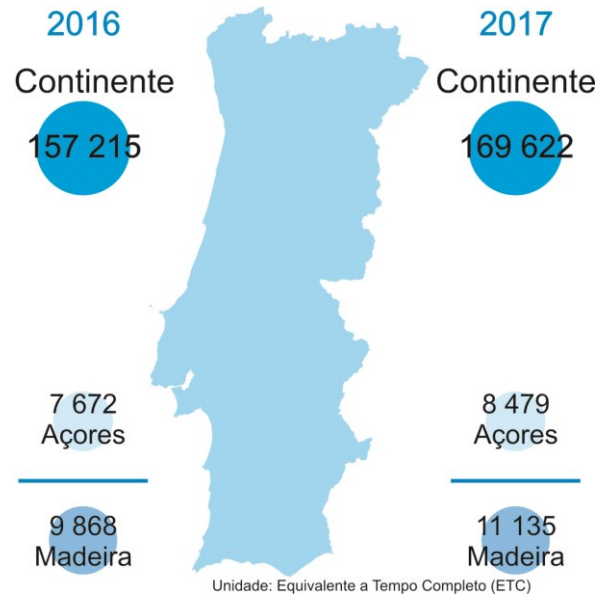
In 2016 and 2017, the Autonomous Region of Azores and the Autonomous Region of Madeira represented, together, 10,7% of the total OE GVA (4.1% and 6.6%, respectively).

This proportion compares with a lower relative weight of the two regions (4.5%) in the country's total GVA (2.1% and 2.4%, in the same order). In the respective regional GVA, the OE GVA represented 7.5% in the Autonomous Region of Azores and 10.3% in the Autonomous Region of Madeira.

**Picture 14 – OE GVA in Continental Portugal, Autonomous Region of Azores and Autonomous Region of Madeira (2016-2017)**



**Picture 15 – OE Employment in Continental Portugal, Autonomous Region of Azores and Autonomous Region of Madeira (2016-2017)**



Note: Continente - Continental Portugal; Açores - Autonomous Region of Azores; Madeira - Autonomous Region of Madeira. Unit: Million euro.

Note: Continente - Continental Portugal; Açores - Autonomous Region of Azores; Madeira - Autonomous Region of Madeira. Unit: Full Time Equivalent (FTE).

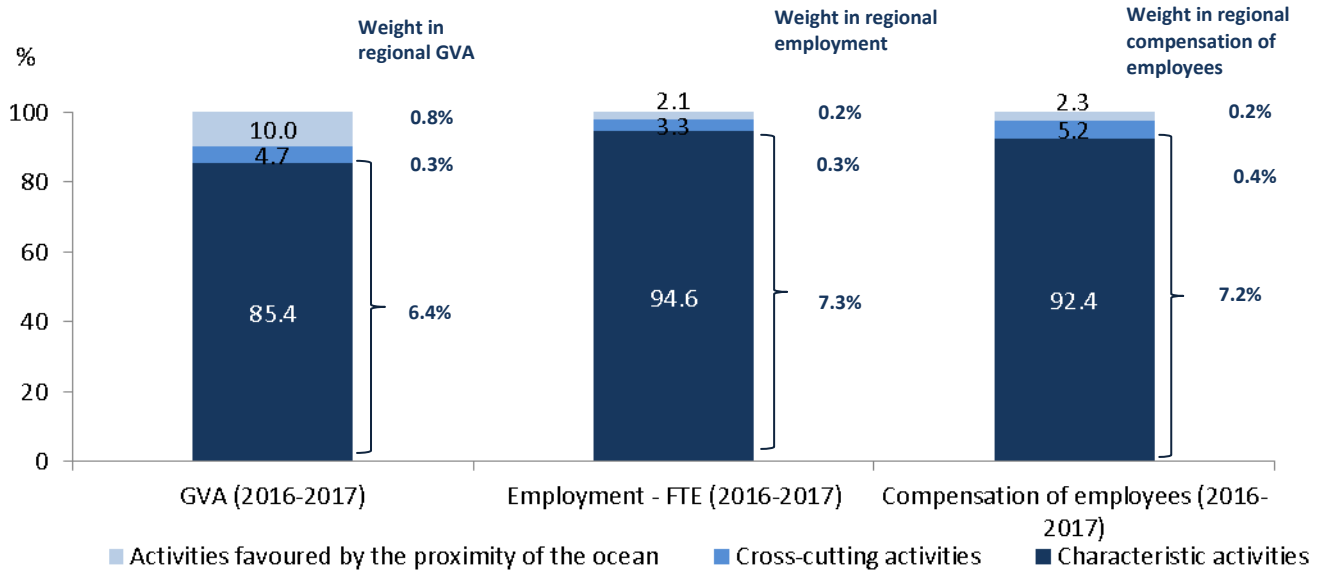
## 2.1 Autonomous Region of Azores

In 2016-2017, the OE represented, on average, 7.5% of ARA's GVA. By observation levels, the significant weight of **characteristic activities** (such as fishing and aquaculture, boating, shipbuilding, port and coastal defense works, port activity, maritime transport, etc.) stands out, corresponding to 85.4% of OE GVA and 94.6% of OE employment.



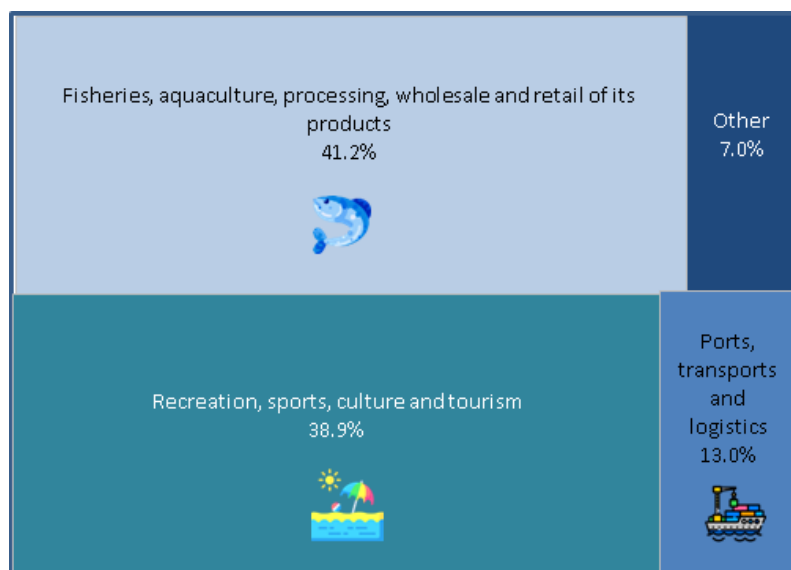
**Picture 16 – OSA GVA, employment and compensation of employees, by levels of observation in**

**Autonomous Region of Azores**



In the distribution of the OE GVA by group, the highlights are group 1 – Fisheries and aquaculture processing and wholesale and retail of its products, 4 - Recreation, sports, culture and tourism, with particular emphasis on the nautical component and 3 - Ports, transport and logistics, totaling more than 90% of the OE GVA.

**Picture 17 – Distribution of OE GVA in Autonomous Region of Azores, by group (average 2016-2017)**

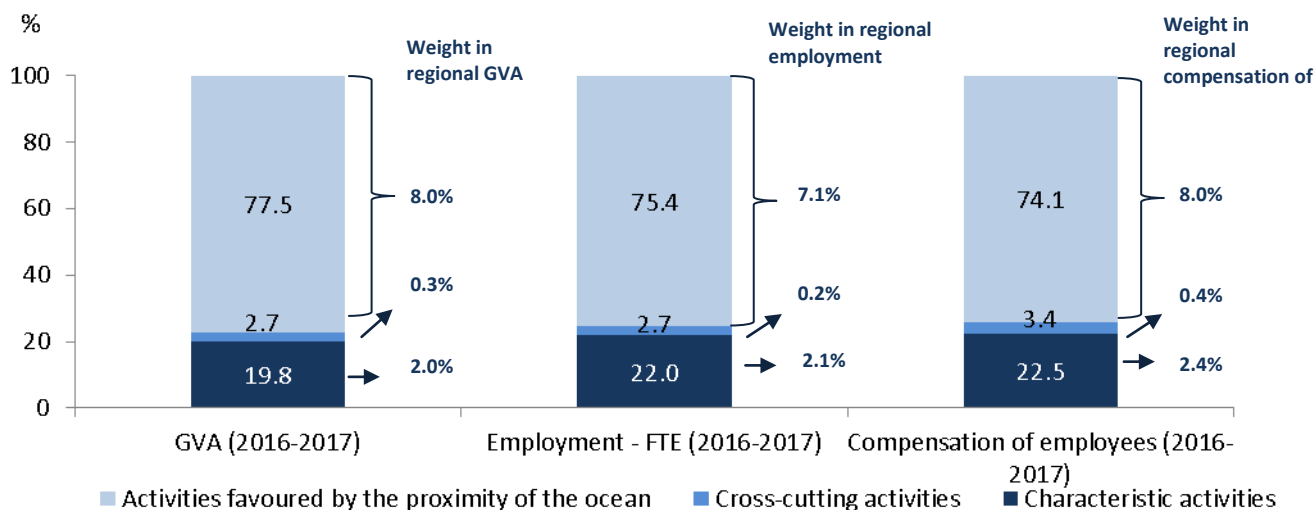


## 2.2. Autonomous Region of Madeira

In 2016-2017, the OE represented, on average, 10.3% of GVA in the Autonomous Region of Madeira. By observation levels, there was a clear predominance of activities favored by the proximity of the sea, that is, activities associated with coastal tourism, which constituted 77.5% of the regional OE GVA and 75.4% of the regional OE employment.

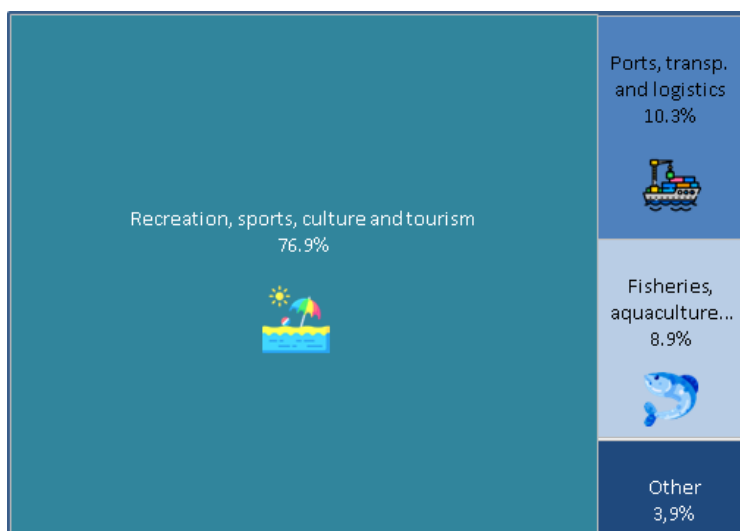


**Picture 18 – OSA GVA, employment and compensation of employees, by levels of observation in Autonomous Region of Madeira**



The relevant weight of group 4 - Recreation, sports, culture and tourism reflect the relevance of the coastal tourism in the economic activity of Autonomous Region of Madeira.

**Picture 19 – Distribution of OE GVA in Autonomous Region of Madeira, by group**

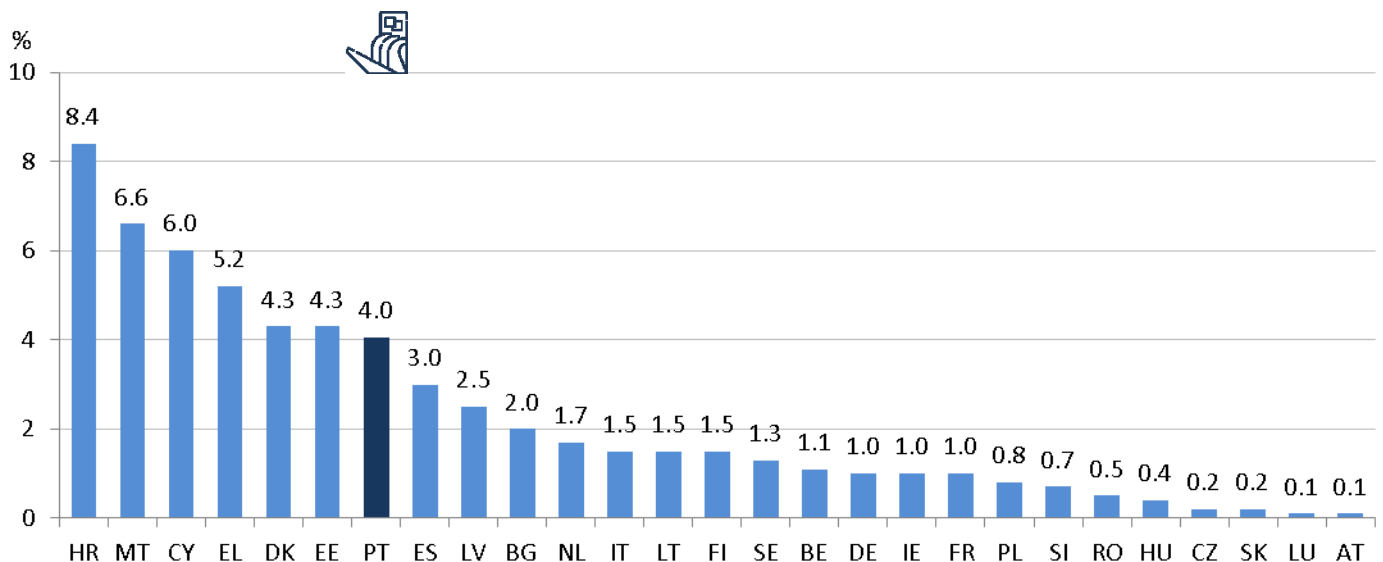


### 3. International comparisons

To the present date, Portugal is the only European country with an OSA. There are, however, some estimates of the value of the OE economy at global and regional level, as well as several studies carried out by some countries, which attempt to quantify the relative importance of the ocean in the economy (in terms of GVA / GDP and employment).

In this press release, the values presented in the European Commission document *The EU Blue Economy Report 2020* were used as a reference for international comparisons, for timeliness reasons and because it includes almost all countries of the European Union, although there is no total harmonization in activities, products and methodologies considered in the European Commission document and in the national OSA. Comparisons should be made with some caution, and one should not try to identify strict differences in quantitative terms.

**Picture 20 – Weight of OE GVA in national GVA in the European Union countries, in 2018**

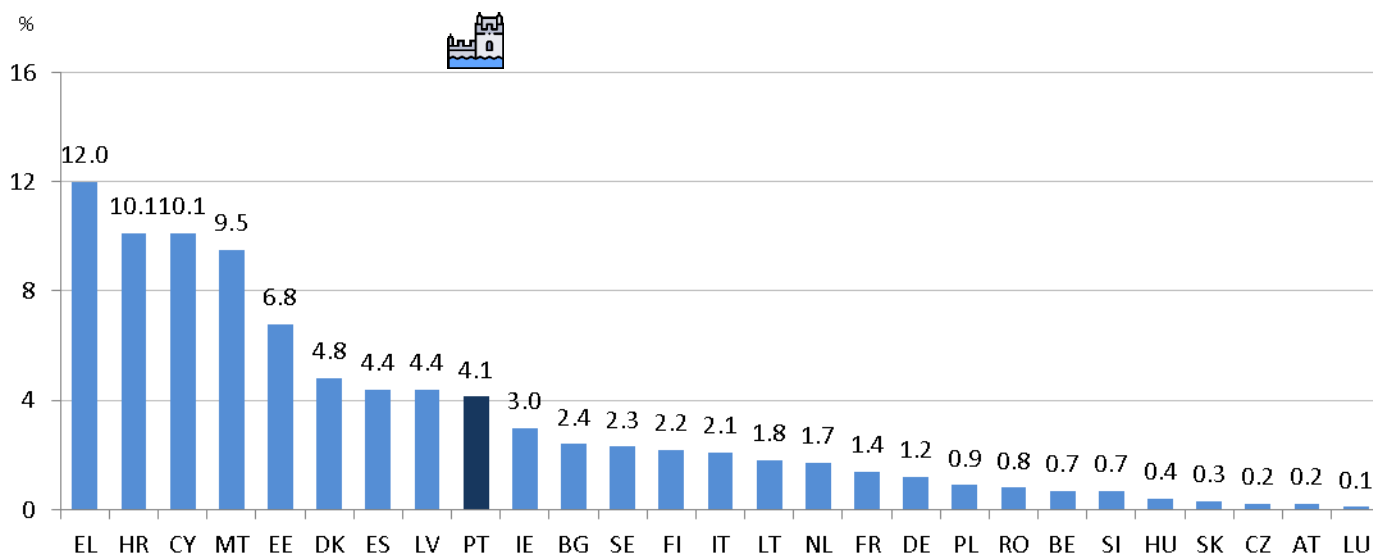


Source: The EU Blue Economy Report 2020 and Portuguese OSA 2020.

With the results now obtained with the OSA, in 2018, Portugal was positioned among the EU member states in which OE has a relatively high importance, in a group of two more countries (Denmark and Estonia) with weights in the order of 4% of GVA

Regarding employment, Portugal occupies the ninth place (4.1%), just below Spain and Latvia (both with 4.4%).

**Picture 21 – Weight of OE employment in national employment in the European Union countries, in 2017**



Source: THE EU Blue Economy Report 2020 (benchmark year 2017) and Portuguese OSA 2020.

#### 4. Application of the Input-Output Tables (base 2016) to the OSA

Applying the 2017 Integrated Input-output Symmetric Tables System, recently published by Statistics Portugal, to the main results of the OSA, it is possible to determine, in addition to the direct effects, the indirect effect<sup>1</sup> of the OE activities on the national economy.

This system, respecting a general balance between aggregate demand and supply, represents the interconnections between the branches of economic activity, allowing determining, under certain conditions and hypotheses<sup>2</sup>, the propagation effect to the various industries of the change in demand of OE products.

In 2017, the demand of OE products is estimated to have a direct and indirect contribution of 5.0% to GDP (9,724 million euros) and 5.2% to GVA (8,800 million euros). Assuming the same coefficients of the referred system, these percentages will have evolved to 5.1% and 5.4%, respectively, in 2018. These results are equivalent to saying that 1% of the expenditure in OE products has an impact of 0.05% in GDP.

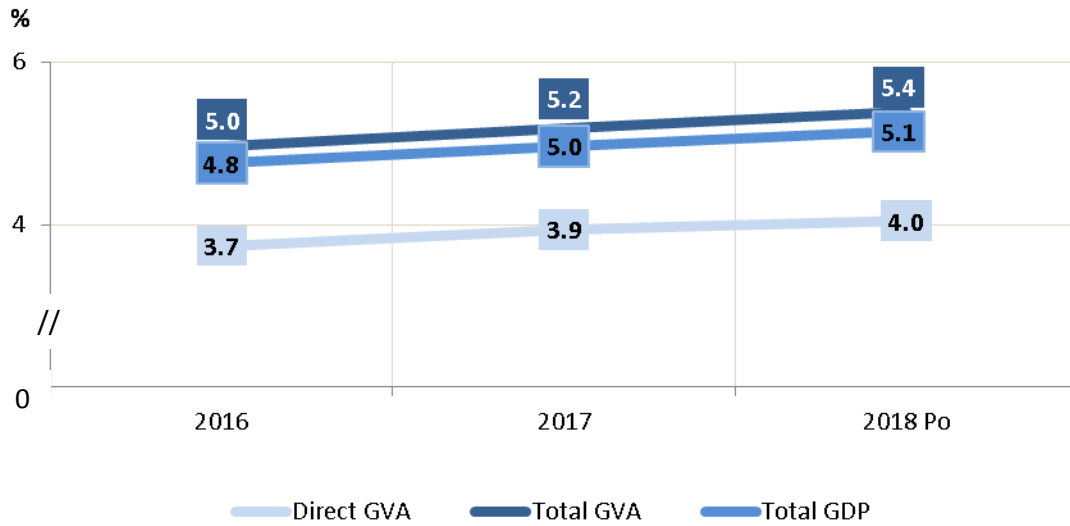
In 2017 the consumption of OE products generated 2,805 million euros of imports (22.4% of consumption was satisfied by imports).

<sup>1</sup> The direct effects measure the impact generated in the activities that results from an increase in the final demand that is directed to them. The indirect effects measure the entire chain impact generated in the various activities that supply the activities when they increase their demand for factors of production to, in turn, respond to an increase in final demand.

<sup>2</sup> Among these hypotheses, the following stand out: constant technical coefficients; lack of economies of scale; absence of change in relative prices and substitution effects; unlimited productive capacity; homogeneous products; and absence of financial restrictions.

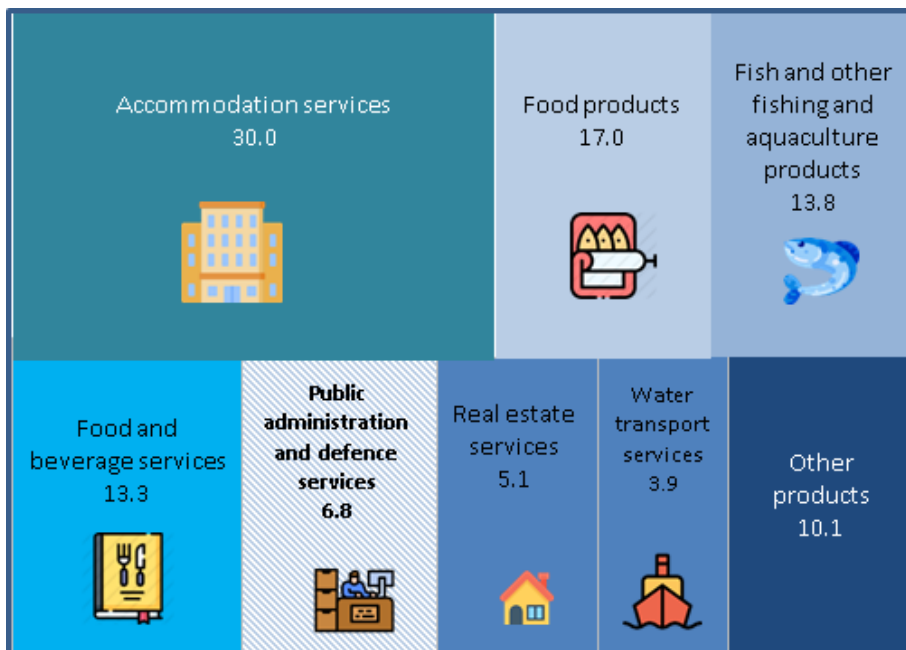


**Picture 22 - Evolution of the weight (%) of direct GVA, total GVA and total GDP of the OE Economy**



Focusing on the analysis of OE products with the greatest impact on wealth creation in this trienium, it is estimated that, as a whole, accommodation services, food products, fisheries and aquaculture products and related services and food and beverage services have accounted for more than 70% of the GDP generated by the OE. At a much lower level, public administration services, real estate services and water transport services emerge.

**Picture 23 - Main products that contribute to the total GDP of the OE, 2016-2018 (pp)**



## 5. Comparison of main aggregates in OSA 2010-2013 and 2016-2018

Despite the change in benchmark year and the fact that the previous edition of the OSA was a pilot exercise, some comparisons can be made regarding the main OSA aggregates.

In the 2016-2018 triennium (base 2016), OSA GVA represented 3.9% of the national economy GVA, and the OE employment corresponded to 4.0% of the total national employment in 2016-2017. Between 2010-2013 (base 2011), the OE GVA represented 3.1% of the national economy GVA, while employment was 3.6% of the total national employment.

The increase in the relative weight of GVA, as well as employment, between 2016 and 2018, reflects the growth dynamics in activities favored by the proximity of the sea, whose GVA and employment registered increases of 128.6% and 51.7% compared to previous triennium, benefiting from the dynamism observed in the tourist activity at national level.

**Picture 24 - Comparison of OSA main aggregates in the 2011 and 2016 bases of National Accounts**

Observation levels		GVA		Employment	
		2010-2013Po Base 2011	2016-2018Po Base 2016	2010-2013Po Base 2011	2016-2017 Base 2016
<b>Characteristic activities</b>	Value (million euros / No.)	2,604	3,039	89,722	93,261
	Weight (%) in national economy	<b>1.7</b>	<b>1.8</b>	<b>2.0</b>	<b>2.1</b>
<b>Cross-cutting activities</b>	Value (million euros / No.)	900	917	27,643	22,901
	Weight (%) in national economy	<b>0.6</b>	<b>0.5</b>	<b>0.7</b>	<b>0.5</b>
<b>Activities favored by the proximity to the sea</b>	Value (million euros / No.)	1,175	2,686	43,403	65,834
	Weight (%) in national economy	<b>0.8</b>	<b>1.6</b>	<b>0.9</b>	<b>1.4</b>
<b>Total OSA</b>	Value (million euros / No.)	4,679	6,641	160,768	181,996
	Weight (%) in national economy	<b>3.1</b>	<b>3.9</b>	<b>3.6</b>	<b>4.0</b>

## Methodological notes:

### Introduction

The Ocean Satellite Account (OSA) is developed by Statistics Portugal in partnership with the Directorate-General for Maritime Policy (IMP) under a protocol established between the two entities following the Council of Ministers Resolution no 99/2017, of 10<sup>th</sup> July.

OSA is based on the conceptual framework of the Portuguese National Accounts (PNA) System. The project aims to provide statistics that measure the size and importance of the Ocean Economy in the Portuguese economy, and to support the decision on coordination of public policies for the ocean, providing information on the production structure of the related activities, the explanation of the services that it involves and the characterization of the agents who provide them, contributing to monitor the National Ocean Strategy for 2013-2020 (NOS 2013-2020), from the economic point of view. OSA allows having adequate information in the context of the Integrated Maritime Policy (IMP) and other processes where it is important to have statistical information. Note that, at European level, the document "Blue growth" is the socio-economic dimension of the IMP, thereby contributing to the Europe 2020 Strategy and to the Maritime Strategy of the European Union (EU) for the Atlantic Area.

The main objective of the OSA is to provide an economic information system related to the sea, designed as a satellite of National Accounts (NA). The choice of NA as reference reflects its importance as a complete representation, reliable, systematic and internationally comparable of the functioning of the economy. OSA is considered the most appropriate tool to estimate the size and importance of the ocean economy (OE) in the Portuguese economy and to obtain information on the structure of the production activities related to the ocean.

OSA privileged the simultaneous treatment of supply and demand. Thus, information was obtained, not only for the production account (output at basic prices, intermediate consumption, GVA), but also for relevant economic variables such as households and public administrations consumption, imports and exports. Thus, it was possible to estimate the OE contribute to GVA and national employment. Additionally, an estimate was made for paid and unpaid employment, not only due to its relevance, but also to allow assessing the results plausibility.

### 1. Methodological references

Satellite accounts have as main reference the NA concepts and methods, as defined in the European System of National and Regional Accounts (ESA 2010). Satellite accounts aim to expand the observation capacity of particular phenomena, constituting extensions in greater detail of the NA.

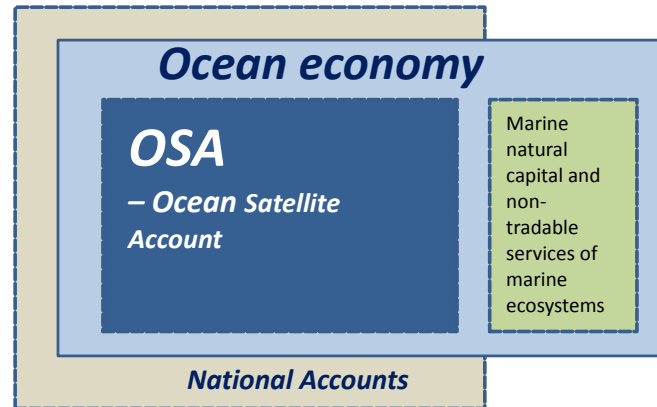
OSA also has as main methodological references the proposal for a database to IMP, made to EUROSTAT, in 2009: Ifremer et al., "*Study in the field of maritime policy - Approach towards an Integrated Maritime Policy Database*" and the work done and in progress, since 2012, in the EC / DG MARE, in the Blue Growth scope: "*Blue Growth*".

The second edition of OSA was also based on the Methodological Report produced by Statistics Portugal and DGPM, in 2016: "*Satellite Account for the Sea - 2010-2013. Methodological Report*". In this edition, the level of regional breakdown of the account was improved, by adopting the Nomenclature of Territorial Units for Statistical Purposes (NUTS) 1, starting to individualize the results for the Autonomous Regions of Azores and Madeira.

### 2. Concepts and nomenclatures

In the feasibility study for OSA, based on the strategic framework of the EU IMP and of the ENM 2013-2020, it was considered the following conceptual definition of Ocean Economy: "Economic activities that take place at sea and others that are not taking place at sea but depend on it, including marine natural capital and non-tradable services of marine ecosystems", which are not, however, recorded in the OSA as those are not included in the production boundary of NA as defined in ESA 2010 (Picture 25).

**Picture 25- The Ocean Economy for the Satellite Account**



Source: Prepared by DGPM/Statistics Portugal

The economic activities that take place at the ocean are, for example, maritime transport, fisheries and marine aquaculture, bioprospecting, research and exploration of non-living marine resources, marine tourism, marine equipment operation – namely Information, communication and electronic technologies (ICET) maritime and submarine equipment - and services, such as marine information and communication services.

Among the economic activities that depend on the ocean, but do not take place at sea, the following groups are distinguished:

- The activities that directly depend on the enjoyment of goods and services of marine ecosystems (e.g. coastal tourism);
- The activities that provide goods and / or provide specific services to the activities that take place at the ocean (e.g. ports and logistics, construction, maintenance and ship repair, ship dismantling, construction and marine equipment maintenance and maritime services on land);
- The activities belonging to certain functional chain values, which can hardly be separated, and that influence, directly, the activities that take place at the ocean. In this situation are the value chain centered on fish (e.g. aquaculture in inland waters, as it uses the same fish distribution channels), the shipping value chain focused on water vessel (e.g. transport on inland waterways, river cruises, where there is no differentiation in the production of vessels), and nautical tourism value chain (covering namely the maritime tourism companies operating in water).

The remaining activities, which do not operate or not depend on the ocean, represent the rest of the economy.

The definition of Ocean Economy takes into account the economic activities that use the ocean, directly or indirectly, focusing on the value chain in which they operate, covering both activities that are located in the maritime area, as others located in coastal areas and also in remote areas of the coast, if related to the Ocean. In this context, the economic value of production and consumption of "maritime" goods and services will depend on the set of productive activities defined in the scope of this study, as activities related directly or indirectly to the ocean. Activities that cannot be "measured" under the Portuguese System of National Accounts aggregates were not considered in the OSA context.

The activities or goods and services (products) related to the Ocean Economy are fundamentally identified as those who meet simultaneously the following conditions:

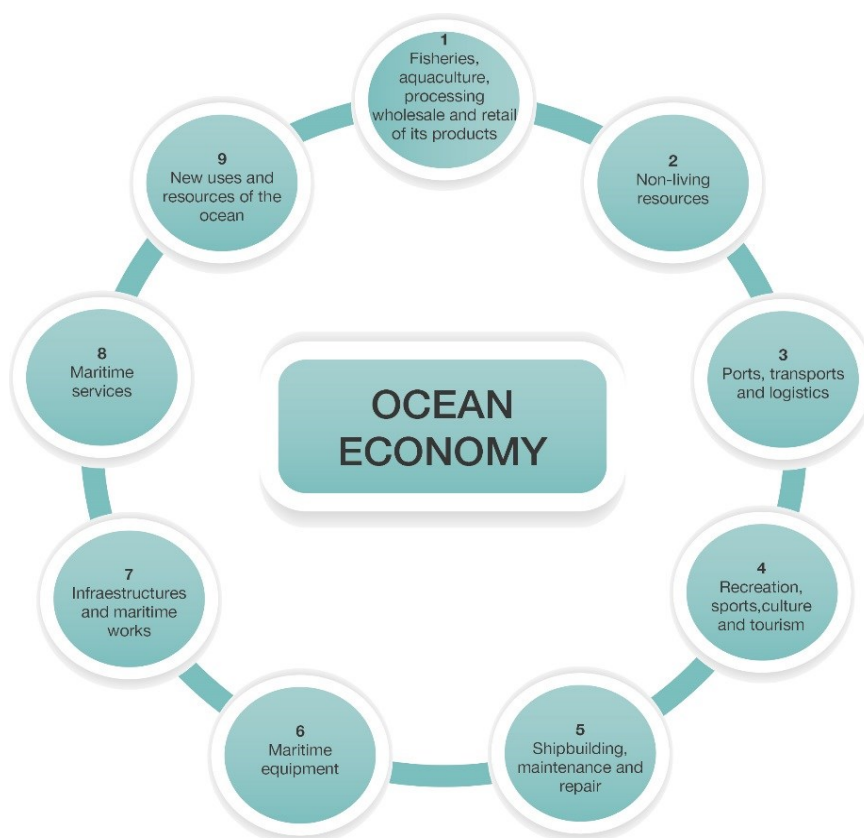
1. Activities and / or goods and services that, in the absence of the ocean, would cease to exist in significant quantities, or their consumption would be significantly reduced;
2. Existence of statistical information available, or that can be obtained.

It should be noted that the OSA compilation is made under the PNA, where the main concepts involved in building a satellite account have its origin, in general, in the European System of Accounts (ESA). Thus, the ocean economy does not integrate the non-tradable services of marine ecosystems as these are not included in the production boundary defined by ESA 2010. It is, therefore, more restricted than the one developed within the NOS 2013-2020.

The compilation of OSA started with the transposition of the maritime economy definition for statistical language, specifically the identification of the ocean activities and products in the official classifications in use. The delimitation and characterization of the OSA reference population, inventorying the kind of activity units (KAU) and proceeding to their classification, was conducted by Economic activity (Portuguese Classification of Economic Activities – CAE, equivalent to the Statistical Classification of Economic Activities in the European Community - NACE) and by groups of activities, according to a specific classification designed by Statistics Portugal and DGPM, supported by the NOS 2013-2020 and the IMP.

The scope of the Ocean Economy, considered in the OSA, aggregates activities in two main areas: "Established activities" and "Emerging activities" which, in turn, are divided into groups. It were considered nine groups, eight of which correspond to established activities (groups 1 to 8) and the last group 9 - New uses and resources of the ocean, which congregates emerging activities (Picture 26). The adopted criterion for the classification of economic activities as established or emerging obeyed the international logic of maturity level of the markets, namely what was followed in the EU, in the "Blue Growth" report for the purpose of international comparisons.

**Picture 26- - Groups considered in the OSA**



It was adopted a value chain logic, taking into account, inter alia, the level of industry disaggregation permitted by the National Statistical System (NSS). Given this restriction, the methodological option was to consider Maritime and Marine Equipment and Services as independent groups, containing cross economic activities to other groups (Picture 27).

**Picture 27- Groups of economic activities for the Ocean Economy in the OSA**

Groups	Activities	
	That operate on the Ocean	That do not operate at the ocean but depend on it*
<b>ESTABLISHED ACTIVITIES</b>		
1. Fisheries, aquaculture, processing, wholesale and retail of its products	Sea fishing	Inland fishing
	Marine aquaculture	Inland aquaculture
	Aquaculture in inland waters	
	Processing industry	
	Processing of fishery and aquaculture products	
		Marketing of fishery and aquaculture products
	2. Non-living marine resources	Research marine mineral resources
Research of conventional energy resources (oil and gas)		
Exploitation of marine mineral resources		
Operation of conventional energy resources		
Capture and water desalination		
3. Ports, transports and logistics	Maritime freight transport	Inland freight transport
	Transport of passengers by ferry	
	Cruises	
	Ports and logistics	
	Boating (recreational and sport)	
4. Recreation, sports, culture and tourism	Cultural activities (eg heritage, shows, events related to the sea)	
		Coastal tourism (ex.: sun / beach)
		Imputed rents (second homes)
	Shipbuilding	
5. Shipbuilding, maintenance and repair	Naval maintenance and repair	
		Naval dismantling
	Machinery and marine equipment	
6. Maritime equipment**	Submarine cables and pipelines	
	Ocean Information Technology, Communication and Electronics (ICTE)	
	Maritime robotics	
	Other equipment (e.g. textiles, clothing, packaging, etc.)	
	Coastal defense works	
7. Infrastructures and maritime works	Port infrastructure	
	Education and R & D	
8. Maritime services**	Governance	
	Maritime information and communication services	
		Consulting and services to companies in the areas of the sea
		Financing and marine insurance
	Other services	
	<b>EMERGING ACTIVITIES</b>	
9. New uses and resources of the ocean	Marine biotechnology	
	Unconventional energy resources (gas hydrates)	
	Marine renewables	
	Gas storage	
	Earth observation services	

**Note:**\* Or other aquatic environment; \*\* Encompass transversal uses and activities to other groups.

**Legend:** Areas of Intervention

- Living resources
- Non-living resources
- Infrastructure, uses and industrial activities
- Infrastructure, uses and services activities
- Governance activities

## Groups:



1 - **Fisheries and aquaculture, processing and wholesale and retail of its products** - includes activities related to the value chain of fishery and aquaculture products. The core activities include Fisheries and Aquaculture, with connections upstream to the food industries for animals, namely for aquaculture, and downstream with the transformation industry, such as processing and preserving of fish, crustaceans and mollusks. It also includes the production of ice, cold storage and trade, wholesale and retail trade, of fishery and aquaculture products.



2 - **Non-living marine resources** - includes activities related to the research and exploitation of conventional energy resources (oil and gas), to the research and exploitation of marine minerals and the extraction and refining of salt and production of condiments derived from it. It also includes the desalination of sea water.



3 - **Ports, transports and logistics** - includes activities related to the water transportation value chain, whose main activity is the shipping of goods and passengers. Downstream includes port services and rental of maritime and inland waterway transports and the river transport of goods and passengers.



4 - **Recreation, sports, culture and tourism** - includes the maritime activity of recreation and sport, the maritime dimension of culture and maritime and coastal tourism, including maritime touristic activities operating in water. This group includes the activities related to boating, which are considered recreational boating and nautical sports. Coastal tourism includes housing, imputed rents of second homes, real state promotion of tourist accommodation, restaurants, travel agencies and associated recreational activities and leisure, including the related cultural activities, like the activities considered in the Tourism Satellite Account (but only the ones taking place in coastal areas).



5 - **Shipbuilding, maintenance and repair** - comprises construction activities of ships and floating platforms, including pleasure and sport boats, as well as the repair and maintenance activities of boats and the dismantling of end-of-life vessels.



6 - **Maritime equipment** - comprises diverse manufacturing activities such as, for example, the ones allowing equipping a vessel or a floating platform. It is a heterogeneous group, dedicated primarily to building and repair of relevant equipment for the other activities of the ocean economy. It was decided, therefore, to bring together in one group all the activities identified in the manufacturing industry with the production / repair of marine equipment of support for most of the activities of the other groups.



7 - **Infrastructure and maritime works** - includes activities related to construction works and expansion of port terminals in order to develop maritime and land accessibility conditions, namely land corridors for the transport of goods by rail (associated with shipping, by connecting the rail to the main interchanges of intermodal transport). It also includes the construction and repair of ports, marinas, as well as dredging, protection and coastal defense, etc.



8 - **Maritime services** - includes, as the name indicates, the service activities related to the ocean. Includes education, training and R&D in areas related to the ocean, governance activities, such as defense and maritime security and maritime spatial planning, and a large subgroup of other service activities encompassing maritime information and communication services, consulting and business services in the ocean areas, maritime finance and insurance, trade and distribution activities related to the ocean and others.



9 - **New uses and resources of the ocean** - this group was established in order to quantify a set of emerging activities, yet with little economic importance, which would, otherwise, be "diluted" in other activities. The relevance of this isolated group was evaluated during the work. Includes the marine biotechnology; marine renewable energies; gases storage; research and exploitation of unconventional energy resources (gas hydrates) and the services of earth observation.

In addition, the OSA information was segmented into observation levels:

- **Characteristics activities** - activities in which an important part of the operations takes place at sea or whose products come from or are intended for use at sea or on the shore limit. This level includes all groups except 6- *Maritime equipment*, 8- *Maritime services* and part of 4- *Recreation, sports, culture and tourism* (notably coastal tourism);
- **Cross-cutting activities** - activities of support to the remaining activities considered under the OSA scope. Include 6- *Maritime equipment* and 8- *Maritime services*;
- **Activities favored by the proximity of the sea** - include the accommodation activities, restaurants and imputed rents of second homes located in villages in coastal areas (based on the European classification of coastal and non-coastal areas, i.e. parishes with maritime coast or with 50% or more of the surface up to 10 km away from the sea (see 3. Methodology, for further detail). This set of activities corresponds to coastal tourism.

### 3. Methodology

For the **selection of the OSA reference population** for the years 2016-2017, the Portuguese NA accounts population was used as starting point (base 2016). Like the NA, the compilation of the OSA population was made by institutional sector (i.e. S.11 - Non-financial corporations, S.12 - Financial corporations, S.13 - General Government, S.14 - Households; S.15 - Non-profit institutions serving households). Initially, the considered codes were the Portuguese Classification of Economic Activities (CAE Rev.3) related to the NACE codes set out in Ifremer study for Eurostat, previously referenced in the national " *Satellite Account for the Sea – 2010-2013. Methodological Report*. However, the building up of the OSA population based only on NACE did not always prove sufficient. Therefore, whenever it was concluded that a certain KAU operations were relevant in the sea area, this KAU was included, regardless of the NACE code.

After the delimitation of the reference population, the collection of economic variables to the generation of income account (output, intermediate consumption, GVA, other taxes on production, other subsidies on production, gross operating surplus), by institutional sector was conducted. Afterwards, a **simplified supply and uses table (SUT) for the Ocean products** was compiled, having as reference the SUT of Portuguese NA (127 branches of economic activity X 433 products), which allowed to confront the supply and demand and assess the initial estimates. For the completion of this framework it was necessary to calculate, by selected product, imports, exports, public consumption, private consumption, investment and intermediate consumption of the product. Whenever the detail of data sources allowed (namely Simplified Business Information - SBI and General Government administrative data), these values were obtained directly, without the use of coefficients.

Estimates for **2018** were also made, applying the Integrated System of Symmetric Input-output Matrices of 2017, recently published by Statistics Portugal, albeit without the analysis of the entire reference population, using a detailed study of the most relevant entities, of information relating to international trade and available detailed information of the final NA.

Regarding **education**, an estimate was made for services related to teaching of subjects / courses linked to the Ocean. This estimate was based on a pre-selection of courses unequivocally related to the Ocean, based on information provided by the Directorate-General for Education and Science Statistics (DGEEC) (course/entity).

For **Research and Development (R&D)**, the main data source was the Survey on National Scientific and Technological Potential (IPCTN), which, since 2014, individualizes the ocean projects, through the following strategic priority codes: 10.1.Ocean economy - marine food resources (fisheries and aquaculture), 10.2.Ocean economy - natural systems and renewable energy resources, 10.3. Ocean economy - deep sea resources, 10.4.Ocean economy - ports, logistics, transport, shipbuilding and maritime works and 10.5.Ocean economy - culture, tourism, sport and leisure.

This information was complemented, inter alia, by SBI data and by information provided by the Foundation for Science and Technology (FCT) necessary for calculating the "Ocean component" in the total FCT participation / financing. The methodology used was the same used by Portuguese NA to calculate the national R&D.

For the **estimates on international trade**, having as framework the NA international trade, the Statistics Portugal International Trade database, the SBI and the Balance of Payments of Portugal from the Bank of Portugal, were considered as main sources of information.



In a first phase, NA data were used for the products considered totally Ocean. For the other cases, in order to determine the Ocean fraction of External Trade, the classification of international trade statistics was studied in detail. Whenever the classification allowed to determine the share (or fraction) related to the ocean, information of the respective flows to economic activity units that made up the OSA population was appropriated (for example, the detail of the Combined Nomenclature for fishing nets allowed the appropriation of information on imports and exports of ropes and nets). Whenever the detail of nomenclature was not enough to determine what fraction would be Ocean, the economic activity units of the OSA universe were studied, identifying the cases that would be more relevant and / or that would be specifically related to the ocean, considering only the trade flows of these units (e.g. in the case of "other electrical equipment", only imports and exports of units specifically related to the ocean economy were identified).

OSA considered as imports the final consumption expenditure of residents outside the national economic territory associated with hotels, restaurants and similar services and travel agency services, tour operators and other reserves and related services. Symmetrically, it considered as exports the final consumption expenses of non-residents in the national economic territory. To measure the ocean component of these imports and exports, the Households Budget Survey (HBS) structures were used, as well as the structures of production of these services, calculated in the OSA compilation. Consequently, household's final consumption expenditures of these products are compliant with the residence principle.

The estimate of **employment** in the OSA consisted of the calculation of the Full Time Equivalent posts (FTE) for the economic activities considered and by institutional sector. More specifically, in the case of the institutional sectors of S.11 - Non-financial corporations and S.14 - Households, the output / FTE ratios were used; in the case of the institutional sectors S.13 - General Government and S.15 - Non-profit institutions serving households (NPISH), the compensation of employees/ FTE ratios were used instead (since the output estimate for these sectors is based on the valuation of production costs, it is considered that the compensation of employees will be more directly related to employment variables).

In the case of General Government, that methodology was applied to the most populous group, group 8 - Maritime services, while in the other groups the calculation of employment was exhaustively calculated. The same happened with the institutional sector S.12 - Financial corporations, whose value was also estimated in an exhaustive manner.

### **3.1. Main methodological changes compared to the previous edition of the OSA**

OSA new edition is consistent with Portuguese NA (Base 2016). The previous edition had base 2011 as reference. The most relevant differences are related to:

1) Scope: In this edition, tourism products considered for the purpose of import and export now include the product NPCN 5502 - Other accommodation services, which include, for example, services provided by camping sites, guest houses, local accommodation.

2) Improvements in the estimates of some activities, using the same methods as in the NA: Travel agencies - only the intermediation service should be considered for the purposes of valuing the output. The value of intermediated services - accommodation, transport, etc. - must be deducted, if it is included in the value of the provision of services. The same should happen with the intermediate consumption of these entities, so the respective GVA does not change with this methodology; Auxiliary transport services - there was a change in the level of output and intermediate consumption, with no impact on the level of GVA; Financial intermediation services indirectly measured (FISIM) and Non-life insurance service - this edition of the OSA incorporated the full calculation of these items.

3) Data sources: It should be noted that, in close collaboration with the Foundation for Science and Technology (FCT), INE had access to information involving a set of financing instruments (namely Projects, Scholarships, Scientific employment, R&D Units), allowing a more accurate estimate of the ocean coefficient in the total FCT participation / financing compared to the previous edition (where the coefficient used was only based on the ocean aspect of R&D Projects). It should also be noted that the Survey on National Scientific and Technological Potential (IPCTN) has now available separately the ocean priority.

### 3.2. Tourism and coastal areas

In compiling the OSA for Portugal it were included coastal tourism activities. The compilation of data on tourism within the OSA, which includes hotels and similar establishments, restaurants and similar establishments, travel agencies, tour operators and other reservation services and related activities, was particularly complex.

Under the OSA, and according to *Turismo de Portugal*, IP, in ocean-related tourism analysis were considered two aspects:

- consumption stemming from the motivations of consumers;
- Territory (geographic location of consumers of tourism products), taking into account the definition of coastal area.

As far as the motivation of consumers is regarded, in the context of OSA, different types were registered, namely:

- cruises;
- nautical (recreational / sports);
- sun and sea;
- sporting event (who participate) and for sports-event (onlooker who goes to watch the event);
- health tourism (e.g. : thalassotherapy);
- scientific tourism / research;
- "nature tourism" (e.g.: observation of cetaceans).

The selection of related kind of economic activity units, including hotels and restaurants resulted, in a first phase, from the intersection with the geographical classification (i.e., check if the units were in areas classified as coastal or not). However, implementation of this methodology was complex due to numerous constraints, namely:

- **Definition of "regional/coastal zone"** – within the NUTS 3, parishes are classified as coastal according to the distance to the sea:

- if the parish is by the sea, it is part of the coastal region;
- if the parish is not by the sea, but has 50% of its surface to a 10Km away from the sea, is also considered coastal parish;

All other parishes are considered non-coastal.

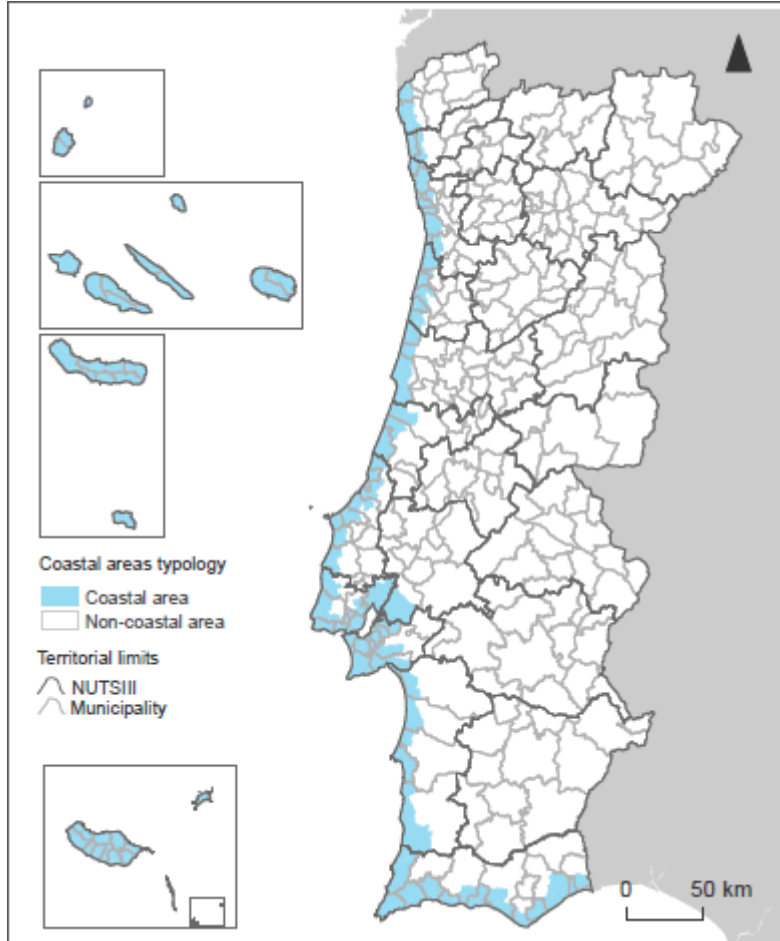
In preparing the Portuguese OSA, this geographic criterion was used (v. Picture 26), complemented by:

- **Component motivation**, where the business travel component was broken down, and was not included in the OSA estimates. When considering only the geographical component one would be ignoring the motivation component (e.g. not all tourism which takes place in Lisbon and Oporto is related to the sea).

- **Inclusion of river tourism** - this form of tourism sometimes uses the same means and equipment that "sun and sea" tourism and the same company can operate the means regardless of being in a river or marine environment. The importance of "river tourism" type, within the total tourism related to water (the number of Tourist Animation Agents in national tourism register whose activity is classified as "Water") was not considered relevant.

**Box - Tourism and coastal areas (cont)**

Picture 28- Map of coastal areas in Portugal - LAU-2



Source: Cartography based on CAOP - Official Administrative Map of Portugal, 2019; Coastal areas (Eurostat), 2016 (V03883)

The simple application of geographical criteria (i.e. location in the coastal parish) could imply, given the characteristics of the Portuguese territory, an overvaluation of the Ocean component (e.g.: not all hotels located in Lisbon chose this location due to the proximity of the sea. Indeed, while capital, Lisbon gathers other attributes beyond the geographical, which justify the choice). In very synthetic terms, the calculation methodology for this component may be summarized as follows:

- Restaurants - the units selected were located in coastal parishes (big restaurant chains and catering companies were not considered). Using detailed information on NA/Tourism accounts it was possible to consider only the consumption for leisure tourism purposes, i.e. the business was not included;
- Hotels - the selected units were located in coastal parishes (the headquarters of hotel chains were not considered). As in the case of restaurants, using detailed information on NA/Tourism accounts it was possible to consider only the consumption for leisure tourism purposes, i.e. the business tourism was not included;
- Imputed rentals of second homes - imputed rents correspond to income associated with assets that families hold in the form of own housing and are the counterpart of accommodation services that this asset provides. Note that the estimated value for these services - the imputed rents - is embedded in GDP. The methodology for measuring the rents to be charged followed by NA resorted to the use of the 2011 Housing and Population Census, more specifically the information on actual rents, and the use of an econometric model of hedonic regression. For purpose of the OSA compilation it was applied the NA accounts methodology to coastal parishes. For the metropolitan areas of Lisbon and Oporto were also consulted real estate experts in order to select only the coastal parishes in which the effect of the proximity of the sea was significant in the context of second homes.

#### 4. Conventional signs and acronyms

##### Conventional signs

//	Non available
Po	Provisional

##### Acronyms

CAE	Portuguese Classification of Economic Activities
CAOP	Official Administrative Map of Portugal
DGEEC	Directorate-General for Education and Science Statistics
DG MARE	Directorate-General for Maritime Affairs and Fisheries of the European Commission
DGPM	Directorate-General for Maritime Policy
EC	European Commission
ESA 2010	European System of National and Regional Accounts
EU	European Union
FCT	Science and Technology Foundation
FISIM	Financial intermediation services indirectly measured
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GVA	Gross Value Added
HBS	Households Budget Survey
ICTE	Information, communication and electronic technologies
IMP	Integrated Maritime Policy
INE	Statistics Portugal
IPCTN	Survey on National Scientific and Technological Potential
KAU	Kind of activity units
NA	National Accounts
NACE	Statistical Classification of Economic Activities in the European Community
NOS 2013-2020	National Ocean Strategy 2013-2020
NPCN	National Account Products Classification
NPISH	Non-profit institutions serving households
NSS	National Statistical System
NUTS	Nomenclature of Territorial Units for Statistical Purposes
OE	Ocean Economy
OECD	Organisation for Economic Co-operation and Development
OSA	Ocean Satellite Account
PNA	Portuguese National Accounts
p.p.	Percentage points
R&D	Research and Development
SBI	Simplified Business Information
SUT	Supply and uses tables

#### 5. Final considerations

The OSA was an exploratory work based on concepts and compilation practices that are still under development at the international level. On the other hand, the ocean economy is a broader concept than the one that was used in the satellite account for statistical purposes. It should be noted also that, according to the Organisation for Economic Co-operation and Development (OECD), any complete ocean economy definition should contemplate, besides the set of economic activities that take place at the ocean and others that are not performing at the ocean, but depend on it, also the marine natural capital and the non-marketable services of the marine ecosystems. However, as mentioned above, these activities are not included in the OSA since they are not included in the NA production boundary according to the ESA 2010.