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Economic Contribution of the Whale-Watching Industry for the Madeira Archipelago

INTERNSHIP REPORT

Svetlana Krasovskaya
MASTERS IN ECOTOURISM



UNIVERSIDADE da MADEIRA

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Svetlana Krasovskaya

MASTERS IN ECOTOURISM

SUPERVISOR

Manfred Josef Kaufmann

CO-SUPERVISOR

Filipe Marco Andrade Alves



Master degree in Ecotourism

Innovation study:
«Economic contribution of the whale-watching
industry for the Madeira Archipelago»

Student: Svetlana Krasovskaya №2091213

Internal supervisor: Manfred Kaufmann (UMa);

External co-supervisor Luís Dias (Ventura | Nature emotions);

External co-supervisor Filipe Alves (CIIMAR-Madeira, Ventura | Nature emotions).

2017

Monster of the sea, giant of the depth,
Tower capsized in the waves,
Appearing everywhere in the rounded sphere;
Never created a greater beast:
Fin erect at times;
Ragingly shattering the seas;
Whose awesome and rough members
Evoke the hoarse lamentation of Thetis.
Whale-we commonly name it.
(Brazilian poem, 1769
english version)



Image: whale-watching in Madeira Island. ('Ventura | Nature emotions', 2014)

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Abstract

The beauty of Madeira does not finish with just wonderful landscapes and mountains, tropical gardens, old villages and famed wines. Water that surrounds the island is filled with so much beauty too. In the Archipelago of Madeira, we can observe around 35% of the worldwide species of marine mammals.

Whale-watching in Madeira is a quite recent but fast-growing activity. The commercial activity of whale-watching began on the south coast of Madeira in the beginning of 2000s. Nowadays there are more than 12 companies dedicated to this business. Most of them are located in the main island of Madeira but there is also one in Porto Santo doing whale-watching during the touristic season.

I had a great opportunity to make my master degree project in cooperation with “Ventura| Nature emotion” company. It is a nature tourism company based in Madeira Island, Portugal with a clear ambition – organizing birdwatching tours, whale and dolphin watching tours and outdoor activities around Madeira Island, Desertas islands and Selvagens islands on a classic sailing boat.

During my 9-month internship, I worked in the sea and on the land. The internship program has offered me a great opportunity to grow and develop. Working in “Ventura| Nature emotion” as an intern was not only an honor and privilege but a lifelong experience that will forever shape my professional life.

I have studied detailed information of marine life of the Madeira Archipelago, learnt the operation system of an ecotourism company business and obtained financial data about whale-watching activity which I used for my final innovation study. Moreover, the background of my first degree in finances was an advantage to develop the proposed study.

The main goal of this innovation study is to calculate the economic contribution of the whale-watching industry to the Madeira archipelago in 2015, and to show all financial benefits that each individual species and each individual animal brings to the community. The total direct income from the 12 main companies which conduct whale-watching activity in Madeira Archipelago in 2015 amounted €4 186 364.

For this innovation study, we used a few qualitative methods: document analysis, client interviews, active observations and sighting data analysis. By combining data from the active participation of marine- life observation and numbers from whale-watching operators, it was possible to estimate the direct economic contribution of whale-watching. By client interviews, we identified target audience for this kind of activity and key ideas of promotion strategy for whale-watching. This can help to promote Madeira Island as a worldwide whale-watching destination. Finally, directions of future work in a field of whale watching activity in the Madeira Archipelago were determined. This innovation study includes abstract, 5 chapters, conclusion, bibliography and annex.

Resumo

A beleza da Madeira não se baseia apenas nas suas paisagens magníficas. Montanhas, jardins tropicais, aldeias e vinhos famosos. O mar está repleto de muitas belezas. No arquipélago da Madeira podemos observar cerca de 35% de espécies de mamíferos marinhos, a nível mundial.

Observação de baleias na Madeira é uma atividade recente, mas com crescimento rápido. A atividade comercial relacionada com observação de baleias começou na parte sul da ilha nos anos 90.

Atualmente existem mais de 12 companhias dedicadas a este tipo de negócio. Maior parte está localizada na ilha da Madeira com algumas a praticarem esta atividade no Porto Santo durante o verão que existe mais atividade turística.

Tive uma grande oportunidade para realizar o meu projeto de mestrado com a companhia de animação turística “Ventura| Nature emotion”. Esta empresa pratica turismo de natureza baseada na ilha da Madeira. Tem uma ambição clara – organizar atividade de observação de aves, observação de baleias e golfinhos e atividades nas redondezas da ilha da Madeira como por exemplo visitar as ilhas Desertas e Selvagens.

Durante o meu estágio de 9 meses trabalhei no mar e em terra. O estágio proporcionou-me a possibilidade de crescer e me desenvolver. Trabalhar com a “Ventura| Nature emotion”, a título de estagiária, não só foi uma honra como um privilégio, mas também uma experiência que irá ter um marco significativo na minha vida profissional.

Estudei detalhadamente informações relacionadas com a vida marinha do arquipélago da Madeira, aprendi o modo de operação de uma companhia com vertentes no ecoturismo e obti data financeira sobre a atividade de observação de baleias que utilizei nas minhas calculações finais. A minha licenciatura anterior em finanças foi uma mais valia para o desenvolvimento do estudo proposto.

O principal objetivo de este estudo de inovação é de calcular a contribuição económica da indústria da observação de baleias no arquipélago da Madeira em 2015, de modo a apresentar todos os benefícios financeiros que cada espécie

individual de animal trás á comunidade. Os proveitos directos dos 12 principais empresas que desenvolvem atividade de observação de baleias no arquipélago da Madeira em 2015 totalizaram € 4 186 364.

Para este estudo de inovação nós usamos alguns métodos qualificativos: análise de documentos, inquéritos a clientes, observação ativa e obtenção de data. Combinando informações através de uma participação ativa de vida marinha e números fornecidos por operadores de observação de baleias é possível estimar a contribuição direta a nível económico da observação de baleias. Podemos identificar o publico alvo através de inquéritos aos clientes para este tipo de atividade e delinear novas estratégias de promoção para esta atividade. Estas ações podem ajudar a promover o destino Madeira a nível mundial como um destino de excelência para a observação de baleias. Por fim, foram determinadas a direção que deve prosseguir esta atividade. Este estudo de inovação inclui o abstrato, 5 capítulos, conclusão, bibliografia e anexo.

1. The whale-watching activity

1.1 Whaling versus whale-watching.

The economic importance of whale watching is already as high as the contribution of whaling during its peak (Bjorgvinsson, 2008).

For example, whale-watching is more lucrative for Iceland than whaling. Between 1985 and 1989, the annual value of whaling was estimated to be around US\$ 3-4 million. In 2002, in Iceland whale-watching generated more than US\$ 16 million (Greenpeace, 2003).

The incredible growth of the global whale watching industry over the past decade provides a detailed analysis of its expanding economic benefits. What began as a seasonal fluke off the coast of California in the 1950s has grown into a vibrant, profitable sector of the international ecotourism market. IFAW study shows more than 13 million people took whale watching tours in 119 countries worldwide, generating a massive US\$2.1 billion in total expenditures during 2008 (O'Connor et.al, 2009). The report also shows huge growth of the whale watching industry in Asia, the Pacific, South America, the Caribbean and Europe, significantly outpacing growth in global tourism in the past 10 years. Growth means work places: more than 3,000 whale watching companies around the world hired around 13,200 people. Globally, the whale watching industry has grown at an average rate of 3.7% per year, comparing with global tourism growth of 4.2% per year in the same period. The industry has grown from one of many activities in the tourism market to one that in parts of the globe has hit the mainstream (O'Connor et.al, 2009).

In the Archipelago of Madeira, like in other regions of the world, marine animals have passed from a hunting resource to eco-tourism's resource. For decades, whales have been killed for their meat, oil and bones. In the region of Madeira, like in other regions of the world, marine animals have passed from a hunting resource to a tourist resource. The whale- hunting activity was developed between 1940 and 1981, where sperm whales were its most popular target. During this period around 6000 animals were killed. In 1940 the first whaling factory was

built on the North coast of the island. Another one was opened in 1942 on the South coast in Calhau do Garajau. In the late 40's Caniçal whale-factory was installed in the eastern point of the south coast and replaced the Garajau factory. A network of 8 outlooking points were the basis of success for the hunting activity. The detailed history of whale-hunting on Madeira Island can be found in the Madeira Whale Museum which is located in Caniçal.

In 1941 hunting for the sperm whales brought 125312 kilos of whale products and 110827 escudos (552.8 euros) only from the port of Porto Moniz, including 19 kilos of ambergris. The Portuguese escudo (PTE) is now obsolete, as it was replaced by the euro (EUR) on 1 January 1999. 1 EUR is equivalent to 200,482 PTE (Converso Euro e Escudo, 2017).

Results of the whaling industry for the Madeira Archipelago in 1942 are presented in table 1 (Silva and Meneses, 1966).

Table 1. Results of the whaling industry for the Madeira Archipelago in 1942.

Name of port	Kilos of whale products	Escudos
Funchal	977902	1 411 660
Ponta da Cruz	2201	2 002
Camara de Lobos	606199	1 200 961
Ribeira Brava	52978	75 241
Ponta do Sol	65723	108 524
Calheta	73096	116 065
Paul de Mar	74645	110 063
Porto Moniz	174849	143 350
Sao Vicente	6286	14 096
Ponta Delgada	2196	4 012
Porto da Cruz	6499	8 836
Machico	148451	210 723
Santa Cruz	60179	87 260
Reis Magos	121280	93 115
Porto Santo	40615	28 519
Total	2413099	3 614 427
Total in euros		18028.70

The international whales' protection process increased in the 70's in some countries like USA, England and France (Vera, 2012). Later, in 1972 they implemented a Marine Mammals' protection law.

After publication of Marine Mammals' protection law (Marine Mammal Commission, 2017), whale-watching has been increasing. Nowadays there are more than 12 (see section 3.2.1) conducts in this activity in the Archipelago of Madeira, transporting hundreds of passengers every day.

It is difficult to make direct comparisons of the economic benefits of whaling and whale-watching. The peaks of these industries occurred at different times and only a few nations still hunt whales. This study aimed only to provide an estimated direct income of the whale-watching industry in 2015.

The first and the only study which estimated economic contribution of the whale-watching industry for the Madeira Archipelago was made in 2007 (Ferreira, 2007). During these 10 years, we don't have any published statistic information about this field. The present study focusses on the south coast, where most (or all) of the touristic vessels operate.

1.2 History of whale-watching around the world.

Whale-watching as a commercial activity started in 1955 in the south of Californian Coast as a partnership between a researcher and a local fisherman (Perrin et.al., 2009). The industry spread throughout the western coast of the United States over the following decade. In 1971, the Montreal Zoological Society commenced the first commercial whale watching activity on the eastern side of North America, making trips in the St. Lawrence River to view Fin and Beluga Whales (Perrin et.al., 2009).

A study prepared for IFAW in 2009 estimated that 13 million people went whale watching globally in 2008. Whale watching generates around 13,000 work places (O'Connor et.al., 2009). Even places that are still involved with hunting whales recognized the touristic value of marine animals. The industry has grown from its place serving a select niche in the tourism market, to one that in parts of the globe has hit the mainstream. Globally, the whale-watching industry has grown at an average rate of 3.7 % per year, comparing well against global tourism growth of 4.2 % per year in the same period (O'Connor et.al., 2009). While whale-watching is most commonly used as a form of recreation, it also serves as an educational and scientific way to study the species without interfering with their habitat or lives (Anonymous C, 2017).

The definition of whale watching includes viewing all kinds of cetaceans, including whales, dolphins and porpoises. It is an act of observing animals in their natural habitat (similar to bird watching), when the participant standing at the end of the pier or on the deck of a boat with binoculars and cameras, watching marine mammals in their natural habitat (Anonymous C, 2017). It does not include animals in captivity.

Whale- watching usually involves boat trips, but observations can also occur from land or by air (helicopter or plane). There are several places around the world where whales are very close to the shore, which allows participants to watch from equipped points of view, which are often advertised by local travel agencies (O'Connor et.al 2009). Observation of whales and dolphins from the land is

becoming more and more popular. This takes more patience, but the rewards can be considerable. Generally, it is the ideal way to observe the natural behavior of animals on the surface without disturbing or affecting them. Whale watching on land can be part of an official tour, but the places often have no entry ticket price (Hoyt, 2003).

A participant of a whale-watching trip is called a whale- watcher. That is the person who decides to participate in this kind of activity, usually buying a ticket or tour (O'Connor, et.al 2009).

1.3 Whale-watching industry in Madeira Island.

The commercial activity of whale and dolphin watching began on the south coast of Madeira in the beginning of 2000s. Over the years, this activity has been increasing in the number of companies and operating platforms.

The sea around Madeira Island is very rich in cetaceans. There are 29 (although 25 are confirmed) species you can find around Madeira (Freitas et al., 2012), which represents about 35% of the worldwide known species (Jefferson et al., 2007).

Example of species sighted in Madeira:

- Common Dolphin (*Delphinus delphis*)
- Atlantic spotted dolphin (*Stenella frontalis*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Striped dolphin (*Stenella coeruleoalba*)
- Short-finned pilot whale (*Globicephala macrorhynchus*)
- Fin whale (*Balaenoptera physalus*)
- Bryde's whale (*Balaenoptera edeni*)
- Killer whale (*Orcinus orca*)
- Sperm whale (*Physeter macrocephalus*)

Numbers which were presented by the Museu da Baleia (Whale Museum) and the Institute of Oceanography (Faculty of Sciences of University of Lisbon) reported approximately 58,000 whale watchers in 2007 had undertaken trips in the Madeira Archipelago (O'Connor, et.al., 2009). A study in 2007 estimated that the whale-watching industry involved 1.5 million euros per year in Madeira (Ferreira, 2007). In that year, the fleet was composed of 10 vessels operating year-round mainly along the south of the island of Madeira (Ferreira, 2007). Only two of them were dedicated whale watching operators. Another two companies offered some watching trips between other kind of activities, but other operators tend to see whales in an opportunistic manner (O'Connor et.al., 2009).

Nowadays the activity is mainly conducted by 12 whale-watching companies in the Madeira Archipelago which have special license for this kind of activity. Eight

of them are located in the port of Funchal, three are in Calheta and one company is in Porto Santo Island.

These are:

1. VMT Madeira Catamaran Trips (Funchal)

The company works with three catamarans: “Sea the best” with the carrying capacity of 98 passengers, “Sea pleasure”- 70 passengers and “Sea nature” with capacity for 216 passengers and with two decks. Trips are made twice a day with duration of 3 hours, with a strong possibility of spotting whales and dolphins in their natural habitat.

2. Rota dos Cetáceos (Funchal)

The company is directed to the observation of marine mammals. Three speed boats are fully-prepared for comfortable observations. If conditions are good it is possible to swim with dolphins. The company has three RIB boats with a capacity for 12 people each.

3. Ventura | Nature emotions (Funchal)

The company joined the Responsible Whale Watch Partnership “PlanetWhale” and has been collaborating with governmental and non-governmental conservation organizations such as the “Madeira Whale Museum”, the “Natural Park of Madeira”, and the SPEA. These 2,5-hour tours are made in RIB boats with a capacity for 12 people. Swimming with dolphins always depends on the specie and animals behavior. Trips onboard the classical sailing boat Ventura do Mar are made twice a day and take around 3 hours. All trips are guided by a marine biologist.

4. Magic Dolphin (Funchal)

The company offers cruises on a stable sailing catamaran. Tours are made twice a day during the winter and three times a day during the summer. The catamaran is well equipped with a large lounge with 22 sitting places.

5. Bonita da Madeira (Funchal)

Bonita da Madeira is an original caravel, built in 1996, 23m long and 99 tons and has a passenger carrying capacity of 80 people. The company makes

special cruises, where the main goal is to find and enjoy the marine life such as dolphins, whales and turtles.

6. Santa Maria do Colombo (Funchal)

Replica of Christopher Columbus's flagship "SANTA MARIA" makes cruises twice a day along Madeiran coast with the possibility to observe dolphins and whales. The ship "SANTA MARIA" has a capacity for more than 100 passengers and includes a bar.

7. Gavião (Funchal)

Quality service is aimed to discover the marvels of marine life fauna and the indigenous flora of the island. They can take a maximum of 20 passengers. The boat makes two trips a day where they search for turtles, whales and dolphins off the coast of Funchal and Câmara de Lobos.

8. Seaborn Catamaran (Funchal)

Sea Born has two sailing catamarans, 23 meters long and with a capacity for 98 passengers. During the trip, it is possible to observe dolphins, whales and turtles in their natural habitat.

9. H2O Madeira (Calheta)

This company makes boat trips twice a day to watch cetaceans. Trips last around 2 and half hours with the possibility to swim with dolphins. RIB boat "Pampero" has all safety standards and ensuring a very close encounter with the animals with a passenger capacity of 10 tourists and 2 guides. Departing from and returning to the marina of Calheta.

10. Lobosonda (Calheta)

Lobosonda has been a whale watching operator in Madeira since 2003. The company offers two different kinds of trips: with a traditional fishing boat which has carrying capacity for 16 people and a speed boat which takes 12 people. If weather conditions and the animals' behavior are good, the company does snorkeling with dolphins in the open ocean.

11. On Tales (Calheta)

On Tales started to do whale-watching trips in 2015 with a motor-powered micro yacht that was completely revised, improved and prepared for maritime tourism and also a traditional fishing boat. Passenger capacity is about 6 people.
12. Mar Dourado (Porto Santo).

The company is located in Porto Santo Island. The company is dedicated to nautical and leisure activities, they provide boat trips with a small RIP boat (maximum 10 passengers) to various spots of the island (caves tours, dolphins and whales observation, snorkeling, underwater hunting and fishing etc.) and different kinds of water sports.

1.4 Legal regulation of whale-watching activity in Madeira.

There is a great need for using laws limiting the whale watching industry (Lemmet et.al., 2008).

Several studies have recorded changes in cetacean behavior in response to whale watching:

- changes in surfacing,
- acoustic behavior,
- swimming behavior,
- changes in direction,
- changes in group size,
- in coordination (Parsons, 2012).

It can increase an animal's chronic levels of stress, which might have a negative effect on health, reduced reproductive rates and bring an alteration of essential behaviors, such as feeding or resting. Whales could be injured or killed as a result of collisions with whale-watching vessels, especially in areas with a high intensity of traffic (Parsons, 2012).

Following what has been done in most other developed countries, the whale-watching activity also became legally regulated in Madeira. This took place in May 2013 by the Dec.-Leg.-Regional 15/2013/M.

This regulation controls the observation of all species of marine mammals, sea turtles and pelagic seabirds in the territorial sea (from the coast to 12 nautical miles) and in the exclusive economic sub-area of Madeira (from the coast to 200 nautical miles), as well as in terrestrial.

This specific legislation includes the definition of operation areas and its carrying capacity. In order to achieve a balance between the touristic and socioeconomic interests related to the activity and the conservation of cetacean species in the archipelago of Madeira as well as the welfare of the animals observed (Freitas et.al., 2013).

This document has few main objectives:

- to define a set of rules for observation activity;

- to avoid or minimize animals' disturbance;
- to create the management, monitoring and control instruments for the activity;
- to contribute to sustainability and quality of observation activity.

In this way, the interests of the conservation and well-being of animals are reconciled and developed by environmental tourism activities in the region.

Minimum set of rules for whale-watching activity:

- Boats cannot approach animal within more than 50m;
- Boats are required to approach a whale from a direction parallel to, and slightly to the rear of the animal (figure 2);
- Reduce speed in the distance between 100m and 50m from the animals;
- Stay in the observation area for a maximum of 10 min;
- No more than three vessels are allowed within 300m of the animals at one time;
- Anytime when animals show signs of disturbance, vessels should move away;
- Vessels are required to keep out of the path of any whale;
- The license is required to realize this touristic activity.

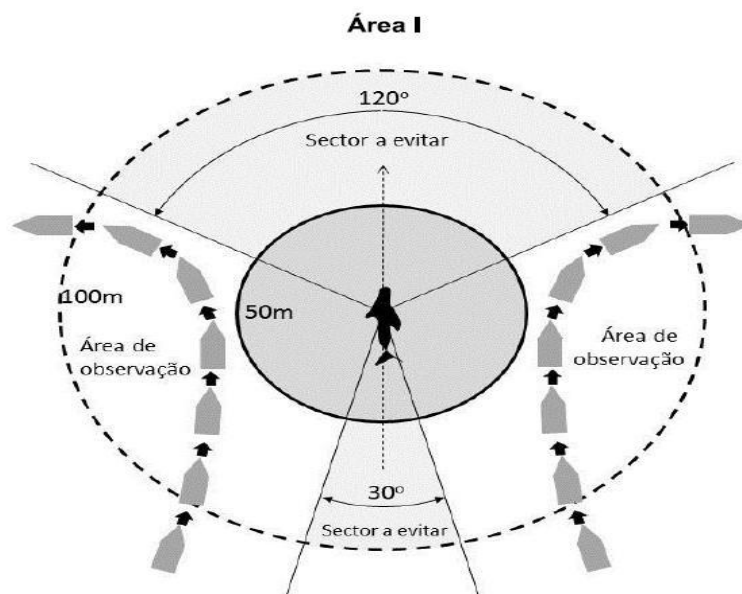


Figure 1. Circuit of correct approach to the animal. (Assembleia legislativa da RAM, 2013)

2. Details of internship, area, objectives and methodology of the study

2.1 Details of internship

2.1.1 Place of internship

“Ventura | Nature emotions” is a nature- based tourism company with an idea to organize whale and dolphin watching tours, birdwatching tours and other nature activities around Madeira Island, Desertas Islands and Selvagens. Company was created in 2000. It is situated in Marina of Funchal and presented by sale office and kiosk.

Company is a partnership of the Responsible Whale Watch Partnership ‘Planet Whale’, which recognizes the best Whale Watching Operators, and it is associated to the ‘Madeira Whale Museum’ and the ‘Natural Park of Madeira’ collecting sighting data and following the best guidelines when with dolphins and whales. The idea of the company is to create correct knowledge of the species and their habitats in order to have a successful conservation attitude.

“Ventura | Nature emotions” has a team of motivated people with great experience and high background knowledge in the several fields, like marine and land biology, navigation and touristic management. On 2006 the company started to make land bird-watching tours to observe emblematic birds like the zino's petrel, torcaz pigeon and the madeira firecrest in the mountains

Ventura | Nature emotions offers:

- Whale and dolphin watching with a rib boat (passenger capacity is 12 people)

Tour is made with marine biologist and includes insurance. Lookouts from land can guarantee the observation. It takes about 2,5 hours and starts with briefing about the trip. Boat goes in direction of Ponta do Garajau, about 12 -15 nautical miles off shore.

- Whale and dolphin watching with sailing boat (passenger capacity is 16 people)

Tour includes marine biologist, insurance and complete briefing about the tour, made by the crew. Sailing boat goes about 5-6 nautical miles from the coast

and has a stop during the trip at the base of Cabo Girão the 2nd highest sea cliff in Europe.

- Desertas Islands Tour 1 day with sailing boat

Journey takes 3,5 hours until Deserta Grande Island, where boat stops for lunch which is served on board. After guided tour in the island takes about 45 minutes. Boat returns in the harbor of Funchal around 19:30.

- One and a half day trip to the Desertas Islands

The trip starts after a complete briefing, made by the crew. On Deserta Grande Island boat anchors in front of the warden's research station. Program includes guided tour in the island (0,5 hour), small pelagic trip with chumming (2,5 hours) until the sunset, traditional dinner and breakfast in the day after. Boat returns to Madeira in the next day by 14:00 pm.

- Birdwatching land tour

Usually this tour starts early morning to have the opportunity to observe in morning activities several land species and also some marine birds. Routs pass through Laurisilva forest, viewing points, high altitude zones, cliffs and near the coast line. This 8 hours tour can be fixed according special wishes to observe determined species. After the pick-up guide makes a detailed briefing about the tour options.

- Canyoning

Canyoning is an activity which includes descending through canyons, down waterfalls and walking gorges, swimming in natural swimming pools and jumping through different levels of the waterfalls with mountain equipment's. Company offers a big variety of trips with different levels of difficulty, for beginners and experienced tourists.

2.1.2 Practical Context

My internship took a period between September 2016 and June 2017 in Marina of Funchal. The main goal was to gain experience by collaborating in the company activities, along developing an innovation study. The innovation study was focused on an assessment of the economic value of the whale-watching industry in Madeira.

Work plan included practical experience and innovation study.

Practical experience was gained by:

- Observation/identification of target species
- Interviewing clients
- Participation in educational briefings
- Meeting with representatives of hotels and travel agencies to promote the product
- Attending clients in the company's office
- Participating and leading guide-trips.

Working process on innovation study included:

- Literature research
- Meeting with representatives of governmental agency (SPNM (Serviço Parque Natural da Madeira), Tourism Office)
- Meetings with representatives of whale-watching companies
- Selection of research method
- Selection of target species
- Study of statistical / financial data
- Assessment of the economic value of the whale-watching activity
- Assessment of the economic value of a whale

Detailed schedule of the work plan is presented in the table 2.

Table 2. Working timetable

	Tasks	Sept 16	Oct 16	Nov 16	Dec 16	Jan 17	Feb 17	March 17	April 17	May 17	June 17
Practical experience	Observation species	✘	✘	✘	✘	✘	✘	✘	✘		
	Interviewing clients	✘	✘	✘	✘	✘	✘	✘	✘		
	Participations in educational briefings	✘	✘	✘							
	Meeting with representatives of hotels and travel agencies	✘	✘								
	Attending clients in the company's office				✘	✘	✘				
	Participating and leading guide-trips						✘	✘	✘		
	Innovation study	Literature research			✘	✘	✘				
Meetings with representatives of governmental agencies			✘								
Meetings with representatives of whale- watching companies				✘							

Selection of research method	✗									
Selection of species for study	✗									
Study of statistical / financial data	✗	✗	✗	✗	✗	✗	✗	✗		
Preparation of report								✗	✗	
Preparation of presentation										✗

This archipelago is characterized by the presence of the Portuguese Current, the Azores Current and Canary Current (Alves, 2013). The continental shelf is not presented, so deep-water zone can be reached in short distances from the coastline. From one side, the lack of continental shelf makes marine animals get closer to the coast and to be observed easier, from the other side Madeiran waters give good conditions for resting, socialization and give birth to calves.

Calves are regularly seen, indicating that these waters are used to give birth and breeding. Many marine mammals migrate to give birth to calves. At this moment, they are very sensitive. Intrusive viewing can create stress for mothers and separate mother- calf pairs. Noise from boats creates stress for mammals and may interfere with their hunting and diving behaviors. More than that, direct collision with fast moving boats can kill marine animals. There was a great need for using laws limiting the whale watching industry.

In order to minimize the stress caused by whale-watching vessels on the observed cetaceans, the Madeira Whale Museum (MWM) proposed a voluntary code of conduct in 2003 stipulating a set of rules for observation. Though voluntary, the code was adopted by the majority of the companies in the sector and was the basis of legislation created by the Regional Government (Decreto Legislativo Regional n. ° 15/2013/M - Regulamento da Atividade de Observação de Vertebrados Marinhos na Região Autónoma da Madeira) (Freitas et.al., 2013) (see section 1.4).

2.3 Objectives of this study

The main goal of this study is to account the economic contribution of the whale-watching industry for the Madeira archipelago, to show that whales and dolphins bring huge financial benefits to the community.

This innovation study sets six points to evaluate the whale-watching industry:

- total whale-watcher participating in the industry in 2015;
- economic contribution of the industry;
- economic contribution of each species, based on literature research;
- economic contribution of an individual whale, based on literature research;
- suggestion of promotion of the whale-watching activity in Madeira;
- identify directions of future work in a field of whale watching activity.

This study provides an estimate of the economic activity generated whale-watching industry in 2015. This estimate is based on a calculation of the direct economic expenditure on whale-watching trips (purchase price paid by participants). Direct value of whale-watching was the only one that could be used in the present study.

Economists often use an approach to valuing natural resources known as Total Economic Value (TEV). TEV includes valuation of direct use, indirect use and non-use values. Whale watching tourism is an example of a direct use value, and is the only use considered in this report.

Indirect use values, such as the role whales play within wider ecosystems (as hotels, travel agencies, restaurants, etc.), are difficult to assess and are beyond the scope of this report. Non-use values refer to the value humans place on knowing that a natural asset exists, even if they never plan to see or use it. People may also value the idea of passing on natural assets to future generations or having the option to use the asset in the future. Such non-use values are often invoked in conservation discussions and can be very large. In the case of whales, the non-use values that people attach to them can be demonstrated by public donations to

conservation organizations, which people make regardless of whether they ever plan to actually see whales. Estimating non-use values, while possible, is beyond the scope of this report (Knowles et. al., 2011).

2.4 Methodology of this study

For this study, few qualitative methods were used consisting of document analysis, client interviews, active observations and data obtained. During my internship at “Ventura| Nature emotion” I gained a lot of practical experience by doing:

- observation/identification of target species such as, Atlantic spotted dolphin, common bottlenose dolphin, short-beaked common dolphin, Bryde's whale, short-finned pilot whale;
- interviewing clients.

Interviewing was used:

- to define the clients profile and to obtain opinions and feelings about trip;
- this method can be easily managed and structured during the interview;
- method is easy to compare results.

400 structured personal interviews were undertaken in the period from April 2016-March 2017. An example of the inquiry form can be found in annex 1.

- Participation in educational briefings, where marine biologist gives detailed information about different species;
- Meeting with representatives of hotels and travel agencies. The main idea of those meetings was to present “Ventura| Nature emotion”, give information about products which the company sells, and of course, to gain selling skills;
- Attending clients in the company’s office, where I could get information about tourists, their suggestions and level of satisfaction;
- Meetings with representatives of whale-watching companies to obtain financial data about whale-watching activity from 2015. This step was to assemble a database that contained information about all whale-watching operators in Madeira.

By combining data from marine observation and whale-watching operators, it was possible to estimate the direct economic contribution of the whale-watching industry.

The document analysis, which was made during the internship, involved a review of the literature and documents relating to the administration and management of whale- watching activity in Madeira. The data sources included government policy documents, academic journals and books, and commentary from a range of websites. The content analysis of internet-based information about whale-watching in Madeira was conducted within an internet search. The top ten ranked website results from each keyword search were then recorded and analyzed.

3. What is the monetary value of a whale?

3.1 What was the whale worth before? Products of whaling.

Throughout the world, and for centuries, whales have been killed for their meat, oil and bones. The commercial whaling industry boomed in the 18th and 19th centuries, whaling became a highly lucrative business for those involved in hunting, selling and using whale parts (Anonyms C, 2017). The populations of whales were attacked with such ferocity that some species were reduced by up to 95%. The blue whale was one of the most hunted species, followed by others, such as rorquals, right whales and sperm whales.

Main whale products:

1. Sperm oil

Oil from sperm whale blubber has particular qualities. One is that it keeps its lubricating qualities in extreme temperatures making it ideal for machines. Another feature is its superb qualities of illumination because it burns very clearly and brightly, without smoke. A byproduct of the sperm oil use was high quality soap.

2. Spermaceti

Spermaceti is a liquid wax. It is also known as "head oil" or "head matter" as it was found in the heads of sperm whales. While in the head it is a rose-tinted, semi-transparent liquid that crystallizes after contact with the air. This material was the most valuable product of the whaling industry as it has a high melting quality and burns cleanly and brightly, without odor. The highest quality candles were made with spermaceti. Before its use in candle industry, it was used as a medicinal ointment and as a sizing in wool combing, leather tanning, cosmetics, the garment industry and in the manufacture of typewriter ribbons.

3. Whale oil

Whale oils were the first of all oils — animal or mineral — to achieve commercial importance. The principle sources for whale oil were right whales, bowhead whales and humpback whales. For whale-hunters, rather than return home without filling the ship with sperm oil, they were to take other whales instead. Whale oil has an ancient history having been used in Europe as an

illuminant and a lubricant, as well as food. During the 19th century in Europe and America, oil was used in the tempering of steel, screw cutting and cordage manufacture. It continued to be used for illumination, especially in the headlamps of miners. By-products of the whale oil were soap and material that was added to spermaceti to improve quality of candle.

4. Baleen or "Whalebone"

Instead of teeth, baleen whales have long strips, which hang from the top of their mouths, and which animals use to strain out krill from sea water. Baleen is made of keratin, the same material as in human nails and hair. It was used in a variety of 19th century products: corsets, fishing poles, hoops for women's skirts, umbrella ribs and other tools for which plastic or steel would now be used. Baleen whales do not have teeth. But the teeth of other whales, such as the sperm whale, would be used in such products as chess pieces, piano keys, or the handles of walking sticks.

5. Ambergris

Ambergris is a wax-like substance, grey or blackish colour, produced in the digestive system of sperm whales. Freshly-produced ambergris has a marine, fecal odor. With time, it acquires a sweet smell, commonly likened to the fragrance of rubbing alcohol. Ambergris is formed from a secretion of the bile duct in the digestive system of the sperm whale. It can be found floating on the sea or on the coast. It is also sometimes found in the dead sperm whales. Scientists have inferred that the material is produced by the whale's gastrointestinal tract to facilitate movement of hard, sharp objects that it may have eaten.

Ambergris was used by perfumers, allowing the scent to last much longer. It has now largely been replaced by synthetic ambroxan. It is still possible to find perfumes with ambergris around the world. This substance has also been used as a flavoring for food and it is considered as an aphrodisiac in some cultures. During the Middle Ages, Europe used ambergris as a medication for headaches, colds, epilepsy and other diseases (New Bedford whaling museum, 2011).

3.2 What is the whale worth now?

3.2.1 Overall economic value of whale-watching activity in Madeira archipelago.

To estimate the economic value of whale-watching activity in Madeira, requests were sent to all 12 main whale-watching companies in order to provide the number of tourists in 2015.

Data was received from 4 operators: VMT Madeira, Ventura| Nature emotion, Lobosonda, and H2O Madeira. Data from the other whale-watching operators were estimated based on local knowledge and visual observation during the internship according with seasonality and carrying capacity of vessels. Ticket prices are presented on the official website of whale-watching operators. Detailed information for each company cannot be presented in this study in connection with the policy of commercial secrecy.

The total direct income from the 12 main companies which conduct whale-watching activity in Madeira archipelago in 2015 amounted €4 186 364 (Table 3). This amount is 2.8 times more than the €1 500 000 estimated in 2007 (Ferreira, 2007).

Table 3. Results of whale-watching activity in Madeira in 2015.

Whale-watching activity in Madeira in 2015	
Number of tourists	129158 passengers
Total direct income	4 186 364 €

We can therefore mention that whale-watching is a growing touristic activity in the Madeira archipelago, which involves more and more participants every year.

3.2.2 Relative and direct contribution per each of the most observed cetaceans species in the Madeira Archipelago.

In cooperation with Filipe Alves, it was possible to account the direct contribution in 2015 per each species, based on (Alves et al., 2017). I used the relative sighting frequency found by Alves et al. (for the period 2005-2015) and applied the estimated value from the year 2015.

Table 4. Relative and direct contribution per species of cetacean in Madeira during 2005-2015.

Species (common name) or taxon	Species (scientific name) or taxon	Relative contribution, %	Direct contribution, €
Atlantic spotted dolphin	<i>Stenella frontalis</i>	22.88	957 840
Common bottlenose dolphin	<i>Tursiops truncatus</i>	20.71	866 996
Short-beaked common dolphin	<i>Delphinus delphis</i>	14.59	610 791
Bryde's whale	<i>Balaenoptera brydei</i>	12.09	506 131
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	11.59	485 200
Sperm whale	<i>Physeter macrocephalus</i>	4.01	167 873
Striped dolphin	<i>S. coeruleoalba</i>	3.81	159 500
Beaked whale	<i>Ziphiidae</i>	2.05	85 820
Bryde's whale sp.	<i>Balaenoptera sp.</i>	2.04	85 402
Fin whale	<i>B. physalus</i>	1.75	73 261
Rough-toothed dolphin	<i>Steno bredanensis</i>	0.98	41 026
Non-identified dolphin	<i>Delphinidae</i>	0.89	37 259
Risso's dolphin	<i>Grampus griseus</i>	0.82	34 328
Blainville's beaked whale	<i>Mesoplodon densirostris</i>	0.52	21 769
Pygmy sperm whale	<i>Kogia breviceps</i>	0.36	15 071
Sei whale	<i>B. borealis</i>	0.30	12 559
False killer whale	<i>Pseudorca crassidens</i>	0.17	7 117
Killer whale	<i>Orcinus orca</i>	0.11	4 605
Other species		0.31	12 978
Total		100	4 186 364

The five most observed species in the Madeira archipelago between 2005-2015 make 82% of numbers of observations and consequently, 82% of the economic value. They are based in the waters of Madeira to perform various activities, such as feeding, resting, socializing, reproduction, breeding and calving. These are the

most abundant species and most likely to be observed, from the 29 known species in Madeiran waters (Freitas et. al., 2012).

These species are, according to Table 4 (from Alves et al., 2017):

- Atlantic spotted dolphin,
- Common bottlenose dolphin,
- Short-beaked common dolphin,
- Bryde's whale,
- Short-finned pilot whale.

3.2.3 Economic value of an individual whale in the Madeira archipelago.

Estimating the economic value at the individual level was only possible for the island-associated, short-finned pilot whales given that it is the only species for which abundance is known (Alves et al, 2015), as well as the ratio of the island-associated versus the transient animals (Alves, 2013).

Alves et al. (2015) estimated that 140 (95% Confidence Interval (CI): 131–151) short-finned pilot whales are island-associated to Madeira Island.

Direct contribution from short-finned pilot whales, which was estimated in the present study is €485 200 in 2015 (Table 3). Knowing that 75% of all sightings are from island-associated short-finned pilot whales (Alves, 2013), I used this information to estimate the economic value of each island-associated animal in the Madeira archipelago in 2015 (Table 5).

Table 5. Economic value of single island-associated animal for the Madeira Archipelago in 2015.

Species	Direct contribution per species in 2015	Number of island-associated animals	Direct contribution of island-associated animals	Economic value of single animal with CI 131–151	Economic value of single animal, average
short-finned pilot whale	485 200 €	140 (75% of all observations)	363 900 €	2 778- 2 410 €	2 594 €

Like most cetaceans, the short-finned pilot whale is a long-lived mammal. Alves et al. (2015) estimated high survival rates for this species in Madeira, i.e., estimated that the adult island-associated (i.e., resident and regular visitor) whales had a constant survival rate of 0.96 (95% CI: 0.85–0.99). Females of short-finned pilot whales may live up to 63 years. In contrast, males have a maximum longevity of only 46 years (Alves et. al., 2015). Medium lifetime for both males and females is 54.5 years.

So, a rough estimate indicates that each island-associated short-finned pilot whale during his life may result for Madeira economy $54.5 \times 2594 = €141\,373$ of

direct income, excluding inflation rate, tourism activity growth and other indicators.

4. Promotion of whale-watching activity in Madeira.

In 2015, tourism continued to be a key driver of the global economic recovery and a vital contributor to job creation, poverty alleviation, environmental protection and multicultural peace and understanding across the globe. By the annual report of The World Tourism Organization (UNWTO) over one billion tourists travelled internationally in 2015. This reflects a 4% growth or an increase of 50 million tourists that travelled to an international destination during the year. Prospects for 2016 remain positive, with international tourist arrivals expected to grow by 4% worldwide. (Del Rosario et al., 2016)

It is important to catch the wave of worldwide growth of tourism. In this study, I took the opportunity to develop a strategy of promotion of whale-watching activity in Madeira (see section 4.2).

4.1 Promotion as a process.

Promotion is a process made to inform potential clients about product, sharing with them its most attractive and innovative points. A mechanism called “word of mouth” is the main channel of promotion as it offers higher yields for small business at a lower cost. On the other hand, it is important to remember an increasing number of independent tourists who organize their own trips not only basing on personal recommendations from friends and family members but basing to the wide availability of information on the internet.

The tourism product has a few special characteristics:

- **Intangibility:** The product cannot be inspected, touched or seen before purchase. The only guide for consumers is information from published material, such a brochures, posters and web pages.
- **Heterogeneity:** The nature of the tourism product bringing together elements from all over the world creates an information problem. The industry consists of fragments and lacks standardization. Problem arises from competition within the industry which impinges upon tour operators, travel agencies and ultimately, the client. (International Labour Office, 2013)
- **Volatility:** The tourism product is constantly changing. Changes in the market need to be monitored.

Key issues in promotion campaign:

- Promotion is a process which is made to inform potential clients about product, explaining the most attractive and innovative points.
- A successful product is one which is capable of satisfying tourists needs and wishes at a desirable price.
- Only a product with clear key ideas can get top place in market pyramid.
- Distribution of a tourism product needs to be adapted to the type of product and target audience.
- People who offer a product are the best drivers for effective promotion.

4.2 Promotion strategy for whale-watching activity.

To start the promotion process is really important to make the list of key ideas relating to the individual characteristics of your service that you would like the visitors to remember and tell other potential clients.

The key idea of whale- watching business is to be an eco-friendly tourist activity which promotes knowledge about diversity of marine mammals in Madeira Archipelago and a safe and friendly way for its observation. Our potential clients are not only regular tourists who choose whale watching as one from a package of other tourist activities during their holidays but also students who take courses in the marine biology area, amateur and professional photographers, eco-oriented tourists and nature-lovers.

Main distribution and promotion channels:

- Domestic and foreign travel agencies. This distribution channel is aimed for two main lines, foreign and domestic tourists.
- Tourism fairs and exhibitions. It's an alternative form of presentation of a product with the creation of personal contacts between private and public tourism businesses.
- Professional associations. Participating in professional associations helps to create corporate image, promote public relations and make agreements with new distribution channels.
- Notes and press releases. Important to select media best suited to the product and target audience.
- Internet. Today Internet is invaluable for communication, information and promotion. Distribution of the tourism product is directly connected with the internet.
- People. The employee plays a vital role in effective marketing strategy. People buy from people, so the attitude and skills of all staff constitute the main aspect of the brand and quality of service.

- Advertising. The main materials used to distribute information are flyers, posters, brochures, billboards and web pages. The advertising campaign needs to be well-planned and evaluated.

4.3 Advertising campaign for whale-watching activity.

Firstly, a target audience should be chosen. I propose to use as a choosing criteria 400 inquiries (annex 1) which were made, as part of the internship, during the period between April 2016 and March 2017.

According to the results, profiles of clients who used “Ventura | nature emotions” whale-watching services in Madeira Island:

- They travel with family or friends.
- Majority of clients are from United Kingdom, Germany and France.
- Visitors are generally both men and women who have an older age structure (age between 50 and 60 years).
- The most frequent activity to do is “levada” trekking tour.

The specific objective of the campaign is promotion of whale-watching as an eco-friendly product which firstly cares about animals’ welfare. It’s important:

- motivate participants to care about whales and the sea and to work for or contribute to its conservation;
- provide public knowledge about cetaceans;
- improve guide training and teach nature guides who can tell good, accurate stories and build the bridge between the tourists and the sea;
- involve the community and explain a financial interest in whale watching and the conservation of whales and the sea. (Hoyt, E., 2003)

As an example of promotion of animals’ welfare, there is a practical course, “Whales & Dolphins” which “Ventura|nature emotions” in partnership with the “CIIMAR-Madeira” (Interdisciplinary Centre of Marine and Environmental Research), the “Madeira Whale Museum”, and the “OOM” (Oceanic Observatory of Madeira). The main goal of the practical course is to provide the participants with the chance to learn more about the marine life in Madeiran waters. A practical course is made with lectures and pelagic trips focused on whales and dolphins, during seven days. Lectures are about marine life in general, biology and conservation of whales and dolphins, identification of whales, dolphins, sea birds and seals and wild life’s photo- techniques. The pelagic trips are usually carried

out in two types of vessel, 8-meters rigid inflatable boat and 16-meters sailing yacht.

An advertising campaign will be most effective before or during high season periods, such as summer time and Christmas holidays. Information about this specific touristic product can be disseminated through:

- local travel agencies,
- hotels,
- airport,
- professional forums,
- marine biology courses and presentations,
- through internet resources.

6. SWOT analysis and discussion.

SWOT analysis is a matrix of strengths, weaknesses, opportunities and threats about a company, project or business.

- Strengths: the strongest characteristics of the business or project that give it advantages.
- Weaknesses: the weakest characteristics of the business or project.
- Opportunities: factors of an environment that a project or business can take advantage of.
- Threats: factors of an environment that can cause problems for a business or project.

SWOT analysis is used to identify which internal and external factors are important to achieving an objective. SWOT analysis groups elements into two main categories:

- Internal factors – the internal strengths and weaknesses
- External factors – the opportunities and threats presented by the environment (Osita et.al., 2014)

Table 6. SWOT analysis of innovation study «Economic contribution of the whale-watching industry for the Madeira Archipelago».

<u>Strengths</u>	<u>Weaknesses</u>
<ul style="list-style-type: none">• Innovative character• No competitive researches• Understandable and interesting data presentation• Background of my first degree in finances	<ul style="list-style-type: none">• Lack of detailed financial data• Lack of professionalism• Lack of time to compare the results of several financial periods
<u>Opportunities</u>	<u>Threats</u>
<ul style="list-style-type: none">• Increase of local and tourist demand in whale-watching activities• Increase of cooperation between whale-watching companies	<ul style="list-style-type: none">• Decrease in tourism activity• Changing of tourist preferences• Changing the migration routes of marine mammals

The strongest points of this research are innovative character and understandable presentation of material with historical reference that could be interesting not only in a scientific society but to the average reader also.

It is one of the first attempts to estimate direct income of such a narrow area of tourism such as whale-watching in Madeira Island. Unfortunately, I got accurate data only from 4 operators. Data from the other whale-watching operators were estimated based on local knowledge and visual observation. Thus, lack of detailed financial information and cooperation between operators made it impossible to achieve accurate calculations. Also from final results were excluded inflation rates, tourism activity growth and other indicators.

But the number that I accumulated shows an increase of the commercial activity of whale-watching, which means that it is necessary to continue research and promotion in this field.

Conclusion

Whenever people looked at the sea, they saw whales. First, from the shore and then from the ships, they were watching these creatures with surprise. Even when they hunted whales, a well-established period in history as well as in literature, the whale's appearance caused an adrenaline rush that was not entirely related to the potential economic benefit (Barr et. al., 2000).

The world's ocean contains a big variety of resources and has an importance for tourism. The large diversity of the marine environment makes it impossible to catalogue all of resources which are used for ecotourism activities. Much of marine ecotourism is based around encounters with large marine mammals.

Today whales and dolphins have significant value for people in coastal communities in terms of income from whale-watching trips. They make communities attractive for visitors. The observation of cetaceans is an activity that can bring not only commercial benefits but also educational, environmental, scientific, and socio-economical advantages. Whale-watching is a positive alternative of the whale-hunting industry which helps to improve ecological and economical sustainability and make the marine environment healthier.

The Archipelago of Madeira in recent decades gained a big human interest and fascination by marine mammals. We can see an increase in the scientific research, the conservation effort and the commercial activity of whale-watching. Approximately 35% of all known species of cetaceans can be observed here and yet Madeira Island is almost unknown in the world as a whale-watching destination. Only in 2015 direct income from this activity reached €4 186 364. This amount is 2.8 times more than the €1 500 000 estimated in 2007 (Ferreira, 2007) and it has a huge growth potential. This young but fast-growing touristic activity needs our attention.

Directions of future work in a field of whale watching activity in the Madeira Archipelago:

- Detailed monitoring of the fast-growing whale-watching industry is an important step for sustainability and good quality of provided service.

- Comparison of the financial results of the whale-watching industry during years helps to evaluate the effectiveness of advertising campaign and change direction of promotion activities, if it is necessary.
- Level of clients' satisfaction and their suggestions, researched by after trips interviewing. This will help to improve quality and promote Madeira Island as a worldwide whale-watching destination.
- Present whale- watching as an eco-friendly tourist activity which promotes knowledge about diversity of marine mammals in Madeira archipelago and safe and friendly way for its observation.

What is the true value of whales and dolphins for community of Madeira Island? My research only hints at the answer to this question but by future work in this field we will be able to obtain more accurate data.

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Annex 1

Inquiry form



<i>Activity:</i>									
Ventura(Cabo Girão)		Desertas		Whale&Dolphin Watching					
Swimming w/ Dolphins		Bird Watching							
<i>Nationality</i>		<i>Sex</i>			<i>Age</i>				
<i>E-mail adress</i>									
<i>Accommodation place</i>									
<i>How did you hear about "Ventura Nature Emotions"?</i>									
Leaflet		Internet		Ventura Kiosk		Ventura Office		Hotel	
Agency		Friends		Other					
<i>Where have you made your reservation?</i>									
Ventura Kiosk		Ventura Office		Hotel		Agency		By phone	By Internet
<i>With whom are you doing this activity?</i>									
Family		Friends		Alone					
<i>Did you know there is always a marine biologist on board?</i>									
Yes		No							
<i>Is this the first time that you do an activity with this company?</i>									
Yes		No		How many times?					
<i>Why did you choose "Ventura"? (Mark one or more answers)</i>									
Price		Type of vessel		Marine Biologist/ Guide on Board					
Operation hours		Client's reference		Trip Advisor Reference					
Guaranteed observations		Dolphins and Whales		Contact with Nature					
<i>Was the whale watching activity one of the main reasons you have chosen Madeira as your holiday destination?</i>									
Yes		No							
<i>Have you ever participated in any similar activities?</i>									
Yes		No		Where? (Location/Country)					
<i>Which other activities would you like to do during your stay in Madeira?</i>									
Desertas		Whale&Dolphin Watching							
Swimming w/ Dolphins		Canyoning		Bird Watching					
Diving		Trekking		Mountain Bike		Other:			
<i>Would you recommend the activity you just made to a friend?</i>									
Yes		No							

We are very grateful for your cooperation!!