



INSTITUTO
UNIVERSITÁRIO
DE LISBOA

Sustainable Biofloc Marine Shrimp Aquaculture at Madeira Archipelago

Arthur Barbosa de Castro Friedrich

Master in Business Management

Advisors:

Professor PhD Ricardo Correia, Universidade da Madeira

Professor PhD Renato Lopes da Costa, ISCTE Business School



Sustainable Biofloc Marine Shrimp Aquaculture at Madeira Archipelago

Arthur Barbosa de Castro Friedrich

Master in Business Management

Advisors:

Professor PhD Ricardo Correia, Universidade da Madeira

Professor PhD Renato Lopes da Costa, ISCTE Business School

Acknowledgments

To my beloved fiancée and future wife Izabella Zobot and to my brother Thiago Friedrich for always believing in me and embracing this journey.

Special thanks to Professor Ricardo Jorge de Castro Correia and Professor Renato Lopes da Costa for the support on this work.

Special thanks to Duarte Correia who envisioned the potential of this project since day one and gives this business idea the necessary momentum.

Abstract

The following text is the Business Management Master dissertation. It aims to present a business plan to sustainable farm inland the *Litopenaeus vannamei* shrimp at Madeira Island. The company to be created is Oceanum founded by the author at the same archipelago. The business plan describes the strategic approach, the market research, and the financial analysis necessary to start the project. The literature revision supports the decision for the best strategy to be implemented and defines the necessary analysis to be conducted to answer critical business viability questions. The chosen analyses are presented in logical order and summarized along the text. Market analysis presents PESTEL framework, customer analysis and main competitors' analysis. The Business Analysis presents the internal analysis using the VRIO matrix and the external analysis using Porter's Five Forces framework, resuming them at the SWOT matrix. The Strategy Analysis summarizes the business unit strategies and possible corporate strategies defined for Oceanum. The chosen strategies, supported by the previous analysis are presented in a plan at the Strategy Implementation section, which defines the marketing mix and the qualitative resources necessary to execute the project. The following section presents the project's quantitative analysis proving its monetary financial viability. Therefore, it is possible to conclude that farming shrimp at Madeira Island proved itself not only viable but also profitable.

Key Words: Business Plan, Strategy, Financial Viability, Shrimp Farming, Biofloc Technology System.

JEL Code:

M - Business Administration and Business Economics; Marketing; Accounting

M1 – Business Administration

M10 – General

M19 - Other

Contents

Acknowledgments	i
Abstract.....	ii
Figure Index	v
Table Index	vi
Annexes Index	vii
List of Abbreviations	viii
Introduction.....	1
1. Literature Review	2
1.1 Focus on Business Sustainability	2
1.1.2 Aquaculture as a Sustainable Business.....	2
1.2 Strategy	5
1.2.1 Business Strategy	7
1.2.2 Corporate Strategy	8
1.3 Marketing.....	11
2. Business Presentation	13
3. Market Analysis	18
3.1 External Analysis.....	18
3.1.1 Political Spectrum.....	18
3.1.2 Economic and Social	19
3.1.3 Technology	23
3.1.4 Environment	24
3.1.5 Legal	25
3.2 Transaction Analysis:	25
3.2.1 Customer Analysis.....	25
3.2.2 Industry Analysis & Competitor Analysis.....	29
4. Business Analysis	35
4.1 Internal Analysis	35
4.2 External Analysis.....	39
4.3 SWOT Analysis	41
5. Strategy Analysis.....	43
5.1 Business Unit Analysis	43
5.2 Corporate Analysis.....	44
6. Strategy Formulation.....	45

6.1 Oceanum Mission and Vision	45
6.2 Oceanum’s Objectives	46
7. Strategy Implementation.....	47
7.1 Marketing Mix.....	47
7.1.1 Product.....	47
7.1.2 Price	48
7.1.3 Placement.....	48
7.1.4 Promotion	49
7.2 Resources.....	51
7.2.1 Implementation Plan.....	51
7.2.3 Human Resources	52
7.2.4 Material Resources	53
7.2.5 Manager	53
7.2.6 Sales Force.....	54
8. Economic and Financial Viability	54
8.1 Premises.....	54
8.2 Sales and Costs Forecast.....	55
8.3 Fixed Capital and Amortizations.....	55
8.4 Working Capital Requirement	56
8.4.1 Inventory.....	56
8.4.2 Receivables.....	56
8.4.3 Payables for Suppliers	56
8.4.4 Payable Taxes	56
8.4.5 Capital Structure.....	57
8.4.6 Financial Demonstratives and Indicators	58
8.4.7 Project Evaluation.....	62
9. Conclusion	63
10. Bibliography	67
11. Annexes	73

Figure Index

Figure 1- Evolution Of Strategic Management Research	7
Figure 2 -Generic Penaeus Morphological Lateral View	15
Figure 3 - Litopenaeus Vannamei Life Cycle.....	15
Figure 4 – Shrimp Productive Chain Along Its Life Cycle	16
Figure 5 - Madeira Island Archipelago Territory Division Per Type Of Land (%).....	20
Figure 6 - Madeira Autonomous Region Labour Cost Index	21
Figure 7 - Number Of Unemployed People At Madeira Island (In Thousands)	21
Figure 8 – Internet Access Using Broadband Per 100 Residents (%) At Madeira Island	23
Figure 9 - Percentage Of Portugueses Aged Between 16 And 74 Years That Used Internet On The 3 First Months Of The Year (Per Activity And Per Year)	24
Figure 10 - Hierarchy Of Effect Models - AIDA	26
Figure 11 - Madeira Island Fishing And Aquaculture Firms (Profit Margin Vs Rms)	34
Figure 12 - Oceanum Value Chain	37
Figure 13 - Gap Analysis Chart (Ansoff, (1965) Cited In Baker (2014)).....	45

Table Index

Table 1 - Water Parameters For Shrimp Farming	17
Table 2 -Oceanum's Seafood Industry Opportunities And Threats	31
Table 3 – Oceanum`S Resources	36
Table 4 - Oceanum's Resources And Capabilities	37
Table 5 - Oceanum's Vrio Matrix	38
Table 6 – Product/Market Strategies For Growth.....	44
Table 7 - Oceanum Objectives Divided According To Three Time-Frames.	46

Annexes Index

Anexxe A - Initial Investment Procurement Sources	73
Anexxe B - Tanks Quotation	74
Anexxe C - A3 Areators Quotation	75
Anexxe D - Fifth Year Investment Expectation (Includes Initial Investment).....	76

List of Abbreviations

AIDA	Awareness, Interest, Desire, Action
B2B	Business to Business
B2C	Business to Customer
BFT	Biofloc Technology System
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CAPM	Capital Asset Pricing Model
CO_2	Carbon Dioxide
DREM	Madeira's Regional Statistic Directorate
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest and Taxes Depreciations and Amortizations
ESG	Environmental, Social and Governance
EUR	Euro Currency
FAO	Food and Agriculture Organization
HSE	Health and Safety
INE	Portuguese National Institute of Statistics
IRC	Portuguese Income Taxes for Enterprises
IRR	Internal Rate of Return
IRS	Portuguese Income Taxes for Individuals
NH_3	Ammonia
NH_4	Ammonium
NO_2	Nitrite
NO_3	Nitrate
NPV	Net Present Value
NSS	National Strategy for the sea
PC	Personal Computers
PDM	City Master Plan
PESTEL	Political, Economic, Social, Technology, Environment, Legal
PS	Social Party
PSD	Social Democratic Party
PSI	Portugal Stock Index
RAI	Regional Authority Index
RBV	Resource Based View
RMS	Relative Market Share
ROI	Return on Investment
SWOT	Strengths Weaknesses Opportunities and Threats
VAT	Value Added Tax
VRIO	Value, Resource, Immitability, Organization
WACC	Weighted Average Cost of Capital
YTM	Yield to Maturity

Introduction

The project aims to develop an innovative business plan to produce shrimp inland at Madeira Island using the Biofloc Technology (BFT). There is no similar production at the Archipelago, and the main advantage identified is the possibility to offer a fresh shrimp and positioning it as a local product.

The Madeira Archipelago is situated on the North Atlantic Ocean. Its location is ideal for aquaculture productions due to its water quality. The open sea aquaculture business production achieved excellent results that prove this theory (Andrade & Gouveia, 2008). In 2020, open sea cages of Gilthead Seabream (*Sparus Aurata*) generated five million euros of revenue with twelve cages. This represents 34% of Madeira's wine annual revenue, one of the most traditional industries in the region (Gaspar, 2021).

Madeira Island economy suffered the impacts of the global COVID-19 pandemics since it exposed Madeira's dependence on tourism (Abreu, 2020). Therefore, the archipelago economy needs to diversify its activities and sectors to become more resilient for future crises (Caldeira, 2021). Shrimp production is a profitable activity and may pose itself as a new alternative on the Archipelago to enhance sector diversification (Samocha, 2019b).

Seafood annual consumption is high in Madeira Island, similar to the national average of 53,8 kg of seafood per capita according to Portuguese National Statistical Institute (INE). Approximately 35% of Madeira residents consume shrimp twice a month, while 1,7% consume it twice a week, which can represent an annual shrimp demand of approximately seven hundred and fifty tons. The consumption of shrimp is predominant in younger people, which seems to represent a decline in traditional seafood consumption and a shift to more convenient food in line with twenty-century trends (Hermida & Costa, 2020).

The shrimp production evaluated in this text will use Biofloc technology (BFT) at inland tanks to cultivate *Litopenaeus vannamei*, also known as White-leg-Shrimp. This specie presents positive results on a super-intensive regime (> 200 shrimp/m²). Biofloc Technology is an innovative technique developed to minimize water exchange on production sites. Excessive water utilization is a major concern in conventional shrimp cultivation due to waste generation and the destruction of native ecosystems (Martinez-Porchas & Martinez-Cordova, 2012). Biofloc Technology uses dextrose and other sugar sources to stimulate microorganism aggregation that can break down toxic components excreted by the shrimps. These aggregates help maintain the water parameters stable and contribute as a complementary feed for the

shrimp (Ahmad, Babitha Rani, Verma, & Maqsood, 2017) (da Silveira, Krummenauer, Poersch, Rosas, & Wasielesky, 2020).

Madeira Island aquaculture sector has been facing political resistance in the past years. Main political opposition consider the current open sea cages a problem pointing sea bottom and visual pollution as the main critical points (Pacífico, 2021). Therefore, the present work aims to overcome these objections throughout inland clean production.

Shrimp production at Madeira Island is viable and have potential to improve Madeira Island resilience for future crises. Furthermore, it is the opportunity to insert the archipelago on the world aquaculture scenario that is one of the most promising industries of the century. (FAO, 2022)

1. Literature Review

1.1 Focus on Business Sustainability

The businesses of today are under pressure to guarantee sustainability in their actions. Although it might appear to be a recent theme, the sustainability concept has been discussed for decades. Accordingly to Elkington (1997) sustainability is the principle to ensure that our actions of today do not limit the range of economic, social and environmental options open to future generations. However, when extended to society, the sustainability definition puts businesses and organizations as actors, therefore also responsible for the legacy to future generations.

The traditional concept of business characterized by value propositions centered on profit generation has been criticized due to the rise of social inequality and environmental issues, which created a shift on new business formulations where economic value generation should be linked to social and environmental value (Comin et al., 2020).

The concern about economic, social and environmental profit is the definition of the triple bottom line, which in conjunction with the urge for solving climate change, growing population and resource scarcity issues are transforming the way businesses are done (Ritala, Huotari, Bocken, Albareda, & Puumalainen, 2018).

1.1.2 Aquaculture as a Sustainable Business

Aquaculture is the farming of aquatic animals; it has the highest growth rate in the world among all other agro-industrial activities. There are different models of aquaculture farms

depending on the species produced, the system preferred and water source availability (Martinez-Porchas & Martinez-Cordova, 2012).

Commercial aquaculture can be classified as extensive, semi-intensive or intensive. This classification depends on stock density at the production site and the inputs necessary to cultivate each species. Extensive aquaculture uses large portions of land to establish low stocks density to avoid the necessity for feeding and treatments. In extensive aquaculture, organisms can thrive independently using what the surrounding environment provides as a source of food and water quality. Therefore, the amount of management and inputs are meagre in comparison with semi-intensive and intensive aquaculture. Marine mussels and freshwater crayfish are an example of species farmed on extensive aquaculture facilities (Lucas, John S; Southgate, Paul C.; Tucker, 2019).

Semi-intensive and Intensive aquaculture borders are not completely clear. Semi-intensive aquaculture relies in part on natural cycles productivity. However, it requires more supplementation than extensive aquaculture, such as aeration systems, organic and inorganic fertilizers addition, and supplemental feeding. Still, it is not entirely dependent on external inputs to thrive compared to extensive aquaculture. The Nile Tilapias farms are one example of semi-intensive cultivation (Lucas, John S; Southgate, Paul C.; Tucker, 2019)

On the other side of the spectrum is intensive aquaculture, which depends entirely on external inputs to operate. Nevertheless, the need for complex management and higher feed and energy requirements are compensated with more significant yields per area than other aquaculture models. Salmon and Gilthead Seabreams are examples of finfishes farmed on intensive aquaculture sites (Lucas, John S; Southgate, Paul C.; Tucker, 2019).

In association with the degree of intensity, there are different systems models in which production occurs. The aquaculture systems can be static, open, semi-closed or Recirculating (Closed). Static systems are usually tanks and ponds with no water exchange during the production cycle. Nonetheless, water is partially or entirely renewed to avoid water parameter deterioration at the end of the production cycle. Semi-closed systems have some degree of water exchange with adjacent watercourses but are not as intense as in open systems. In this case, no complete water substitution is required at the end of the farming cycle because it is possible to adjust the amount of water exchanged during the operation. Open systems are placed in large areas of natural water bodies, for example, lakes and oceans, where there is no correction of water parameters since natural currents and tides maintain them. 'Cages separate the finfish species from the natural environment, while racks or long lines are used for open-water bivalves farming. Finally, recirculation closed systems are almost isolated from the

original water source. Water is added only to compensate for evaporation or incidental losses. The closed systems require total control of water parameters quality. They are also energy-demanding, which requires more efficient management of production sites, but allow year-round production with higher yields. Due to high operating costs, closed systems are almost exclusively used for intensive aquaculture (Lucas, John S; Southgate, Paul C.; Tucker, 2019).

Depending on which type of aquaculture model, entrepreneurs need to evaluate its sustainability when planning their businesses. For example, positioning open-water saltwater aquaculture as a sustainable business has been a trend in the last decade. It has been considered one of the best options to alleviate worldwide malnutrition and an ally to preservation. This trend, however, has been criticized because do not consider the food unequal distribution and premium prices for carnivorous finfish species (Belton et al., 2020).

Furthermore, some traditional extensive aquaculture techniques are considered a non-sustainable activity due to environmental harm. There are at least eleven causes that classify some aquaculture models as non-sustainable: Mangrove forests and land degradation to aquaculture construction sites; Soil Salinization/Acidification; Water Pollution; Eutrophication/Nitrification of water bodies; Ecological impact of exotic species introduction; Ecological impacts of inadequate medication practices; local changes of hydrological patterns; Interference on the indigenous organisms reproduction cycle; Negative Effects on fisheries; Accusations the presence of toxins and heavy metals and uneven food distribution (Martinez-Porchas & Martinez-Cordova, 2012).

Therefore, aquaculture may be closer or far from sustainable principles depending on how the business is structured. This business plan intends to evaluate the viability of a sustainable Biofloc Technology System Marine Shrimp Farming at Madeira Archipelago. The proposed model is intensive in animal density, which means that shrimp density will be superior to 200 shrimps/m³. Also, the water will be recirculated during the farming process in a closed system. The model considers no partial water exchange and water parameters quality guaranteed by applying Biofloc System Technology (BFT).

Biofloc Technology System (BFT) consists of developing microorganism aggregation (called Biofloc) at the cultivation water, such as algae, protozoa and bacteria, in a matrix with particulate organic matter to improve water quality, wastewater treatment and disease control in intensive aquaculture systems. The biofloc microorganism's aggregates development is interconnected to the Nitrogen cycle present in all aquaculture systems. In resume, ammonia (NH₄⁺) is the main excreta of fish and crustaceans. In intensive aquaculture, mainly in a closed system, the concentration of ammonia can quickly reach toxic levels that are harmful to fish

and crustaceans. The formation of biofloc accelerates the decomposition of toxic ammonia to less harmful compounds such as Nitrite (NO_2^-) and Nitrate (NO_3^+), which keep water parameters quality (Mugwanya, Dawood, Kimera, & Sewilam, 2021).

BFT is a necessary tool to move shrimp Intensive aquaculture closer to sustainability. Besides improving water quality, biofloc aggregates have high nutritional value and have a probiotic effect on shrimp. For example, Biofloc can reduce the need for formulated feed up to 30% in White-Leg-Shrimp (*Litopenaeus vannamei*) cultures due to its high protein content. Furthermore, when feeding on bioflocs, Shrimps activates their short-term memory immune system against possible new pathogens, improving survival rates (Samocha, 2019b).

Intensive shrimp farming is a promising solution as a protein source in a moment that the urge for food and protein sources is one of the global concerns due to the increase in population (FAO, 2020). Therefore, the application of BFT on intensive shrimp farming gives it a more sustainable approach characterized by zero water exchange, reduction of formulated feed amounts and preservation of coastal land (Mugwanya et al., 2021).

Sustainable Biofloc Marine Shrimp aquaculture development at Madeira Island is an innovative business model never tried before in the region. Therefore, a business plan is essential to mitigate risk and appropriately scale-up the activity. The implementation of an aquaculture business has five phases: Screening, Research Trials, Pilot Trial, Commercial Trial and Full-scale production. The screening phase is the first step to evaluate any legal restriction, market demand, and potential investment return. The research trials look at the species environmental requirements and production cycles, which will define if the white-leg-shrimp is adequate to Madeira conditions and can provide yields and monetary return to make the project viable. The pilot trial, in its turn, brings the project to reality to test farming structure, survival rates and water quality problems. The commercial trial is the next step and consists in scaling up the pilot plant to supply commercial production volume. The full-scale production phase is the last step after the maturation of commercial trials, in which entrepreneurs expand the number of production units (Lucas, John S; Southgate, Paul C.; Tucker, 2019).

The master dissertation development will comprise the screening and the research trial phases, which requires critical investigation to define market size, ideal site locations and financial viability analysis of a pilot plant.

1.2 Strategy

The definition of strategy has been a challenge for management theorists for years. Although the term has been used in a variety of contexts, from military operations and politics to business and non-profit organizations, it is still developing. In a proposal to reunite the last fifteen years of strategy concept definition, Khalifa (2021) provides a specific definition for strategy: "Strategy, rendered as a cohesive core of guiding decisions, is an entity's evolving theory of winning high-stake challenges through power creating use of resources and opportunities in uncertain environments." The given strategy definition is based on the logical connection between "ends-ways-means", which means that without ends (objectives), there is no need to for ways to realize it. Therefore, no means are needed also. From this logical connection, Khalifa (2021) construct the strategy definition based on five aspects that have been evolving in the last fifteen years of management study on the theme. The five attributes are: Strategy is aspirational; is power creating; is directional; is systemic and is intentional.

It is aspirational because it is born on the desire to improve. It is power creating because it needs power to change, which means leaders must have the power to change organizations or give the power to their teams to change the *status quo*. Strategy is directional because any strategy needs goals to guide the decisions steps. These guiding steps must apply to the whole organization; therefore, strategy must be systemic, involve the firm as one not only isolated individuals or departments. Finally, strategy is intentional because it requires people's action in an organized way to achieve the desired goals (Khalifa, 2021).

Strategy is aspirational, because it must fight against autonomous wills that are hard to predict or control. Therefore, organizations must aspire to define, talk about, and implement strategy. Strategy is power creating because it is the conscious decision for effectiveness, in other words, the careful decisions of investing resources in actions that will enhance company's power to generate competitive advantage. Regarding the directional attribute, strategy must be able to guide decisions in all levels of company, which is totally dependable on the good communication of strategy along the organization departments and divisions. The necessity for communication and presentation of strategy is connected to the systemic attribute of strategy. Khalifa (2021) here, paraphrase the famous "Blind men and the elephant" metaphor created by Mintzberg in 1998 in the book *Strategy Safari*, where each blind man describes one part of the elephant, but since they cannot see the whole living elephant, they create different forms for the same organism. Strategy follows the same logic, if not holistically seen, each part of the organization will understand it differently. Therefore, for Khalifa (2021), if not systemic it is not strategy. Finally, the intentional attribute of strategy unites the four previous ones, because

it depicts strategy as “the result of reflection and thinking not of serendipity or drift”, which means that if not well planned and communicate, there is simply no strategy (Khalifa, 2021).

The definition of strategy is necessary to guide the business plan when choosing the tools that are necessary to analyzing a company’s internal and external situation. Depending on which strategy theory the company choose, it may change the types of analyses that must be done.

1.2.1 Business Strategy

According to Guerras-Martín, Madhok, & Montoro-Sánchez (2014), in his article about The Evolution of Strategic Management Research: Recent Trends and Current Directions, it is possible to positioning schools of strategic management in a graph according to their internal or external domain (intern firm factors or external firm environment) against its level of analysis macro or micro, where macro refers to the relationship between the company and its environment while micro refers to the relation between individuals and the firm.

The Figure 1 shows the last years strategic management schools positioned accordingly to the Internal and External factors against Macro and Micro relations.

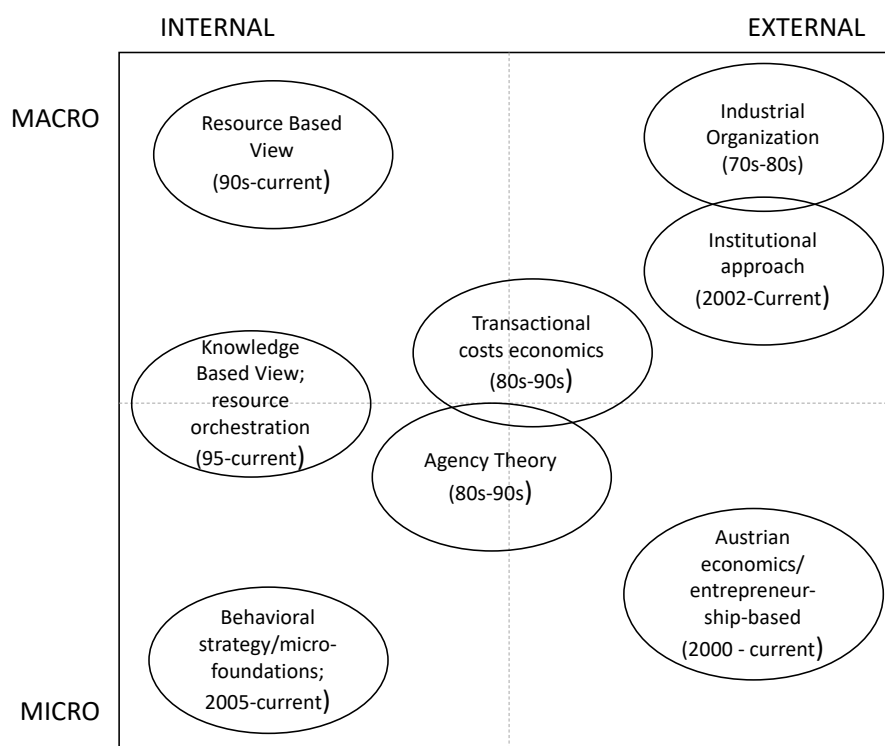


Figure 1- Evolution of strategic management research (Guerras-Martín et al., 2014)

Behavioral strategy unites cognitive and social psychology with strategic management theory and practice. According to this school, strategy needs to take in consideration human

cognition, emotions and social behavior to the strategic management of organizations, in theory and real-world practice (Powell, Lovallo, & Fox, 2011).

The Austrian economics entrepreneurship-based approach define the actions of entrepreneurs as the market's main drive force. On Austrian approach, the Market is not a pie with a defined size as considered by previous neoclassical researchers from 1930, which each business has its own piece leaving nothing or very little for smaller competitors. On their view, entrepreneurs are responsible for unveiling opportunities not seen before, which create new business possibilities (Kirzner, 1997). Therefore, Austrian economics entrepreneurship-based category is on the micro spectrum of Figure 1 because it has the entrepreneur (as an individual) as the center of the approach, and its actions reflect on the external level of the company, which categorizes Austrian approach as external.

Agency theory and transactional costs economics lie in the middle of figure 1 where they both balance internal and external approaches. The Agency Theory central spectrum is justified by pointing that managers and workers (Internal firm Individuals) decisions are built on social contracts that define their relationships with the exterior (other individuals or organizations that own part of the company equity or debt) (Company, Jensen, & Meckling, 1976). Transactional cost theory considers the effects of transactions (its costs) on business decisions. Since transactions happen inside and outside the firm and depend on the actions of individuals (micro) or organizations (macro), the Transaction Cost Theory can also be positioned on figure 1 central spectrum. (Guerras-Martín et al., 2014)(Baumol, 1986)

If in Transactional Cost theory firms exist because they are able to avoid the costs associate with market transactions, knowledge-based theory focuses on the transactional costs of knowledge internally on the firm. The internal knowledge transference and registration occurs when individuals register process and specific knowledge in routines and specific processes to avoid the costs of communication and learning between the specialized individuals that compose the firm (Grant, 1996). The knowledge transference capability is considered an internal resource of the firm, this positions the Knowledge-based theory on the left side of Figure 1. Moreover, since knowledge can be exchanged between individuals and firms, knowledge-based theory stays in the middle of Figure 1 the vertical axis and can be consider the frontier between Business Units Strategies and Corporate Strategies.

1.2.2 Corporate Strategy

On the upper right corner of Figure 1, there are two management schools Industrial Organization and the Institutional Approach. The Industrial organization are mainly

represented by Porter (1980) school which filled a theory gap on business positioning among competitors and the influence of external forces. Porter (1980) presented five forces that influences strategy making, which are the threat of new entrants, bargain power of the buyers, threat of substitutes, bargain power of suppliers and rivalry among existing competitors. The five forces framework can be applied to any industry to help managers understand how firms' industry operates and which are the main difficulties to face while aiming profit. The generic approach to any industry does not mean the framework evaluates all businesses in the same way though, since each force has a different weight depending on industry's characteristics. The airline industry, for example, faces strong pressure from customer's bargain power whose are very price sensitive, while new entrants threat force tends to be less powerful since the industry has high regulatory entry barriers. On the other hand, combustion engine makers suffer less from buyer's bargain power because products are differentiated and highly specialized but are facing strong substitution pressure from global trend for electrical motors. The five forces are described in the following paragraphs (Porter, 1980).

Threat of new entrants: New entrants bring new capacity and desire to gain market share which consequently generates prices, costs and and rate of investment pressure. New entrants that come from other markets can use capabilities and resources to challenge competition on the new market. The threat of entry limits an industry profit margin when high because demand incumbents to keep prices low and invest in innovation. Ex: Coffee retailing as Starbucks face high threat from new companies and must expend in new products and marketing to keep profitability.

The power of suppliers: Powerful suppliers can hold prices higher to business and control the value chain by limiting quality. Industries that need specific raw materials can be restricted to few suppliers what gives them power to control prices that will impact directly on firm's profitability. Microsoft is a case of near monopoly to PC makers that cannot run without the software, for example.

The power of buyers: Powerful buyers can reduce profitability by pushing the prices down, demanding better quality (more cost). Buyers that have different options and are price sensitive drive the industry toward constantly price reductions, the same occurs with there are few buyers buying in large quantities, therefore they represent a high percentage of firm's revenue. Industries such as plastic components for cars suffers high buyer pression from giant car manufacturers that represent high percentage of their purchases.

The threat of substitutes: A substitute is a product or service that execute the same or a similar function in comparison if the original. Video conference has been a powerful substitute

for travel, mainly during COVID-19 pandemic. The same is valid for e-mail and traditional post. Therefore, when substitutes power is high, it limits industry's profitability putting a ceiling on prices. Business travels if expensive will be substitute by videoconferences. Firms must invest in product differentiation to avoid the pressure from substitutes.

Rivalry among existing competitors: Rivalry force can have innumerable forms, from price discounting to new products introduction and advertising campaigns. The more intense is competition the higher is the limit to profitability. Industry must avoid competing exclusively on price since it is considering a destructive rivalry because generate successive rounds of price cuts what directly impact profitability.

The Institutional approach aims to discuss the external relationship between firms and the rules, the political, social, and legal grounds that shape humans' interactions. The institutions are present on firm's environment and can be, for example, governments, labor-unions, other companies and all the written or cultural rules that are present on firm's society. The interaction with institutions varies accordingly to countries and regions. Western and Eastern societies differ on institution-organization interaction due to cultural differences. Firms on emerging countries in contrary to companies based on developed economies are different on the proximity with institutions. Firms on emerging markets, for example, need to be closer to institutions to thrive better under the frequent market uncertainty, which is not required on developed countries that face less economical oscillations and have more effective regulation bodies (Peng, 2002).

The strategy field related to the industrial organization theory focuses on describing firm's external environment and the relationship between companies. Porter (1980) brings his paramount concept of five forces to proper position the firm against the main forces that can contribute or challenge its success. The forces described above are, rivalry among competitors, Bargain power from buyers, Bargain power of suppliers, new entrants, and substitutes. According to Porter (1980), the understanding of where firm lies among the competitors the five forces intensity is the first step to proper drawn a reasonable strategy. The relation between firm and the five forces draws attention to the main challenges of industry sector and guides companies to choose among the three proposed main strategies available: cost leadership, differentiation or focus. Cost differentiation is the ability to cut expenses at best and can be achieve through economy of scale and optimization. Differentiation refers to enhancing product value perception (distance between price and expected return on purchasing) due to better features than competitors or aggregated value (Magretta, 2012) . Focus, in its turns,

refers to a focusing on a very specific market of clients that are available to pay higher prices to have their needs fulfilled.

On its turn, resource-based view theory, understand firms as organisms that are heterogeneous and have mobile resources, which means that even in the same industries firms are different among them and have some resources that on the most case can be acquired by other firms. Resources can be tangible (physical assets) or intangible (know-how, individual relationships, brands) and the use of them determines if firms can or not achieve sustainable advantage in competitive markets (J. Barney, 1991a). Although, resource-based view theory does not exclude external analysis proposed by Porter (1980) on Opportunities and Threats from firm's environmental analysis, it defends an analysis on the internal unique firm's resources that can be evaluated as strengths and weaknesses. Furthermore, for J. Barney (1991a), resources are classified as source of competitive advantage if they are rare, imperfectly imitable and non-substitutable. These definitions will be further explained on internal analysis section 4.1 Internal Analysis, where the text analyzes the business unique resources and capabilities. The approach on internal resources and the impact on firm's competitiveness among competitors, position the resource-based based view theory on the top left corner of Figure 1.

The business plan strategy choice must include inputs from all schools discussed above, since it is a solid way to understand strategy borders and its many forms of representation. Oceanum business plan for shrimp farming at Madeira Island will proceed with both internal and external analysis to have a complete overview of the activity. This holistic approach is mandatory to reduce risks and create a clear vision of the business for possible investors.

1.3 Marketing

The definition of marketing has been changing over the years because since marketing occurs in different contexts and industries one definitive theory of marketing is not possible (Gamble et al., 2011). Although one definitive theory of marketing is not possible, it is possible to find relevant insights into the evolution of the definitions since 1960 as presented in the paper The Marketing concept in the 21st century: A review of how Marketing has been defined since the 1960s.

The necessity for marketing after Second World War increased due to the surplus generated by enterprises. Rogers, 1963 cited in Gamble et al. (2011) defined marketing as the social process used by organizations (including businesses, non-profits and even governments and

churches) to interact with the external environment for providing services and exchange values in order to justify its continued existence. Gamble et al. (2011) understand that this definition includes non-profits and other non-business institutions but lacks the a managerial approach for marketing. Kotler, 1967 cited in Gamble et al. (2011) compensates the lack of managerial marketing approach by defining it as “The analyzing, organizing, planning and control of the firm’s customer-impinging resources, policies, and activities with a view to satisfying the needs and wants of chosen customer groups at a profit”. Kotler’s definition demonstrates a clear linear business structuring and customer segmentation.

In 1970, marketing definitions need to be understood in the context of energy and economic crises that occurred in that period. Star et al. (1977) cited in Gamble et al. (2011) defines marketing as a process through which business, institutions and organizations, first select target customers or constituents, then assesses the needs of such target customers and finally manages their resources to satisfy them. This definition shows marketing as a process, which implicates a logical and sequential order. The assessment of customer needs, while properly using firms' resources, demonstrates the more mature post-recession 70s culture (Gamble et al, 2011).

For the 1980 decade, Gamble et al (2011) presents the marketing definitions made by Mandall & Rosenberg (1981) cited in Gamble et al. (2011) and Gronroos (1989) cited in Gamble et al. (2011) which start to segment each market actor in producers and consumers and how they should interact to keep a long-term relationship. Mandall & Rosenberg (1981) cited in Gamble et al. (2021) added in their marketing definition the tools that producers use to match the marketing offering with customers’ desires: the product or service, its promotion, distribution and price. These tools may be seen as the start of what today’s marketing theories define as the marketing mix. Gamble et al. (2011) also point that this decade is known for the increase in social awareness and the rise of green consumer movements.

The marketing definitions in the 1990 decade are the first to consider marketing as an academic discipline. This movement in the marketing definitions exemplifies the expansion and consolidation of marketing as a sensitive and responsive way to meet market needs and defend competitive advantage (Lynch, 1994 cited in Gamble et al., 2011).

Webster, 1992 cited in Gamble et al. (2011) define marketing as the management function responsible for assuring that every aspect of the organization focuses on customer relationship [...]”. Defining marketing as a management function reinforces the need for a methodological approach to respond to market needs.

From 2000 to 2011, Gamble et al. (2011) state that the internet and digital technologies widened the marketing definitions. Furthermore, the marketing definitions start to approach

the social aspect and position marketing as constructive engagement to generate value, which means that further to customer relationship nutrition, marketing should consider the benefit of local and global stakeholders in their relationship. Gamble et al. (2011) cite and call particular attention to Kotler et al. (2009) marketing definition:

“Marketing is a societal process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others.” For Gamble et al. (2011) this definition is of particular interest because emphasizes freely exchanging and do not mention producers or customers, therefore breaking boundaries and giving marketing a more integrative and interactive perspective that were not present in Kotler, 1967 cited in Gamble et al. (2011) definition discussed before.

The marketing definitions increased in complexity since the sixties, this result followed the increase in competition generated by an interconnected world. However, Baker (2014) defines marketing in a simple but powerful statement: “The creation and maintenance of mutually satisfying exchange relationship”. In comparison with previous definitions, it is in line with Kotler et al. (2009) cited in Gamble et al. (2011) which does not mention producers or customers given marketing the integrative perspective. It also does not fix boundaries on the communication channels or any regulation on the exchange of services or goods. Further to this, it is possible to recall the Rogers (1963) cited in Gamble et al. (2011) definition that extends marketing to non-profits, governments and churches. However, Baker (2014) does not define marketing as a managerial science as Kotler (1967) cited in Gamble et al. (2011) did, omitting the analytical and data-driven science marketing tendency of last years.

In other words, although simple at first analysis, Baker (2014) definition is generic enough to include previous definitions and also capture the real meaning of marketing which is to nurture mutually satisfying exchange relationships. Due to its simple but powerful understanding of marketing, this text will base the business plan marketing approach on this definition. It is important to clarify that this definition does not represent the entire marketing methods and concepts, therefore the study of other definitions will be present throughout the text. However, in case this text meets marketing unexplored fields or dead ends in decision making, the marketing decision will have (Baker, 2014) definition as the guidance.

2. Business Presentation

Oceanum is in a mission is to help people thrive integrated with nature. The company was born to raise awareness about Madeira Island's natural beauty while promoting sustainable

ways to do business. We deeply believe that Madeira Seas and its Forests unite on the table. Finding and providing sustainable food sources to get people together and tackle climate change is what Oceanum aims to achieve before 2030.

The study of strategy starts with the business mission. The mission is a broad statement of the company's purpose, which differentiates the company from others of the same type. However, the mission statement does not limit it to the purpose, it also comprises the business philosophy and reveals the image the company seeks to project (Pearce, 1982). The company's mission has three core components according to Pearce, the company's basic product or service, the principal production technology and the primary market. Oceanum's mission is to unite family and friends at the table, providing healthy and environmentally friendly food.

Oceanum's vision is to find and provide sustainable terrestrial and seafood sources to unite people around the table to improve their happiness and truly tackle climate change before 2030.

To start accomplishing its mission and vision Oceanum will raise the Whiteleg Shrimp (*Litopenaeus vannamei*) at Madeira Island. Therefore, every time shrimp is mentioned in this text, it refers to the white-leg shrimp species, which the scientific name is *Litopenaeus vannamei*. The business model consists in producing the shrimp in excavated tanks filled with salt water. The tanks will operate with complete water reuse without any discharge of water into the surrounding environment. Salt water should be provided directly from the sea and will be treated to fill the tanks for the first time and to compensate for any minor loss from the tanks' operation and evaporation. It is important to emphasize that the complete reuse of water is possible thanks to Biofloc Technology System (BFT) technique that will be applied during shrimp farm operation.

It is important to emphasize that the complete reuse of water is possible thanks to Biofloc Technology System (BFT) technique that will be applied during shrimp farm operation.

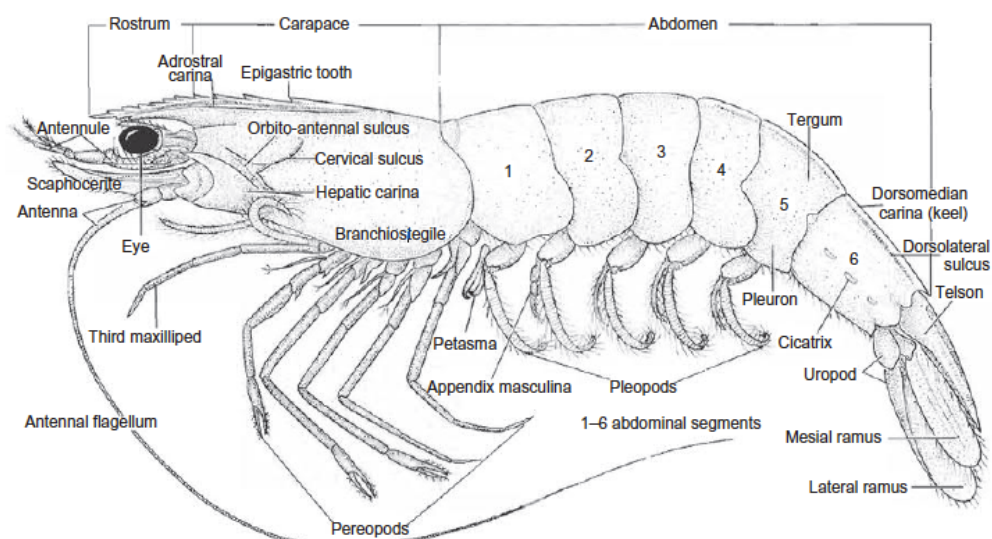


Figure 2 -Generic *Penaeus* morphological lateral view (Samocha, 2019).

The wild shrimp life cycle has different stages in various habitats. The juvenile usually prefers brackish water of mangroves while the adult forms prefer deeper waters with higher salinity. Figure 3 exemplifies the stages of the shrimp life cycle. However, Oceanum's business will raise the shrimps from the Megalopa phase until the adult form, which is the phase ready for commercialization.

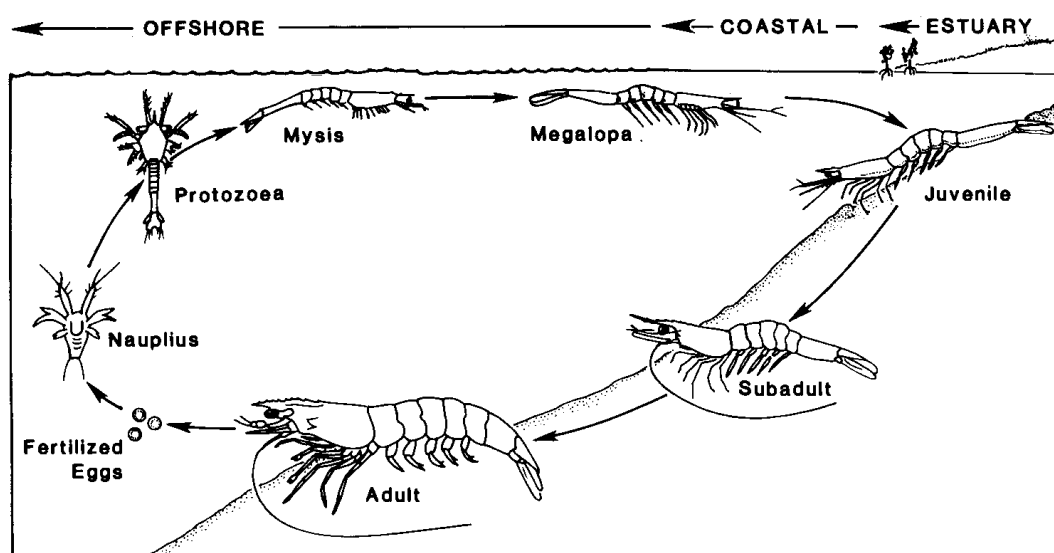


Figure 3 - *Litopenaeus vannamei* life cycle (Samocha, 2019).

The Figure 4 diagram presents the shrimp productive chain. Oceanum value chain is represented from the number I to number VII. Postlarvae (I) will be imported to Madeira and raised until commercial size (VII). All aquaculture initiatives start with the capture of wild

broodstock or eggs. However, shrimp farming is already a well-established industry widespread around the world, which is already capable of providing on a commercial scale healthy and resistant postlarvae. This means that no broodstock will be extracted from the sea to provide Oceanum's postlarvae, which will be provided by enterprises based on the US or mainland Europe.

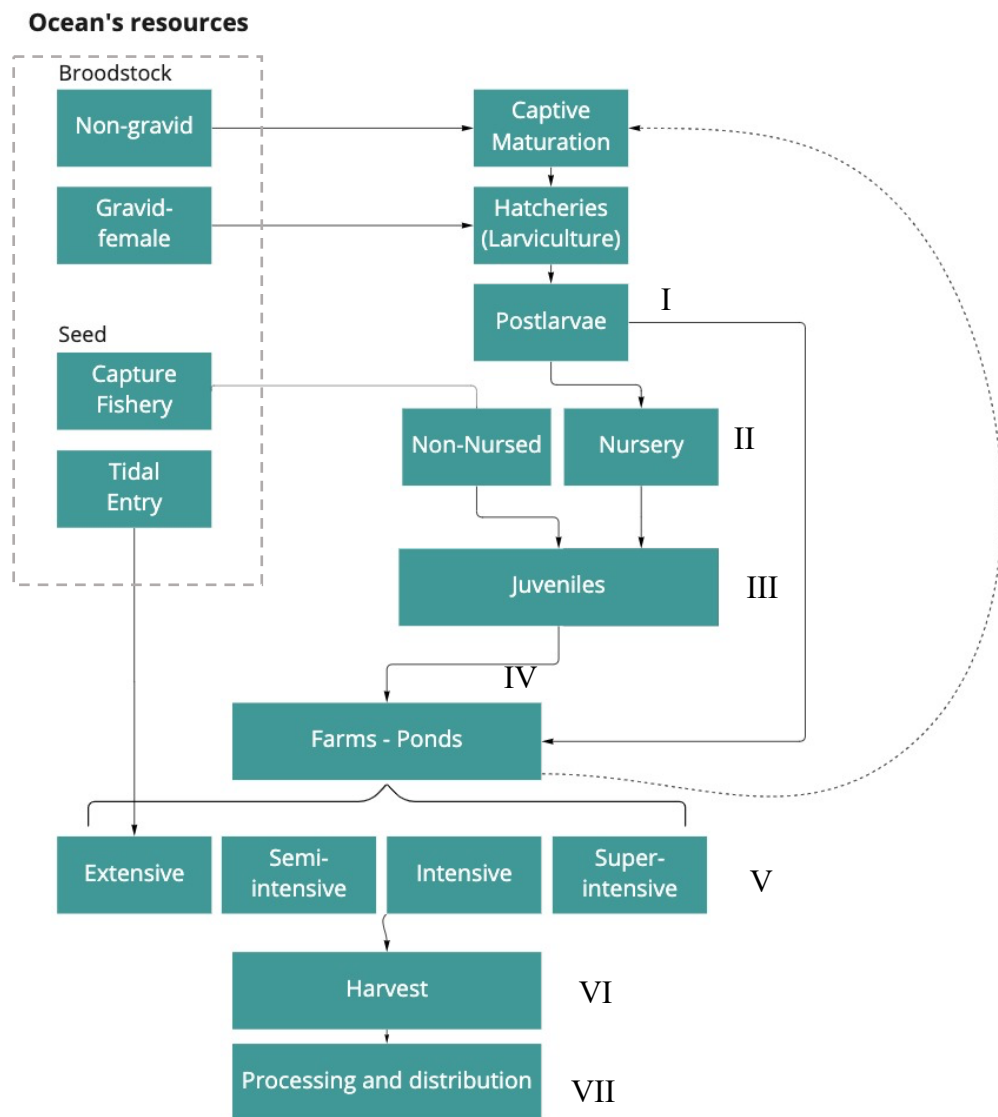


Figure 4 – Shrimp productive chain along its life cycle (A. W. Fast, Bailey-Brock: Julie H., & Moss, 1992)

The shrimp farm's parameters are basically the water quality parameters. They are Salinity, Dissolved Oxygen, Temperature, Dissolved CO₂; Alkalinity and Suspended Solids. The correct parameters measurement is important to reproduce the ideal conditions for the growth of *Litopenaeus vanammei*. The water parameters knowledge is fundamental to design the

production facility and to determine the energy input necessary for the farm, which will directly impact the business profitability.

Table 1 - Water parameters for Shrimp Farming (Samocha, 2019b)

Parameter	Value/Range
<i>Salinity</i>	<i>15-30 ppt</i>
<i>Dissolved Oxygen</i>	<i>> 4,5 mg/L</i>
<i>Water temperature</i>	<i>26°C to 32°C</i>
<i>Dissolved CO₂</i>	<i>< 5 mg/L</i>
<i>Alkalinity</i>	<i>120 – 150 mg/L CaCO₃</i>
<i>Nitrogen Composts</i>	<i>35 mg/L N-AT (NH₄ + NH₃)</i>
<i>Total suspended solids</i>	<i>< 10ml/1000ml</i>

The *Litopenaeus vannamei* nutrition is omnivorous, the diet is based on animal and plant feed. The higher the growth rate, from juvenile to adult (Phase III to VI in Figure 4) the higher is protein intake, which requires specialized manufactured feed. The commercial feeds available have high protein content and offer the necessary quality to avoid waste. This guarantee a high feed conversion rate, which means that to harvest one kilogram of shrimp two kilograms of feed is necessary (1:2), while beef cattle have an average (1:6) feed conversion rate (Smith, Davis, & Loerch, 2010). The lower feed conversion rate is usual for aquatic animals, which increases the sustainability of this kind of farms because less feed is necessary to farm the same weight of meat (FAO, 2018).

The farming technology used in Oceanum's farm though will use the Biofloc Technolgy System, further explained in the next session, which allows shrimps to supplement their feed needs by eating microorganisms present on biofloc. Therefore, better conversion rates than (2:1) are expected, reducing overall operational costs. (Gaona, da Paz Serra, Furtado, Poersch, & Wasielesky, 2016) and (Samocha, 2019a).

Better feed conversion rates are the reason for choosing *Litopenaeus vannamei* as the preferable shrimp for Oceanum's farms. This specific specie has a better performance on BFT systems than other shrimp species, tolerating higher shrimp density per cubic meter.

The BFT System

The production will use the biochemical technology BFT (Biofloc Technolgy System), cited before, but further explained in this section. The BFT system is used for water organisms farming in a closed loop (without water exchange) for super-intensive systems (high number of organisms per square meters). The system requires constant aeration and has its name because of the presence of bioflocs (Samocha, 2019a)

Bioflocs are an aggregation of organic composts and microalgae, ciliates, flagellates, protozoa, bacteria and others. The aggregation occurs when the farm water is constantly aerated to keep the composts and living organisms suspended in the water column. Cultivating shrimps using the BFT is advantageous because the microorganisms present in it are capable of improving water quality, reducing toxic composts and also are a supplementary source of food for the shrimps (Gaona et al., 2016).

The reduction of toxic composts allows biofloc systems to operate with minimum water renovation and keep farm biosecurity. The system performance depends on a stable balance of the carbon-nitrogen (C:N) proportion. The appropriate C:N proportion is kept by water monitoring. Carbon sources are added to the water to keep the proportion balance, compensating for the extra nitrogen generated by shrimp excreta and feed leftovers. Periodic organic carbon sources examples are sugar or sugar cane honey. The golden rule is usually to add carbon sources every time ammonia levels reach concentrations of 1 mg/L. (da Silveira et al., 2020).

Oceanum's facilities will be as close to shore as possible to avoid transporting seawater far away. It is possible to cultivate in lower salinities or using artificial salt, but since Madeira Island is abundant in clear seawater it is not necessary to use artificial salt. Oceanum aims to produce seventy tons of shrimp after 5 years of operation, but at the beginning, the idea is to start with small and replicable modules to improve water and zootechnical parameters. Producing 70 tons need around 7000 square meters of tanks plus the auxiliary infrastructure. The production site must contain, a laboratory for shrimp and water analysis, an inventory room, an administrative area, a machinery room and a space reserved for logistic operations.

The tank area will be constructed under greenhouse protection to maintain high water temperatures since *Litopenaeus vannamei* do not have a satisfactory zootechnical performance in temperatures below 26° C. The greenhouse also contributes to improve energy efficiency and biosecurity.

3. Market Analysis

3.1 External Analysis

3.1.1 Political Spectrum

There are different ways to structure firms' external analysis. One of the most known frameworks is the PESTEL. PESTEL analysis's objective is to identify the environment where

the firm is inserted and provide vital information to stakeholders to understand the current context and predict possible trends for the future. This business plan uses the PESTEL framework for external analysis. It includes relevant information regarding the Island's politics, economics, social, environmental and legal aspects.

In 1976 the constitution defined Madeira as an autonomous region of Portugal. The autonomy assigned to Madeira includes a parliament directly elected and regional cabinets with decisions on various policy areas. The increase of self-rule has been increasing at Madeira Island since the autonomy assignment. According to Ruel (2019), the F(RAI) increased from 14.5 points in 1976 to 19.5 in 2010 ($CARG_{34years}$ 0.87%). RAI indicates financial and political autonomy. Although autonomous in some political and financial decisions, Constitution obliges political parties in Portugal to be statewide, not allowing regionalist parties. However, Madeira has a curious case of one rule party, the Social Democratic Party (PSD), which has been winning Regional Presidential Elections from 1976 to the present year of 2022. The consistent presence of PSD in the higher ranks of regional government since 1976, and their social policy focused on tackling regional social problems, mainly related to poverty and illiteracy, have been positioning PSD with a strong regionalist character (Ruel, 2019).

Aquaculture is supported by the actual government since it is in line with the Portuguese central government resolution that defines the strategic approach for the Ocean Decade 2020-30 (Presidência do Conselho de Ministros, 2021). However, the Socialist Party (PS), in opposition to the actual party PSD is leading a movement against aquaculture open-sea cages in some cities on Madeira Island, such as Calheta and Ponta do Sol (Pacífico, 2021). Further to this, civil society have been organizing public petitions against open sea aquaculture, which have at the moment 725 signatures (“Contra a Aquacultura no Arco da Calheta e na Madeira,” n.d.).

3.1.2 Economic and Social

Land

Economists' main concern is maximizing satisfaction through the utilization of scarce resources, which in resume are land, labour and capital (Baker, 2014). The analysis of Madeira's Island Economic can be evaluated for each of these resources.

Land in Madeira Island Archipelago is a scarce resource since its borders are defined by the sea. It is possible to divide the land into four categories Artificial Surfaces, Agricultural Areas, Forests and seminatural areas, and water bodies. Artificial Surfaces that comprise Urban, Commercial and Industrial Fabric occupy 14,83% of the territory. Agricultural areas that

include arable land, permanent crops and pastures represent around 14%, while Forests and Semi-natural areas correspond to 68,92% per cent of available land. Water bodies are 2,25% (Buckner et al., 2016).

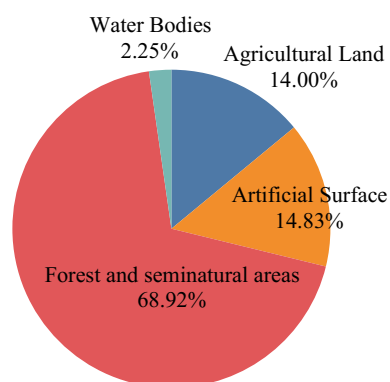


Figure 5 - Madeira Island Archipelago Territory Division per type of land (%) (Buckner et al., 2016)

Labour

Labour costs at Madeira Island are composed by two main costs Wage Costs and Other Cost. Wage Costs includes: Base Wage, Regular Bonuses, Irregular Bonuses and Allowances (holiday bonus, Christmas Bonus etc), Overtime work payment, Payment in kind. Other Cost comprises: Severance payment, Employers' legal costs, Collective agreed, contractual and voluntary costs (DREM, 2021a). These items compose the Labour Cost Index developed by Madeira Island Statistics Regional Direction (DREM) to evaluate year on year variation of labour costs.

SUSTAINABLE BIOFLOC MARINE SHRIMP AQUACULTURE AT MADEIRA ARQUIPELAGO



Figure 6 - Madeira Autonomous Region Labour Cost Index (DREM, 2020)

Figure 6 presents the Evolution of Madeira Island Labour Index since 2008, which uses 2016 as the Index Base. In the past 5 years, the Cost of Labour has been increasing year by year, in 2021 it was 25,8% more than in 2016. This was the highest value registered since 2009.

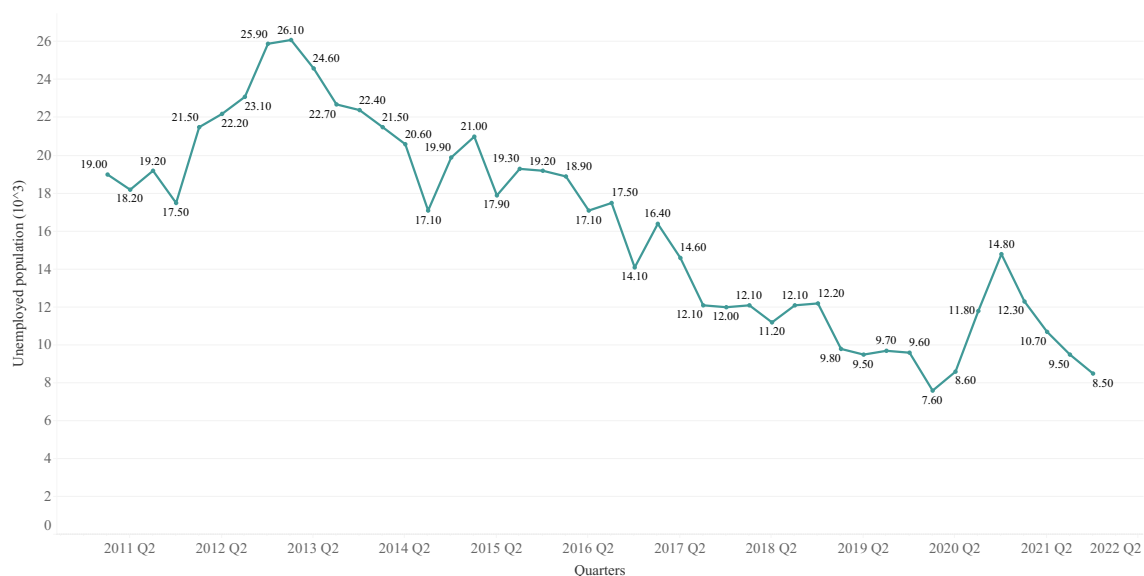


Figure 7 - Number of Unemployed People at Madeira Island (in Thousands) (DREM, 2022)

Figure 7 shows the number of unemployed people on Madeira Island since 2011. Unemployment has been declining in general terms since the series began. Recently, in 2020 Q4, unemployment achieved the highest number since 2017Q1, which reflects the tourism crisis generated by the Covid-19 Pandemic.

Madeira Island firm's workforce perception is different from the Portuguese national average. Among all of Madeira's firms, 22,9% identify an inadequately educated workforce as a major constraint while the national average is 11,1%. For this indicator, Madeira has the highest level among Portuguese regions, followed by the North region (13,9%) and Lisbon Metropolitan Area (10,4%). Therefore, 56% of firms offer formal training to their employees, while the national average is 29% (The World Bank, 2020).

Capital

Capital access in Madeira Island can be accessed throughout (The World Bank, 2020) Enterprises Surveys, which provide an overview of the obstacles experienced by private sector firms in Portugal. The per cent of firms in the period between 2018 and 2020 using banks to finance their investments in Madeira was 21,8%, which is higher than the Portuguese national level of 16,7%. Regarding bank loans or lines of credit, 57,1% of Madeira Island firms confirmed they have a bank loan or line of credit active with a financial institution. No Madeira's firms reported loan rejection in the fiscal year before the survey was conducted, which may vary between 2017 and 2019 depending on the survey date at each firm. In general, Capital access overall perception can be evaluated using the percentage of firms that identify access to finance as a major constrain, which is 4.3% in Madeira, 4.8 p.p. lower than the national average of 9.1%.

Social

In 2020, Madeira's population is around 253 thousand people, and it has population density of 317 habitants/km². The Island Capital, Funchal, is the most populated area, with 103 thousand people, approximately 60% of total population and with a population density of 1361,2 habitants/km² (Direção Regional de Estatística da Madeira, 2021)

In 2021, 18,8% of total resident population aged between 16 and 89 years has superior education as the highest level of education, while 24,97% has the secondary school as the highest educational level. Therefore, 63% of population do not have completed the secondary school at Madeira Island Archipelago. Portugal national numbers are higher, 24,12% of population has the superior education as the highest educational level and 25,42% has the secondary school. (PORDATA, 2021).

The median earning per capita declared on Portuguese Income Tax after deductions in 2019 was EUR 9527,00 per year (EUR 793,25 per month). Regarding wage-earning, the

minimum wage in 2021 was EUR 682,00, which will raise to EUR 723,00 in 2022 (Direção Regional de Estatística da Madeira, 2020)

3.1.3 Technology

Communication at Madeira Island is developing each year. In 2019 31,7% of residents have access to high-speed internet at home, this percentage increased to 33,0% in 2020. Since 2016 it increased by 5,6 p.p. as shown in Figure 8.

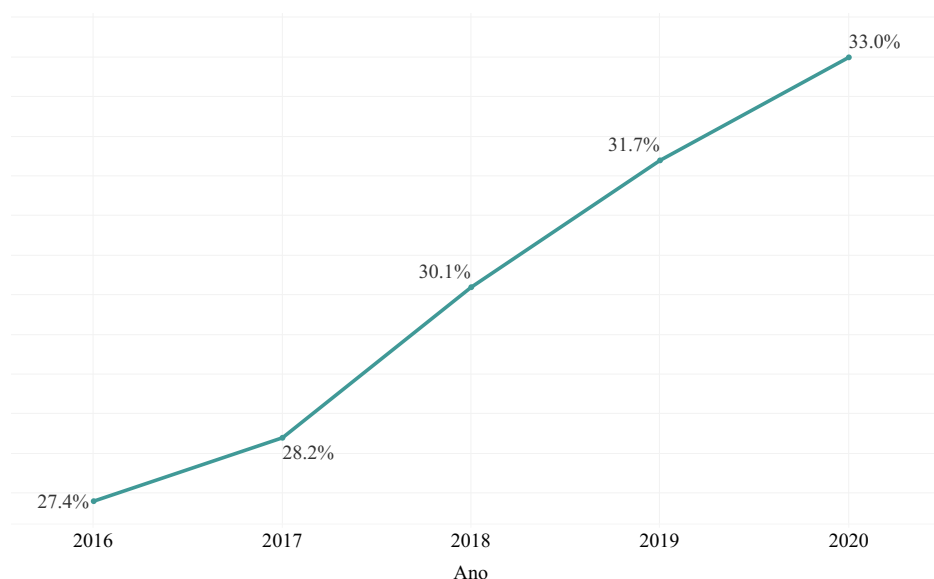


Figure 8 – Internet Access using broadband per 100 residents (%) at Madeira Island (INE, 2021a)

For paid television, there are around 100.000 subscriptions, which represent almost 40% of the population. Therefore we may infer that more than 40% of the population have access to paid television because one subscription can be watched by the subscribers' relatives. (Direção Regional de Estatística da Madeira, 2020)

Statistics regarding internet use were not found specifically for Madeira Island Region. However, at the national level, it is possible to understand how Portuguese people have been using the internet. According to Figure 9, after reaching 80,2% in 2019 the use of social media has been stable at around 80%. Sending and receiving e-mails increased from 80,1% in 2017 to 87,6% in 2021, which represents a CAGR of 1.8 p.p.

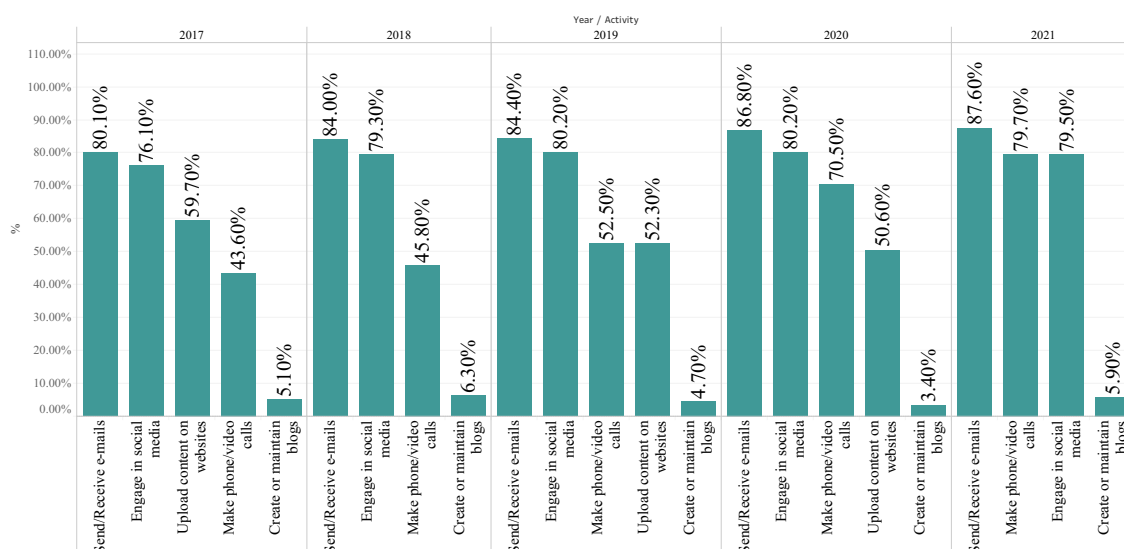


Figure 9 - Percentage of Portuguese aged between 16 and 74 years that used internet on the 3 first months of the year (Per Activity and Per Year) (INE, 2021b)

3.1.4 Environment

Portugal is in an important moment regarding environmental policies. Recently, in 21st June 2021, the Ministry Council Board released the National Strategy for the Sea 2021-2030. The National Strategy for the Sea (NSS) has its principles in line with United Nations 2030 Agenda. In the years from 2016 to 2018, the sea economy in Portugal has been growing twice as faster in comparison to the national economy.(Direção Geral de Política do Mar, 2021). Besides the importance to economy, NSS has clear environmental goals, which influences business decisions in Portugal and consequently at Madeira Island Archipelago.

The NSS's 10 goals are listed below (Direção Geral de Política do Mar, 2021):

- SO1 - Combat climate alterations and pollution & protect and restore ecosystems.
- SO2 – Stimulate employment and the Sustainable and Circular blue Economy.
- SO3 – Decarbonize the economy and promote renewable energy sources and national energetic autonomy
- SO4 – Promote and guarantee food safety and sustainability
- SO5 – Facilitate potable water access
- SO6 – Promote health and well-being
- SO7 – Stimulate scientific knowledge, technologic development and blue innovation
- SO8 – Increment the education, the formation, the culture and the ocean literacy.
- SO9 – Stimulate industrialization and productive capacity & digitalize the ocean
- SO10 – Guarantee security, sovereignty, cooperation and government

It is possible to relate at least three Strategic Objectives directly to environment preservation (SO1, SO2 and SO3) while the others impact environment indirectly.

The objectives presented on NSS are in line with Madeira's Regional Directorate for the Sea presents as their mission. The Directorate was created inside the Regional Secretary for Sea and Fishing to develop and regulate the subject related to the sea. Promote ocean literacy and define regional politics related to the sea are one of its main objectives. Aquaculture licensing, development and regulation are responsibilities of the Directorate (Madeira Regional Directorate for the Sea, 2021).

3.1.5 Legal

Madeira firms also provided their impressions regarding regulations and taxes at the archipelago at the Enterprises Surveys (World Bank, 2020). Senior management spend 12,5% of their time dealing with the requirements of govern regulations, which is above national average of 9,9% time spent. Construction-related permits takes in average 32,8 days to be obtained. 62,5% of firms believe Tax Rates at Madeira Island is a major constrain to business development. Furthermore, 25,5% of Madeira's Island firms are visited or required to meet tax officials, which is more than double than the average Portuguese national level of 10,1%.

Enterprise Survey The World Bank (2020) present Madeira firm's election of the three biggest business obstacles at the Archipelago. 51,7 % of firms chose the tax rates as the biggest obstacles, 21,0% chose transportation as the biggest obstacle and 5,4% believe that inadequately educated workforce is the biggest obstacle. Licensing is not considered an obstacle since just 0.1% of the business in Madeira Island cited it as a major constraint.

3.2 Transaction Analysis:

Transaction analysis refers to the touchpoint between firms and its market with the external environment that affect both. Firms' touchpoints with the market are the interaction with clients and competitors. These interactions occur in complex environments that are ruled by uncertainty. Therefore, it justifies the necessity for constant external and internal analysis in an iterative process seeking for continuous improvement. The following analysis contemplate Oceanum's customers and competitors.

3.2.1 Customer Analysis

There are important factors to consider when accessing the customer analysis for a business plan. Baker (2014) describe six key concepts that help answering the question “How do buyers choose?” The concepts are:

1- Selective Perception

This first concept calls attention to the customer's perception of his needs, seller must always put themselves on the buyer's perspective to avoid promoting features not desirable or indifferent to the customer. The product can be revolutionary in its features, but if it requires complex adaptation from the customer's point of view, it might not be valuable to the customer's selective perception.

2- The hierarchy of needs

This concept is related to Maslow A. (1943) cited in Baker (2014) theory that defined a five-step hierarchy of customer's needs:

- I. Physiological needs
- II. Safety needs
- III. Love needs
- IV. Esteem needs
- V. Self-actualization needs

Usually, customers will try to satisfy their own needs according to Maslow's hierarchy. According to the desired product or service, this analysis can help managers to classify customers' motivations, which will guide marketing techniques and practices.

3- The hierarchy of effects

The hierarchy of effects is the chronological order that describes customers' journey from product or service Awareness to the final action (Purchase). One example of the Hierarchy of Effects is present in the below diagram. The name is AIDA and the letters stand for:



Figure 10 - Hierarchy of effect models - AIDA (Baker, 2014)

The first step is awareness, it represents the step when consumers perceive the product or service among the various market stimuli. Secondly, the Interest step is the perception of possible exchange interaction where the customer will probably benefit from buying the product or service. Desire is the step when customers believe that the product will fulfil their needs (desire) and this will lead them to the Action phase, where the purchase will occur. Although obvious in some contexts, Baker (2014) states that mapping each of the steps saves time and effort to set marketing objectives in terms of moving people along the hierarchy of effects.

4- Post-purchase dissonance

The post-purchase dissonance happens the moment after the purchase. The customer starts using the product or service and starts his judgement on how far the product is in relation to the previous purchase expectation. This phase is important to understand the feelings and opinions of customers about the firm's product. Further, this concept is important to define the after-sale role and performance.

5- Buy phases and buy classes

The buy phases described in this section are similar to the ones discussed in the hierarchy of effects. The additions are 'buy classes' composed by New Task, Modified rebuy and Straight rebuy. They help the manager to understand the challenges customers have when buying a product for the first time (new task), buying an old product with some modifications (modified rebuy) or the repetition of previous purchases (Straight rebuy).

6- The characteristics of goods

The classification of goods influences management decisions because are linked with customer purchase decisions. Aspinwall L. (1958) cited in Baker (2014) proposes the analysis of five product characteristics:

- Replacement Rate;

The time between purchases on this item or the purchase frequency. This rate addresses how many times per week, month or year the products are purchased.

- Gross margin;

The difference between the sales price and the paid cost of the product.

- Adjustment;

The number of services applied to the product to meet customer needs.

-Time of consumption;

The lifetime of the product.

-Searching Time;

The average time customer needs to find the product or a similar one.

Aspinwall L. (1958) cited in Baker (2014) use these five characteristics to divide products in three main categories:

- I. Red Goods (Convenience Goods): High replacement rate, low gross margins, adjustments, time of consumption and search time.
- II. Orange Goods (Shopping Goods): Medium score for the five characteristics.
- III. Yellow Goods (Specialty Goods): Goods with a low replacement rate, but a high score for the other four characteristics.

Baker (2014) proposes his own model based on the six concepts previously discussed. Baker's model defines the purchase as the result of the interaction between the six concepts. The message derived from the customer analysis is to understand each of levers necessary to address the product to the right customer. To address Oceanum's Customers the below analysis was conducted following (Baker, 2014) customer analysis audit method:

Who buys?

The clients are restaurant chefs that want to buy high-quality shrimp with a predictable offer. There are between 1100 and 1350 restaurants in Madeira which can be considered potential prospects (Advisor, 2022; DREM, 2021b). The ideal chefs are those who have formal education in gastronomy or experience and can understand the importance of quality and the supply predictability in their raw ingredients, which increase restaurant profitability by reducing scarcity of goods, diminishing supply costs and maintaining quality standards (Mun & Jang, 2015).

What do they buy?

Chefs will buy raw white-leg shrimp (*Litopenaeus vannamei*), fresh or recently frozen, produced locally at Madeira Island. It is possible to estimate the local shrimp consumption as between 680 and 750 tons per year. This consumption volume includes different shrimp species and formats (frozen, pre-boiled etc). The actual supply of shrimp is usually sold frozen and not

fresh since there is no significant wild shrimp captured at the Island sea nor any local aquaculture producer. (INE, 2022)

When do they buy it?

The chefs will buy according to their needs preferable weekly to guarantee the shrimp's freshness. The production planning will follow the chefs' needs guaranteeing a predictable supply of shrimps. Therefore, it is expected a close relation between chefs' needs and the quantity produced.

Where do they buy?

The shrimps will be purchased in straight rebuy or mid-term contracts depending on the quantity required. Small orders are negotiated by phone at spot prices, while higher quantities will be delivered directly to the client following the agreement of established mid-term supply contracts.

How do they buy?

The shrimp purchase for high-volume clients will be on a planned basis, while small orders (on-demand) will be negotiated daily or weekly depending on the clients' needs

Why do they buy?

Chefs want to have a predicable source of raw ingredients. According to Murphy & Smith, (2009) restaurants place particular emphasis on the reliability of supply, consistency, quality, and price—all of which relate to the concept of supply chain management. Therefore, Oceanum's shrimp production will fill the gap for this particular product and supply service.

The purchasing decision will be based on experimental knowledge and comparison with no fresh frozen shrimp. Oceanum will have the first mover advantage in this industry at the archipelago, which allows for constant feedback from clients (Chefs) and the consequent the adaptation of final shrimp size and freshness. Murphy & Smith (2009) states that Chefs exchange information regarding sources of ingredients and experiences with different producers and help establish a regional brand for local ingredients. Therefore, Oceanum will supply information to Chefs and collect their inputs to improve the product.

3.2.2 Industry Analysis & Competitor Analysis

The industry analysis starts with the mapping of the value chain from Raw Material to Post Order (Baker, 2014). The value chain overview is fundamental to define who are the actors in the industry. Returning to Figure 4 we recall Oceanum's value chain position, which comprises items I to VII. Therefore, we can identify the main industry actors: 1-the suppliers which sell post-larvae, feed and general materials; 2-the customers, which were defined in the previous section; 3-The shrimp farmers and other competitors who sell shrimps from two sources: aquaculture farms and wild captured shrimp.

The suppliers can be divided into three groups: the ones that supply post-larvae, the suppliers of feed and probiotics eventually used and the suppliers of other materials and equipment.

As previously stated, Oceanum is based in Madeira Island in the middle of the North Atlantic Ocean and suppliers are scarce, and sometimes inexistent. At the time this dissertation is being written, there is no Post-Larvae or Shrimp Feed supplier on the Island. Other equipment, such as pumps, tools, laboratory materials and chemicals have local suppliers but do not necessarily have the best price, which will demand procurement research to avoid an increase in costs.

Shrimp farming business procurement focuses on primary activities, which are vital to business functioning (Carvalho et al., 2020). In Oceanum's case, it comprises post-larvae and feeds purchase. Carvalho et al. (2020) indicates four steps to guide management decisions to define the right supplier:

- Define the contract method: total or partial contract, fixed priced or adjustable?
- What are the qualification criteria to define a supplier? Quality, standards etc.
- Proposal reception and analysis
- Supplier selection.

Answering Carvalho et al. (2020) questions bring the understanding that finding the right suppliers to raise shrimps at Madeira Island will be a challenge. Therefore, to minimize stock-out risks, contracts with fixed prices are the best option to achieve the product growth phase. Suppliers linked to primary activities need to provide high-quality feed and post-larvae since it is mandatory for business performance (Samocha, 2019). Therefore, the proposal reception and analysis phase will demand samples for quality and performance tests before any supplier selection.

The other industry actors are shrimp farmers and seafood distributors. Since at the moment there are not any shrimp farmers in the archipelago, the competitor's analysis must focus on

seafood distributors who import frozen shrimp from international producers and fishing companies. Local shrimp farming is inexpressive (INE, 2022).

Evaluating competitors starts with the industry's critical success factors. Grunert et al. (1998) did extensive research on a European-based company in the business of frozen seafood and define critical success factors as “a skill or resource that a company can invest in, which, on the market, the company is operating on, explains a major part of the observable differences in perceived value and/or costs.” Although Oceanum aims to sell fresh or recently frozen shrimp, Grunert et al. (1998) research can be used as a proxy to define what are the possible critical success factors in the industry. They are presented in eleven points:

- 1) Innovative Product Development
- 2) Systematic market analysis
- 3) Knowledge of consumer's quality/taste demand
- 4) Approved production facilities
- 5) Supply consistent quality
- 6) Fast response to changes in the consumer/customer demands
- 7) Respond to changes in the supply of raw materials
- 8) Image
- 9) Supplier/customer relationship
- 10) Own-Production
- 11) Ability to offer competitive prices

It is fundamental to consider these factors before starting Oceanum's shrimp production. Since critical success factors are actionable by definition (Grunert et al., 1998), Oceanum can control its own factors and systematically compare them with competitors to improve results. Looking at the shrimp farming industry value chain, cited at the beginning of this section and presented in Figure 4, the eleven frozen seafood critical success factors allow Oceanum to evaluate Opportunities and Threats. The table below presents the industry critical success factors divided into Opportunities and Threats according to Oceanum's current situation.

Table 2 -Oceanum's Seafood Industry Opportunities and Threats

Opportunities	Threats
1) Innovative Product Development	5) Supply consistent quality

- | | |
|---|--|
| 2) Systematic market analysis | 6) Fast response to changes in the consumer/customer demands |
| 3) Knowledge of consumer's quality/taste demand | 7) Respond to changes in the supply of raw materials |
| 4) Approved production facilities | 11) Ability to offer competitive prices |
| 8) Image | |
| 9) Supplier/customer relationship | |
| 10) Own-Production | |

Possible opportunities for Oceanum are related mainly with innovation and customer proximity. Since this is the first kind of crustacean farms at Madeira Island, innovation is one of the strengths at least in short and mid-terms. Customer proximity is also an opportunity because chefs will help Oceanum build the product. Chefs are in direct contact with final customers (B2C) and following market trends for restaurants. Therefore, points 1, 2, 3, 8, 9 can be considered opportunities. Point 4 and 10 are also opportunities because beside strong safety regulation at Madeira Island, Oceanum's founders have engineering background, which guarantee the maintenance and necessary attention to safety practices and the well-functioning of own production sites. Points

Regarding threats, the main concerns are related to raw materials supply. Although relationship with suppliers is considered an opportunity (point 9), supply quality and response to changes in supply of raw materials (Points 5 and 7) maybe slow due to the Island characteristic isolation from mainland. Consequently, it affects points 6 and 11, Fast response to Changes in Consumer Demands and Ability to Offer Competitive prices respectively, that are also considered threats.

The exercise of establishing Oceanum's opportunities and threats cannot be complete without evaluating competitors throughout a benchmark analysis. There is no shrimp farm in Madeira at the time this text is being written, therefore Oceanum's competitors are mainly seafood distributors and importers. Huge retail chains (Ex. Jeronimo Martins, Sonae and Nobrega) are also important local competitors since they provide seafood in various formats including shrimps, mainly frozen but also fresh, which can be the main option for small restaurants. However, in the short and middle-term, Oceanum will not try to substitute huge

retails chains for small restaurants, since its focus are specialized chefs who wants a more specialized shrimp.

The graph on Figure 11 presents Madeira's Island Fishing and Aquaculture Firms that can offer shrimps to restaurants. The data was extracted from Orbis Platform a comparable data resource developed by Bureau van Dijk firm. The data extracted from Orbis, compared companies at the archipelago that develop their activities in the following categories: 03-Fishing and aquaculture; 031-Fishing; 0311-Marine Fishing; 0312-Freshwater fishing; 102-Processing and preserving of fish; crustaceans and molluscs; 1020-Processing and preserving of fish; crustaceans and molluscs; 4638- Wholesale of other food, including fish crustaceans and molluscs; 4723-Retail sale of fish, crustaceans and molluscs in specialized stores.

The data extracted contained firm's name, last available data year, firm's operating revenue, number of employees, Profit Margin (%), Falcon and WVB Global scores (Financial Risk Evaluation scores). **Error! Reference source not found.** presents Profit Margin against Relative Market Share, where:

$$\text{Profit Margin} = \text{P/L before Tax} / \text{Operating Revenue}$$

If the company **is** the market leader:

$$\text{Relative Market Share} = \text{Company's Market Share} / \text{Second Player market share}$$

If the company **is not** the market leader:

$$\text{Relative Market Share} = \text{Company's Market Share} / \text{Leader's market share}$$

The size of each circle represents the Operating Revenue size in thousands of Euros.

$$\text{Market Share} = \text{Company's Revenue} / \text{Sum of all Companies Revenues}$$

Figure 11 gives us an overview of the market for seafood on Madeira Island. The idea of using relative market share (RMS) is to understand how far companies are from the leader. An analysis of market share only does not transmit this perception or any other tendency. For example, 20% market share represents the leader position in a sector but a small player in another, therefore, relative market share analysis helps benchmarking companies against the sector leader.

The Orbis Extraction database presented 181 companies of various sizes in number of employees, revenue and profitability during the year 2020. The data were treated to simplify

the analysis, therefore companies with activities not related to aquaculture or seafood distribution were also eliminated. Examples of descriptions that were eliminated are Repair of Fabricated metal products and Combined office administrative service activities. After this description filter, 26 companies were left. Since 26 companies' names are easily handled, further online research was done on each company to eliminate companies wrongly classified, which result in a competitor database of 17 companies from the seafood distribution or aquaculture sector.

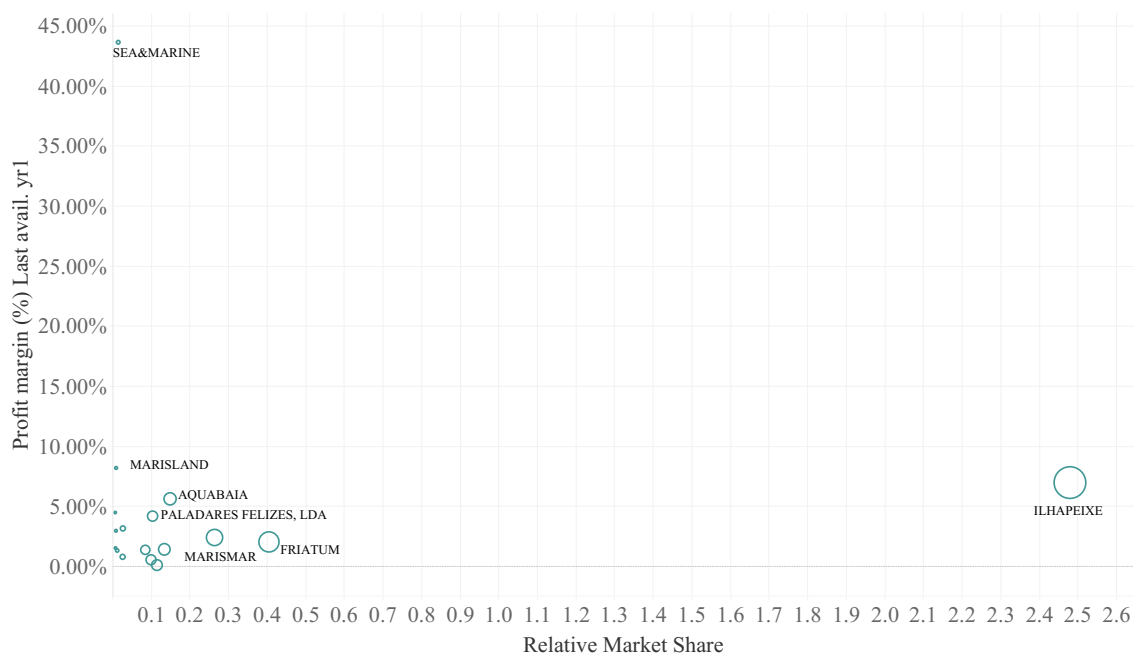


Figure 11 - Madeira Island Fishing and Aquaculture Firms (Profit Margin vs RMS)

The 2020's market leader analysis presents Ilha Peixe (Operating Revenue 20,72M) as the leader followed by Friatum (Operating Revenue 8,36M) which is part of Grupo Vidinha, one of the biggest players in the fish industry at the archipelago, and Marismar (Operating Revenue 5,44M). The three companies hold together 68,2% of the Market share, while the other 14 share 31,8% of the market. The sector's profit margin tends to concentrate under 5% per cent, with some exceptions.

It is important to state that the three main retail companies, Pingo Doce supermarkets (Jerónimo Martins SA), and Continente (SONAE SA) were not included as competitors in benchmarking because, although they offer shrimp, their operations are much more complex and involve other products, which would bring excessive complexity. The premise assumed here is that local restaurants may buy from these supermarket chains to avoid inventory rupture

but would not sign supply contracts due to the huge difference in size and the consequent low buyer power.

4. Business Analysis

4.1 Internal Analysis

Recalling the literature review, there are three schools of strategy that focus on the internal aspects of firms: Figure 1 presents them as Resource-Based View, Knowledge-Based View and Behavioral Strategy. All three can be used to evaluate firms' internal characteristics for the analysis purpose, however another characteristic need to be considered. Resource Base View school approach is Macro, in other words, considers the interaction between firms, while Behavioral Strategy concentrates on the individual. (Knowledge-based view is in the middle of the Macro-Micro scale in Figure 1).

For the purpose of this text, it is better to use the Resource Based View approach since Oceanum is not yet a running business. A proper evaluation using the other schools as Knowledge-based view or Behavioral Strategy requires a more micro approach which Oceanum cannot still provide. Therefore, the internal analysis in this text will be based on the Resource Based View (RBV), which models the firm's performance using resources and capabilities as a source of competitive advantage (J. B. Barney & Hesterly, 2013).

Resources are tangible and intangible firm assets that it can use to conceive and implement it is strategies. Examples as machinery, cars, tools (tangible) and brands, and reputation (intangible). Capabilities are subsets of resources (tangible or intangible) which firms can use to take full advantage of other resources. It is possible to classify a firm's resources and capabilities into four categories financial resources, physical resources, and individual and organizational resources.

Oceanum was born in March 2021 to prove that Madeira Island businesses and people can thrive consuming sustainable products. Oceanum has a high-value human capital, it was founded by a group of engineers. Physical resources are one car and high-performance computers to develop any necessary analysis, further to this, 10 thousand square meters of land have been rented to be the headquarters of Oceanum, this land will not support the tank due to its agroforest classification at Funchal PDM but can serve as a selling point or a place to reunite customers and chefs to prepare organic food shrimp dishes for marketing and conservation purposes. At the moment, financial resources equal the founders' personal Income and Assets,

but they will be compensated by Venture Capital in the mid-term appealing to the innovative business model in the archipelago. Table 3 presents the first assessment of Oceanum's resources. Since it is a new company, resources are still scarce and can change fast depending on external events for better or worse. This small resilience is expected in this company stage but requires attention to avoid losses. This text, for instance, is a tool itself to protect founders and clarify potential risks in this business.

Table 3 – Oceanum's Resources

Financial	Physical
Founder's Capital	Car
Venture Capital	Personal Computers
	10000 sqm Land
Individual	Organizational
High Qualified Founders	Open Communication
	Horizontal Structure
	Culture and Reputation

It is suggested by J. B. Barney & Hesterly (2013) and Grant (2020) that the identification of resources and capabilities depend on the value chain analysis. Therefore, to identify Oceanum's resources and capabilities it is possible to recall Figure 4 to have a holistic view of the Shrimp Farming value chain.

For example, according to Prahalad & Hamel (1990) who popularized the concept of resources and capabilities throughout the term "firm's core competences" it is important to use core competences (maximum 6) to define a firm's core products. Core products are an example of resources that when enhanced by a firm's capabilities can deliver value to customers and preserve competitive advantage.

Figure 4 can guide the search for resources and capabilities that Oceanum must focus to obtain competitive advantage. Careful analysis is requested to understand the process to

delivery High Quality Farmed Shrimp. In order to make the analysis easier Figure 4 can be rearranged in McKinsey Value chain model below on Figure 12. It is possible therefore to understand which are the most important factors to consider in each step from post-larvae procurement to harvested shrimp distribution.

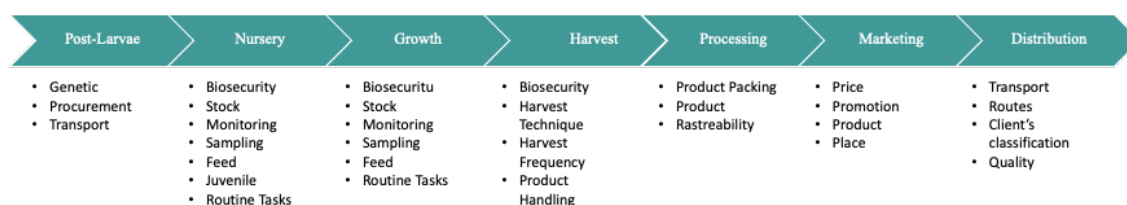


Figure 12 - Oceanum Value Chain

The value chain analysis together with the resources table allows the mapping of Oceanum's capabilities. Farming Management and Procurement will be facilitated with the founder's experience in procurement and consulting, who has been working in SAIPEM as a buyer for more than one year and has two years of management consulting experience. The nursery, Growth and Harvest phases require attention to organization and biosecurity, which is in line with Izabella's experience with clean rooms in the chip industry and health and safety coordination at Madeira Island. Monitoring and routine creation is the speciality of Thiago which can implement operational and sales indicators to monitor each phase. (Nursery to Harvest and Distribution Phase). Therefore, it is possible to add Oceanum capabilities in Table 4 to complete the evaluation.

Table 4 - Oceanum's Resources and Capabilities

Financial	Physical
Founder's Capital	Car
Venture Capital	Personal Computers
	10000 sqm Land
Individual	Organizational
High Qualified Founders	Open Communication
Management and Procurement Experience	Horizontal Structure

Biosecurity and Organization

Culture and Reputation

Operational and Sales Routines and Indicators

After the careful establishment of Oceanum's resources and capabilities, it is possible to apply VRIO framework analysis to evaluate how many (if any) of these resources can provide a competitive advantage. VRIO's framework is presented by J. Barney (1991b) and in his further work to determine the competitive potential of resources and capabilities, which must be protected by firms to achieve competitive advantage. The VRIO framework is a tool inside the RBV school to complement the Opportunities and Threats done in the Market Analysis sections. It pinpoints the sources of competitive advantage and helps evaluate how sustainable these competitive advantages can be in a time frame (J. B. Barney & Hesterly, 2013). Table 5 below presents Oceanum's VRIO framework:

Table 5 - Oceanum's VRIO matrix

Resource and Capabilities:	Valuable?	Rare?	Costly to immitate?	Exploited by organization?	Classification
Founders Capital	No	-	-	-	Competitive disadvantage
Private Investors Interest	Yes	Yes	No	-	Temporary competitive advantage
Car	Yes	No	-	-	Competitive parity
Personal Computers	Yes	No	-	-	Competitive parity
10000 sqm Land in Funchal	Yes	Yes	Yes	Yes	Sustained competitive advantage
High Qualified Founders	Yes	Yes	Yes	Yes	Sustained competitive advantage
Management and Procurement Experience	Yes	Yes	Yes	Yes	Sustained competitive advantage
Biosecurity and Organization	Yes	Yes	Yes	No	Potential Competitive Advantage
Operational and Sales Routines and Indicators	Yes	Yes	Yes	No	Potential Competitive Advantage
Open communication	Yes	Yes	No	-	Temporary competitive advantage
Horizontal Structure	Yes	No	-	-	Competitive parity

Culture and Reputation	Yes	Yes	Yes	Yes	Sustained competitive advantage
-------------------------------	-----	-----	-----	-----	--

If the resource or capability is classified as competitive disadvantage it means management should act to eliminate or improve this resource because it will not exploit environmental opportunities neither neutralize threats. If the classification is competitive parity, the resource will not create competitive advantage but if not exploited may create disadvantage, therefore attention is required. Temporary competitive advantage is it will differentiate the company for a period providing a first-mover advantage. However, when competition realize that this is an advantage it will act to duplicate it as soon as possible establishing competitive parity. The potential competitive advantage classification means that the resource is valuable, rare and costly to imitate, but company is not organized enough to use it. Consequently, managers should act quickly to organize and transform it in Sustainable Competitive Advantage.

Oceanum VRIO matrix present four Sustained Competitive advantage and two Potential competitive advantage. The majority of these resources and capabilities are Individual Resources (Table 4). At this stage, these are competitive advantages to apply for investment from private and public sectors. However, if Oceanum is too slow to act on improving the other resources and capabilities it might lose momentum to achieve better results, mainly financially.

4.2 External Analysis

The literature review presents different strategy schools on the external view spectrum. They are Industrial Organization, Institutional Approach School and Austrian economics/ entrepreneurship-based school, which occupies the right side of Figure 1. The Industrial Organization approach has Porter as one of the most influential authors and considers the interaction between firms and their surrounding environment under the influence of the five forces (Threat of Entry, Threat of Substitutes, Rivalry among Competitors, New Entrants Threat and Bargain Power of Buyers). Institutional Approach School studies firms and their interaction with surrounding institutions (Government bodies, Regulatory Agencies etc), while the Austrian economics/entrepreneurship-based school puts the entrepreneur as the driving force of the economy.

Oceanum's external analysis can benefit from the three external schools. The Austrian Entrepreneurship-based strategy school helps define limits to Oceanum's founders' individual capacities to scale up the business. Individual willpower is a true game-changer at this point in

company foundation and development, but attention is needed to avoid naïve beliefs that all can be done alone. Challenges regarding investment, interactions with government bodies and logistical difficulties may be far beyond the founder's reach, for example. Therefore, they must be addressed strategically, recurring to as much external help as possible, for example, local partners.

The interaction with government and regulatory agencies can benefit from Institutional Approach School to help Oceanum map the role and impact of these institutions on Oceanum's operation. Although Madeira Island is part of Portuguese territory, it has its particularities due to its natural isolation in the middle of the Atlantic Ocean. The small population and its minor geographical size associated with a strong and relatively independent local government may influence firm-government interactions. Politicians, entrepreneurs, and government employees eventually share spaces and know each other in person due to the small size of the Island, which is not common in bigger cities and regions. Oceanum needs to consider the interaction scenario when requesting permits or investments to avoid any possible conflict of interest.

Austrian school and the institutional approach are important to help Oceanum build its external analysis for the scale-up phase, but the investment is crucial to start operating. Therefore, the Industrial Organization approach analysis is important to give investors an overview of the industry forces for risk mitigation.

The following paragraphs are the analysis of shrimp farming industry forces at Madeira Island:

- The threat of new entrants:

Shrimp farming has medium entry barriers such as environmental and operational licensing. High-skilled labour is required therefore finding qualified personnel is a challenge at Madeira Island. The initial investment is high since Biofloc Shrimp Farming requires state-of-the-art equipment.

- The power of suppliers:

Suppliers of Post Larvae (raw material) have medium force over Shrimp Farmers since they can control prices of the entire chain. It is considered medium and not high because their product is perishable (living larvae). Feed suppliers have high force over Shrimp Farmers. Similar to other industries (cattle and chickens), feed costs increase when commodities prices increase. Machinery and equipment suppliers have low power over farmers. Although initial investment tends to high, after delivering the equipment suppliers do not have much more influence over the farmers on the operation due to its long depreciation time.

- The power of buyers:

Buyers have high power over farmers on the spot sales market since fresh shrimp are perishable. Buyers have low power over farmers on future contract sales since the price is negotiated previously. Further to this, the dependence on a steady supply of shrimp tends to be a disadvantage to buyers.

- The threat of substitutes:

The threat of substitution is high considering small/medium (10g to 15g) size and frozen shrimp on the spot sales market. Restaurants have plenty of options from supermarkets and distributors.

The threat of substitution is low considering fresh shrimp and bigger size shrimp (frozen or fresh) which are hard to find on traditional channels and depend on importation. Recent media news communicates that Madeira's wild shrimp fishing will be permitted in Madeira limiting the catches to 20 tons per year (30% of Madeira's annual consumption). This fact may represent a high threat of substitution but also an opportunity because shrimp fishing will be prohibited between April and September which leaves an open demand window. Winter and Autumn months will require attention to avoid or minimize loss of market share.

- Rivalry among existing competitors:

Shrimp Distributors and soon shrimp fishermen will be Oceanum's competitors. The rivalry is considered low now in the fresh shrimp market since there are not any shrimp farmers in Madeira. The advent of Madeira's wild shrimp may change the course of this industry, raising demand or dominating it, but it is too early to say. If government bodies increase the fishing permits for more than 20 tons per year this might flood the market and generate a decrease in market price and consequent reduction in industry profitability.

4.3 SWOT Analysis

After evaluating Oceanum's internal and external aspects, it is possible to unite Strengths, Weaknesses, Opportunities and Threats on the SWOT matrix. The SWOT is an important tool because its technique is useful to reduce the available information to manageable portions. The rule of thumb is to present all the information on one sheet of paper since there are limits to the amount of information humans can process (Baker, 2014).

Strenghts	Weaknesses
10000 sqm Land in Funchal (Distribution)	Founders Capital
High Qualified Founders (Strong HR)	Private Investors Interest
Management and Procurement Experience	Car and Computers (Easy to Imitate)
Culture and Reputation (Sustainable Firm)	Open communication (Easy to Imitate)
Biosecurity and Organization (Quality)	Horizontal Structure (Easy to Imitate)
Operational and Sales Routines and Indicators	
Opportunities	Threats
Innovative Product Development (First Firm)	Fail to supply consistent quality
Systematic market analysis (Buyers Feedback)	Possible fail to response to changes in consumer/customer demands
Knowledge of consumer's quality/taste demand	Fail to respond to changes in supply of raw materials
Approved production facilities	Fail to offer competitive prices
Brand Image (Local Product Brand)	
Supplier/customer relationship (Local Chefs)	
Own-Production	

The SWOT analysis is a balanced tool to unite insights from the VRIO matrix (Resource Based View) and Porter's Five Forces analysis (Industrial Organization Approach). It is important to avoid common errors that may occur, for example, generic statements that can fit any category or focus too much on founders' ideas without listening to customers' perceptions (Example: Long-time established brands may think it is an advantage while customers may perceive it as outdated) (Baker, 2014).

In resume, Oceanum's SWOT provides a clear message that the founder's knowledge is the most power strength at this moment. Therefore, it is the founder's role to use creativity to

enable this knowledge to be used. This will demand building enough revenue to fund founders, which can be achieved by public or private funding or the selling offside products to improve the brand presence and sustain founders' cost of living. Financial limitations are the most severe weakness at moment, which may delay Oceanum's progress, fortunately these are solvable problems, mainly in this decade where government funds are directed to aquaculture business. Founder's knowledge and interpersonal skills are strengths that must be used to capture opportunities such as building good commercial relationship with buyers and suppliers and to improve Oceanum's production facilities operation. If well used, the strengths will minimize the risks presented by external threats, that are price wars (perishable products), bad quality or delayed raw material supply, and customers requiring changes faster than Oceanum capability of adaptation.

5. Strategy Analysis

5.1 Business Unit Analysis

According to Porter (1990) there are two main strategies to possess sustainable competitive advantage: lower cost or differentiation. Lower cost consists in processes and capabilities to produce at a lower cost, in other words, it means efficiency. Being more efficient than competitors in producing, designing and marketing products or services. If prices are similar among competitors, lower costs permit higher returns. Differentiation is the ability of delivering superior value to clients. Superior quality, special features or after-sales services are examples of differentiation. Differentiation allows firms to operate in a premium price, which leads to higher profit margins when costs are similar among competitors.

Porter defends that any successful strategy must pay attention to both lower costs and differentiation. However, although not impossible, having both differentiation and lower costs is difficult because the differentiation of a product or service usually incurs higher costs. Technology can help to lower costs and differentiate at the same time, but in the long run, competitors tend to imitate and achieve the same level.

Oceanum's efforts will focus on differentiating its products from competitors' offers. Shrimp harvested at Oceanum's facilities will have customized sizes and weights according to Madeira Island chefs' preferences. Cost reduction will also be part of Oceanum's goals. However, Biofloc Shrimp Farming demands state-of-the-art equipment and it is energy-intensive, these characteristics limits cost reduction, which if not respected may compromise product quality.

5.2 Corporate Analysis

Growth is an essential movement to guarantee firm's survival. Firms should pursue growth to survive and to mitigate risk by expanding its operation into new markets (Baker, 2014). Ansoff (1957) divides growth into four strategies: Market Penetration, Market Development, Product Development and Diversification. Table 6 helps identify the differences and interactions between the strategies to grow.

Table 6 – Product/Market Strategies for Growth (Ansoff, 1957)

Market Product Line		M1	M2	M3	...				
P1	Market Penetration	Market Development							
P2	Product Development					Diversification			
P3									
⋮									

The firm is pursuing market penetration if the strategy is to increase the amount of the same product in the same marketing. Market Development occurs when firms start to open new markets with the same product, for example, when passenger airlines start to open new markets for cargo transportation. Product development becomes part of a firm's strategy when new lines of products are developed to serve the firm's actual market. Finally, diversification happens when firms focus on developing new product lines and new markets. Ansoff (1965) cited in Baker (2014) states that companies usually follow one or more than the cited strategies altogether, and when done correctly is a sign of a well-managed firm, since growth strategies are necessary to survival by improving firms' resilience.

It is important to say that growth strategies are not detached from risk. The creation of new markets and product lines to diversify brings inherent risks that increase with the distance between a firm's actual core business and its new product proposition. Baker (2014) recalls the Figure 13 to explain that firms must pursue diversification when the three other strategies do not work. It is possible to see that the higher the diversification the lower the synergy and higher the risk, but higher ROI are possible.

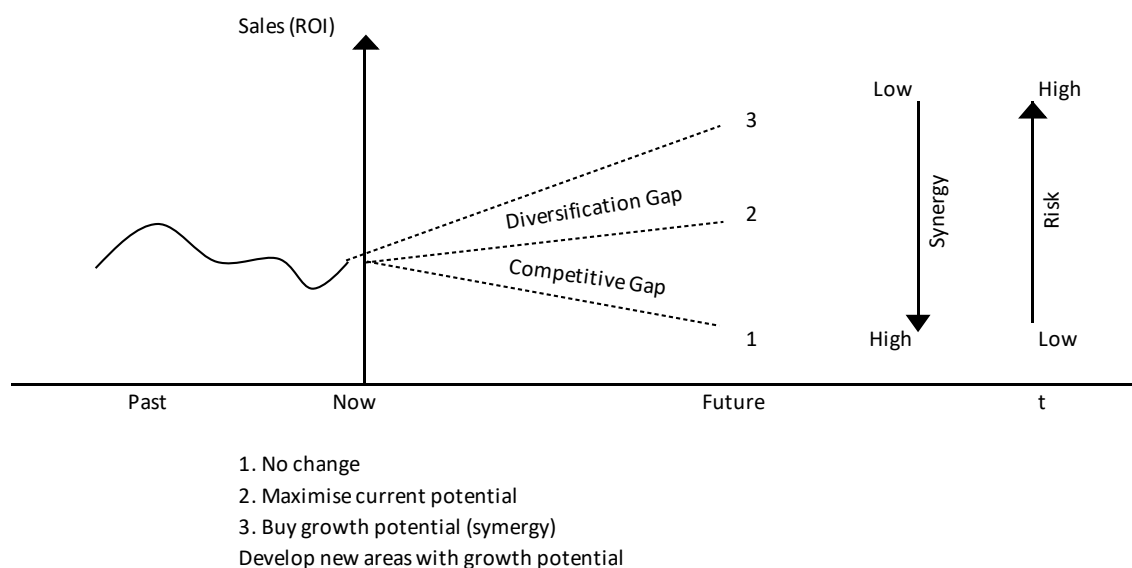


Figure 13 - Gap Analysis Chart (Ansoff, (1965) cited in Baker (2014))

Oceanum's growth strategy in the initial phase cannot be further to Market Penetration. In its early stages, it is fundamental to mitigate risks and invest in developing a strong core product capable to build Oceanum's brand reputation of quality and sustainability.

Therefore, it is possible to expect that Shrimp will be the only product in the first five years of business. After well-established production and sale cycles, Oceanum will start to develop new product lines, such as shrimp dumplings and other frozen variations to serve the same restaurant market (Product Development). In a five-year time, if production reaches enough momentum to reach ten per cent of the Island's demand for Shrimp (around 70 tons per year) Market Penetration strategy must be conducted to allow production to increase. It means that Oceanum may have to focus on delivering new shrimp products to final customers changing from an exclusively B2B sales model to B2C. The outcomes of the Market Penetration strategy will be perceived in the following years, but the Ansoff growth matrix shows itself as a powerful tool to clarify the steps Oceanum must follow to achieve its desired outcomes.

6. Strategy Formulation

6.1 Oceanum Mission and Vision

Oceanum's mission is unite family and friends at the table, providing health and environmentally friendly food. Oceanum will accomplish this by providing safe seafood applying and communicating sustainable practices to empower community on the development

of an environmental-friendly business. Mission and vision are powerful tools for any company to guide their actions throughout the years. Oceanum values are strongly based on the goals of obtaining environmental, social and economic profits, the three pillars of sustainability. We believe that without caring for community and the environment any economical profit alone does not provide enough sustainable competitive advantage. Economical profit is the key driver for firms' survival, but achieving prodigious results are directly linked to communities' social wellbeing and environmental-friendly actions because they guarantee the maintenance of a balanced and resilient business environment.

6.2 Oceanum's Objectives

Oceanum objectives can be divided according to three timeframes (Table 1). Short-term objectives (1 to 2 years), medium-term objectives (3 to 5 years) and long-term objectives (more than 5 years).

Table 7 - Oceanum objectives divided according to three time-frames.

Time Frame	Objective
Short-Term	Define the permits necessary with the government bodies Prepare Business Plan for the first production module Apply for Venture Capital Funds Apply for European Funds Found suitable land for the project Collect the necessary fund to finance the project
Mid-Term	Receive the permits Start building the first module Import the first batch of Post-Larvae Import the first feed supply Produce the first cycle of fresh shrimp
Long-Term	Constantly improve the cycle operation efficiency Increase the quantity produced per cycle Increase the product mix Open new markets

6.3 Critical Success Factors

Critical success factors are the core factors responsible for Oceanum success on the development of its business model. It is possible to track Oceanum's critical factors from its SWOT matrix analysis.

The main critical success factor is the complementary and high qualification of its founders. The well-prepared founders are important assets to translate Oceanum business plan in small and actionable steps that will lead to fresh shrimp production.

Further to this, Oceanum's culture and reputation as sustainable firm will help to minimize risk and gain public support to develop shrimp farming. Madeira Island population suffers from Ocean illiteracy and some groups are against aquaculture, therefore Oceanum's critical success factors must be used to share knowledge with the community and help shrimp farming achieve its place among other sustainable business on the archipelago.

7. Strategy Implementation

7.1 Marketing Mix

Baker (2014) presents different perspectives about the marketing mix. The marketing mix is basically the firm's touchpoints with the market. It is the group of tools available to managers to operate the company's marketing and communications with the clients. McCarthy (1978) cited in Baker (2014) defined the 4 Ps of Marketing. Product, Price and Promotion. Other authors have further definitions including other Ps (7Ps or even 12Ps), they criticize McCarthy's theory as being too simplistic. Baker (2014) agrees that 4Ps are not enough to solve all the challenges of marketing a company, but it is important to accept that the simple concept of 4P is powerful and valuable to construct and start any marketing plan. This text also agrees with the importance of the 4P of marketing and will follow describing Oceanum's 4Ps.

7.1.1 Product

Oceanum's product consists of sustainable fresh shrimp sized at least 20g. This definition is crucial to Oceanum's operation since it is directly related to the operational procedures. The 20g plus shrimps are classified as big, which implies longer production cycles of more than 90 days. For the customers, the bigger the shrimp the higher the amount of fresh meat which is usually understood as a product of better quality. In the short term as described above, Oceanum will solely focus on delivering high-quality shrimp fresh or recently frozen until it has this procedure well stabilized. Once satisfactory quality levels are achieved, Oceanum will focus its energies on structuring new product lines to its product mix. Possible examples are peeled-off shrimp, frozen shrimp empanadas and pre-cooked shrimps. The increase in product mix is in line with the growth strategy proposed by Ansoff and will increase Oceanum's resilience.

The main differential characteristic of Oceanum's shrimp is its sustainable approach. The biofloc technique applied on Oceanum's farms will allow a reduction in costs and will be a powerful marketing asset to increase shrimp value in the market. Further to this, if well positioned as Madeira's Regional product, Oceanum shrimp will be more appealing to local restaurants, since they can position their meals as more sustainable and regional.

7.1.2 Price

Oceanum expects to offer differentiated shrimp. Therefore, it expects added value on its price. Price theory explains that the higher the prices the smaller the quantities sold. This said Oceanum must aim to optimize profit generation charging enough to compensate for the small volume produced in the early stages of operation. The challenge in pricing farmed shrimp is to prove that farmed shrimp has no flavour difference from the wild one. On the contrary, shrimp farms can offer a regular supply of well-sized shrimp and better quality and biosecurity since the process is controlled from Post-Larvae to Harvest and Distribution. Those characteristics are an opportunity to set higher prices for the end customers, but they must be perceived as valuable by the buyer to have the desired effect on pricing.

The advantages of buying farmed shrimp should be well communicated to enhance buyers' perception of Oceanum's farmed shrimp. Communication is done through marketing campaigns, focusing on shrimp freshness and availability while clarifying the brand's sustainable approach.

Baker (2014) emphasizes that price should not always be used to profit maximization since it is too simplistic. The price is a tool directly correlated with profitability, but it also affects sales volume and a firm's stability and these other two indicators must be considered in price strategy management. There are two price strategies commonly used: skimming the market and penetration strategy. Skimming the market consists in charging an extra price to "skim the market milk" and capture value by providing a differentiated product. Penetration strategy, however, prefers price reductions in exchange for market share. Oceanum will use the skimming strategy because it will be able to accelerate payback, increase profit on the early product life cycle, reduce initial risk, diminish the need for financial resources and imply positive prestige and quality.

7.1.3 Placement

Placement is the "P" that represents the distribution and sales channels. These channels' functions are basically to connect production and consumption. Producers are geographically

separated from buyers; therefore, it is important to define proper channels to connect them from production sites to delivery. Time is another variable present in distribution strategy because, except for personal services, products are produced at a time before their consumption. Information is the third characteristic related to channels since they allow the flux of information in both ways from customers to producers. The information flux can fill producers with information to improve products and services, while on the consumer side it clarifies product features and their applications. The last characteristic related to channels is the ownership of the product. Channels permit to establish clear borders for goods ownership transfer, which brings security and trust to commercial exchanges.

There are three types of distribution strategies: intensive, selective and exclusive distribution. An intensive strategy consists in covering a wider market and high-volume sales. Customers are varied in type and high in numbers, therefore it is fundamental to have a mass marketing advertisement campaign (Ex.: Groceries and household products). Selective distribution is related to moderate market coverage and a medium number of channels, customers are also moderate in number and pleasant shopping conditions and good service are the main goals for the business (Ex.: Furniture, Clothes and Watches). Exclusive distribution has a strong image, controlled channels and price stability. Few are the channels, and they are restricted to few customers, therefore marketing is directed towards personal selling and good service (Ex.: Automobiles, designed clothes and caviar) (Baker, 2014)

Oceanum strategy choice for the starting phase is an exclusive distribution to partner restaurants.

7.1.4 Promotion

Promotion objective is to increase sales. Baker (2014) proved in one of its articles that there is a positive correlation between advertising expenditure and sales. In other words, the more money injected into advertising the more sales are expected. For sure, there is not any direct mathematical equation that defines the exact output in sales according to a specific investment in advertising. Therefore, each business has its particularities regarding promotion, which must be in line with the firm's strategy.

Although the promotion objective is sales generation. It is important to understand that there is a customer path between product awareness to purchase, as previously discussed in the transaction analysis section (Figure 10). This path, Awareness, Interest, Desire and Action are addressed in the promotion strategy since each step is important to help the customer achieve the desired action of choosing the firm's product among its rivals. Baker (2014) considers this

path and united strategies proposed by Corkindale (1976), in the article “Setting Objectives for Advertising ” to define eight strategic advertising objectives that are discussed below in Oceanum’s context:

- Objectives of Awareness;

The Oceanum’s advertising is already running on Instagram to raise awareness for the conservation of Madeira’s Nature. It is possible to check at @Oceanum_Madeira content related to Ocean preservation. The main objective is to develop Oceanum brand recognition and associate it with a sustainable relationship with the sea.

- Objectives related to trial;

Oceanum will position itself as a differentiated environmentally friendly product. The idea is to position sustainable shrimp as an alternative to wild catch crustaceans. Therefore, this is expected to stimulate product trials.

- Objectives of Promoting Behavioral Change;

More than selling sustainable seafood, Oceanum wants to promote behavioral change. Oceanum has a strong conservation purpose and therefore promotion will focus on the nature conservation benefits of consuming aquaculture shrimp. Therefore, we expect to raise awareness about ocean preservation while delivering a sustainable product.

- Objective related to education and information;

Oceanum advertising will assure the understanding of shrimp's sustainability. Advertising will also focus on exposing the positive points of shrimp regular supply, one of the strongest points of Oceanum's offer. Therefore, chefs will be advised on how to communicate the value of using sustainable shrimp in their dishes and how it can leverage their profitability.

- Objectives related to attitudes;

Further to educating on aquaculture shrimp sustainability, Oceanum wants to share how people can improve their attitudes and relationship with nature. Eating sustainable shrimp is a remarkable attitude to consume food while preserving nature, therefore it must be promoted to improve Oceanum as a sustainable brand and to attract new clients that want to change their consuming habits for more sustainable foods.

- Objectives related to reminding;

Advertising will also reinforce Oceanum's brand in the archipelago. The main objective is to position it as a sustainable option for restaurants that want to have peace of mind regarding shrimp's steady supply and the assurance that it comes from a sustainable source.

- Objectives related to branding/image building;

Advertising will promote Oceanum's shrimp freshness aiming at local chefs and restaurant chains. The first and second years will focus on one-to-one approach with chefs because production outputs tend to be small. After the scale-up phase, third year and further, other media channels with a bigger audience would be preferred to sell products and firm new contracts.

- Objectives of delivering a specific message;

Besides advising regarding Oceanum's shrimp freshness and sustainability promotion advertisement will share positive evaluations and create awareness on how Oceanum's business model guarantee Oceans preservation.

7.2 Resources

7.2.1 Implementation Plan

The analysis of Oceanum's business resources requires an understanding of business implementation phases. Oceanum plans to grow in 4 phases:

I – Permits obtention to three shrimp harvest cycles (Up to the first two years)

Consists of the time necessary to apply for funding, obtain permits, receive funding, execute facilities construction, import shrimp larvae and feed, and raise the shrimp from the post-larvae size until the harvest phase. The initial phase will take up to two years since this business is an innovation to Madeira Island and may face bureaucratic barriers to entry. Investment is necessary to support cash flow necessity while operation does not sustain itself.

II – Fourth shrimp harvest cycle to sixth cycle (Third year)

After the farm's construction phase and the execution of three initial testing harvest cycles, Oceanum's shrimp farming operation matures to the commercial scale while maturing the farming techniques. The business efficiency indicators and metrics become more robust and

reliable. Marketing investment to open new selling channels will start together with phase two. The second phase will be a turning point since positive cash flow is expected from the selling of the first harvests. The second phase will indicate if Oceanum's operations have the potential to grow.

III – Seventh to Ninth shrimp harvest cycle and Module Duplication (Fourth year)

In case of phase two runs, as expected, operational practice will achieve maturity and a module duplication is expected to offer a more stable shrimp supply to customers. This phase will request a second round of investment in case of expansion but tend to be easier to predict since business indicators will be more mature and reliable than in previous phases.

IV - Further expansions and module duplications following demand (Fourth year and beyond).

The third phase and constant marketing research will define the north for Oceanum's operation expansion. It will depend on Island shrimp demand, export prospects and ESG indicators. If one of the three fails in presenting reasonable levels, Oceanum will focus on improving business operation until achieving better performance to expand safely.

7.2.2 Organogram

Strategy implementation depends on firm's organization. Oceanum will have a simple hierarchical structure. The founder, Arthur Friedrich, who writes this text will be responsible for nurturing commercial partnerships with suppliers and customers, procurement and relationship with government bodies to request permits and authorizations. The directors Izabella Zobot and Thiago Friedrich will be responsible for product quality and HSE, and operational effectiveness, respectively. The rest of operational team will be picked up following technical requirements demanded by the activity according to the business growth necessity. Initial stages will require the founder and director's workforce only. Third parties' providers will be temporarily contracted to execute any needed maintenance, repair or building until Oceanum business develop the minimum cashflow to keep employees under a lower risk scenario.

7.2.3 Human Resources

Human resources will grow according to Oceanum's operation. On the first phase, from getting permits to tree shrimp harvest cycles, the founder and the two directors will run the

operation alone and contract third party providers to execute any activity that lays out of their working scopes. From the second growth phase that runs from the fourth shrimp farm cycle to the sixth (second year), employees will grow accordingly to the maintenance and operational necessity. It is expecting that 2 more employees will join the team. One for feeding and water parameters check and other for machinery maintenance. Both under the supervision of HSE/Quality director and Operations director. The third phase, which comprises the construction of a new module with the same tanking capacity, will be based on the evaluation of team's performance to understand the necessity of contracting more employees for operational tasks. Employee per tank ratio is expected to be clear at this stage, making further expansions simpler regarding firm's employees' necessity.

7.2.4 Material Resources

The material resources for the first phase depend on the size of the production. The first phase will require a land rental of at least 8000 thousand square meters to start construction of a 50 m² nursery tank and two 400 square meters tanks to start the pilot plant. Although the first phase does not require 8000 thousand square meters, it is better to start in a place where expansion is possible to avoid managing two different sites.

The tanking area defines production volume maximum output and the necessary equipment to run the business. It is possible to check in the annexes the list of materials necessary for the first tanking area plus basic infrastructure equipment to run the pilot plant.

7.2.5 Manager

The management of Oceanum is the founder responsibility assisted by the HSE and Quality Director and the Operations Director. All three are engineers, first two chemical engineers while the third is mechanical engineer.

The initial phases of the business required technical expertise and experience that team can provide. Lack of knowledge in any function will be compensated by short term courses and the contract of third parties' service. The team's engineering background allow good communication with stakeholders, ROI analysis and risks assessment, which are characteristics necessary to run any business. Further to this, team's environmental and social awareness will be guiding operations under the sustainable approach of the triple bottom line, which expect economic profit but must provide social, environmental profit (Elkington, 1997).

7.2.6 Sales Force

Oceanum sales force will grow according to the business phase. Phases I and II will not need any salesman since the plan is to sell directly to partners restaurants. The productions cycles are supposed to be in development in this phase, which not require a big sales team, the founders will be able to negotiate closely to restaurants to develop a trial supply of shrimps. The following phases, III and IV will need at least one extra vendor to register customers' requests while delivering the product. The vendor will also help the founders approaching new restaurants to deliver the next shrimp harvest (increase customer base).

7.2.7 Juridic and accounting Support

Juridic and accounting support will be done by contracting third parties according to fiscal and juridic needs and legislation. The third party's services prove themselves cheaper for Oceanum in the initial phases and will grow according to business necessity.

8. Economic and Financial Viability

The objectives of financial analysis are three in this text: Define the investment sum necessary to scale production from zero to around Seventy tons per year; Calculate the net present value and finally the payback time of investments

8.1 Premises

It is necessary to define the following premises from which the financial and economic analysis are built on. The main premises are listed below:

- VAT taxes: The VAT consider for shrimp is the intermediary which correspond to 12%.
- Income Taxes (IRC): Companies at Madeira Island pay 20% of Income Taxes.
- Prazo médio de recebimento: Clients will have 30 days to pay Oceanum.
- No Risk Interest Rate: The No Risk Interest Rate considered is the 10 years Portuguese Treasury Bond Yield, which is 2,26% on August, 2022.
- Market Prize: Market Prize considered is the difference between PSI 20 Index Three years Yield (8,27%), which replicates Lisbon Stockmarket Returns, and the No Risk Interest Rate. The difference is 6,1% (8,27% - 2,26%).

- Financial Betas (Damodaran, 2022): The financial betas were estimated using the average between agriculture sector data and Processing Food Sector, which we considered the most appropriate mix to simulate the Shrimp Farming Aquaculture business.

- Inflation Rates: Inflation rate is 1,3%

- Depreciation: The project duration is 12 years to define financial analysis borders. It does not mean that the company will stop its activities once the time period is over, on the contrary, Oceanum expect to run the activity indefinitely. However, extending the analysis more than 12 years bring too much uncertainty without adding any value to the analysis on this text context. The depreciation assumed respect the Oficial Portuguese decree n.º 25/2009, from the 14th of September, 2009.

8.2 Sales and Costs Forecast

The sales and cost forecast are related to the size of operations. The below demonstrative presents the scale-up phase from year zero to year five when the investment in infrastructure reaches the maximum, which is the investment necessary to produce seventy tons.

The first year will produce around 3 tons of fresh shrimp corresponding to 56% of the module capacity. The main objective of the first year is to register the zootechnical performance and test Oceanum's operational capacity. It is also important to test in practice the suppliers' ability to provide post-larvae on the necessary frequency. The financial modelling expected revenue for the first year is 60.000,00 and it will increase accordingly to infrastructure investment until the fifth year, reaching 1.362.000,00. The bigger the tanking areas the higher the shrimp production volume. However, after the fifth year, no investment in tanks will be done and any increase in revenue is the result of operational improvements in farming process.

8.3 Fixed Capital and Amortizations

The initial investment consists of two 400 m² tanks for the growth phase and water management and one 50 m² tank for the nursery. It is also included the necessary machinery and laboratory equipment, and the assets for shrimp commercialization. It is possible to evaluate some of the prices quoted in these text annexes.

Amortization considers the total depreciation of assets at the project's end in the twelfth year. The total depreciation makes the investment analysis simpler because it avoids the evaluation of different amortization rates (each item has its depreciation rate). Total depreciation also means that no residual value will be considered at the project's end, in other

words, no money is recovered from the selling of equipment and infrastructure. The total depreciation may turn the Net Present Value analysis more challenging because no residual value is considered. However, if the business plan presents a positive Net Present Value without residual values, this means that any monetary recovery at the project's end would increase the Net Present Value.

8.4 Working Capital Requirement

8.4.1 Inventory

Inventory includes all the feed necessary for the shrimp farm cycle. The feeds are divided into two groups post-larvae feed and shrimp feed (Growth feed). Post Larvae inventory will consider 45 days of feedstock, which is longer than the post-larvae cycle. The same is considered growth feed, which will have a 120 days inventory. The decision to have one complete farming cycle in feed stored is considered to avoid any problems that may incur due to the Island's isolation. Just in-time feed delivery is not yet a reality at Madeira Island to risk losing one harvest. Therefore, before operating is not safe to assume an inventory cycle smaller than the complete shrimp cycle.

8.4.2 Receivables

Oceanum's strategy focuses on acquiring recurrent customers by contract. Therefore, it may be necessary to provide a 30-day payment for the key accounts. The first three years will provide 30 days for all customers, but from the fourth year forward the aim is to reduce 30 days payment to only 30% of the clients. However, for the purpose of financial analysis 30 days payment is considered for all customers.

8.4.3 Payables for Suppliers

Oceanum will negotiate to have 30-day payment with the most suppliers possible. The two main suppliers are feed suppliers and post larvae suppliers. The first years may require payment at sight, but after scaling up the business it will probably allow thirty-day payments or more, according to the purchasing amount.

8.4.4 Payable Taxes

Payable taxes consider the difference in VAT between what is received from customers on top of sales minus the tax paid on any raw material and equipment necessary for the company's operation.

8.4.5 Capital Structure

This project is starting from zero. Therefore, for the project evaluation analysis we are considering 100% own capital as recommended by Mota et al. (2020). It is important to state that Oceanum will seek external sources of finance to diminish the risk on equity. However, the financial structure will be decided after the complete financial analysis. The aim is to follow the sector Debt-to-Equity ratio that was calculated at 0.34 using the average between the Farming/Agriculture (36,82%) and Food Processing (30,52%) sectors Debt-to-Equity ratio presented by Damodaran (2022).

SUSTAINABLE BIOFLOC MARINE SHRIMP AQUACULTURE AT MADEIRA ARQUIPELAGO

8.4.6 Financial Demonstratives and Indicators

	2022-23	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Sales	60.000,00	130.965,74	285.867,10	623.979,96	1.362.000,00	1.491.996,25	1.634.400,00	1.634.420,00	1.634.440,00	1.634.460,00	1.634.480,00	1.634.500,00
Costs of goods Sold	31.674,96	67.364,78	145.267,16	315.309,55	686.471,68	751.848,89	823.466,02	823.476,08	823.486,14	823.496,20	823.506,25	823.516,31
Wages	72.000,00	99.177,71	198.355,41	198.355,41	198.355,41	198.355,41	198.355,41	198.355,41	198.355,41	198.355,41	198.355,41	198.355,41
Overhead	2.688,92	4.479,68	8.388,50	16.920,51	35.543,87	35.543,87	35.543,87	35.543,87	35.543,87	35.543,87	35.543,87	35.543,87
EBITDA	- 40.309,62	- 28.615,54	- 42.945,39	142.257,32	546.510,83	620.997,17	702.592,86	702.604,32	702.615,78	702.627,24	702.638,70	702.650,16
Depreciation	30.354,23	42.545,53	70.003,30	117.640,49	304.091,61	304.091,61	304.091,61	304.091,61	304.091,61	304.091,61	304.091,61	-
EBIT	- 70.663,85	- 71.161,07	- 112.948,69	24.616,83	242.419,23	316.905,56	398.501,25	398.512,71	398.524,17	398.535,63	398.547,09	702.650,16
EBIT (1-T)	- 70.663,85	- 71.161,07	- 112.948,69	19.693,46	242.419,23	316.905,56	562.441,94	318.810,17	318.819,33	318.828,50	318.837,67	562.120,13
Depreciation	30.354,23	42.545,53	70.003,30	117.640,49	304.091,61	304.091,61	304.091,61	304.091,61	304.091,61	304.091,61	304.091,61	-
Operational Cash Flow	- 40.309,62	- 28.615,54	- 42.945,39	137.333,95	546.510,83	620.997,17	866.533,55	622.901,78	622.910,94	622.920,11	622.929,28	562.120,13
Negative Profit Report	70.663,85	71.161,07	112.948,69	-	12.354,39	-	-	-	-	-	-	-

Raw Materials Purchasing	2022-23	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Costs of Goods Sold	31.674,96	67.364,78	145.267,16	315.309,55	686.471,68	751.848,89	823.466,02	823.476,08	823.486,14	823.496,20	823.506,25	823.516,31
Final Inventory	4.772,75	8.643,64	17.092,86	35.535,52	75.791,45	82.882,21	90.649,74	90.650,83	90.651,92	90.653,01	90.654,10	90.655,19
Initial Inventory	0	4.772,75	8.643,64	17.092,86	35.535,52	75.791,45	82.882,21	90.649,74	90.650,83	90.651,92	90.653,01	90.654,10
Purchases	36.447,72	71.235,66	153.716,39	333.752,20	726.727,62	758.939,64	831.233,55	823.477,17	823.487,23	823.497,29	823.507,34	823.517,40

Taxes and Others (VAT)	2022-23	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
IVA Sales	7.200,00	15.715,89	34.304,05	74.877,60	163.440,00	179.039,55	196.128,00	196.130,40	196.132,80	196.135,20	196.137,60	196.140,00
IVA to deduct	8.018,50	15.671,85	33.817,60	73.425,48	159.880,08	166.966,72	182.871,38	181.164,98	181.167,19	181.169,40	181.171,62	181.173,83
IVA to pay (receive)	-818,50	44,04	486,45	1.452,11	3.559,92	12.072,83	13.256,62	14.965,42	14.965,61	14.965,80	14.965,98	14.966,17
IVA Balance (Period end)	-68,21	3,67	40,54	121,01	296,66	1.006,07	1.104,72	1.247,12	1.247,13	1.247,15	1.247,17	1.247,18

[illegible]

SUSTAINABLE BIOFLOC MARINE SHRIMP AQUACULTURE AT MADEIRA ARQUIPELAGO

IRC												
Firm	8.145,45	11.220,10	22.440,21	22.440,21	22.440,21	22.440,21	22.440,21	22.440,21	22.440,21	22.440,21	22.440,21	22.440,21
Balance IRC	581,82	801,44	1.602,87	1.602,87	1.602,87	1.602,87	1.602,87	1.602,87	1.602,87	1.602,87	1.602,87	1.602,87
State/Public Entities	1.957,77	2.794,38	5.621,97	5.702,44	5.878,09	6.587,50	6.686,15	6.828,55	6.828,56	6.828,58	6.828,59	6.828,61
Working Capital	2022-23	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Inventory	4.772,75	8.643,64	17.092,86	35.535,52	75.791,45	82.882,21	90.649,74	90.650,83	90.651,92	90.653,01	90.654,10	90.655,19
Clients	5.600,00	12.223,47	26.680,93	58.238,13	127.120,00	139.252,98	152.544,00	152.545,87	152.547,73	152.549,60	152.551,47	152.553,33
	10.372,75	20.867,11	43.773,79	93.773,65	202.911,45	222.135,19	243.193,74	243.196,70	243.199,65	243.202,61	243.205,57	243.208,53
Suppliers	68,21	-3,67	-40,54	32.273,58	70.232,65	75.561,90	82.756,73	82.472,97	82.473,98	82.474,98	82.475,99	82.477,00
State/Public Entities	1.957,77	2.794,38	5.621,97	5.702,44	5.878,09	6.587,50	6.686,15	6.828,55	6.828,56	6.828,58	6.828,59	6.828,61
	2.025,97	2.790,71	5.581,43	37.976,02	76.110,74	82.149,40	89.442,88	89.301,52	89.302,54	89.303,56	89.304,59	89.305,61
Working Capital	8.346,78	18.076,39	38.192,36	55.797,63	126.800,71	139.985,79	153.750,86	153.895,18	153.897,11	153.899,05	153.900,98	153.902,92
Working Capital Investment	8.346,78	9.729,62	20.115,97	17.605,27	71.003,07	13.185,09	13.765,07	144,32	1,93	1,93	1,93	1,93
Cash Flow	2022-23	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Operational Cash Flow	- 40.309,62	- 28.615,54	- 42.945,39	137.333,95	546.510,83	620.997,17	866.533,55	622.901,78	622.910,94	622.920,11	622.929,28	562.120,13
Residual Working Capital												153.902,92
	-40.309,62	-28.615,54	-42.945,39	137.333,95	546.510,83	620.997,17	866.533,55	622.901,78	622.910,94	622.920,11	622.929,28	716.023,05
CAPEX	333.896,57	121.912,93	247.119,95	381.097,56	1.305.157,81	-	-	-	-	-	-	-
Working Capital Investment	8.346,78	9.729,62	20.115,97	17.605,27	71.003,07	13.185,09	13.765,07	144,32	1,93	1,93	1,93	1,93
	342.243,35	131.642,54	267.235,92	398.702,83	1.376.160,88	13.185,09	13.765,07	144,32	1,93	1,93	1,93	1,93
Total Cash Flow	- 382.552,97	- 160.258,09	- 310.181,31	- 261.368,87	- 829.650,05	607.812,08	852.768,48	622.757,46	622.909,01	622.918,18	622.927,34	716.021,11

Financial Indicators and Premises	Value	Source
Inflation Rate	1,30%	https://www.pordata.pt/Portugal/ (on 29/08/2022)
Base yield rate (One Year Euribor Rate at 29-08-2022)	1,34%	https://www.euribor-rates.eu/pt/taxas-euribor-actuais/
Portugal Treasury 10 years (Inflation Discounted)	0,95%	https://bpstat.bportugal.pt/serie/12099464 (July 2022)
Sector Unlevered beta (Average: Agriculture + Food Processing)	0,71	https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html
Sector D/E Ratio	0,34	Calculated https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html
Project D/E Ratio	0,34	Calculated based on Damodaran Betas Average between Agriculture and Food Processing
IRC	20%	Taxes on Enterprise
ßl do projeto	0,90	Calculated
Premio de Risco	5,93%	(PSI INDEX 3 years return (Real) - Portugal 10 years Treasury Bond Yield Real) - MarketWatch on 29/08/2022
Cost of Equity (CAPM) – rE (Inflation Discounted)	6,29%	Calculated
YTM (Portugal 2020) – (Inflation Discounted)	4,48%	Calculated
Cost of Debit - (Inflation Discounted)	3,59%	Calculated
WACC - (Inflation Discounted)	5,61%	Calculated
Profitability Index	2,04	Calculated
Financial Autonomy E/A	0,75	Calculated based on D/E

Financial Viability Scenarios	Value	Source
Low Risk Discount Rate Scenario		
Discount Rate - R	0,95%	https://bpstat.bportugal.pt/serie/12099464 (July 2022)
Net Present Value (NPV)	€ 2.432.097,97	Calculated, if NPV > Proceed with the project.
Internal Rate of Return (IRR)	17,83%	Calculate the Discount rate to have NPV=0. Any Discount Rate below IRR has a positive NPV.
Payback Time	7 years and 7 months	Calculated
Sector Debit-to-Equity Rate Scenario		
Discount Rate - WACC	5,61%	Calculated
D/E	0,34	Calculated based on Damodaran Betas Average between Agriculture and Food Processing
Net Present Value (NPV)	€ 1.337.981,07	Calculated, if NPV > Proceed with the project
Lower Debit-to-Equity Rate Scenario		
D/E	0,1	Hypothesis
WACC	6,05%	Calculated using D/E = 0,1
Net Present Value (NPV)	€ 1.258.800,09	Calculated

Other Ratios	2022-23	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
ROA (No Debit)	-20,53%	-15,94%	-16,76%	1,90%	10,40%	11,94%	9,86%	15,31%	17,93%	21,63%	27,25%	58,60%
ROE (No Debit)	-20,53%	-15,94%	-16,76%	1,96%	10,63%	12,19%	10,68%	16,42%	19,47%	23,91%	30,97%	74,19%

SUSTAINABLE BIOFLOC MARINE SHRIMP AQUACULTURE AT MADEIRA ARQUIPELAGO

Pilot Plant Total Investment					
Type:	Quantity	Unit	Unit Price	Investment	%
Production Infrastructure:					
Greenhouse	1352,78	m2	48,00	64.933,57	18,74%
Tank excavation (+ 2 tanks Water/residues)	1352,78	m2	6,00	8.116,70	2,34%
Construção Tanque (Includes HDPE and geomembrane)	1352,78	m2	30,00	40.583,48	11,71%
Electrical Installation (Boards, wires, labour)	1352,78	m2	14,40	19.480,07	5,62%
Hydraulic Installation (Pipes, connections and labour)	1352,78	m2	10,80	14.610,05	4,22%
Containers	3	NR	1.200,00	3.600,00	1,04%
Sun Protection Shadow Mesh	800,03	m2	0,81	650,59	0,19%
Labour	1352,78	m2	5,83	7.892,42	2,28%
Machinery:					
Recycle + Aeration Pump	13,53	KIT	3.697,13	50.014,13	14,44%
Foam Fractioner (Skimmer)	13,53	NR	3.035,45	41.063,04	11,85%
GH Lights	10	NR	20,00	200,00	0,06%
Mechanical Building Lights	10	NR	20,00	200,00	0,06%
Exhaust Fan - winter	4	NR	110,00	440,00	0,13%
Biogas Reactor	100	m2	10,90	1.090,00	0,31%
Drum Filter	1	NR	10.000,00	10.000,00	2,89%
Diesel Generator	2,00	m2	10.294,00	20.588,00	5,94%
Laboratory					
Analitical Balance	1	NR	1.200,00	1.200,00	0,35%
Lab Glassware	20,00	NR	150,00	3.000,00	0,87%
Computer	1	NR	500,00	500,00	0,14%
Inhof Cones	4	NR	37,00	148,00	0,04%
Buckets and net	20	NR	35,00	700,00	0,20%
Multiparameters Probe	3	NR	1.200,00	3.600,00	1,04%
PhMeter	3	NR	100,00	300,00	0,09%
Refractometer (Salinity)	3	NR	30,00	90,00	0,03%
Alkalinity Kits	3	NR	70,00	210,00	0,06%
Peroxides H2O2 (35%)	100	NR	4,28	428,22	0,12%
Probiotics	100	NR	15,00	1.500,00	0,43%
Personal Protective Equipment	10	NR	200,00	500,00	0,14%
Distribution					
Delivery Truck (Iveco + Freezer compartment)	1	NR	45.000,00	45.000,00	12,99%
Transport Boxe	66,00	NR	12,00	792,00	0,23%
Freezer	4,00	NR	500,00	2.000,00	0,58%
Packing Machine	2	NR	1.500,00	3.000,00	0,87%
TOTAL				346.430,26	100,00%

8.4.7 Project Evaluation

The project proves itself viable. The three analyses conducted are Net Present Value (NPV) for the 12 years period, Intern Return Rate (IRR) and payback time.

The cash-flow analysis presented above starts with the sales forecast and the evaluation of variable and fixed costs to define earnings before taxes and depreciation (EBITDA). After discounting depreciation, it is possible to obtain the EBIT that is used to calculate the Operational Cash Flow. The information about Sales, Cost of Goods Sold, Overhead and Taxes is used to calculate Purchases, Inventory and Taxes. These values are the base for Working Capital Investment calculation which together with Operational Cash Flow and CAPEX define the Total Cash Flow.

Oceanum's demonstrative has a negative profit in the first three years. Operations start to be profitable in the fourth year. This is the result of the increase in sales volume because we are considering prices per kg fixed at 20,00/kg. The main motive for unprofitability in the initial years is wages. Other costs are negligible or variable (increase with revenue), therefore salaries are the main drive to justify initial years negative results. Inflation will not be considered in cash flow calculations to avoid complexity. However, inflation impact is considered on the Weight Average cost of Capital, which will also consider the cost of debt balanced with the cost of equity to deliver the associate risk rate for the shrimp farming business.

It is important to use tables presented in the cash flow analysis to calculate the Net Present Value and evaluate the business viability. It is possible to evaluate if the business is viable when we study its cash flow over the years. Net Present Value analysis consists in calculating how much the future cash flows would represent in value on the present date. Bring the cash flows to the same period, usually, the present is mandatory when comparing future cash flows because comparison is only valid under the same conditions. The cash flow is compared using a discount rate that will transform future cash flow to present values allowing comparison.

The discount rate is usually what is considered a No (Low) Risk Rate. In other words, the No Risk Rate represents the yields provided by the safest investment available for investors, which does not offer risk (or the lowest amount of risk available). The No Risk Rate on this text is the 10 years Portuguese Treasure Bond which practically does not have any risk regarding repaying the investors. The discount rate is related to the cost of opportunities for those willing to invest in the business proposed. If the expected return

rate applied on future cash-flows results in a negative Net Present Value, the investor must not invest his money on the project since it has a lower return and higher risk than other possible investments.

The present project has a positive Net Present Value with an Internal Return Rate (IRR) of 17,83%. The internal return rate is higher than the No Risk Rate and higher than the WACC calculated. The results indicate that the project is viable and offer a reasonable return rate that justify the investment. Since IRR is higher than WACC, the project can assume the same level of debt structure presented on similar business ($D/E = 0.34$) without compromising investors' profitability. WACC assume debit acquisition on its calculus, which up to a certain level reduces risk for investors, because third part money is used as leverage. Therefore, if the project operation achieves the planned results, it is viable enterprise. The WACC was also tested for a lower D/E rate ($D/E=0,1$) to test the business model with less leverage. In this case WACC obtained is 6,05% which is also lower than the IRR and relatively good for investors.

The payback time calculation also depends on updating expected future cash flows to the present. It counts how many years are necessary for Operational cash-flow sum to overcome working capital necessities and total investment (CAPEX). The time to pay the initial investment and the Working Capital Necessity is 7 years and 7 months.

9. Conclusion

The shrimp aquaculture business in Madeira Island is an innovative project. The moment this text is written, there is no similar business operating on the archipelago. The local demand for the product is enough to support the business activities since the aim is to capture 10% of the market share in the next few years. The production sustainable approach allows the extension of the price range, which can be transformed into higher profitability if operations processes improve to minimize costs while keeping quality. The external firm environment has its benefits and challenges. The local political stability is positive for business development together with social and economic indicators. However, it is important to consider possible wage increases in the next few years, because unemployment rates have been decreasing in the past few years. Further, the Qualified labour force tends to be a challenge in Madeira Island due to the small population and the difficulties to keep qualified workers that tend to migrate to Continental Europe. Access to credit and capital does not seem to be a problem at the Archipelago, it is Oceanum's responsibility to build the correct capital structure to leverage the company's operation

without raising risk levels considerably. Technology is improving the Madeira Island population's access to the internet and business need to reinforce their digital presence, Oceanum has started already its marketing activities positioning itself as a pro-conservation business that wants to make people thrive while preserving. Environmental and Legal aspects tend to follow the same pattern. The tendency for the next 10 years is to reduce pollution and tackle climate change. Therefore, strict environmental laws are expected. Oceanum's environmental responsibility is inside the business core, therefore, although challenging, respecting the environmental and legal requirements are more of an advantage to Oceanum than an obstacle.

The Oceanum clients are local restaurant chefs that want to differentiate themselves by providing quality and sustainability to their dishes. Oceanum will guarantee a steady shrimp supply for restaurants, which provides predictability for both. Contracts will define conditions for recurrent purchases for key account customers. The steady supply of fresh and sustainable shrimp is the main advantage against Oceanum's competitors which cannot provide the same. The competitors are the seafood distributors that exist in the Archipelago in many sizes (check Figure 11), they supply frozen shrimp that travel long distances before reaching customers' tables, which is an advantage for Oceanum. However, it is important to understand clients and divide them between restaurants that consider the quality of their dishes from those that focus on reducing costs only since premium shrimp would not fit their portfolio.

Oceanum has a strong team to start business operations. It is composed of two chemical engineers and one mechanical engineer. The founders' knowledge is the main strength to start the company and make it thrive during the first years. Company resources are scarce at this point since capital and assets are still linked to the founder's finance assets. However, the business evolution with investment capture rounds will provide the necessary physical resources to develop the project. Regarding the external forces, Oceanum may face high dependence on suppliers until developing enough capacity to produce feed and post larvae. Depending on Oceanum's growth it might be not necessary, but in any scenario efficient working capital management is mandatory.

Strategically, Oceanum will focus on differentiation. This is important to define because inland shrimp farming using biofloc technology is a sustainable business, but requires state-of-the-art knowledge, reliable equipment and capable human capital. If not differentiated, Oceanum's shrimps would not fit for price competition (low-cost strategy) since competitors would easily provide cheaper frozen shrimp, with lower quality but

much better in price. The business operations initial years will concentrate on producing high-quality fresh shrimp, with only one product in Oceanum's portfolio. However, to keep growth stable and healthy, new product lines will be developed after operation stabilization. Finally, Oceanum marketing mix will guarantee a high-quality product, positioning it as a local and sustainable product. Price will follow skimming the market strategy focusing on high aggregated product value. Placement will consider exclusive distribution directly to chefs, which allows Oceanum to collect feedback to improve its operations, further it has a strong image, controlled channels and price stability. The promotion of Oceanum's brand will associate shrimp freshness and sustainability. The main objective is to guarantee awareness creation on how Oceanum's business model is linked to the ocean's preservation.

Oceanum will grow in four phases. The first phase length is up to two years and consists of requesting the necessary permits, receiving funding and starting the production site construction and concluding at least three shrimp harvests. The second phase expected length is one year and will define a clear image of Oceanum's operational efficiency, metrics and numbers will show the business performance with better precision. Investment in widening client portfolios will start in phase two. Phase three is also expected to have a one-year duration (fourth year) and further investment in infrastructure is expected to grow operations. The metrics of the third year will guide expansion to diminish risks and improve return on investment. The last phase will start in the fifth year and continue beyond it. Operations expect to achieve the cruise phase, which allows Oceanum to replan expansion and define sustainable metrics to guide the next years on how to keep delivering freshness and quality on its products while protecting the environment.

Oceanum will grow in four phases. The first phase length is up to two years and consists of requesting the necessary permits, receive funding and start the production sites construction and conclude at least three shrimp harvests. Second phase expected length is one year and will define a clear image of Oceanum's operational efficiency, metrics and numbers will show the business performance with better precision. Investment in widening client portfolio will start in phase two. Phase three is also expected to have one year duration (fourth year) and further investment in infrastructure is expected to grow operations. The metrics of third year will guide expansion to diminish risks and improve return on investment. The last phase will start at the fifth year and continue beyond it. Operations expect to achieve cruise phase, which allows Oceanum to replan expansion

and define sustainable metrics to guide the next years on how to keep delivering freshness and quality on its products while protecting the environment.

10. Bibliography

- Abreu, P. (2020, December). Turismo náutico pede apoio para não se “afogar” na crise, p. 20.
- Advisor, T. (2022). Restaurants Madeira Island. Retrieved May 1, 2022, from https://www.tripadvisor.pt/Restaurants-g189166-Madeira_Madeira_Islands.html
- Ahmad, I., Babitha Rani, A. M., Verma, A. K., & Maqsood, M. (2017). Biofloc technology: an emerging avenue in aquatic animal healthcare and nutrition. *Aquaculture International*, 25(3), 1215–1226. <https://doi.org/10.1007/s10499-016-0108-8>
- Alimba, C. G., & Faggio, C. (2019). Microplastics in the marine environment: Current trends in environmental pollution and mechanisms of toxicological profile. *Environmental Toxicology and Pharmacology*, 68(February), 61–74. <https://doi.org/10.1016/j.etap.2019.03.001>
- Andrade, C., & Gouveia, N. (2008). Ten years of marine aquaculture development in Madeira archipelago. In M. D. G. & Pham, C.K., R.M. Higgins & E. Isidro (Eds.), *Proceedings of the International Workshop: Developing a Sustainable Aquaculture Industry in the Azores* (pp. 30–32).
- Ansoff, H. I. (1957). Strategies for diversification. *Harvard Business Review*, (2), 113–124.
- Baker, M. J. (2014). *Marketing Strategy & Management. Marketing Strategy* (Fifth). London: Palgrave and Macmillan. <https://doi.org/10.4324/9780080511139>
- Barney, J. (1991a). Firm resources and sustained competitive advantage. *Journal of Management*, 17.
- Barney, J. (1991b). Firm Resources and Sustained Competitive Advantage.
- Barney, J. B., & Hesterly, W. S. (2013). *Strategic Management and Competitive Advantage. Competitive Strategy*. <https://doi.org/10.7551/mitpress/9780262015998.003.0002>
- Belton, B., Little, D. C., Zhang, W., Edwards, P., Skladany, M., & Thilsted, S. H. (2020). Farming fish in the sea will not nourish the world. *Nature Communications*, 11(1). <https://doi.org/10.1038/s41467-020-19679-9>
- Buckner, C. A., Lafrenie, R. M., Dénommée, J. A., Caswell, J. M., Want, D. A., Gan, G. G., ... Mathijssen, R. H. J. (2016). Dynamics of the Land Use Changes and the Associated Barriers and Opportunities for Sustainable Development on Peripheral

- and Insular Territories The Madeira Island (Portugal). *Intech*, 11(tourism), 13.
<https://doi.org/http://dx.doi.org/10.5772/intechopen.80827>
- Caldeira, D. (2021). *A Agricultura Madeirense e Eu*. (P. D. C. L. ARTELEIA, Ed.) (Primeira E). Funchal.
- Carvalho, J. C. de, Guedes, A. J. M., Martins, A. L., Póvoa, A. P. B., Luís, C. A., Dias, E. B., ... Ramos, T. (2020). *Logística e Gestão da Cadeia de Abastecimento*. (Sílabo, Ed.). Lisboa.
- Comin, L. C., Aguiar, C. C., Sehnem, S., Yusliza, M. Y., Cazella, C. F., & Julkovski, D. J. (2020). Sustainable business models: a literature review. *Benchmarking: An International Journal*, 27(7), 2028–2047. <https://doi.org/10.1108/BIJ-12-2018-0384>
- Company, P., Jensen, C., & Meckling, H. (1976). THEORY OF THE FIRM :
 MANAGERIAL BEHAVIOR , AGENCY COSTS AND OWNERSHIP
 STRUCTURE, 3, 305–360.
- Contra a Aquacultura no Arco da Calheta e na Madeira. (n.d.). Retrieved April 29, 2022, from <https://peticaopublica.com/viewsignatures.aspx?pi=PT93728&pg=2>
- Corkindale, D. (1976). Setting Objectives for Advertising. *European Journal of Marketing*, 10(3), 109–126. <https://doi.org/10.1108/EUM00000000005040>
- da Silveira, L. G. P., Krummenauer, D., Poersch, L. H., Rosas, V. T., & Wasielesky, W. (2020). Hyperintensive stocking densities for *Litopenaeus vannamei* grow-out in biofloc technology culture system. *Journal of the World Aquaculture Society*, 51(6), 1290–1300. <https://doi.org/10.1111/jwas.12718>
- Damodaran, A. (2022). Betas by Sector (US).
- Direção Geral de Política do Mar. (2021). Estratégia Nacional para o Mar 2021-2030 aprovada em Conselho de Ministros.
- Direção Regional de Estatística da Madeira. (2020). *Madeira em Números 2020*. Funchal. Retrieved from <https://estatistica.madeira.gov.pt>
- Direção Regional de Estatística da Madeira. (2021). *Anuário Estatístico da Região Autónoma da Madeira 2020*. (Direção Regional de Estatística da Madeira, Ed.), *Anuário Estatístico da Região Autónoma da Madeira* (Edição 202, Vol. 1).
- DREM. (2020). Labour Cost Index (Base 2016); Annual - 2008-2018. Retrieved May 2, 2022, from <https://estatistica.madeira.gov.pt/en/download-now-3/social-gb/mercetrab-gb/mercetrab-ict-gb/mercetrab-ict-serie-gb/send/313-labour-cost-index-time-series/12833-labour-cost-index-base-2016-annual-2008-2018.html>

- DREM. (2021a). In the 3rd quarter of 2021, the Labour Cost Index in the Autonomous Region of Madeira increased by 5.2% year-on-year. Retrieved from <https://estatistica.madeira.gov.pt/en/download-now-3/social-gb/merc trab-gb/merc trab-ict-gb/merc trab-ict-noticias-gb/3167-12-11-2021-in-the-3rd-quarter-of-2021-the-labour-cost-index-in-the-autonomous-region-of-madeira-increased-by-5-2-year-on-year.html>
- DREM. (2021b). *Serie Sociedades Constituidas e Dissolvidas (1976-2021)*. Funchal.
- DREM. (2022). Employment Statistics of the Autonomous Region of Madeira, 2011-2021 (2011 series revised). Retrieved May 2, 2022, from <https://estatistica.madeira.gov.pt/en/download-now-3/social-gb/merc trab-gb/merc trab-ie-gb/merc trab-ie-serie-gb/merc trab-ie-long-series-gb/send/325-labour-force-survey-long-series/14450-quarterly-time-series-of-the-labour-force-survey-of-the-autonomous-reg>
- Elkington, J. (1997). *Cannibals with Forks - The Tripple Bottom Line of 21st century business*. Oxford: Capstone Publishing Limited.
- FAO. (2018). *The State of World Fisheries and Aquaculture - Meeting the sustainable development goals*. *Aquaculture* (Vol. 35). Roma. <https://doi.org/issn 10>
- FAO. (2020). *The State of World Fisheries and Aquaculture 2020. Inform*. Rome, Italy: FAO. <https://doi.org/10.4060/ca9229en>
- FAO. (2022). *The State of World Fisheries and Aquaculture. Towards Blue Transformation*. Rome: FAO. Retrieved from https://www.fao.org/3/ca9229en/online/ca9229en.html#chapter-1_1
- Fast, A. W., Bailey-Brock: Julie H., & Moss, S. M. (1992). *Marine Shrimp Culture: Principles and Practices*. (A. w. Fast & L. J. Lester, Eds.). Elsevier B.V.
- Gamble, J., Gilmore, A., McCartan-Quinn, D., & Durkan, P. (2011). The Marketing concept in the 21st century: A review of how Marketing has been defined since the 1960s. *The Marketing Review*, 11(3), 227–248. <https://doi.org/http://dx.doi.org/10.1362/146934711X589444>
- Gaona, C. A. P., da Paz Serra, F., Furtado, P. S., Poersch, L. H., & Wasielesky, W. (2016). Effect of different total suspended solids concentrations on the growth performance of *Litopenaeus vannamei* in a BFT system. *Aquacultural Engineering*, 72–73, 65–69. <https://doi.org/10.1016/j.aquaeng.2016.03.004>
- Gaspar, P. (2021, March). Travão às jaulas “empurra” Jerónimo Martins para Marrocos. *Jornal Da Madeira*, p. 14.

- Grant, R. M. (1996). TOWARD A KNOWLEDGE-BASED THEORY OF THE FIRM, *17*, 109–122.
- Grant, R. M. (2020). *Contemporary Strategy Analysis* (Tenth). Wiley.
<https://doi.org/10.4324/9781003104339>
- Grunert, K. G., Sorensen, E., & Bisp, S. (1998). Using the key success factor concept in competitor intelligence and benchmarking. *Competitive Intelligence Review*, 9(3), 55–67. [https://doi.org/10.1002/\(sici\)1520-6386\(199807/09\)9:3<55::aid-cir10>3.0.co;2-j](https://doi.org/10.1002/(sici)1520-6386(199807/09)9:3<55::aid-cir10>3.0.co;2-j)
- Guerras-Martín, L. Á., Madhok, A., & Montoro-Sánchez, Á. (2014). The evolution of strategic management research: Recent trends and current directions. *BRQ Business Research Quarterly*, 17(2), 69–76.
<https://doi.org/10.1016/j.brq.2014.03.001>
- Hermida, M., & Costa, S. (2020). Between Tradition and Taste: Fish Consumption Habits in a Small Portuguese Archipelago. *Journal of Aquatic Food Product Technology*, 29(4), 335–349. <https://doi.org/10.1080/10498850.2020.1734892>
- INE. (2021a). Acessos à Internet em banda larga por 100 habitantes (%) por Localização geográfica (NUTS - 2013) e Segmento de acesso; Anual. Retrieved from <https://www.ine.pt>
- INE. (2021b). *Proporção de indivíduos com idade entre 16 e 74 anos que utilizaram Internet nos primeiros 3 meses do ano (%) por Tipo de actividades efectuadas na Internet (comunicação e criação de conteúdos); Anual - INE, Inquérito à utilização de TIC pelas famílias*. Lisboa.
- INE. (2022). *Importações () de bens por Local de origem e Tipo de Bens (Nomenclatura combinada - NC8); Anual - INE, Estatísticas do comércio nacional de bens*. Retrieved from <http://www.ine.pt>
- Khalifa, A. S. (2021). Strategy, nonstrategy and no strategy. *Journal of Strategy and Management*, 14(1), 35–49. <https://doi.org/10.1108/JSMA-04-2020-0092>
- Kirzner, I. M. (1997). Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach, 35(1), 60–85. <https://doi.org/10.4324/9780203465974.pt1>
- Lucas, John S; Southgate, Paul C.; Tucker, C. S. (2019). *Aquaculture Farming Aquatic Animals and Plants*. (I. John Wiley & Sons, Ed.) (Third). Wiley Blackwell.
- Madeira Regional Directorate for the Sea. (2021). Madeira Regional Directorate for the Sea Mission.
- Magretta, J. (2012). *Understanding Michael Porter - The Essential Guide to*

- Competition and Strategy*. □□□□□□ (Vol. ث قففق). Boston: Havard Business Review Press.
- Martinez-Porchas, M., & Martinez-Cordova, L. R. (2012). World aquaculture: Environmental impacts and troubleshooting alternatives. *The Scientific World Journal*, 2012. <https://doi.org/10.1100/2012/389623>
- Mota, A. G., Barroso, C. D., Nunes, J. P., Oliverira, L., Ferreira, M. A., & Inácio, P. L. (2020). *Finanças da Empresa - Teoria e Prática*. (M. Robalo, Ed.) (6th Editio). Lisbon: Silabo.
- Mugwanya, M., Dawood, M. A. O., Kimera, F., & Sewilam, H. (2021). Biofloc systems for sustainable production of economically important aquatic species: A review. *Sustainability (Switzerland)*, 13(13), 1–16. <https://doi.org/10.3390/su13137255>
- Mun, S. G., & Jang, S. C. S. (2015). Working capital, cash holding, and profitability of restaurant firms. *International Journal of Hospitality Management*, 48, 1–11. <https://doi.org/10.1016/j.ijhm.2015.04.003>
- Murphy, J., & Smith, S. (2009). Chefs and suppliers: An exploratory look at supply chain issues in an upscale restaurant alliance. *International Journal of Hospitality Management*, 28(2), 212–220. <https://doi.org/10.1016/j.ijhm.2008.07.003>
- Pacifico, M. (2021). Célia Pessegueiro não permitirá a instalação de jaulas de aquacultura na Ponta do Sol. *Diário de Notícias*, 7–8.
- Pearce, J. A. (1982). The Company Mission as a Strategic Tool. *Sloan Management Review Association*, 23(3), 7–15.
- Peng, M. W. (2002). Towards an institution-based view of business strategy in Asia. *Asia Pacific Journal of Management*, 251–267. <https://doi.org/10.4337/9781847203182.00010>
- PORDATA. (2021). População residente com idade entre 16 e 89 anos: total e por nível de escolaridade completo mais elevado.
- Porter, M. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. The Free Press. New Yoirk. <https://doi.org/10.4324/9781912281060>
- Porter, M. (1990). *The Competitive Advantage of Nations*. News.Ge. New York: The Free Press.
- Powell, T. C., Lovallo, D., & Fox, C. R. (2011). BEHAVIORAL STRATEGY. *Strategic Management Journal*, (32), 1369–1386. <https://doi.org/10.1002/smj>
- Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvad Business Review*, 41–60. <https://doi.org/10.1016/b978-0-7506-7223-8.50003-4>

- Presidência do Conselho de Ministros. (2021). *Resolução do Conselho de Ministros 27/2021 - Aprova a Estratégia Nacional para o Mar 2021-2030. Diário da República - I Série-B*.
- Ritala, P., Huotari, P., Bocken, N., Albareda, L., & Puumalainen, K. (2018). Sustainable business model adoption among S&P 500 firms: A longitudinal content analysis study. *Journal of Cleaner Production*, 170, 216–226.
<https://doi.org/10.1016/j.jclepro.2017.09.159>
- Ruel, T. (2019). Regional elections in Portugal the Azores and Madeira: Persistence of non-alternation and absence of non-statewide parties. *Regional and Federal Studies*, 29(3), 429–440. <https://doi.org/10.1080/13597566.2018.1526786>
- Samocha, T. M. (2019a). *Sustainable Biofloc Systems for. Sustainable Biofloc Systems for Marine Shrimp*.
- Samocha, T. M. (2019b). *Sustainable Biofloc Systems for Marine Shrimp. Sustainable Biofloc Systems for Marine Shrimp*.
- Smith, S. N., Davis, M. E., & Loerch, S. C. (2010). Residual feed intake of Angus beef cattle divergently selected for feed conversion ratio. *Livestock Science*, 132(1–3), 41–47. <https://doi.org/10.1016/j.livsci.2010.04.019>
- The World Bank. (2020). Enterprise Surveys.
- World Bank. (2020). World Wide Governance Indicators. Retrieved from fonte: <https://databank.worldbank.org/source/worldwide-governance-indicators#>

11. Annexes

Anexxe A- Initial investment procurement sources

Infra-estrutura Produtiva:	Quotation Source
Greenhouse	Quotation at Agrocalheta (attached below)
Tank excavation (+ 2 tanques Agua/Resíduos)	Calculation using the price generator for excavation up to two meters, semi-hard clay soil (https://bit.ly/3LgrNsl)
Construção Tanque (Includes HDPE geomembrane costs)	Quotation Ambitela (attached below)
Electrical Instalation (Quadros, fios and mão de obra)	Estimation based on book Sustainable Biofloc System for Marine Shrimp (Electrical Instalation Comprises 26,83% of greenhouse cost)
Hidraulic Instalation (Pipes, conections and labour)	Estimation based on book Sustainable Biofloc System for Marine Shrimp (Hidraulic Instalation Comprises 28,73% of tanking costs including excavation)
Containers	Quotation obtanaited from private seller at Facebook Market place in Madeira Island
Sun Protection Shadow Mesh	Quotation obtained at Worten Market Place (https://bit.ly/3RQWIDw)
Labour	Calculated as 10% of total costs summing Electrical Instalation, Hidraulic Instalation, Sun Protection Shadow Mesh, Tanking Construction
Machinery:	
Recycle + Aeration Pump	Quotation obtained from a3eration (attached below)
Foam Fractioner (Skimmer)	Quotation obtained from a3eration (attached below)
GH Lights	Quotation obtained at mauser.pt
Mechanical Building Lights	Quotation obtained at mauser.pt
Exhaust Fan - winter	Quotation Obtained at Cablematic (https://bit.ly/3UfP2qr)
Biogas Reactor	Calculate using Ambitela quotation. Biogas reactor can be done likewise the excavated tanks with and added HDPE fabric to cover it up
Drum Filter	Quotation not received until now. Approximated value obtained at online at JX Filtration
Diesel Generator	Quotation obtained at Brycus.pt (Model GDS50T-47KVA 37KW 400 / 230V GENERGY)
Laboratory	
Analitical Balance	Quotation obtained at quirumed.com
Lab Glassware	Quotation obtained at normax.pt
Computer	Quotation Obtained at Worten.pt
Inhof Cones	Quotation obtained at normax.pt
Bukets and net	Estimative since net prices could not be founded
Multiparameters Probe	Quotation obtained at https://www.hanna.pt/produto/hi98194
PhMeter	Quotation obtained at hanna.pt
Refractometer (Salinity)	Quotation obtained at hanna.pt
Alkalinity Kits	Quotation obtained at hanna.pt
Peroxides H2O2 (35%)	Estimation using Group SPD prices (grupospd.pt)
Probiotics	AquaStar® Growout/Dosage: 2-5 kg/t feed according to developmental stage and culture conditions
Personal Protective Equipment	Estimated using leroy.pt prices

Distribution

Delivery Truck (Iveco + Frigorífico Novo)	Quotation at Iveco Novo Daily 35S13V - 12m3 (https://bit.ly/3LIXKzn) for EUR20700 + IVA. Waiting for freezer chamber quote.
Transport Boxe	Quotation at Auer Packing (https://bit.ly/3LIVMPv)
Freezer	Quotation at ercomercial.com/pt/congelador-horizontal-beko-hsa47530n
Packing Machine	Quotation at Ggm Gastro https://bit.ly/3qK2OnM

Anexxe B - Tanks quotation



Proposta Nº96/22

Impermeabilização de tanques para aquicultura - eamarões_Madeira				ORÇAMENTO LISTA DE PREÇOS UNITÁRIOS	
Arthur Friedrich				PREÇOS EUROS	
ARTº	DESIGNAÇÃO	UN	QUANT.	UNITÁRIOS	TOTAIS
1	Berçário (10x5x1,5)				
1.1	Fornecimento e instalação de geotextil não tecido, 200 g/m2, incluindo todos os acessórios e trabalhos indispensáveis	m2	167,00	0,90 €	150,30 €
1.2	Fornecimento e instalação de geomembrana em PEAD, 1,50 mm de espessura, incluindo todos as soldaduras e trabalhos indispensáveis.	m2	167,00	10,60 €	1 770,20 €
2	Tanque 1 (30x13,5x1,75)				
2.1	Fornecimento e instalação de geotextil não tecido, 200 g/m2, incluindo todos os acessórios e trabalhos indispensáveis	m2	790,00	0,90 €	711,00 €
2.2	Fornecimento e instalação de geomembrana em PEAD, 1,50 mm de espessura, incluindo todos as soldaduras e trabalhos indispensáveis.	m2	790,00	10,60 €	8 374,00 €
3	Tanque 2 (30x13,5x1,75)				
3.1	Fornecimento e instalação de geotextil não tecido, 200 g/m2, incluindo todos os acessórios e trabalhos indispensáveis	m2	790,00	0,90 €	711,00 €
3.2	Fornecimento e instalação de geomembrana em PEAD, 1,50 mm de espessura, incluindo todos as soldaduras e trabalhos indispensáveis.	m2	790,00	10,60 €	8 374,00 €
	Soldaduras de tubagem adjacentes às entradas e saídas da respetiva geomembrana	un		105,00 €	
TOTAL 3º IVA					20 090,60 €

Condições para a execução

- Entrega das áreas livres e desimpedidas de objetos, para entrarmos em obra;
- Máquina de apoio, Giratória ou Retro

Exclusão

- Abertura e Fecho de Valas
- Movimentação de Terras
- Alojamento e alimentação (para 3 pessoas) - a cargo do dono de obra
- Transporte de materiais - 3950 €

3 na nossa proposta:

- voos e aluguer carro

SUSTAINABLE BIOFLOC MARINE SHRIMP AQUACULTURE AT MADEIRA ARQUIPELAGO

Anexxe C - A3 areators quotation



Quote

Date: February 17, 2022
Quote # BA20674

To Oceanum Portugal
Travessa do Pimenta, 14, 2D
Funchal 9060-235
Madeira Island - Portugal

Salesperson	Job	Payment Terms	Due Date
Advent		100% Transfer at order	March 31, 2022

[illegible]

Robert Adams

February 17, 2022

Make all checks payable to Advent Environmental Systems LLC.

Thank you for your business!

Anexxe D - Fifth year investment expectation (Includes Initial Investment)

Tipo:	Qtd	Preço Unitário ()	Unidade	Investimento
Infra-estrutura Produtiva:				
Greenhouse	8000.33	48.00	m2	384,015.72
Tank excavation (+ 2 tanques Agua/Resíduos)	7273.02	6.00	m2	43,638.15
Construção Tanque (Includes HDPE geomembrane costs)	8000.33	30.00	m2	240,009.82
Electrical Instalation (Quadros, fios and mão de obra)	8000.33	12.88	m2	103,031.42
Hidraulic Instalation (Pipes, conections and labour)	8000.33	10.19	m2	81,492.06
Containers	3.00	1,200.00	NR	3,600.00
Sun Protection Shadow Mesh	7273.02	0.81	m2	5,914.42
Labour	0.00	-	0	43,404.77
Machinery:				
Recycle + Aeration Pump	75.00	3,697.13	KIT	277,284.75
Foam Fractioner (Skimmer)	75.00	3,035.45	NR	227,658.75
Heat Pumps (Total)*	17.00	36,880.00	NR	626,960.00
GH Lights	20.00	20.00	NR	400.00
Mechanical Building Lights	20.00	20.00	NR	400.00
Exhaust Fan - winter	68.00	110.00	NR	7,480.00
Biogas Reactor	500.00	10.90	m2	5,450.00
Drum Filter	18.00	100.00	NR	-
Diesel Generator	22.00	12,619.00	m2	277,618.00
Laboratory				
Analitical Balance	1.00	1,586.95	NR	1,586.95
Lab Glassware	21.00	150.00	NR	3,150.00
Computer	1.00	500.00	NR	500.00
Inhof Cones	4.00	37.00	NR	148.00
Bukets and net	20.00	35.00	NR	700.00
Multiparameters Probe	3.00	1,450.00	NR	4,350.00
PhMeter	3.00	100.00	NR	300.00
Refractometer (Salinity)	3.00	30.00	NR	90.00
Alkalinity Kits	3.00	70.00	NR	210.00
Peroxides H2O2 (35%)	1000.00	1.50	NR	1,500.00
Probiotics	771.93	-	NR	-
Personal Protective Equipment	10.00	200.00	NR	500.00
Distribution				
Delivery Truck (Iveco + Frigorífico Novo)	1.00	45,000.00	NR	45,000.00
Transport Boxe	66.00	12.00	NR	792.00
Freezer	4.00	500.00	NR	2,000.00
Packing Machine	2	1,500.00	NR	3,000.00
TOTAL				2,392,184.81