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Business Plan: Biological Milk Production in Azores - *BioAçores*

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Master in Finance

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October, 2020

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BUSINESS
SCHOOL

Department of Finance

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This thesis represents an important step in my life, professionally and personally, once it means the end of my academic career. Obviously, this was not an easy path, however, I learned in life that tough challenges are only given to the ones that can overcome them.

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Finally, to my father that will always be my example and to whom I devote all my achievements in life.

Resumo

De acordo com Mahatma Gandhi, ¹“*The Earth provides enough to satisfy every person’s need but not every person’s greed*”. Deste modo, a Região Autónoma dos Açores, como arquipélago insular com características peculiares, que conecta o continente europeu ao continente americano tem o dever de preservar o meio ambiente.

Desde sempre que o setor dos lacticínios se assumiu como preponderante tanto na vertente ambiental, económica e mesmo turística da região. O leite, as vacas, os pastos verdejantes fazem parte da nossa cultura e quotidiano, acima de tudo, fazem parte de nós.

Face a vivermos num mundo cada vez mais globalizado, o desenvolvimento contínuo dos setores é imperativo, correndo o risco de serem ultrapassados pela concorrência.

Hoje em dia, os consumidores já não são os mesmos que os de outrora, são mais informados, prezam pela sua saúde e bem-estar, muitos deles influenciados pelas redes sociais.

Para além dos factos supramencionados, denota-se que excesso de oferta de leite convencional face à procura das indústrias, resulta num valor pago aos produtores abaixo do que era praticado em anos anteriores.

Estes aspetos resultaram no desenvolvimento do Plano de Negócios para a produção de leite biológico na ilha de São Miguel, produto ainda pouco explorado na região.

O projeto tem como objetivo a produção certificada de um leite premium português, com componentes nutricionais e ambientais mais vantajosas que o leite convencional.

Em suma, o projeto BioAçores pretende assim diferenciar-se no panorama nacional pela sua responsabilidade social aliada ao consumo sustentável de produtos com qualidade superior no mercado, impactando diretamente a economia açoriana.

Classificação JEL: (M31) – Responsabilidade Social; (M13) – Start-up; (F64) – Ambiente; (G31) – Projetos de investimento; (L66) - Bebidas

Palavras – Chave: Responsabilidade Empresarial; Novas Firmas, Ambiente, Projetos de investimento; Bebidas

¹ “O Planeta Terra fornece o suficiente para satisfazer todas as necessidades das pessoas, mas não a ganância de todas.”

Abstract

According to Mahatma Gandhi, “*The Earth provides enough to satisfy every person’s need but not every person’s greed*”. Considering that, the Autonomous Region of the Azores, as an insular archipelago with unique characteristics, connecting European mainland to American one, has the duty to protect the environment.

Since always, the dairy sector assumed itself as predominant in the environmental, economic and touristic dimension of the region. Milk, cows, green pastures, all of this make part of our culture and daily routine; most of all make part of ourselves.

Owing to the fact that we live in a globalized world, the continuous sectors’ development is imperative, otherwise, they can be outdated.

Nowadays, consumers are not the same as before, they are more informed, value their health and well-being, a lot of them influenced by social media.

Besides all of those facts mentioned before, it is important to highlight that there is oversupply of conventional milk comparatively to the industry’s demand, resulting in a low price paid to milk producers, less than previous years.

Those aspects resulted in the Business Plan development to the biological milk’s production in São Miguel Island, which is an underexplored product, so far.

The project has the purpose the certified production of a Portuguese premium milk, with higher nutritional and environmental components than conventional milk.

Summarizing, the BioAçores project aims to differentiate in the national panorama for its social responsibility allied with sustainable consumption of higher quality products, affecting directly the Azorean economy.

JEL Classification: (M31) - Social Responsibility; (M13) – Start-ups; (F64) – Environment; (G31) – Capital Budgeting; (L66) – Beverages

Keywords: Corporate Social Responsibility; New Firms; Environment; Capital Budgeting; Beverage

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List of abbreviations

ADNPV: Adjusted Net Present Value

APREN: Associação Portuguesa de Energias Renováveis

B2B: Business to Business

B2C: Business to Consumer

BdP: Banco de Portugal

CF: Cash Flow

CAP: Common Agricultural Policy

CAPEX: Capital Expenditure

CEO: Chief Executive Officer

CIT: Corporate Income Tax

CLA: Conjugated Linoleic Acid

CMI: Central Milk Testing

CMT: California Mastitis Test

C02: Carbon Dioxide

COGS: Cost of Goods Sold

DHI: Dairy Herd Improvement

DOP: Denominação de Origem Protegida

EBIT: Earnings before interest and taxes

EBITDA: Earnings before interest and taxes, depreciation and amortizations

EC: European Commission

EFSA: European Food Safety Authority

EPA: Environmental Protection Agency

EU: European Union

FCFF: Free Cash Flow to the Firm

FNPV: Financial Net Present Value

FTIR: Fourier Transform Infrared

GDP: Gross Domestic Production

GFCF: Gross Fixed Capital Formation

GVA: Gross value added

HACCP: Hazard Analysis and Critical Control Points

HCl: Hydrochloric acid

IAPMEI: Instituto de Apoio às Pequenas e Médias Empresas e à Inovação

IFOAM: International Federation of Organic Agriculture Movements

INE: Instituto Nacional de Estatística

IRMA: Infrared Milk Analyser

IRR: Internal Rate of Return

MFF: Multiannual Financial Framework

MSNF: Milk-Solids-Not-Fat

NPV: Net Present Value

OECD: Organisation for Economic Co-operation and Development

OPEX: Operating Expensed

PB Period: Payback Period

PDO: Protected Designation of Origin

PESTEL: Political, Economic, Social, Technological, Environmental and Legal

PGI: Protected Geographical Indication

P&L: Profit and Loss

PRORURAL: Programa de Desenvolvimento Rural da Região Autónoma dos Açores

RAA: Região Autónoma dos Açores

ROA: Return on Assets

ROE: Return on Equity

SREA: Serviço Regional de Estatística dos Açores

TAEG Taxa Anual de Encargos Efetiva Global

TAN: Taxa Anual Nominal

TSG: Traditional Speciality Guaranteed

UHT: Ultra-high temperature

VAT: Value Added Taxes

WC: Working Capital

Executive Summary

BioAçores is a business plan that has the objective of producing biological cows' milk in São Miguel, an Azorean island. This idea came from the crescent awareness of population for sustainable and healthier products in their daily routine. Adding to this, enterprises have more environmental concerns and look for better alternatives to reach sustainable global goals.

Since 2000, biological products are being developed because producers found an opportunity in the market to explore unique products with premium nutritional quality that reflects in the sell price. Considering that, BioAçores follows the same path as the organic market trend. In the opposite way, there are threats to stop, as for example, the lack of consumers' knowledge about this new product, which may need more effort from start-up companies.

Regarding the target itself, BioAçores focus mainly in final consumers (B2B) that belongs to upper-middle class, considered passionate and aged in between 26 and 35 years old living in urban areas. Apart from those characteristics they are considered pro-active purchasers because they look for information, have healthy and environmental worries.

BioAçores is a winner proposal due to its differentiation strategy based on its production location, once São Miguel has good conditions and resources to do it. Adding to this, it is a product with higher nutritional quality and creates value added to Azorean economy with the increase of profits for producers.

The financial analysis was based on a good application of community funds that may have a positive impact on society and world sustainability, perhaps also depending on producers that may take some time to recover soils and costing an extra amount for them.

This analysis was based on reasoned assumptions and every financial indicator that were calculated supporting it showed that BioAçores is a feasible project that must be implemented in the market.

1. Introduction

1.1 Motivation

In the beginning of my academic path, my goal was always to get knowledge enough to pursue my future career in my hometown, where I thought were plenty of things to change and improve, in order to get the maximum profit from our land.

Even though this may seem contradictory, I always felt that our potential is higher than most of the people may think, however it was unexploited, leading to economic dependence from the mainland.

The sustainability of our planet is another of my concerns, as a world citizen. The way people live in their routine, some of them without knowing or concerning about the impact that some of their attitudes have on the lives of others, has made our planet unsustainable when talking about nature and live animals.

1.2 Objectives

Industries that most contribute to environmental pollution are those that exploit animals, for example dairy industry.

According to the aspects mentioned in section 1.1 and considering that dairy industry is one of the most important in the Azores, the objective proposed in the present study is to find a way to make dairy industry more efficient and environmentally friendly for every stakeholder and, consequently, make consumers healthier.

A way to achieve sustainability and economic profit for every player in the milk market is investing in innovations such as biological milk and Azores is a privileged land to do so.

Besides having the perfect climate and pastures with great conditions, investment in milk industry and Government support will be needed too.

1.3 Structure

This study will be developed in five chapters as it follows.

In Chapter 2, a literature review will be presented relating to the different aspects that will lead to the proposal of biological milk production such as the dairy sector, sustainability and the organic market.

In Chapter 3, the market analysis will be exposed, including external analysis, competitive analysis and internal analysis. Those three components will facilitate the recognition of the market in which the project BioAçores will be implemented.

In Chapter 4, the implementation strategy of biological milk will be described, what will be useful to analyse the financial aspects later.

In Chapter 5, the financial analysis will be presented, which will make it possible to understand which factors are more impactful to the feasibility of the project.

Finally, the last chapter presents the conclusions, including a summary of the main issues mentioned in the previous chapters as well as the contributions to the Azores economic outlook.

2. Literature Review

2.1 Dairy sector

The importance of the dairy sector is recognized worldwide, since the beginning of our lives we consume dairy products in diverse ways such as Butter & Spreadable Fats, Cheese, Cream, Dairy-Based & Soy-Based Desserts, Drinkable Yogurt, Fromage Frais & Quark, Milk, Soymilk & Soy Drinks and Yogurt products (Profile, 2016). Taking a step back to 2015, even though Europe has decided to end the EU milk quotas, pushing the prices down, the industry produced 168,2 millions of milk's tonnes, 96,8% cow's milk with special highlight to countries like Germany and France, which together fabricated around 38%. (Papers et al., 2018). The industry's future seems promising, with a market value outlook in 2020 of 240 339 700 euros, due to the increasing global trend demand. World population is growing, so is the process of urbanization associated with the fact that people's diet is changing and emerging markets are gaining a particular importance. (Deloitte, 2017; Profile, 2016).

Nowadays, the sector faces some challenges, which can be seen as opportunities to develop in every steps of the value chain. Producers must be able to tackle emerging technologies and datafication, which can be an efficient way to measure and monitor farm operations if they complement with operational and commercial practices. Additionally, it can help farmers to expand production in a profitable and sustainable way. Processors must handle with a more informed consumer seeking for healthy eating and clean label products. Those companies, which are able to associate their tech capabilities, identifying and exploring consumer insights from local markets and ensure the security of the supply chain, will gain the consumers' trust. Finally, retailers must adapt to the new trend of healthy snacking culture, the higher routine to eat outside home and the online shopping. How? Making a better use of technologies, getting data to target customers in order to match supply and demand. (Deloitte, 2017). All of those concepts mentioned result in a new way of thinking and producing goods. Currently, firms must consider not only, the traditional value drivers - price, taste and convenience, but also the evolving drivers – health and wellness, safety, social impact and experience, always communicating in a transparent way.

Milk is a product that comes from secretion of mammals' females after the birth or colostrage period. The colostrage phase starts before the birth, extends during 6 to 8 days after the childbirth, and is characterized for being a brown viscous liquid essential to the child health.

The consumption of regular milk is important in every age, because it is a way to complement the lack of some nutrients in population' habits and fundamental for good functioning of the organism. The composition of milk is based on water, lactose, fat, protein substances, mineral salts like calcium and phosphorus and in smaller quantities it has trace elements like vitamins, other lipids, enzymes, hormones and gases (Figure 1)

Starting with lactose, it is the carbohydrate of the milk, but it does not have a fast fermentation that is why the digestibility is not easy like others type of sugar. Secondly, fat is a source of energy transporting liposoluble vitamins like A, D, E and K. Mineral salts, specially calcium and phosphorus are important to bone and teeth structure.

The protein can be divided in 2 types of substances depending on solubility. Casein, which is the major part, with a concentration of 27 grams per litre, with high quality and appropriate in repairing muscle tissues, with digestibility coefficient of 98%. It coagulates with the action of animal rennet or another coagulant enzyme. The other part is soluble proteins that coagulates with heat, presented in whey and divided in albumins, globulins and enzymes. (Dias, 2010)

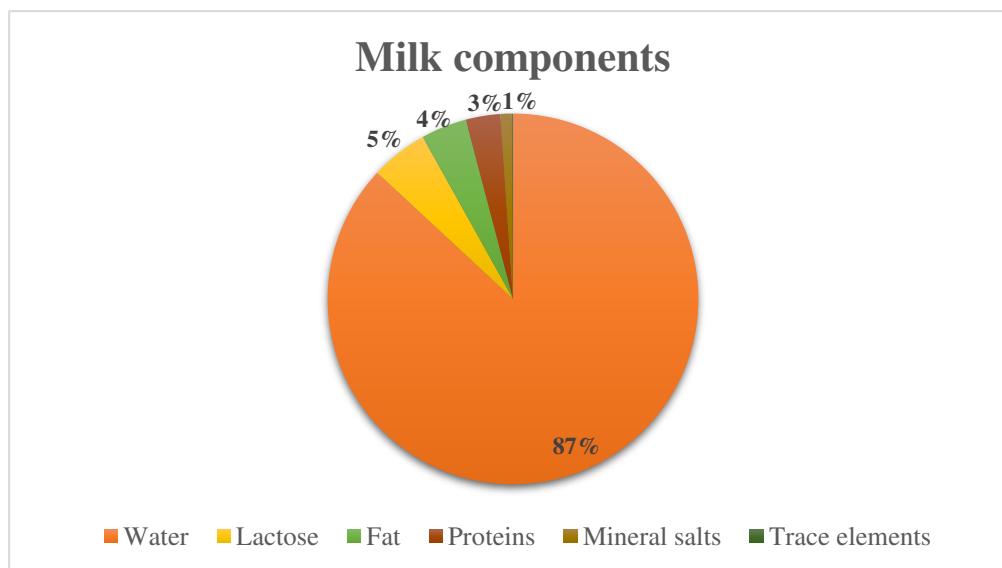


Figure 1 - Milk composition

2.1.1 Technology

The technology on the back of dairy products, as it was expectable, suffered many improvements with higher hygienic and healthy worries, from all the stakeholders. In the last 70 years, there was developments related physicochemical and microbiological state of milk

and dairy products, in the production processes advances related to hygiene and automation and in the manufacture and distribution area, progresses in the energy efficiency. (Wilbey, 2017). Replacing old techs for new ones is a natural process within this industry as for example, when it comes to measure milk components, protein estimation, fat measurements, firstly was used methods such as Gerber, Milk-solids-not-fat (MSNF), Kjeldahl, Rose-Gottlieb, respectively and afterwards, those were replaced for Infrared milk analyser (IRMA) which measured everything mentioned before. (Wilbey, 2017, Andersen *et al.* 1993). Thus, this was replaced for Fourier transform infrared (FTIR), a third generation of milk analysers using wavelength scan which measure components such as casein, adulterants. (Wilbey, 2017, Mauer *et al.* 2009).

Nowadays, the major part of dairy industries uses this type of analysers and one example is MilkoScan7RM due to its efficiency and considering that it is a time saver. The MilkoScan7RM is a high capacity, fully automatic milk analyser for central milk testing (CMI) payment and dairy herd improvement (DHI) measuring up to 17 parameters in just six seconds. (Milkoscan, n.d.). This machine can, not only analyse raw cow milk, but also sheep, goat and buffalo with the Fourier Transform Infrared (FTIR) technology, that can act in simultaneous with Fossomatic 7 or Fossomatic 7DC somatic cell counter to form a CombiFoss 7. It has the ability to figure out parameters like fat, protein, lactose, solids, urea, freezing point depression, free fatty acids, casein, fatty acids profile, ketosis, pH, H-index and untargeted adulteration screening. Therefore, it is easy to understand why companies invest in this type of technology, saving human resources, time and most important of all, money.

Regarding hygiene, the Methylene blue dye reduction, that took two hours to show a result, was replaced by a fluorometric method (IDF 2013).

2.1.2 Dairy Analysis

All components of food industry face a number of rigorous analysis before entering the market, considering the importance that those have to maintain quality and safety of consumers. In dairy sector, there are crucial tests made to assure milk security.

One type is *organoleptic analysis*, which has the main purpose to evaluate milk hygienic quality through color, flavor, smell and general aspect. If raw milk is rejected in the first phase, another detailed assessment is made to have a counterproof.

Firstly, milk color must be white or sort of yellow, coming from milk' fat. If it has a blue or pink-colored must be immediately rejected because it is a sign of serious changes in animals'

udder. Secondly, acid and dirty milk has a strong and unpleasant smell, sometimes sour. Finally, clean milk cannot have impurities at the surface and its viscosity must let a layer in glass when emptied. (Dias, 2010)

Microbiological analysis is another type to certify that the sample is not contaminated with external microorganisms. Those assessments are made determining the content of total mesophylls to know if the milk is contaminated with bacterial colonies. In this analysis, a sample dilution must be made and consequently, the exact volume is transferred to a Petri box, adding the culture medium. After this has solidified, must be placed in an incubation conservatory to the microbial development. If the milk were contaminated, there would be colonies growth. (Dias, 2010)

Afterwards, *physicochemical analysis* is made, with special highlight to the determination study, which evaluates density, fat, cryoscopy index and total dry extract and fat free. Density is the proof with more advantage, because in most of the cases, confirms the fraud. Determining the density is possible to suspect if the milk is skimmed or watery, with the help of a thermolactodensimeter. Additionally, the density value combined with determination of fat percentage gives the value of total dry extract.

The Gerber method is an useful tool to determine milk's fat, choosing wisely proteins with the action of sulfuric acid, extracting fat, separated through centrifugation helped by iso-amyl alcohol. The average value of fat is 3,9%, directly linked with physical-chemical and sensorial characteristics. Cryoscopy index is a way to detect frauds when it comes to add water in the milk, which decreases the nutritional value and more dangerously, is a source of contamination with pathogenic germs. But how? Measuring freezing point or the pressure of milk freezing point comparing to the water. Milk composition must have an approximated value of -0,531°C to cryoscopy point. (Dias, 2010)

The total dry extract is the sum of fat, protein, lactose and mineral salt percentage, that must have a minimum of 11,5%. As it was mentioned, a simple but long way to determine this factor is having the data of fat and density at 20°C and apply the equation:

$$R = 266,66 \frac{d_{\frac{20}{20}} - 1}{d_{\frac{20}{20}}} + 1,258G$$

Hence, the price paid to producers is linked with nutritional aspects that their milk has such as percentage of protein, fat or lactose. There are a considerable number of ways to figure out

the percentage of protein present in the milk such as Kjeldahl method, Formol method, semi-automatic method – black starch “pro milk” and automatic method through infrared “MilkoScan”.

Kjeldahl method consists in determining organic protein nitrogen and afterwards multiply the nitrogen content by a specific factor related with the type of existent proteins, 6,38 in the milk case. The procedure is based on heating the sample with sulfuric acid until the carbon and hydrogen become oxidized and protein nitrogen is transformed in ammonium sulfate. After, concentrated sodium hydroxide is added and heated to release ammonia, which is distilled to a container with a known volume of boric acid, becoming ammonium borate. This formation is determined with a solution of acid HCl standardized. The percentage of nitrogen is calculated through the followed equation:

$$\% \text{ nitrogen} = \frac{1,4 * N(V1 - V0)}{m}$$

N = Standardized solution of NaCl

V1 = Volume spent in sample (mL)

V0 = Volume spent in the blank essay (mL)

m = sample mass (g)

The protein percentage is equivalent of: $\% \text{ protein} = \% \text{ nitrogen} * 6,38$. (Dias, 2010)

2.2 Sustainability

Greenhouse gas emissions is one of the main worldwide concerns and agriculture is one of the largest contributors with methane from rice paddies, enteric fermentation in ruminant animals and nitrous oxide from the use of manures and fertilizers. In this regard, there are various financial incentives, which encourage organic farming to improve land management and resource conservation. In fact, it is necessary to search for a sustainable agriculture to not compromise future generations and this include three dimensions. Ecological with focus on using local ecosystems resources and preserve biodiversity; economical to assign value to ecological assets and highlight subsidies to fight against unfair competition; social and political dimension which main concern is the equity of tech change, at local level promote farmer participation and at higher level contribute for poverty reduction. (Kaur, 2013)

Actually, for agricultural systems to be sustainable they must incorporate some key principles such as integrate natural processes like nutrient cycling, nitrogen fixation, soil regeneration and natural enemies of pests, they need to minimize non-renewable inputs, make productive use of knowledge and skills of farmers and they should network with each other to solve agricultural problems. Besides all those incentives, not everybody is open to changes considering that poor countries are in competition with each other getting lower prices, returns, markets for agri-food products are unstable, and smallholders have more difficulties in accessing to international markets. What to do to struggle with this? Agricultural policies should include a multi-track approach, small farmers should be linked with local markets, agri-business development in small farms, finally, agro processing with value added activities and urban agriculture should meet local increases in demand for meat. (Kaur, 2013)

The aim of European Commission on behalf of European Union is to improve environmental performance of organizations, so firms should take a greener approach, using renewable resources minimizing the environmental impact of their activities. In fact, companies' trend is to measure, manage and report it as a response to stakeholder's request and competition among industry peers on sustainability leadership. (Lazăr, 2017)

2.3 Organic Market and Organic products

The concept of organic farming emerged in the first half of the 20th century, in 1905, with Albert Howard who was considered the father of it and managed an agricultural research station in India. At that time, Van Huik and Bock felt the necessity to divide farmers into two groups, those how were driven by ethical concerns, ideological ones and the pragmatic whose focus was the utility and financial aspects. Then, Alrøe and Noe decided to distinguish the way that organic farming was seen into three ways, protest against mainstream agriculture, meaning with all the values that it included and the last aspect, as a market opportunity. (Bietti, 2011)

However, remained the question, what is organic farming? It is characterized essentially for its “naturalness” linked with the idea of biological processes and cycles of nature. The techniques that characterize this type of farming are soil management with crop rotation, green manure with animal manure and weed management without pesticides with compost and biological pest control. (Bietti, 2011; Kaur, 2013)

Since 1991, the European Union controls organic farming by Regulation (EEC) 2092/9, which establishes rules for labelling any food product of this type. One of the revision projects

set the IFOAM Principles of Organic Agriculture, which relies on four aspects: health, ecology, fairness and care. Firstly, health of planet with everyone who lives there, well-being, prevention and preservation of living systems. Ecology with recycling processes, enhancing biodiversity and using renewable energies. Fairness with equality of treatment and respect for all life opportunities. Lastly, care, in order to protect current and future generations. However, those values are in tension with each other and do not fit in with globalization and large-scale production. (Bietti, 2011)

Later, the EU felt it was necessary, due to consumer demand for quality products and to in order to promote environmental sustainability and animal welfare, to create a Council Regulation 834/2007 (R2007) which was guided by Codex Alimentarius. This book defines organic agriculture as a management system, which promotes and enhances agroecosystem health, including biodiversity, biological cycles and soil biological activity using methods to minimize the usage of external inputs, avoid synthetic fertilizers and pesticides. (Bietti, 2011; Skrodzka, 2017).

In the late 1980's and early 1990's, the concept of green marketing started to become explored. In 1995, Peattie and some years later, Welford defined green marketing as a management process responsible for identifying, anticipating and satisfying the requirements of customers in a profitable and sustainable way. Peattie, in 2001 divided the green marketing into three phases: Ecological, helping to solve environmental problems through remedies; Environmental focusing on applying clean technology with innovative products; Sustainable where it is essential for companies to produce environmentally friendly products. (Lazăr, 2017) When it comes to talk about green marketing-mix, Prakash, in 2002, defended that it was not only a combination of the general 4P's but also was about understanding public policies processes. In 2004, Ginsberg & Bloom used the general 4P's to separate green marketing into strategies: lean, defensive, shaded and extreme. (Anwar et al., 2016)

In fact, when it comes to market those green products, firms must reflect other factors besides the common 4P's. In 2012, Shrama & Goyal, warned that the pricing of green marketing was an aspect to take particular attention, considering that they support environmental friendliness, so a value can be added for changing appearance, functionality and customization. Looking to the promotion, Solaiman in 2015 said that green products needed to communicate substantive information with meaningful links to corporate activities, requiring changes in the products, process or even corporate focus. Summing all those facts, external factors like health-

consciousness or eco-friendly nature of green products can make people switch to them. (Anwar et al., 2016).

According to “*The World of Organic Agriculture 2018*” organic fields are a global trend applied in 186 countries, which in total has 71.5 millions of hectares, which represents more 2,9% comparatively to 2017, which preserve the natural resources with the best environmental methods.

The Oceania, more specifically Australia, is the global area that most contributes to those numbers, with almost 35.6 million of hectares.

From Organic Farmland, the research speaks also about the fact that there is a significant increase in the number of organic producers, which in 2018 was 2.8 million, representing an increase of 55% comparatively to 2009.

Finally, in order to have a consistency of values, it is important to highlight market values, which are around 97 billion of euros. The most contributor to the market is, without any doubt USA, which has a market value of 40.6 billion of euros. The second place is Germany with 10.9 billion of euros and, the third one is France that has a market value of 9.1 billion of euros. It was precisely in France that organic market had the higher growth rate, around 15.4%.

Besides those good percentages of USA and Central European countries is in Denmark and Switzerland that people spend more per capita, representing around 312 euros.

2.3.1 Organic Farming vs Conventional Farming

Meanwhile, some studies were made in order to compare the real effects of organic farming instead of conventional one. In 2001, Virginia Worthington, in USA, concluded that organic crops contained more vitamin C, iron, magnesium, phosphorus, and smaller amounts of nitrates and nevertheless had less protein, was a better one. However, researchers from London School of Hygiene and Tropical Medicine defended that there is no evidence to corroborate the difference between both types of agriculture. They said that organic food composition depends on production cycles, so encouraged farmers to optimize their activities instead of getting ecological certificates. In 2014, M. Barański et al. study made analyses of 342 peer review publications and found that organic products had higher antioxidants, lower in certain toxins and that organic grown crops had much lower pesticide residues. Another inquiry made by Garber in 2014 and supported by US Environmental Protection Agency (EPA) concluded that pesticides cause different diseases like cancer, obesity, diabetes, Parkinson or infertility.

Therefore, scientific data suggests that people can shrink their exposure to pesticides if they decide to consume organic products. (Skrodzka, 2017).

A study published on *British Journal of Nutrition* discovered that animal products if organic contains 50% more of omega 3 fatty acids. However, how? The report described that this happens if animals have a natural grass-based diet, which has high levels of clover used to fix nitrogen helping crops and grass to grow. Considering that, the large majority of cows has a nutrition based on 60% fresh grass-based diet or hay or silage, if those components are organic benefits the outcome product. Adding to what was mentioned before, the study also reported that organic milk contains 40% more conjugated linoleic acid, CLA, which is linked to reducing risks of cardiovascular disease, cancer and obesity. Besides that, once more, was proven that organic milk has higher concentration of iron, vitamin E, carotenoids and less iodine. (M. Baran'ski *et al.*, 2014)

When it comes to compare with conventional farming, this is a technique that uses seeds genetically transformed, traditional technology, which uses synthetic pesticides and chemical fertilizers, that is why is cheaper than organic, with less benefits as it was mentioned before.

2.3.2 Organic Consumer Profile

The consumption path is constantly changing, and industries must be able to predict, understand and match their needs, the only profitable way to survive in this economic environment. Nowadays, the major challenge is that consumers are more informed and have great concerns looking for specific information in products, doubting of green advertising claims or sometimes the perception that they have of green products is not the correct one. Nevertheless, the buyer looks for food, which is produced considering environmental aspects and are willing to pay an extra amount for that. This creates the perfect opportunity for firms to develop products and services, creating a niche of market, a greener one. (Anwar et al., 2016).

If firms manage to justify their premium price, offering a quality product that creates a feeling of trust and that they can see value in how health and ecological benefits could improve their lifestyle, this would match the supply and demand in the organic market.

Some studies supported that, people who search for this type of product has a science background, are highly educated and more easily are older women compared to men considering that they search for more information before consuming. Adding to this, they have higher income in order to pay an extra amount for those products.

2.3.3 Requirements to be a Bio Producer

Regarding the pastures where the production of dairy cows will lead to the development of biological milk, some requirements must be fulfilled in order to get an organic stamp.

Therefore, the soils must be without pesticides and fertilizers, using renewable natural resources like the manure way of treating the soils or legume cultivation.

When it comes to select fertilizers or soil remedies, there are plenty of options like those that are presented afterwards:

Compost: organic products or by-products of vegetable origin for fertilizing (oilseeds bagasse flour, cacao peels, etc); algae and algae products; sawdust and wood shavings; tree bark compost; wood ashes; soft rock phosphate (cadmium content $\leq 90\text{mg/kg}$); aluminium and calcium phosphate (alkaline soils); cadmium content $\leq 90\text{ mg/kg}$); dephosphorization slags; crude potassium salts; potassium sulphate, magnesium; calcium (plaster); vinasse and vinasse extracts; calcium carbonate of natural origin; industrial lime from sugar production; elemental sulphur; trace elements; sodium chloride.

Considering the pesticides that are recommended in order to substitute the traditional ones, those are:

1) Vegetable or animal origin: azadirachtin extracted from the neem plant; bee wax; gelatine (insecticide); hydrolysed proteins; lecithin (fungicide); vegetable oils (peppermint oil, pine oil); pyrethrins extracted from *Chrysanthemum cinerariifolium*; quassia;

2) Microorganisms used against plagues: microorganisms (bacteria, virus e fungus) that are not genetically modified

3) Other substances used in organic farming: copper in the form of copper hydroxide, copper oxychloride, copper sulphate or cuprous oxide; potassium salts of fatty acids (soft soap); paraffin oil; Potassium permanganate; sulphur

When it comes to talk about cattle feed raw materials, recommended to substitute the traditional ones, those are based on:

1) Vegetable origin: Cereal grains; seeds and oleaginous fruits; legume seeds; Tubers and roots; other seeds and fruits; Fodder and other coarse food; other plants

2) Animal origin: Milk and dairy products; fish and other sea animals

3) Mineral origin: Sodium, potassium, phosphorus; magnesium oxide; sulphur

Finally, feed additives that can be used in the biological milk production, those must be:

1) Trace elements: Iron, iodine, cobalt, copper, manganese, zinc, molybdenum, selenium

2) Vitamins, pro vitamins, analogous substance: vitamins derived from raw materials in food; vitamin A, D and E

3) Enzymes

4) Microorganisms

5) Conservers

6) Binders, anti-caking agents and coagulants

7) Antioxidant substances

8) Antioxidant additives

There are products that considering their composition cannot be used to clean the livestock facilities. Instead, producers must use:

Potassium and sodium soap, lime milk, lime, quicklime, liquid bleach, caustic soda, caustic potash, hydrogen peroxide, natural plant essences, citric acids, peracetic, formic, lactic, oxalic and acetic, alcohol, nitric acid, phosphoric acid, formaldehyde, cleaning and disinfecting products for teats and milking facilities, sodium carbonate.

3. Market analysis

In order to know more about the market in which biological milk will be acting, it is imperative to do an analysis of the dairy sector, specifying organic dimension, external and internal points that influence it. Afterwards, it will be necessary to do an internal analysis of the biological production in Azores and conclude about its customer profile and possible competitors.

3.1 External Analysis

3.1.1 Dairy sector

According to the Portuguese classification of economic activities, the dairy sector belongs to section C (manufacturing industries), 10th division (food industry), group 105 (dairy industry) and related category 1 051 (milk and derivatives industry) and 1 052 (ice cream and sorbets manufacturing). (Econ, 2007)

The description of group 105, mentioned that it “includes preparation activities (clarification, standardisation, thermisation, homogenization), treatment (pasteurization, sterilization, ultra-high temperature), butter and derivatives production (butteroil, concentrated butter), of cheese (processed cheese), curd cheese, fermented milk (including yogurts), partial or totally dehydrated milk (evaporated milk, condensed and powder milk), jellied milk, powdered whey, ice creams, sorbets, casein, caseinates and lactose production. Includes the preparation of flavoured milk and chocolaty.” However, this clutch does not include milk production in the livestock farming, margarine and similar production to spread, powder milk preparation for babies, milk and cheese substitutes’ fabrication, and milk collection from transportation milk companies, production of specialties of frozen pastry or ice cream parlours.

The dairy sector is traditionally diverse in multiple characteristics such as provenience of raw milk, dimension of companies or even the type of final products. In Portugal there is plenty of firms that play in this market, some multinationals like Bel, and other smaller ones that make up the majority.

In 2017, Portugal had 1 242 693 firms, 67 555 of them belong to the manufacturing industry, representing 5, 4% of total. Nowadays, the market has 410 dairy industries working, 72 of them belong to the Azorean archipelago.

Furthermore, in 2017 the turnover of total Portuguese market was 371 477 802 487 euros, manufacturing industries was equivalent of 90 310 829 201 euros, food industry represents almost 16,5% of it. Dairy industry invoiced 1 326 653 485 of euros and the main part was consumed in the internal market. (INE)

According, to SREA, the amount billed in the Azorean archipelago represented 5 031 503 000 euros with 111 246 people working and 818 081 164 euros was from manufacturing industries. Those 72 dairy industries produced 294 631 800 euros, which emphasise the predominance of this sector in the regional productivity.

This industry has an important role in Portuguese economy representing in 2016, 3, 3% of gross value added (GVA) on the Portuguese economy. In 2017, the dairy sector had 352 companies performing in Portugal, representing 3% of 73,6% of micro companies, however the biggest portion of business volume, with 953 million of euros, belong to the four big firms in the market. Its young companies also characterize this sector, almost 44% of them only have 5 years maximum.

It is also fundamental in the Azorean archipelago, where in 2017 there were about 2 040 dairy farms in the Azores and dairy industries employ about 1 300 workers.

Agro - food industry= 5, 07% of GVA

3.1.2 PESTEL Analysis

PESTEL analysis is an useful tool used to look upon the entity's broader organization, evaluating macro-environmental factors that may influence the atmosphere in which the company works on, identifying opportunities and threats. Furthermore, PESTEL framework is useful to analyse the evolving context on a national and industry level which helps to figure out the company's competitiveness and position in the market, eventually changing management decisions and drawing different strategic options (Eisenberg, 2019).

Hence, this study is important in order to realise what kind of external factors will influence the Bio Milk production and define the best positioning in the market.

Political context

The government policy, the stability or instability of overseas markets, foreign trade policy, tax policy, labour and environmental laws, trade restrictions are all factors that create an impact in the way that firms are managed.

The Azorean archipelago is considered an autonomous region; however, it is not economically independent from Portuguese mainland that is why European funds are essential.

The multiannual financial framework (MFF) is the European Union long-term budget and it defines annual spending boundaries for the various policy headings that is why countries' annual funds must be set within those limits. This approach made the EU's policies and programmes more efficient and more predictable to eventual financiers, reducing their risks. The MFF structure is divided into Cohesion Fund and the Common Agricultural Policy (CAP), which is split into two main pillars, investing directly into farmers' projects and rural development.

Presently make sense to analyse not only the MFF 2014-2020 period, but also the following one, MFF 2021-2027, which at the date, is being discussed.

In the first period, European Union set to Portugal 30 thousand million euros which were splitted into Cohesion Fund with 22 thousand and 159 million euros and 8 thousand and 1 million euros to CAP, 4 thousand and 1 million in direct payments and 4 thousand and 58 million to rural development. Specifically, to the Azores was destined 295 million euros from the European funds and another 45 million euros of national co-funding.² The 2013 reform established also the minimum of 30% of the rural development was destined to environmental and climate issues, which includes organic farming.

Furthermore, Azores and Madeira islands received additional CAP of 106 million a year during these 7 years, related to the POSEI scheme which help promoting agricultural development and prepare the sector for future challenges.

For the second period, 2021-2027, the discussion was managed by the prime – minister António Costa and the prediction is that will be directed to Cohesion Fund 21 thousand and 170 millions of euros, a reduction comparing with the previous period which created multiple political debates between parties. CAP will have an amount around 7 thousand and 6 million euros, 4 thousand and 2 million for direct payment and 3 thousand and 4 million for rural development.³

² All of those values are in current prices

³ All of those values are in current prices and subject to confirmation

In 2015, European Union decided to put an end to milk quotas, which in fact distort the market because there were no limits when it comes to production and Portuguese producers had to face north and central European competitors that are exporters by nature. Azorean archipelago was the only Portuguese region that increased production destined to the internal market with the support of POSEI scheme.

Nevertheless, the market is really volatile since then, not only prices paid to producers but also market demand and supply, reasons why, 3 years after the end of milk quotas, more than 60% of Azorean producers went bust, according to João Ponte, actual regional secretary of agriculture and forests. In order to minimize those effects, apart from POSEI scheme, was the mechanism of operators’ auto accountability which means that every milk producer has a supply contract with a cooperative, guaranteeing some safety because they manage to sell a certain quantity of milk at an established price.

Economic context

Several factors may influence the development of project activities, such as economic growth, interest rates, exchange rates, inflation, disposable income of consumers and businesses.

Considering that farming belong to the primary sector and tillage is one of the most important activities that creates income in the Azorean economy (Figure 2) it depends a lot of the subsidies given by the European Union and Government to reduce the milk price per litre.

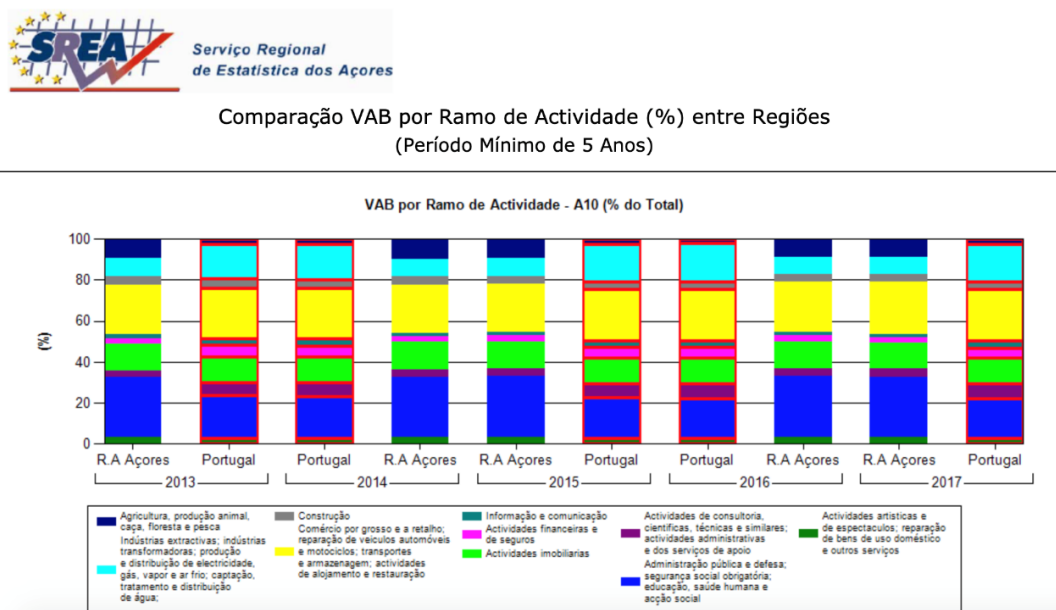


Figure 2 - Gross Added Value of economic activities

Source: SREA, 2017

According to recent statistics made by Bank of Portugal and Organisation for Economic Co-operation and Development (OECD), Portuguese GDP which in 2018 was around 201 530 millions of euros will continue to develop in a positive way, closely related to the progress in the Euro Zone. The OECD predicts that GDP will grow 1,8% in 2019 and 1,9% in 2020, less than the Government expects even though it is still a good prognosis. The deficit will be 0,5% of GDP in 2019 and a considerable reduction in 2020 to 0,2% of GDP. Those projections were sustained by the persistent employment growth and wage increases, in some sectors, that help the rise of private consumption. In 2017 agriculture, forestry and fishery represented around 2% of total GDP, industry that includes construction was around 20%, manufacturing was 12,5% of GDP and the most considerable sector was services with 65,5% of Portuguese GDP. Exportations growth will slow down because Portugal's major trading partners have weakened their economic activity. Adding to this, corporate profits and financial conditions benefit business investment growth (Figure 3).

Portugal: Demand, production and prices

	2015	2016	2017	2018	2019	2020
	Current prices EUR billion	Percentage changes, volume (2011 prices)				
Portugal						
GDP at market prices	179.8	1.9	2.8	2.1	1.8	1.9
Private consumption	117.7	2.4	2.3	2.5	2.4	1.6
Government consumption	32.6	0.8	0.2	0.8	0.2	0.6
Gross fixed capital formation	27.8	2.3	9.2	4.4	6.0	5.5
Final domestic demand	178.2	2.1	3.0	2.6	2.6	2.1
Stockbuilding ¹	0.6	-0.1	0.0	0.2	0.1	0.0
Total domestic demand	178.8	2.0	3.0	2.8	2.7	2.1
Exports of goods and services	72.6	4.4	7.8	3.6	2.4	4.0
Imports of goods and services	71.6	4.7	8.1	4.9	4.1	4.4
Net exports ¹	1.0	-0.1	0.0	-0.5	-0.8	-0.2
<i>Memorandum items</i>						
GDP deflator	–	1.8	1.5	1.4	1.1	1.6
Harmonised index of consumer prices	–	0.6	1.6	1.2	0.7	1.3
Harmonised index of core inflation ²	–	0.9	1.2	0.8	0.8	1.3
Unemployment rate (% of labour force)	–	11.1	8.9	7.0	6.3	5.9
Household saving ratio, net (% of disposable income)	–	-3.7	-4.1	-4.2	-3.9	-3.6
General government financial balance ³ (% of GDP)	–	-2.0	-3.0	-0.5	-0.5	-0.2
General government gross debt (% of GDP)	–	146.7	146.9	140.8	138.2	135.0
General government debt, Maastricht definition (% of GDP)	–	129.2	124.8	121.5	118.9	115.7
Current account balance (% of GDP)	–	0.6	0.5	-0.6	-1.1	-0.3

1. Contributions to changes in real GDP, actual amount in the first column.
2. Harmonised index of consumer prices excluding food, energy, alcohol and tobacco.
3. Based on national accounts definition.
Source: OECD Economic Outlook 105 database.


StatLink  <https://doi.org/10.1787/888933935743>

Figure 3 - Economical projection for Portugal

Source: OECD Economic Outlook and European Commission

During the period of crisis, Portugal suffered a considerable number of financial restrictions and those are now being replaced which associated with the public employment and fiscal

policies support the current disposable income growth and, consequently, private consumption. (Figure 4)

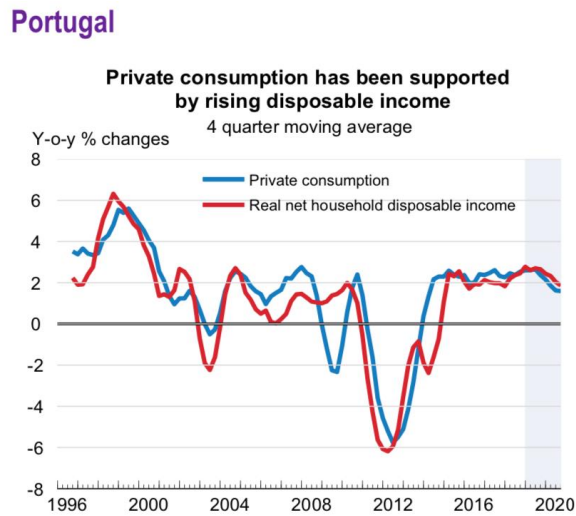


Figure 4 - Disposable income vs Private Consumption

Source: OECD Economic Outlook and European Commission

Furthermore, a country does not survive without research and development, this only happen with private investment. Since 2015, short-term interest rates are negative in the euro area and long-term interest rates on government bonds have good returns making them a tool attractive to invest the money with low risk (Figure 5), (Figure 6). Considering all those facts mentioned before, investment could be divided and analysed in three main groups: households, corporate and general government.

Variable		Short-term interest rate											
Frequency		Annual											
Time		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Country	Unit												
Portugal	Percentage	4.634	1.228	0.811	1.391	0.573	0.221	0.210	-0.019	-0.264	-0.329	-0.322	-0.310
Euro area (17 countries)	Percentage	4.648	1.276	0.817	1.391	0.576	0.222	0.210	-0.019	-0.264	-0.329	-0.322	-0.310

Figure 5 - Short - term interest rates

Source: OECD

Variable		Long-term interest rate on government bonds											
Frequency		Annual											
Time		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Country	Unit												
Portugal	Percentage	4.520	4.210	5.396	10.239	10.547	6.293	3.754	2.423	3.172	3.053	1.843	1.542
Euro area (17 countries)	Percentage	4.312	3.848	3.571	4.238	3.665	2.858	1.956	1.141	0.780	1.030	1.072	0.887

Figure 6 - Long - term interest rates on government bonds

Source: OECD

Before the crisis, the general government’ investment was superior of the euro area however, in recent years it is not applicable, but it is moving towards the convergence (Figure 7).

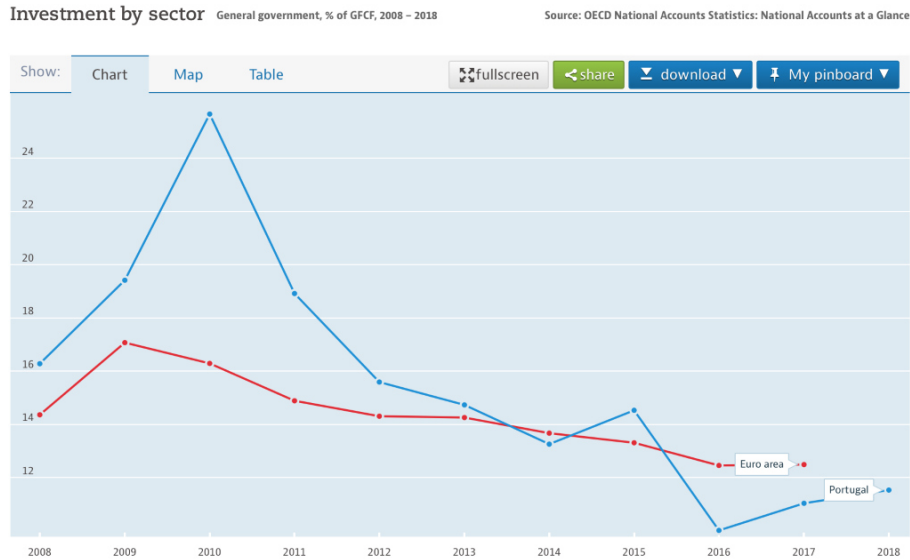


Figure 7 - General Government investment in % of GFCF

Source: OECD Economic Outlook

Entrepreneurial environment improved in the recent years, financial conditions are better, that is why return on equity and return on assets increased in small and medium enterprises, core of Portuguese economy and they are now prepared to accept new investment projects (Figure 8).

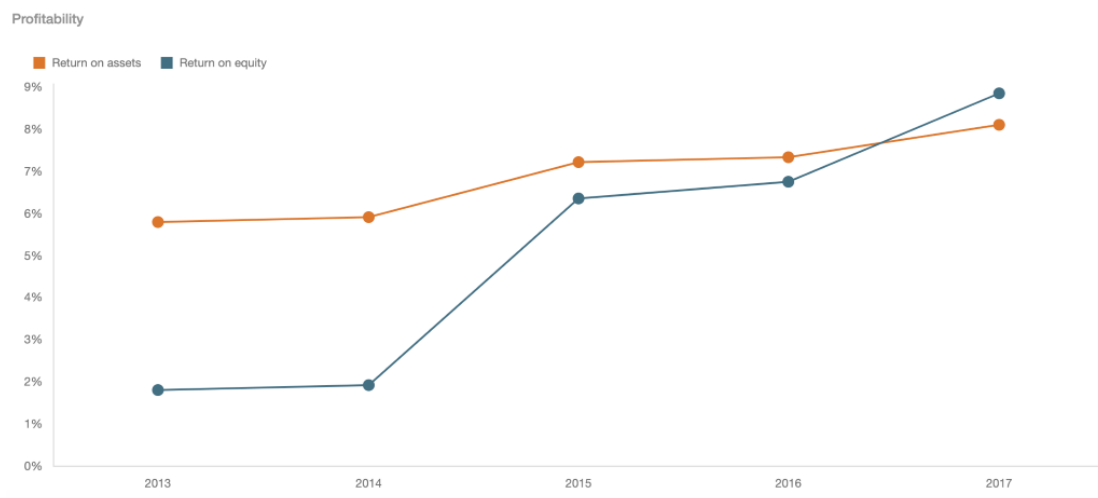


Figure 8 - ROE and ROA of firms

Source: Bank of Portugal

From 2011, the companies' investment in percentage of Gross Fixed Capital Formation in Portugal is higher than the euro area medium and last years the difference is more significant, due to foreign investment in the country attracted by facilities given by Portuguese government (Figure 9). Nevertheless, the major part of those investors looks forward for second and third sectors, one of the reasons why the first sector is less profitable and need more subsidies than the other ones.

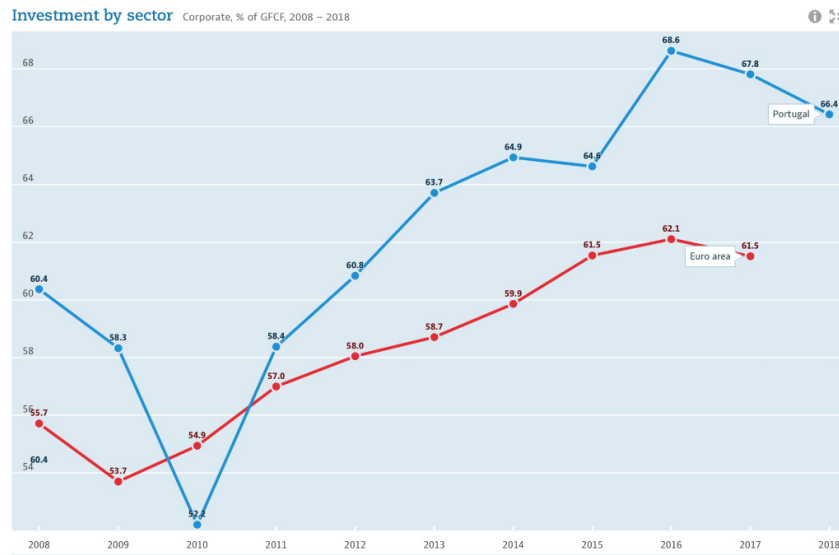


Figure 9 - Corporate investment in % of GFCF

Source: OECD Economic Outlook

Even considering those subsidies, Portuguese farmers' income is inferior of the average wage of euro area's countries. Specifically, when it comes to talk about raising dairy cattle, those farmers have even more expenses and, nowadays, they still have much more financial debt than equity in their structure (Figure 10)

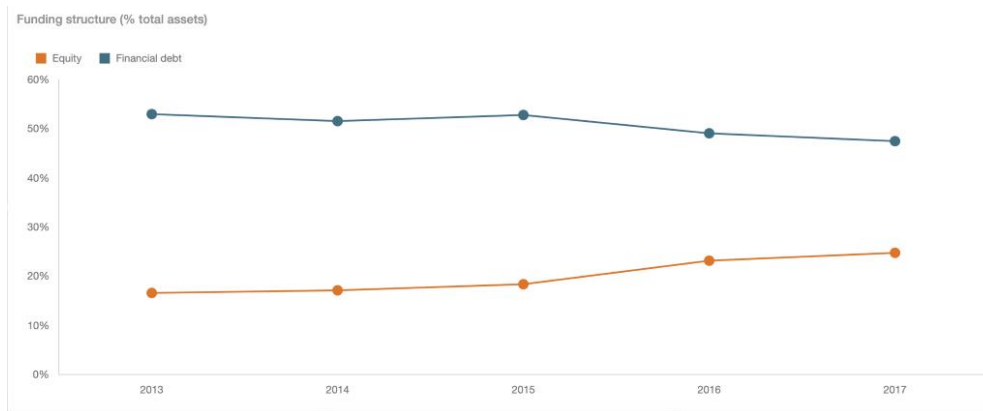


Figure 10 - Funding structure of dairy cattle farmers

Source: Bank of Portugal

The Azorean autonomous region has special benefits when it comes to talk about Corporate Income Tax, Personal Income Tax and Value Added Tax with 20% lower comparing to the mainland. It is the 8th lowest CIT rate and the 2nd lower VAT rate in all European Union.

Social Context

In the social background, there are some aspects to consider for example, population growth, age distribution, health consciousness, career attitudes and factors related to the ones mentioned before.

According to national statistical institute in 2017, Portugal had around 10 million, 300 thousand citizens and about half of them belong to the working population. Specifically, agriculture employs 6,4% of effective population, a low number comparing with previous years, that had its top value in 1998 with almost 14%. This reduction is related with the crisis and automation is replacing a good number of jobs, making them more efficient. (*World Bank Data*)

Primary sector is still a major part of the economy in Alentejo and Azores, which are the areas that employ more. Considering the gender distribution, surprisingly it is well balanced, 56% of employed persons are male and 44% female. In the opposite way, age distribution does not have the same stability, it is a sector really aged, because the major part of the work force is 55 years old or more. Nowadays, younger generations are attracted to carriers more intellectual rather than the ones that require physical work. (*Pordata*)

Technological context

Nowadays, more than ever, organizations must be aware of improvements on technologies in order to keep themselves actual and do not stay behind their competitors. Therefore, this segment includes new ways of producing goods and services, distributing them or just innovations when it comes to communicate with target markets.

In the agricultural sector, the Chemical – Mechanical technological model is still in use; however, it is commonly agreed that it has created a diversity of unsustainable environmental consequences and it is economically depleted.

Two strategic approaches can be made. First one is using inputs with more precision, in time and space. Second, is based on coping and using ecological processes to replace industrial inputs such as fertilizers and pesticides.

Either way, the challenge for every industry and producer is investing on knowledge development in order to be more efficient economically and environmentally.

Nowadays, generations are really chapped, used to social media and unconsciously those ways of communicating influence them. More than ever, strong brands need to have a strong market approach including advertising through social media, sometimes using ambassadors such as influencers that present products or services for their followers.

Environmental context

Lately, environmental context in addition to the technological one, is really important due to worldwide concerns about it. Environmental and ecological regulation, reduction of carbon footprint and waste management, sustainable policies and using renewable energies are some factors that must be analysed.

In Portugal, contrary of European average, from 2004 to 2008 agricultural methane emissions so as nitrous oxide emissions had been increasing. The CO₂ emissions in total, from 2002 until 2014 had been decreasing, which was a positive outlook, however in COP24, United Nations summit meeting for climate change concerns, in December 2018, there was an awareness to the world increase of CO₂ emissions from 2017 to 2018 of around 2,7%.

The usage of renewable energy in Portugal had faced better days, from 2016 to 2017 the contribution of it to total consumption of electricity suffered a decrease of almost 20%, from 72,09% to 52,12%. The main cause was the hydric energy that is not predominant as it was before. (Pordata) According to APREN, Portuguese association to renewable energies, at April 2019 that percentage was 59,2%, wind power has major predominance. In the Azorean archipelago, 39% of total energy is renewable; the major part is geothermal energy due to its volcanic origin, which reveals a lot of potential.

All of those facts must be taken into consideration by all countries to achieve the goal signed with the Paris agreement in 2015 of limiting the global warming to 1,5°C.

The greatest challenge for all is reducing in 50% the CO₂ emissions until 2030, specialists think that if economic sectors make an effort it is achievable.

Legal context

Finally, in this last perspective, health and safety, advertising standards, consumer rights and laws, product labelling and safety are some of the factors that must be analysed.

In order to have a competitive advantage when it comes to negotiate with other countries improving fair competition between companies, European Union set a number of quality policies to protect and promote some products dependent of their characteristics.

Firstly, if an agricultural product has a special link to a specific place where it is made and follow a traditional production process, as an intellectual property it can have PDOs, protected designation of origin or even, PGIs, protected geographical indication. Secondly, products may have tradition in their production process or in its composition, without connection to a specific geographical area, they are stamped with a TSG, traditional speciality guaranteed as a protection against falsification and misuse. Thirdly, there are even other products produced in difficult natural areas such as mountains and islands, like the Azores and Madeira that have a special logo.

Food safety is probably the most delicate factor of all of those mentioned before and invariably, European Commission had set some rules in April 2004. In the beginning of 2006, those rules were applied preventing food crises, advised by EFSA, European Food Safety Authority and controlled by HACCP, Hazard Analysis and Critical Control Points principles and cover all stages, from production to placing on the market. Some of the guidelines goes towards controlling salmonella and other food-borne zoonotic diseases.

Moreover, there is an established regulation to get the organic stamp, which is controlled by the European Commission.

Consumers' rights make part of the Portuguese constitution in 60^o article and in the law n^o24/96, and they must safeguard their life quality, in terms of the good quality of products and services, competitive and fair price, health protection, safety, eliminating prejudice and own formation and information. Some of the platforms that consumers can access to complain are DECO Proteste or even Direção Geral do Consumidor.

3.1.3 Porter Five Forces' analysis

Since 1979, when Professor Michael Porter from Harvard Business School created this tool, it has become one of the most used in the analysis of the environmental attractiveness, profitability and competition intensity of a particular industry. Porter found out that most of the companies give too much attention to competitors, when there were multiple aspects that may also influence the firm. Reason why, he set five forces that shape the strategy of a company, which are threat of new entrants, supplier power, buyer power, threat of substitution and competitive rivalry.(Bolotova, 2016)

In order to apply this analysis to the Bio dairy market, a scale from 1 to 5 was applied to evaluate the power of each force and the attractiveness that they represent in the industry,

considering macroeconomic and geographic information. In the end, an average value will allow to conclude about the attractiveness of the industry.

Threat of new entrants

A point that may be seen as a barrier to new entrants is the fact that some key players that are already in it have strong brands and acquired loyalty from consumers through multiples ways such as advertising or being the first in the industry and this is the case of Terra Nostra, produced by Fromageries – Bel or even Mimosa. A possible way to compete is using scale economies, i.e. producing in such a quantity that leads to a reduction of price. However, organic market is still a niche market and that is why most of the products are considered premium with high prices because producers cannot produce in large scale.

Additionally, producers must consider some start-up losses even if they produce small amounts, because milk is a delicate product with short period of shelf life. In addition, organizations have to invest in research and development because they deal with biological milk which is still an innovation in the Azorean archipelago, requiring new technologies also.

There are some investment funds from the Government like Posei and Prorural +, with the purpose of helping not only farmers converting to Bio and maintaining it, but also industries to invest in fixed assets, develop new products and to adapt to environmental practices. Despite that, there are a considerable number of rules and requisites to access to those resources. Another difficulty that new entrants may find is getting the required organic' stamp, which takes two years minimum to get due to soils' conversion, plus the tests needed to prove that it is already converted, made by an independent and certified entity.

New entrants have other costs disadvantages independent of their size, like getting raw milk which is associated with farmers' cooperatives that have pre-established contracts with industries and farmers that are willing to convert their soils are even less. The good point is that biological milk production is new for everyone, so in terms of experience this is irrelevant.

Finally, accessing to distribution channels can be seen as challenging, that require intensive selling efforts through campaigns of marketing like tasting sessions, in order to gain a place in the supermarket shelf, especially in smaller ones. Nowadays, bigger supermarkets have an area designated to Bio products, which make it easier.

Summing up, there are advantages and disadvantages to enter in the Bio Dairy industry. Nevertheless, the scale associated with this force is 2, so the potential for new entrances in this market is medium - low.

Supplier power

Suppliers in this Bio milk production process are all the farmers with required requisites to produce it. In the Azorean archipelago they are not as much as the desired quantity for industries, what gives them some leverage.

Another important fact is that organic raw milk is a differentiate product, premium, contrary to other types of milk and not every farmer wants to produce it considering the time necessary to recover soils (2 years) and costs related to that. Reason why, industries depend on their raw milk quality and cannot switch to another supplier so easily.

An aspect benefiting industries is that there is no possibility to farmers integrate vertically, they also depend on the industry to dispose their milk and prices are pre-established considering some factors like percentage of protein and fatty tissue, reducing market's volatility.

To conclude, the supplier power is medium-high, with a scale of 2,8, not contributing to the attractiveness of organic dairy industry.

Buyer power

Buyer power of grossers and retailers such as supermarkets or specialised stores is low when it comes to talk about orders' volume of organic milks they do. Firstly, as mentioned before, milk has reduced shelf time and as it is for a niche market, they do not order in large quantities. This is seen in specialised stores and minimarkets than in supermarkets.

A pull force for industry is the fact that biological milk, specially produced in Portugal with guaranteed quality is different from other milks that stores sell nowadays, that is why can be more profitable than others.

In this case, vertical integration of buyer is almost impossible, which benefits the producer's power.

The main point and an important one that increases bargaining power of buyers is the fact that they influence consumers' purchasing decisions in the way they place products in the stores.

Overall evaluation, buyer power is low, corresponding to a 1,8 in the scale, increasing the attractiveness of the industry.

Threat of substitution

Substitutes in organic dairy industry is probably the most problematic factor to consider, due to multiple opportunities present in the market for customers.

In the past couple of years, plant milk such as rice, soy, almond became trendy due to their components. People that consume it are somehow lactose intolerant, have environmental concerns or value substitute's nutritional components.

Another real threat is conventional milk with a more appealing price and designated for mass consumption without preference, those consumers are more price sensible.

In sum, this threat has high force, that is why has 3,5 in the scale, making this industry less attractive.

Competitive Rivalry

In the biological milk industry, the number of competitors is considerable, even though the major part of them are from other European countries, they are big enough to distribute to Portugal. Considering that those competitors have different origins, their strategies are also unpredictable which another challenge to deal with is.

Most of the times, product differentiation is the key for industries' problems and that is why producing biological milk in Azores, that have better conditions in terms of weather to cow feeding, almost pioneering in Portugal with exception of Prado Verde is a way of innovating. However, price cannot be competitive enough because it is a premium milk, with all the costs of that associated and Portuguese milk industries are not as big as international competitors are.

Moreover, industry growth is slow which make possible to fight for market shares more easily with different strategies.

Finally, exit barriers are high which prejudice all the market, because companies remain in it even with low profitability, which leads to the Government help.

In conclusion, the rivalry is strong between large players, which act in a volatile market with perishable products, that is why rivalry has high force, 3 in the scale decreasing the attractiveness of the industry.

Main conclusion

After all forces being analysed, it is possible to conclude that the industry attractiveness is negatively influenced by the force of substitutes and by rivalry. Besides that, producing biological milk in the Azorean archipelago is a feasible challenge. (Table 1)

Table 1 - Porter's 5 forces lattice

Forces	Power	Attractiveness
Threat of new entrants	2	3
Supplier Power	2,8	2,2
Buyer Power	1,8	3,2
Threat of substitutes	3,5	1,5
Competitive Rivalry	3	2
Average Result	2,62	2,38

Source: Author's elaboration

3.1.4 Customer Profile

In order to develop a successful product, it is imperative to seek for what consumers miss in the market or create a need, which will be satisfied with what it is going to be launched. Therefore, to recognize the type of market that is being targeted for Bio Milk production, a consumer profile needs to be filled considering a segmentation criterion because the same product may have different individual perceptions regarding taste, value given to it, most appreciated aspects and overall characteristics of the product.

Bio Milk, considering that it belongs to the food market, can be used as a final product, which is related to business to consumer (B2C) segment and as an intermediate consumption connected to business to business (B2B) segment. Even though, in this business plan, the primordial target is the first segment, due to the profitability of it, both will be analysed, separately.

Business to consumer (B2C)

In order to have a better perception of what kind of costumers this market leads with, a survey was made with a 175 population' sample from all over the country, inclusively the urban areas on the national level.

Demographic

This is a qualitative variable, which includes objective aspects of the population in study such as age, gender, family size, income, educational background and considering a survey made to a representative population.

Regarding organic products, the income aspect due to the premium price unachievable to everyone is very relevant, reason why the target of Bio Milk is the upper and middle class, from 1.400euros of medium monthly income and above (Appendix A/Appendix B). In addition, the consumer profile is characterized to be mainly females, with ages between 26-35 years old (Appendix C/Appendix D), with at least a bachelor's degree (Appendix E/Appendix F) and with a family size of maximum 4 members (Appendix G/Appendix H).

Geographic

The purpose of this variable is to separate the market on a regional basis, from urban areas, rural and town areas.

Normally, people from urban areas and big cities, such as Lisbon and Porto are more influenced by other cultures, especially nowadays when the immigrants from central European and Asiatic countries are part of everyday life. Reason why, in those areas, citizens that also belong to the age range established before; look for alternative products such as Bio Milk.

Psychographics

Evaluating consumers' purchase attitude is imperative because lifestyle, attitude, personality, interests and opinions influence it.

Generally, people who consume biological products worry about their health and well-being with the indirect non-consumption of pesticides, fertilizers and considering that those products do not pass through multiples transformations eliminating nutritional elements. Consequently, as it was analysed in the survey, those consumers have an active and sporty life (Appendix I/Appendix J).

Adding to this, there are environmental and animal welfare concerns, which make customers, switch to plant beverages (Appendix K).

Behavioural

Segmentation based on behaviour is another type of market targeting because consumer' purchase decision is really suggested by usage rate related to the involvement, product knowledge, preferences depending on which buying stage they are and if they are loyal to a brand.

Nowadays, consumers want to know more about what they are consuming, considered pro-active purchasers since, in the beginning, they search for information, comparing between

alternatives that are in the market to choose the one that best fits with their habits. Once they are familiar with the product, purchasing it becomes a natural routine that requires less involvement. Summing up, when the customer is satisfied, he buys again and if the brand gets his loyalty, he sticks with the brand and probably will recommend it.

Benefits Sought

In order to know what kind of characteristics customers' value more for their lifestyle, benefits sought is a useful way of market division.

Therefore, organic consumers are known because they worry about themselves choosing what the best for their health is. Afterwards, Bio Milk is also valued because it has a higher quality with less environmental impact and perverse animal welfare (Appendix L). It should be noted that plant beverage purchasers appreciate more the environmental impact than the higher quality (Appendix M). Considering that it is a premium product, people are willing to pay an extra amount.

Business to Business (B2B)

Geographic

As mentioned before, organic customers are more located in urban areas, that is why partners for Bio Milk will be also located in those regions, due to the proximity between them.

Firmographic

This variable does not belong to the segmentation criteria made before with B2C, because it is correlated with firms, size of companies and what are the products made there.

Businesses like retailing industries, convenience, and specialized stores and, nowadays more frequently, supermarkets with an area focused on organic market, are aware of these products similar to Bio Milk, and that is why they are the main partners, located in cities' centres. Regarding stores' sizes, convenience and specialized stores are small/medium size, depending on the city, the opposite of supermarkets that make part of large size.

Behavioural

Bio Milk collaborates are extremely important, mainly producers, the first phase of the value chain, without raw milk production is useless. Subsequent phases related with market' partners

are also essential because when supermarkets or specialised stores order, they value the urgency of the response, which creates loyalty and commitment between both parts. Most of the firms are averse to risk, so they give importance to close relationship with good service instead of volume of orders.

Benefits sought

In organic products, partners in the retailing industry are more focused in the quality of what they are selling instead of the price, contrary to what they do with other products. It is a reason that they want to maintain close relationships with industries that provide a service with quality.

3.1.5 Life cycle, Opportunities and Threats

Biological dairy production is a new way of introducing sustainable products that can improve our environmental footprint in the market, a valuable source of helping. Considering that, the life cycle of this future entrepreneurship belongs to the first stage, seed and development, where the feasibility of the idea is being evaluated.

When it comes to evaluate external features, SWOT analysis is extremely useful, once it is a mirror of what is going on in the market that companies must be aware of to take advantage or avoid, depending if talking about opportunities or threats. (Table 2)

Table 2 - Opportunities and Threats

Opportunities	Threats
- Niche market, more rentable	- Lack of consumers knowledge
- Increasing demand for organic	- Substitute products
- Sustainability and safety	- High competition for funds
- Healthier lifestyle	- Global crisis
- Awareness of organic benefits	
- Social impact and experience	

Source: Author's elaboration

3.2 Competitive Analysis

3.2.1 Direct Competitors

Direct competition is when two or more companies offer products and services similar to each other, targeting the same customers in some aspects, which means that they play in the same potential market. In this case, direct opponents are the brands who sell organic and non-organic milk.^{4 5}

1) Group Lactogal

Description: This multinational that perform with 6 factories in the Iberian Peninsula was founded in 1996 and is formed by Lactogal Produtos Alimentares S.A, Lactícínios Vigor and Etanor Penha. Their purpose is to produce and commercialize milk and derivatives to national and international market.

Brands: Agros, Mimosa, Gresso Adagio, Matinal, Castelões, Castelinhos, Vigor, Pleno, Primor, Serra da Penha, Fresky, Milhafre dos Açores and Serra Dourada

Products: Non-organic and organic milk, yogurts, cheese, butter, cream, water and juices

Price: Semi-skimmed bio milk UHT of Prado Verde, Agros = 1,29€/litre

Semi-skimmed pasture UHT milk of Milhafre dos Açores = 0,76€/litre

Target: Wholesalers and retailers

Families and individuals

Promotion: TV commercials, online presence, facebook page, promote tasting in establishments

2) Fromageries Bel Portugal

Description: A French multinational named Bel Group, bought Lacto Ibérica in 2004 and named Fromagerie Bel, that is a fusion of Lacto Lusa, S.A; Lacto Lima, S.A; Lacto Açoreana S.A; Agrolactea, Produtos Alimentares, Lda and Lactícínios Loreto. It has 2 factories in Portugal and it is focused in accelerating the sustainable and global growth of the group.

Brands: Terra Nostra, Limiano, A vaca que ri, Babybel, Leerdammer, Boursin

Products: Non-organic milk, butter, cheese, powdered milk

⁴ In order to compare prices, it will be used Continente online platform and semi-skimmed milk.

⁵ In order to compare prices, in large groups it will be used milk produced in Azores.

Price: Semi-skimmed pasture UHT milk of Terra Nostra = 0,77€/litre

Target: Wholesalers and retailers, families and individuals

Promotion: TV commercials, online presence, promotions in establishments, advertising, giveaways

3) Lactaço

Description: This company is composed by 4 Azorean cooperatives named Unileite, Uniqueijo, CALF in 2004 and afterwards, they acquired Leite Montanha. Their main focus is to promote Azorean dairy and nowadays, they have 6 platforms in Portugal.

Brands: Nova Açores, Queijo São Jorge, Ilha Azul, São Miguel, Rainha do Pico, Topo, Lourais, Queijo do Pico DOP, Leite dos Açores, Famoso queijo ilha, Capelinhos, Moledo, Queijo Ponta da Ilha, Queijo Beira, Mistério, Mic - Mac

Products: Non-organic milk, butter, cream, cheese, juices

Price: Semi-skimmed milk UHT of Nova Açores = 0,69€/litre

Target: Specialized stores (Loja Açores), Retailers

Promotion: Online presence, advertising

4) Asana La vida Bio

Description: This is a Spanish company that produce milk from Austrian Alps.

Products: Organic milk, porridge of oat, avena, butter, cheese,

Price: Organic semi-skimmed UHT milk = 1,39€/litre

Target: Upper-middle class supermarkets like ElcorteIngles

Promotion: Online

5) Cantero de Letur

Description: This company produces organic dairy in Spain, Albacete since 1990. Their mission is to produce healthy and natural food, contributing for the well-being of everyone.

Products: Yoghurt, kefir, milk, cheese, milkshakes (all organic)

Price: Organic semi-skimmed pasteurized milk = 2,99€/litre

Target: Upper-middle class supermarkets like ElcorteIngles

Promotion: Made by retailers

6) Andechser Natur

Description: This is a German company founded in 1908, located in Upper Bavaria, south of Munich. The company motto is the love of one's native country and pure joy of life.

Products: Milk, goat milk, cheese, yoghurt, dessert, drinks, cream, butter (all organic)

Price: Iogurte Bio Natural 500 gr = 1,49€

Target: Conscious consumers

Promotion: Online

3.2.2 Indirect Competitors

Indirect competition takes place when two or more companies provide a product or service that even with slightly different products, has the same target satisfying equal needs. For instance, plant drinks brands fill the same need in some aspects as biological milk, when it comes to talk about environmental awareness, nutritional values or even biodiversity of soils. Considering that it is necessary to evaluate them, in order to identify threats and opportunities in the market.

6

1) Alpro

Description: Alpro is a Belgium company founded in 1980, simply transforming soy in something drinkable to compete with milk. The company acquired Sojinal factory in France and continue the expansion to UK also, having nowadays 1100 employees. The purpose is to change the way the world eats for the better, maximizing wellbeing of everyone.

Brands: Alpro and Provamel

Products: Soy, oat, almond, rice, coconut, hazelnut (drinks), yogurt alternatives, desserts, cream alternatives, vegetable ice cream, spreadable cream

Price: Soy drink = 1,79€/litre

Oat drink = 2,29€/litre

Almond drink = 2,29€/litre

Rice drink = 1,99€/litre

Coconut drink = 2,29€/litre

Hazelnut drink = 2,49€/litre

Target: Large retailers and specialized

⁶ Continente online platform will be used to have a better comparison

Promotion: Advertising campaigns

2) Joya

Description: Austrian company that since 2002 look forward to have sustainable production in their 100% plant-based products.

Products: Almond, Oat, Coconut, Rice, Chia, Soy (drinks), yoghurts, ice creams, desserts, cooking oil, vegetarian food

Price: Oat drink = 2,99€/litre

Almond drink = 2,79€/litre

Coconut Rice drink = 2,89€/litre

Chia drink = 2,59€/litre

Target: Large and small retailers. Individuals with environmental concerns

Promotion: Online promotion

3) Dream

Description: Since 1971 this American company with its headquarters in Missouri have the mission to improve world sustainability.

Products: Rice, Almond, Oat, Coconut, Cashew, Hazelnut, Vanilla and Choco drinks,

Price: Almond drink = 2,75€/litre

Rice drink = 2,09€/litre

Rice-Hazelnut-Almond drink = 2,96€/litre

Target: People with sustainable lifestyle

Promotion: Retailers

4) Bjorg

Description: French company created in 1988, pioneers in plant drinks and presently, all their products are biologic certified. In 2000 the company joined a small Dutch group and have, nowadays, more than 200 products.

Products: Coconut, Oat, Almond, Cashew drinks, snacks, appetizers, desserts, bread and cookies

Price: Oat drink = 2,29€/litre

Bio Coconut drink = 2,99€/litre

Bio Almond without sugar drink = 3,29€/litre

Target: People with sustainable lifestyle

Promotion: Retailers

5) Continente Bio

Description: Continente supermarket decided to produce a biological line of products, including plant-based drinks

Products: Rice, Soy, Oat, Almond, Quinoa drinks, grains, coconut oil, olive oil, chocolate, eggs, vegetables, fruits, various kind of butter.

Price: Bio Soy drink = 1,39€/litre

Bio Oat drink = 1,29€/litre

Bio Almond drink = 1,99€/litre

Bio Rice drink = 1,39€/litre

Bio Quinoa drink = 2,49€/litre

Target: Continente stores only; Sustainable consumers

Promotion: Advertisement in flyers

3.3 Internal Analysis

3.3.1 Strengths and Weaknesses

A SWOT analysis is a useful tool used to assess company's competitive position. In one way, opportunities and threats are associated to external analysis of the market itself that was evaluated before. In the other way, strengths and weaknesses are associated to internal analysis, meaning factors that firms can change to improve their position in the market. (Table 3)

Table 3 - Strengths and Weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> - Premium products - Premium location - National product (DOP) - Higher profit per litre - Good application of funds with social impact 	<ul style="list-style-type: none"> - Supplements are costly - Lack of producers' knowledge - Different target and marketing - Increasing competition with lower prices

Source: Author's elaboration

3.3.2 Location

The Azorean archipelago is composed by nine volcanic islands in the North Atlantic Ocean with a moderate weather during all the year. Therefore, it has a long list of natural parks, protected areas, forest reserves and locations with high geological interest, which guarantees the preservation of nature.

Azores is recognized by its green landscapes all around, where fresh grass born 365 days per year, guaranteeing soil productivity, which is also a consequence of high average annual rainfall, equally split during the year.

The disadvantage presented in those islands is that there are a lot of small pastures instead of few bigger ones, that are more rentable when talking about organic milk production. Another point to consider is the difference between measures depending on the city, mostly seen in São Miguel.

3.3.3 Critical Success Factors

Critical success factors are elements that are imperative a firm establish in order to achieve their goals and mission in the market. Basically, those are the guidelines that an enterprise must follow to succeed in the business world. Each company has their own successful critical factors, depending on what they want to achieve for itself. (Table 4)

Table 4 - Critical success factors

Critical success factors	Description
Milk producers	Select the right number of producers able to produce bio milk
Proximity to pastures	Reduce time and expenses in transportation
Close relationship with producers	Quality of raw milk is essential to produce a unique product
Distribution partners	Establish partnership with logistics firms
Well defined target	Unique product with special target
Same deadlines for payment and receiving	Establishing the same timing is crucial to balance accounts
Minimum waste	Amount of milk received will be the same as produced

Sustainability approach	Procedures according to National and European laws and regulations
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Source: Author's elaboration

3.3.4 Mission, Vision and Values

Mission: Produce certificate and high-quality organic milk with healthier benefits for all the customers

Vision: To be seen as an impactful Azorean firm in the organic market, trailing the way for world's sustainability

Values: Committed to make an impact; preserve biodiversity; lead the innovation; corporate responsibility

4. Implementation Strategy

4.1 Product

4.1.1 Value Proposal

The biological milk is an innovative way of producing milk, taking into account the animal welfare, environmental concerns and the healthy aspects with considerable better nutritional factors. With all mentioned above, it is included in the “Product Push” perspective.

For all intermediaries in the value chain, this is an upgrade in the medium-long term, because it has better characteristics compared with the regular milk, that is why it is included in premium section, rewarding everyone.

A question that is imperative to answer is “why people will buy it?”.

Nowadays, there is more concerns and awareness for what we consume, people want to know how it is produced, where it comes from, if it considers the sustainability of our planet. Additionally, milk is still very important in quotidian for multiple aspects presented before and giving customers an improvement in terms of nutritional aspects, it has factors enough to be a winner proposal.

Therefore, the product that is proposed in this project is the semi-skimmed milk with ultra-high temperature treatment.

4.1.2 Name, Brand, Logo

The name of a start-up' product must be a sound that stays in the mind of customers. If it has that factor, it is easier to be recognized when it comes to choose it instead of other competitors.

In order to join Azores and biological milk in a word that could be memorized the brainstorming leads to “BioAçores”.

This is the brand that will be stamped in the package:



4.1.3 Productive process

The production process is a primordial aspect to describe and to pay attention to, guaranteeing security and trust ability of all the value chain process for the well-being of the final customer.

1. Milking process

Description: Fall/Winter: 5h30-6h30/16h30-17h30 || Spring/Summer: 5h-6h/17h-18h

- Cows tits must be clean with water and sodium hypochlorite
- Clinical tests *
- Suction pumps extract the milk through vacuum, and it is stored in a container that maintains milk natural properties, refrigerating at 0°C-6°C.
- Dry cows' tits with disposable paper, avoiding contaminations
- After the milking process, tits must be disinfected with iodine with glycerine to close lactiferous duct. Suction pumps must be also disinfected with iodine solution at 4%

*Clinical tests: 2 options to detect mastitis

1) Mug with black background: 3 first jets disposed, and another 3 jets put in the mug, if it creates lumps can be a sign mastitis.

2) Exam CMT (California Mastitis Test): a racket with 4 division, one for each tit, has the CMT solution and when the milk is infected, it creates lumps or has an aspect of gel.

2. Transportation

Description: Collect milk from organic producers in isothermal tank trucks at 10°C and transport to the fabric, day in, day out.

Small producers that do not have refrigerated tanks to keep milk must transport every day to the fabric at a maximum temperature of 8°C.

3. Milk triage

Description: Qualitative triage through laboratory to microbiological, organoleptic, physicochemical analysis and to nutritional aspects.

Storage: Until transformation process, milk must be below 6°C, during maximum 4hours.

Technology: MilkoScan 7RM

4. Standard Treatment

Description: Focus is to guarantee raw milk' safety and conservation with natural processes like movement, heat and barriers

- Movement: Way to adjust fat content by centrifugation. In order to achieve organic semi-skimmed milk, the percentage of fat should be between 1,50%-1,80%. Afterwards, there is the homogenisation with uniform distribution of fat globules.
- Heat: Thermal treatment at ultra-high temperature (UHT), 135°C during 1 second, with the objective of deleting pathogenic bacteria and allows safety conservation during a longer shelf life period.
- Barriers: Filling of milk in packages which is a barrier by itself to contamination.
Package – Sterile, aseptic and without air which associate with UHT conquer longer shelf life period

5. Aggregation

Description: Aggregate into packages of 6 to put into normal containers to transport afterwards

4.2 Physical Space

Biological milk production in the Azorean archipelago has a comparative advantage because everything is more a less close from one another. Therefore, having an efficient process, the industry must be near biological explorations, in order to cut transportation costs. Considering that, a good location will be Arrifes, location where there is more pastures.

The industry must have an integrated management system, supported by Food Safety System Certification 22000 and environmental management, ISO 14401.

Partnership:

In order to avoid having a storage only to keep the milk expecting to be sold this physical space must be outsourced to a logistics company. This partner has the responsibility of picking up full containers of biological milk and store in their certified warehouse. Afterwards, when a customer like wholesalers need to fill their stock, an order must be made to bio milk industry and redirected to the partner which will deliver it.

4.3 Technology & Quality

When it comes to technology, this is present in every steps of the process, since the beginning. Firstly, it is necessary an isothermal tank truck to transport the milk from the pasture at a maximum of 10°C.

Afterwards, in order to test the quality of the milk and if it is usable to the production it is necessary a Milkoscan 7RM, that gives the exact components of the milk.

Considering that, it is a start-up business it is important to understand the production line equipment in more detail, once it will be a central part of the BioAçores success. (Table 5)

Table 5 - Required technology

Equipment	Function	Details
1.Silo Tank	Store raw milk	<ul style="list-style-type: none"> » Made of mild steel and coated with anti-corrosion paint. » Capacity of 25.000 litres » Equipped with various types of agitators and monitoring and control equipment
2. Plate Heat Exchanger	Heating and cooling liquid	<ul style="list-style-type: none"> » Composed by several plate sections, in which, pre-heating, final heating and cooling occur » Heating medium is hot water and cooling medium cold water » Plant capacity: 20.000l/h
3. Centrifugal clarifier	Separate solids out of a liquid	<ul style="list-style-type: none"> » Equipped with a stack of a conical disks for creating a large equivalent clarification area in a small bowl volume
4. Intermediate Tank	Temporary storage of processed milk	<ul style="list-style-type: none"> » Made of stainless steel, insulated to maintain product temperature

		<ul style="list-style-type: none"> » Capacity of 1.000 to 50.000 litres » Option of being equipped with systems for cleaning and for control of level and temperature
5. Pipes and fittings	Connecting main components and pneumatically operated valves for controlling and distributing the product flow and cleaning fluids	<ul style="list-style-type: none"> » Made of stainless steels » Straight pipes, bends, tees, reducers and unions » Special fittings such as sight glasses, instrument bends » Valves for stopping and directing flow » Valves for pressure and flow control » Pipe supports
6.Pumps	Milk transportation through entire milk treatment plant	<ul style="list-style-type: none"> » Centrifugal pumps with delivery line, shaft seal, suction line, impeller, pump casing, buck plate, motor shaft, motor, stainless steel shroud and sound insulation
7.Control Equipment	Control of capacity, pasteurization and valve position	<ul style="list-style-type: none"> » Includes manual control, unit control and supervision, line control and supervision and production management How it works? » <u>Process Control System</u>: Includes user interfaces, process control, In and Out System » <u>Management Execution Systems (MES)</u>: Executes production management

8. Various service systems	Water supply, steam production, refrigeration for coolant, compressed air for pneumatically operated units, electric power, drain and wastewater	
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Source: *Dairy Processing Handbook - Tetrapack*

4.4 Human Resources

In the beginning of the project the approach will be making more with less, so it is important to cut costs in human resources that are not priority to the industry.

Considering that, the start of the project will have around 12 employers split into driving the truck that will collect milk from producers, laboratorial analysis, productive process in order to check constantly machines and possible faults, research and development department, delivery to the distributor after packaging and finally, the financial department. Afterwards, when the project starts to grow, the number of employers will vary in the same path and in 2030, it is expected to have 19 workers.

Some functions like accountability and marketing will be via outsourcing, once the company will not need a full-time employer, in the beginning, that make up for this.

4.5 Price

The final price applied to this product will be achieved taking into account its cost of production and the price of the competitors in the market.

The cost of production is split between feed, work, maintenance, supplies, rentals, animal health, fuel, farm management, marketing, outsourcing services and depreciation/amortization costs.

Additionally, the price of competitors varies between 1,3 euros and 1,6 euros, which is also the price that consumers are willing to pay to buy this differentiated product.

Considering those purposes, the market price will be 1,3 euros.

4.6 Distribution

This is an area that is adjacent to the core of the business and having this in mind, should be outsourced in order to make the business feasible.

The logistics company that the industry must cooperate will have the function of picking up the packed milk of the factory, storing it until they have the order to deliver to the supermarket.

At this point of the process, the supermarket can be in the island which make it easier to deliver or can be in the mainland. In order to achieve Lisbon and Porto must be shipped and afterwards delivered.

4.7 Communication

The communication approach is important when it comes to present a brand-new product to the customers.

Nowadays, most of the presentation of those products pass through the social media influencers. However, the ones that have more followers can be extremely expensive, so the strategy will be subcontracting a company that could find new influencers.

Adding to this strategy will be the promotion in supermarkets that can target other kind of buyers, the ones that are not influenced by social media.

5. Financial Evaluation

5.1 Main Assumptions

The first assumption was that the main target is Portugal Mainland and considering that the VAT applied to agricultural goods is 6%.

The price that was set to enter the market according to market studies and considering the price that people are willing to pay to buy this differentiated product is 1,3 euros without VAT effect.

Another assumption is the corporation tax applied to Azorean firms, which is 16,90% when enterprises achieve a positive result. Additionally, when the result is between 1.500.000 euros and 7.500.000 euros, the company pay a state surtax of 3%.

Finally, the amount of raw milk litres delivered by the producers will be fully transformed and sold to the market. 90% of the production will be sold to Portugal mainland and the other 10% will remain in Azores.

5.1.1 Sales Forecast

In the beginning of the business, in order to have an accurate estimate, 4 pastures are considered, with a total of around 165 cows.

These cows, Holstein – Frisia, considering their bio lifestyle only produce around 11 litres per day. However, this milk has better characteristics and that is why the price paid to producers is higher, around 10 cents/litre more than conventional milk.

Applying those numbers to year 2021, leads to an estimated production of 655.366 litres, which represents 0,625% of conventional milk production, which in 2019, according to SREA, was 104.858.520 litres.

From 2021 until the end of the project horizon an increment of 0,1% per year over the conventional milk was assumed. At the end of the project's timeline, 2030, it will represent 1,5% of conventional milk production, reaching 1.545.318 litres in that year.

In 2030, 10 producers will be associated to the “BioAçores” brand, corresponding to around 400 cows, that produce 4.293 litres of milk per day.

Applying the price with VAT to the production estimate of bio milk, in 2021 total sales of BioAçores will reach 903.975 euros. Considering the growth projection, in 2030, at the end of the project’s timeline, the sales prediction will reach 2.129.448 euros. (Table 6)

Table 6 - Sales Forecast

Years	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Source
	0,6%	0,7%	0,8%	0,8%	0,9%	1,0%	1,1%	1,2%	1,3%	1,5%	Milhafre Bio Milk production SREA - 2019
Estimated production conventional milk (litres)	104.858.520										
Estimated production bio milk (litres)	655.366	720.902	792.993	872.292	959.521	1.055.473	1.161.020	1.277.122	1.404.835	1.545.318	N
Sales prediction (€)	851.975	937.173	1.030.890	1.133.979	1.247.377	1.372.115	1.509.327	1.660.259	1.826.285	2.008.914	N
Total with VAT (6%)	903.094	993.403	1.092.744	1.202.018	1.322.220	1.454.442	1.599.886	1.759.875	1.935.862	2.129.448	N

Source: Author’s elaboration

5.1.2 Cost of goods sold and Depreciation Cost

According to the “Organic Dairy Project 2019” and other literature in the area, a litre of bio milk costs around 0,60 euros. This price is distributed among feed, work, maintenance, supplies, rentals, animal health, fuel, farm management, marketing and others with less relevance.

In order to determine the amount needed to invest in fixed capital, the amount of depreciation in relation to the total value of disburseable costs was used (12,5%) and also the estimated annual production value in 2021, which led to a value of 82.000 euros for depreciation.

The main equipment has a life span of 10 years, and it is assumed that it will be fully depreciated in the period of the project with a straight-line method. Thus, the amount needed to invest in fixed capital is assumed 820.000 euros. (Table 7)

Table 7 - COGS and Depreciation

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Cost of goods sold and materials consumed	(393.219)	(435.245)	(479.067)	(527.333)	(580.502)	(639.079)	(703.624)	(774.758)	(853.167)	(939.613)	N
Expenses depreciation and amortization	(81.921)	(81.921)	(81.921)	(81.921)	(81.921)	(81.921)	(81.921)	(81.921)	(81.921)	(81.921)	N

Source: Author’s elaboration

5.1.3 Supplies and External Services

One of the most important factors in an industry is the workforce for the different areas of the business and as it was mentioned before, in chapter 4.4, the BioAçores will have between 12 and 19 employees during the project lifetime. Each employee will earn 700 euros per month plus social security costs.

Considering that this is a start-up, some types of costs such as accounting and delivery support will be outsourced. The accountability support will cost around 20.000 euros/year, according to current market price of these services.

Apart from that, it is important to understand the outsourcing delivery, which includes services such as storage, movement in the warehouse, transportation and containerisation.

Pallets with maximum capacity of 120 packs of milk, equivalent of 720 litres, will be used. Other costs will be supported with containers for 3.360 packs of milk, equivalent to 20.160 litres.

Storage cost will be 0,06 euros/pallet or 55 euros in 2021 and 129 euros in 2030.

Cost of Movement in the warehouse is estimated at a cost of 0,65euros per pallet representing 1.183 euros in 2021 and 2.790 euros in 2030. It is important to highlight that the stock moves, at least twice, in and out.

Transportation cost between the factory and the warehouse costs around 80 euros/container. Considering that the transportation will only take place when the container is full, cost is estimated as 2.579 euros in 2021 and in 2030, with the increase in the litres produced, as 6.081 euros.

Finally, the containerisation cost, concerning orders to BioAçores to ship to the mainland, will be 15 euros/container, representing 439 euros in 2021 and 1.035 euros in 2030, because it is expected that 90% of the production will be to the mainland. (Table 8)

Table 8 – Supplies and External Services

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Supplies and External Services	(23.756)	(24.181)	(24.649)	(25.164)	(25.731)	(26.354)	(27.039)	(27.793)	(28.622)	(29.535) t
Outsourcing Accounting	(19.500)	(19.500)	(19.500)	(19.500)	(19.500)	(19.500)	(19.500)	(19.500)	(19.500)	(19.500) Average market price
Outsourcing Delivery	(4.256)	(4.681)	(5.149)	(5.664)	(6.231)	(6.854)	(7.539)	(8.293)	(9.122)	(10.035) Link
Personal Costs:										
Wages	(8.400)	(8.400)	(9.800)	(10.500)	(11.200)	(11.200)	(11.900)	(12.600)	(12.600)	(13.300) N
Social security (23,75%)	(1.995)	(1.995)	(2.328)	(2.494)	(2.660)	(2.660)	(2.826)	(2.993)	(2.993)	(3.159) N

Source: Author's elaboration

5.1.4 Working Capital

The working capital is the difference between current assets and current liabilities, and measures the company's liquidity.

In the composition of current assets, BioAçores has cash and equivalents, accounts receivables and inventories (Table 9).

Cash and equivalents are assumed to be 1% of annual sales and they will be part of the annual balance statement of the firm. Accounts receivables are related with the time that

customers take to pay their orders and the policy of the company is receiving in 1-month maximum. Finally, the firm expects to sell all their production, consequently, only 1 day for inventories was assumed.

In the composition of current liabilities, the firm has accounts payables and accrued income taxes.

Accounts payables the time that the firm take to pay their expenses, is assumed to be 1 month.

The accrued income taxes will also be 1 month. This time will be applied to the debt amount to social security and corporate taxes.

In 2022, the investment in Working Capital is 4.431 euros. It will evolve over the lifetime of the project and will be 865 euros in 2030.

Table 9 - Working Capital Map

Working Capital Map										
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1. Current Assets										
Cash and Equivalents	9.031	9.934	10.927	12.020	13.222	14.544	15.999	17.599	19.359	21.294
Accounts Receivables	75.258	82.784	91.062	100.168	110.185	121.203	133.324	146.656	161.322	177.454
Inventories	1.820	2.003	2.203	2.423	2.665	2.932	3.225	3.548	3.902	4.293
Total (1)	86.109	94.720	104.192	114.611	126.073	138.680	152.548	167.803	184.583	203.041 t
2. Current Liabilities										
Accounts Payable	32.768	36.270	39.922	43.944	48.375	53.257	58.635	64.563	71.097	78.301
Accrued income taxes	6.693	7.371	8.168	9.033	9.983	11.017	12.161	13.417	14.787	16.299
Total (2)	39.461	43.641	48.090	52.978	58.358	64.273	70.796	77.980	85.884	94.601 t
3) Working Capital (1-2)	46.648	51.079	56.102	61.634	67.714	74.407	81.751	89.822	98.699	108.440 N
4) WC variations										
WC investment	-	4.431	5.023	5.532	6.081	6.692	7.345	8.071	8.877	9.742 N
WC disinvestment	-	-	-	-	-	-	-	-	-	-

Source: Author's elaboration

5.1.5 Investment needed

The investment in fixed capital is composed mainly by industrial transformation equipment, described in Chapter 4, and will cost 819.000 euros.

This investment will be financed partly with a Government subsidy and partly with leasing obtained from a bank in the Azores.

5.2 Cash Flow Forecast

Cash flow is the amount of cash and its equivalents being transferred into and out of a business. A firm that generates positive cash flows can create value for shareholders, maximizing long-term free cash flows.

In the beginning of the project, free cash flow is negative for 352.163 euros (Table 10). In 2022, it will become positive with a value of 154.864 euros. In 2024, free cash flow overcomes 1 million euros, which is an excellent perspective for a start-up. In 2030, free cash flow reaches the value of 6.299.124 euros.

Table 10 - CashFlow Map

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cash Flow Map										
EBIT (1-t)	385.124	425.106	470.511	520.749	575.977	636.969	703.680	776.980	857.792	946.235 Link
Depreciations and Amortizations	81.921	81.921	81.921	81.921	81.921	81.921	81.921	81.921	81.921	81.921 Link
Investment in Working Capital										
WC	46.648	51.079	56.102	61.634	65.982	72.490	79.634	87.485	96.118	105.594 Link
WC variations	-	4.431	5.023	5.532	4.348	6.509	7.144	7.850	8.633	9.476 Link
Operational Cash Flow	467.044	511.458	557.454	608.202	662.246	725.399	792.745	866.751	948.347	1.037.631 Link
Capex	819.207									
Residual Value										-
Free Cash Flow	(352.163)	507.027	552.431	602.670	657.898	718.890	785.601	858.901	939.713	1.028.155 Link
Accumulated Cash Flow	(352.163)	154.864	707.295	1.309.965	1.967.863	2.686.753	3.472.354	4.331.256	5.270.969	6.299.124 Link
Assumptions										
Op. CF = EBIT (1-t) + Depreciations										
CF = Op. CF - Capex - Inv. WC										
Capex										
819.207 Link										
Considering straight line depreciation method in 10 years.										

Source: Author's elaboration

5.3 Economic Viability Indicators

Net Present Value and Internal Rate of Return are both measurements of a project profitability. The first one is the difference between the present value of cash inflows and outflows. The internal rate of return is a discount rate that makes the NPV of all cash flows equal to zero in a discounted cash flow analysis.

For the calculation of the cost of capital to be applied in the calculation of the NPV, the following assumptions were used: for the unlevered rate a risk-free rate of 1,5% was used, beta unlevered of 0,77 and market risk premium of food and beverages of 7%, obtaining a discount rate of 6,89%.

The BioAçores Present Value, without Capex, amounts to 4 022 548 euros and NPV is 3 203 341 euros. The IRR of the project is equal to 39, 31% (Table 11).

Both indicators lead to the conclusion that the project is very profitable for the assumptions used and justified previously.

Payback period was also calculated for Investment in BioAçores project, will be recovered in 3,186 years to be precise, which is a very good indicator, adding to the ones pre-mentioned.

Table 11 - Financial Indicators

	Feasibility Valuation									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capex	(819.207)									
FCFF	(352.163)	507.027	552.431	602.670	657.898	718.890	785.601	858.901	939.713	1.028.155
		Sem Capex	Com Capex							
NPV		4.022.548	3.203.341							
IRR		39,31%								
Payback		3,186 years								

Source: Author's elaboration

5.4 Break-even Point

The Break-Even Point is a measure that defines how many units, in the case litres, a firm must sell in order to compensate total fixed and variable costs.

In 2021, BioAçores must sell 53.750 litres to achieve this point and in 2030, evolving till 59.234 units in 2030 (Table 12).

Table 12 - Break-Even Point

Break-Even Point										
BE point = Fixed Costs/ (Sales per unit - Variable Costs per unit)										
Fixed Costs	116.071	116.497	118.698	120.079	121.511	122.134	123.686	125.306	126.136	127.914
Sale price per unit	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30
Variable Costs per unit	0,60	0,60	0,60	0,60	0,60	0,60	0,60	0,60	0,60	0,60
Sales/Variable Costs	2,17	2,17	2,17	2,17	2,17	2,17	2,17	2,17	2,17	2,17
	53.571	53.768	54.783	55.421	56.082	56.370	57.086	57.834	58.216	59.037

It's necessary to sell 53.750 litres of milk to pay the fixed costs.

Source: Author's elaboration

5.5 Sensibility Analysis

The world is constantly changing, and firms must adapt themselves being aware to risks and uncertainty factors.

Considering that, sensibility analysis is extremely useful because it reflects how the company's ratios develop with changes in some crucial project assumptions.

In BioAçores project, it was considered very important to see how NPV and IRR reacted to possible variations of sales price, sales quantity, COGS and Investment.

In 2021, the percentage of sales quantity comparatively to conventional milk was 0,625%. The idea is like variation in price, if BioAçores sells more 0,10%, 0,20%, NPV and IRR will be better and if sales quantity were worse than expected, less 0,10% or 0,20%. However, this is not as much as volatile when compared to price changes.

Considering COGS, if the cost reduces, NPV and IRR become more attractive to investors, where IRR can achieve almost 50% more than the actual, once the cost reduces to 0,40euros.

In the opposite way, if cost increase, those measures became worse, with less 30% of IRR when cost is 0,80euros.

Table 13 - Sensibility Analysis

Sensitivity Analysis			
Variation in Price			
	NPV	IRR	Variation NPV %
1,50 €	5.255.671	50,05%	30,7%
1,40 €	4.639.110	44,71%	15,3%
Base - 1,30€	4.022.548	39,31%	0,0%
1,20 €	3.405.987	33,80%	-15,3%
1,10 €	2.789.425	28,12%	-30,7%
Variation in Sales Quantity			
	NPV	IRR	Variation NPV %
+20%	4.835.078	39,40%	20,2%
+10%	4.429.119	39,36%	10,1%
Base - 0,625%	4.022.548	39,31%	0,0%
-10%	3.615.367	39,24%	-10,1%
-20%	3.207.574	39,15%	-20,3%
Variation in COGS			
	NPV	IRR	Variation NPV %
0,80€	2.849.035	29%	-29,2%
0,70€	3.435.792	34%	-14,6%
Base - 0,60€	4.022.548	39%	0,0%
0,50€	4.609.305	44%	14,6%
0,40€	5.196.062	50%	29,2%
Variation in Investment			
	NPV	IRR	Variation NPV %
+20%	3.869.268	32%	-3,8%
+10%	3.945.908	35%	-1,9%
Base - 819k	4.022.548	39%	0,0%
-10%	4.099.189	44%	1,9%
-20%	4.175.829	50%	3,8%

Source: Author's elaboration

5.6 Financial Analysis

5.6.1 Subsidies and Government support

The Azorean Government supports the enterprises with two types of subsidies, called POSEI and PRORURAL+, both developed and adapted according to European Commission regulations.

The first one, POSEI strategy was designed to contribute to the sustainable agriculture development, assuring the feasibility of two of the primordial treasures of the archipelago: rural communities and natural legacy

The Azorean Government in partnership developed PRORURAL+ with multiple public and private entities setting the regional strategy for rural development.

Considering those descriptions mentioned, biological milk production in São Miguel, fulfil some requirements and would be accepted in some of the policies adopted in those subsidies, like described below:

Policy 4: Fixed Assets Investment

- » Construction, acquisition and real state improvement
- » Buying and leasing machines and agricultural equipment
- » Studies of economic/financial viability
- » Acquisition of informatic programmes, patents and licences
 - Maximum amount = 500.000 Euros
 - Support tax: 50%-75%

Policy 16.1: Cooperation and development of new products and practices

- Amount: Maximum 70% of expenses

Policy 16.2: Cooperation and adaptation to environmental practices

» Application of renewable energies and preserving agricultural landscape

» Operational costs of execution (studies, maintenance costs, Human Resources and equipment's)

- Amount: Maximum 70% of expenses

Those kinds of subsidies require multiple steps and bureaucracies, in order to achieve the maximum amount. Therefore, to have an assured estimative for the amount, it was considered 60% of the support for fixed assets investment, equivalent to 320.000 euros.

The same logic was applied to the other policy of development of new products. A tax support rate of 60% over expenses was applied, which in the project itself corresponds to an amount of around 70.000 euros.

5.6.2 Financing tool - Leasing

In order to acquire all the production line necessary to set the BioAçores business it is necessary to resort to a leasing contract for the remaining amount of the total investment, around 500.000 euros.

According to Caixa Leasing website, , an index rate of the actual market, -0,36%, and a spread of 3,25% were considered, which is basically a TAN of 2,89 and a TAEG of 3,03%.

As the instalments will have a monthly basis, the monthly tax of 0,25% was considered.

The monthly payments will be made during the life span of the project, which means 10 years or 120 months, and will be equal to 4.774,60 euros, except in the 12th month of each year, where tax savings are applied.

At the end of the period, BioAçores will exercise the option to acquire the equipment, in exchange of 2% of the initial value of 500 000 euros, which corresponds to 10 000 euros.

The NPV of the leasing financing was calculated and has the value of 12 915 euros (Appendix N).

5.6.3 Financial Valuation

In order to determine the total value of the project, the NPV of leasing and subsidy was calculated, with a result of 332 915 euros.

Finally, the Financial Net Present Value of BioAçores project was calculated adding the NPV without financial effect, equal to 3 203 341 euros, and obtaining finally the amount of 3 536 257 euros, which is extremely profitable and feasible (Table 14).

Table 14 - Financial Valuation

Financial Valuation	
Adjusted Net Present Value = NPV Leasing + Investment Subsidy	
NPV of Leasing	12.915
Investment Subsidy	320.000
ANPV	332.915 t
Financial Net Present Value = ANPV + NPV	
ANPV	332.915
NPV	3.203.341
FNPV	3.536.257 t

Source: Author's elaboration

6. Conclusions

The purpose of this business plan was to figure out the feasibility of developing a biological milk in São Miguel, an island with plenty of resources and known for its pastures and cows, that produce most part of conventional milk consumed in Portugal. In this part, it is important to summarize main conclusions.

Dairy industry is an important player in the economy, especially in the Azores. Considering that, Regional Government gives a lot of support to its innovation and development.

Besides this support, there was the aim of revitalizing this industry and respond to the consumers' demand for sustainable and healthier products, which is a market opportunity.

In 2020, the market is somewhat restricted to vegetable drinks and low supply of biological Portuguese milk brands. Regarding this, BioAçores was created to analyse the viability of being an Azorean start-up in the market that produce a premium product.

The fact that it is produced in an island with peculiar characteristics and with certain methods in pastures makes the milk with superior quality due to its nutritional components.

Nevertheless, there are some difficulties to the development of the business plan, which are mainly related to the farmers linked to the project, once they need to recover their pastures in order to be biological producers. Adding to this, the fact that it is a new product, may take some time for customer's retention.

As it was possible to validate through financial analysis it is possible to conclude that it is an extremely feasible project, even in pessimistic scenarios. The financial ratios like NPV, IRR and Payback Period are attractive and appeal to the investment.

In sum, this business plan is a proof that development and innovation can be achieved even in primary sectors and rural areas like the Azores.

There will be future for Earth if everybody takes a step towards sustainability.

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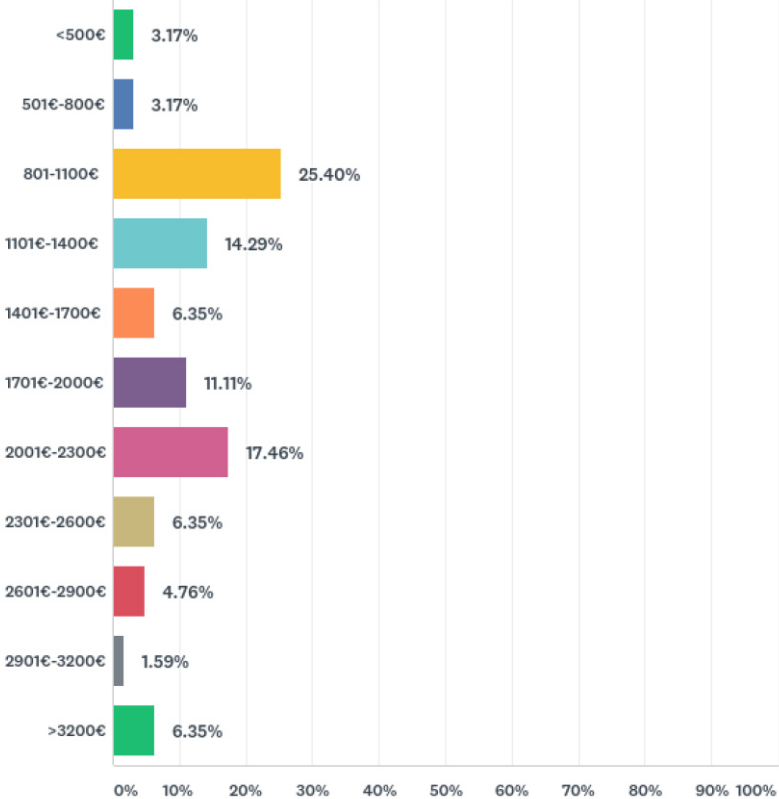
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8. Appendices

Appendix A - Average monthly income of a cow’s milk purchasers' family

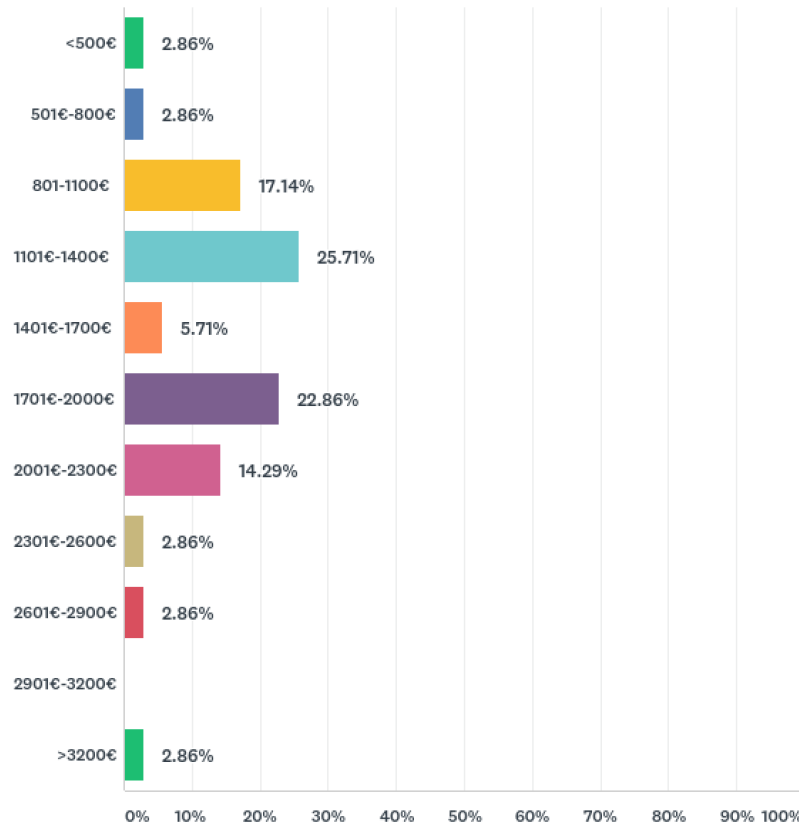
Q6 Which is the average monthly income of your family?



Source: Author’s elaboration

Appendix B - Average monthly income of a plant milk purchasers' family

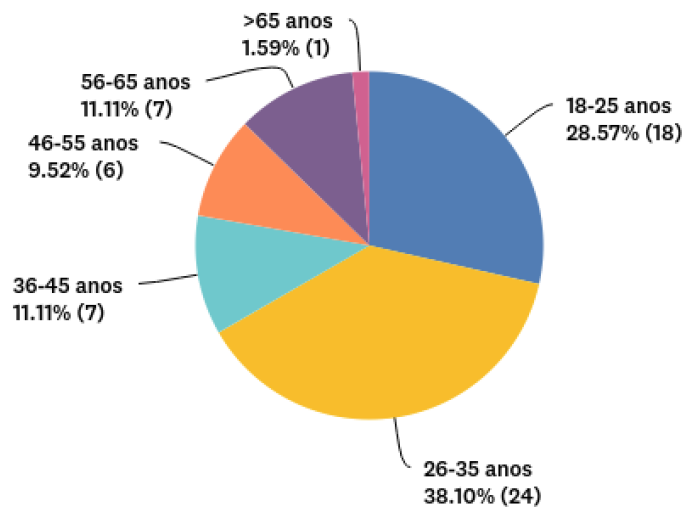
Q6 Which is the average monthly income of your family?



Source: Author's elaboration

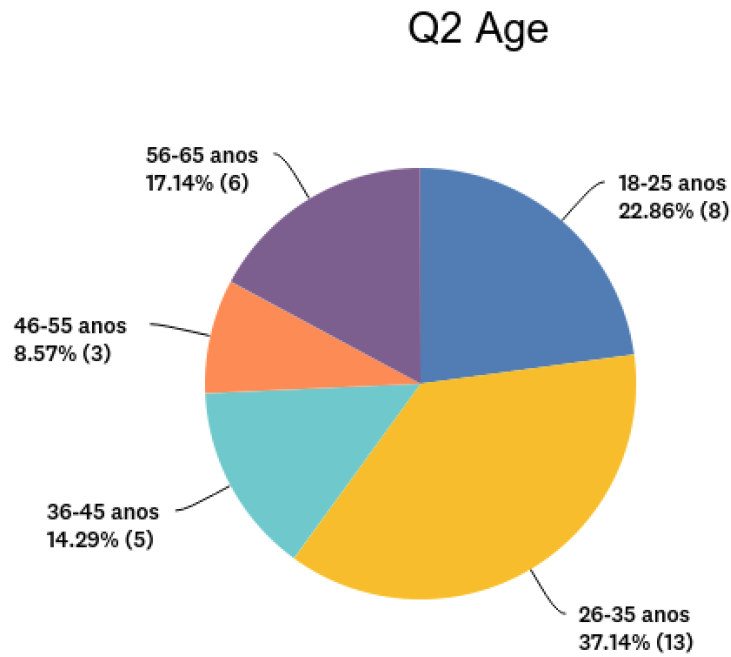
Appendix C - Age of cow's milk consumers

Q2 Age



Source: Author's elaboration

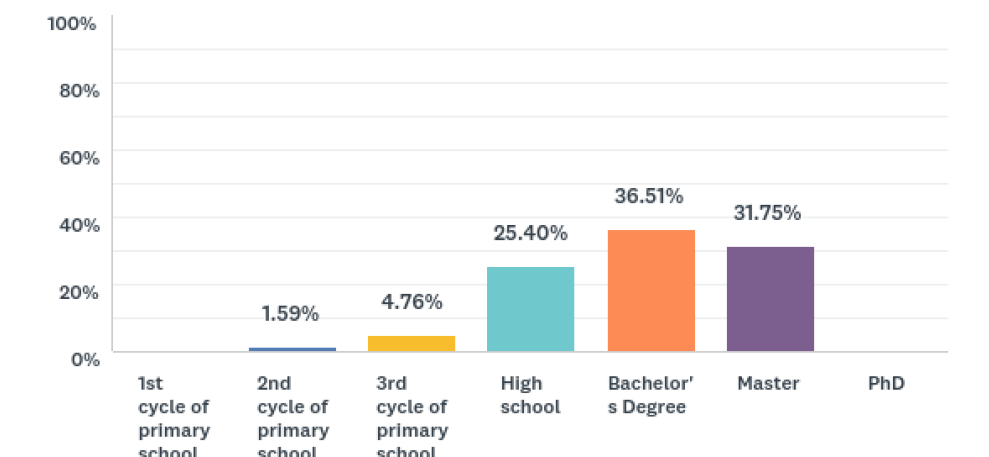
Appendix D - Age of plant beverage consumers



Source: Author's elaboration

Appendix E – Level of schooling of cow's milk purchasers

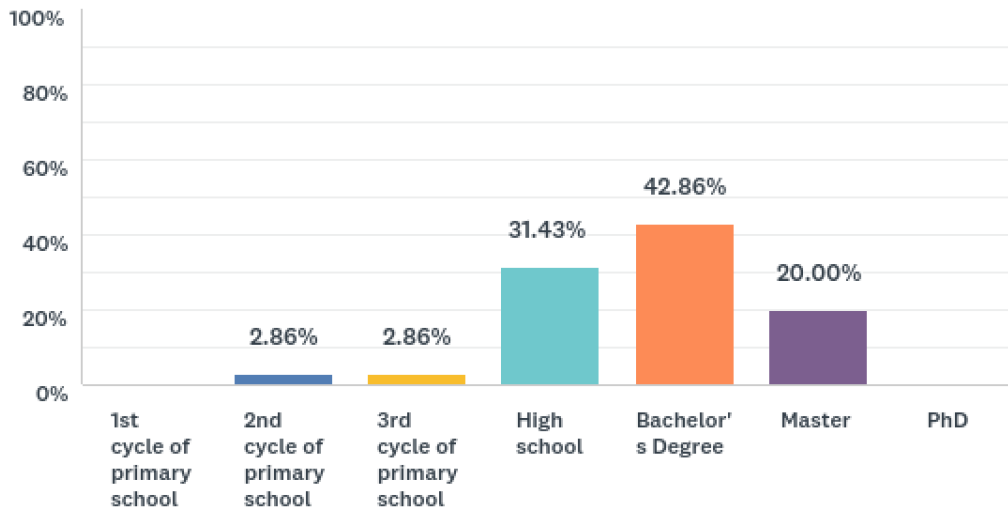
Q4 What is your level of schooling?



Source: Author's elaboration

Appendix F – Level of schooling of plant beverage purchasers

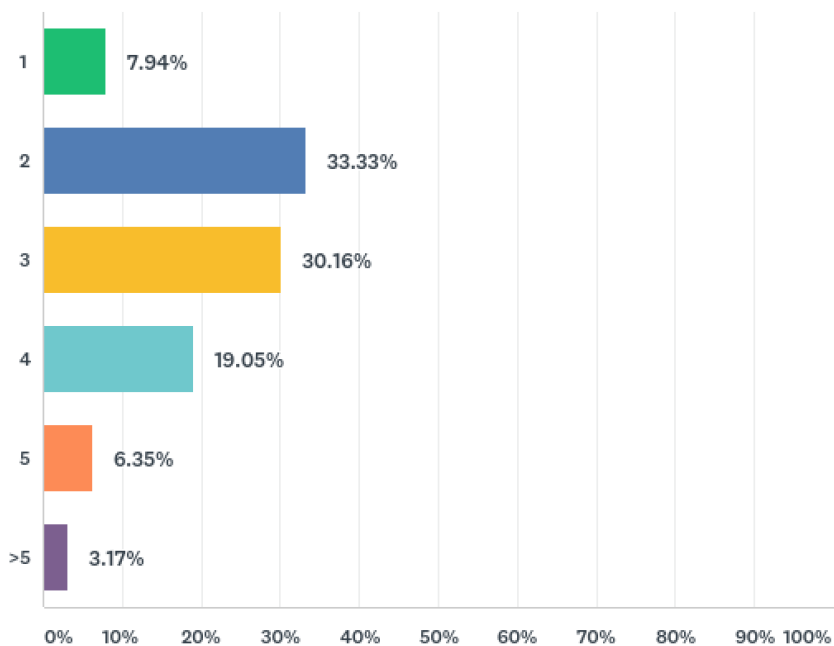
Q4 What is your level of schooling?



Source: Author's elaboration

Appendix G – N° of individuals in a cow's milk consumers' household

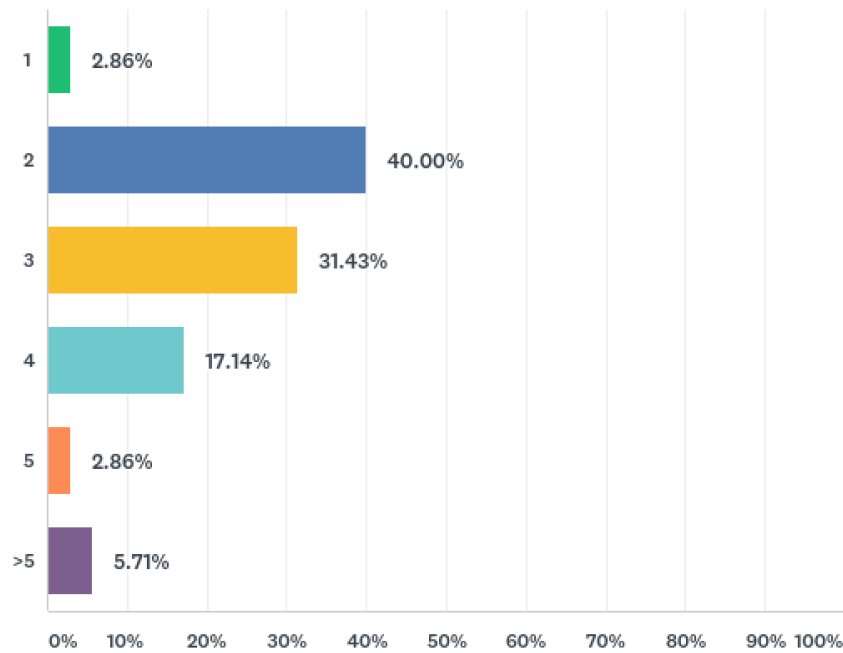
Q5 How many individuals belong to your household?



Source: Author's elaboration

Appendix H – N° of individuals in a plant beverage consumers' household

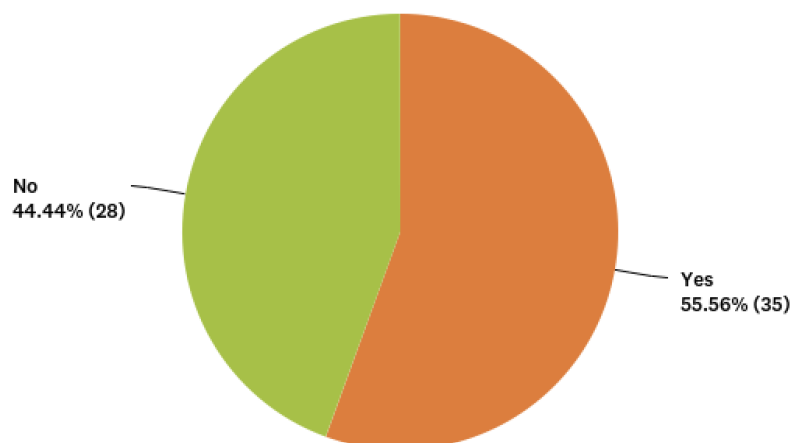
Q5 How many individuals belong to your household?



Source: Author's elaboration

Appendix I – Level of activity of cow's milk customers

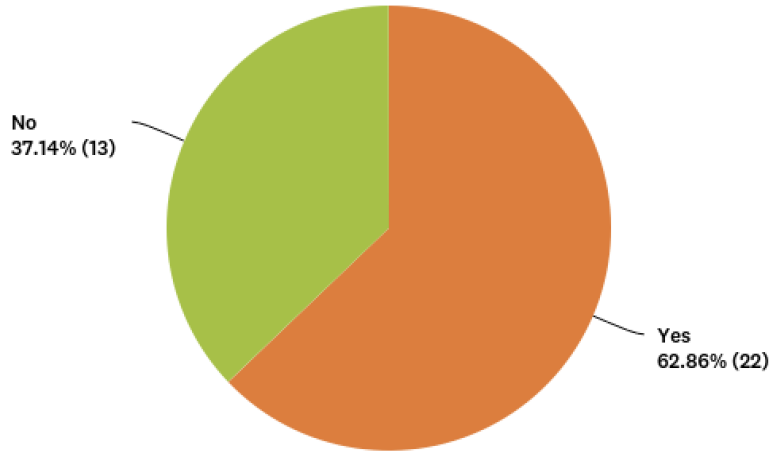
Q7 Do you practise any kind of sports?



Source: Author's elaboration

Appendix J – Level of activity of plant beverage customers

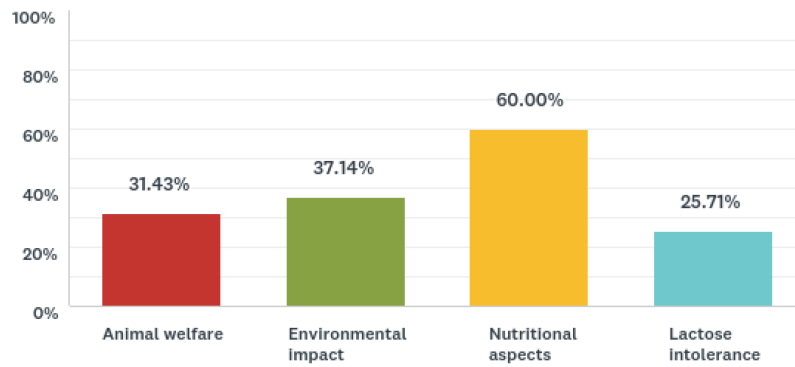
Q7 Do you practise any kind of sports?



Source: Author's elaboration

Appendix K – Factors that increase plant beverage consumption

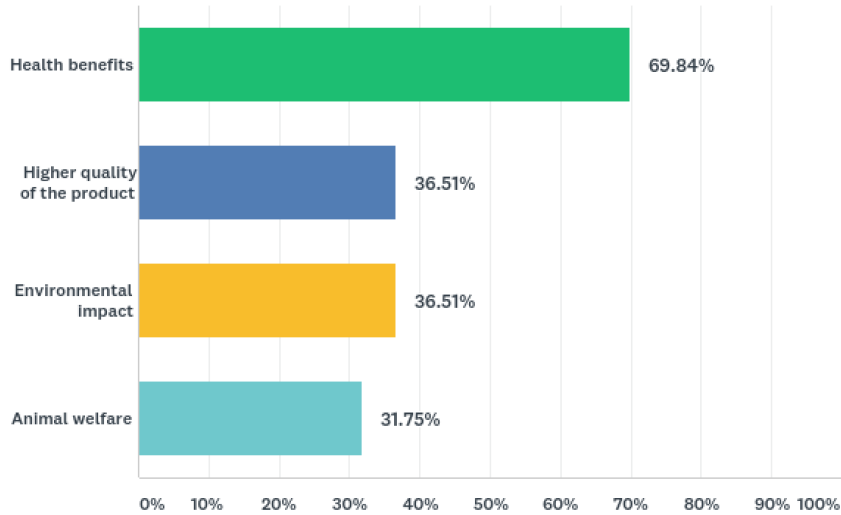
Q16 Which are the factors that make you choose plant milks?



Source: Author's elaboration

Appendix L – Factors that could make cow’s milk consumers switch to Bio Milk

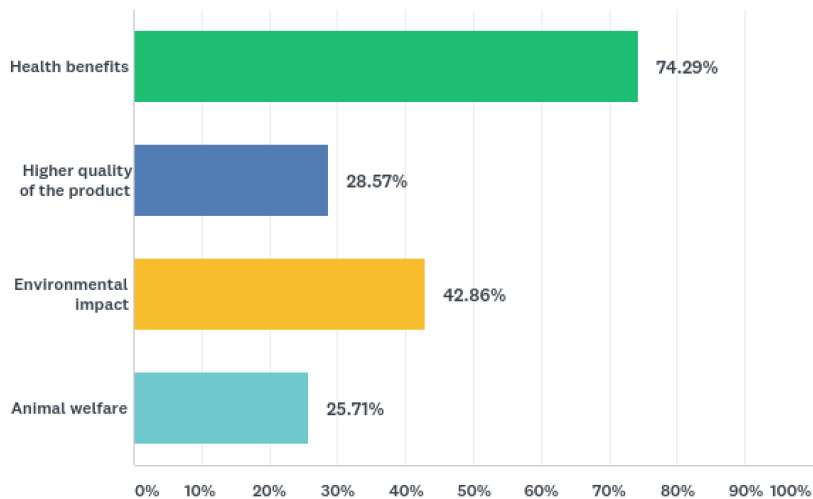
Q12 Which are the factors that could make you switch to Bio Milk?



Source: Author's elaboration

Appendix M – Factors that could make plant beverage consumers switch to Bio Milk

Q18 Which are the factors that could make you switch to Bio Milk?



Source: Author's elaboration

Appendix N – Leasing Payments Map

Nº	Monthly payment	Interest	Capital	Capital Outstanding	Tax savings	Monthly payment including fiscal effects
0	4.744,60 €	0,00 €	4.744,60 €	495.255,40 €	0,00 €	-4.744,60 €
1	4.744,60 €	1.238,14 €	3.506,46 €	491.748,94 €	0,00 €	-4.744,60 €
2	4.744,60 €	1.229,37 €	3.515,23 €	488.233,71 €	0,00 €	-4.744,60 €
3	4.744,60 €	1.220,58 €	3.524,02 €	484.709,69 €	0,00 €	-4.744,60 €
4	4.744,60 €	1.211,77 €	3.532,83 €	481.176,86 €	0,00 €	-4.744,60 €
5	4.744,60 €	1.202,94 €	3.541,66 €	477.635,20 €	0,00 €	-4.744,60 €
6	4.744,60 €	1.194,09 €	3.550,51 €	474.084,69 €	0,00 €	-4.744,60 €
7	4.744,60 €	1.185,21 €	3.559,39 €	470.525,30 €	0,00 €	-4.744,60 €
8	4.744,60 €	1.176,31 €	3.568,29 €	466.957,01 €	0,00 €	-4.744,60 €
9	4.744,60 €	1.167,39 €	3.577,21 €	463.379,80 €	0,00 €	-4.744,60 €
10	4.744,60 €	1.158,45 €	3.586,15 €	459.793,65 €	0,00 €	-4.744,60 €
11	4.744,60 €	1.149,48 €	3.595,12 €	456.198,53 €	0,00 €	-4.744,60 €
12	4.744,60 €	1.140,50 €	3.604,10 €	452.594,43 €	2.412,35 €	-2.332,25 €
13	4.744,60 €	1.131,49 €	3.613,11 €	448.981,32 €	0,00 €	-4.744,60 €
14	4.744,60 €	1.122,45 €	3.622,15 €	445.359,17 €	0,00 €	-4.744,60 €
15	4.744,60 €	1.113,40 €	3.631,20 €	441.727,97 €	0,00 €	-4.744,60 €
16	4.744,60 €	1.104,32 €	3.640,28 €	438.087,69 €	0,00 €	-4.744,60 €
17	4.744,60 €	1.095,22 €	3.649,38 €	434.438,31 €	0,00 €	-4.744,60 €
18	4.744,60 €	1.086,10 €	3.658,50 €	430.779,81 €	0,00 €	-4.744,60 €
19	4.744,60 €	1.076,95 €	3.667,65 €	427.112,16 €	0,00 €	-4.744,60 €
20	4.744,60 €	1.067,78 €	3.676,82 €	423.435,34 €	0,00 €	-4.744,60 €
21	4.744,60 €	1.058,59 €	3.686,01 €	419.749,33 €	0,00 €	-4.744,60 €
22	4.744,60 €	1.049,37 €	3.695,23 €	416.054,10 €	0,00 €	-4.744,60 €
23	4.744,60 €	1.040,14 €	3.704,46 €	412.349,64 €	0,00 €	-4.744,60 €
24	4.744,60 €	1.030,87 €	3.713,73 €	408.635,91 €	2.193,06 €	-2.551,54 €
25	4.744,60 €	1.021,59 €	3.723,01 €	404.912,90 €	0,00 €	-4.744,60 €
26	4.744,60 €	1.012,28 €	3.732,32 €	401.180,58 €	0,00 €	-4.744,60 €
27	4.744,60 €	1.002,95 €	3.741,65 €	397.438,93 €	0,00 €	-4.744,60 €
28	4.744,60 €	993,60 €	3.751,00 €	393.687,93 €	0,00 €	-4.744,60 €
29	4.744,60 €	984,22 €	3.760,38 €	389.927,55 €	0,00 €	-4.744,60 €
30	4.744,60 €	974,82 €	3.769,78 €	386.157,77 €	0,00 €	-4.744,60 €
31	4.744,60 €	965,39 €	3.779,21 €	382.378,56 €	0,00 €	-4.744,60 €
32	4.744,60 €	955,95 €	3.788,65 €	378.589,91 €	0,00 €	-4.744,60 €
33	4.744,60 €	946,47 €	3.798,13 €	374.791,78 €	0,00 €	-4.744,60 €
34	4.744,60 €	936,98 €	3.807,62 €	370.984,16 €	0,00 €	-4.744,60 €
35	4.744,60 €	927,46 €	3.817,14 €	367.167,02 €	0,00 €	-4.744,60 €
36	4.744,60 €	917,92 €	3.826,68 €	363.340,34 €	1.967,10 €	-2.777,50 €

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37	4.744,60 €	908,35 €	3.836,25 €	359.504,09 €	0,00 €	-4.744,60 €
38	4.744,60 €	898,76 €	3.845,84 €	355.658,25 €	0,00 €	-4.744,60 €
39	4.744,60 €	889,15 €	3.855,45 €	351.802,80 €	0,00 €	-4.744,60 €
40	4.744,60 €	879,51 €	3.865,09 €	347.937,71 €	0,00 €	-4.744,60 €
41	4.744,60 €	869,84 €	3.874,76 €	344.062,95 €	0,00 €	-4.744,60 €
42	4.744,60 €	860,16 €	3.884,44 €	340.178,51 €	0,00 €	-4.744,60 €
43	4.744,60 €	850,45 €	3.894,15 €	336.284,36 €	0,00 €	-4.744,60 €
44	4.744,60 €	840,71 €	3.903,89 €	332.380,47 €	0,00 €	-4.744,60 €
45	4.744,60 €	830,95 €	3.913,65 €	328.466,82 €	0,00 €	-4.744,60 €
46	4.744,60 €	821,17 €	3.923,43 €	324.543,39 €	0,00 €	-4.744,60 €
47	4.744,60 €	811,36 €	3.933,24 €	320.610,15 €	0,00 €	-4.744,60 €
48	4.744,60 €	801,53 €	3.943,07 €	316.667,08 €	1.734,27 €	-3.010,33 €
49	4.744,60 €	791,67 €	3.952,93 €	312.714,15 €	0,00 €	-4.744,60 €
50	4.744,60 €	781,79 €	3.962,81 €	308.751,34 €	0,00 €	-4.744,60 €
51	4.744,60 €	771,88 €	3.972,72 €	304.778,62 €	0,00 €	-4.744,60 €
52	4.744,60 €	761,95 €	3.982,65 €	300.795,97 €	0,00 €	-4.744,60 €
53	4.744,60 €	751,99 €	3.992,61 €	296.803,36 €	0,00 €	-4.744,60 €
54	4.744,60 €	742,01 €	4.002,59 €	292.800,77 €	0,00 €	-4.744,60 €
55	4.744,60 €	732,00 €	4.012,60 €	288.788,17 €	0,00 €	-4.744,60 €
56	4.744,60 €	721,97 €	4.022,63 €	284.765,54 €	0,00 €	-4.744,60 €
57	4.744,60 €	711,91 €	4.032,69 €	280.732,85 €	0,00 €	-4.744,60 €
58	4.744,60 €	701,83 €	4.042,77 €	276.690,08 €	0,00 €	-4.744,60 €
59	4.744,60 €	691,73 €	4.052,87 €	272.637,21 €	0,00 €	-4.744,60 €
60	4.744,60 €	681,59 €	4.063,01 €	268.574,20 €	1.494,35 €	-3.250,25 €
61	4.744,60 €	671,44 €	4.073,16 €	264.501,04 €	0,00 €	-4.744,60 €
62	4.744,60 €	661,25 €	4.083,35 €	260.417,69 €	0,00 €	-4.744,60 €
63	4.744,60 €	651,04 €	4.093,56 €	256.324,13 €	0,00 €	-4.744,60 €
64	4.744,60 €	640,81 €	4.103,79 €	252.220,34 €	0,00 €	-4.744,60 €
65	4.744,60 €	630,55 €	4.114,05 €	248.106,29 €	0,00 €	-4.744,60 €
66	4.744,60 €	620,27 €	4.124,33 €	243.981,96 €	0,00 €	-4.744,60 €
67	4.744,60 €	609,95 €	4.134,65 €	239.847,31 €	0,00 €	-4.744,60 €
68	4.744,60 €	599,62 €	4.144,98 €	235.702,33 €	0,00 €	-4.744,60 €
69	4.744,60 €	589,26 €	4.155,34 €	231.546,99 €	0,00 €	-4.744,60 €
70	4.744,60 €	578,87 €	4.165,73 €	227.381,26 €	0,00 €	-4.744,60 €
71	4.744,60 €	568,45 €	4.176,15 €	223.205,11 €	0,00 €	-4.744,60 €
72	4.744,60 €	558,01 €	4.186,59 €	219.018,52 €	1.247,14 €	-3.497,46 €
73	4.744,60 €	547,55 €	4.197,05 €	214.821,47 €	0,00 €	-4.744,60 €
74	4.744,60 €	537,05 €	4.207,55 €	210.613,92 €	0,00 €	-4.744,60 €
75	4.744,60 €	526,53 €	4.218,07 €	206.395,85 €	0,00 €	-4.744,60 €

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75	4.744,60 €	526,53 €	4.218,07 €	206.395,85 €	0,00 €	-4.744,60 €
76	4.744,60 €	515,99 €	4.228,61 €	202.167,24 €	0,00 €	-4.744,60 €
77	4.744,60 €	505,42 €	4.239,18 €	197.928,06 €	0,00 €	-4.744,60 €
78	4.744,60 €	494,82 €	4.249,78 €	193.678,28 €	0,00 €	-4.744,60 €
79	4.744,60 €	484,20 €	4.260,40 €	189.417,88 €	0,00 €	-4.744,60 €
80	4.744,60 €	473,54 €	4.271,06 €	185.146,82 €	0,00 €	-4.744,60 €
81	4.744,60 €	462,87 €	4.281,73 €	180.865,09 €	0,00 €	-4.744,60 €
82	4.744,60 €	452,16 €	4.292,44 €	176.572,65 €	0,00 €	-4.744,60 €
83	4.744,60 €	441,43 €	4.303,17 €	172.269,48 €	0,00 €	-4.744,60 €
84	4.744,60 €	430,67 €	4.313,93 €	167.955,55 €	992,41 €	-3.752,19 €
85	4.744,60 €	419,89 €	4.324,71 €	163.630,84 €	0,00 €	-4.744,60 €
86	4.744,60 €	409,08 €	4.335,52 €	159.295,32 €	0,00 €	-4.744,60 €
87	4.744,60 €	398,24 €	4.346,36 €	154.948,96 €	0,00 €	-4.744,60 €
88	4.744,60 €	387,37 €	4.357,23 €	150.591,73 €	0,00 €	-4.744,60 €
89	4.744,60 €	376,48 €	4.368,12 €	146.223,61 €	0,00 €	-4.744,60 €
90	4.744,60 €	365,56 €	4.379,04 €	141.844,57 €	0,00 €	-4.744,60 €
91	4.744,60 €	354,61 €	4.389,99 €	137.454,58 €	0,00 €	-4.744,60 €
92	4.744,60 €	343,64 €	4.400,96 €	133.053,62 €	0,00 €	-4.744,60 €
93	4.744,60 €	332,63 €	4.411,97 €	128.641,65 €	0,00 €	-4.744,60 €
94	4.744,60 €	321,60 €	4.423,00 €	124.218,65 €	0,00 €	-4.744,60 €
95	4.744,60 €	310,55 €	4.434,05 €	119.784,60 €	0,00 €	-4.744,60 €
96	4.744,60 €	299,46 €	4.445,14 €	115.339,46 €	729,93 €	-4.014,67 €
97	4.744,60 €	288,35 €	4.456,25 €	110.883,21 €	0,00 €	-4.744,60 €
98	4.744,60 €	277,21 €	4.467,39 €	106.415,82 €	0,00 €	-4.744,60 €
99	4.744,60 €	266,04 €	4.478,56 €	101.937,26 €	0,00 €	-4.744,60 €
100	4.744,60 €	254,84 €	4.489,76 €	97.447,50 €	0,00 €	-4.744,60 €
101	4.744,60 €	243,62 €	4.500,98 €	92.946,52 €	0,00 €	-4.744,60 €
102	4.744,60 €	232,37 €	4.512,23 €	88.434,29 €	0,00 €	-4.744,60 €
103	4.744,60 €	221,09 €	4.523,51 €	83.910,78 €	0,00 €	-4.744,60 €
104	4.744,60 €	209,78 €	4.534,82 €	79.375,96 €	0,00 €	-4.744,60 €
105	4.744,60 €	198,44 €	4.546,16 €	74.829,80 €	0,00 €	-4.744,60 €
106	4.744,60 €	187,07 €	4.557,53 €	70.272,27 €	0,00 €	-4.744,60 €
107	4.744,60 €	175,68 €	4.568,92 €	65.703,35 €	0,00 €	-4.744,60 €
108	4.744,60 €	164,26 €	4.580,34 €	61.123,01 €	459,47 €	-4.285,13 €
109	4.744,60 €	152,81 €	4.591,79 €	56.531,22 €	0,00 €	-4.744,60 €
110	4.744,60 €	141,33 €	4.603,27 €	51.927,95 €	0,00 €	-4.744,60 €
111	4.744,60 €	129,82 €	4.614,78 €	47.313,17 €	0,00 €	-4.744,60 €
112	4.744,60 €	118,28 €	4.626,32 €	42.686,85 €	0,00 €	-4.744,60 €
113	4.744,60 €	106,72 €	4.637,88 €	38.048,97 €	0,00 €	-4.744,60 €
114	4.744,60 €	95,12 €	4.649,48 €	33.399,49 €	0,00 €	-4.744,60 €
115	4.744,60 €	83,50 €	4.661,10 €	28.738,39 €	0,00 €	-4.744,60 €
116	4.744,60 €	71,85 €	4.672,75 €	24.065,64 €	0,00 €	-4.744,60 €
117	4.744,60 €	60,16 €	4.684,44 €	19.381,20 €	0,00 €	-4.744,60 €
118	4.744,60 €	48,45 €	4.696,15 €	14.685,05 €	0,00 €	-4.744,60 €
119	4.744,60 €	36,71 €	4.707,89 €	9.977,16 €	0,00 €	-4.744,60 €
120		24,94 €	-24,94 €	10.002,10 €	180,78 €	180,78 €
						Residual Value
						-10.000,00 €

Source: Author's elaboration