

# iscte

INSTITUTO  
UNIVERSITÁRIO  
DE LISBOA

---

## **Innovated International Business Plan: Sustainability, a new Portuguese Linen Textile Company**

Margarida Lopes de Campos Figueiredo

Master in Internacional Management

Supervisor:

Department of Marketing, Operations and Management, Isabel Cristina Duarte, Assistant Professor, ISCTE Business school

Supervisor:

Maria João Delgado, Assistant Professor, Lisbon School of Architecture, Universidade de Lisboa

October, 2022



BUSINESS  
SCHOOL

---

Department of Marketing, Operations and Management

**Innovated International Business Plan: Sustainability, a new Portuguese Linen Textile Company**

Margarida Lopes de Campos Figueiredo

Master in Internacional Management

Supervisor:

Department of Marketing, Operations and Management, Isabel Cristina Duarte, Assistant professor, ISCTE Business school

Supervisor:

Maria João Delgado, Assistant Professor, Lisbon School of Architecture, Universidade de Lisboa

October, 2022

## Acknowledgements

First of all, I would like to thank my dissertation supervisors, Isabel Cristina de Almeida and Maria João Delgado. Primary for accepting to oversee all my research, and secondly for guiding me every time I needed assistance, throughout the process.

Thank you to all the Interviewees, Pedro, Joana Lourenco da Cunha, Lars Gotterup, for your time and insights, which were much valued. Additionally, I want to thank Agnes de Raeve from Libeco company, for sending an extraordinary book about linen craft.

To my parents, who always pushed me to do better. To my mom in special, that even though she is currently living abroad, always managed to “WhatsApp” me for extra motivation and support.

To my beloved sisters, Sara and Mariana, thank you for your unconditional support and for always showing interest in learning about my project.

Finally, to my dear friends, who always had a kind word of motivation to me and my project.



## Agradecimentos

Em primeiro lugar, gostava de agradecer às minhas supervisoras Isabel Cristina de Almeida e Maria João Delgado por terem aceite supervisionar o meu trabalho de pesquisa e por me terem guiado sempre que precisava de ajuda.

Obrigada a todos os entrevistados, Joana Lourenço da Cunha, Lars Gotterup e Pedro pelo vosso tempo e pelo conhecimento que me transmitiram. Adicionalmente, quero agradecer à Agnes de Raeve, da empresa Libeco, por me ter enviado um livro extraordinário sobre o linho.

Agradeço aos meus pais, que sempre me impulsionaram a fazer melhor. À minha mãe em especial, que mesmo estando neste momento fora do país, sempre conseguiu estar presente e disponível para uma chamada WhatsApp, nos momentos em que eu mais necessitava de ajuda e motivação.

Às minhas queridas irmãs, Sara e Mariana, obrigada pelo incondicional apoio e por mostrarem sempre interesse em aprender comigo e, simultaneamente, ajudar-me com ideias e sugestões de melhoria do meu trabalho.

Finalmente, quero agradecer às minhas amigas, que sempre me motivaram a continuar a trabalhar na minha tese.



## Resumo

Esta tese de mestrado foi escrita no âmbito do curso de Mestrado em Gestão Internacional do ISCTE Business School. Debruçar-se-á sobre o tema da Sustentabilidade na indústria têxtil, por ser uma das indústrias mais poluentes do mundo. De acordo com algumas organizações internacionais (por exemplo, a Ellen MacArthur Foundation), a indústria têxtil e de vestuário é a terceira indústria mais poluente do mundo. Desta forma, a melhor maneira de gerir este problema global é abordando o tema da “sustentabilidade”.

A sustentabilidade é a capacidade de existir e de se desenvolver sem, contudo, esgotar os recursos naturais para o futuro. Trata-se de um tema atual, que envolve tanto riscos como oportunidades. As empresas da indústria têxtil (EIT) precisam de crescer num ambiente regulatório em rápida mudança, mas também necessitam de mitigar os riscos ambientais decorrentes dos seus negócios e em toda a sua cadeia de abastecimento. O termo *Triple Bottom Line* (TBL) - *People, Planet and Profit* – introduzido por Elkington (2017), tornou-se uma abordagem influente em todo o mundo, incluindo nas empresas e no mundo dos negócios. Este conceito surge como a chave para uma estratégia a longo prazo para as empresas que se encontram a fazer a transição para a sustentabilidade. Estes três pilares serão desenvolvidos na Revisão de Literatura, bem como algumas soluções emergentes para minimizar o impacto negativo da produção têxtil. Uma dessas soluções consiste na “economia circular”, cujos princípios têm sido adotados por diversas empresas e organizações em todo o mundo (especialmente nos países mais desenvolvidos), com o intuito de diminuir o desperdício, a poluição, a extração excessiva de recursos naturais e aumentar o ciclo de vida dos produtos. No entanto, as práticas da economia circular não se têm revelado suficientes para combater os efeitos da poluição e das alterações climáticas. Uma segunda abordagem descrita na Revisão da Literatura, relacionada com a primeira, é a utilização de fibras naturais na indústria têxtil. Assim, esta tese propõe uma indústria mais limpa e verde, focando-se no desenvolvimento da indústria do linho. A pesquisa foi realizada através de uma intensa revisão de literatura, questionários e entrevistas semiestruturadas, efetuados a especialistas da indústria têxtil e do linho.

A Comissão Europeia publicou, em março de 2022, a Estratégia da UE para Têxteis mais Sustentáveis e Circulares, estabelecendo, assim, os objetivos para uma indústria têxtil circular e neutra em carbono. Quando comparadas com as fibras sintéticas, as fibras naturais são um recurso sustentável e, nesse sentido, melhor para o meio ambiente, pois são materiais renováveis e biodegradáveis.

Para concluir, esta tese irá focar-se na indústria têxtil do linho, descrevendo as potenciais características da fibra de linho e algumas práticas sustentáveis importantes a adotar.

Alinhando o conhecimento da indústria têxtil, do linho e da sustentabilidade, foi desenvolvido um Plano de Negócios Inovador, designado de “Sustentabilidade: uma nova Empresa Têxtil Portuguesa do linho”.

**Palavras-Chave:** Plano de Negócios; Negócios Internacionais; Economia Circular; Sustentabilidade; Mercado Têxtil; Mercado do Linho;

**Códigos de classificação JEL:**

M14 - Cultura corporativa; Diversidade; Responsabilidade Social

M16 - Negócios Internacionais

F23 - Empresas multinacionais; Negócios Internacionais;





## Abstract

This Master's thesis is written under the context of the International Management Master course, at ISCTE Business School. It will address the theme of Sustainability, particularly in the textile industry, as it is one of the most polluting industries in the world. According to some international organizations (e.g., *Ellen Macarthur Foundation*), textile and apparel industry is the world's third most polluting industry. The best way to manage this global problem is by addressing it through "sustainability".

Sustainability is the ability to exist and develop, without depleting the natural resources in the future. This is a crucial topic that involves both risks and opportunities. Companies of the textile industry (CTI) need to navigate a rapidly changing regulatory environment, but they also need to understand and mitigate environmental risks within their businesses and throughout their supply chain. The term *Triple Bottom Line* (TBL) - *People, Planet and Profit* - introduced by Elkington (2017), became an influential approach worldwide, including for companies and for the business sector. This concept came as the key to long-term strategies for companies that are making the transition to sustainability. These three pillars will be developed in the Literature Review, as well as new emergent solutions to minimise the negative impact of textile production. One of those solutions is "circular economy", whose principles have been adopted by many different companies and organisations around the world (mainly in developed countries), to decrease waste, pollution, excessive extraction of natural resources and to increase the life cycle of products. However, circular economy practices alone are not enough to combat pollution and climate change effects. A second solution mentioned in the Literature Review, connected with the first one, is the use of natural fibres in the textile industry. Hence, this thesis proposes a cleaner and greener industry, by focusing on developing the linen industry. The research was carried out by intense literature review, surveys and semi-structured interviews to experts on textile and linen industry.

The European Commission published, in March 2022, the EU Strategy for Sustainable and Circular Textiles, which sets the goals for a carbon-neutral and circular textile industry. When compared to synthetic fibres, natural fibres are a sustainable resource and, thus, better for the environment, as they are made from renewable, biodegradable materials.

To conclude, this thesis will focus on the Linen textile Industry, describing the potential characteristics of linen and some sustainable practices that companies in this sector should adopt.

Combining the knowledge of textile industry, the linen and sustainability, an Innovative Business Plan was created: "Sustainability: a new Portuguese Linen Textile Company".

**Keywords:** Business Planning; International Business; Circular Economy; Sustainability; Linen Market; Textile Industry;

**JEL Classification System:**

M14- Corporate Culture; Diversity; Social Responsibility

M16- International Business Administration

F23- Multinational Firms; International Business



## Index

Resumo.....	v
Abstract .....	viii
Index of Figures .....	xiv
Index of Tables .....	xvi
GLOSSARY of ACRONYMS.....	xviii
CHAPTER I. INTRODUCTION .....	1
1.1 Theme relevance .....	1
1.2 Problem to Address and Research Questions .....	1
1.3 Work Objectives .....	2
1.4 Methodology Resume .....	2
CHAPTER II. LITERATURE REVIEW .....	4
2.1 Globalization, Welfare and Competitiveness.....	4
2.2 Mass Customization in the Apparel Industry and Fashion Sustainability concerns.....	5
2.3 Sustainability issues in Textile and Apparel Industry .....	6
2.3.1 Environment impact,.....	6
2.3.2 Socio-Economic impact .....	8
2.3.3 Sustainability and CSR .....	8
2.3.4 Circular Economy in Textile and Apparel industry .....	10
2.3.5 New technology in Textile and Apparel Industry in the I4.0 Era.....	11
2.4. Challenges in the Portuguese Textile and Apparel Industry .....	12
2.4.1 The Portuguese Textile and Apparel Industry.....	12
2.4.2 Trends and Issues in Textile and Apparel Exporting Sectors in Portugal .....	13
2.4.3 Fibre Types and Textile structures – the Linen case. ....	14
CHAPTER III. BUSINESS OBJECTIVES .....	16
CHAPTER IV. METHODOLOGY .....	17
CHAPTER V. MARKET ANALYSIS .....	19
5.1 Industry Analysis .....	19
5.1.1 Global and European Textile Market .....	19
5.1.2 Portuguese Textile Market.....	20
5.1.3 Linen Market .....	21
5.2 PESTEL Analysis .....	23
5.2.1 Political Factors .....	23
5.2.2 Economic Factors .....	24
5.2.3 Social Factors.....	27
5.2.4 Technology Factors .....	28

5.2.5 Environmental Factors .....	28
5.2.6 Legal Factors.....	29
5.3 SWOT Analysis.....	29
5.4 Five Forces of Porter .....	31
CHAPTER VI. THE COMPANY: INTRODUCTION, OBJECTIVES AND GLOBAL MKT STRATEGY.....	35
6.1 Portuguese Linen Textile Company.....	35
6.1.1 Value proposition .....	36
6.1.2 Mission and Vision .....	36
6.2 Strategic Objectives.....	37
6.3 Global Marketing Strategy .....	37
6.3.1 International Strategy .....	37
6.3.2 Segmentation-Target .....	38
6.3.3 Position.....	40
6.4 MKT Mix .....	41
6.4.1 Product .....	41
6.4.2 Price.....	43
6.4.3 Place .....	44
6.4.4 Promotion .....	44
6.5 Technology .....	45
6.6 Staff .....	45
6.7 Sustainability Plan .....	46
CHAPTER VII. Financial Plan of the Portuguese Linen Textile company .....	49
7.1 Financing .....	49
7.2 Investment /New Corporation Costs .....	49
7.3. Profitability Analysis.....	50
6.3.1 Structural Costs .....	50
7.3.2 Forecast Sales.....	51
7.3.3 Income Statement.....	52
7.4 Cash Flow .....	53
7.5. Risks.....	54
7.6. Research Financial Results .....	54
CHAPTRE VIII. BUSINESS RECOMENDATIONS .....	55
CHAPTER IX. FINAL REMARKS.....	56
9.1 Conclusion .....	56
9.2. Limitations.....	57
Bibliographic References.....	58

Appendices..... 67

## Index of Figures

Figure 2.1 - Energy consumption during garment life-cycle .....	5
Figure 2.2 - The Atacama Desert .....	7
Figure 2.3 - The 17 UN Sustainable Development Goals .....	8
Figure 2.4 - Linen Flax plant .....	15
Figure 2.5 - Linen Fabric .....	15
Figure 5.1 - Type of European Textile and Apparel companies (%) .....	18
Figure 5.2 - European Textile Leader .....	18
Figure 5.3 - Textile, Clothing and Footwear Sales Variation in European Union .....	19
Figure 5.4 – Type of Portuguese Textile companies .....	20
Figure 5.5 - Number of Textile Companies, Employees and Turnover in Europe and Portugal .	20
Figure 5.6 - Main Markets for Portuguese textile exports (%).....	20
Figure 5.7 - Global Fibre Production, million tonnes (%) .....	21
Figure 5.8 - Market Development Index and Industry Linen Market Growth .....	22
Figure 5.9 - The World by Income .....	25
Figure 5.10 - Global Fibre Growth in million tonnes .....	26
Figure 5.11 - SWOT Analysis.....	29
Figure 6.1 - Possible Clients for Portuguese Linen Textile company.....	38
Figure 6.2 - Europe map, Linen company selling points: Portugal, Spain, UK, France, Germany, Slovenia, Italy .....	39
Figure 6.3 - Portuguese Linen Textile company Position .....	40
Figure 6.4 - Portuguese Linen Textile company clothing products .....	42
Figure 6.5 - Linen Retail Chain Survey: “What is the price range to buy a single 100% linen T- shirt?” .....	43
Figure 6.6 - Supply Chain for the Portuguese Linen Textile company .....	48





## Index of Tables

Table 6.1 - Structural Costs of the Portuguese Linen Textile company .....	43
Table 6.2- Portuguese Linen Textile company’s collaborators .....	45
Table 6.3 - Sustainability Plan of the Portuguese Linen Textile company .....	46
Table 6.4 - Suppliers Sustainability Plan of the Portuguese Linen textile company .....	47
Table 7.1 - Total Financing .....	49
Table 7.2 - Capex .....	50
Table 7.3 - Capex detail .....	50
Table 7.4 - Structural Costs .....	51
Table 7.5 - Operational Expenses.....	51
Table 7.6 - Forecast Sales .....	52
Table 7.7 - Income Statement.....	53
Table 7.8 - Cash Flow.....	54



## GLOSSARY of ACRONYMS

CTI – Companies of the textile industry

CELC – European Confederation of Linen and Hemp

SDG - Sustainable Development Goals

CSR - Corporate Social Responsibility

TBL - Triple Bottom Line

CE - Circular Economy

SD - Sustainable Development

EU - European Union

UN - United Nations

ECB - European Central bank

GOTS - Organic Textile Standard

OEKO -Tex- Tested for harmful substances and produced sustainability

SWOT - Strengths, Weakness, Opportunities and Threats

EBITDA - Earnings Before Interest, Taxes, Depreciation and Amortisation

EBIT – Earnings Before Interest and Taxes

NPV – Net Present Value



## CHAPTER I. INTRODUCTION

### 1.1 Theme relevance

Textile and Apparel industry is a very profitable industry but, on the other hand, very damaging to the environment. When fast-fashion companies started to appear back in the 60s, they started dominating fashion market and selling high quantities of clothes, especially in the developed countries (Europe and USA).

In fact, clothing demand has doubled over the last 15 years (Ellen Macarthur Foundation, 2022). On the other hand, clothing use (the number of times one single item is used) has declined by almost 40%, and many environmental problems have thus increased, due to mass fashion production. Tonnes of pollution from the textile and apparel industry are contaminating the air, soil and water and this trend has increased at a high pace, for as long as companies have focused on producing in massive ways, overlooking the effects behind a linear business economy. In addition, green gas emissions from textile industries, as well as from energy, transport and agriculture, have contributed to climate change, a threatening global problem to the survival of our planet.

### 1.2 Problem to Address and Research Questions

Today, the textile and fashion industries are not only among the most environmentally damaging industries but also, suffer from major social responsibility issues. Moreover, the textile industry is producing increasing amounts of new materials to maintain and promote the ever-increasing consumption of clothing. This adds to the burden on the environment and the people, and when financial pressures are overwhelming, environmental protection measures are often omitted. Fashion and textile industries have traditionally been characterized by capitalist growth paradigms. However, public and political pressure has grown in recent years to change the industry towards sustainability, although doing so has proved extremely difficult. Organisational change has been the subject of much literature and research, but it is still difficult for an organization to implement effective change.

In this sense, sustainability is going to be addressed and described in this thesis project as the alternative to a business formula that leaves a damaging trail on environmental and promotes social injustices. Therefore, a sustainable business plan will be presented, focusing on the textile industry. Linen was the only raw-material chosen, since it is one of the most sustainable fibres in the world. In this sense, it is necessary to deal with four relevant factors:

- 1. How is the textile market in Portugal and how does linen manufacturing work?*
- 2. What is the production cost of linen clothing products?*

3. What is the price range for chain retailers to buy a single 100% linen T-shirt?

4. Are designers looking forward to work with 100% linen fibre?

### 1.3 Work Objectives

The main objective of this thesis is to propose an Innovative Business Plan. It consists of creating a business and financial plan for a new linen company/factory situated in Portugal.

This company will be responsible for overseeing all the textile steps, from the spinning to the clothing manufacturing. This is very important from the environmental point of view, since all the textile activities will be centralised in one single country, reducing the CO2 emissions from transport and ensuring a better productivity control. From the economic point of view, it can also contribute to strengthening the Portuguese local and regional economy. The objective of the Business Plan is to show the viability of the project, as well as to raise awareness about the importance of linen in the textile industry.

### 1.4 Methodology Resume

Regarding the methodology implemented, this thesis will follow the guidelines of a Business Plan elaboration.

The first methodological approach concerns a *Literature Review*, which will seek for scientific data about environmental and social-economic problems of the textile and apparel industry and examples of solutions that have been proposed by new organisations (e.g., Ellen Macarthur Foundation). These include, for instance, reducing textile waste and increasing the life cycle of the products, promoting the circularity of materials and changing design techniques. Furthermore, the thesis will include a compilation of data about the main challenges in the Portuguese Textile and Apparel Industry, the main trends and issues, the different types of existing fibres and the importance of linen in textile industry.

The second methodological approach considers the four questions to clarify the way the business plan was developed. To respond to those questions, specific research techniques were adopted, such as interviews and questionnaires. The interviews were made to experts in the business area (textile, design). Questionnaires were also used with open and closed questions to student designers/professor designers and to retail chain companies. First, it will be presented an *Industry Analysis* regarding the Portuguese and European textile market. In order to understand the global context of the textile and linen business, *PESTEL Analysis* was used to identify the main political, economic, social, technological, environmental and legal trends. Additionally, the business plan will describe the *Five Forces of Porter* that can shape the business

strategy: *substitute products, new entrants, suppliers, clients and competitors' analysis*. Afterwards, the new linen company will be presented by addressing its textile process, mission, vision, value proposition and its strategic objectives. The more operational part of the Business Plan starts with the company's *Global Marketing Strategy*, which includes an analysis into the following elements: *International Strategy, Segmentation, Position, MKT Mix, Technology and Sustainability Plan*. A sustainability plan is imperative in every business, especially in industries that have greater environmental impact. This is very much in line with the United Nations recommendations adopted in 2015 at the UN Sustainable Development Summit, calling on countries and companies from all over the world to adopt new strategies to protect the planet and the people. Lastly, the business plan will include a *Financial Plan*, some *Business Recommendations*, and *Final Remarks*, which include a *Conclusion* and some *Limitations* of the thesis project. The results from the Financial Plan will show a positive NPV (€3.626.618,25) and a payback in 4 years, which shows the viability of the Linen Textile business.



## CHAPTER II. LITERATURE REVIEW

### 2.1 Globalization, Welfare and Competitiveness

To some extent, the rapid increase of production, facilitated by new technologies, transportation and market deregulations (Pruijg, Marques & Pervez 2009), has contributed to the global movement of people, products, services and materials. This globalization movement brought many benefits to the textile industry. Many manufacturing companies have relocated their operations to developing countries in order to reduce their labour costs and, consequently, reduce their production costs (Pannicia, 2002; Dicken, 2003; Staber, 1997). By doing this, companies became more competitive. Undoubtedly, globalization brought many advantages, by helping increase international trade, create more jobs and polarise income distribution (Staber, 1997).

However, some economists and researchers have started exposing the social downsides of globalization (Martinez & Vega Ruiz, 2002), namely those related with the low level of salaries that employees receive; the bad working conditions many of them have to endure; and the salary inequality between men and women. From the environmental perspective, globalization has also contributed, for instance, to the extraordinary increase in the levels of pollution in countries where manufactures are located. At the same time, these levels of pollution have affected millions of people that live nearby. The increasing displacement of manufacturing activities to the developing countries, such as Bangladesh and India, have significantly affected their levels of air and water pollution. In India, people consuming water from the rivers near factories started developing skin and stomach problems, as the water became polluted and non-drinkable (Endevr, 2020). Besides the environmental problems that occur in those countries, globalisation has led many factories to operate at a fast rate, forcing people to work long hours without pauses, in order to guarantee that fashion shops (mostly in the Western countries) are always full of clothes to meet the high demand. Data from the World Bank suggest that by 2030, global apparel consumption is projected to rise by 63%, from 62 million tons in 2018, to 102 million tons, equivalent to more than 500 billion additional T-shirts. In fact, according to Ellen Macarthur Foundation, global production has roughly doubled (from 2000-2016). Big corporations are, in fact, taking benefits from moving their operations to other countries to gain cost advantages and at the end, to increase their margins and, thus, profit more from increased sales. On the other hand, pollution, diseases, and unfair wages seem to dominate the places where unsustainable industries are located. Even though globalization was so important in putting continents, countries, and people together, making them dependent on each other, one cannot disregard its negative side effects as well, namely for the environment. There are some

studies that indicate that some companies are already looking inwards, trying to centralize all their manufacturing processes in one specific country-district, instead of reallocating to other countries. From an economic point of view, this could be a determinant factor to re-industrialize our economies, create new jobs, reduce countries' huge dependency (Pruig, at al., 2009) and, of course, reduce environmental costs, by reducing transports and logistics. This could be a new important challenge for Europe.

## 2.2 Mass Customization in the Apparel Industry and Fashion Sustainability concerns

It was around 1960 that fast fashion brands started appearing and taking over the fashion industry (Ellen MacArthur Foundation, 2022). Fast fashion is described as a business model based on offering consumers stylish clothing at low prices (Piippo, Niinimäki, & Aakko, 2022). Mass production is the key to lower the final product costs and gain competitiveness. Offering stylish clothes at low prices has led consumers to often buy in an irrational way, most of the times resulting in a considerable amount of waste. In fact, EU consumers discard an average of 11kg of textiles every year, which equals to 36 skirts per person discarded every year (*European Parliament*, 2020). This model of consumption of "buy and discard", which fast companies have perpetuated during decades, is synonymous of unsustainability. As the United Nations Secretary General (UNSG) António Guterres bluntly said in the last UN Climate Change Conference (Cop 26) in November 2021, "*It is enough treating Nature like toilet*". He meant that we must start treating nature with respect, limiting the use of fossil fuels, opting for renewable resources, and decreasing general waste in our planet.

If we want to bring sustainability into the fashion business, we need a new model of economy that addresses the social, economic, and environmental problems that mass production has been responsible for. We need new patterns of production and consumption. But before that, let's look at the textile industry processes. Clothing requires a lot of resources and energy (Peters, Li & Lenzen, 2021). Figure 2.1 shows all the steps of fashion production and their energy consumption proportion

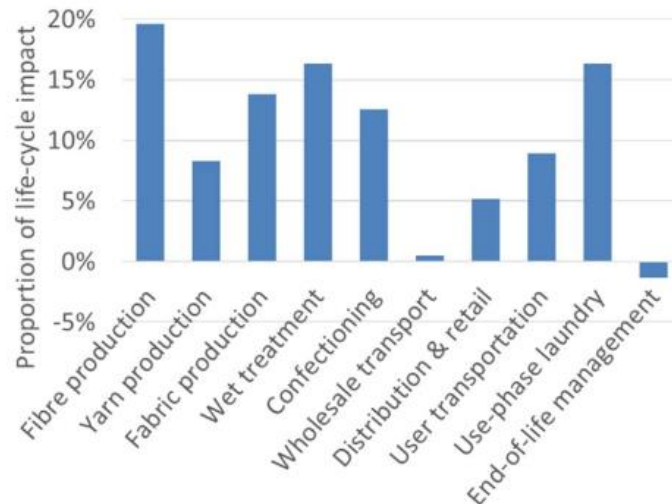


Figure 2.1: Energy consumption during garment life-cycle (Peters, Li & Lenzen, 2021)

The information is based on the total consumption of clothing in Sweden (Sandin, 2019). Since the country relies on globalised supply chains, the proportion values are likely to be broadly representative of consumption in other countries (like Portugal), where fast fashion is still predominant. The first process indicates that yarns production requires a good amount of energy, 19% of overall process. In fact, 75% of the energy demand over the garment life cycle occurs prior to retail sale. Wet treatment (bleaching and dyeing) represents 16% of energy consumption. Wholesale transport is the process with less energy consumption compared to the other ones. Overall, this analysis suggests that all the textile supply chain needs to be analysed, in order to identify the key processes that need more resources and, thus, how to minimise them. Sustainability is the new approach to end mass production and to reduce the impact of a company's supply chain. In the next part, the environmental and socio-economic impacts of the Textile and Apparel industry will be analysed in more detail, as well as the solutions to tackle them.

## 2.3 Sustainability issues in Textile and Apparel Industry

### 2.3.1 Environment impact,

To assess which are the most polluting industries in the world, it is important to bear in mind the five main types of pollution: air, water, soil, light and noise. According to several research studies, the fashion industry is the third most polluting industry in the world (Piippo, et al., 2022), after the oil and agriculture industry. When it comes to soil pollution, the huge number of pesticides used to protect the harvesting degrade the soil and kill biodiversity. Studies have concluded that cotton production uses the highest number of harmful pesticides and fertilisers and has the highest water footprint (Niinimäki, Dahlbo, Peters, & Perry, 2020). For 1 kg of cotton

there is a need of 7.000 to 29.000 litres of water (Muthu, 2012). Cotton is grown by irrigation, so the production of fibre can represent over 88% of the total water used in the manufacturing process (Sandin, 2019) as it is seen in Appendix A, according to a report from the “*Textile exchange fibre market 2021*”.

Fashion industry is a chemical-intensive industry. During the textile process, many different chemicals are used in washing, bleaching, dyeing, printing and finishing clothes. In fact, it is estimated that 8.000 chemicals are used in textile production (Niinimäki, et al., 2020). Additionally, the hazardous substances used during the textile process are disposed into the water, contaminating rivers and seas and being one of the causes for people's health diseases. Air pollution is also a major concern. The oilers and diesel generators used during production emit pollutants that are released into the air (Niinimäki, et al., 2020). Data suggests that the problems of pollution occur more in the pre-consumer phase (Niinimäki, et al., 2020), which means they are higher in the production/manufacturing developing countries than in the consumption developed countries. For instance, China is one of the countries most responsible for direct and indirect energy consumption in the textile industry (Appendix B).

Textile waste is also a big problem in the post-consumer phase. The USA is the biggest textile buyer and contributor of fashion waste. In 2015, more than sixteen million tons of textile waste were generated in the USA, according to *American Apparel and Footwear Association (EPA)* and only 15,28% of this amount was recycled, 19,28% incinerated and 65% discarded into the landfills. A major part of this waste goes to the large trashing locality, in Chile, into the so-called “*Atacama Desert*” (figure 2.2).



Figure 2.2: The Atacama Desert, Chile (RFI, 2021).

Textile production is responsible for emitting tons of CO<sub>2</sub> (4-5 billion tons annually). According to the *European Environment Agency*, textile purchases in 2017 generated around 654 kg of CO<sub>2</sub> emissions per person. According to *EU* data, the fashion industry is responsible for 10% of global carbon emissions (*European Parliament*, 2020), more than international flights and maritime

shipping combined. The upstream value chain of clothing, footwear and household textiles consumed in the EU is the fourth highest in terms of raw materials consumption (Appendix C). Water pollution and water consumption are also a major problem. It is estimated that 70 billion liters per year are consumed for clothes production, responsible for 20% of industrial water pollution from textile treatment and dyeing. Moreover, 2.700 litres of water are needed to produce one t-shirt, which equals drinking water for one person for two years (*European Parliament, 2021*).

### 2.3.2 Socio-Economic impact

Multinationals are getting high profits with this fast-fashion fashion model, based on low prices and short clothing durability. From the side of the manufacturers, this production massification requires high working hours, low wages, and less security at work.

In 2002 and 2003, two factories in Bangladesh collapsed due to structural degradation and no safety rules, causing the death of more than 1.200 workers. Women comprise the majority of worldwide garment workforce, accounting for 60,5% of the total workforce (*International Labour Organization, ILO, 2019*). Nevertheless, their work is not properly recognized, and women are also subject to far lower salaries, when compared to men. They can end up receiving the minimum wage, about three dollars a day (*International Labour Organization, ILO, 2019*). Slow fashion concept, on the other hand, is more prone to lie on the quality of materials/products and on greater life durability of the materials and garment (Matušovičová, 2021). One way of prolonging the usage of materials and clothes is by understanding the concept of circular economy. Introducing sustainable practices can, in fact, be the driving force for urgent environmental action and social changes in the apparel and textile industry.

### 2.3.3 Sustainability and CSR

Sustainability started to be mentioned around the 80s when academics from different research areas (e.g., science, biology, ecology, engineering, fiscal) realised that the fast consumption model was undoubtedly leading to a fast depletion of the natural resources. To find an equilibrium among people`s necessities and available natural resources, a British author John Elkington revealed the three dimensions (pillars) of the new sustainability model: economic, social and environmental. In his book (Elkington, 2017), Elkington called the three dimensions the *Tripple Bottom Line*, which should function in equilibrium, side by side, to maximise value to all the stakeholders. To be sustainable, an organisation must be financially independent (profit), minimise its environmental impacts (environment) and act according to social needs (social).

In 1987, the *World Commission on Environment and Development (WCED)*, urged world leaders to align the economy with the environmental and social concerns. The Commission was chaired by Gro Harlem Brundtland, who published a report named “*Brundtland Report*” on “*Our Common Future*”. The report described, for the first time, the meaning of Sustainable Development (SD) as “*a development that meets the needs of the present without compromising the ability of future generations to meet their own needs*”. Many years later, in 2015, all United Nations Member States adopted the 2030 Agenda with an ambitious program of 17 Sustainable Development Goals (SDG) and its 169 targets, to be accomplished by 2030 (figure 2.3). This represented an urgent call by all countries (developed and developing) to forge a global partnership to ensure a sustainable life for the future generations.



Figure 2.3: The UN 17 Sustainable Development Goals (data from UN, 2022)

The principles embedded in this new UN agenda are already guiding many corporations all over the world to make significant changes in their business models. Along with *sustainability*, other terms such as *Corporate Social Responsibility (CSR)* and *Business Ethics* are gradually becoming part of the business sector and part of the DNA of many companies. As David Chandler and William Werther arguably said about CSR (*Strategic Corporate Social Responsibility*, p.5, 2005) “A view of the corporation and its role in society assumes a responsibility among firms to pursue goals in addition to profit maximisation and a responsibility among a firm’s stakeholders to hold the firm accountable for its actions”. Companies have often followed the economic rule of being profitable. However, today the role of a company is far more than being profitable. It is providing a secure, a rewarded and justice job to its employees; is maintaining good relationships with their suppliers; is following the government laws; is ensuring reliable and quality products to its customers; is fighting for diversity and equality; is promoting transparency with its stakeholders; and is taking care of the environment as well. By incorporating those values, the company is creating value for the employees and for the society, and for the company itself. Companies can stand out more if they pursue sustainable practices, as consumers are becoming more aware of their impact in society and in the environment.

Fashion companies, for instance, are trying to increase the circularity of their materials in the supply chain, to decrease the usage of raw materials or choosing better materials.

#### 2.3.4 Circular Economy in Textile and Apparel industry

Circular economy (CE) is characterised by the basic principles of reusing, recycling, reducing materials (Stahel, 2019) and thus, reducing waste. It seeks to change the economic system - linear economy (LE) – by extending the utility of materials/clothing (Appendix D). The LE process implies unlimited and continuous production, overlooking social and economic impact of all supply chains. To clarify, it is possible to outline LE with the following steps: 1- extraction of natural resources, 2-transformation into products (weaving, knitting, manufacturing), 3-consumption, 4-disposal, 5-waste and consequently environmental impacts (Agyemang, Sarpong & Mani, 2019; Ghisellini, Cialani & Ulgiati, 2016).

Circular economy does entail a different approach. The term “reducing” means decreasing the inputs (primary energy and raw materials) and outputs (wastes) to achieve eco-efficiency (Rahla, Mateus & Bragança, 2021). “Reusing” means using more often clothes or materials that still have utility. It includes repair and refurbishment” (Rahla, Mateus & Bragança, 2021). “Recycle” means making new clothes with the rest of materials used during the production cycle. Recycling has the objective of extending the life cycle of products (Ellen MacArthur Foundation, 2021). Most of the time, the term “recycling” refers to fibre recycling. According to data, recycling is still very low; less than 1% of worldwide clothing is recycled (*World Bank*, 2015). The reasons why recycling is still not a priority in many companies is because there are many barriers. On the technology side, there is a complex process attached to disabling all the materials (e.g., zippers, buttons, fibre blends) before going to the recycling process. This is time consuming and a very expensive process. Furthermore, recycling can include financial, educational, legal and infrastructural barriers (Echeverria et al., 2019). In addition, recycling products usually entails “downsizing” a product, rather than “upcycling” it, which means that the product normally loses quality (Palm et al., 2014). For that reason, many companies choose to “reuse” instead. In fact, reusing is becoming the fastest growing segment in the fashion market (*Thred up*, 2019). It allows to decrease the use of raw materials, save water, energy, reduce the carbon footprint and solid waste. In this context, circular economy is a prominent strategy to end resource scarcity and decrease environmental problems. Given the high rate of textile waste, reusing or recycling it can be the opportunity to reduce the rate of textile waste and decrease global carbon and water footprint by 5–10% (Leblanc, p.2, 2018).

Another aspect in the circular economy is the “circular design”, (Dan & Ostergaard, 2021), which means that the products can be developed with sustainable and high durability materials.



Here are some associated practices: using fabric-cutting techniques (Fletcher & Grose, 2012) for instance by using 3D software to create garments prototypes before using fibres, to manage the quantity that will be necessary and reduce the maximum fibres used; reuse generated waste; create multifunctional garments (t-shirts that can be worn inside out depending on the weather conditions); create trans-seasonal clothes to increase their life-cycle and finally, create modular clothes (for example: a dress that can be divided in two pieces). It is important to note that some designers have limited power to influence sustainability design if they do not have access to sustainable materials and proper education (information and knowledge) about circular design strategies. They need to be trained to help transform the fashion industry (Dan & Ostergaard, 2021).

Circular economy proposes a “regenerative and restorative cycle” (Ghisellini et al., 2016; Ellen MacArthur Foundation, 2013) based on materials’ design, closed-loop systems (Appendix E), according to Murray & Skene (2017), and resource and material efficiency. The Design of the products is essential to the circularity of materials, as it contributes to product recycling and to its increased durability.

#### 2.3.5 New technology in Textile and Apparel Industry in the I4.0 Era

To facilitate the transparency and traceability of the textile supply chain system (Appendix F), one thing that has been addressed by many specialists is the blockchain technology (Fung, Chan, Choi & Rong, 2021). Blockchain is a technology that allows data to be transitioned through different machines along the supply chain. Data can be uploaded every time when a product is out of stock, when clients make an order, when suppliers are buying more materials, and all members from the supply chain can access accurate information to manage their process and make better business decisions.

Technology I4.0 has been addressed in many articles as the new “arm” to achieve sustainable development (Beier, Niehoff & Ziems, 2017) and to increase transparency (Khan, Ahmad, & Majava, 2021). Blockchain is part of the Industry I4.0. With internet and cloud services data, different devices from all over the world can be connected (internet of things), and data collected and actively shared, providing real-time information about machines, productions, operations and component flows. This system helps managers track, monitor materials and make sustainable decisions about product’s production and post-consumption product recoveries (Khan, et al., 2021). For instance, if the manager can access information about the way its raw materials were produced and eventually discovers that they were made with negative environmental and social impacts- with high extraction of oil, non-organic materials, high level of water, and reduced labour conditions- he/she can support environmental and social



causes by stop buying that product to its supplier. Due to globalization, traceability of employees' conditions becomes harder. Therefore, blockchain would help fix this issue too.

Blockchain provides incentives for more sustainable consumption (Kohler & Pizzol, 2021). The assumption is that having more specific and trusted information allows consumers to make more informed decisions. To conclude, this technology helps to close the loop and helps companies increase the circularity of the materials, by having a tractability system.

## 2.4. Challenges in the Portuguese Textile and Apparel Industry

Textile companies have gone through many changes over the years when it comes to increasing sustainable practices over their processes, in line with a more corporative social responsibility towards society and the environment. In the next part, we will be able to look into some practices that Portuguese companies have adopted. Additionally, there will be important information of the trends in the textile and apparel market and the importance of natural fibres for the environment, with particular reference to the linen fibre. Finally, the chapter will address the history and importance of linen in Portugal, which has gained importance over the last years.

### 2.4.1 The Portuguese Textile and Apparel Industry

The textile and apparel sector play an important role in the development of the Portuguese economy. Before the pandemic, textile represented €7.701 billion of sales and €5.215 billion of exports, according to Portuguese Statistics Institute (INE), data from 2019. In fact, textile and apparel represented 10% of total national exports, according to the Portuguese Textile Association (APT).

There are big textile companies in Portugal with an important position in the international market, such as Riopelle, Polopiqué and Somelos. They have significantly grown their sales' volume in the last years, by improving the quality of their fabrics, investing in new and innovative fabrics, in new technology, as well as in sustainable practices. These textile companies have recognised that sustainability is the path to reduce waste, to be more environmentally friendly and to adjust their business to consumers' requests, since they are increasingly becoming more concerned about what they buy. Here are some initiatives that they have developed over the last years:

- Becoming member of *Cotton initiative*, which stands for organic cotton (Polopiqué, Somelos).
- Adopting credibility certifications (ex: GOTS certification, OEKO-Text 100 label, Recycled 100, Better Cotton Initiative (Polopiqué, Riopelle, Somelos).
- Using technology to reduce carbon emissions and water waste (Polopiqué, Riopelle).

- Reducing and eliminating toxic chemicals along the supply chain (Riopele).
- Reusing fibres and other waste materials (Polopiqué, Riopele).
- Recycling fibres and water (Polopiqué, Riopele).
- Investing in renewable energy, for example in solar panels (Polopiqué, Riopele).
- Sourcing new ways to dyed fabrics by using fruits (e.g., nuts) (Somelos).
- Using system of sorting to avoid the waste ends up in the landfills (Riopele).

Over the years, Portuguese textile industry has been recognized nationally and internationally for its impressive craftsmanship and expertise in high quality clothing and textiles. The north region of Portugal is where the main textile and apparel companies are situated, which includes cities such as Porto, Braga, Famalicão and Guimarães. In fact, most production facilities in Portugal own the entire production chain, from spinning and weaving, to dyeing and finishing, making it one of Europe's most innovative textile and clothing production hubs. In addition, Portuguese factories work with very good fabrics. During colonial times, Portugal was able to acquire cotton from Africa and silk from India. Even though markets have changed throughout the years, Portuguese factories developed their abilities and expertise in spinning and weaving those important fibres. For that reason, *"Made in Portugal"* has become a symbol of quality and reliability.

#### 2.4.2 Trends and Issues in Textile and Apparel Exporting Sectors in Portugal

In the last two years, the business of the textile and apparel sector has been living very challenging times. The business sector went through one of the biggest crises ever described, related to the Coronavirus (COVID-19) pandemic. The first contagious virus started appearing in Portugal in the first quarter of 2020. People had to be locked inside their homes because of higher contamination, which led to a fast decrease in textile and apparel shopping. As a result, many manufacturers stopped producing or reduced their overall production. Portuguese textile business volume declined over 8,62% and the garment volume 10,68% (Banco de Portugal, 2020). In 2020 textile exports decreased 11% compared to 2019 (Banco de Portugal).

However, in 2021 the business sector recovered and after one year was able to increase its exports to €5.419 billion, exceedingly more 16,5% compared to 2020 and 3,9% than the pre-pandemic year. The extraordinary recovery allowed Portugal to continue having a positive textile/fashion commercial balance (Exports>Imports). The following products make up most of Portugal's exports: T-shirts represent €1 billion; house linen €533 million; and sweaters/sweatshirts €421 million, according to Fashion Statistics (Appendix G).

As in the rest of the world, the Portuguese economy is facing a new challenge today, related with the increase in the general prices, from food to fossil fuels and electricity. Electricity is the highest fixed cost for textile companies. If prices continue to increase, companies will have no other choice than to increase their final prices, which will reduce the client's purchasing power and, as consequence, the company's sales volume.

#### 2.4.3 Fibre Types and Textile structures – the Linen case.

Natural fibres are more environmentally friendly than synthetic fibres. They come from plants that can sequester CO<sub>2</sub> and therefore, clean the air (Rana, Pichandi, Parveen, & Fangueiro, 2014). In addition, natural plant cultivation consumes less energy than the production of synthetic fibres (Alay & Duran 2019).

Natural fibres are produced from renewable resources and they are biodegradable, unlike the production of synthetic fibres. The synthetic fibres, such as Petroleum fibres, are fibres obtained by petroleum and gas reserves, meaning they are not renewable resources. In this group we can include the following fibres: polyester, acrylic, nylon and polyolefin. They have the worst impact on the environment, compared to cellulose fibres (viscose, rayon, bamboo, monocel, lyocell) because they require toxic chemicals to manufacture the clothes (Alay, et al., 2019), which is dangerous for workers and pollutes the water. When they are washed, fibres release millions of micro-plastics into the water system (European Parliament, 2019). Linen is the oldest fabric in the world and one of the most sustainable fibres (Good on you, 2021). Therefore, it is worthwhile to explore this fibre in the next chapters.

##### 2.4.3.1 The ancient Linen in Portugal

Before technology and fashion massification, natural fibres were mostly used for garment production: linen, silk, wool, goat skin and in some places camel skin (Santana, & Wanderly, 1998). During the Middle Ages and especially after the XVIII century, linen and wool were the most used fibres for garment (Neves, 1982). Linen dates back to the old Egypt time, where it was cultivated in large quantities, as most habitants used that textile (Santana, at al. 1998)

With the help of merchants, linen reached the European markets through trade transactions. Because of its richness, farmers started to cultivate linen mostly in the north of Europe, making it an important textile to trade off. Linen became known also in the Portuguese territory and, in the XIX century, it was already one of the most important fabrics, used particularly in the north of the country and contributing to the development of the region. Craftsmen would create linen fabric first as a domestic task, creating their own bed sheets and towels. It was a full craft task, where no chemicals were needed for the dyeing/bleaching

process. Seeing the potential of linen, Portuguese manufacturers in the northern region of Portugal started manufacturing this fibre and gradually building a specialized industry. However, with globalization in full speed and, consequently, the raise of new potential markets, other fibres were introduced, resulting in their increased (and cheaper) consumption.

Nowadays, there are few Portuguese textile companies manufacturing linen fibre for the clothing industry. In most of the cases, textile companies use linen to blend with other fibres (e.g., cotton) to create garments. Moreover, there are other textile companies that use linen to create bed sheets and towels (home textile market). In the next chapter, a description will be made of the linen characteristics that make it a potential fibre for clothing garment.

#### 2.4.3.2 The importance of Linen in Textile Industry

Linen is considered to be the oldest and also the most sustainable fibre in the world (Good on you, 2021). It is extracted from the flax plant (2.4) and it grows in countries with relatively mild weather, such as France, Belgium, Netherlands, Germany and Spain (*Asia Europe Foundation*, 2018).

It requires less soil and water to grow than cotton (Aldalbahi, Mehez & Mohamed, 2021). There are some studies that mention that linen production only needs water from the rain (*Good on you*, 2021). Furthermore, it does not need pesticides to grow, and the flax plant can absorb up to 2.1 tons of CO<sub>2</sub> per ton of flax cellulose produced (*Good on you*, 2021). In addition, flax fibre is capable of absorbing water up to 12% of its weight (Aldalbahi, et al., 2021). Flax fibres are two-fold stronger than those of cotton and five-fold stronger than those of wool (Aldalbahi, et al., 2021). 100% fibre (2.5) linen is stronger and more durable than the majority of fibres (Rana, at al., 2014). It is also a thermal insulator, which means that it is fresh in the summer and warm in the winter (Rana, at.al., 2014). Furthermore, linen is naturally antibacterial, good moisture absorbent, breathable and biodegradable, confirming the sustainability of its fibre (*Good on you*, 2021).



Figure 2.4: Linen Flax Plant (Textile for circular fashion, 2021); Figure 2.5: Linen Fabric (Linen Fabrics UK, 2022).

### CHAPTER III. BUSINESS OBJECTIVES

A business plan is a simple plan that helps managers understand the current situation of the business (strengths, weaknesses, opportunities, and threats) and to look into the future. The business plan is critical to effectively manage the business and attract new customers, partners, as well as to access loans. According to Fiore, F. (2005), the business plan has two functions. Firstly, it is an organisational tool to simplify and clarify business goals and strategies; secondly, it is a sales document that sells a business idea and shows that a product or service can generate profit and attract funding and business resources.

The main objective of the elaboration of the present business plan is to create a sustainable linen company that is competitive in the Portuguese textile Industry and that meets the needs of Portuguese customers and consumers. Therefore, this plan should serve as a guide for implementation practice, as well as the guiding line for decision-making, the definition of the company's objectives and planning needs. More specifically, the main objectives of this project are the following:

1. to perceive and evaluate the acceptance of the new business concept by the previously defined target group.
2. to develop an implementation strategy based on a complete analysis of the environment, the market and the competitive position.
3. to study the economic-financial viability of the defined strategy, based on sales and cost forecasts.

## CHAPTER IV. METHODOLOGY

In this project, secondary data from external sources were widely used, such as literature review, company websites and online annual reports. The author developed some of the information according to the directions obtained in the Literature Review. Primary data was also obtained through interviews and questionnaires.

A multi-item questionnaire was sent to retail-chain shops. The main purpose of which was to assess the acceptance of the linen product by the defined target group. The questionnaires' results can be found in the Appendix U. The questionnaire was completed using the research method of non-random sampling. The sample had 4 responses. Another questionnaire was sent to designers and professor designers. The research method used was the random sample. The sample consisted of 13 respondents. The main methods used to analyse the two questionnaire results were descriptive statistics and qualitative analysis.

Other relevant information was obtained by conducting three interviews with designers and manufacturers of linen textiles. The interviews were conducted in Portuguese and in English via videoconference (see Appendix T). To develop this Business Plan, the following questions were addressed in the questionnaire, in the interviews and through market analysis, namely:

### **1. How is the textile market in Portugal and how does linen manufacturing works?**

Before diving into the linen manufacturing process, specific data about the textile and apparel industry will be provided, which was obtained through secondary data, in order to better understand its value within the Portuguese market. This will include information from the demand side, such as “which are the main countries looking for Portuguese textile products”, “which are the main textile trends”, as well as “which are the main challenges of this industry”. This information was important to create the international business plan and to do the SWOT analysis. Afterwards, a description will be made about the linen fibre features and its benefits to the environment. Furthermore, interviews were conducted to gather information about textile industry and linen characteristics. The first interview was with a textile consultancy, *Win-Win textile* (Lars Gotterup, CEO of the company). It allowed a better understanding of the history of linen in Portugal; the characteristics of the linen market and the linen business; the sustainability principles; as well as important information on manufacturing techniques. The second interview was with a designer professor (prof. Joana Lourenço da Cunha) from Minho University. She shared important techniques about the designing process and important insights about sustainability. When it comes to manufacturing processes, a collaborator from *Polopiqué* (Pedro, responsible for the spinning process), one of the biggest textile companies in Portugal, was interviewed to explain more about the textile linen process (what type of machines a textile

factory uses; how are they used; which process produces more/ less waste of fibres and water, etc). This part will be described in more detailed in the company's introduction. A Belgian textile company that manufactures and sells linen products, *Libeco*, also helped with this subject, by sending a book with all the information about linen manufacturing.

## **2. What is the production cost of a linen clothing product?**

Despite the fact that Polopiqué sells a variety of fibres (e.g., cotton, viscose, linen), its balance and income sheets were used as a model to create the Linen company structure costs. The values were then adapted, after doing some research about the medium final price of a clothing with 100% linen fibre. Moreover, Win-Win textiles helped to give information about raw materials price (one line T-shirt costs around 6€ in terms of manufacturing).

## **3. What is the price range for retailers to buy a single 100% linen T-shirt?**

The first survey was sent to Retail chain stores that sell linen clothing, with a total of 14 questions. For this, the purpose non-random sampling was used. From many big fashion companies operating in Europe, the retail chain shops that sell linen clothing products were the ones chosen. This survey was important to better understand the price range a particular brand is expecting to buy for the product, as well as to understand the type of clients and what they think about linen. These are some of the questions made: *1. What is your price range to buy a single 100% organic linen t-shirt? 2. Why did you choose linen fibre for your clothing line? 3. Are you planning to increase linen clothing demand in the next 3 years? 4. Do you think consumers have been buying more linen clothing in the last 5 years? 5. What is the average age of consumers that buy linen clothing?*

## **4. Are designers looking forward to work with 100% linen fibre?**

A second survey was sent to designers and designer professors from Architecture Lisbon University (11 questions), to assess their perception about natural fibres, linen characteristics and to assess their interest to work with organic linen fibre. The questionnaire was completed using the method of random sampling, considering the characteristics of the group.

## CHAPTER V. MARKET ANALYSIS

### 5.1 Industry Analysis

The industry Analysis will give important data about European and Portuguese Textile market as well as important indicators about linen Market.

#### 5.1.1 Global and European Textile Market

Textile market involves the transformation of natural and man-made fibres into yarns and fabrics to produce a variety of products, such as high-tech synthetic yarns, bed sheets, industrial fibres and clothing. In Europe, the textile industry includes 50.947 companies, employing 593.000 people and generating a turnover of €88.000 billion (2019). If we look at the textile and apparel sector, 99.8% of the companies are mostly medium and small companies (EURATEX, Key & figures 2020), with 10-249 employees (Figure 5.1). The total fashion and textile industry include 1.5 million companies generating a turnover of €162 billion (European Commission, 2021). Over 70% of the total labour force are women.

The textile production can be divided into three sectors: clothing, household and industrial. In Europe, there are five leading countries in textile investment, clothing and man-made fibres (synthetic). Italy wins the first position, followed by Germany, France, Portugal and finally Poland (Euratext figures, 2020), as we can see in Figure 5.2.

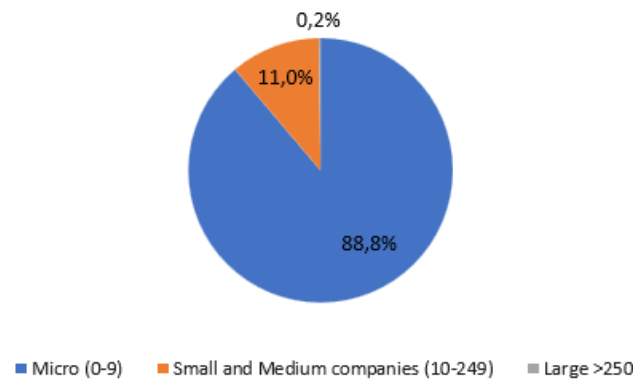


Figure 5.1: Type of European Textile and Apparel companies, in percentage (Euratext figures, 2020)

European textile leader (investment, clothing, man-made fibers)
1.Italy
2.Germany
3.France
4.Portugal
5.Poland

Figure 5.2. European Textile Leader (Euratex, 2020)



In 2020 this sector was extremely affected by the pandemic of COVID 19. As a result, people stopped buying clothes and, consequently, textile and clothing production was reduced to the minimum or even stopped. Analysing the volume of textile, clothing and footwear retail trade in the European Union (EU27), in figure 5.3, there was a high instability from March 2020 until March 2021. In March and April of 2020, the sales average drop was 52%.

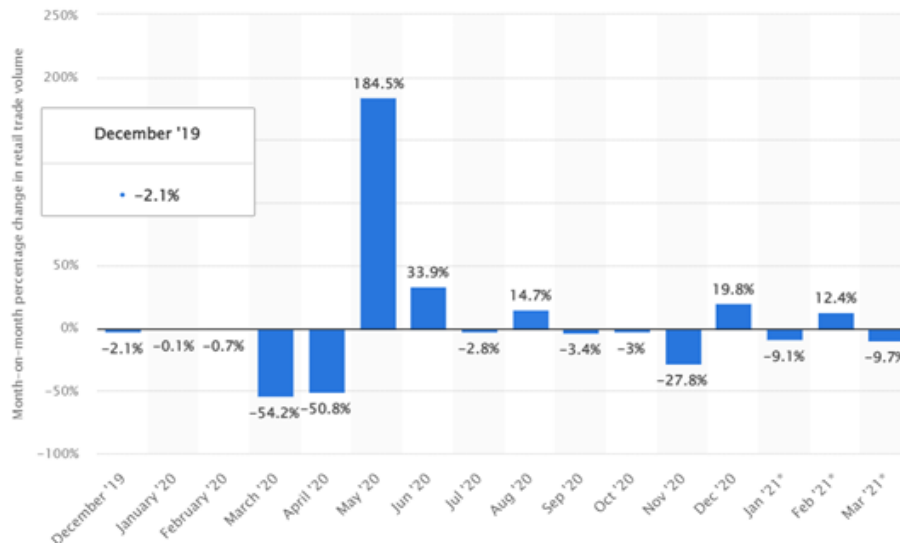


Figure 5.3 Textile, Clothing and Footwear Sales variation in European Union, Statista 2022

The biggest textile (fabrics) exporters are China, European Union (28), India and USA (Appendix H). China has the biggest textile export share of 39%, according to *Euratext data*, considering the top 15 textile exporters in the world. And the EU (28 countries) accounts for 24%. However, textile and apparel exports from the EU represent more than 30% of the total amount (European Commission, 2021).

### 5.1.2 Portuguese Textile Market

The textile and apparel sector play an important role in the development of the Portuguese economy. Like in overall Europe, small and medium companies represent the majority of textile and apparel companies in Portugal.

There are 6.491 companies from the textile and apparel sector (30% are textile), employing 123.344 people, contributing to a total turnover of €6.888 million (Banco de Portugal, 2021). Almost 50% (48,95%) of this turnover comes from medium companies. Small and medium (SME) companies represent 38,12%, with 10-249 employees (around 77,8% are small companies, with 10 or less employees). Most companies in Portugal are nevertheless micro companies (61,27%), by looking at figure 5.4. In addition, about 76,1% of all textile companies are located in the north of Portugal.

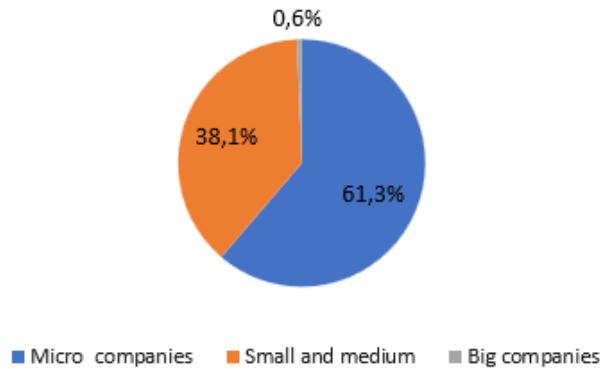


Figure 5.4: Type of Portuguese Textile companies, in percentage (Bank of Portugal, 2020)

	Number of Textile companies	Employees	Turnover
<b>Europe</b>	50.947	593.000	88.000 (M) €
<b>Portugal</b>	6.491	123.344	6.888 (M) €

Figure 5.5: Number of Textile Companies, Employees and Turnover in Europe and Portugal, Euratext (2020)

The main markets for Portuguese textiles are Spain (20,3%), France (11,6%), USA (10%), Germany (8,7%) and UK (6,6%). Furthermore, the five countries from which Portugal imports more textiles are Spain (20,2%), Italy (13,7%), India (9,4%), Germany (8,9%) and China (7%), data from Portuguese Textile Association (ATP), 2020.

Main markets for Portuguese textiles exports	
Spain	20,3%
France	11,6%
USA	10,0%
Germany	8,7%
UK	6,7%

Figure 5.6: Main Markets for Portuguese Textile Exports (%), Euratext (2020)

The year 2020 was a particularly difficult one, brutally affecting many countries in the world, including Portugal. Consequently, many thousands of companies were also severely impacted. It was a rough year for the textile industry, which saw its turnover decrease by -8,6% (Banco de Portugal, 2020), a little behind the medium global turnover slowdown of -9% (International Textile Manufacture Federation, 2020).

### 5.1.3 Linen Market

Around 80/85% of the flax used for fibres is grown in Western Europe (South of France, Belgium, Netherlands). France is the world leader in flax linen production. Other key flax fibre producing

countries are Belarus, Russia, Ukraine, and China. In 2020, the global flax fibre production was estimated at around 1 million tonnes. Linen is included in “Other Plants” (Figure 5.7), which accounts only for 6,5% of all global plant fibre production. On the other hand, synthetic fibres account for 68,2% of overall global fibre production.

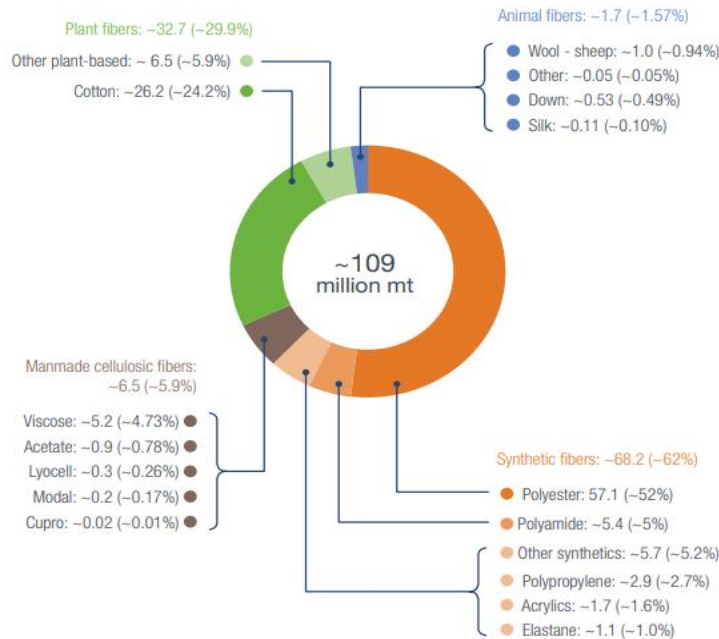


Figure 5.7: Global Fibre Production, million tonnes (%), Textile Exchange Preferred Fibre Report, 2021

Linen is divided into three markets: home décor, apparel and industrial. This business project will deal with linen in the apparel industry. Demand for linen is expected to increase due to its high quality and for being a sustainable fibre (Maxime Market Research, 2020). Besides being an extremely comfortable fibre, linen is durable (Lars Gotterup, 2022), soft and breathable, with high absorption capacity. The only downsizing is linen’s poor elasticity, which explains the reason why it easily becomes a wrinkly fibre (Maxime Market Research, 2020). Furthermore, it is highly expensive to produce flax fibre because it needs to be separated from the stalk, which explains the slow market growth and the fact that it is considered a luxury market. In 2020, the market share of linen was less than 1% of the global fibre market. In addition, according to the European Confederation of Linen and Hemp (CELC) only 0.5% of the flax grown in Europe is certified organic. There are two important labels in the flax industry: European Flax®, which certifies the European origin of Premium quality fibre; and the Masters of Linen®, which guarantees a mark of excellence for 100% linen made in Europe, from field to yarn, fabric and sustainable production.

According to the *Allied Market Research* Report of 2021, Europe was in 2015 the largest buyer of linen fibre, although China is expected to increase its linen market in the following years. This report also highlights the companies that have mostly varied their business fibres, by including linen fibre (Banana Republic, Peacock Alley, Ralph Lauren, Levi Strauss & Co., Michael Kors, American Eagle, Tommy Hilfiger, H&M, and China Linen Textile Industry Ltd).

The global linen fibre market is expected to increase in the forecast period of 2020-2026 at a CAGR (Compound Annual Growth Rate) of 5,1%. This growth is driven by its quality element (Maxime Market Research, 2020). Given this market overview, linen market seems to still be in its “Introduction” life cycle phase, since there is still a high market growth potential, and the demand is also expected to gradually increase over the years<sup>1</sup>.

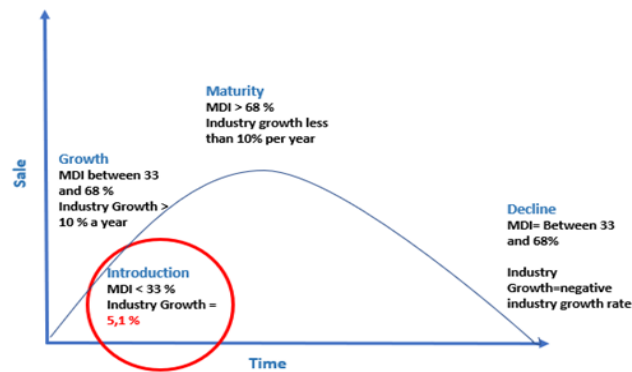


Figure 5.8: Market Development Index and Industry Linen Market Growth (Author)

Creating a new business requires addressing external and internal market trends that can influence its growth, which therefore can help managers make the right decisions. A PESTEL analysis (Political, Economic, Social, Technology, Environmental, Legal) will be used, focusing on European and Portuguese trends that shape textile business. Additionally, the business plan will include an analysis through the Five Forces of Porter, as well as a SWOT analysis, to get a better understanding and knowledge of the main strengths of the new linen company, its weakness, as well as the opportunities and threats in the national and international context.

## 5.2 PESTEL Analysis

### 5.2.1 Political Factors

In 2019, the European Commission presented the *European Green Pact* with the objective to boost Europe towards a green economy and to bring it as the first neutral impact continent by

<sup>1</sup> MDI (Market Development Index) is the percentage between market demand and potential market.

2050. European Union (EU) must be able to reduce by 55% the greenhouse emissions by 2030. Given the focus on environmental issues, several law proposals were implemented for different economic sectors (energy, transport, environment, industry, water, agriculture, research, and innovation). One of the priorities of this green pact is to reduce pollution from air, water and soil and to protect biodiversity. The Linen business plan that will be developed is aligned with this proposal. Linen is considered to be the most sustainable fibre in the world and flax production absorbs high levels of CO<sub>2</sub>. Therefore, producing linen fibre is a sustainable opportunity that apparel, and textile companies, should embrace.

The Portuguese Recovery and Resilience Plan (PRR) is an investment plan to be implemented at national level until 2026. A total of €16.6 billion will be invested. A set of reforms and investments included in the PRR will address three crucial areas: Resilience, Climate Transition and Digital Transition. These are foreseen to allow the country to resume its sustained economic growth and to strengthen the country's convergence with Europe over the next decade. Within the climate transition area, about €145 million will be invested in Bioeconomy, through three business sectors: textile and apparel, shoes and natural resin. When it comes to the textile sector, the plan is to increase the incorporation of forest biomass (cellulose and lignin), invest in natural fabrics (pineapple and banana sleeves, hemp and bamboo) and in new models of business plans based on the circularity of raw materials (reuse, recycle). On top of this, the objective is greatly to further promote conscious awareness about production and sustainability consumption within society.

### 5.2.2 Economic Factors

- European Economic Growth:

The European economy is projected to grow over the forecast period 2022-2023, achieving a real growth rate of 2.7% and 2.3% in 2022 and 2023 respectively (EU, 2022), as shown in Appendix I. These values are substantially different from what was initially expected in November 2021, which predicted an estimated growth of 4,3% and 2,5% for 2022 and 2023, respectively. This growth fluctuation has been affected by two main situations. Firstly, the bottlenecks and disruptions in global supply, particularly in its manufacturing sector, which was felt mainly in the last months of 2021. The swift economy recovering after the coronavirus crisis led to a rise in demand for different products and, for that reason, distributing companies were struggling to meet with the sharp demand. The second situation is related to the war in Ukraine by Russia, which started in early February 2022. This war on European soil has been responsible for the rise in food and energy prices, which is creating instability in the region, but also causing

severe social, economic and humanitarian crises in other parts of the world. Energy prices alone have been increasing since last November 2021 (European Central Bank, 2021).

- Portuguese Economic Growth:

From 2014 to 2019, Portugal was growing on average 1% per year (Pordata, 2022). The highest growth was 3,51% in 2017. However, in 2020, Portugal grew -8,96%, as a result of the global health pandemic that impacted profoundly many economic sectors, leading to an economic recession. According to the Portuguese Central Bank, Portugal is expected to achieve a nominal GDP of 6,3% in 2022 (Banco de Portugal, June 2022), 2,6% in 2023 and 2% in 2024. However, with prices increasing at a fast pace, inflation is expected to reach 6,8% by the end of 2022 (European Commission, 2022).

- Inflation and Interest Rate:

There has been a global inflation (oil, gas, food, etc) due to the significant increase in demand during the last trimester of 2021. Industries and transport infrastructures are still in the process of adapting their activities and slowly corresponding to this economic growth. Therefore, this is causing product shortages in many countries and the rise of prices. Until the Coronavirus continues to persist, more price instability periods will occur. Eurozone inflation rose up to 2.2% in the end of 2021 (ECB, 2021). In 2022, inflation is expected to reach 8,6% in June, much higher than the 1,7%, estimated at the end of 2021, due to big instability caused by the war in Ukraine. In the banking system, interest rates are what gives liquidity to the bank when they provide credit to families and companies. The interest rates provided by a bank are the nominal interest rate. Portugal is a member of the European Union (EU) and therefore, its interest rates are regulated by the ECB. The interest rates have stayed negative (Appendix J) in Portugal over the last five years, as in Europe. In 2021 ECB explained that inflation would be temporary and, thus, the real interest rate would remain on hold until 2024. However, as mentioned before, inflation rose significantly in May and June 2022, mainly in energy and food prices, and it is projected to continue to grow (ECB, 2022). For the first time in 11 years, the ECB is thinking about raising interest rates to control inflation in the eurozone.

- Income Analysis:

According to the latest numbers, Europe's population is 748.5 million people, representing 9,4% of the total world population (*Worldometers, June 2022*). When it comes to income, figure 5.9 shows that Europe is the region with the highest income, a perfect market to sell a medium-expensive product like linen. In fact, Europe is home to four of the biggest world economies (G7)<sup>2</sup>.

---

<sup>2</sup> G7 member countries: Germany, Italy, France, United Kingdom, USA, Canada, Japan + EU

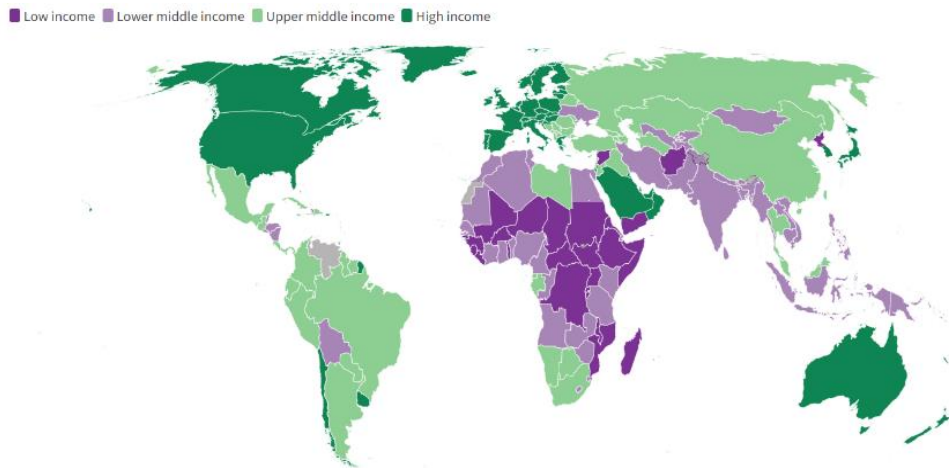


Figure 4.9: The world by income (World Bank, 2020)

A high-income economy is defined by the World Bank as “a nation with a Gross National Income (GNI) per capita of US\$12,696, while upper-middle economies have per capita GNIs between US\$3,046 and US\$12,535.

- Economic Business Trends

The global market for natural fabrics is growing (figure 5.1), showing an increasing awareness about the importance of sustainability. However, synthetic fabrics are expected to increase as well (*Textile Exchange Report 2020, 2021*), with the population growing, which is expected to reach 8,5 billion of people in 2030. The global fashion market is projected to grow in revenue value from €1.5 billion in 2021, to roughly €2 billion by 2026 (Statista, 2022).

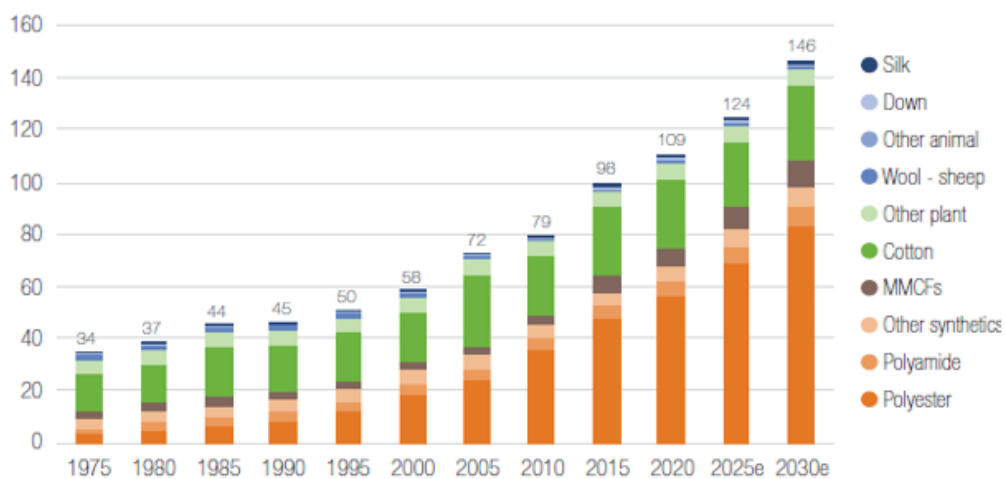


Figure 4.10: Global Fibre Growth in million tonnes (Textile Exchange Fibre Market Report 2021)

Reducing green gas emissions by 55% in all Europe is a challenging task. In terms of fashion, it stresses the need for an urgent model transition, back to 'slow' fashion, investment in sustainable fibres, renewable resources and circular economy. According to many specialists in the fashion and textile industry, investing in a circular economy is not a disinvestment but an opportunity (Ellen Macarthur Foundation, 2021). Investing in a circular economy is expanding the lifespan of their products, (*European Environment Agency (EEA)*, 2017) by reusing, recycling and choosing the right materials to design the product. Therefore, a company can immediately save a lot of money by reducing waste and by setting a strategy for materials' circularity. *Resortecs* is an innovative Belgian company that has built new technology to disassemble apparel at industrial scale, to facilitate the process of recycling. The design of clothing is as important as the recycling process. Ellen Macarthur Foundation shares many tools to help companies redesign their clothes to avoid textile and water waste, as well as to facilitate the process of recycling. In 2019, it launched the *Jeans Redesign Initiative*, which aims to demonstrate how a garment can be designed and made for a circular economy. The guidelines for this new manufacturing jeans design are an example of sustainability in the manufacturing process. The denim and the thread are biodegradable, which means they do not have any chemicals. About 98% of the water is recycled, the jeans are made with recycled fibres. Moreover, instead of having paper labels, these jeans have all the information of the materials used during the design process printed inside them. Many companies have already followed the guidelines of this manufacturing design and are very confident that this will change the jeans market (ISKO, 2021). It seems that circular economy model is already being used by many organisations and companies as a solution to reduce their environmental impact. Likewise, investing in sustainable fibres seems to be an option too. *Patagonia* is one of the oldest apparel brands investing in sustainable fibres, such as linen and organic cotton. The brand *H&M* is moving away from its fast fashion roots and investing in sustainable fibres, like organic cotton and recycled polyester. *Ellen Fisher*, an American famous clothing, shoes, and accessories brand company is changing the design and manufacturing process to be as sustainable and eco-friendly as possible, from the fibres used, to the ethical treatment of the workers (Forbes, 2020).

### 5.2.3 Social Factors

Over the last years, younger people have become more aware of the impact of climate change in nature and of the importance in preserving the survival of next generations.

Greta Thunberg, a student and Swedish activist, made a speech in 2018 at the United Nations calling for an environmental action, urging politicians and leaders from all over the world to change the current business models, towards a more social and sustainable one. After



her speech, students from all over the world started protesting regularly in front of their country's parliaments, to call for “environmental justice”. Climate change is a reality that companies and Governments cannot run away from. Increased pressure is coming from customers, investors and the media, calling for more sustainable practices. According to *One Pulse Survey* (2018), 88% of people from America and England want to consume brands that are more environmentally friendly. Buying second-hand clothes is becoming a sustainable option for many consumers too. In fact, *BCG Consultancy* suggested that the global second-hand market will likely grow over the next five years (2020) by a compound annual growth rate (CAGR) of 15% to 20%.

#### 5.2.4 Technology Factors

It is possible to identify in the textile industry new methods and technologies that are changing the market. For instance, the *Inditex* Group has been investing in new sustainable programs to decrease their environmental impact. It has a research programme created to measure the level of microfibres released when fibres are washed, seeking a way to reduce the level of microfibres into the water. *Inditex* also developed an innovation Hub aiming to develop technologies that can transform carbon emissions into a resource for the production of a new fibre. This initiative gives an opportunity for the company to reduce its carbon footprint.

The *List Programme* is yet another pioneering programme that seeks to improve the quality of chemicals in the manufacturing process. As already mentioned, fashion industry is a chemical-intensive industry, and therefore this kind of programme can represent a good solution to highlight. Recycling textiles is not an easy task, as already described. There are companies investing in new technology to improve the recycling process, like *Resortecs*. Designing clothes is also a major trend in the technology sector. Different materials, such as food waste, biodegradable threads made from algae, pineapple sleeves and textile waste are just some of the innovative examples that companies have started using in the textile industry, by also developing new technology methods.

#### 5.2.5 Environmental Factors

The *European Green Pact* (2019) proposes a cleaner environment for the future. On top of this, the European Commission urges countries and governments to use cleaner energies, end the massive deforestation and invest in soil recovery, to increase plants' CO<sub>2</sub> absorption and protect biodiversity.

The flax plant, as already mentioned, has the capacity to absorb a great amount of CO<sub>2</sub> from the air. This is a significant issue for the fashion industry, taking into account that it is responsible

for 10% of global carbon emissions (*European Parliament, 2020*). Over 200 million trees are cut down annually (*Canopy Planet, 2021*) to create plant-based materials like viscose, for example. In fact, the Amazon Forest is one of the most affected places in the world when it comes to deforestation. Forest is giving space to create cattle which, in turn, will lead to the production of fibre producing leather bags, shoes and belts.

### 5.2.6 Legal Factors

The legal context encompasses the several laws used to monitor environmental impact. For instance, the European policy on air quality sets standards for a range of pollutants, with the objective of ensuring that by 2030, the number of premature deaths caused by exposure to ground level ozone (particularly PM2.5) is reduced by half, as compared to 2005 levels.

The “*European Green Deal*” helps in this matter, by urging companies in the world to adopt a zero-pollution action plan. Countries have adopted several measures to decrease carbon emissions, by introducing carbon taxes per ton. Sweden is the country with the highest taxes on carbon emission. It taxes €166,33 per ton of carbon emission, followed by Switzerland, Liechtenstein (€85) and Finland (€62). Portugal has a tax of €24 per ton of CO<sub>2</sub> emitted. It adopted this tax system in 2015 and is part of the European Trading System (EU ETS), which sets the total amount of greenhouse gas that can be emitted. In Portugal, energy taxes represent most of the other environmental taxes (75%). After energy taxes, transport and pollution taxes constitute other environmental taxes. To conclude, every company in Portugal has to comply with environmental legislation in order to operate.

Besides environmental laws, it is noteworthy to highlight that Portugal is one of the countries in Europe with the highest Corporate Income Tax (21%), according with the Tax Foundation. It can be difficult for a Portuguese textile company to compete with other companies with lower taxes.

### 5.3 SWOT Analysis

SWOT analysis is a fundamental tool to assess a company's resources and capabilities<sup>3</sup> before it decides which strategy to adopt, as well to conquer new clients. In the next figure 6.3, it is possible to analyse what are the strengths and weakness of the new linen company, the opportunities the company can face in the national and international market, as well as some threats that can affect the development of its business.

---

<sup>3</sup> Resources are the organisation's assets, knowledge, and skills. Capabilities are the company's ability to make use of its resources.

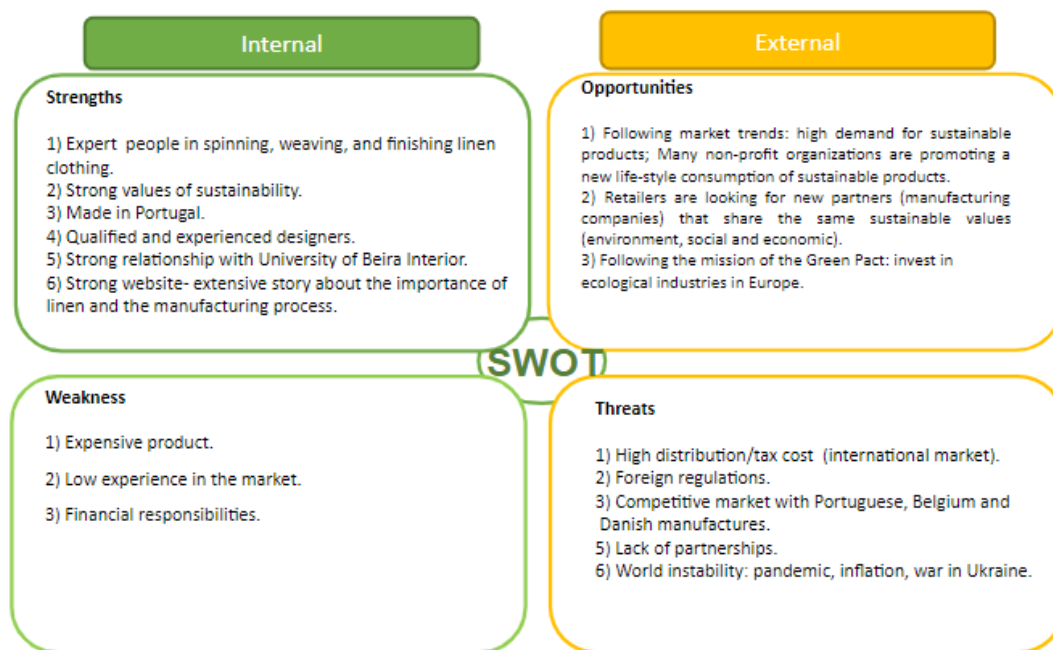


Figure 4.11: SWOT Analysis (Author)

Creating this new linen company (and factory) will require high investments, because it entails the construction of a building from scratch, with several manufacturing machines and a specialised workforce. Financial responsibility will be the biggest weakness for the new company, as well as its immaturity in the market. Linen is an expensive product, since linen processing requires a lot of time (Joana Lourenço da Cunha, 2022). This is a weakness for the company, because not every person will be able to purchase it.

All the manufacturing phases will be carried out by the company located in Portugal, which means the company can better control its levels of production and be able to reduce costs. The company's strengths lie in the expert people it will recruit for the different production areas. Additionally, it will offer a high-quality product, made in Portugal.

Since the company will be located in Covilhã, it will benefit from the opportunity to partner with the University of Beira Interior, by opening its facilities to students, who may be invited to participate in the manufacturing process. In the future, this can be an opportunity to recruit new and experienced people.

As for the external opportunities, this company will be able to increase the offer of sustainable products, which retailers and consumers are increasingly looking for (Joana Lourenço da Cunha, 2022). The sustainable market is still not very significant. For instance, organic cotton makes only 0,96% of the total cotton market (26,2%), according to the Textile Exchange Fibre Market Report (2021). Nevertheless, according to market trends, people are now

more concerned with their purchases, in the sense that they are looking for sustainable brands that sell products with sustainable fibres or are traded fairly among suppliers. Selling a product with a sustainable fibre is an opportunity for the company to contribute to a “greener economy” and to meet the proposal set forth by the European Green Pact. Moreover, this linen company can become one of the most important linen manufacturers in Europe, since there are not many manufacturing companies that create clothing with 100% linen.

As far as the exterior threats are concerned, the linen company will have high distribution costs by selling to other European countries. Managing global logistics is the highest challenge for the linen company (pointed out by linen companies in the questionnaire, Appendix U), as it entails many transport’s logistics, taxes and foreign regulations.

#### 5.4 Five Forces of Porter

To understand the attractiveness of the linen company in Portugal, the powerful tool of Porter’s 5 Forces (Michael.E Porter, 1980) is used, which will examine the following topics: 1) *the Buyer Bargaining Power*, 2) *the Supplier Bargaining Power*, 3) *the Threat of New Substitute Products*, 4) *the Threat of New Entrants* and 5) *the Rivalry Competition*. For each topic of analysis, a score of “Low” and “High” force level is attributed. The scores can be seen in more detail in the Appendix K.

- **Consumer’s Bargaining Power**

Fashion industry has grown over the last 20 years particularly in the developed countries, where consumers’ income is higher. This increase results, in part, from a high diversity of fashion choices available. Consumers’ do have more brands to compare with and choose from. With that said, from the consumers’ point of view, the level of switching cost is low (*high power*). This situation becomes negative to the Linen Portuguese Textile company. Additionally, the prices for fast fashion brands are lower than sustainable linen products.

Secondly, when there are still few linen options, the switching cost of consumers for the linen company products is high (*low power*). In this scenario, the linen company has more power towards consumers.

Thirdly, there is high differentiation between linen and other fibres, such as synthetic polyester, viscose, rayon. These synthetic fibres are less durable than linen fibre. However, they are also less expensive and easy to purchase. When it comes to natural fibres, such as cotton and linen, they have high quality and are especially comfortable to be used in different weather situations. Therefore, from a consumers’ perspective, there is high differentiation between linen and other fibres, which decreases their power (*low power*). Finally, if the chain retailers can easily backward integrate, meaning beginning to produce the linen company products

themselves, the bargain power of customers/ retail chain is high. However, for the Portuguese Linen Textile company this is not expected (*low power*).

- **Supplier's Bargaining Power**

The suppliers of flax plants are mainly concentrated in the Western and Northern Europe (France, Belgium, and the Netherlands) but also in Russia and in some Canadian regions. Since there are not many linen flax suppliers, their bargaining power is high towards the Portuguese Linen Textile company (*high power*). This situation is, therefore, negative for the linen company. Secondly, the level of dependency of suppliers on the *Portuguese Linen Textile company* is low since they have already their market well established and running (*high power*).

Thirdly, even though hemp is the most similar substitute fibre to linen, its production is still limited (174.027 tonnes in 2020)<sup>4</sup>, which means that it does not represent a threat to the suppliers (*high power*).

Lastly, it is not likely that flax suppliers will take over the textile industry, as flax production and linen manufacturing are two distinct industries, which require extensive capital and technical knowledge. Consequently, the power of the suppliers is low (*low power*), turning out positive to the Linen company.

- **Threat of New Substitute Products**

Three sustainable substitute fibres were considered in this analysis: hemp (direct substitute fibre), organic cotton and recycled polyester.

There are many textile manufacturing companies in Portugal and in the rest of Europe, as it was mentioned in the Global and European analysis (chapter 5.1). Nevertheless, even though the production of these substitute fibres is still low, European companies are becoming increasingly interested in new sustainable options of production, which includes the above-mentioned fibres (*high power*). For the *Portuguese Linen Textile company*, this might represent a competitive market.

Secondly, the characteristics of substitute fibre products is a very important element to discuss. Like linen, hemp is a very strong and durable fibre. The only difference is that it does not stay as wrinkled as linen does. In Portugal, the hemp industry is growing to produce textile, paper, insulating panels and biofuels. However, there are not yet many companies manufacturing hemp textile, since it is still very expensive to produce it. Moreover, the plant *cannabis sativa*, which is extracted from the fields to create hemp, still has some bad connotation for being used for drugs. In fact, growing hemp is heavily regulated or prohibited in many countries. In terms of demand, organic cotton is the most popular substitute product of

---

<sup>4</sup> Source: *Textile Exchange Preferred Fibre and Market Report*, 2021.

linen, since it is a sustainable fibre<sup>5</sup>. *Polopiqué* is a Portuguese textile company specialised in organic cotton. Beyond Portugal's borders, there are a vast number of textile/fashion companies selling this fibre (*Inditex group, Patagonia, Ellen fisher, People tree*).

*Riople* and *Limar* are among the Portuguese manufacturing companies that use recycled polyester. The market share of recycled polyester has been increasing in the textile industry (textile polyester represented 14.7% in 2020). The following international brands are also investing in recycled polyester to be more sustainable: *Inditex Group, Ecoalf, Gucci* and *Patagonia*. To conclude, there is a high bargaining power of substitute product characteristics (*high power*). This decreases the *Portuguese Linen textile company* power. Finally, Consumer switching cost for organic cotton is low, because of its high quality (*high power*). Similarly, there is low switching cost for recycled polyester fabric because it is cheaper than linen fabric.

- **The Threat of New Entrants**

It is not expected that many textile companies manufacturing 100% pure linen will appear in Portugal and in Europe in the short term, since linen manufacturing is still very expensive. For that reason, linen fabric is specially sold to a particular niche market. Building a textile company requires extensive capital (such as infrastructure, human labour, machines) and high manufacturing knowledge (Joana Lourenço da Cunha, 2022).

Therefore, the Portuguese *Linen Textile company* is positively well positioned in the market according to 'new entrants' (*low power*).

- **Rivalry Competition**

To make a competitor analysis, two different realities will be taken into account: Portuguese linen textile companies with the highest volume of sales; and secondly two foreign textile companies, a Dutch and a Belgian. The two latter belong to the Linen Association, that certifies companies with the 'Master of Linen', which represents the world's finest linen.

There are four important textile companies in Portugal, but only two of them are vertical companies (spinning, weaving, confection): *Polopiqué* and *Riople* with €110 M and €73 M of business sales, respectively. *Polopiqué* is specialised in spinning organic cotton, but also manufactures linen and other fabrics. It was founded in 1996 in the city of Guimarães. Around 70% of *Polopiqué* textile goes to *Index*, a Spanish fashion group. It has other clients, such as *Mango* and *Patagonia* and a partnership with one of the greatest fashion groups, *Phillips-Van Heusen Corporation (PVH)*, which includes brands like *Tommy Hilfiger, Calvin Klein, and Warner*.

---

<sup>5</sup> Source: Organic cotton production increased from 239,787 tonnes in 2018/19 to 249,153 tonnes in 2019/20. Organic cotton has a market share of 0.95 percent of all cotton produced in 2019/20, *Textile Exchange Preferred Fibre and Market Report*, 2021.

*Polopiqué* announced, in the end of 2019, that it aims to purchase a spinning machine for natural linen, to end their spinning exports to China<sup>6</sup> and, in the long term, gain more competitive advantage. With this investment, *Polopiqué* will create the first spinning 100% linen machine in Europe (Pedro R., 2022). In 2019, the company reached a sales volume of €200 M. They sell all their textiles to 24 countries. In terms of certification, it has acquired the GOTS certification and is member of the *Better Cotton Initiative*, an organisation that gathers farmers and companies in the world that promote fair working conditions and the quality of cotton fibre.

*Riopele* is one of the oldest textile companies in Portugal. It was founded in 1927 in Famalicão. *Riopele* has been investing a lot in technology. It has invested €35 M to be one of the most modern textile companies in Europe. It has a strong digital platform, which allows the company to reach more clients and increase its sales. *Riopele* exports 95% of its production to 30 countries around the world. It has received many awards for its sustainable products, by creating new fibres made of recycled fibres, food and fibre's left-overs.

The other Portuguese textile companies (*Somelos* and *TMG Fabrics*) are considered indirect competitors, as they do not assume a vertical structure. *Somelos* dedicated its knowledge in weaving cotton fabrics and *TMG* on weaving and garment manufacturing.

Northern Linen BV is a Dutch trading company. The company has production facilities in Russia and China and exports fabrics worldwide. Fabrics produced by Northern Linen BV are used in the fashion and home textile industry. The brand names under which Northern Linen BV sells its clothing products are *Northern Linen* and *Linopersempre*. These brands are responsible for flax fibre production, spinning, weaving and finishing fabrics.

There are also important Belgium textile companies like *Belgium Linen*, an association that includes *Libeco*, *Verlim* and *Deltracon*, but they are more known by creating textile for home-products. More information about all these competitors can be found in the Appendix L.

---

<sup>6</sup> 90% of flax harvest goes to spinning factories in China, *Asia Foundation 2022*.

## CHAPTER VI. THE COMPANY: INTRODUCTION, OBJECTIVES AND GLOBAL MKT STRATEGY

### 6.1 Portuguese Linen Textile Company

The new Portuguese linen textile company will be set in the Northern region of Portugal. The North of the country includes cities such as Porto, Braga, Viseu, Guimarães, Famalicão and Covilhã, which have contributed, during decades, to the development of a traditional crafting activity that has passed from generations to generations. Therefore, the company will establish its position in Covilhã, in order to have access to this labour force and their important expertise. Textile and clothes production undergo four steps.

This new company will carry out all the related textile steps, except the fibre production, namely:

- 1- Combing
- 2- Spinning
- 3- Knitting/ Weaving,
- 3- Dyeing/ Bleaching/ Finishing
- 4- Garments manufacturing

**Process:** Linen company will purchase the main raw material, the flax fibre, from a French flax supplier named Jos Vanneste. This company is certified with the *European Linen Certification*, which stands for premium flax fibre, and the *OEKO-TEX Certification*. This is one of the world's best-known labels for textiles tested for harmful substances. It stands for customer's confidence and high product safety (OEKO, 2022). The linen company will receive every month a certain amount of 100% natural flax linen that has to be carefully spun.

The first stage of fibre transformation is the combing process (Appendix M). In this process, the fibres are divided per branch and put into the machine, grabbed by the tip of the flax fibre to be combed with a laminator. Each branch should have flax in the same colour to increase quality. After being combed, they are transformed into soft flax fibres. During the combing process, ribbons of flax fibre are formed (Appendix M). A bombing machine is used in this process. The second step is fibre spinning (Appendix M). Fibres can be spun dry, semi-wet or wet. In this process, the fibres will be wet to be transformed into smoothy yarns (Libeco, 2022). The velocity of the machine determines the level of thickness of the fibre. The third stage is the weaving process (Appendix M). After the yarns are being assessed by the production team, they go to a bombing machine to be extended. The person responsible for this process must pass with his/her hands through the yarns to check if there is any broken flax yarn. A weaver knot is very flat and small, and it can easily pass unnoticed. Finally, the yarns are washed, bleached, and dyed with chemicals (not toxic), to prevent them from shrinking in the laundry (Lars Gotterup,



2022). In this process, a jigger machine is used (Appendix M). Dyeing provides colour to fabric and improves its appearance. However, very little dyes will be used since linen has natural brown and yellow colours (Joana Lourenço da Cunha, 2022) that the company will maintain. After the finishing process, they go to the manufacturing process. This includes Designing, Sampling, Costing, Making Cutting, Sewing Washing, Finishing, Packing and Final Inspection.

### 6.1.1 Value proposition

Value proposition is defined by the company's promised value delivered to its customers. It reveals the company's product/service that creates value to a particular customer segment. It is unique to an organisation, as it distinguishes it from its competitors. Therefore, it is worthwhile to define what "value" is.

According to Alexandre Osterwalder (2010), value can be provided through various elements: *"newness, performance, customization, getting the job done, design, brand/status, price, cost reduction, risk reduction, accessibility and convenience/usability"*. For the linen company, it falls into these two groups: the newness and the performance. Newness, because there is few clothing in Portugal and overseas with linen fibre; and performance, since the clothing will be made to last and have high quality of fibre.

*VP: "We deliver a quality, durable and local linen product derived from sustainable methods in its production and manufacture process".*

Thus, considering the present case, the beliefs, philosophies and principles that drive the business will be:

- Professionalism and environmental orientation;
- Trust and product/service quality;
- Transparency;
- Respect for sustainability and use of natural fibres (linen);
- Innovation and creativity;
- Ethics and social responsibility;
- Fair working conditions;

### 6.1.2 Mission and Vision

*Mission: The reason to exist...*

*"To provide consumers a wearable linen product that meets their personal choices through a service and product with high quality, based on long lasting fibres and sustainability principles. We believe clothing should be ethical made, timeless, well-made, designed to respect nature and be part of a responsible life cycle."*

*Vision: What the company wants to be in the future...*

*“We want to become one of the clients’ preferred linen brands in Portugal, which delivers 100% organic linen garment with the highest quality. Our focus is to deliver a product made in a sustainable way, by using a natural fibre and reducing the impact of our manufacture process.”*

## 6.2 Strategic Objectives

The main strategic objectives of the Linen company for the first six years of activity will be:

- Disseminate the concept of the linen clothing brand.
- Increase consumer awareness about the importance of linen as a sustainable textile.
- Develop new products, innovate and conquer new markets.
- Achieve high levels of customer satisfaction (at least 75%).
- Ensure good relationship with suppliers (Jos Vanneste flax supplier).
- Establish the company in the national and international market as an innovative and sustainable company by offering 100% organic linen.
- Achieve a turnover of more than of €1.000.000 in the third year.
- Achieve 10-15% growth in sales in the first three years.
- Achieve more than €2M of sales in the first year (2022);
- Recover investment in less than five years (CF Accumulated);

## 6.3 Global Marketing Strategy

After doing an Industry Analysis and accessing the linen company’s competitors, the next step is choosing a Marketing Strategy, which complies with three main steps: choosing the International Strategy; choosing a Target Market; and finally creating a Marketing Mix.

### 6.3.1 International Strategy

*“Patterns of decisions determining and revealing the firm's objectives, purposes, or goals” (Andrews, 1971).*

*“Serving an unmet need, doing something unique or uniquely well for some sort of stakeholders” (Montgomery, 2012).*

The new linen company’s plan is to sell its products nationally and internationally. In order to serve this big market, it will adopt the International Strategy as part of the International Corporate Strategy (David J. Collins).

This strategy is described by low global and local integration. It focuses on the export and import of goods or services. In this case, the company will focus on exports. The company will

sell standardised products to some European countries, without adapting its clothing to different countries. In this type of companies, core competences<sup>7</sup> are essential to gain competitive advantage. To achieve a core competence, the business must meet three characteristics: the activity must be valuable, difficult to imitate and should be rare (C.K. Prahalad and Gary Hamel, 1997). The core competence of the linen company is its ability to create high quality linen clothing. This will help the company win orders against competitors. Linen clothing is valuable because it is made with a sustainable and durable fibre. It is also not easy to imitate since the process to create linen fabric is complex and long (Joana Lourenco da Cunha, 2022). Finally, it is rare because there are few manufacturers selling 100% organic linen clothing.

### 6.3.2 Segmentation-Target

There are two types of business segmentations: *B2C (Business to Consumer)* or *B2B (Business to Business)*. The company will serve the latter since it is a textile linen company looking for retail chain shops to sell its clothing items. Nevertheless, it is not enough to choose who the companies are. It is important to get to know the type of customer segments that exist in the market, so that the designers of our company can make clothing according to their preferences and needs. In this perspective, the retailers and the type of customer segments will be described to help define our customer strategy.

The first step is Global Market Segmentation, which breaks the market in different segments to help identify the target segment/customer. To do this segment analysis, the following three types of segmentation were chosen:

- Geographic: it includes the location where the product will be sold and the location characteristics (e.g., density of population, area, climate).
- Demographic: designates customer's gender, age, education, income, social status, family and occupation.
- Psychographic: it helps describe a client's lifestyle, values, attitudes, engagement with the brand and usage interest.

Firstly, it is important to outline the geography space the company will operate in and gain market share. As already mentioned, the linen textile will be situated in the North of Portugal and the clothes will be sold to clothing retail chain shops in Portugal and other European countries. These retailers must sell linen clothing in Europe and have a sustainability approach embedded in their business strategy. Europe is a high potential market since retailers have been

---

<sup>7</sup> Core competencies are the resources and capabilities that comprise the strategic advantages of a business (Twin, 2021).

increasingly diversifying their fibre's portfolio. These are some of the potential retailers: *Ellen Fisher, People Tree, COS (H&M), Derek Rose, Toast, Linenfox, NAZ (Portuguese), ISTO (Portuguese).*



Figure 5.1: Possible Clients for Portuguese Linen Textile Company (Author)

According to research, there are many English brands selling linen (the first five companies are English). Therefore, England is a good market to sell our clothes. Portugal is also an important market opportunity. There are Portuguese companies selling only sustainable fabrics like NAZ. One of its more popular fabrics is linen. When referring to the Portuguese market, this also includes international brands operating in Portugal, such as COS (H&M group). COS sells linen clothing and linen blended with cotton. Below is a map indicating the countries where the company is going to sell its products.



Figure 5.2: Map of Europe, Linen company selling points: Portugal, Spain, UK, France, Germany, Slovenia, Italy (Author).

When it comes to customer profile, age is a good segment to start with. The company will serve a group of customers around 20-50 years old. This segment of people was chosen because it includes young people and active workers, which means that they have resources to purchase more expensive clothes. According to the survey done to Linen Retail Chain Shops (Appendix U), the average age for linen clothing items is 20-39 years. Income analysis must be considered too. This segment of people must be integrated in the group of upper middle income or high income. Data from the survey also showed that females are more interested in buying linen clothing. Therefore, this new company will produce more female clothing.

In terms of behaviour characteristics, this group of people must be passionate about sustainability, linen fibre and life-time products. This segment will help to position the product in the market because it helps to answer the question “*why will our customers buy our products from the rest of the competition?*”.

### 6.3.3 Position

Durability **high** Sustainability **high**

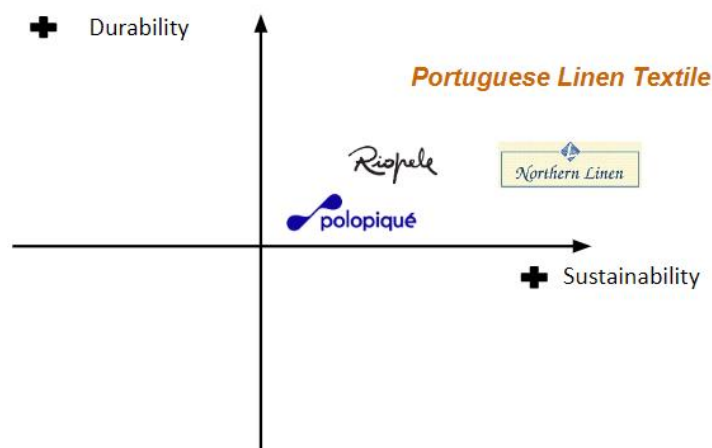


Figure 5.3: Portuguese Linen Textile company Position (Author)

The Position Strategy is crucial for a company to differentiate its products/services from its competitors. It was first introduced in 1960 in an article for Industrial Marketing magazine (Keegan, W. 2013). It helps the company gain a distinctive and desirable place in the market.

The main two things that customers should think about this is the sustainability and durability of their new product. When it comes to sustainability, both Polopiqué and Riophele show a compromise with the environment, as it was mentioned in the competitor analysis, by investing in clean energies, reducing the consumption of water and energy, by recycling fibres and by using more sustainable fibres. For this reason, they both have good scores in sustainability. The linen textile company will be as sustainable as its competitors: it will manage

waste, water and use organic fibres. However, it will not manufacture synthetic fibres (lower durability) like those companies. The linen company uses only linen, whereas the other companies use linen and blended linen. Therefore, it is positioned in a higher sustainability and high durability levels than those companies. Like Nothern linen, it only sells linen fibre, which explains why it is positioned above Polopiqué. In addition, it is situated in the same position as Riopele, since they both invest more in sustainable fibres than Polopiqué.

To conclude, when clients are making the decision to purchase from Portuguese Linen Textile company, what should first come up in their minds is the sustainability, durability and quality factors. Nevertheless, quality is not highlighted in the *Position* strategy, since there are other quality fibres, such as cotton and silk. However, linen is one of the most durable fabrics in the world.

## 6.4 MKT Mix

Marketing Mix refers to the construction of the company's marketing approach. It was first introduced in 1960 by a Marketing professor and author E. Jerome Macarthur (1964). He is the author of the *4Ps* that will be described ahead: *Product, Price, Place and Promotion*. The goal of a well-constructed MKT Mix is to meet customers' needs. Furthermore, it is an important tool to compare the products or services of a company with its competitors.

### 6.4.1 Product

The new linen textile company will be known for offering classic and timeless linen clothing with nude and natural colours. This means that the company will sell clothing with browns, yellows and greyish colours, linen natural colours. Sticking to flax natural tones will ensure a more environmentally friendly garment, because there is no need to use many chemicals to dye and bleach clothing.

The company will start creating 6 clothing type products: two feminine and two masculine t-shirts; two feminine and two masculine trousers; and finally, two dresses.

Clothing	Feminine/ Masculine	Characteristics	Clothing design	size	Price
T-shirt Round neck	F	100% linen - Round neck - Short sleeve color: grey		S M L	35
T-shirt Round neck	M	100% linen - Round neck - Short sleeve color: yellow		S M L	35
Dress Pointed collar	F	100% linen - Pointed collar - Button-up front - Two sides seam pockets Color: smooth yellow		S M L	40
Dress with ribbons	F	100% linen -symmetric skirt -relaxed wrap shape -ribbons in the sleeves color: light brown		S M L	45
Trousers high waisted	F	100% linen - Wide fit - High waisted - Hidden zip and button placket - Two side pockets color: light brown		S M L	45
Trousers classic	M	100% Linen - Front pockets - Belt loops color: light brown		S M L	40

Figure 5.4: Portuguese Linen Textile clothing products (Author)

The dress with ribbon and the high-waisted trousers will be more expensive because they will be exported to international countries. Exporting to the international market requires more costs, due to longer distances, and it can require custom fees as well (for example to UK).

### 6.4.2 Price

Price is a marketing mix element with high importance. From the customer's point of view, it may determine the buying decision, whereas from the company side it affects its revenue.

The linen textile company will focus on the quality and the features of its clothing. As a result, the type of pricing will lie on a valued-based setting. The value of the product lies on the type of fibre used: organic linen. Organic means that the flax plant grows with no irrigation, it is not genetically modified (GMO), and finally was grown with low or zero use of fertilisers. The flax fiber will have the European Flax® label, which also guarantees that no waste will be created, as the linen flax plant is fully used.

The price of the product was determined with the help of the Consultancy Textile company (Win-Win Textiles) and based on the results from the Linen Retail Chain Survey (Appendix U). It costs around €6-9 to fabricate one linen t-shirt. The selling price of the same linen t-shirt can vary between €15 to €40 (Appendix U). In fact, according to the same survey, 50% of the customers mentioned that they would be willing to purchase a linen t-shirt for €40:

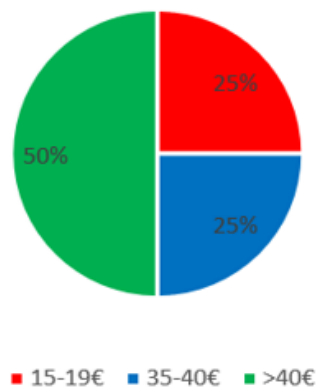


Figure 6.5: Linen Retail Chain Survey: "What is the price range to buy a single 100% linen T-shirt?"

The established price depends on the quantity of the fibres used during the manufacturing, the design process and the transportation costs. By establishing a medium selling price of €35, the production cost of a single t-shirt product can be reached by merging the following costs:

Table 6.1: Structural Costs of the Portuguese Linen Textile company (Author)

Structural costs		Linen T-shirt
Sales	100%	35 €
COGS	20% of sales	7 €
<b>GP (Gross profit)</b>	<b>80%</b>	<b>28 €</b>
External Services	20% of sales	7 €
Personal Costs	22% of sales	8 €
Total costs	42%	15 €
<b>EBITDA</b>	<b>38%</b>	<b>13 €</b>



### 6.4.3 Place

The company will be situated in Covilhã, in the Northern region of Portugal. Covilhã has a long history and tradition in textile business, with an important access to knowledge and expertise, which can be used for the new textile business. In addition, Beira Interior University (UBI) is also located in Covilhã and is offering a variety of courses in industrial design, fashion design, chemical engineering, all of which are very valued in a textile company.

In terms of costs, it is advantageous to create a business which is located away from the main cities of Portugal (Lisbon and Porto), as it allows the company to receive more income support from the Government and from European funds. All the merchandise will leave from the factory and be distributed to the clients' warehouses. This transport will be carried out by a subcontractor freight transport company (Patinter).

### 6.4.4 Promotion

It is important to invest in Marketing, so that the public can get to know the company's business and the importance of linen products. Creating a website with a specialised MKT agency can cost around €1.000-€6.000, depending on the number of working days and the complexity of the website. These agencies are prepared to work with different industries and have the necessary resources to implement a professional website MKT plan. They have many experts, such as web designers, developers, graphic designers and marketers. The company will be partnering with the portuguese agency Smart Kiss. This MKT service will cost €5.400:

- €60 per 1 hour.
- Established working hours 90h
- MKT Cost= 60 \* 90= €5.400.

This service will be part of a Specialized Work in the Financial Plan (Appendix O). The linen manufacturing will have a strong marketing website communication. This translates in highlighting the value proposition. According to some studies, people's interest in buying luxury clothing increases more when they associate clothing with high durability (Sun, 2021). Therefore, it is important to highlight linen fibre characteristics, such as its durability and sustainability. It is also important to show the process of linen manufacturing.

To better understand the linen manufacturing process, the website must provide information about the important parts of the process, explaining how flax linen is transformed into a durable fibre and the sustainable methods used along the process. People need to have access to this information to understand the quality of the product and the work effort that is behind it. In addition, our partners should also be mentioned in the website. Transparency is the key to conquer new clients and increase their trust on the product and on the company.

To attract new clients, the company will invest in SEO (*Search Engine Optimization*). SEO is a digital MKT tool used to help companies be found online via search engines like Google. It helps to improve the website visibility, when clients search for the brand. Quality content and keyword research are crucial factors of content to increase our brand customer’s views. For instance, words like “sustainable clothing”, “natural fibres”, “environment” can help the brand be easily spotted at the top of an internet page. The prices range from €1 to €3.000 per month, depending on the service. Our company will adopt a fixed price contract and will pay the following:

- The costs with marketing and services will include €500 for SEO maintenance per month and additional €500 for other costs. These values will be included in MKT Services of the Financial Plan.

The company also expects to attend two important fairs: the National Fair of *Modtissimo*, which occurs in Portugal (in Matosinhos) every year since 1992. And the International Fair *Prémère Vision*, which occurs in France.

- This will represent an additional annual cost of €12.000 in the financial pan, on Traveling and Events.

### 6.5 Technology

The main investment will be in the acquisition of production machines: a combing, a spinning, a weaving, knitting and a dyeing machine. In terms of sustainability, the company will invest in 12 solar panels and in a water tank to collect water from the rain and use it for its production process. Furthermore, it will have a residual water treatment (ETAR). The company will invest in IT tools for all staff. The IT costs are presented in the Financial Plan.

### 6.6 Staff

The company will start with a total of thirty-seven collaborators, distributed as follows (2022):

Table 6.2: Portuguese Linen Textile company’s collaborators (Author)

Collaborators	number
Administration	1
Financial Director	1
Commercial/ Marketing	2
Production / Operation	20
Quality	2
Maintenance	1
Distribution	2
IT	1
Designers	7
Total	37

The administrator must have a minimum of 10 years of experience in the textile industry and in leading a team of a minimum of 10 in a textile company. Additionally, he/she must have knowledge of linen business. There will be one financial director that should have experience of more than five years in financial activities. The MKT/commercial collaborators must have at least 5 years of experience in marketing and some knowledge in the textile industry. There will be twenty people responsible for the production area. They must have at least 3 years of experience in working in a textile factory. Two people will work in the quality team. This team will be responsible for analysing the quality of the yarns before they go to the finishing process (washing, bleaching, dyeing). They will also be responsible for collecting yarns that were left during the weaving and the spinning process. The linen manufacturing will start with one maintenance technician, which should be an electronic engineer. After three years of activity, the number of maintenance technicians is expected to increase. There will be two distributors responsible for managing the clothing items in the warehouse; seven designers; and finally, one IT collaborator. All the staff salary base can be seen in the Appendix R.

## 6.7 Sustainability Plan





The importance of sustainability has been increasingly recognized in the fashion and textile industry, to counteract the current adverse practices towards the environment and our society. As a result, many companies have been introducing in their accounting reports a section dedicated to sustainable practices and environmental impact of their activities. The *Higg Index* is an assessment scoring tool that measures the environmental sustainability impacts of the textile industry. The Material Sustainable Index (MSI), part of the *Higg Index*, measures five environmental impacts: global warming, eutrophication (excessive minerals in water, often due to fertiliser runoff and pollution), water scarcity and chemistry, and fossil fuel. Based on this index, these are some indicators that the new linen manufacturing will include in its report:

### Company Environment Reporting Assessment:

Table 6.3: Sustainability Plan of the Portuguese Linen Textile company (Author)

Environment Indicators	Assesment
% Recover Water	This indicator indicates the percentage of water used from the rain.
% Waste reduction	This indicator reflects the percentage of waste produced and reduced in the factory (plastics, food, glass, etc).
% of fibers reused	This reflects the percentage of fibers reused in the manufacturing process.
% Waste water	This indicator shows the percentage of waste water in the manufacturing process.
CO2 emmissions	This indicator reflects the amount of CO2 emmitted by a kilo of fabric.
Energy comsumption	This indicator shows the energy consumption by kilo of fabric.
% of certified materials	This indicator provides information about the percentage of materials that are certified with: GOTS, ISO 9001, ISO 14001, Master Linen.
Types of Dyes	It must reflects compliance with chemicals safety (ECHA European chemical Agency)



- ❖ The company will have a rain-water system to collect water from the rain and use it in its spinning process.
- ❖ Throughout the factory, there will be eco-sites to ensure the waste is properly gathered and recycled, to avoid them from going into the landfills. The waste management is based on the three Rs principle: Reduce, Reuse and Recycle.
- ❖ The priority of this textile company is to value quality and long-lasting fibres. The quality team has the responsibility to collect the fibres left during the spinning, weaving and design clothing process and find new ways to reuse them. Reusing is essential to save resources and energy. The objective is to combine reused fibres with virgin fibres, to increase their durability.
- ❖ It is essential to assess the percentage of water waste, and ultimately to decrease that waste in the next production phase.
- ❖ The indicator of energy is important for the company to know how much energy it consumes and how it can reduce it. It has the same objective with the CO2 emissions indicator. Solar panels will be built to produce clean energy.
- ❖ Its carbon offsetting comes from the flax linen production, which has the function of absorbing tones of CO2 from the atmosphere.
- ❖ Non-toxic chemicals are a priority for the company. For that reason, the linen company must use chemicals allowed by the European Chemical Agency (ECHA).
- ❖ According to the 17 Sustainable Development Goals, these are the goals that the Linen company is particularly committed to:
  -  **7- Clean and affordable energy:** to "ensure access to affordable, reliable, sustainable and modern energy for all";
  -  **8- Decent work conditions economic growth:** to "create decent jobs for all and improve living standards.";
  -  **12- Responsible Consumption and Production:** it advocates for "environmentally management of chemicals and all waste as well as a substantial reduction in waste generation, through measures such as recycling.";
  -  **13- Climate Action:** it advocates for "strengthening resilience to climate-related natural disasters." By promoting the production of flax plant, the company will be promoting the reduction of CO2 emissions.

Assessing the type of supplier`s production is essential to ensure a sustainable value chain. Here are some important indicators that this linen textile company will assess:

Table 6.4: Suppliers Sustainability Plan of the Portuguese Linen textile company (Author)

Environment indicators	Assessment
CO2 tonnes absorbed in flax production	This indicator reflects the tonnes of CO2 the flax plant will absorb during its grow.
% Water in flax production	This indicator reflects the percentage of water used to produce a bunch of flax linen (it could be zero).
% of fertilizers used	This indicator reflects the percentage of fertilizers used to produce a portion of flax linen (it could be zero).

- ❖ The percentage of fertilisers will be none or few, since the company will buy organic linen.

In line with the Literature Review, design is an important part of sustainability. Choosing quality materials is essential in this company too. Moreover, there are other principles that designers should follow:

- ❖ Create simple garments with few elements to decrease the use of fibres and materials.
- ❖ Plan the design forms before using prototypes to avoid fibres waste.
- ❖ Attention to fabric-cutting efficiencies to optimise the amount of fabric use (e.g., use few accessories, use one material).
- ❖ Print all the material information in the clothing, replacing the “label” paper.
- ❖ Be creative and think about using natural materials to add in the clothing (e.g., buttons made from wood) and to do natural dyes.

On a more commercial and administrative level, the manager and the commercial team should work together to forecast commercial activities, to produce the right level of production, maximising general resources, including energy and fibres waste. On a social level, the company will commit with the following principles:

- ❖ Ensure good working conditions.
- ❖ Promote equality, diversity and inclusion.
- ❖ Have a CODE of conduct.
- ❖ Provide health insurance.
- ❖ Ensure ongoing training.

To conclude, this will be the Portuguese Linen Textile Company’s Supply Chain:

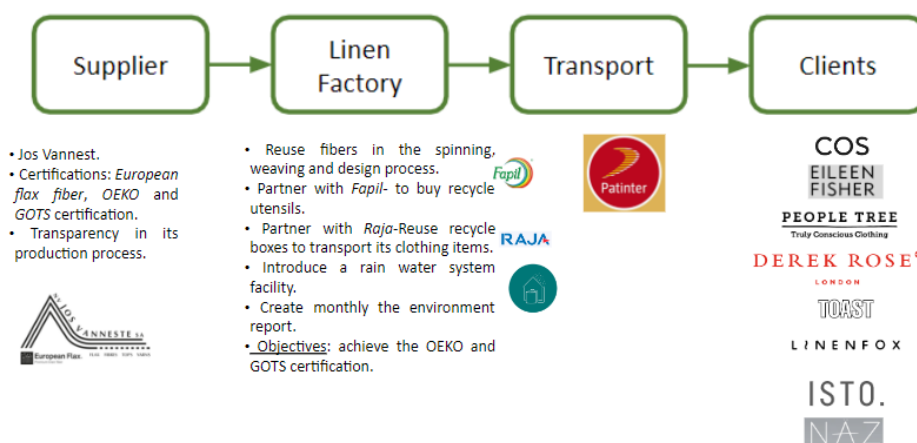


Figure 6.5: Supply Chain for the Portuguese Linen Textile company (Author)

- ❖ It will cooperate with a Portuguese company that sells recycled utensils, for example plastic bags and clean utensils to be more sustainable (Fapil).
- ❖ To transport its clothing items, when necessary, the company will buy recycled boxes to a Portuguese company called Raja.

## CHAPTER VII. Financial Plan of the Portuguese Linen Textile company

### 7.1 Financing

This Financial plan is a representation of a medium textile company. It will include three financial statements: Balance, Income and Cash-Flow. The Balance is used to analyse the company's economic position (Appendix N). The Income Statement will analyse the net income. Finally, the Cash Flow will be used to analyse the liquidity of the business. The time frame of the Financial Plan is six years (2022-2027).

A medium inflation rate of 2,6% was used for the six-year period. It is worthwhile to mention that it was not considered the high inflation rate in electricity, as a result of the war in Ukraine.

Table 7.1: Total Financing (Author)

Financing	Value
Bank Loan	3 047 325 €
Concessional Funds (PRR and EF)	1 015 775 €
Equity	105 000 €
<b>Total Financing</b>	<b>4 168 100 €</b>

The linen company will be financed through Bank loans, European concessional funds and funds from the Portuguese Recovery and Resilience Plan (PRR). The distribution will be 75% from bank loans and 25% from concessional funds, with a total investment of €4.063.100.

### 7.2 Investment /New Corporation Costs

Table 7.2: Capex (author)

CAPEX	
Property	200 000 €
Infrastructures	350 000 €
Machines	3 375 000 €
Transport Equipment	100 000 €
Administrative equipment	5 000 €
Other tangible assets	28 100 €
Intangible assets	5 000 €
<b>Total Investment</b>	<b>4 063 100 €</b>

Before starting the business activity, the company needs to buy a property and a building (infrastructure) to operate its activity. The company also needs to buy production machines (bombing, spinning and weaving machine). Furthermore, it needs other Tangible Assets, such as computers to its employees and, finally Intangible Assets, which include computer programs. The value of capital expenditure (CAPEX) required to implement the business is shown in the following table:

Table 7.3: Capex detail (Author)

Machines	Bombing, Spinning, Weaving machine and other small machines	(one machine from €75.000 to €1M)
Other Tangible Assets	Water tank, Sollar pannels	€3.500, (12*€200)
	Knitting machines+ PC + production materials	(7*€100), (7*€900) + €15.200
Intangible Assets	Computer programs	€5.000

Working Capital (WC), also known as Net Working Capital (NWC), is the difference between the company's Current Assets, such as cash, accounts receivable/customers' unpaid bills, inventories, and finished goods; and its Current Liabilities, such as accounts payable and tax debts. It is calculated as follows:

- The value of 'Clients' was calculated by dividing the annual sales with the average time of receivables (12 months) (Appendix R- Petty cash).
- The 'Cash' was calculated by the difference of funds received and application of funds (Appendix R- Financial Funds).
- The 'Inventories' were calculated by dividing the Costs of Goods Sold (COGS) with the average time of Inventories (12 months) (Appendix R- Petty cash).
- The value 'Suppliers' was calculated by summing the COGS + External services and dividing per the average time of payments (12 months) (Appendix R- Petty cash).

Appendix R- Petty Cash, shows that the NWC is positive during the years, which indicates that the Portuguese Linen Textile company can fund its current operations, invest in future activities and grow.

### 7.3. Profitability Analysis

#### 7.3.1 Structural Costs

The following figure shows the structural costs of the Linen company. It will have a Gross Margin of 80%, which means that the Cost of Goods Sold (COGS) will be 20% of the sales. The raw

material is linen fibre, purchased from *Jos Vanneste* supplier. Operational expenses or External services will be 20% of sales, and Personal costs will represent 22%.

Table 7.4: Structural Costs (Author)

Structural costs	
Sales	100%
GOGS	20% of sales
<b>GP (Gross profit)</b>	<b>80%</b>
External Services	20% of sales
Personal Costs	22% of sales
Total costs	42%
<b>EBITDA</b>	<b>38%</b>

Operational expenses include the following activities and respective value per month:

Table 7.5: Operational Expenses (Author)

Operational Expenses	Value per month
Specialized work	450
MKT services	1000
Notary	1000
Office materials	500
Electricity	45000
Fuels	2000
Water	5000
Traveling and Events	1000
Clothing transport	5000
Cleaning service	1500
Other services (ex:security)	1500
<b>Total Operation Expenses</b>	<b>63950</b>

Specialized work accounts for €5.400 (equivalent to €450 every month). The company will also pay €1000 for MKT services, which includes the SEO services and other marketing services.

In terms of Travelling and Events, the company will invest in two events, with a total cost of €12.000, as it was mentioned before. It includes travelling, hotels, and sampling materials costs.

All the expenses for operational services can be found in Appendix O.

### 7.3.2 Forecast Sales

As it was described in the “Product” chapter, the company will start by producing six pieces of clothing. The medium price for the linen clothing in the national market will be €35 and in the international market €45. The forecast sales for the linen company in the next six years is described in the following table:



Table 7.6: Forecast Sales (Author)

Sales volume - National market	2022	2023	2024	2025	2026	2027
<b>T-shirt roundneck (grey)</b>	€ 350 000,00	€ 418 600,00	€ 474 273,80	€ 532 135,20	€ 569 916,80	€ 610 380,90
Sales Quantity	€ 10 000,00	€ 11 500,00	€ 12 650,00	€ 13 915,00	€ 14 610,75	€ 15 341,29
Grow rate of units sold	0%	15%	10%	10%	5%	5%
Unit Price	€ 35,00	€ 36,40	€ 37,49	€ 38,24	€ 39,01	€ 39,79
<b>T-shirt roundneck (yellow)</b>	€ 420 000,00	€ 502 320,00	€ 569 128,56	€ 638 562,24	€ 683 900,16	€ 732 457,08
Sales Quantity	€ 12 000,00	€ 13 800,00	€ 15 180,00	€ 16 698,00	€ 17 532,90	€ 18 409,55
Grow rate of units sold	0%	15%	10%	10%	5%	5%
Unit Price	€ 35,00	€ 36,40	€ 37,49	€ 38,24	€ 39,01	€ 39,79
<b>Dress pointed color</b>	€ 315 000,00	€ 376 740,00	€ 426 846,42	€ 478 921,68	€ 512 925,12	€ 549 342,81
Sales Quantity	€ 9 000,00	€ 10 350,00	€ 11 385,00	€ 12 523,50	€ 13 149,68	€ 13 807,16
Grow rate of units sold	0%	15%	10%	10%	5%	5%
Unit Price	€ 35,00	€ 36,40	€ 37,49	€ 38,24	€ 39,01	€ 39,79
<b>Trousers classic</b>	€ 280 000,00	€ 334 880,00	€ 379 419,04	€ 425 708,16	€ 455 933,44	€ 488 304,72
Sales Quantity	€ 7 000,00	€ 8 050,00	€ 8 855,00	€ 9 740,50	€ 10 227,53	€ 10 738,90
Grow rate of units sold	0%	15%	10%	10%	5%	5%
Unit Price	€ 40,00	€ 41,60	€ 42,85	€ 43,70	€ 44,58	€ 45,47

Sales Volume- Export	2022	2023	2024	2025	2026	2027
<b>Dress yellow ribbons</b>	€ 1 350 000,00	€ 1 544 400,00	€ 1 749 805,20	€ 1 874 041,37	€ 2 007 098,31	€ 2 149 602,29
Sales Quantity	€ 30 000,00	€ 33 000,00	€ 36 300,00	€ 38 115,00	€ 40 020,75	€ 42 021,79
Grow rate of units sold	0%	10%	10%	5%	5%	5%
Unit Price	€ 45,00	€ 46,80	€ 48,20	€ 49,17	€ 50,15	€ 51,15
<b>Trousers highwaisted</b>	€ 1 125 000,00	€ 1 287 000,00	€ 1 458 171,00	€ 1 561 701,14	€ 1 672 581,92	€ 1 791 335,24
Sales Quantity	€ 25 000,00	€ 27 500,00	€ 30 250,00	€ 31 762,50	€ 33 350,63	€ 35 018,16
Grow rate of units sold	0%	10%	10%	5%	5%	5%
Unit Price	€ 45,00	€ 46,80	€ 48,20	€ 49,17	€ 50,15	€ 51,15
<b>Total sales in the National Market</b>	€ 1 365 000,00	€ 1 632 540,00	€ 1 849 667,82	€ 2 075 327,29	€ 2 222 675,53	€ 2 380 485,49
<b>Total sales in the International Market</b>	€ 2 475 000,00	€ 2 831 400,00	€ 3 207 976,20	€ 3 435 742,51	€ 3 679 680,23	€ 3 940 937,52
<b>Total Sales</b>	€ 3 840 000,00	€ 4 463 940,00	€ 5 057 644,02	€ 5 511 069,80	€ 5 902 355,76	€ 6 321 423,02

The expected volume of sales can also be seen in Appendix P. In the second year, a growth rate of 15% is expected in the national market. In the following two years, a grow of 10% and 5% in the fifth and final year respectively. As for the international market, a grow rate of 10% is expected in the first two years and 5% in the next following years. The medium selling price will be €41 (selling volume/ total quantities).

### 7.3.3 Income Statement

Table 7.7 shows the Income Statement of the products sold during the six years. In the first year, the company will be able to achieve a positive net profit of €503.815. The sales will continue to increase, reaching more than €6 million in 2027. As result, sales will increase over the 6 years, at a growth rate of 64%.

The interest rate, for long term loans, is 2,02% (Pordata, May 2022).

Table 7.7: Income Statement (author)

	2022	2023	2024	2025	2026	2027
Sales and Services	€ 3 840 000	€ 4 463 940	€ 5 057 644	€ 5 511 070	€ 5 902 356	€ 6 321 423
COGS (Cost of Goods Sold)	€ 768 000	€ 892 788	€ 1 011 529	€ 1 102 214	€ 1 180 471	€ 1 264 285
<b>Gross Profit</b>	€ 3 072 000	€ 3 571 152	€ 4 046 115	€ 4 408 856	€ 4 721 885	€ 5 057 138
Operational Expenses	€ 767 400	€ 859 488	€ 928 247	€ 993 224	€ 1 042 886	€ 1 095 030
Personal Costs	€ 861 935	€ 980 177	€ 1 023 327	€ 1 033 231	€ 1 043 235	€ 1 053 338
<b>EBITDA (Earnings before Interest and Taxes and Depreciation)</b>	€ 1 442 665	€ 1 731 487	€ 2 094 541	€ 2 382 401	€ 2 635 764	€ 2 908 771
Costs/Income of depreciations	€ 716 942	€ 716 942	€ 716 942	€ 715 275	€ 682 000	€ 7 000
<b>EBIT (Operational Result)</b>	€ 725 723	€ 1 014 546	€ 1 377 599	€ 1 667 126	€ 1 953 764	€ 2 901 771
Fees obtained	€ 7 833	€ 14 275	€ 21 508	€ 30 317	€ 40 541	€ 57 679
Interest payment	€ 61 802	€ 61 802	€ 46 352	€ 30 901	€ 15 451	€ -
<b>Result before Interest</b>	€ 671 754	€ 967 019	€ 1 352 755	€ 1 666 542	€ 1 978 854	€ 2 959 450
Interest (2,02%)	€ 167 938	€ 241 755	€ 338 189	€ 416 635	€ 494 714	€ 739 862
<b>Net Profit</b>	€ 503 815	€ 725 264	€ 1 014 566	€ 1 249 906	€ 1 484 141	€ 2 219 587

Sales Growth Rate:

2023	2024	2025	2026	2027
16,2%	13,3%	9,0%	7,1%	7,1%

Grow rate in 6 years =  $(6.321.423 - 3.840.000) / 3.840.000 = 64,6\%$

Net income Growth rate:

2023	2024	2025	2026	2027
44,0%	39,9%	23,2%	18,7%	49,6%

Grow rate in 6 years =  $(2.219.587 - 503.818) / 503.815 = 3,4\%$

## 7.4 Cash Flow

The statement of Cash Flow shows the money that enters and goes out of the company. Therefore, it measures the capacity of a company to generate profits and to commit with its payment's duties. In the first year, the Linen company will have a negative cash flow because of the high investment in fixed capital (€-4.063.100).

Consequently, the Free Cash-Flow accumulated will be negative in the following two years. Only in 2024 the company will have a positive accumulated cash flow of €184.671,23.

Table 7.8: Cash Flow (author)

Resources released from the Project	2022	2023	2024	2025	2026	2027
Operational Results (EBIT) x (1-IRC)	€ 544 292,15	€ 760 909,36	€ 1 033 199,31	€ 1 250 344,25	€ 1 465 323,09	€ 2 176 328,18
Depreciations	€ 716 941,67	€ 716 941,67	€ 716 941,67	€ 715 275,00	€ 682 000,00	€ 7 000,00
Provisions	€ -	€ -	€ -	€ -	€ -	€ -
<b>Total</b>	€ 1 261 233,81	€ 1 477 851,03	€ 1 750 140,97	€ 1 965 619,25	€ 2 147 323,09	€ 2 183 328,18
<b>Investment/Desinvestment in Operation Fund</b>						
Operation Fund	-€ 374 670,98	€ 166 067,37	-€ 32 850,98	-€ 23 304,37	-€ 21 861,87	-€ 23 488,73
<b>Exploration in Cash Flow</b>	€ 886 562,84	€ 1 643 918,40	€ 1 717 290,00	€ 1 942 314,88	€ 2 125 461,22	€ 2 159 839,44
<b>Investment/Desinvestment in Fixed Capital</b>						
Fixed Capital	-€ 4 063 100,00	€ -	€ -	€ -	€ -	€ -
<b>Free Cash-flow</b>	-€ 3 176 537,17	€ 1 643 918,40	€ 1 717 290,00	€ 1 942 314,88	€ 2 125 461,22	€ 2 159 839,44
<b>CASH FLOW accumulated</b>	-€ 3 176 537,17	-€ 1 532 618,77	€ 184 671,23	€ 2 126 986,11	€ 4 252 447,33	€ 6 412 286,77

Depreciation taxes can be found in Appendix R.

## 7.5. Risks

1. Economic instability due to Interest rate increases and inflation.
2. The rise of energy prices.
3. New environmental taxes (for example in fossil fuels).
4. The lack of raw materials supply due to the high dependency on one exclusive supplier.

## 7.6. Research Financial Results

Reaching Financial Autonomy (Equity/Total Assets) higher than 15% is a good sign for any company. It shows its ability to face its financial duties. In the end of 2022, the Linen company will have a financial autonomy of 32%, over the recommended value. It shows security in the investment.

Over the six years of business activity, the financial autonomy will keep increasing. According to Portuguese textile industry data (República Portuguesa, 2018), most of the medium companies have a financial autonomy of 42% in textile industry. The financial autonomy of the Linen company will be above the average (Appendix S).

Solvability examines a firm's ability to meet its long-term debts and obligations (Equity/Liability). The Linen company's solvability is expected to increase over the 6 years (14% to 89% in 2027). This explains that the company has sufficient equity to cover its supplier payments and long-term debts (Appendix S).

Return on Investment (ROI) will be 10% in 2022. It is the ratio between Net profit/Assets. The ROI in textile and apparel industry is 10% (República Portuguesa, 2018), and 9% in textile industry. In the second year, the Linen company will be able to have a ROI of 14%. A ROI that grows, shows to future investors that they would get a good return on their investment.

Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. If it is positive, it means that the investor should invest in that moment, as it will be profitable in the following years. With sales increasing over time, the net income will follow the same trend.

There are two perspectives to calculate NPV: Project and Investor perspective.

Appendix Q shows that the Linen Company is a good investment, since NPV will reach a positive figure (€3.626.619), according to the first perspective.

In terms of payback, there are two ways to calculate the time the company needs to recover its investment: Accumulated Cash-Flows and Linear Cash-Flows. The payback for the Project

accumulated Cash-Flow will be 4 years. Nevertheless, the Linear formula shows that the company need less than three years to recover its investment. From the investor perspective, the payback will be 2 years, considering an accumulated Cash-Flow. However, the investor will be able to recover the investment in two months by using the linear formula. Through the Financial analysis, it is possible to say that most of the business objectives were met:

- Achieve a turnover of more than of €1.000.000 in the third year.
- Achieve 10-15% growth in sales in the first three years (although in the third year there is only 8% expected grow).
- Achieve more than €2M of sales in the first year (2022).
- Recover investment in less than five years (CF Accumulated).

## **CHAPTRE VIII. BUSINESS RECOMENDATIONS**

To sum up the company analysis, is noteworthy to give some recommendations:

- The long-term objective is to achieve the OEKO and GOTS certification (priority).
- The Linen company should focus on implementing sustainable policies, through the adoption of solar panels and facilities to recycle water (priority).
- Reusing fibres is a priority to minimize the use of natural resources (priority).
- Diversify raw material suppliers (priority).
- Promote decent working conditions – e.g., provide materials, equal opportunities, health insurance (priority).
- Study the possibility of using natural products (e.g., grapes, nuts, vegetables) to dyed clothing (eco-print).
- 3D printing is a technology used in the design process. The designer can create its clothing models in the system without needing materials to do its prototypes. It helps to reduce the number of fibres used.
- In terms of technology, the company should implement a software system to help manage its business (when sales growth is higher than 15%). The objective is to help track in real time all its clothing items, increasing efficiency in its operation.

## CHAPTER IX. FINAL REMARKS

### 9.1 Conclusion

Sales are an important indicator to see if retail chain shops are accepting well the linen organic product. By looking at the financial statements, sales are increasing and going to have a quick growth in the first year (16%). According to the Retail Chain's survey (Appendix U), retailers expect to purchase more linen clothing in the next three years. Afterwards, sales will grow slowly (13%, 8%, 7%, 7% in 2024-2027 respectively) since expensive products take time to achieve maturity in the market. The positive evolution of sales shows that the Linen company will deliver a high-quality product and be committed to fully satisfying its clients.

It is important to highlight the results from the Design survey (Appendix U-second survey). This is a very important survey, as it shows that any manufacture company cannot survive if designers are not interested in working with the materials/fibres that a manufacture is offering. Moreover, designers have also the power to raise sustainability issues in the working environment and to choose which fibres they prefer to work with, as it was mentioned by Professor designer Joana Lourenço da Cunha. When the respondents were asked if they have the *'role to increase awareness about sustainable fibres'*, all answered *yes*. Additionally, even though the majority still prefer to work with cotton, 61,5% said that they would prefer linen as a second option, which is a very positive sign for a company that works only with linen fibre. When the designers/professor designers were asked if they wanted to work with a 100% linen company, all responded *yes* too. However, not all the designers would like to work only with natural fabrics. The reason for that is because they say that synthetic fabrics have a good texture to work with. Moreover, natural fabrics are more expensive than synthetic fabrics, which can become an important obstacle.

As the Literature Review revealed, Circular Economy is an important step to rebuild the environment and decrease waste. Interestingly, only 69% said that the new creativity lies on circular economy options. But all the designers said that they would prefer to work in a company with a "sustainable mindset".

The Retailer Chain Shops' survey shows important conclusions as well. A crucial fact for the new Linen Textile company is that Linen Retailers are thinking about purchasing more linen fibre clothing in the next three years. It is important for the Linen company to focus its sales on those clients. On top of this, it is important to know that some of the retailers already buy textile linen in Portugal (2 responses). Since they know already Portuguese clothing products, they could be more interested in the new linen product.

There is still a long road ahead for companies to start prioritizing natural fibres instead of synthetic fibres, mainly because they are more expensive to produce. However, consumers also need to change their mindset and start buying better clothes that have higher durability and sustainability qualities. According to our surveys, general consumers do not know yet a lot about linen features. Therefore, it is important for manufactures and fashion companies to further promote natural fibres.

The result of fast fashion production is a landscape of tons of waste and high levels of soil, air, and water pollution. However, if we start choosing sustainable clothing by looking at the type of fibres used and knowing where they were produced, this will already represent a potential step to limit the environmental damage of textile production and manufacturing.

## 9.2. Limitations

Despite the important contribution provided by the academic and scientific research, there are still a set of elements that constituted limitations to this project.

The biggest limitation is related with the survey that was sent to Retail Chain Companies. The number of responses received was very low (4), even though it was sent to 25 retail companies. Therefore, the results can be interpretive in a subjective way. The reason why some of the companies did not respond, was because they were already collaborating with other institutions.

The second limitation is related with the financial results. The estimated value for investment in machines equipment and property was obtained in the internet. It would have been more reliable if a textile company would have provided more details about its financial aspects. Moreover, the evolution of sales is based on the author's positive expectation, which believes that the new product will gain market and conquer new clients.

Finally, it would have been interesting to visit a textile factory/company to see all the manufacture processes and to acquire more in-depth information about staff work, machines, factory tools and teams' collaboration.

## Bibliographic References

- s.a (2021). *About masters of linen: European Linen & Hemp*. Retrieved October 2021, from <http://news.europeanflax.com/celc/27-club-masters-of-linen/>
- Agyemang, M., Kusi-sarpong, S., & Mani, V. (2019). Drivers and barriers to circular economy implementation: An explorative study in Pakistan's automobile industry. (2019). *ResearchGate*, 57, 971–994. <https://doi.org/10.1108/MD-11-2018-1178>
- Alay, E., & Duran, K. (2019). A Sample work on green manufacturing in textile industry (*ScienceDirect*). <https://doi.org/10.1016/j.scp.2016.03.001>
- Aldalbahi, A., Mehez, H.E.& Mohamed, H.E. (2021). Effects of Technical Textiles and Synthetic Nanofibers on Environmental Pollution. *Polymers*, 13, 6–7. <https://doi.org/10.3390/polym13010155>
- Allied market research. (2021). *Linen Fabric Market by Usage (Clothing, Towels, Bed Linen) - Global Opportunity Analysis and Industry Forecast, 2021–2028*. <https://www.alliedmarketresearch.com/linen-fabric-market>
- Asia Europe Foundation. (2018, December). *About Linen: A European Fiber. Processed in China*. Asia Europe Foundation, Culture 360.ASEG.Org. Retrieved September 2021, from <https://culture360.asef.org/magazine/about-linen-european-fiber-processed-china/>
- Associação Têxtil Portuguesa (ATP). (2021). *Associação Têxtil Portuguesa (ATP)*. ATP. Retrieved March 1, 2022, from <https://atp.pt/pt-pt/estatisticas/estatisticas-2019>
- Autumn 2021 Economic Forecast: From recovery to expansion, amid headwinds*. (2021, November). European Commission. Retrieved November 2021, from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_5883](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5883)
- B. Werther, W., & Chandler, D. (2009). *Strategic Corporate Social Responsibility: Stakeholders in a Global Environment* (2 Edition) [E-book]. SAGE Publications.p. 5. [https://books.google.pt/books?id=Ft\\_ndtEyJPkC&pg=PA5&lpg=PA5&dq=A+view+of+the+corporation+and+its+role+in+society+assumes+a+responsibility+among+firms+to+pursue+goals+in+addition+to+profit+maximization+and+a+responsibility+among+a+among+a+firm%E2%80%99s+stakeholders+to+hold+the+firm+accountable+for+its+actions&source=bl&ots=ys9LxFiJwS&sig=ACfU3U0SIzjKzS4SmL4hbRRg4ceWBS2qRg&hl=pt-PT&sa=X&ved=2ahUKEwib44-Ww8P3AhUhxiUKHRkBBSSQ6AF6BAG6EAM#v=onepage&q&f=false](https://books.google.pt/books?id=Ft_ndtEyJPkC&pg=PA5&lpg=PA5&dq=A+view+of+the+corporation+and+its+role+in+society+assumes+a+responsibility+among+firms+to+pursue+goals+in+addition+to+profit+maximization+and+a+responsibility+among+a+among+a+firm%E2%80%99s+stakeholders+to+hold+the+firm+accountable+for+its+actions&source=bl&ots=ys9LxFiJwS&sig=ACfU3U0SIzjKzS4SmL4hbRRg4ceWBS2qRg&hl=pt-PT&sa=X&ved=2ahUKEwib44-Ww8P3AhUhxiUKHRkBBSSQ6AF6BAG6EAM#v=onepage&q&f=false)
- Banco de Portugal. (2019). *Autonomia Financeira*. Banco de Portugal, Ecosistema. Retrieved 2022, from <https://bpstat.bportugal.pt/conteudos/sabia-que/137>

- Banco de Portugal. (2021, November 10). *Análise setorial da indústria dos têxteis e vestuário*. Retrieved November 2021, from <https://bpstat.bportugal.pt/conteudos/publicacoes/1292>
- Banco de Portugal. (2021a, November). *Inflation for October and November*. <https://bpstat.bportugal.pt/conteudos/noticias/1299>
- Banco de Portugal. (2022, June). *Economic projections*. <https://www.bportugal.pt/en/page/projecoes-economicas>
- BCG. (2020, October). *The Consumers Behind Fashion's Growing Secondhand Market*. Retrieved November 2021, from <https://www.bcg.com/publications/2020/consumer-segments-behind-growing-secondhand-fashion-market>
- Beier, G., Niehoff, S., & Ziems, T. (2017). Sustainability aspects of a digitalized industry – A comparative study from China and Germany. volume 4, 230–232, *Springer*. <https://doi.org/10.1007/s40684-017-0028-8>
- Belgian Linen. (2021). *BelgianLinen About*. Retrieved in 2021, from <https://www.belgianlinen.com/>
- Capital Group. (2021). *ESG Global Study*. Retrieved November 2021, from [https://www.capitalgroup.com/eacg/esg/esg-global-study.html?cid=p67064742429&ad\\_id=554874990223&gclid=CjwKCAiAm7OMBhAQEiwArvGi3lp4jFyy9uY0iOi8tACP4VM1ZdXOxJnkJGG3z\\_cpTBetZxYedezR9BoCWxwQAvD\\_BwE&gclid=aw.ds](https://www.capitalgroup.com/eacg/esg/esg-global-study.html?cid=p67064742429&ad_id=554874990223&gclid=CjwKCAiAm7OMBhAQEiwArvGi3lp4jFyy9uY0iOi8tACP4VM1ZdXOxJnkJGG3z_cpTBetZxYedezR9BoCWxwQAvD_BwE&gclid=aw.ds)
- Cottonized flax fiber. (2021). Jos Vanneste SA. <https://www.jos-vanneste.com/products/cottonised-flax-fibers>
- Dan, M. C., & Østergaard, T. (2021). Circular fashion: the new roles of designers in organisations transitioning to a circular economy. Volume 24, *Taylor and Francis online*. <https://doi.org/10.1080/14606925.2021.1936748>
- Dicken, P. (2003). *Global shift, Reshaping the economy in the 21th century: Vol. 4 edition*. Sage publications. [https://books.google.pt/books?hl=ptPT&lr=&id=Ay\\_9sUvgB3MC&oi=fnd&pg=PR14&dq=Dicken,+P.+\(2003\),+Global+Shift.+Reshaping+the+Global+Economic+Map+sage&ots=UNTQMfDnuv&sig=-YSr45frmTNLDd3-PPKLTktWY4o&redir\\_esc=y#v=onepage&q&f=false](https://books.google.pt/books?hl=ptPT&lr=&id=Ay_9sUvgB3MC&oi=fnd&pg=PR14&dq=Dicken,+P.+(2003),+Global+Shift.+Reshaping+the+Global+Economic+Map+sage&ots=UNTQMfDnuv&sig=-YSr45frmTNLDd3-PPKLTktWY4o&redir_esc=y#v=onepage&q&f=false)
- Elkington, J. (2017). *Partnerships from cannibals with forks: The triple bottom line of 21st-century business* (Vols. 8, issue 1). (2017). [E-book]. Capstone Publishers, U.K. <https://doi.org/10.1002/tqem.3310080106>
- Ellen Macarthur Foundation. (2021). *Fashion and the Circular economy*. Ellen Macarthur. Retrieved in 21–12-21, from <https://archive.ellenmacarthurfoundation.org/explore/fashion-and-the-circular-economy>



Ellen Macarthur Foundation. (2021). *The Jeans Redesign*.  
<https://ellenmacarthurfoundation.org/the-jeans-redesign>

Ellen Macarthur Foundation. (2022). *Building a restorative and regenerative economy*.

Endevr. (2020, January 1). The True Cost: Who Pays the Real Price for YOUR Clothes | Investigative Documentary [Video]. Youtube. <https://www.youtube.com/watch?v=5-OzHqYGnlo>

EU economic resilience. European Union. Retrieved in 2022, from [https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-forecasts/spring-2022-economic-forecast\\_pt#executive-summary](https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-forecasts/spring-2022-economic-forecast_pt#executive-summary)

EURATEX, Economic and Statistics. (2020, June). *Euratex-Facts and Key figures 2020*.  
<https://euratex.eu/facts-and-key-figures/>

European Central Bank (ECB). (2021). *ECB macroeconomic projections for euro area*. ECB Euro system. Retrieved November 2021, from [https://www.ecb.europa.eu/pub/projections/html/ecb.projections202109\\_ecbstaff~1f59a501e2.en.html](https://www.ecb.europa.eu/pub/projections/html/ecb.projections202109_ecbstaff~1f59a501e2.en.html)

European Central Bank. (2022). *Monetary Policy decisions*. European Central Bank. Retrieved June 2022, from <https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.mp220609~122666c272.en.html>

European Commission. (1987). *Report of the World Commission on Environment and Development: Our Common Future*.  
<https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>

European Commission. (2019). *European green Pact*. Retrieved November 2021, from [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_pt](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_pt)

European Commission. (2020). *Climate Change and Green Pact*. Retrieved December 2021, van [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/climate-action-and-green-deal\\_pt](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/climate-action-and-green-deal_pt)

European Commission. (2021). *Temporary global price pressures drive inflation to ten-year high*. European Commission, Brussels. Retrieved November 2021, from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_5883](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5883)

European commission. (2022). *Spring 2022 Economic Forecast: Russian invasion tes*

European Environment Agency (EEA). (2017). *Circular Design, products in the circular economy* (No. 6). European Union (EU).

EUROPEAN LINEN. (2021). European Line & Hemp. Retrieved October 2021, from <http://news.europeanflax.com/celc/27-club-masters-of-linen/>

- Fashion Statistics Portugal. (z.d.). *FashionUnited*. Retrieved on 22 september 2022, from <https://fashionunited.com/statistics/portugal>
- Fashion united. (2015). *Fashion Statistics Portugal, export*. Retrieved April 2022, from
- Fiore, F (2005). *Writing a Business Plan in no time*, 1st ed., Reader Q&A Ed.
- Fletcher, K., & Grose, L. (2012). *Fashion and Sustainability, Design for Change*.
- Forbes. (2018b). *88% of consumers want to make the difference*. Retrieved November 2021, from <https://www.forbes.com/sites/solitairer Townsend/2018/11/21/consumers-want-you-to-help-them-make-a-difference/?sh=ce6584369547>
- Forbes. (2020). Sustainable Fashion Demand Provides New Opportunities In Material Science And Chemistry. Retrieved 10 february 2021, from <https://www.forbes.com/sites/allisongasparini/2020/05/19/sustainable-fashion-demand-provides-new-opportunities-in-material-science-and-chemistry/?sh=4691bd64b495>
- Fung, Y.-N., Chan, H.-L., Choi, T.-M., & Rong, L. (2021). Sustainable product development processes in fashion: Supply chains structures and classifications. *Web Science*. Published. <https://doi.org/10.1016/j.iipe.2020.107911>
- Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114, 11–32. <https://doi.org/10.1016/j.jclepro.2015.09.00>
- Global Eco Fiber Market Size | Industry Report, 2020-2027*. (z.d.). Retrieved on 22 September from 2022, van <https://www.grandviewresearch.com/industry-analysis/eco-fiber-market>
- HiGG. (2022). An Introduction to MSI. Higg MSI. Retrieved in March 2022, from <https://howtohigg.org/higg-msi/an-introduction-to-msi/>
- How sustainable is linen. (sd)*. Retrieved from November 2021. Good on you. from <https://goodonyou.eco/how-sustainable-is-linen/>
- Inditex. (2021). *Inditex report 2020*. <https://www.inditex.com/documents/10279/664163/2020+Inditex+Annual+Report.pdf/cb184fcc-d1d5-a691-1ee3-8e46871615ab>
- INE (Índice Nacional Estadística). (2019). *Empresas exportadores de bens*. INE. Retrieved from December 2021 from,
- International Labor Organization. (2019). The future of work in textiles, clothing, leather and footwear (No. 236). [https://www.ilo.org/wcmsp5/groups/public/---ed\\_dialogue/---sector/documents/publication/wcms\\_669355.pdf](https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_669355.pdf)
- Investopedia. (2022, juni). *Solvencia Ration*. Retrieved in June 2022, from <https://www.investopedia.com/terms/s/solvencyratio.asp>
- Keegan, W., & Green, M. C. (2013). *Global Marketing (7de editie)*. Perason Global Edition.

- Khan, I. S., Ahmad, M. O., & Majava, J. (2021). Industry 4.0 and sustainable development: A systematic mapping of the triple bottom line, Circular Economy and Sustainable Business Models perspectives. *Journal of cleaner production*. 3,12; Published. <https://doi.org/10.1016/j.jclepro.2021.126655>
- Khys., J (2005). *Globalization, Corporate Social responsibility and poverty*. The Royal Institute of International Affairs members, volume 81.
- Kohler S. & Pizzol M., (2021). Unfinished Paths-From blockchain to sustainability in Supply chain. *Frontiers*. <https://doi.org/10.3389/fbloc.2021.720347>.
- Kozlowski, A., & Bardecki, M. (2019). Tools for Sustainable Fashion Design: An Analysis of Their Fitness for Purpose. ResearchGate, 1–2
- Libeco. (2018). *The Linen Craft, fiber to fabric*. Libeco.
- Lusa. (2021, 6 juli). <https://www.jornaldenegocios.pt/empresas/industria/detalhe/textil-riopele-investiu-35-milhoes-em-oito-anos-para-se-tornar-a-fabrica-mais-moderna-da-europa>. *Jornal de Negócios*. Retrieved in 15–01-02, from <https://www.jornaldenegocios.pt/empresas/industria/detalhe/textil-riopele-investiu-35-milhoes-em-oito-anos-para-se-tornar-a-fabrica-mais-moderna-da-europa>
- Martinez, D., & Luz Vega Ruiz, M.L. (2002). *La Globalizacion Gobernada: Estado, sociedad, Y mercado en el siglo XXI* (2de editie). Worldwide Books.
- Matušovičová, M. (2021). Sustainable fashion as a part of the circular economy concept. *Sustainable Fashion as a Part of the Circular Economy Concept*, 13(45), 215. <https://doi.org/10.2478/stcb-2020-0009> - slow fashion
- Maxime Market research PVT. (2021). *Global Linen Fabric Market- Industry Analysis and Forecast (2020–2026)*. Retrieved November 2021, from <https://www.maximizemarketresearch.com/market-report/global-linen-fabric-market/85858/>
- Mcdowall, W., Geng, Y., & Huang, B. (2017). Circular Economy Policies in China and Europe. *Journal of Industrial and Ecology*. <https://doi.org/10.1111/jiec.12597>
- Morgan, B. (2020). 11 Fashion Companies Leading The Way In Sustainability. *Forbes*. Published. <https://www.forbes.com/sites/blakemorgan/2020/02/24/11-fashion-companies-leading-the-way-in-sustainability/?sh=58f42daf6dba>
- Murray, A., Skene, K., & Haynes, K.(2017). The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Web of Science*. 10.1007/s10551-015-2693-2

- Muthu, S.S., (2012). Recyclability Potential Index (RPI): The concept and quantification of RPI for textile fibres. *Recyclability Potential Index (RPI)*. Elsevier, 58–62. <https://doi.org/10.1016/j.ecolind.2011.10.003>
- Neves, J. (1982). *Tecnologia Têxtil, 1ª parte, Matérias-primas têxteis*. Porto: Livraria Lopes da Silva Editora, pp. 10-26.
- Niinimäki, K., Dahlbo, H., Peters, G., & Perry, P. (2020, April). The environmental price of fast fashion. *RsearchGate*, 189,193.<http://doi.org/10.1038/s43017-020-0039-9>.
- ONU news. (2021, November). COP26. ONU. Retrieved November 2021, from <https://news.un.org/pt/story/2021/10/1768732>
- Palm, D., Elander, M., Watson, D., Kiørboe, N., Salmenpera, H., et al., 2014. *Towards a Nordic Textile Strategy: Collection, Sorting, Reuse and Recycling of Textiles*.
- Pannicia, I. (2002). One, a Hundred, Thousands of Industrial Districts. Organizational Variety in Local Networks of Small and Medium-sized Enterprises. *SAGE Journals*, 18, 667–699. <https://doi.org/10.1177/017084069801900406>
- Pereira, L. (2014). *Estudo das Potencialidades do Linho na moda Contemporânea*. Universidade da Beira Interior, faculdade de Engenharia. <https://ubibliorum.ubi.pt/handle/10400.6/5697>
- Peters, G., Li, M., & Lenzen, M. (2021). The need to decelerate fast fashion in a hot climate - A global sustainability perspective on the garment industry. *Journal of Cleaner Production*, 1–5. <https://doi.org/10.1016/j.jclepro.2021.126390>
- Piippo, R., Niinimäki, K., & Aakko, M. (2022). Fit for the Future: Garment Quality and Product Lifetimes in a CE Context. *Sustainability*, p.1. <https://doi.org/10.3390/su14020726>
- Pordata. (2021). *Taxas de juro sobre novas operações de empréstimos (média anual) a empresas*. retrieved May 2022, from [https://www.pordata.pt/Portugal/Taxas+de+juro+sobre+novas+opera%C3%A7%C3%B5es+de+empr%C3%A9stimos+\(m%C3%A9dia+anual\)+a+empresas+total+e+por+escal%C3%A3o+de+cr%C3%A9dito-2847](https://www.pordata.pt/Portugal/Taxas+de+juro+sobre+novas+opera%C3%A7%C3%B5es+de+empr%C3%A9stimos+(m%C3%A9dia+anual)+a+empresas+total+e+por+escal%C3%A3o+de+cr%C3%A9dito-2847)
- Pordata. (2022). Taxa real do PIB. Portada. Retrieved June 2022, from <https://www.pordata.pt/Portugal/Taxa+de+crescimento+real+do+PIB-2298>
- Portal do INE. (2022, June). *Índice de Preços do consumidor*. [https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine\\_destaques&DESTAQUESdest bou i=540173136&DESTAQUESmodo=2](https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdestbou i=540173136&DESTAQUESmodo=2)
- Portugal Têxtil. (2021, 21 oktober). *TMG Textiles vanguardista e digital*. Retrieved 2021, from <https://www.portugaltextil.com/tmg-textiles-vanguardista-e-digital/>
- Prause, G. (2015). Sustainable business models and structures for industry 4.0. *Journal of Security and Sustainability Issues*, 5, 159–169. [https://doi.org/10.9770/jssi.2015.5.2\(3\)](https://doi.org/10.9770/jssi.2015.5.2(3))

- Preferred fibers & Materials Market Report 2020*. (2021). Textile Exchange.  
[https://textileexchange.org/wp-content/uploads/2021/08/Textile-Exchange\\_PREFERRED-Fiber-and-Materials-Market-Report\\_2021.pdf](https://textileexchange.org/wp-content/uploads/2021/08/Textile-Exchange_PREFERRED-Fiber-and-Materials-Market-Report_2021.pdf)
- Pruig, F., Marques, H., & Pervez, N. G. (2008). Globalization and its impact on operational decisions: The role of industrial districts in the textile industry. *International Journal of Operations and Production Management*, 693-697.  
<https://doi.org/10.1108/01443570910971388>
- R. Stahel, W. (2019). *The Circular Economy* (Ellen Macarthur).  
<https://doi.org/10.4324/9780429259203>
- Rahla, K.M., Mateus, R., & Bragança, L., (2021, April 7). Implementing Circular Economy Strategies in Buildings-From Theory to Practice. *MDPI*, 4-5.  
<https://doi.org/10.3390/asi4020026>
- Rana, S., Pichandi, S., Parveen, S., & Figueiro, R. (2014). Natural Plant Fibers: Production, Processing, Properties and Their Sustainability Parameters. *Springer Link*. Published.  
[https://doi.org/10.1007/978-981-287-065-0\\_1](https://doi.org/10.1007/978-981-287-065-0_1)
- Répubblica Portuguesa. (2021, April). *Plano de Recuperação e Resiliência*. Ministério do Planeamento. <https://www.portugal.gov.pt/pt/gc22/governo/programas-de-acao-governativa/plano-de-recuperacao-e-resiliencia>
- Resortecs. (2017). Retrieved September 2021, from <https://resortecs.com/>
- Reuters. (2021, October). *ECB to raise rates in 2024, but risk remains of earlier hike*. Retrieved November 2021, from <https://www.reuters.com/world/europe/ecb-raise-rates-2024-risk-remains-earlier-hike-2021-10-22/>
- Riopele (2022). Fashion Fabrics. <https://www.riopele.pt/>
- Sandin, G. (2019). Environmental Swedish Fashion Assessment. *ResearchGate*, 1–3.  
<https://doi.org/10.13140/RG.2.2.30502.27205>
- Santana J.J.F.& Wanderley, M.J. (1998); A indústria têxtil artesanal e de confecção nos primórdios da civilização. Campina Grande: EMBRAPA,
- Shirvanimoghaddam, K., & Motamed, B., & Naebe M. (2020). Death by waste: Fashion and textile circular economy case. *ScienceDirect*, 718, 2.  
<https://doi.org/10.1016/j.scitotenv.2020.137317>
- Staber, U. (1997), *Specialization in a declining industrial district, Growth and Change*, (Vol. 28), pp. 475-95. <https://doi.org/10.1111/1468-2257.00068>
- Statista. (2021). *Global Apparel Market*. Retrieved March 2022, from
- Statista. (2021). *Leading exporting countries of textile worldwide by value in 2019 (in billion U.S. dollars)*. Retrieved November 2021, from

- <https://www.statista.com/statistics/1054452/textile-apparel-goods-leading-exporters-worldwide/>
- Statista. (2021). *Leading exporting countries of textile worldwide by value in 2019 (in billion U.S. dollars)*. Retrieved November 2021, from
- Statista. (2021). *Month-on-month percentage change in the volume of textile, clothing, and footwear retail trade in the European Union (EU27) from December 2019 to March 2021*. Retrieved November 2021, from <https://www.statista.com/statistics/1133942/textile-and-clothing-retail-development-during-coronavirus-eu/>
- Tax Foundation. (2021). *Carbon Taxes emissions*. <https://taxfoundation.org/carbon-taxes-in-europe-2021/>
- Textile and clothing industries*.(2022). European commission. Retrieved on April 2022, from [ec.europa.eu/growth/sectors/fashion/textiles-and-clothing-industries\\_en](http://ec.europa.eu/growth/sectors/fashion/textiles-and-clothing-industries_en)
- Textiles and clothing in the EU*. (2022) Internal Market, Industry, Entrepreneurship and SMEs, characteristics of the industry. Retrieved on 22 September 2022, from [https://single-market-economy.ec.europa.eu/sectors/fashion/textiles-and-clothing-industries/textiles-and-clothing-eu\\_pt](https://single-market-economy.ec.europa.eu/sectors/fashion/textiles-and-clothing-industries/textiles-and-clothing-eu_pt)
- The impact of textile production and waste on the environment*. (2020, December 29). European Parliament. Retrieved September 15, 2021, from <https://www.europarl.europa.eu/news/en/headlines/society/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographic>
- ThredUp. (2019). *ThredUp*. Thredup resales report. Retrieved in 2021, from <https://thredup.com/resale/>
- Top 10 Largest Textile Producing Countries 2020*. (2021, April). Bizvibe. Retrieved October 2021, from <https://blog.bizvibe.com/blog/top-10-largest-textile-producing-countries>
- Twin A., (2021, 6 february). *Core Competencies*. [https://www.investopedia.com/terms/c/core\\_competencies.asp](https://www.investopedia.com/terms/c/core_competencies.asp)
- United Nations (UN). (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. Department of Economic and Social Affairs Sustainable Development. Retrieved November 11, 2021, from <https://sdgs.un.org/2030agenda>
- United Nations (UN). (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. Department of Economic and Social Affairs Sustainable Development. Retrieved November 11, 2021, from <https://sdgs.un.org/2030agenda>
- Visintainer Lerman, L., Britess Brinitez, G., Gerstlberg, W., V.R., & Frank, A. G. (2021). Sustainable conditions for the development of renewable energy systems: A triple bottom line perspective. *Elsevier*, 75, 1–2. <https://doi.org/10.1016/j.scs.2021.103362>

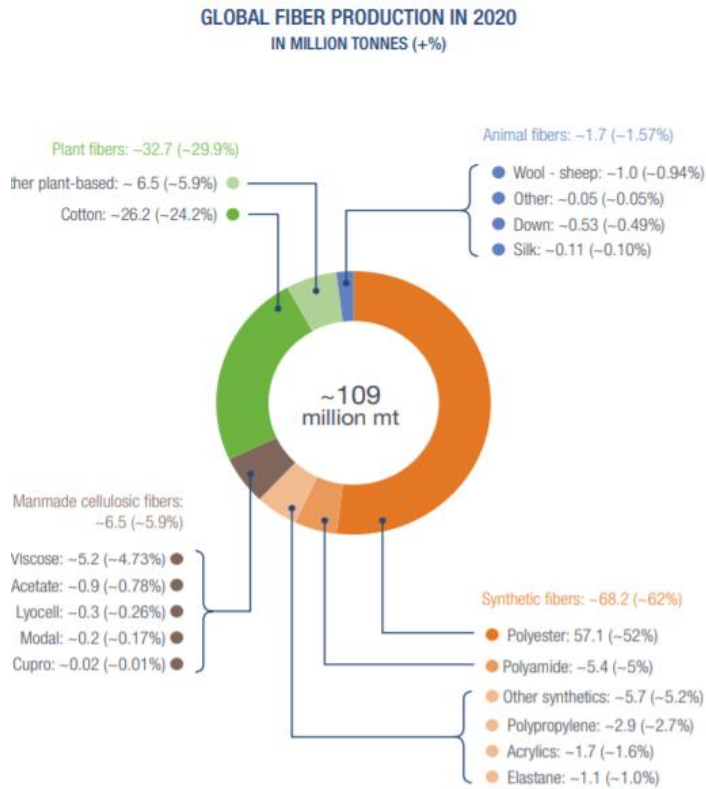
WHAT A WASTE 2.0. (2018, September 20). World Bank Group. Retrieved September 15, 2021, from <https://datatopics.worldbank.org/what-a-waste>

Wordometer. (2022). Europe Population. Retrieved February 2022, from <https://www.worldometers.info/world-population/europe-population/>

World Population Review. (2022). Income countries 2022. <https://worldpopulationreview.com/country-rankings/low-income-countries>. Retrieved March 2022, from <https://worldpopulationreview.com/country-rankings/low-income-countries>

## Appendices

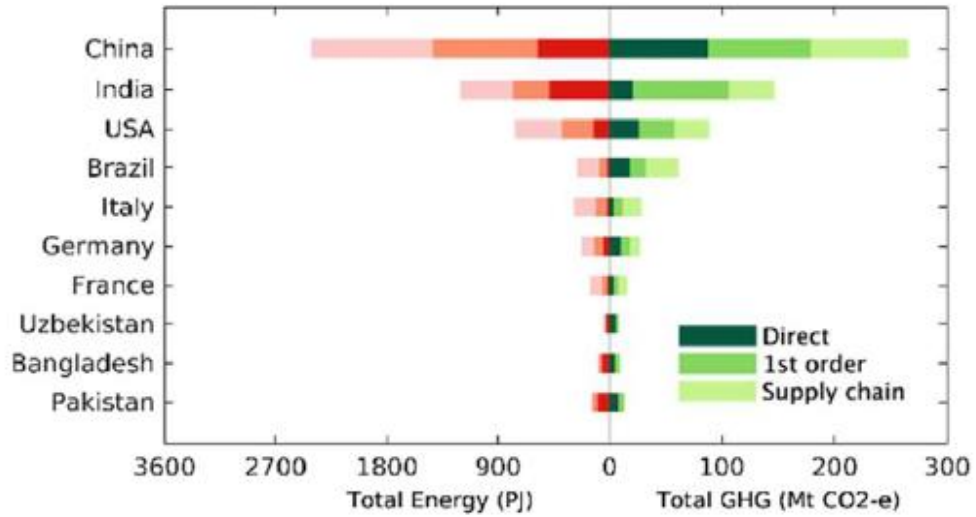
### Appendix A: Global Fibre production in 2020



Source: Textile Exchange Preferred Fibre material market report, 2021

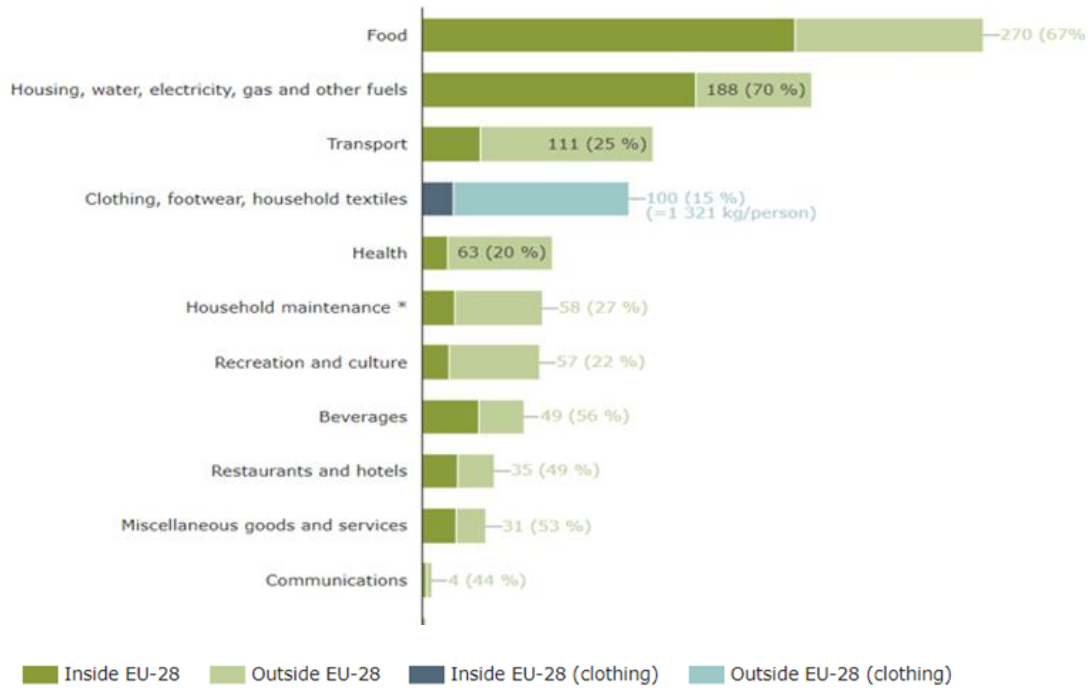


Appendix B: Top countries with most energy produced and consequently, with the largest GHG emissions, 2021



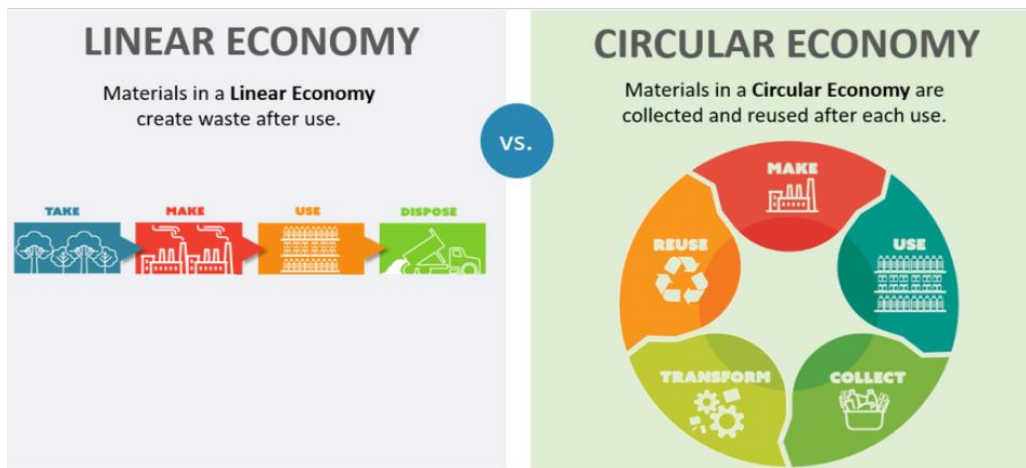
Source: Peters & Lenzen, 2021 (data from *Journal of Cleaner production*)

Appendix C: The use of primary raw materials in the upstream supply chain of EU 28 households' consumption, 2017 indexed values with textile consumption = 100



Source: United Nations (UN), 2021

## Appendix D: From a Linear to a Circular economy



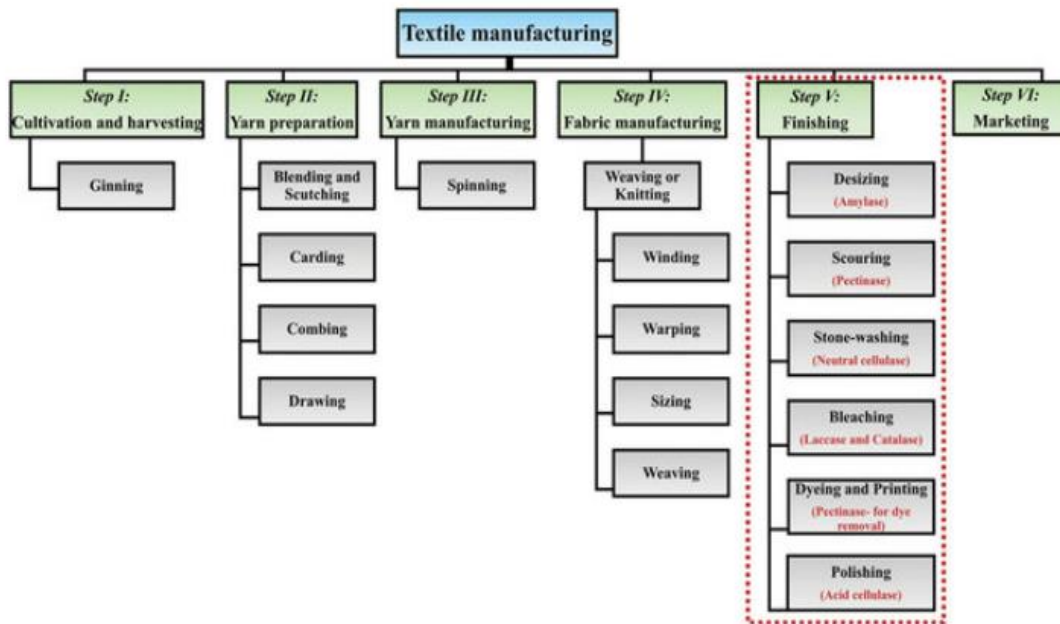
Source: *Hi.Cone*, 2021

## Appendix E: Closing the Loop



Source: *United Nations (UN)*, 2019.

Appendix F: Steps in the Textile Manufacturing Process



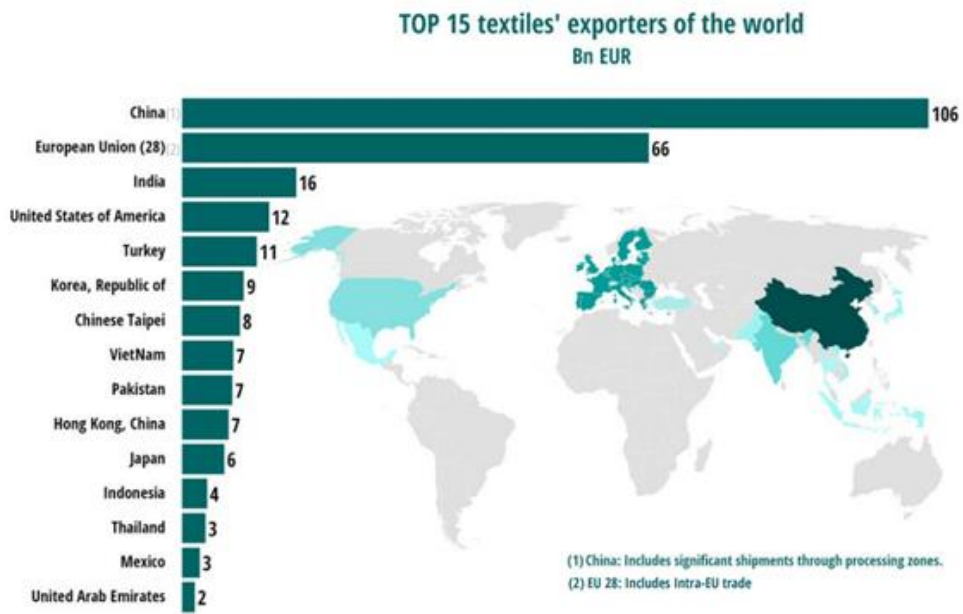
Source: *Textile word supply chain*, 2020

Appendix G: The main Portugal textile products exports

<b>Portugal Textile exports (M€)</b>	
<b>T-shirts</b>	1000.000
<b>House Linen</b>	533
<b>sweaters/sweatshirts</b>	421

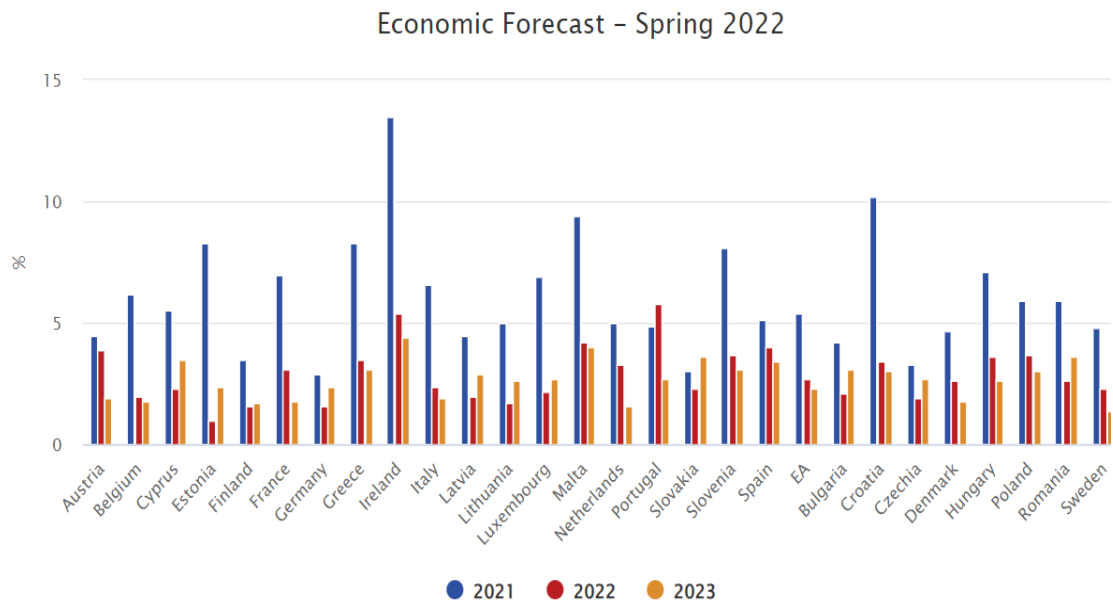
Source: *FaschionUnited*, 2014

Appendix H: Top 15 Textiles exporters of the world



Source: *Euratext* (2020)

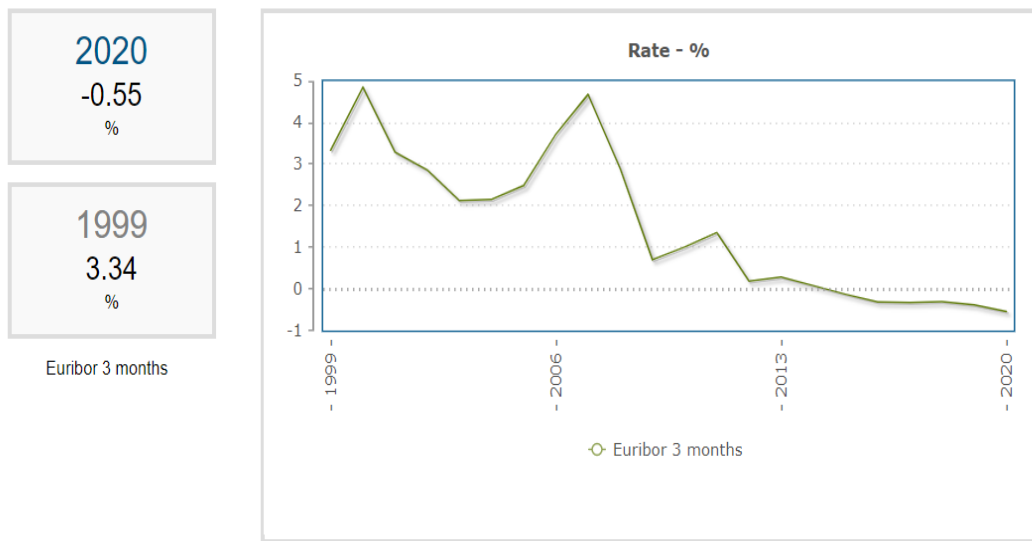
Appendix-I GDP forecast in EU



Source: *European commission, 2022*



## Appendix J- Interest Rates in Portugal



[Click here to see the graphic in detail](#)

Source: *Portada*, 2022

Appendix K- Five Forces of Porter analyse for the Portuguese Linen textile company.

<b>Barganing power of Consumers = medium low</b>		
<b>Sub-factors</b>	<b>Consumers Power</b>	<b>Effect on Linen Portuguese company</b>
Level of consumers switching cost is low	high	Negative
The number of 100% linen companies	low	Positive
Level of differentiation between linen and other fibers	low	Positive
Possibility of backward integration from Textile company	low	Positive

<b>Barganing power of Suppliers = medium high</b>		
<b>Sub-factors</b>	<b>Suppliers Power</b>	<b>Effect on Linen Portuguese company</b>
Level of concentration (number) of suppliers is high	high	Negative
Level of dependency of suppliers on the new Linen company is low	high	Negative
Substitute to suppliers products	high	Negative
Level of forward integration	low	Positive

<b>Barganing power of Substitute Products= high</b>		
<b>Sub-factors</b>	<b>Substtute products power</b>	<b>Effect on Linen Portuguese company</b>
Number of textiles operating in Portugal and overseas	high	Negative
Susbtitue products characteristics	high	Negative
Consumer switching cost low	high	Negative

<b>Barganing power of New entrants= low</b>		
<b>Sub-factors</b>	<b>New entrants Power</b>	<b>Effect of Linen Portuguese company</b>
Easy to enter in the linen market	low	Positive

Source: Author

## Appendix L: Portuguese linen Textile company competitor's analyse

Company name	Localization	Type of company	Born	Fibers they sell	Linens characteristics	Market overseas
Somelos	Guimarães	Fabrics	1958	100% Cotton and blended linen with cotton	100% linen and blended linen	Yes
Riopele	Famalicão	Vertical company	1927	Polyester, viscoce, recycled polyester, linen	100% linen and blended linen	95% of export (30 countries: South Korea, Japan, Spain, etc)
Tmg Fabrics	Braga	Fabrics/ Garment manufacturing/Automotive/Energy	1937	Cotton, linen, wool, tencel, lyra	Blended linen	90% of exports (textil , automotive, energy)
Polopiqué	Guimarães	Vertical company	1996	Organic cotton, lycel, polyester, cashemere, silk and linen	100% linen and blended linen	24 countries: Europe, EUA, Canada, Brasil, China, India, Egipt, South Africa, Australia
Belgical Linen	Belgium	Fabrics	No. inf	linen	100% linen and blended linen with cotton	Yes
Northern Linen BV	Netherlands	Fabrics	No. inf	linen	100% linen and blended linen	Yes

Source: Author

Company name	Sales volume	Number of employees	Infrastructures	Production capacity	Technology	Certifications
Somelos	35 M (2017)	No Inf.	300,000 m2	sales volume 35M (2017)	No Inf.	Better cotton initiative
Riopele	73€ M	1144	140,000 m2. Investment in 8300 m2 -capacity to 400 t of yarns	700,000 m/month.	35M of investment; Stong digital plataform; artificial intelligence in the weaving process; Source plataforms; Implementation of an infrastructure to collect water from the rain-	"STEP by OEKE-TEX", "Global Recycled Standard (GRS)", "Selo Famalicão Visão'25" prize for "Tenowa – The Rebirth of Textiles
Tmg Fabrics	<200M	No Inf.	No Inf.	No Inf.	Design 3D; software Penelope (textile design software)	GOTS, OEKO Global Recycled, Organic Blended content certification
Polopiqué	200 M (2019)	1000	70,000 m2.	24.000.000 t of garment; 100,000 pieces a day; Investment plan in the first spinning machine for natural linen (10€ M).	software flux.wms: helps managing the orders in real-time	OEKO, Organic Standard Certification, Better cotton Initiative
Belgical Linen	No Inf.	No Inf.	No Inf.	No Inf.	No Inf.	Belgian linen, European Flax. OEKO, Organic Textile Standard, Global Recycled Standard
Northern Linen BV	No Inf.	No Inf.	No Inf.	No Inf.	No Inf.	European flax, OEKO, Organic Textile Standard; Recycle Textile Standard, Master line

Source: Author (continuation)

## Appendix M: Portuguese Linen Company Manufacturing process

### 1- Flax linen hanged to a machine (combing process)



Source: Polopiqué, 2022

### 2- Flax linen combed, transformed into a ribbon flax fibre (combing process)



Source: Polopiqué, 2022

### 3- Spinning machine



Source: Polopiqué, 2022

### 4- Weaving Machine



Source: Libeco, 2022

### 5- Finishing process, Jigger machine



Source: Libeco, 2022

## Appendix N- Portuguese Linen Textile company Balance sheet

	2022	2023	2024	2025	2026	2027
<b>Non-Current Assets</b>	€ 3 346 158	€ 2 629 217	€ 1 912 275	€ 1 197 000	€ 515 000	€ 508 000
Tangible Fixed Asset	€ 3 342 825	€ 2 627 550	€ 1 912 275	€ 1 197 000	€ 515 000	€ 508 000
Investment Properties						
Intangible Assets	€ 3 333	€ 1 667	€ -	€ -	€ -	€ -
Financial Investments						
<b>Current Assets</b>	€ 1 638 322	€ 2 479 767	€ 3 571 612	€ 4 875 993	€ 6 375 211	€ 8 864 898
Inventory	€ 32 000	€ 37 200	€ 42 147	€ 45 926	€ 49 186	€ 52 679
Clients	€ 346 163	€ 403 285	€ 456 922	€ 499 033	€ 534 464	€ 572 411
State taxes	€ 141 134					
Cash	€ 1 119 025	€ 2 039 282	€ 3 072 542	€ 4 331 035	€ 5 791 561	€ 8 239 808
Accounts receivables						
<b>Total Assets</b>	<b>€ 4 984 480</b>	<b>€ 5 108 984</b>	<b>€ 5 483 887</b>	<b>€ 6 072 993</b>	<b>€ 6 890 211</b>	<b>€ 9 372 898</b>

	2022	2023	2024	2025	2026	2027
<b>Shareholder's Equity</b>						
Capital	€ 100 000	€ 100 000	€ 100 000	€ 100 000	€ 100 000	€ 100 000
Common Stock						
Other Equity instruments	€ 5 000	€ 5 000	€ 5 000	€ 5 000	€ 5 000	€ 5 000
Retained earnings		€ 503 818	€ 1 229 086	€ 2 243 662	€ 3 493 581	€ 4 977 739
Equity variations	€ 1 015 775	€ 1 015 775	€ 1 015 775	€ 1 015 775	€ 1 015 775	€ 1 015 775
Net Profit	€ 503 818	€ 725 269	€ 1 014 575	€ 1 249 919	€ 1 484 158	€ 2 219 604
<b>Total Shareholder's Equity</b>	<b>€ 1 624 593</b>	<b>€ 2 349 861</b>	<b>€ 3 364 437</b>	<b>€ 4 614 356</b>	<b>€ 6 098 514</b>	<b>€ 8 318 118</b>
<b>Non Current Liabilities</b>	€ 3 047 325	€ 2 285 494	€ 1 523 663	€ 761 831		
Long-Term debts	€ 3 047 325	€ 2 285 494	€ 1 523 663	€ 761 831		
Other Payments						
<b>Current Liabilities</b>	€ 312 564	€ 473 636	€ 595 804	€ 696 835	€ 791 743	€ 1 054 843
Suppliers	€ 144 626	€ 165 098	€ 182 580	€ 197 386	€ 209 352	€ 222 064
State Taxes	€ 167 938	€ 308 538	€ 413 223	€ 499 449	€ 582 392	€ 832 779
Shareholders						
Short-term debts						
<b>Total Liabilities</b>	<b>€ 3 359 889</b>	<b>€ 2 759 130</b>	<b>€ 2 119 466</b>	<b>€ 1 458 666</b>	<b>€ 791 743</b>	<b>€ 1 054 843</b>
<b>Total Liabilities and Shareholder's Equity</b>	<b>€ 4 984 480</b>	<b>€ 5 108 984</b>	<b>€ 5 483 887</b>	<b>€ 6 072 993</b>	<b>€ 6 890 211</b>	<b>€ 9 372 898</b>

Source: Author

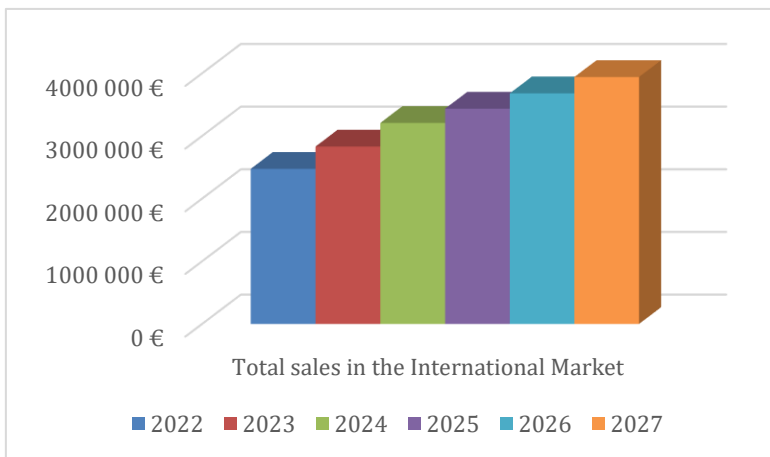
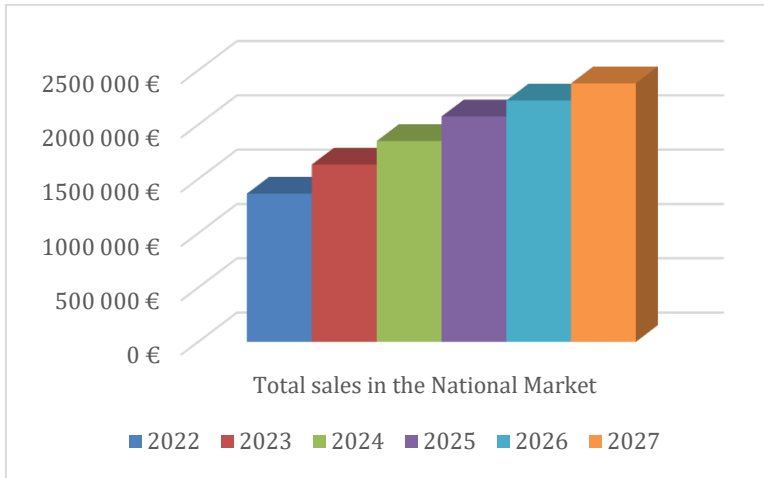
## Appendix O- Portuguese Linen Textile company Operational Expenses

	IVA	FC	VC	value per month	2022	2023	2024	2025	2026	2027
Specialized work	23%	65%	35%	€ 450	€ 5 400	€ 6 048	€ 6 532	€ 6 989	€ 7 339	€ 7 705
MKT services	23%	65%	35%	€ 1 000	€ 12 000	€ 13 440	€ 14 515	€ 15 531	€ 16 308	€ 17 123
Office Materials	23%	65%	35%	€ 500	€ 6 000	€ 6 720	€ 7 258	€ 7 766	€ 8 154	€ 8 562
Electricity	23%	65%	35%	€ 45 000	€ 540 000	€ 604 800	€ 653 184	€ 698 907	€ 733 852	€ 770 545
Fossil Fuels	23%	65%	35%	€ 2 000	€ 24 000	€ 26 880	€ 29 030	€ 31 063	€ 32 616	€ 34 246
Water	6%	65%	35%	€ 5 000	€ 60 000	€ 67 200	€ 72 576	€ 77 656	€ 81 539	€ 85 616
Travelling and Events	23%	65%	35%	€ 1 000	€ 12 000	€ 13 440	€ 14 515	€ 15 531	€ 16 308	€ 17 123
Goods transportation	23%	65%	35%	€ 5 000	€ 60 000	€ 67 200	€ 72 576	€ 77 656	€ 81 539	€ 85 616
Notary	23%	100%		€ 1 000	€ 12 000	€ 13 440	€ 14 515	€ 15 531	€ 16 308	€ 17 123
Cleaning services	23%	100%		€ 1 500	€ 18 000	€ 20 160	€ 21 773	€ 23 297	€ 24 462	€ 25 685
Other services	23%	100%		€ 1 500	€ 18 000	€ 20 160	€ 21 773	€ 23 297	€ 24 462	€ 25 685
<b>TOTAL FSE</b>					€ 767 400	€ 859 488	€ 928 247	€ 993 224	€ 1 042 886	€ 1 095 030
External services - Fixed costs					€ 515 610	€ 577 483	€ 623 682	€ 667 340	€ 700 707	€ 735 742
External services - Variable costs					€ 251 790	€ 282 005	€ 304 565	€ 325 885	€ 342 179	€ 359 288
<b>TOTAL External services</b>					€ 767 400	€ 859 488	€ 928 247	€ 993 224	€ 1 042 886	€ 1 095 030

Source: Author



Appendix P- Linen's company sales evolution (2022-2027)



Source: *Author*

## Appendix Q- Net present value (NPV) and payback

Land	€	200 000,00	
Infrastructures	€	350 000,00	
Machines	€	3 375 000,00	
Transport Equipment	€	100 000,00	
Administrative equipment	€	5 000,00	
Other Tangible Assets	€	28 100,00	
Intangible Assets	€	5 000,00	
<b>Total Investment</b>	<b>€</b>	<b>4 063 100,00</b>	
Financing	€	3 047 325,00	75%
Equity	€	105 000,00	
Aids	€	1 015 775,00	25%
<b>Total Financing</b>	<b>€</b>	<b>4 168 100,00</b>	

Years	2022	2023	2024	2025	2026	2027
number of years	1	2	3	4	5	6
Loans refund	0	761 831	761 831	761 831	761 831	
Interest payment	61 802	61 802	46 352	30 901	15 451	
Loans received	3 047 325					

	R (discount rate)						2027 Total Cash Flow
	2022	2023	2024	2025	2026	2027	
Cash Flow Project	- 3 176 537	1 643 918	1 717 290	1 942 315	2 125 461	2 159 839	€ 6 412 686,77
Cash Flow Investor	- 191 014	820 285	909 107	1 149 583	1 348 179	2 159 839	€ 6 195 979,00
<b>Discounted Cash Flow Project or NPV</b>	- 2 887 761	1 358 610	1 290 225	1 326 627	1 319 744	1 219 173	<b>€ 3 626 618,55</b>
<b>Discounted Cash Flow Investor or NPV</b>	- 173 649	677 921	683 026	785 181	837 113	1 219 173	<b>€ 4 028 764,50</b>

Notes:

- 1) The Project Cash flow shows the free Cash Flow
- 2) The Cash flow Investor is calculated by adding to the free cash flow loans received and deducting loans refund and interest payment.
- 3) Loan refund (Financial Funds)
- 4) Interest payment (Income statement)

Method 1: CF Accumulated

Years	2022	2023	2024	2025	2026	2027	Payback
Project	- 2 887 761	- 1 529 151	- 238 926	1 087 702	2 407 446	3 626 619	4 years
Investor	- 173 649	504 272	1 187 298	1 972 479	2 809 592	4 028 764	2 years

Method 2: Linear Formula

Years	2022	2023	2024	2025	2026	2027	AVERAGE CASH FLOWS	Financing/Average Cash Flow	Payback
Project	159 564	1 358 610	1 290 225	1 326 627	1 319 744	1 219 173	€ 1 112 323,92	2,740	2 years and 9 months
Investor	- 68 649	677 921	683 026	785 181	837 113	1 219 173	€ 688 960,75	0,152	2 months

Notas

- 1) In the first year of the project it is necessary to add to the cash flow the financing
- 2) In the first year of investor it is necessary to add to the cash flow the value of equity

PAYBACK: the number of years to recover the investment

## Calculations notes:

Year	2022	2023	2024	2025	2026	2027
Capital debts	€ 3 047 325,00	€ 3 047 325,00	€ 2 285 493,75	€ 1 523 662,50	€ 761 831,25	€ -
Interest rate	2%	2%	2%	2%	2%	2%
Interest payment	€ 61 555,97	€ 61 555,97	€ 46 166,97	€ 30 777,98	€ 15 388,99	€ -
Loans refund	€ -	€ 761 831,25	€ 761 831,25	€ 761 831,25	€ 761 831,25	€ -
Stamp tax	€ 246,22	€ 246,22	€ 184,67	€ 123,11	€ 61,56	€ -
Debt service	€ 61 802,19	€ 823 633,44	€ 808 182,89	€ 792 732,34	€ 777 281,80	€ -
Debt value	€ 3 047 325,00	€ 2 285 493,75	€ 1 523 662,50	€ 761 831,25	€ -	€ -

capital debts\* interest rate  
 capital debts /4  
 interest payment\*4%  
 interest payment+loans refund+stamp tax  
 capital debts-loans refund

stamp tax= 4%  
 Refund years= 4

## Appendix R: Portuguese Linen Textile company's Other Financial data

### 1. Petty cash

	2022	2023	2024	2025	2026	2027
<b>Petty cash Necessity</b>	€ 519 296,98	€ 440 484,85	€ 499 069,34	€ 544 958,51	€ 583 650,56	€ 625 089,75
Clients	€ 346 162,50	€ 403 285,35	€ 456 922,30	€ 499 032,92	€ 534 464,26	€ 572 411,22
Inventories	€ 32 000,00	€ 37 199,50	€ 42 147,03	€ 45 925,58	€ 49 186,30	€ 52 678,53
State tax	€ 141 134,48	-	-	-	-	-
<b>Petty cash Resources</b>	€ 144 626,00	€ 231 881,24	€ 257 614,75	€ 280 199,55	€ 297 029,74	€ 314 980,20
Suppliers	€ 144 626,00	€ 165 097,79	€ 182 580,44	€ 197 386,28	€ 209 351,53	€ 222 063,86
State tax	-	€ 66 783,45	€ 75 034,31	€ 82 813,27	€ 87 678,21	€ 92 916,34
Petty cash difference	€ 374 670,98	€ 208 603,61	€ 241 454,59	€ 264 758,95	€ 286 620,82	€ 310 109,55
<b>Investment in Petty cash</b>	€ 374 670,98	-€ 166 067,37	€ 32 850,98	€ 23 304,37	€ 21 861,87	€ 23 488,73

Source: Author

### 2. Financial Funds

	2022	2023	2024	2025	2026	2027
<b>Funds origin</b>						
Receivables	€ 1 442 664,53	€ 1 731 487,48	€ 2 094 540,74	€ 2 382 400,66	€ 2 635 764,11	€ 2 908 770,90
Social Capital	€ 100 000,00					
Other Equity Instruments	€ 1 020 775,00					
Long-term Loans	€ 3 047 325,00					
Desinvestment in Fixed Capital						
Desinvestment in Petty Cash		€ 166 067,37				
Financial income	€ 7 833,17	€ 14 274,98	€ 21 507,80	€ 30 317,24	€ 40 540,93	€ 57 678,66
<b>Total</b>	€ 5 618 597,70	€ 1 911 829,83	€ 2 116 048,54	€ 2 412 717,91	€ 2 676 305,04	€ 2 966 449,56
<b>Application Funds</b>						
Investment in Fixed Assets	€ 4 063 100,00					
Investment in Petty cash	€ 374 670,98		€ 32 850,98	€ 23 304,37	€ 21 861,87	€ 23 488,73
Income Tax (IRC)		€ 167 938,46	€ 241 754,65	€ 338 188,81	€ 416 635,45	€ 494 713,62
Dividends						
Loans refund		€ 761 831,25	€ 761 831,25	€ 761 831,25	€ 761 831,25	
Financial payments	€ 61 802,19	€ 61 802,19	€ 46 351,64	€ 30 901,09	€ 15 450,55	
<b>Total</b>	€ 4 499 573,17	€ 991 571,90	€ 1 082 788,52	€ 1 154 225,52	€ 1 215 779,12	€ 518 202,35
Treasury Balance	€ 1 119 024,53	€ 920 257,93	€ 1 033 260,02	€ 1 258 492,39	€ 1 460 525,92	€ 2 448 247,20

Source: Author

### 3. Depreciation's data

Depreciation Taxes	
land	2%
Infrastructures	2%
Machines	20%
Transport Equipment	25%
Administrative equipment	25%
Other tangible assets	25%
Intangible assets	33%

Source: Author

#### 4. Collaborators

Personal Costs	2022	2023	2024	2025	2026	2027
Administrator	1	1	1	1	1	1
Financial Director	1	1	1	1	1	1
Commercial/MKT	2	2	2	2	2	2
Production	20	25	25	25	25	25
Quality	2	2	2	2	2	2
Maintenance	1	1	2	2	2	2
Distributors	2	2	2	2	2	2
Designers	7	7	7	7	7	7
IT	1	2	2	2	2	2
<b>Total</b>	<b>37</b>	<b>43</b>	<b>44</b>	<b>44</b>	<b>44</b>	<b>44</b>

Source: Author

#### 5. Staff salary base

2023	2024	2025	2026	2027
14	14	14	14	14
2,00%	2,00%	1,00%	1,00%	1,00%

Salary base	2022	2023	2024	2025	2026	2027
Administrator	4 000 €	4 080 €	4 162 €	4 203 €	4 245 €	4 288 €
Financial Director	3 000 €	3 060 €	3 121 €	3 152 €	3 184 €	3 216 €
Commercial/MKT	2 500 €	2 550 €	2 601 €	2 627 €	2 653 €	2 680 €
Production	800 €	816 €	832 €	841 €	849 €	858 €
Quality	1 500 €	1 530 €	1 561 €	1 576 €	1 592 €	1 608 €
Maintenance	1 250 €	1 275 €	1 301 €	1 314 €	1 327 €	1 340 €
Distributors	800 €	800 €	800 €	800 €	800 €	800 €
Designers	1 500 €	1 530 €	1 561 €	1 576 €	1 592 €	1 608 €
IT	1 500 €	1 530 €	1 561 €	1 576 €	1 592 €	1 608 €

Source: Author

## Appendix S- Finance Indicators

Economic Indicators	2022	2023	2024	2025	2026	2027
Return on Investment (ROI)	10%	14%	19%	21%	22%	24%

Financial indicators	2022	2023	2024	2025	2026	2027
Financial Autonomy	32%	46%	61%	76%	89%	89%
Total Solvability	14%	18%	25%	41%	87%	89%

Source: Author

**Fist Interview - with the designer Professora Joana Lourenço da Cunha, from Minho University.**

**Date: 01/04/2022**

**1.A- Introduction**

- 1. Gostaria de saber mais sobre o papel que a prof. Joana Lourenço Cunha tem no sector da moda.**

*“Sou Professora de Moda da universidade do Minho, no entanto trabalho também na área de engenharia têxtil. Tenho vindo a desenvolver trabalhos de investigação sobre o design dos tecidos, isto é, tecidos de construção (malhas e estampados) e tecidos de superfície (design têxtil, cor) e na relação emocional do consumidor com o design e a durabilidade dos tecidos.”*

- 2. Considerando o seu papel como professora de design como define a Sustentabilidade e como enquadra esse conceito na criatividade e na gestão da produção das suas peças? /ou/ na gestão de conteúdos e da criatividade nas suas aulas, focando-nos na produção de peças?**

*“Vejo a sustentabilidade num aspeto alargado. A sustentabilidade não reside só no tipo de materiais escolhidos. Reside no aspeto social (o impacto dos materiais nas pessoas) e a nível de processos, desde a produção da fibra até ao design e uso da peça de roupa. Contudo, tenho mais conhecimento da sustentabilidade a nível do produto e não tanto de produção/processos.”*

- 3. Como vê os valores da sustentabilidade serem integrados, atualmente, na indústria da moda?**

*“No passado existia um Marketing “verde” que por vezes era enganador. Nem tudo o que é orgânico e verde, significa que o produto é sustentável. Mais recentemente, tem havido uma maior evolução e inovação das empresas no sentido de se tornarem realmente mais sustentáveis, a nível da escolha de materiais para as suas coleções de roupa, no melhoramento dos processos produtivos, para reduzir a pegada carbónica e logísticos, tal como na gestão de água e energia utilizada.”*

**2.A Perguntas sobre o uso de materiais mais sustentáveis**

- 1. De uma maneira geral, quais são as características dos materiais para a moda que mais atraem atualmente os designers quando criam as suas coleções? revê-se nessas práticas ou a sua perspetiva distingue-se dos demais criadores?**

*“Trabalhamos com todo o tipo de fibras como o algodão, linho e seda. Para nós o ‘driver’ das nossas aulas consiste na sustentabilidade. Em todas as coleções procuro sempre que os alunos*

*escolham materiais sustentáveis. Por exemplo, no projeto de estampados que estamos a desenvolver, é importante que eles comparem a quantidade de água utilizada para fazer uma fibra de algodão com uma fibra de polyester. Analisar o impacto das fibras no meio ambiente é uma prioridade nas aulas. A recuperação das fibras nas indústrias é também um tema importante que se debate nas aulas.”*

**2. Para além do uso de fibras sustentáveis, procura integrar (ou ensinar) outras práticas sustentáveis, como a reciclagem dos materiais, a redução de químicos não tóxicos, gestão sustentável da quantidade de água para criar fibras, etc?**

*“Sim. Quando pensamos no produto, devemos pensar no ciclo de vida do produto. Por exemplo, em termos de reciclagem, é importante evitar misturas na mesma peça, porque é será mais difícil reciclá-la no futuro. É mais fácil trabalhar com monomateriais.*

*A desmontagem é um método que serve para utilizar partes de roupa que não foram utilizadas noutra peça.*

*Em termos de estamparia é importante recuperar técnicas artesanais porque isso significa criar peça a peça e reduzir desperdícios. Os corantes naturais (frutos, legumes e cebolas) são hoje utilizados para tingir roupas, substituindo químicos que após a fase de tingimento, poluem as águas residuais. Apenas adicionando sal aos restos destes produtos naturais consegue-se fazer vários tipos de tingimentos. Para além de reduzir a poluição das águas, é uma forma de recuperar o desperdício alimentar. Em vez destes produtos chegarem ao lixo, podem ser reutilizadas na indústria têxtil. Temos feito vários trabalhos com os alunos sobre os corantes naturais: eucalipto e o bambo. Outro tópico que ensinamos aos alunos tem a ver com a lavagem doméstica. Peças mais escuras tendem a perder mais tinta, poluindo mais a água. O processo de branqueamento é muito tóxico. É importante estudar a possibilidade de se reduzir os químicos no design das roupas (ainda em investigação) tal como nas lavagens. Existem duas formas de fixar as cores: por eco-print, na qual se utiliza plantas naturais, no entanto é necessário muita água quente e energia. Já a dermofixação, não necessita de tanto água (vapor quente) mas requer químicos.”*

**3. Qual a sua relação com o linho? Quais as Vantagens e desvantagens?**

*“É uma das fibras que tenho em maior eleição devido à cultura do linho na região do Minho. Gosto muito porque é bastante confortável, é uma fibra duradoura, por isso sei que a peça de roupa vai ter muitos anos de vida. E gosto bastante das cores naturais que o linho apresenta (castanhos-amarelados).*

*Do ponto de vista de sustentabilidade, as peças de roupa de linho que mantêm essas cores naturais são melhores para o ambiente, pois significa que não foram utilizados químicos no processo de tintagem.*

*A desvantagem do linho é que é muito caro. Pode custar mais três vezes ou quatro do que o algodão.”*

- 4. Se decidir trabalhar com o linho, ou se o faz já com regularidade, considerará/considera a utilização de matéria-prima nacional ou produzida em plantações não nacionais? Pode justificar a sua opção?**

*“Eu opto sempre por trabalhar com produtos locais enquanto designer. Mas enquanto pessoa, também procuro escolher o que é local. Hoje atualmente produzimos muito pouco a planta do linho para fazer fibras. Preferimos focarmo-nos na atividade de manufatura e não tanto na produção”*

## **2. B- Perguntas sobre o uso de materiais mais sustentáveis (no sector)**

- 1. Ao se desenvolver e aplicar o conceito de “design verde” na moda e ao investir em peças sustentáveis, será possível ganhar ou manter uma vantagem competitiva nas criações de moda?**

*“É uma vantagem competitiva ter fibras amigas do ambiente. No entanto, não basta apenas olhar para a fibra em si. Se é uma peça que foi branqueada, do ponto de vista químico já é negativo. De outra perspetiva, se estou a comprar linho de um local longe do meu, não estou a fazer uma compra muito sustentável pois, estou a contribuir para o aumento da pegada carbónica. Uma boa forma de fazer uma compra mais sustentável, é olhar para a etiqueta do produto e ver onde foi feito. O local onde é produzido diz muito sobre o produto. Hoje ser uma empresa 100% sustentável ainda não é uma tarefa fácil pois procura-se ainda economizar muitos os seus custos. Mas cada vez mais as empresas se preocupam com o meio ambiente, de que forma os seus produtos impactam no ecossistema, e nas pessoas e procuram ser transparentes com o tipo de peças de roupa que estão a vender. A obtenção de certificados ambientais contribui para essa transparência.”*

- 2. Na sua perspetiva e conhecimento de causa, os designers, actualmente, procuram trabalhar mais com fibras sustentáveis? Por que motivo, na sua opinião?**

*“Sim, porque sabem das consequências da produção de fibras para o meio-ambiente.”*



**3. Qual a importância dos designers na consciencialização para o uso de fibras sustentáveis, como o linho?**

*“Os designers têm a função de impulsionar as empresas têxteis a percorrer um caminho mais sustentável para trabalhar para um futuro melhor. Têm de ser defensores das questões ambientais e sociais. Há um desinteresse ainda grande do linho em Portugal, porque não ainda não existe uma produção de linho sustentável. Por outro lado, existe mais interesse nas fibras regeneradas: pasta de papel de fibras e madeira.”*

**4. Até que ponto o linho poderá ganhar mais importância no futuro, dado os efeitos devastadores que a indústria têxtil tem trazido para o ambiente?**

*“O mercado ainda é pequeno. De forma a aumentar o interesse pelo linho, têm de existir políticas que incentivem mais ao cultivo do linho na europa, como em Portugal. Seria importante voltar a recuperar a cultura do linho no Norte, como na zona de Guimarães.*

*O linho é um mercado específico que necessita de muita mão de obra para a produção e manufactura, pois é um processo demorado, constituindo um entrave para o aumento da produção fibra do linho.”*

**5. Considera difícil gerir a adopção de materiais e processos de produção sustentáveis, como introduzir o linho, em novas colecções?**

*“É difícil, não basta o linho ser uma fibra sustentável. Tem que se pensar nos processos e também na parte estética. Em termos de tingimento, o linho é umas das fibras que melhor se comporta com corantes naturais. Não é de admirar, já na idade média se utilizava plantas para colorir a fibra do linho.”*

**6. Na sua perspetiva, o que viabiliza e o que inviabiliza a utilização do linho (fibra nova ou reciclada) como matéria-prima no sector da moda?**

*“O linho ainda é uma fibra cara porque existe pouco cultivo e porque o processo de extração da fibra da planta é demorado. Assim, para a empresa que está a manufacturar e a vender linho tem de pensar num nicho de mercado para conseguir tirar proveito económico. Este mercado deve ser um mercado maduro e incluir pessoas que gostem de peças com maior durabilidade.”*

**7. Hoje fala-se muito do conceito de CE que é caracterizada pelos princípios de “reusing, recycling, reducing”. Na sua opinião qual é mais importante dos três?**

*“São todos importantes: para reduzir a produção dos materiais nas coleções, é necessário fazer moldagem primeiro para perceber a quantidade de material que vai ser utilizado. Se a peça for mais recta, mais aproveitamento tenho do material.*

*Existem dois tipos de reciclagem: upcycling (aumenta o valor do produto inicial) e o downcycling (reduz o valor do produto inicial). Se reciclar roupas velhas para criar uma peça com boa qualidade corresponde à primeira. Se utilizar restos de fibras para fazer os enchimentos das toalhas de mesa será um downcycling. Para além disso, temos de pensar quais as melhores fibras para reciclar. A lã por exemplo, é uma boa fibra para reciclar.*

*No caso dos algodões e do linho não são muito bons. Contudo, as tecnologias hoje são essenciais para dinamizar mais a reciclagem no sentido de facilitar, pois não é fácil reciclar uma peça com vários tipos de fibras e acessórios. Na reciclagem pode-se utilizar roupas velhas ou podem-se triturar para transformar noutras peças.”*

**8. Another aspect in circular economy is “circular design”, which means that the products should be developed with sustainable and high durability materials.**

*“Pensar no design do produto é pensar na parte estética e em todos os adereços que fazem parte dele: os botões, as linhas, as etiquetas por exemplo. Botões de madeira é um dos materiais mais antigos que se utiliza na indústria têxtil. No entanto, hoje a maior parte escolhe botões feitos à base de pasta de milho. Em termos de reciclagem, se queremos aumentar a circularidade de peças que tenham botões, temos que ter em conta que o processo vai ser mais demorado, pois implica tirá-los da peça um a um.*

*O plástico é um material muito importante para a circularidade dos materiais. Pode-se aproveitar bastante para fazer a fibra polyester.”*

**9. Na sua opinião o que pode aumentar a circularidade de materiais e reduzir o desperdício de materiais?**

*“Em primeiro lugar é importante reutilizar roupas velhas ou roupa que os consumidores já não utilizam porque passou de moda. Hoje em dia, muitas lojas de roupa já têm contentores para recolher essas roupas que o consumidor já não deseja.*

*A Vintet é uma empresa de roupa online que vende roupas em segunda mão. Existem também várias lojas físicas que trocam roupas em segunda mão.*

*Existe vários exemplos de circularidade dos materiais: utilizar restos de fibras para fazer os enchimentos de toalhas de mesa; bijuteria feita de denim; apares de tecidos para fazer tapetes;*

*cascas de frutas e legumes para tingir roupas; Hoje é necessário criatividade na indústria têxtil para se tornar mais sustentável e amiga do ambiente.”*

## **Second Interview- WIN-WIN Textile**

**With the CEO: Lars Gotterup.**

**Date: 26/03/2022**

### **1. Company Introduction:**

- 1. Tell us about your background (what type of products and services you offer?) and how the idea for your company came about.**

*“Our company is a sourcing and consultancy company serving European and American brands in the apparel industry and footwear industry.*

*Win-Win textile has Danish roots. It was built in 1957 to serve the Scandinavia market. In 1982 the company decided to dislocate its activity as an apparel sourcing to Portugal. It has office in Portugal, Peru and India.*

*In the last 10 years, we start focusing more in sustainable strategies. We started acquiring organic cotton and doing partnerships with small companies to better understand the company “spirit” and company values. Now, all the producers are Portuguese, as well as, our products. One innovative product is our Vegan shoes.”*

- 2. What type of textile process (knitting, design) your company develops?**

*“We are an apparel and textile consulting.”*

### **2. Linen/ textile Business:**

- 1. How is working with linen fibre?**

*“We work with organic linen and linen recycled. Linen recycled is the part of cut linen left during manufacture process. We should mix this fibre with other virgin fibres to increase the durability of the piece. We also use fibres waste internally.*

*We use also recovered linen, linen that was not previously convert in a mesh or in a dyed fabric. We collect these fabrics from suppliers with the certification of - global recycled standard.*

*In the pre-production we recommend to put water in the fibre to avoid they shrink in the wash machine.*

*About 20% of the fibre during manufacturing are going to waste. Only 1% of clothing world wide is recycled.”*

- 2. Does your clients seek a lot for linen fabrics? Who are they?**

*“Yes, we have two clients that only purchase linen fibre: Derek a Danish brand and Toast an English brand. At the moment, we are creating mesh with 100% of linen fibre. The linen is European.”*

**3. Where do you source the material from? Who are your suppliers? (in the beginning and in the last five years)**

*“We buy linen organic and non-organic from Europe such as France, one of the best linen in the world.”*

**4. Can you give me some insights about cost manufacturing, transport delivery?**

*“One t-shirt with 100% linen costs 13€. One meter of linen cost 6€.”*

**5. Where does linen come from, and how you evaluate its sustainability production?**

*“The linen comes from France. We evaluate linen sustainability through long meetings with the suppliers to understand how it is made. Moreover, certifications like GOTS, ensure the linen is organic and all the supply chain have sustainable methods of production and distribution.”*

**6. Do you have a strong marketing plan? In what way do you think MKT can help consumers to purchase more linen fibre?**

*“Our marketing consists of sharing the quality of the materials we work with because quality is associated with durability which means, that piece of clothing will be used for a long time.*

*We like to buy sustainable products; it is our company mission. Therefore, we focus a lot on searching sustainable products. We also recommend in our website painting textiles with less chemicals, to protect the environment.”*

**7. Do you think people are prepared to consume more linen fibres instead of synthetic fibres (cheaper)?**

*“Linen is a special fibre. 25 years ago, it was a fibre that was not fashionable. Nowadays there are a lot of brands that are interested more in purchasing. Since technology improved, fibres were able to improve also.*

*It is certain that linen is different from other fibres: it is more wrinkled, takes time to iron. It is less soft than cotton. However, it is a sustainable fibre that retailers are willing to invest more to change their image of fast-fashion retailers.”*

**8. Why do you think linen industry declined over the years?**

*“Linen industry started declining when the international market opened. More cheap options of fibres were easy to access and therefore, more selling opportunities the companies had. Linen was very known in Portugal during the XIX century. It was used for different materials, ropes, to polish shoes, clothing, and sheets.*

*“The process to create linen fibre is long, that is why it is so expensive. “*

**9. What do you think about a clothing textile business located in Portugal based only with linen fibre?**

*“The business is not going to have a quick growth. Expensive products take longer to achieve maturity in the market. This kind of product demands a niche market. In order to sell more than other retailers, you must present your product as one of the most sustainable products: linen flax*

is extracted from a plant that does not need water to growth. Nowadays, 2700 liters of water is need to create only a t-shirt.”

**10. Do you think it will be profitable?**

“Yes.”

**3. Sustainability/Linen:**

**1. What are the environmental benefits of linen and why is it generally considered a sustainable fibre?**

*“It is a natural plant, so does not need any chemicals and complex machines to extract the fibre from the plant like is used to do viscose fibre. Also does not need any irrigation. On the other hand, cotton requires tonnes of water.”*

**2. Is the eco-friendly nature of linen the modern fashion industry’s new best friend?**

“Yes.”

**3. Do you think that manufactures in general are prepared to shift from synthetic fibres manufacturing to natural fibres manufacturing to protect the planet? Do you think if people knew that linen is one of the most sustainable fibres in the world, they would purchase more linen fibres?**

*“In terms of technical materials, manufactures do not need to invest in new machines. Every weaving and painting machine is ready to create linen fibres. In the confection phase, the companies might need to adapt.”*

*“Consumers want to buy more sustainable products. When it comes to linen, sometimes our clients do not like irregular fibres like linen, so they ask to take those irregularities. “*

**4. What do you think about OEKO and GOTS certification for a linen manufacture? (linen manufacture goal in long-term)**

*“Win-Win Textiles highly recommends the use of linen with these certifications. However, organic linen remains a niche product with only around 0.5% of the flax grown in Europe being certified organic.*

*We also recommend the Benefit corporation- protection to companies that prioritize social and environmental values over shareholder returns.”*

**4. Social Sustainability:**

**1. How can owning product locations contribute in enhancing the social issues?**

*“The manager/CEO has more capacity of controlling the way the product is carried out, how employees working conditions are taking care, how human rights are being respected, to control what type of leadership managers are adopting with the workforce to ensure they are providing equality opportunities. Transparency between the manufacture and the suppliers are also strengthen because they are closer. “*

**2. How is health and safety of the employees being guaranteed through the supply chain?**

*“Every member has access to insurance. When the company needs to require outsourcing workforce for the production/manufacturing is more difficult to access social rights, but I make sure the outsourcing companies follow the same politics as my company. I chose partners that give insurance to their employees.” In my company the woman’s who are expecting a baby receive a bonus. Moreover every member receive a bonus in the Easter.*

*One of the ODS (sustainable development objectives) that we focus is the number 5-Equality. We want that the women’s that work in manufactures have the same rights as man’s have. That is why we constantly talk to the supervisors of that manufactures to access behaviours and ensure they meet with the correct and behave standards we expect.!*

*We have offices in India, and the culture of equality is very different from our culture. Therefore, every day is a challenge in terms of ensuring that all of our employees feel valued and respected in their daily work.”*

### **5. Environment Sustainability:**

#### **1. Do you think suppliers play a key role in maintaining transparency in the process as they are directly in contact with the manufacturers?**

*“We do not have a sufficient level of transparency in the supply chains, there is too much focus on narrow financial objectives. Instead, we should collaborate with our stakeholders, in a common effort to achieve the SDGs and create systemic change.”*

*Transparency ensures traceability. We are able to know where the product we are purchasing comes from, and how it is made. In addition, we are able to have an idea about the impact of the product production/distribution in the environment and afterwards, create strategies to reduce the negative impact.”*

*“Choosing a supplier it is very important. However, I just want to enlighten that we are a service company, and the impact is more in the production.”*

#### **2. Does your company work with certified suppliers who have sustainability as a priority? - What type of materials (fabric) and packaging are currently being used in your company?**

*“The company source through a network of suppliers that have these following certifications:*

*Global recycled Standard- It means we work with manufactures that use recycled fibres. (mechanical recycle). Polyester is a good example of fibre recycled. Manufactures use plastic waste to create polyester fibre. Fibres such as linen and cotton are also recycled. About 50% of fibres reused is with those fibres. The rest 50% is with virgin fibres; OCS (Organic Content Standard)- This applies to every product, except food, and ensures that 95%- to 100% of the product is organic; BCI (better cotton initiative)- promotes better farming activities in the cotton production in 21 countries; OEKO-Tex standard 100- stands for product safety. Ensures that every component of this article, i.e. every thread, button and other accessories, has been tested for harmful substances and that the article therefore is harmless for human health; RDS (Responsible down standard)- aims to ensure that down and feathers come from animals that have not been subjected to any unnecessary harm; Fair trade certification- most globally recognized ethical label. Bluesign- provides solutions in sustainable processing and manufacturing to industries and brands.”*

**3. How is the use of toxins and chemicals regulated in the production process without hampering cost and performance? (corantes)**

*“Since we are not a manufacturing but a textile consultant, we try to partner with companies that are mindful regarding the use of chemicals in their products. If we work with companies that have the GOTS certification, we are more pleased because we know that the product is safe without any harmful substances. “*

**4. How does your company approach the problem of waste generation? Is there a strategy devised to handle the wastes?**

*“All the paper and plastic we used is then collected by a recycled company.”*

**5. Apparel production is considered as a thirsty business, what is your say on the water footprint of your business?**

*“We do not access.”*

**6. In your website it says “At Win-Win Textiles in PORTUGAL, we have developed a concept for garments in circular knits to reduce these challenges: slow production and high lead times” can you explain this?**

*“We promote material recycled, like cotton by using the mechanical method. “*

**7. Win Win textiles: “(...) trabalhamos com lavagem de roupas e-flow e tratamentos com ozônio, focamos na reciclagem e na redução do uso de papel e plástico”\_ vestuário de tecido. What is the ozônio treatment and how and what (vestuário, fibras?)**

*“Water often carries many chemicals when clothes are washed. This type of treatment uses less water to wash clothing. Ozônio treatment is based on natural plants, so it is better to use in the manufacture process in order to not contaminate the water.”*

**8. With respect to demand for energy and resources, what steps have been taken in your company to maximize material and energy efficiency?**

*“We are planning to put solar panels to create more sustainable energy.”*

**6. Economic Sustainability:**

**1. What are the most important costs incurred while operating sustainably and how important is it for your company to minimize costs?**

*“All the products that are organic are more expensive because they take more time to grow. But sustainable products are still very low, fibres organic market account only for 5% of worldwide production. A product without pesticides do not growth so fast, for that reason becomes expensive to compensate. “*

**2. With the increase of the prices in raw materials (Water, fabrics, certifications), how are the profit margins getting affected?**

*“It is true the general prices are increasing. Clothing is a secondary product, for that reason their purchase will decrease significantly, affecting our business. We expect to continue selling with the same value but decreasing the number of product unities.”*

**7. Technology:**

## **1. What technologies you would recommend to a linen manufacture to start its business?**

*“Equipment’s that helps the company reduce the consumption of energy, such as solar panels. E-flow, and 3D machines to help reduce the number of fibres/design tests.”*

### **Third Interview - Polopique.**

**Pedro R., Responsible for the spinning production**

**Date: 02/03/2022**

#### **1.Descreva-me o processo de fiação.**

*“Do caule da planta de linho sai a fibra. Quando as fibras chegam à fábrica, são separadas por cores, e colocadas numa máquina com ponta das fibras para serem fiadas.*

*As fibras vêm em fardos (meio metro) para a fabrica de fiação. São desfibriladas através do laminador para se tornarem em fibras de linho macias. Depois são torcidas e fiadas. Nesta fase, é criado o linho. Água é depositada num compartimento para as fibras serem molhadas e tornarem-se em fios.*

*A máquina de fiar chama-se contínuo. A velocidade determina a espessura do fio. Após serem fiadas, são tingidas ou teceladas primeiro. Finalmente, são enviadas para o processo de manufactura (corte, desenho).”*

#### **2.Quantas pessoas trabalham? Qual o grau de maquinaria?**

*“Todo o processo é mecanizado. Contudo, existem sempre pessoas a controlar o processo, pois o fio pode rebentar. Produzimos 60 t por mês com 150 pessoas por dia e turnos de 50 pessoas.*

*Temos um laboratório para ver se a fibra está em bom estado.”*

#### **3. Existem químicos no processo?**

*“Não.”*

#### **4. Têm algumas práticas de sustentabilidade?**

*“Existe bastante desperdício na fase de fiação, à volta de 30 %. No entanto, é aproveitado para fazer o linho cottonizado (este tipo de linho tem o cumprimento certo para ser misturado). Estas fibras são mais pequenas, e servem para misturar com algodão e viscose. Usamos à volta de 40 % a 50 % de linho.*

*No tingimento e nos acabamentos temos muito cuidado na gestão da água. Os produtos químicos que utilizamos não são tóxicos.”*

#### **5. De onde vem o linho?**

*“Do norte da França, como por exemplo da empresa Jos vanneste, béglica e Holanda.”*

#### **6. O vosso produto é considerado um produto de luxo?**

*“Sim.”*

#### **7.Tem muita procura de linho puro?**



*“Linho100% tem tido mais procura nos últimos anos para toalhas, Lençóis e para meio mistura.”*

**8. Têm um projeto de fiação de linho puro em Portugal. Pretendem comprar maquinaria de fiação de linho à china. Porquê este projeto?**

*“A europa abandonou a produção de linho puro e este tipo de maquinaria só existe na china.”*

**9. Que vantagens traz este projeto para a vossa empresa?**

*“Tornanamo-nos nos únicos produtores da europa com produção 100% de linho. O linho fiado passa a ser feito exclusivamente na Europa e não da china.”*

**10. O processo de Tecelagem é à mão?**

*“Sim temos algum trabalho manual. Pode ir para tingir primeiro ou para tecelagem. E depois para os acabamentos, para o corte e confeção.”*

**11. Qual é a fibra que gostam mais de trabalhar?**

*“Algodão. Somos especialistas no algodão orgânico.”*

**12. Tem conhecimento de outras empresas têxteis que queriam introduzir linho puro em Portugal?**

*“Não. Nem na Europa.”*

## Appendix U- Questionnaires

### First Survey- Retail chain shops (a total of 14 questions)

#### Linen Retail chain shops Assesement

Linen Retailers- Would you be interesting in buying Portuguese organic clothing Linen?

1. Can you tell me the name of your company? (it is not obligatory)

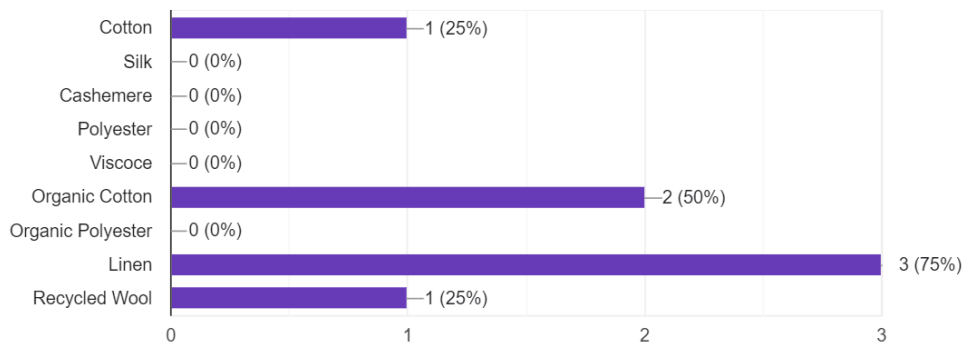
3 respostas

Linenfox
Justinas
Naz

2. Which fibers does your company buy the most?

 Copiar

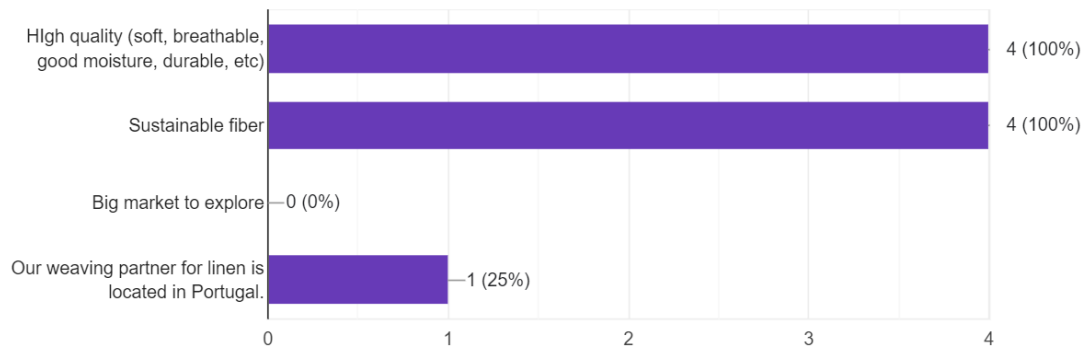
4 respostas



3. Why did you choose linen fiber for your clothing line?

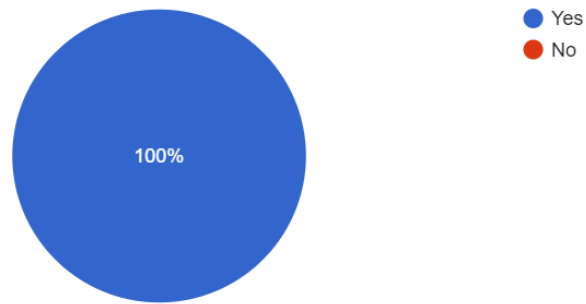
 Copiar

4 respostas



4. Are you planning to increase linen clothing demand in the next 3 years?

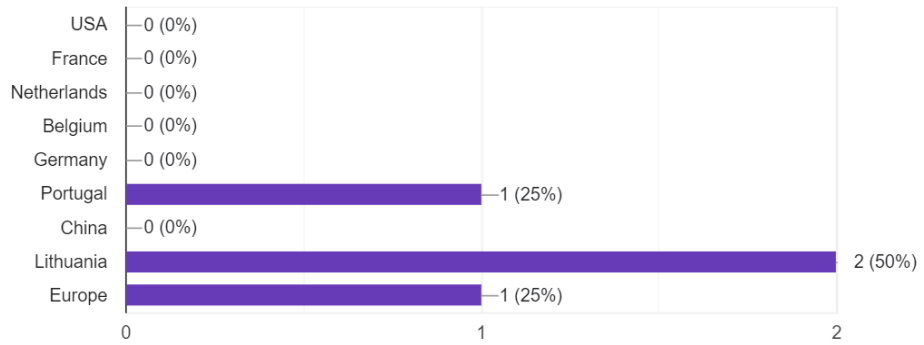
4 respostas



5. Where does your linen come from?

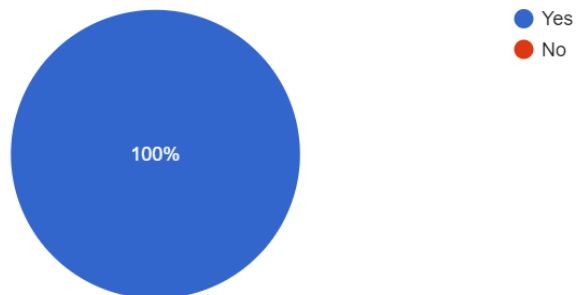
 Copiar

4 respostas



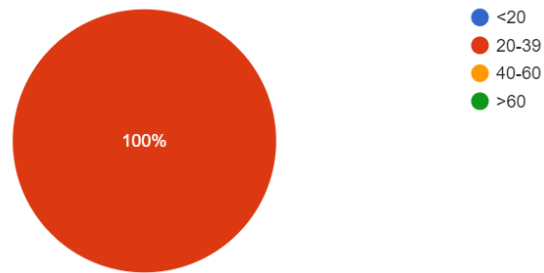
6. Do you think consumers have been buying more linen clothing in the last 5 years?

4 respostas



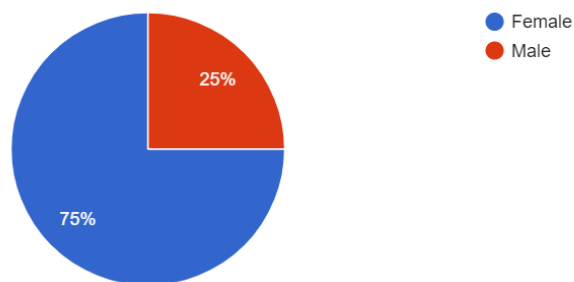
7. What is the average age of consumers that buy linen clothing?

4 respostas



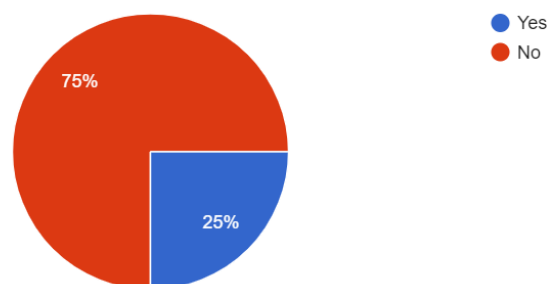
8. Who buys more linen organic clothing?

4 respostas



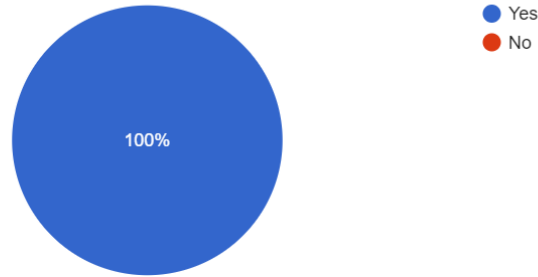
9. Linen fabric is considered one of the most sustainable fabrics in the world. The flax plant, use to create linen fiber, requires minimal water and pesticides, and even grows in poor-quality soil. Plus, it can absorb up to 2.1 tons of CO2 per ton of flax cellulose and every part of the plant is used, so nothing is wasted. Linen is strong, naturally resistant, good moisture absorbent, breathable, durable and biodegradable. Do you think consumers know a lot about linen fiber?

4 respostas



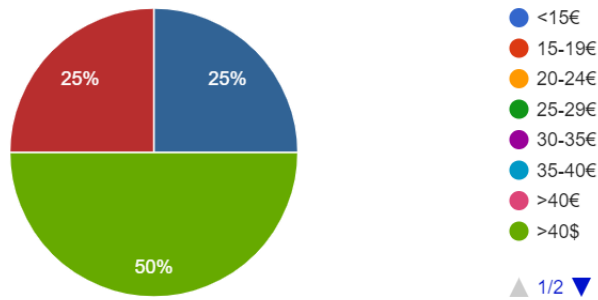
10. Portugal has an old tradition in linen textile and is very famous in Europe for its impressive craftsmanship and expertise in high-quality clothes and home textiles. A Portuguese textile manufacturing is looking for retailers to sell its clothing linen. All the manufacture process will be located in Portugal (combing, spinning, weaving, design, final product) and the flax fiber (organic) will come from France. Would you be interesting in buying Portuguese 100% linen?

4 respostas



11. This linen textile is selling high quality linen by purchasing European linen (certification that proves high quality). What is your price range to buy a single 100% linen T-shirt?

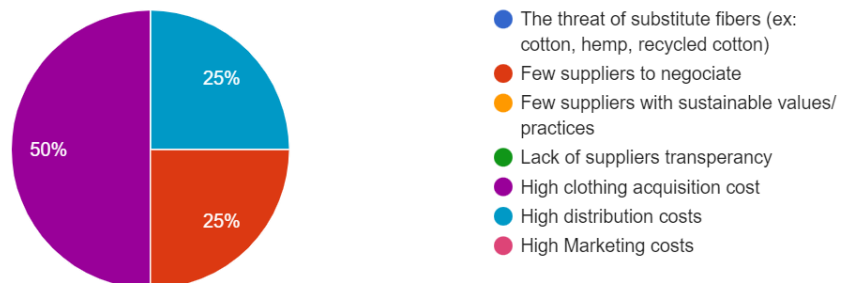
4 respostas



12. What is the biggest threat for your current business with linen clothing?

Copiar

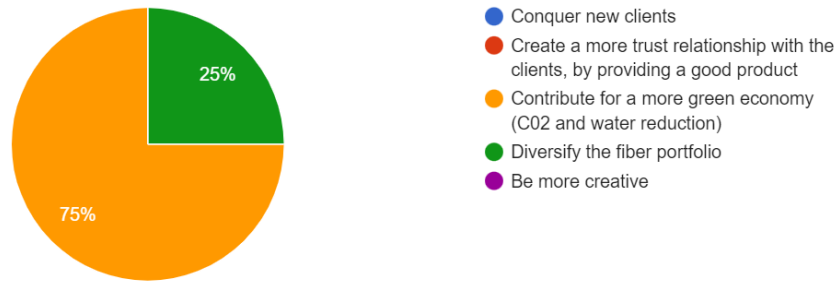
4 respostas



13. What is the biggest opportunity for selling clothing linen?



4 respostas



14. Do you have a long term sustainable plan? Which one?

4 respostas

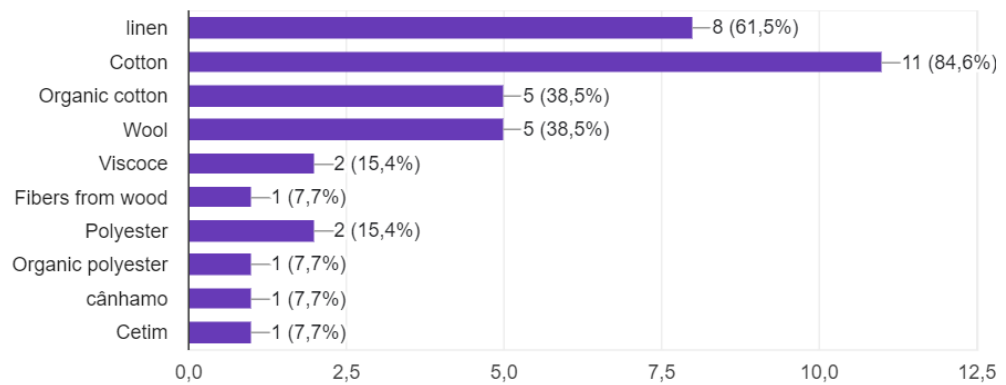
- To thrive and to keep our business going.
- No
- No :)
- you can learn all about our sustainability here <https://naz.pt/pages/sustainability>

**Second Survey: Designers and Designers Professors (a total of 11 answers)**

1. Which fabrics do you like more to work on it?

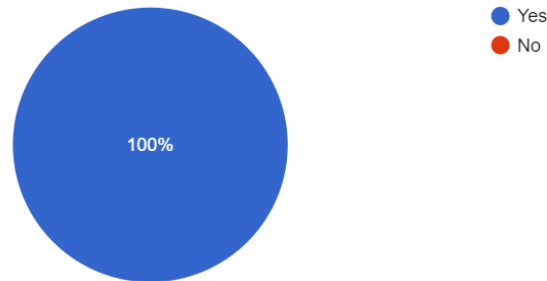


13 respostas



2. Knowing that linen is a natural fabric, such as cotton and silk, would you be more interested in working with linen, concerning the environmental issues that the world is facing today?

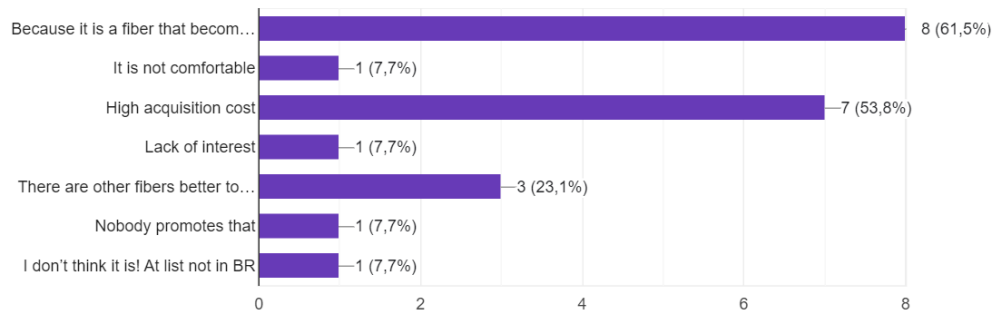
13 respostas



3. According to European Confederation of Linen and Hemp (CELC), nowadays linen market represents only 1% of all global fibers. Why do you think linen is a small market in fashion industry?

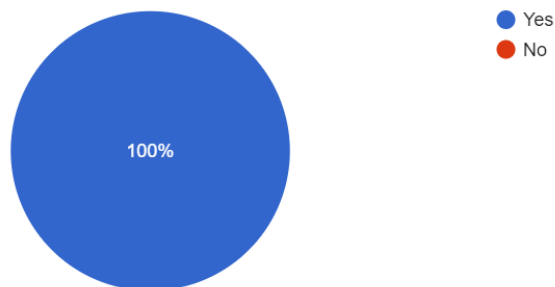


13 respostas



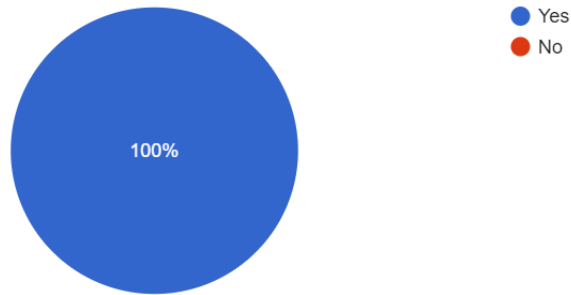
4. Would you be interested in working with Portuguese 100% linen?

13 respostas



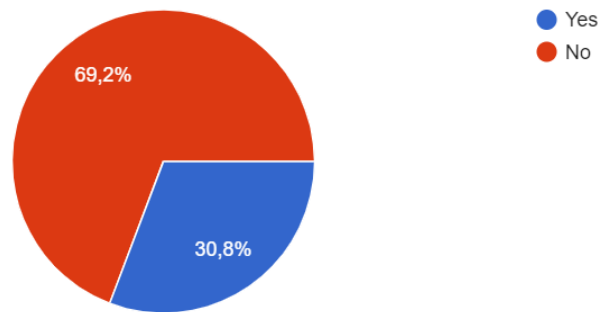
5. Do you think designers have a role in increasing awareness about sustainable fibers?

13 respostas



6. Do designers want to work only with natural and sustainable fabrics?

13 respostas



7. Why?

13 respostas

Because of the requested performance of textiles

Depende dos materiais sustentáveis uma vez que o algodão, por exemplo, gasta imensa água, logo, apesar de ser natural é mau para o ambiente e, especialmente os materiais que vêm de plantas, são usados pesticidas que estragam o solo. Materiais sustentáveis torna-se relativo quando se olha para a forma como são produzidos e muitas vezes dizem que os utilizam mas depois não utilizam materiais sustentáveis.

Por causa do preço dos materiais!! Poucos estão disposto a investir poucos tem budget para investir

Not sure if they care about those things to be honest, although its something everyone should be aware of.

Because sometimes there are textures and characteristics that only synthetic fabrics have

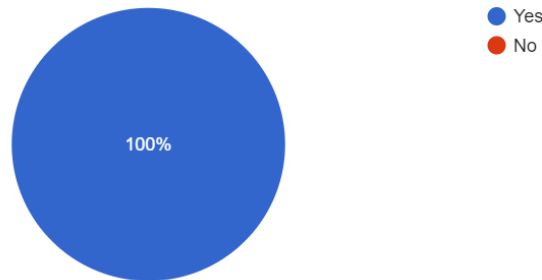
Better for the environment

awareness and environmental consciousness



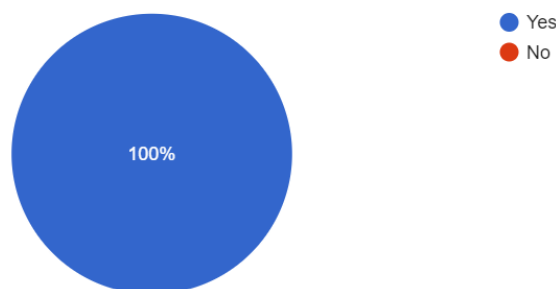
8. Linen fiber has very high features: is soft, resistant, durable, comfortable in touch, breathable and good moisture absorbent. The only downside is that becomes wrinkled and is still considered an expensive fiber because of the long process it takes to transform the fiber into a clothing yarn. Do you think consumers would buy more clothes made with linen fiber if they knew its potential and it was a sustainable fiber?

13 respostas



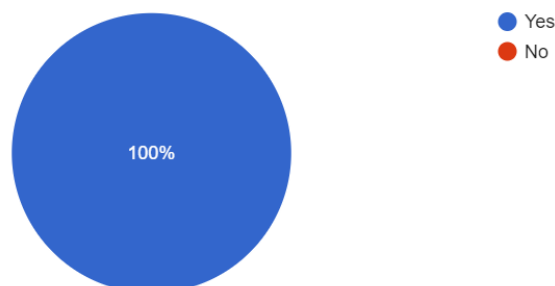
9. Circular economy (CE) is one "that is restorative or regenerative by intention and design", It replaces the concept of the end-of-life of a product with one that emphasizes reuse, repair, remanufacturing or recycling ". Do you think it is important for designers to have educational courses about circular economy?

13 respostas



10. In recent years, a number of design-for-sustainability concepts around cutting waste and circularity of materials have emerged, from utilizing scraps in garments, recycling them into new yarns and reusing old pieces and give them a new life. Do you think you would chose to work in a company with a sustainable mindset, instead of working in a company where the focus is in the style of clothing and making seasonal pieces?

13 respostas



11. Researches say that designers should focus more on the selection of materials and in prolonging the life of products/materials and less in products aesthetic. According to them,"the new creativity lies on circular economy process". Do you agree with this statement?

13 respostas

