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From Wheat to Innovation

A study of traditional and alternative flour markets

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Summary

Introduction:

The traditional use of wheat flour has long dominated the culinary world, serving as an ingredient for several recipes. Breakfasts, lunches, and dinners often involve the consumption of flour products such as bread, pasta, and pizza. It is, in fact, an excellent source of nutrients including proteins and fibers required by our bodies to ensure growth and health.

However, as time passes and new products come into the market, society's needs and preferences may change. In recent years, as the global population continues to rise and environmental issues intensify, the interest and the demand for alternative flours in the culinary world have increased. Alternative flours represent a sustainable option to address environmental problems associated with conventional wheat flour production, which often relies on intensive agricultural practices, extensive water usage, and chemical inputs. The remarkable shift in consumer preferences is also moved by dietary needs, especially for people suffering from wheat-related allergies and intolerances. To these ends, alternative flours such as ancient grains, legumes, nuts, seeds and root vegetables flours have emerged in the last years.

This dissertation aims to investigate and explore the alternative flour market by evaluating its potential, profitability, and growth opportunity, with particular attention on Circular Fiber, a startup searching for its own space in the market.

To the objective of this study, the first chapter involves the analysis of the traditional flour market performed through Porter's five forces and the identification of the main competition drivers of this industry. The second chapter delves into the sector of alternative flour by studying the tendencies and the market factors that drive their adoption, analyzing the costs and the returns, and identifying the opportunities and challenges of this industry. Chapter 3 focuses on the financial perspective of this market and the evaluation of financial returns, operating margins, and costs. To evaluate alternative flour appeal in the market, the fourth chapter contains a commentary on consumers' perceptions and preferences based on their answers to a questionnaire, together with the opportunities and challenges of the market. The last chapter involves a study case of Circular Fiber, an innovative startup in the field of

alternative flours. The analysis starts with the description of the company and its products, followed by the 4C framework to identify its competitors, costs, capabilities, and customers, and completed with an exploration of possible commercial and productive partnerships, as well as potential strategies of fundraising.

In order to accomplish these purposes, a combination of qualitative and quantitative research methods has been employed. These include the analysis of market trends and data, the application of theoretical models, and interviews with industry experts and customers. By synthesizing its main findings, this dissertation contributes valuable insights into the current state and prospects of the alternative flour market. Ultimately, by understanding the dynamics of this industry, it is possible to pave the way for a more diverse and sustainable future for food.

CHAPTER I: The analysis of the traditional flour market

1.1 Different types of wheat flour

Flour is a food product with a powder consistency obtained from the grinding of grains, particularly wheat, and it represents one of the most popular food ingredients in the world.

There are two main categories of wheat flour: soft wheat flour and durum wheat flour. Soft wheat flour is the classic white-colored flour with little granules and rounded edges, obtained from soft wheat and containing a low gluten percentage. People usually employ soft wheat flour for preparing bread, pasta, and leavened products like cakes or pizza. Durum wheat flour, obtained from semolina, has a yellow-amber color, which is then transmitted to the products. Durum wheat flour contains more proteins and gluten than soft flour and is less extendable and tougher; these characteristics make it suitable for the preparation of bread and pasta. However, the flour distinction does not limit to soft and durum wheat but also to the degree of extraction. Flours derived from low extractions (50% milling[1]), labeled in Italy as type 00, have characteristics of whiteness and purity and are mainly made from the central part of the grain. Type 00 flour consists only of starches and proteins, resulting in a lower content of minerals, vitamins, and fiber. It is highly recommended for the preparation of pasta. Differently, flours that undergo a certain degree of extraction (around 72-85%[2]) are labeled as flour type 0, type 1, or type 2. They are less refined than type 00 flour as they also contain flour from the outer part of the grain. Type 0 flour, obtained from semolina, appears white, has a high starch but a low protein content; it is ideal for making bread. Type 1 and 2 flour are darker than type 00 and 0 due to the presence of bran, starches, and proteins; they are highly recommended for preparing pizza. Finally, there is whole-wheat flour, which is not composed of 100% wheat but still contains a high level of bran. Indeed, it is the most complete flour from a nutritional point of view.

1.2 The global traditional flour market

From a global perspective, the flour market reached $160 billion in 2020 and is expected to grow at a CAGR of about 4% yearly until 2026, reaching $194 billion of market size.[3] Factors

[1] Foodu, «Tipi di farina di grano tenero». www.foodu.it
[2] Foodu, «Tipi di farina di grano tenero». www.foodu.it
[3] Business coot (2021). «The flour market – Italy». www.businesscoot.com

contributing to this prediction are population growth, increasing disposable incomes, rising consumption of bakery products, and change in lifestyles. Indeed, its widespread popularity comes from the low-fat content and the numerous health benefits associated with its consumption. Wheat flour finds extensive applications also in the production of paper, shampoos, conditioners, and adhesives, but the food industry exhibits a clear dominance in the market. Over the past three years, a series of events, including the Covid-19 pandemic and the recovery post-pandemic, Russia's export tariffs, and the Ukrainian war, have destabilized the global macroeconomic landscape. The combination of these has led to a substantial rise in prices for several commodities, including agricultural products like cereals. Of particular relevance is the global role held by Russia and Ukraine, the two countries involved in the ongoing conflict. In fact, they jointly represent approximately 15% of the supply and 30% of the export[4], contributing to the rise of soft wheat prices. As evidence of this, one should note that the increase in wheat prices began in 2021 and became more evident in 2022. In the last year, prices have slightly declined but remained above the average values of the previous five-year period. In 2021, global soft wheat harvests reached over 750 million tons, with a growth of 1.3% compared to 2020. Global demand also increased by 1.2%, but it remained below the supply levels, resulting in a slight recovery of stocks.[5] Despite these market fundamentals, the rise in the price of raw materials consequently led to a significant increase in the wholesale price of soft wheat flour. Indeed, the milling industry has to cope with cost increases not only in soft wheat but also in energy and logistics, accounting for over 80% of its production costs.[6] Figure 1 shows the evolution of soft wheat prices at origin, while Figure 2 shows the evolution of wholesale soft wheat flour prices.

[4] ISMEA – Tendenze frumento tenero (Agosto 2022)
[5] ISMEA – Tendenze frumento tenero (Agosto 2022)
[6] ISMEA – Tendenze frumento tenero (Agosto 2022)

Figure 1: Evolution of soft wheat prices at origin (euro/tons)

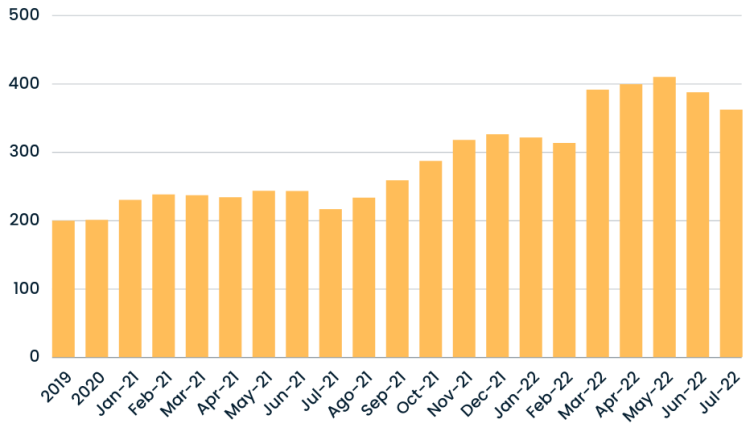
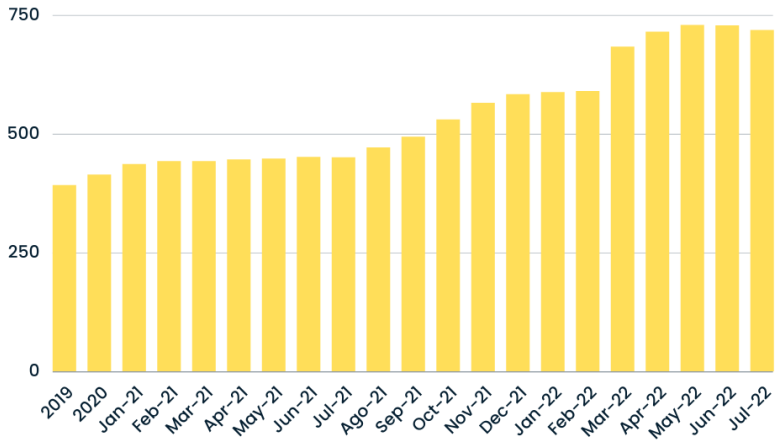


Figure 2: Evolution of wholesale soft wheat flour prices (euro/tons)



On the geographical front, the European Union concentrates almost 20% of global wheat production and is among the main exporters, with about 18% of the total. For the USA, soft wheat production represents an average of 6% of the total production and 12% of global exports, while Canada produces on average 3% of global wheat harvests and satisfies approximately 10% of global demand. Russia and Ukraine, as previously stated, jointly count for the 30% of exports.[7] Even Australia plays an important role in terms of exports, with 13% of the total. Asia-Pacific Region represents the largest wheat flour market, holding most of the market share.[8] This can be attributed to the large population in countries such as China

[7] ISMEA – Scheda Cereali 2022

[8] Mordor Intelligence (2022). «Wheat flour market size and share analysis – growth trends and forecasts». www.mordorintelligence.com

and India, which led to a rise in the overall consumption of flour. Moreover, the increasing adoption of Western food such as pizza, burgers, and pasta is driving the high demand for wheat flour. For instance, China consumed about 148.5 million metric tons and India 104.2 million metric tons of wheat between 2021 and 2022.[9]

The wheat flour market is highly fragmented, with many players in the industry. Key players are continuously involved in extensive research and development activities, as well as in investing in nanotechnology integration in wheat farming. The major players in the global wheat flour industry include Wudeli Flour Mill Group (China), Ardent Mills (US), Archer Daniels Midland Company (US), General Mills (US), and Allied Pinnacle Pty Limited (Australia).

Wudeli Flour Mill Group, established in 1989 in China, produces, processes, and distributes wheat flour and related products in 19 production plants. It has a daily processing capacity of 45,000 tons, planning to increase it to 80,000.[10] The company's winning strategy is to achieve growth by satisfying the needs of customers, farmers, employees, its country, and its enterprise. To accomplish this goal, Wudeli focuses on innovative development and quality control. Ardent Mills is another market leader, established in the US, offering numerous grain-based solutions, supported by more than 35 mills and bakery mix facilities. It has a production capacity of 26,800 tons per day, composed of 98.22% soft wheat flour and 1.78% durum wheat flour.[11] It is owned by ConAgra Foods, Cargill, and CHS through a joint venture. Ardent Mills experienced great financial results in the last years: its sales have increased by 25% from $3.41 billion in 2021 to $4.26 billion in 2022[12], proving an effective hedge against inflation and volatility in wheat markets. Archer Daniels Midland Milling is the second largest flour company in the US in terms of production capacity, which is 15,150 daily tons of soft wheat flour.[13] This firm has been experiencing a consistent growth in revenues over the years; from $64,355 Billion revenues in 2020 and $85,249 Billion revenues in 2021, ADM

[9] Mordor Intelligence (2022). «Wheat flour market size and share analysis – growth trends and forecasts». www.mordorintelligence.com
[10] Buhler Group www.buhlergroup.cn
[11] World-grain (2022). «Grain and milling annual top 10 largest US milling companies». www.world-grain.com
[12] Sosland, J. (2022). «Ardent Mills caps year with strong fourth quarter». www.bakingbusiness.com
[13] World-grain (2022). «Grain and milling annual top 10 largest US milling companies». www.world-grain.com

recorded a value of $101,556 Billion last year, increasing by 57.806%.[14] It is widely known for procuring, storing, and transporting agricultural commodities and products across the world, always caring about sustainability and innovation. Of great relevance is General Mills, an American multinational company known for being a leading manufacturer and marketer of several food products, including flour, both online and in retail stores. According to the latest annual report, General Mills generated almost $19 billion in net sales.[15] Another flour leader is Allied Pinnacle, an Australian firm engaged in the production and supply of flour, bread, and cake mixes to small and large food manufacturers. Allied Pinnacle is owned by Nisshin Seifun Group, which also owns Nisshin Flour Milling, the largest flour miller in Japan. It is Australia's largest end-to-end bakery ingredient supplier with a strong presence in flour, with annual sales of about $750 million.[16]

1.3 The Italian traditional flour market

As for the Italian market, it boasts an ancient tradition of excellence in the milling sector. With continuous stability and some periods of growth, it is the third-largest wheat producer in Europe, after Germany and France. The presence of 290 mills and around 300,000 wheat farmers in the country allowed the production of 4,062,000 tons of soft wheat flour and 4,066,000 tons of semolina in 2022.[17] The obtained flour was then used to produce bread and substitutes (2.315.000 tons), biscuits and leavened products (798.000 tons), pizza, pasta, and other usages (355.00 tons), domestic usages (215.000 tons), exports (285.000 tons), and pasta (94.000 tons).[18] However, the Italian milling industry has been facing some challenges over the years: it has a structural dependence on foreign products for both soft wheat and durum wheat, which can also be attributed to the competitive and organizational issues in the domestic production. Given the structural imbalance between supply and demand for raw materials, the country resorts to imports, especially from Canada, to fill the gap. Northern Italy owns the largest number of soft wheat mills, followed by Central Italy and the South of Italy. From this point of view, the most relevant region is Piemonte, counting 35

[14] Shahbandeh, M. (2023). «Revenue of agricultural company Archer Daniels Midland from 2006 to 2022». www.statista.com
[15] Wunsch, N. (2023). «General Mills – statistics and facts». www.statista.com
[16] Scroeder, E. (2019). «Nisshin to acquire Australia's Allied Pinnacle». www.bakingbusiness.com
[17] ITALMOPA (2022). «Economia del settore: l'industria molitoria italiana nel 2022».
[18] ITALMOPA (2022). «Economia del settore: l'industria molitoria italiana nel 2022».

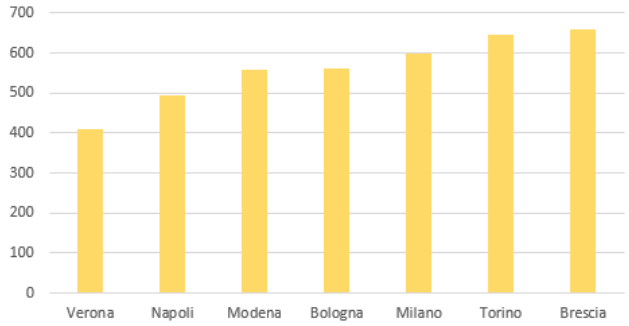
milling plants, followed by Emilia Romagna, and Veneto, counting respectively 32 and 22 milling plants.[19] On the other hand, Southern Italy accounts for the largest number of durum wheat flours, with Sicily counting 37 mills. The production of soft wheat flour is 4 million tons per year on average. In 2020 there was a decline in the annual production, mainly due to a significant contraction in the bakery and restaurant sectors caused by lockdown measures. The decline was partially offset by the growth in the domestic consumption, but it only accounts for a limited share of total purchases. For what concerns durum wheat flour, its production fell from 2020 and 2021 by 8.5% due to the contraction in the demand for semolina used for pasta, experiencing a decline in both domestic (-7.8%) and export markets (-11.7%).[20] Generally, the annual production of durum wheat flour ranges from 3.5 to 4 million tons. Despite the rise in average prices (due to the increase in raw materials price and energy expenses) the revenues of the Italian flour market amount to 4.3 billion euros in 2021, 11.4% higher than the previous year. The increasing demand for soft wheat flour (+4.7% for leavened products and +9.7% for pizza) has in fact contributed to the increase in the revenues for that type of flour, rising by 12.5% between 2020 and 2021 and reaching euro 2 billion.[21] An increase in revenues happened also for durum wheat flour, which, given the increase in raw material and consequently flour prices, rise by 10.4% from 2020 to 2021, reaching 2.2 billion euros.[22]

For what concerns prices in the Italian market, we can distinguish the differences in wholesale prices according to the place and the flour varieties considered. Figure 3 represents the price per ton of soft wheat flour (type 00) from the lowest to the highest value. The lowest price can be found in Verona (409 euro/t), followed by Napoli (495 euro/t), Modena (559 euro/t), Bologna (560 euro/t), Milano (600 euro/t), Torino (645 euro/t), and Brescia (660 euro/t).[23] By further analyzing the data provided by Ismea, it was interesting to notice the relevant difference between prices of June 2022 and prices of June 2023. In June 2022, the average price of soft wheat flour was 728.31 euro/t, while in June 2023 it is 567.78

[19] ISMEA, (2022). «Scheda cereali»
[20] ISMEA, (2022). «Scheda cereali»
[21] ISMEA, (2022). «Scheda cereali»
[22] ISMEA, (2022). «Scheda cereali»
[23] ISMEA, «Soft wheat flour: wholesale prices». www.ismea.it

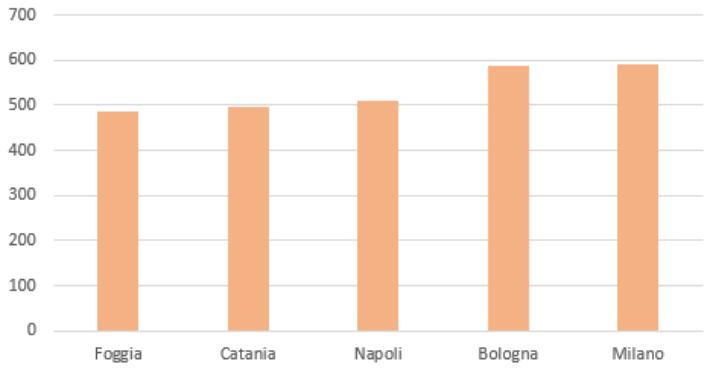
euro/t, decreasing by 28.273%.[24] The reason, as stated before, can be found in the price crisis of 2022 given to the Ukraine-Russia war and to financial speculation.

Figure 3: Price of soft wheat flour (Italian market, June 2023)



On the other hand, Figure 4 depicts the price per ton of durum wheat flour from the lowest to the highest value. One may find the lowest value in Foggia (485 euro/t), followed by Catania (495 euro/t), Napoli (510 euro/t), Bologna (587.5 euro/t), and Milano (592.5 euro/t).[25] Even for durum wheat flour prices dramatically changed from 2022 and 2023. In June 2022, the average price for durum wheat flour was 778.9 euro/t, while in June 2023 it is 558.5 euro/t, with a decrease of 39.463%.[26]

Figure 4: Price of durum wheat flour (Italian market, 2023)



1.4 Costs for the traditional flour market

The costs that traditional flour companies incur in doing their activities do not limit to raw materials. Indeed, several additional items contribute to the general costs of wheat

[24] ISMEA, (2022). «Scheda cereali»
[25] ISMEA, «Durum wheat flour: wholesale prices». www.ismea.it
[26] ISMEA, (2022). «Scheda cereali»

transformation and flour production. Through a questionnaire directed to a sample of companies, in 2019 Ismea investigated and estimated the production costs for soft wheat and durum wheat flour. The selection of the target sample takes into account the processing capacity: large mills with processing capacity greater than 200t/24h and small mills with processing capacity smaller than 200t/24h. For the purpose of this analysis, only large mills will be included.

Large soft wheat mills have an average processing capacity of 600t/24h with an average turnover of €51.8 Million. Moreover, their average volume of soft wheat processed corresponds to about 153 thousand tons per year, with 117 thousand tons of soft wheat flour produced yearly. The flour sales for these companies are mainly directed to the confectionery industry for 35.1%, wholesale intermediaries for 16.8%, and large-scale retail chains for 15.5%. To a smaller extent, they are sold to industrial and artisan bakeries, respectively 10.4% and 11.9%. For large soft wheat flour companies, the average revenues amount to €48 Million, while production costs amount to €47 Million, which are composed of the purchase of soft wheat grain (73.6%), labor (5.1%), packaging materials (3.8%), energy (3.6%), and the remaining by other variable expenses. Fixed costs amount to €5.2 Million, 11.2% of total costs.[27]

Large durum wheat mills have an average processing capacity of 544 t/24h and generate average revenues of €56 Million. The average durum wheat processed volumes amount to 169 thousand tons yearly, while the average production of semolina and durum wheat flour is 127 thousand tons yearly. The obtained durum wheat flour is primarily intended for the production of pasta (29.6%), artisanal and industrial bread (26.7% and 18.7%), artisanal pasta makers (8.1%), intermediaries (5.4%), and large-scale retailers (2.8%). The average revenues amount to €48.6 Million, while production costs reach €47.7 Million. Among total costs, 84.1% derives from the purchase of durum wheat grains, 2.5% from labor, and 3.9% from energy expenses, while the remaining derives from other variable expenses. Fixed costs reach €1,7 Million, representing 3.7% of total costs.[28]

[27] ISMEA, (2019). «I costi di produzione delle industrie di trasformazione del frumento»
[28] ISMEA, (2019). «I costi di produzione delle industrie di trasformazione del frumento»

Based on the data of the analyzed companies, durum wheat mills generate higher revenues and pay less fixed costs on average, while soft wheat mills pay slightly less variable costs.

1.5 Flour industry main competition drivers

To have a complete overview of the traditional flour market, this part of the chapter studies the main competition's drivers and the Porter's five forces analysis, both from an Italian point of view. The main competition's drivers is an analysis of high relevance, as it allows one to determine competition levels within an industry and firms' behavior and margins. Among the factors contributing to this analysis, one may find the differentiation of products, number of firms, switching costs, market growth levels, storage costs, exit barriers, and fixed costs.

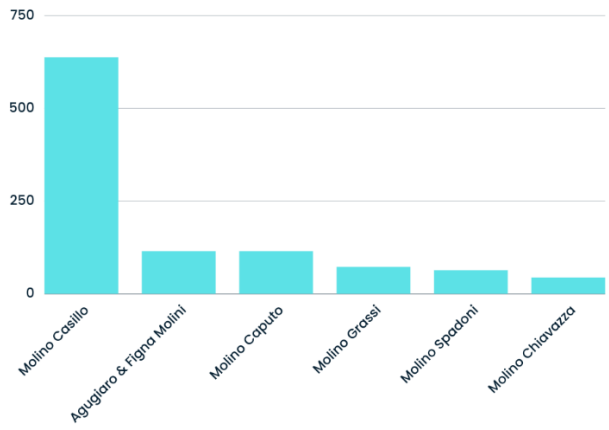
For what entails product differentiation, the Italian market is known for its diverse range of flour types and quality, with a rich tradition in wheat cultivation and milling. Different types of flour exist according to the various processing levels, fiber percentage, milling techniques, and protein content. The resulting flours are type 00 flour, type 0 flour, type 1 flour, type 2 flour, and whole-wheat flour, but one should also consider the diffusion of special flours over the last few years. Moreover, it is of great importance how companies are differentiating their products also in terms of packaging and attention to sustainability. Thus, the differentiation of products in the flour market is high.

Another factor determining competition levels is the number of firms acting in the industry. The Italian market consists of a large number of firms, ranging from large-scale industrial companies to small and medium-sized enterprises. However, this statement does not surprise considering the long-standing tradition, rich culinary heritage, and importance of bread and pasta in the Italian diet. To have an idea of the market leaders in this field, Figure 5 identifies Italian flour companies with the highest turnover in 2021. All the data are gathered from the annual reports of the considered companies. Molino Casillo takes the leadership position in the market with €637 million in revenues.[29] Other important companies in the Italian market scenario are Agugiaro & Figna Molini (€114.48 million in revenue),[30] Mulino Caputo (€112.84 million in revenue),[31] Molino Grassi (€72.56 million in

[29] AIDA. Molino Casillo's financial statement. https://aida-r1.bvdinfo.com/
[30] AIDA. Agugiaro & Figna's financial statement. https://aida-r1.bvdinfo.com/
[31] AIDA. Mulino Caputo's financial statement. https://aida-r1.bvdinfo.com/

revenue),[32] Molino Spadoni (€63.2 million in revenue),[33] and Molino Chiavazza (€43 million in revenue).[34] Overall, considering the high number of market players, the competition levels of this industry are high.

Figure 5: Revenues of the flour market leaders (2021)



Switching costs for the flour industry, do not have a specific value; they depend on many elements such as the company size, quantity needed, geography distances, transportation costs, costs for new contract negotiations, and even the impact on raw materials costs. Thus, it is complex to establish whether switching costs are high or low in the flour market.

Concerning market growth, the traditional flour market is in a mature stage of development. Consequently, a stable path with some periods of growth characterizes this market, especially the Italian one. Durum flour's production volume decreased between 2020 and 2021 (from 4.21 to 3.88 t), while it increased for soft wheat flour (from 3.88 to 3.93).[35] However, there is a linkage between the growth potential of the flour market and the market of alternative flour, which is experiencing a positive trend, given the increasing awareness and information about healthy diets. While the traditional flour market may not have an expected increasing market growth, the alternative flour market does. Overall, we can state that the considered industry follows a low market growth, as it is in a mature stage of development. Hence, the level of competition from this point of view should be high.

[32] AIDA. Molino Grassi's financial statement. https://aida-r1.bvdinfo.com/
[33] AIDA. Molino Spadoni's financial statement. https://aida-r1.bvdinfo.com/
[34] AIDA. Molino Chiavazza's financial statement. https://aida-r1.bvdinfo.com/
[35] ISMEA (2022), «Scheda cereali»

The amount of storage costs contributes to detect competition levels and depends on multiple factors. One of the main expenses for flour companies is warehouse renting or leasing, the price of which is contingent on the size, the location, and the duration of the lease. Indeed, the size of the building should be in line with the storage capacity required by the company, depending on the production volume, inventory levels, and market demand. The larger the storage capacity, the larger the costs needed for renting or leasing the facility. Additionally, flour companies often require the purchasing and maintenance of specialized equipment for handling and storing their products, including packaging machinery, storage silos, and conveyor systems. Another investment to consider is ensuring product safety through surveillance systems installation, fire suppression equipment, and other safety measures within the warehouse. Even transportation costs can raise the value of storage costs, subject to the distance between production facilities and storage sites, but also the location of the flour mills and distribution centers.

Storage costs influence the degree of competition in an industry, but they represent only a part of a company's fixed costs. As with many other elements, fixed costs depend on the scale of operations, production capacity, and business model; but flour companies usually incur some common fixed costs. They include the purchasing or leasing of production and storage facilities, the construction and renovation of buildings, as well as the installation of the necessary machinery and equipment. Of relevance are also all those ongoing costs for utilities such as electricity, water, heating, and ventilation, but also some administrative expenses such as office space rental, salaries for administrative staff, and accounting and bookkeeping services. Flour companies may also face some fixed costs derived from investments in technology and software systems to streamline their operations, manage inventory, or track production, as well as equipment to comply with quality standards such as moisture analysis or gluten testing. In order to evaluate fixed costs faced by flour companies, we will delve into some data. According to the Ismea Mercati survey that we previously saw to assess the costs for traditional flour companies, average fixed costs for soft wheat flour companies amount to €5.2 million, representing 11.2% of total costs, while for durum wheat flour companies they amount to €1.7 million, representing 3.7% of total costs.[36] In light of these data, one may state

[36] ISMEA, (2019). «I costi di produzione delle industrie di trasformazione del frumento»

that fixed costs in the flour industry are generally low – especially for durum wheat flour companies - with consequently higher competition levels.

The last factor contributing to the study of the industry competition levels is exit barriers, making it difficult for a company to leave a particular market. The higher the exit barriers, the less intense the competition level. Fixed costs, previously analyzed, are one of the main components of exit barriers; other crucial elements are all those long-term contracts with suppliers, distributors, and customers creating commitments and obligations, which make it challenging to leave the market without incurring penalties or legal consequences. Moreover, of great significance are all those established relationships with farmers, grain suppliers, and other intermediaries, which are hard to extricate or regain in case of re-entry. Furthermore, flour companies are subject to regulations and compliance requirements like food safety and labeling, and as such, one has to consider all the costs and complications before leaving the market. Finally, exiting the industry may imply losing the value-added associated with the brand and the loyalty of the customer base, simultaneously allowing competitors to gain the market shares left by the exiting company. Considering that fixed costs are generally low and that all the above-mentioned factors vary according to the company and the time period considered, exit barriers for the traditional flour industry are between low and medium.

What emerges from the analysis of the main competition drivers is the high competition level of the traditional flour market, mainly due to the presence of a large number of firms, slow market growth, low storage and fixed costs, and low exit barriers. High levels of competition can have several effects and consequences for the market players. First of all, competition drives companies to offer lower prices to attract customers and gain market shares, and while this trend may benefit buyers (they would have a broader selection of products at a lower price), it may harm companies. In fact, to maintain competitive prices, firms have to lower profit margins, improve operational efficiency, or potentially acquire or eliminate weaker competitors. In this case, the result is the formation of dominant market leaders and industry concentration. Nonetheless, high competition also means improved quality and innovation, as firms develop new products, technologies, or marketing strategies to differentiate themselves from competitors.

1.6 Porter's five forces

The Porter's five forces model aims to identify the intensity of five different forces: the bargaining power of suppliers, the bargaining power of buyers, and the threat of new entrants, competitors, and substitutes. These forces refer to the industry as a whole and define its level of competition, the intensity of which influences and determines the profitability of companies operating in that field.

The bargaining power of suppliers assesses the force of sellers of the sector, including grain producers, wheat farmers, and distributors. Their power extremely depends on the average costs of raw materials, the concentration of suppliers, and the switching costs. The price of raw materials such as durum and soft wheat has decreased in the last year. However, as already explained, raw material prices are lower, but still higher than before the Ukrainian war and the COVID-19 pandemic. From May 2022 to June 2023, durum wheat prices decreased by 59.2%, going from 493.88€/T to 310.22€/T.[37] On the other hand, soft wheat prices decreased by 53.93%, going from a value of 383.1€/T to 248.87€/T.[38] One may notice that, on average, prices for durum wheat are higher than for soft wheat. Later in Chapter III, we will delve into the analysis of the profitability of traditional and alternative flour companies. What evinces from that examination is that traditional flour companies have as major costs raw materials, and their proportion with respect to total costs is increasing over the years. The motive is that, as they rely on a unique source of raw materials, it is complicated for them to control prices, and this affects negatively their margins. Consequently, we can affirm that the bargaining power of suppliers is high for the traditional flour market.

For what concerns buyers, the higher their power, the higher the influence they might have over pricing and contract terms. Buyers in the flour market include food manufacturers, bakeries, and retailers, while their degree of power depends on the concentration of buyers, the availability of substitute products, switching costs, and price sensibility. Switching costs for buyers, as it works for suppliers, might vary according to elements like the company's size, geography distances and transportation costs, and new contract negotiations.

[37] ISMEA. «Prezzi medi mensili per prodotto – Frumento duro». www.ismea.it
[38] ISMEAi. «Prezzi medi mensili per prodotto – Frumento tenero». www.ismea.it

Nevertheless, a buyer generally holds remarkable bargaining power if he detains a significant share of the market of the considered company. In fact, buyers of this field are among those that hold the greatest bargaining power, given the production concentration and the significant quantity of flour that each operator requires, which often results in the demand for standardization and quality of products. Indeed, traditional flour is quite a standardized product compared for example to alternative flour, thus consumers can easily switch from a product to another. A way to cope with the power of buyers is through forward integration, which involves acquiring or controlling distribution channels, allowing the company to gain more control over pricing and market access. For example, the famous flour producer Molino Caputo was able to attract new buyers in 2020 by not limiting the flour sale to the retail level, but reaching also the large distribution by selling packages of 1 and 5 kg of flour in many famous supermarkets like Carrefour.[39]

New entrants might damage existing players as they can increase competition levels in the industry. However, entering a sector may be challenging depending on the barriers to entry, technologies required, economies of scale, brand loyalty, access to distribution channels, and government regulations. Generally, new entrants do not represent a particular threat in the flour market. The production of flour involves significant economies of scale, an advantage that established companies have, benefiting from large production quantities at lower costs. Flour milling also requires substantial capital investments in facilities, equipment, and technology. New entrants may struggle to achieve costs efficiencies and to match other companies' capabilities without significant resources at the beginning. Well-known and established flour brands also enjoy a better knowledge of distribution networks and strong brand loyalty.

Substitute products of traditional flour are alternative flours such as rice, almond, corn, and spelt flour. They might threaten traditional flour if used as a combination or as a substitute for traditional flour in the preparation of bread, pasta, and other type of food. Indeed, the more convenient and high-quality the substitute product, the lower the sector profitability. In Chapter II, we will see that retail prices for alternative flour are higher than traditional

[39] Pizza Tales. «Antimo Caputo e la farina di Napoli». www.pizzatales.it

flour prices: average traditional flour prices range from 1 to 2€ per kg, while some alternative flour prices can exceed 20€/kg. Thus, substitute products often represent a preferred choice over traditional flour if we consider health: most alternative flours are gluten-free, suitable for individuals with celiac disease or for people with wheat allergies. If we consider traditional consumers with no specific dietary needs, they will probably prefer traditional flour over alternative one especially for the cost advantage, but also for the fact that alternative flours do not always directly substitute traditional flours but require recipe modifications to achieve the desired result.

The threat of competitors is the fifth Porter's force and examines the intensity of the competition among existing players. The factors that most contribute to rivalry include the size and number of competitors, differentiation, industry growth rate, and customer loyalty. As stated before, the traditional flour industry finds itself in a mature stage of development, with slow or stable growth. Moreover, the traditional flour industry is characterized by a large number of competitors. Therefore, companies face more competition and use price or product differentiation strategies to obtain rival market shares. Nevertheless, as price differentiation drives prices of the entire sector down, companies usually adopt product differentiation strategies. An example comes from Molino Rossetto, an Italian company that has developed a new packaging line since it has chosen to sell its products through large distribution. The idea was to distinguish from the style of classic flour products to be better recognizable and innovative while caring about sustainability by using paper from sustainably-managed forests.[40]

Overall, we can state that the most powerful force representing a threat for traditional flour companies is the power of suppliers, followed by competitors' rivalry and the power of buyers. The threat of substitutes can be categorized as medium, while the threat of new entrants as low.

[40] Posizionamento Attivo. «Molino Rossetto: quando la mission è una strategia vincente». www.posizionamentoattivo.it

CHAPTER II: The alternative flour market

In recent years, there has been a growing trend toward alternative flour in the market. Consumers are increasingly becoming health conscious, searching for dietary options able to satisfy specific needs. Indeed, alternative flours derive from various sources - such as nuts, seeds, legumes, and ancient grains – that offer several nutritional benefits and unique flavors. The shift in consumer preferences led to a significant increase in the demand for alternative flours. This chapter explores the key trends and opportunities, delving into an analysis of the key players, costs, and differentiation elements of this dynamic industry. As previously stated, there exists a multiplicity of alternative flours, which will be discussed before examining their market.

2.1 Different types of alternative flour

Rice flour, obtained by grinding rice, has a soft texture and fine consistency; it is easily digestible and ideal for people with gluten intolerance. Primarily used for making bread, rice flour contains less than 1% fat and provides calcium, iron, and vitamins.[41]

Chickpea flour is realized through drying and grinding; it promotes proper digestion and is often included in weight-loss diets thanks to the presence of lecithin, which helps eliminate excess fat from our bodies.[42] Chickpea flour is gluten-free and ideal for vegans as an egg substitute since it acts as a binder without compromising the taste. It can be used in various savory and sweet recipes: it is excellent for pizza, cakes, cookies, vegetarian burgers, crepes, and meatballs. It is quite expensive, but one can produce it at home. Chickpea flour is the top selling product in the global alternative flour market: it will continue to dominate the market and growing by a CAGR of 5.4% during the next ten years.

Oat flour is extremely versatile, known for its high fiber content, which provides a prolonged feeling of satiety while maintaining energy levels. It promotes heart health through a combination of fibers, and its low glycemic content helps regulate blood sugar levels.[43] Like chickpea flour, oat flour can be used for the preparation of both savory and sweet products.

[41] Viani, M. (2022). «Viaggio nel mondo delle farine alternative». www.famelici.it
[42] Viani, M. (2022). «Viaggio nel mondo delle farine alternative». www.famelici.it
[43] Viani, M. (2022). «Viaggio nel mondo delle farine alternative». www.famelici.it

However, to obtain a proper leavening, it is better to add other flours, such as whole-wheat flour, to oat flour.

Chestnut flour has a hazelnut color and sweet taste and is primarily used for making desserts. It has a high caloric content, which is why it is mainly produced in the Italian Apennine regions,[44] being a key ingredient in many recipes from hilly and mountainous areas. Chestnut flour is beneficial for intestinal bacterial flora and helps combat cholesterol.

Spelled flour is suitable for baking and gives products a distinct taste and a more rustic color. Compared to other cereals, it has a limited caloric intake, although it is rich in proteins and fibers. However, spelled and wheat flours are very similar from a nutritional standpoint. What differentiate them is the digestibility of the product and the sustainability of its cultivation: it can be cultivated without fertilizers or herbicides.[45]

Obtained from the pulp of raw almonds, almond flour is gluten-free, low in carbohydrate content, and rich in nutrients. Among its characteristics, almond flour reduces "bad" cholesterol, regulates blood pressure, and prevents osteoporosis.[46] It has a slightly sweet aftertaste, which makes it perfect for making cakes. It is important to remember that, when using it in recipes, one has to increase the amount of yeast.

Another alternative flour is flax flour, which is beneficial for the body as a natural medicine. It has a yellow-brown color; it is rich in fibers, minerals, and vitamins. It is commonly included in vegetarian and vegan recipes for its protein content and gluten-free nature, usually serving as an egg substitute.[47] Also, it can be used in sweet and savory recipes, often combined with other flours to obtain a more delicate taste. Nonetheless, these are only a part of the variety of alternative flours; corn flour, quinoa flour, hemp seeds flour, grape flour, coconut flour, and soy flour also exist.

In the last period, a new frontier in nutrition was born: flour produced by grinding insects. These flours are highly rich in protein, 100% natural, and consist uniquely of insects, without

[44] Viani, M. (2022). «Viaggio nel mondo delle farine alternative». www.famelici.it
[45] Barberini, I. (2022). «Farina di farro: cos'è, valori nutrizionali, proprietà e benefici, usi in cucina, come farla in casa e ricette». www.melarossa.it
[46] Viani, M. (2022). «Viaggio nel mondo delle farine alternative». www.famelici.it
[47] Viani, M. (2022). «Viaggio nel mondo delle farine alternative». www.famelici.it

the addition of additives or other ingredients. This idea comes from Cricket One, a Vietnamese company that was little-known in Europe, until the authorization of the European Commission for the sale of the company's specific powder, issued some months ago. The insect-based flour is considered as a viable alternative not only to flour, but also to other protein-rich food like beef, which has a high environmental impact. However, this product has not been spread yet and is currently quite expensive due to the limited availability and the additional processing needed to make it more appealing. For this reason and for the general skepticism of adopting it, the insect-based flour market is still to be explored.

Figure 6 compares the average nutritional values of 100g of some alternative flours to soft wheat flour (type 0) and durum wheat flour.

Figure 6: Average nutritional value of alternative and traditional flour[48]

Avg nutritional value (100g)	Corn flour	Rice flour	Quinoa flour	Oat flour	Chestnut flour	Soft wheat flour	Durum wheat flour
Energy (kcal)	362	360	375	401	343	341	314
Carbohydrates (g)	80,8	87	64,2	72,8	76	76	63
Protein (g)	8,7	7,3	14,29	12,4	6	11	12,9
Lipids (g)	2,7	0,5	7,14	7,1	3,7	1	2,8
Vitamin B1 (mg)	0,35	0,05	-	0,52	0,23	0,25	0,42
Vitamin B2 (mg)	0,1	0,04	-	0,17	0,37	0,04	0,15
Vitamin B3 (mg)	1,9	1,4	-	2,4	1	1,2	5,5
Fiber (g)	3,1	1	7,1	6,8	-	2,9	3,6
Calcium (mg)	6	7	36	80	50	18	29
Iron (mg)	1,8	0,4	4,5	4	3,2	0,9	3,5
Phosphorus (mg)	99	90	457	342	164	160	320
Potassium (mg)	130	104	563	371	847	140	418
Sodium (mg)	1	4	14	33	11	2	2

2.2 The global alternative flour market

The alternative flour market reached $26680 million in 2022,[49] and according to market expectations, it will grow at a CAGR of 5.4%, achieving $38720 million in 2029.[50] Like many others, the alternative flour market experienced lower-than-anticipated demand due to the COVID-19 pandemic in 2020. However, since the end of that period, the demand restored to pre-pandemic levels and has high growth expectations. The reason behind this prediction is

[48] Humanitas Research Hospital. www. humanitas.it
[49] QYR Research (2023). «Global alternative flours market report, history and forecast 2018-2029, breakdown data by manufacturers, key regions, types and application».
[50] QYR Research (2023). «Global alternative flours market report, history and forecast 2018-2029, breakdown data by manufacturers, key regions, types and application».

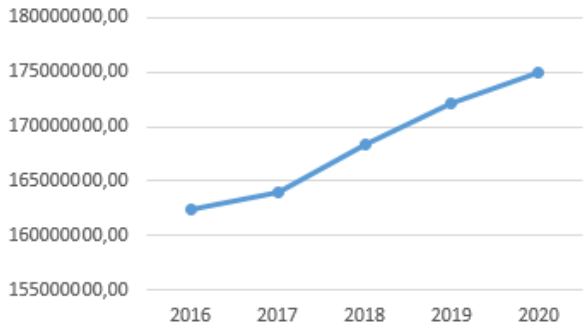
consumers' behavior, which is switching to healthier substitutes for everyday meals containing flour. As they are becoming more and more informed about the various flour options and their uses, the demand for alternative flours is likely to increase. Apart from improving the nutritional value of meals, alternative flours like almond flour allow consumers having diabetes to savor their favorite meals, as they contain low sugar and carbohydrate percentages. Even the increasing prevalence of celiac diseases plays a crucial role in stimulating the growth of the alternative flour market: cases of celiac disease are in fact rising rapidly. Alternative flours like rice, almond, chickpea, and tapioca commonly used as gluten-free substitutes. The sustainability of some alternative flours, such as those made from ancient grains and legumes, is another advantage that helps this market gaining popularity, especially in a period of rising environmental awareness, and among the greatest eco-conscious consumers. Growing and processing alternative flour ingredients may require fewer resources, such as water and land, resulting in lower greenhouse gas emissions, and fewer pesticides and chemical fertilizers, decreasing potential environmental pollution. Moreover, alternative flours usually need less land to be cultivated compared to wheat; this can help conserve natural habitats and reduce land conversion. Alternative flours also require less-energy-intensive processing compared to traditional flour milling, which involves extensive refining and grinding. Finally, the globalization of food culture and cross-cultural influences are exposing consumers to a wide range of flours deriving from various culinary traditions, contributing to their adoption. These key levers are interconnected and can have a crucial effect on the growth and development of the alternative flour market.

According to the Food and Agriculture Organization of the United Nations, the eight most globally produced alternative flours are corn, sorghum, millet, cassava, rye, rice, other cereals, and pulses flour. Corn flour has the highest production volume among all the other alternative flours, with a value of 174,922,717.92 t in 2020, followed by sorghum (25,514,750 t), millet (20,249,701 t), cassava (8,203,832 t), other cereals (6,111,332.66 t), rye (3,509,123 t), rice (1,660,358 t), and pulses (1,200,491 t).[51] Figures 7, 8, and 9 show the trend for global production volumes of the above-mentioned alternative flours, from 2016 to 2020. For simplicity of representation, the trends were split into more graphs according to the

[51] FAOSTAT, www.fao.org

production volumes. Corn flour production volumes follow an increasing trend; a rise of 7.74% characterizes the period 2016-2020. Corn flour is produced in all the five continents; however, the Americas are the leader producer, with 61,079,985 t of flour produced in 2020.[52]

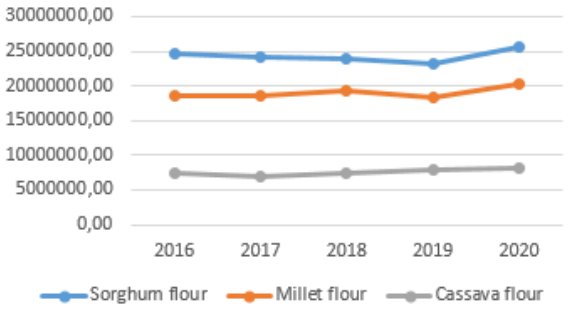
Figure 7: Corn flour global production volume (2016-2020/t)



Sorghum, millet, and cassava flour followed a quite stable path in the period 2016-2020, with cassava flour production volumes being constant also between 2019 and 2020. Sorghum and millet flour experienced an increase in production volumes, respectively of 9.87% and 9.72% between 2019 and 2020. Sorghum flour production happens in all the five continents; however, with 17,422,284.16 t produced in 2020,[53] Africa is the main producer. Millet is produced only in Africa, Asia, and Europe. Africa is the main producer, with 8,094,973.49 t produced in 2020.[54] Cassava flour is produced only in Africa, America, and Asia, with Africa being the first producer (5,210,310.74 t in 2020).[55]

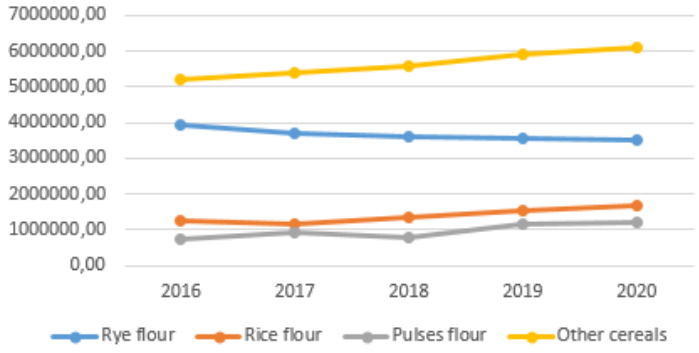
[52] FAOSTAT, www.fao.org
[53] FAOSTAT, www.fao.org
[54] FAOSTAT, www.fao.org
[55] FAOSTAT, www.fao.org

Figure 8: Sorghum, millet, and cassava flour global production volume (2016-2020/t)



The production volume of flour made from other cereals has been increasing since 2016; from that period until 2020, the trend increased by 17.80%. This flour is produced in all the five continents, but Africa is the most important player, with 5,685,381.34 t of other cereals flour produced in 2020,[56] which accounts for the 93% of the total volume of production. The production volumes of rye flour decreased between 2016 and 2020 by 11.61%, while those of rice and pulses flour increased respectively of 31.64% and 65.67%. Rye flour production can be found in Africa, Asia, Europe, Americas, and Oceania, but Europe is the leading producer, with 2,985,698.71 t produced in 2020.[57] All the five continents produce also rice flour; however, as expected, Asia is the main producer, with 1,519,153 t produced in 2020. Like rice flour, pulses flour is produced in all the five continents, with Asia as leading player with 518,924.73 t produced in 2020.[58]

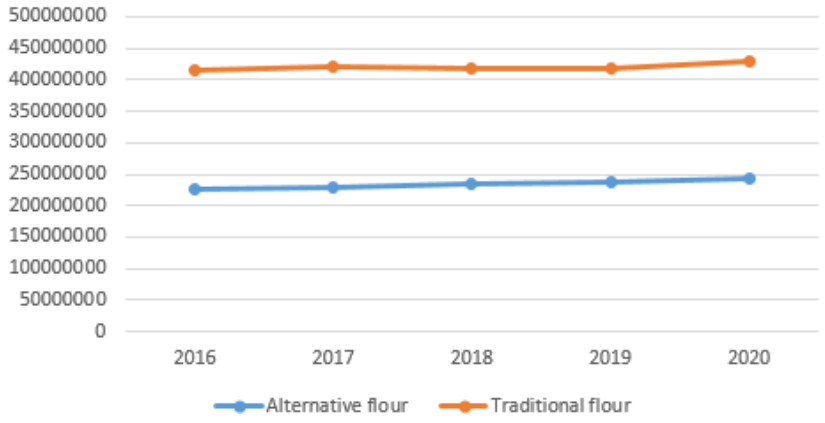
Figure 9: Rye, rice, and pulses flour global production volume (2016-2020/t)



[56] FAOSTAT, www.fao.org
[57] FAOSTAT, www.fao.org
[58] FAOSTAT, www.fao.org

Overall, the total global production of alternative flour – considering also less common flour such as triticale, roots and tubers, mustard seed, fonio, fruits, backwheat, and barley flour - in 2020 accounted for about 244,163,234.7 t.[59] This value is significantly low compared to total global production of traditional flour, which reached 428,667,546.48 t in the same year.[60] However, Figure 10 shows how the trend for alternative flour has been increasing over the years compared to the same trend for traditional flour. For instance, from 2016 to 2020, the production volume of alternative flour increased by 7.3%, while for traditional flour it increased by 3.5%. This fact proves that even though alternative flour production volumes are almost half than those of traditional flour, the former has been increasing by a higher rate, thus showing higher growth potential.

Figure 10: Total global production volume of alternative and traditional flour (2016-2020/t)



In 2019, the global alternative flour revenues market was dominated by Middle East and Africa, with a share of 48.52%, followed by North America and Europe, respectively representing 34.36% and 10.89% of the total share. [61] The dominance of Asia, as we discussed in the case of traditional flour, is due to the growing population, increase in disposable income, and rise in urbanization. As for Europe and North America, they are increasing their awareness, rapidly changing lifestyle towards healthy food habits.

[59] FAOSTAT, www.fao.org
[60] FAOSTAT, www.fao.org
[61] QYR Research (2023). «Global alternative flours market report, history and forecast 2018-2029, breakdown data by manufacturers, key regions, types and application».

For what concerns the competitive landscape, the global alternative flour market is highly fragmented and competitive, with key players employing a range of marketing activities such as partnerships, expansions, mergers and acquisitions, and collaborations to gain a competitive edge in the market. To expand their customer base, in fact, they focus on advertising products on online platforms, attracting the current generation and spreading awareness of the benefits obtained from the consumption of alternative flours. Important are also all those schemes used by key market players to improve production methods and reduce expenditure of raw materials. The market features large, well-established companies expanding their product line to include alternative flours with niche, smaller producers focused on specialty and organic offerings. These companies make alternative flours available through different distribution channels, such as traditional retail stores, health food stores, and online platforms. Of course, companies with a strong online presence are able to gain advantage by reaching a wider customer base. The top six manufacturers of the global alternative flour market are Cargill, ADM, Wilmar International, Bunge, and Louis Dreyfus.

Cargill is an American company, market leader of alternative flour, with 157 years of experience, operating in 70 countries, and selling to 125 countries. In 2022, the company reported $165 Billion in revenues,[62] deriving from operations related to food ingredients, animal nutrition, protein and salt, agricultural supply chain, and financial services. For what concerns the alternative flour world, Cargill produces soluble rice flour, a gluten-free flour able to replace maltodextrin in multiple applications, including beverages, bakery, and snacks. Other alternative flours supplied by Cargill (and Ardent Mills) are of ancient grains such as quinoa, amaranth, and millet.

Archer Daniels Midland Company (ADM) is another key player in the alternative flour market, as it is in the traditional one. The company produces a very wide range of alternative and gluten-free flours, including corn, quinoa, millet, sorghum, buckwheat, hemp, teff, and amaranth flour, ideal for multigrain bakery and snacks.

Wilmar International is Asia's leading agribusiness group established in 1991 and headquartered in Singapore. Wilmar operates across various segments of the agricultural

[62] Cargill Annual Report (2022)

supply chain, from cultivation and processing to merchandising and distribution. It owns over 500 manufacturing plants and has an extensive distribution network covering over 50 countries. Its revenues increased by 11.55% from 2021 and 2022, passing from a value of $65,794 Billion to $73,399 Billion.[63] Among Wilmar products, there is gram flour, also known as chickpea flour, gluten-free and made from either raw or roasted gram beans, containing a high proportion of carbohydrates, proteins, and fiber.

Bunge is another leader in the global agribusiness sector, with headquarters in the US but operating in more than 40 countries through more than 300 facilities. Like the other alternative flour market leaders, Bunge has been growing its net sales over the years: from 2020 to 2022, revenues increased by 62.38%, increasing from a value of $41,404 Billion to $67,323 Billion.[64] Among its line of clean-label ingredients, Bunge produces lentil functional flour, rich in protein vitamins fiber, and minerals, with a neutral flavor suitable for both sweet and savory applications.

Louis Dreyfus is the last of the major players in the international trade of agricultural products, including alternative flour. The company is active along the value chain from agricultural commodities to related food, beverage, feed and fiber sectors. At the same time, it provides equity capital to early-stage companies developing innovative and sustainable products to make agricultural supply chains more sustainable and efficient. The net sales of Louis Dreyfus increased from 2021 to 2022 by 20.9%, going from $49,569 Billion to $59,931 Billion.[65] The company's product selection includes corn flour and sorghum flour.

2.3 The Italian alternative flour market

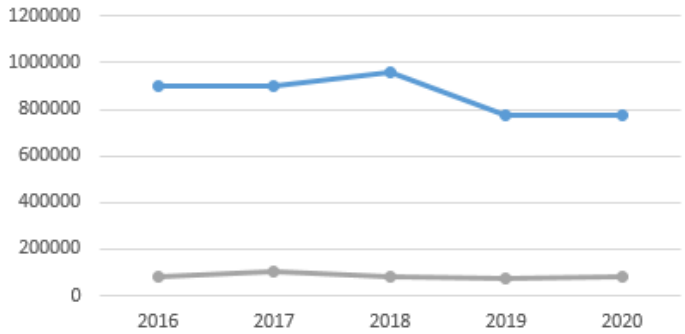
As for the global flour market, consumers in the Italian market are shifting their preferences towards healthier and more sustainable products. Among the most famous trends, one may find the search for free-option products like gluten-free, wheat-free, and lactose-free flour. Indeed, people prefer healthy and organic flours, increasingly appreciating sustainable paper packaging. Moreover, consumers care about origins and flour nutrients; they value regional food materials and favor the most refined varieties like ancient grains. The key-word for the

[63] Wilmar International Limited Annual Report (2022)
[64] Bunge Annual Report (2022)
[65] Louis Dreyfus Company Financial Report and Audited Consolidated Financial Statements (2022)

alternative flour market is diversification, both in terms of grain mix and different grinding levels; in fact, consumers search for the best mix for each dough to get the right lightness and taste of sweet and salty preparations. For these reasons, companies invest in research and development to ensure innovation and the best quality of products.

According to the Food and Agriculture Organization of the United Nations, over the last years Italy has been producing mainly five types of alternative flours: corn flour, rice flour, pulses flour (such as bean, chickpea, and lentil flour), rye flour, and other cereals flour. Corn flour represents the highest volume of alternative flour produced in Italy, reaching 772,200 t in 2020, followed by other cereals flour with 80,000 t produced, pulses flour with 34,373.11 t produced, rice flour with 20,899.52 t, and rye flour with 2,789.69 t.[66] Figure 11 and 12 show the production volumes of the above-mentioned flours from 2016 to 2020. Corn flour and other cereals flour production are depicted in a different graph, as their high value would be difficult to compare with others. From 2016 to 2018, the production volume of corn flour increased, while from 2018 and 2019 the trend decreased by 24.17%. The trend remained stable between 2019 and 2020. For what concerns other cereals flour, its volume of production increased significantly from 2016 and 2017, reaching 103,000 t. Since then, this value has decreased: from 2017 to 2020 it reduced by 28.75%.

Figure 11: Corn and other cereals flour production volume (2016-2020/t)

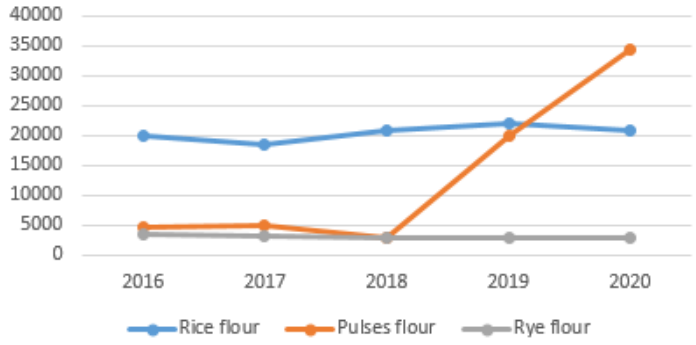


Rice flour production volume does not show a remarkable fluctuation during the 2016-2020 time-period; however, from 2017 to 2019 it increased by 18.60%. Rye flour had a steadier trend during the considered period, with the production volume always ranging

[66] FAOSTAT, www.fao.org

between 2700 and 3200 t. On the other hand, the trend for pulses flour skyrocketed from 2018 to 2020, showing an increase of about 1160%. Pulses flour production volume rose, in fact, from 2720 t to 34373 t.[67]

Figure 12: Rice, pulses, and rye flour production volume (2016-2020/t)



Other alternative flours produced in Italy, but in fewer quantities, are barley flour, fruits flour, and mustard seed flour. The total volume of production of alternative flour in Italy reached 914,055.07 t in 2020,[68] against the value of wheat flour that reached 8,096,000 t.[69] What evinces from this comparison is that even though alternative flour production has generally increased over the years, there is still a long way to reach the volume of traditional flour.

Among the previously cited most relevant players of the Italian traditional flour market, some companies already started to innovate by introducing alternative flour to their product selections. For instance, Molino Casillo produces rice, kamut, and spelled flour; Molino Caputo offers chickpea, red lentil, and pea flour, Molino Grassi sells kamut and spelled flour; Molino Spadoni produces oat, corn, and buckwheat flour; and Molino Chiavazza, which offers spelled, corn, rice, chestnut, and Khorasan flour.

However, there are other companies in the Italian scenario, leader in the alternative flour market. Molino Merano is among these, with more than 600 years of milling experience, valuing their passion for wheat processing and tradition, as well as innovation. It is for this reason that Molino Merano offers a very wide alternative flours selection, including spelled, amaranth, oat, hemp, chickpea, corn, yellow-millet, barley, quinoa, rice, soy, and teff flour.

[67] FAOSTAT, www.fao.org
[68] FAOSTAT, www.fao.org
[69] ISMEA, www.ismea.it

The company experienced revenues of €35.9 Million in 2021.[70] Molini Bongiovanni is another Italian company selling alternative flour, such as amaranth, oat, corn, rice, spelled, quinoa, teff, coconut, barley, potatoes, hemp, and chestnut flour. Molini Bongiovanni is in fact always experimenting new and valuable products, through Research and Development as well as collaborations with universities. The mill recorded an increase in sales by 13.32%, growing from a value of €32.8 Million in 2020 to €37.2 in 2021.[71]

2.4 Comparing flour prices

In this section, we delve into the comparison of prices of alternative flour and traditional wheat flour. By examining pricing data, the aim is to contribute valuable insights into the economic feasibility of embracing alternative flour within the culinary landscape. The analysis is done by gathering pricing data through companies' websites and online retailers.

The first part of the study compares prices of traditional and alternative flour sold by three market players: Molino Casillo, Molino Grassi, and Molino Spadoni. All the prices are collected from the companies' websites and refer to the first part of August 2023.

Molino Casillo, declared as the Italian market leader of traditional flour in Chapter 1 and considered as an important player in the alternative flour market, offers a wide range of product selection: soft wheat flour of type 0 and 00 cost €0.85, €1.09 for type 1 and 2, €0.99 for whole-wheat flour, and €1.09 for durum wheat flour. For what concerns alternative flour, Molino Casillo sells packages of 500g; for this quantity, which is half than what considered for traditional flour, rice flour costs €1.09 and spelled flour costs €2.19.[72]

Molino Grassi offers 1kg and 5kg packages of traditional flour, also distinguishing it according to the different purposes. Soft wheat flour of type 00 (for pasta) costs €1.50 for 1kg and €6.30 for 5 kg, soft wheat flour for pizza costs €1.35 for 1kg and €5.60 for 5kg, while soft wheat flour for cakes costs €1.25 for 1 kg and €5.20 for 5kg. Soft wheat flour of type 1 and whole-wheat flour cost €2.10 for 1kg. Durum wheat flour costs €1.50 for 1 kg and €6.30 for 5kg. Molino Grassi sells also alternative flour in packages of 1 and 5 kg: kamut and spelled flour.

[70] AIDA. Molino Merano's Financial Statement. https://aida-r1.bvdinfo.com
[71] AIDA. Molino Bongiovanni's Financial Statement. https://aida-r1.bvdinfo.com
[72] Molino Casillo, www.molinocasillo.com

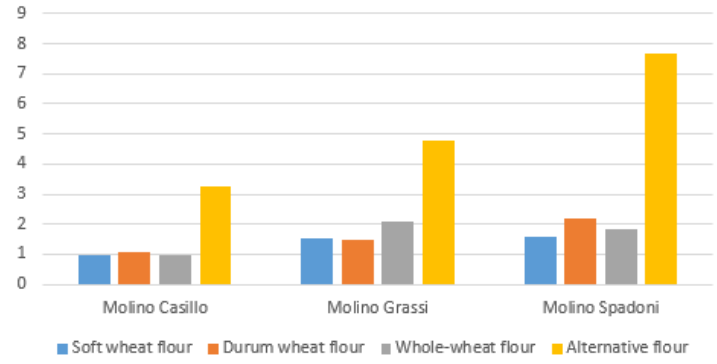
Kamut flour costs €6 for 1kg and €28 for 5kg and spelled flour costs €3.60 for 1 kg and €16 for 5 kg.[73]

Molino Spadoni is another player both in the traditional and alternative flour market. It sells soft wheat flour of type 00 for €1.70, of type 0 for €1.15, of type 1 for €1.90, whole-wheat flour for €1.85, and durum wheat flour for €2.20, all of them in 1 kg packages. Among the alternative flour selection, one may find chestnut flour, sold in 500g packages for €6.40, chickpea flour, sold in 500g packages for €1.95, and kamut flour, sold in 1kg packages for €5.65. Through the "Almaverde bio" line, Molino Spadoni sells also rye flour in 500g packages for €2.60, oat flour in 500g packaging for €3.55, spelled flour in 500g for €3.55, and corn flour in 500g for €3.30.[74]

Figure 13 summarizes all the prices gathered from the websites of Molino Casillo, Molino Grassi, and Molino Spadoni. Soft wheat flour includes type 00, 0, 1, and 2, while alternative flour includes all the non-traditional flour sold by those companies. By examining the graph, it is clear that, on average, Molino Casillo's flour is the least expensive. In particular, soft wheat flour is the one sold at the lowest price by all the three companies. By considering traditional flour only, durum wheat flour is the most expensive for Molino Casillo and Molino Spadoni, while whole-wheat flour is the most expensive flour sold by Molino Grassi. The difference between traditional and alternative flour prices is enormous: if the former is sold by Molino Casillo at €1, the latter is sold at three times more. Molino Grassi and Molino Spadoni sell their alternative flour at even higher prices, respectively at almost €5 and 8€. However, it is important to remark that there exist different types of alternative flour, and that their price can vary according to the main ingredient. In fact, Molino Spadoni, among the products selection, sells chestnut flour (€6.4 for 500g), which is more expensive than the alternative flour sold by Molino Casillo (rice flour for €1.09 and spelled flour for €2.19, 500g both of them). Nonetheless, we can certainly conclude that, on average, traditional flour is less expensive that alternative flour.

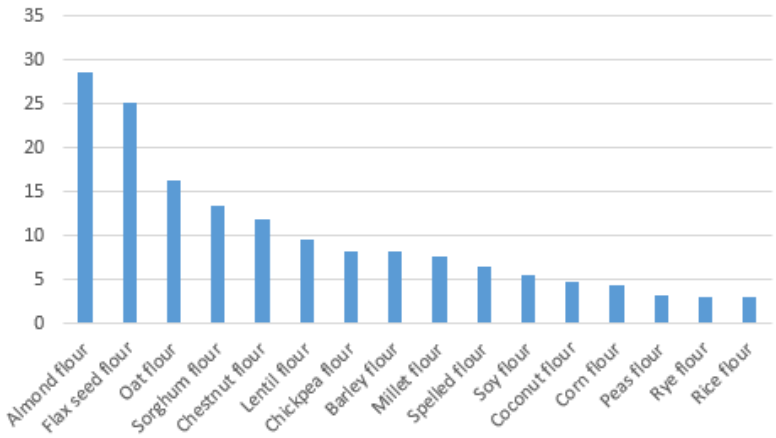
[73] Molino Grassi, www.molinograssi.it
[74] Molino Spadoni, www.molinospadoni.it

Figure 13: Traditional and alternative flour prices (1kg)



The second part of the pricing analysis consists in the comparison among the different alternative flour; this will allow us to have a complete view of this market's prices. All the prices come from Tibiona, an online retail that sells more than 90 different types of flour, and refer to packages of 1 kg. The alternative flours considered for this analysis are sixteen, all of them from Molino Bongiovanni. The most expensive flour is almond flour (€28.26/kg), followed by flax seed flour (€25.24/kg), oat flour (€16.39/kg), sorghum flour (€13.44/kg), chestnut flour (€11.87/kg), lentil flour (€9.58/kg), chickpea flour (€8.29/kg), barley flour (€8.19/kg), millet flour (€7.58/kg), and spelled flour (€6.49/kg). The least expensive alternative flour are soy flour (€5.58/kg), coconut flour (€4.8/kg), corn flour (€4.46/kg), peas flour (€3.29/kg), rye flour (€3.11/kg), and rice flour (€3.102/kg).[75]

Figure 14: Alternative flour prices (1kg, Molino Bongiovanni)



[75] Tibiona, www.tibiona.it

To conclude the analysis of alternative flour prices, we can state that there are some of them that costs more than the others, like in the case of almond flour. Furthermore, it is clear that alternative flour is more expensive than traditional flour and, in some instances, by a great extent. Nonetheless, the higher price can be justified by several factors that can vary according to the specific type of alternative flour. The reasons why alternative flour might be priced higher include variables such as raw materials, nutritional values, production costs, and processing techniques. In the next paragraph, we will delve into these aspects.

2.5 Costs for the alternative flour market

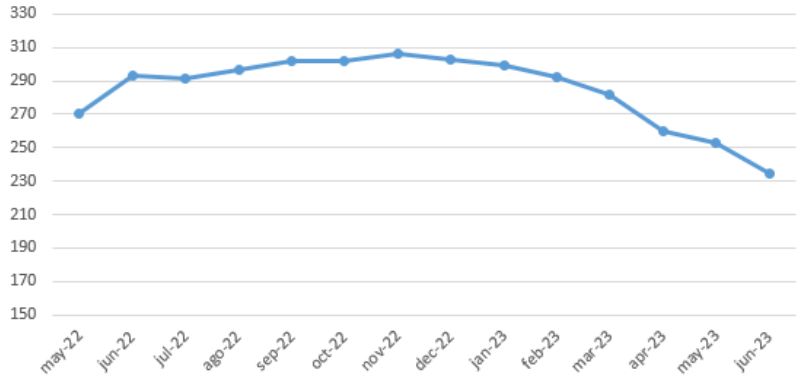
As alternative flours avail their selves of different raw materials compared to traditional flours, the costs faced consequently diverge. For instance, one needs to switch from an analysis of soft and durum wheat to an analysis of rice, corn, oat, and other resources used to make alternative flours.

The following graphs show the trends from May 2022 to June 2023 of some of the raw materials prices used to produce alternative flours: oat, corn, rice, and soy. As happens to wheat, one has to consider that prices suffered the events occurred over the last years, including the COVID-19 pandemic, the recovery post-pandemic, Russia's export tariffs, and the Ukrainian war. Consequently, it may happen that prices show a downward trend, but remain higher than before the pandemics.

The price for oat has decreased during the considered period by 15.34%, going from a value of 270€/t to 234.09€/t, the lowest value between May 2022 and June 2023. The highest value, 306.4€/t, was reached in November 2022.[76] After that, the trend has always been decreasing.

[76] ISMEA. «Prezzi medi mensili per prodotto – Avena». www.ismea.it

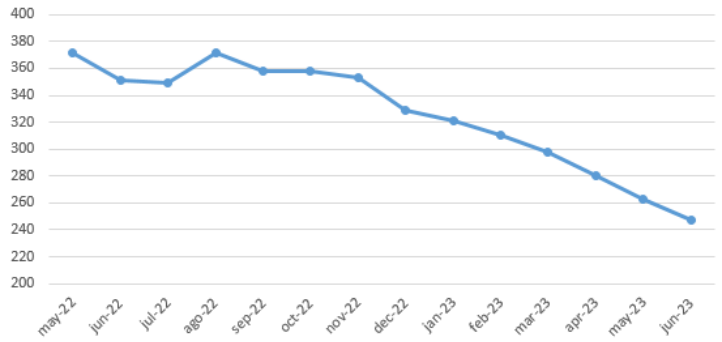
Figure 15: Average monthly oat prices (€/t)



The same downward trend, but more consistent in value, occurs for the price of corn, which decreased by 50.38% from May 2022 to June 2023. Indeed, corn price was 371.55€/t and reached 247.06€/t,[77] the lowest value in the period considered. Compared to oat, corn prices are slightly higher. For what concerns its production, in 2021 corn production reached 6.1 Million tons, was worth €1,600 Million, and represented 31% of the total value of the cereal sector and 5% of the total value of agricultural cultivations.[78] Corn cultivations are mainly located in the center-north area of Italy (Veneto, Lombardia, and Piemonte), both for the surface share and for the production share. The general cost index of production increased by 24.0% on an annual basis, and by 40.2% compared to October 2020. The reason may be found in the increments of costs item like fertilizers (+26.2% and +53.1%), energy products (+52.9% and +94.8%), seeds (+1.0% and +1.2%), and subcontracting (+33.4% and +38.0%). Over the years, corn imports have increased: from 2017 to 2021, the value of imports rose by 21.64%, reaching €1,186 Million.[79]

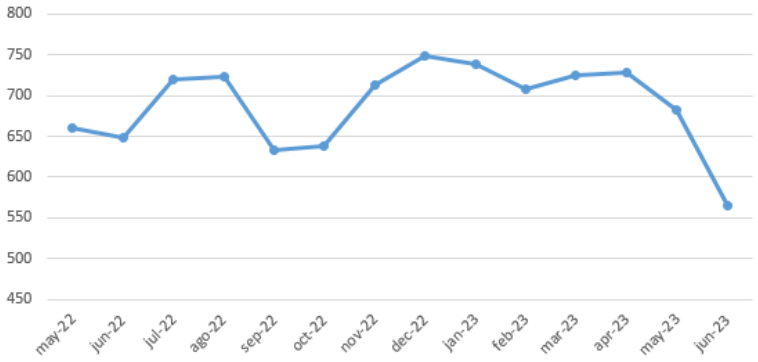
[77] ISMEA. «Prezzi medi mensili per prodotto – Mais». www.ismea.it
[78] ISMEA (2022), «Scheda cereali»
[79] ISMEA (2022), «Scheda cereali»

Figure 16: Average monthly corn prices (€/t)



Prices for rice follow a different trend compared to those of oat and corn, as during the considered time-period they changed several times, with substantial swings. From the starting point of 659€/T in May 2022, prices reached the lowest value of 564.65€/T in June 2023, decreasing by 16.7%. [80]As one may notice, rice price is higher than oat and corn prices.

Figure 17: Average monthly rice prices (€/T)

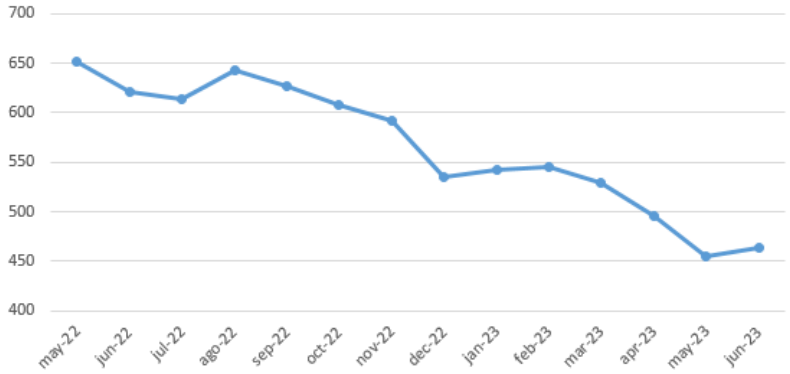


For what concerns soy, its price has mainly been decreasing, starting from a value of 652€/T in May 2022 and reaching a value of 463.6€/T in June 2023, decreasing by 40.63%.[81] In 2021, soy production reached 0.9 Million tons, was worth €398 Million, and represented 31% of the total value of industrial cultivations and 1.2% of the total value of agricultural cultivations.[82] Soy cultivations are entirely located in the center-north area of Italy (mostly in Veneto), both for the surface and for the production share. The general cost index of production increased by 23.3% on an annual basis, and by 38.9% compared to 2020. The

[80] ISMEA. «Prezzi medi mensili per prodotto – Riso». www.ismea.it
[81] ISMEA. «Prezzi medi mensili per prodotto – Soia». www.ismea.it
[82] ISMEA (2022), «Scheda cereali»

reason may be found in the increments of costs item like fertilizers (+17% and 36%), energy products (+52.9% and +94.8%), seeds (+2.3%), and subcontracting (+30.2% and +46.9%). Over the years, corn imports have increased: from 2017 to 2021, the value of imports rose by 21.64%, reaching €1,186 Million. In the last years, soy imports have risen significantly: from 2017 to 2021, the value of imports increased by 111.45%, going from €524 Million to €1,108 Million.[83]

Figure 18: Average monthly soy prices (€/T)



By comparing the raw material prices analyzed above with those analyzed for the traditional flour market, we can state that, for what concerns the June 2023 situation, oat is the cheapest ingredient (234.09€/T), followed by corn (274.06€/T), soft wheat (248.87€/T), durum wheat (310.22€/T), soy (463.6€/T), and rice (564.65€/T).

However, in considering the different raw materials used, one should remember that some alternative flours are made from non-conventional ingredients – such as nuts or special seeds – and as such they might have limited availability or require specialized sourcing, leading to potentially higher costs compared to traditional flour, which is made from a widely cultivated grain.

The costs incurred by traditional flour and alternative flour companies may differ from other aspects, such as the forces of demand and supply. Traditional flour can rely on large-scale production, as the demand for wheat-based products is usually high. Consequently, companies producing traditional flour may benefit from economies of scale, which tend to

[83] ISMEA (2022), «Scheda cereali»

reduce costs. From the alternative flour point of view, the demand may be more specific, as the market would be a niche market, leading to relatively higher production costs. Indeed, being an evolving field, new sources of flours and new production techniques are emerging over time. This means that companies producing alternative flours may invest more in Research and Development to improve products quality and reduce production costs. These experimentation and testing of new formulations phases could add to the company's costs. Moreover, some alternative flours – for example those labeled as gluten-free – require specific certifications, representing a guarantee for celiac consumers, as well as additional costs and compliance-controls for the company. The certification, in fact, ensures that the product contains less than the specified threshold of gluten and is safe for individuals with celiac disease. An important gluten-free certification is the Crossed Grain symbol, issued by organizations like the Italian Celiac Association (AIC). Since alternative flours might be less familiar to consumers compared to traditional flour, companies need to invest more also in educational efforts and marketing to raise awareness, communicate benefits, and promote their products, together with the designing of unique and creative packaging. Finally, producing alternative flours may require specialized machinery and equipment, especially when using less common ingredients, which costs can be higher compared to traditional flour production. Examples can be magnetic separators and sieves, essential to remove impurities, such as small stones, metals, or other foreign bodies. Machines for processing legumes and seeds, such as hullers, decorticators, or crushers are also needed if companies produce alternative flours containing these ingredients. To improve the taste and texture of some alternative flours, roasters may be useful too; in this way, ingredients are roasted before grinding.

To offset these higher costs, companies need premium pricing strategies, justified also by the fact that alternative flours are often positioned as healthier, eco-friendly, and suitable for specific dietary needs.

2.6 Differences in Porter's five forces between the traditional and the alternative flour market

Even if we are considering two highly similar markets, the traditional and the alternative flour market present some dissimilarities in the Porter's five forces, derived from the main features that differentiate them.

For what concerns the threat of new entrants, the alternative flour market has lower barriers to entry, as it is a relatively newer and evolving market compared to traditional flour. Moreover, established players in the alternative flour market have already built strong brand recognition, customer loyalty, cost advantages, and access to distribution channels, making it difficult for new entrants to capture a share of the market. New entrants have also to cope with the compliance with food safety and labeling requirements (especially for what concerns gluten-free products), which can be more complex and time-consuming than traditional flour market's regulations.

Another difference is the reliance on suppliers: alternative flour companies usually do not provide just a single type of flour in the same way that traditional flour companies offer wheat flour; this market involves a more diverse range of sources, such as nuts, seeds, legumes, and other grains. Consequently, product diversity involves more suppliers, reducing the individual supplier's bargaining power. Indeed, in the third chapter we will see that traditional flour companies bear higher raw materials costs than alternative flour companies do exactly for this reason. At the same time, traditional flour companies are more subject to changes in raw materials price fluctuations, while alternative flour companies are more able to keep the situation under control.

As the alternative flour market is a niche market, buyers have less power than in the traditional flour market. In this market, buyers have unique preferences and specific needs that are not easily fulfilled, especially because there are less suppliers available compared to the traditional flour market. Moreover, if flours are perceived as unique, specialized, or cater to specific dietary needs – particularly if we consider individuals with celiac diseases or other wheat intolerances – buyers are less sensitive to price fluctuations, giving them less bargaining power.

If these flours are perceived as unique or specialized, buyers may have fewer alternatives, giving them less bargaining power.

Given that one is the substitute for the other, traditional and alternative flour present opposite analyses from this point of view. Consumers can switch from one to the other depending on their needs and preferences, but if we consider people with wheat-intolerances or celiac diseases, alternative flours have a consistent advantage. However, one should consider that people with these kind of problematics represents a little percentage over the total population, and that the remaining part can easily switch to traditional flour for its cheapness and easiness to use.

Lastly, the competitive rivalry force might seem weaker for the alternative flour market due to the presence of a small number of companies offering this kind of product. The traditional flour market, characterized by the presence of many competitors, is often subjected to price wars, leading to reduce profitability. Niche markets like the alternative flour one have the advantage of being less competitive and based on strong differentiation, always caring about product innovation and development.

In conclusion, the alternative flour market can benefit from lower threat of new entrants, lower suppliers and buyers bargaining power, as well as lower competitive rivalry, but stronger substitutes threat, especially for what concerns people with no specific intolerances. This implies that the alternative flour market might be more favorable for businesses due to the limited pressures from external competitive forces, which can create opportunities for higher profit margins. However, several other factors can determine and influence the profitability of a market, and we will examine this matter in depth in the next chapter.

Chapter III: Profitability analysis of traditional and alternative flour markets

This chapter delves into a comprehensive analysis of the profitability of both the traditional and alternative flour markets, shedding light on the financial dynamics that shape these two distinct sectors. In the following sections, we will dissect key financial indicators, production costs, sales trends, and other essential metrics that contribute to understand the economic viability of traditional and alternative flour production. By undertaking an examination of these factors, the aim is to uncover insights that not only illuminate the present state of these markets, but also offer a glimpse into their potential trajectories. The chapter starts with an investigation of financial and profitability indexes, followed by the assessment of costs and sales trends of the traditional and alternative flour market. The purpose is to compare these data across time, across companies within the same industry, and across the two markets. In so doing, this chapter contributes to a deeper comprehension of the dynamics shaping the modern culinary landscape, understanding the role of traditional and alternative flour markets within the evolving food industry. All the data used for the purpose of this analysis come from the financial statements of companies operating in the flour industry.

3.1 Sales of the traditional and alternative flour market

In the first chapter, with the analysis of the Porter's five forces, the key players of the traditional and alternative flour market, together with some data about their profitability, were already mentioned. In these sections, we will delve into the examination of the revenues of some of those companies: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna for what concerns the traditional flour market – even if some of them produce also alternative flour, but only for a little share -. On the other hand, Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni were chosen for the alternative flour market – even if some of them produce also traditional flour, but in a fewer extent-. The analysis of revenues offers a comprehensive understanding of their financial performance and market positioning. Moreover, it is a crucial component for assessing the overall health and growth prospects of these companies within the evolving landscape of the flour industry. The period considered goes from 2017 to 2021, the year of the last available data. As Figure 19 shows, Molino Casillo has the highest revenues of all the traditional flour market. Indeed, its

revenues more than doubled from 2017 to 2021, with a yearly average increase of 21.77%. The peak of this rise happened between 2018 and 2020, with a little slowdown from 2020 to 2021. The second highest company in terms of sales is Agugiaro & Figna, although the difference in revenues with those of Molino Casillo is profound. Apart from 2020, the company' sales have always been increasing in the period considered, with an annual average growth of 4.55%. Molino Caputo experienced an extraordinary growth between 2020 and 2021: in that interval, sales increased by 40.65%. If we consider the complete period from 2017 to 2021, the company's revenues increased on average by 17.19% annually. The last company scrutinized is Molino Grassi, whose revenues follow a similar trend to the one for Mulino Caputo. In fact, sales has always been increasing, by 6.5% annually on average, except for a little slowdown in 2020. Overall, revenue trends for the traditional flour market are increasing over time at an average path (between companies and among years) of 12.5%. The only exception was 2020, a year characterized by a slowdown in revenues' growth for three over four companies analyzed, probably due to the COVID-19 pandemics. For what concerns the last year, 2021 was profitable for all the studied companies, which recovered after the decline; the path of these trends promises positive projections for the future. However, the increase in revenues is tied to the increase in price for global commodities, in this case for wheat. Thus, it is likely that the inflated portion of sales will not contribute in the increase of companies' profitability, but rather will help covering the rise of wheat prices. We will discuss about this later in the costs section.

Figure 19: Revenues of traditional flour companies (€)[84]

	Molino Casillo	Molino Caputo	Molino Grassi	Agugiaro & Figna
2017	304.489.438	61.725.195	67.739.720	98.442.628
2018	319.871.258	69.289.541	70.532.332	102.782.498
2019	467.063.237	80.641.482	72.079.037	105.317.469
2020	628.800.020	80.228.101	72.558.428	93.121.774
2021	637.537.569	112.842.728	86.367.449	114.480.190

Figure 20 depictures the revenues landscape for the alternative flour market. As one may notice, Molino Spadoni boasts of the highest revenues among the companies considered. A partial explanation to this trend is the fact that Molino Spadoni is famous also for the

[84] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

production of traditional flour, while the others focus more on alternative flour. The second highest company in terms of revenues is Molino Merano, followed by Molino Filippini and Molino Bongiovanni. Even if Molino Spadoni is the leader for what concerns revenues volumes, it is not the same in terms of revenues growth. In fact, from 2017 to 2021, the company's sales grew by 6.88% annually on average, while by 10.28% for Molino Merano, 7.66% for Molino Filippini, and 16.58% for Molino Bongiovanni. Nonetheless, the latter has the highest revenues growth but also the most fluctuating trend. Molino Bongiovanni has in fact showed a decrease in revenues from 2017 to 2018 by 13.97%, by 4.9% from 2018 to 2019, and by 4.87% from 2020 and 2021, while it showed an extraordinary growth by 90.10% between 2019 and 2020. On the contrary, Molino Filippini (except between 2017 and 2018) and Molino Merano always manifested a positive trend. Oppositely to what happened for traditional flour, alternative flour companies did not experience negative trends in 2020, but rather showed a remarkable growth, especially for Molino Bongiovanni and Molino Filippini, whilst 2021 was characterized by a slowdown. Overall, between 2017 and 2021 alternative flour companies' revenues grew by 10.35% annually on average, which is lower than the 12.5% of traditional flour companies.

Figure 20: Revenues of alternative flour companies (€)[85]

	Molino Bongiovanni	Molino Filippini	Molino Merano	Molino Spadoni
2017	1.920.512	8.811.946	24.432.430	49.094.816
2018	1.652.187	7.838.104	25.892.321	48.796.572
2019	1.571.206	8.954.003	31.395.032	54.684.786
2020	2.986.963	11.235.041	33.143.580	64.978.769
2021	2.841.205	11.460.910	35.906.459	63.203.684

In conclusion, traditional flour companies saw higher revenues and a higher annual percentage increase compared to alternative flour companies. This would suggest that traditional flour companies have a stronger presence and dominance in the market, which allows them to capture a larger share of consumer demand. However, this is partially true: as mentioned before and better explained later, the increase in sales is higher for traditional companies as wheat prices increased dramatically over the last years, and general commodities prices consequently grew. On the other hand, alternative flour companies do

[85] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

not rely only on a single ingredient like wheat, and have thus the opportunity of differentiating and diversifying risk. Apart from this, traditional flour products have better distribution networks and availability in mainstream retails, are priced more competitively, and often have stronger brand recognition and marketing strategies than alternative flour. These facts lead people who are not specifically seeking alternative flour for dietary of health reasons to prefer traditional flour, leading to higher sales volumes. However, further analysis would be needed to understand the underlying factors driving these growth rates. In fact, higher revenues do not necessary mean higher profitability. Alternative flour companies might have different cost structures, pricing strategies, or niche market. Additionally, market dynamics and consumer preferences change over time and thus growth rates and revenue differences might evolve as well.

3.2 Costs of the traditional and alternative flour market

As we delve into the financial intricacies of both traditional and alternative flour companies, it becomes evident that the costs associated with their operations play a pivotal role in shaping their profitability. In this section, we will navigate through the distinct costs that these companies encounter across their production processes. In particular, raw materials, personnel, and services costs will be analyzed. By comprehending these cost components, we will gain a deeper understanding of the factors that influence their profitability and market competitiveness of traditional and alternative flour companies, while comparing also the costs items that differentiate these two industries.

Figure 21 shows the total costs faced by the selected companies, together with the portion represented by raw materials. Molino Casillo is the one facing the highest costs, followed by Agugiaro & Figna, Molino Grassi, and Mulino Caputo. For instance, it is important to remember that Molino Casillo was also the company with the highest revenues, but the increase in costs happened between 2017 and 2021 is alarming. Indeed, from the beginning to the end of this period, Molino Casillo's costs increased by 114.97%, with annually average increase of 22.39%. The highest rise in percentage occurred between 2018 and 2019. Mulino Caputo has followed a similar path: from 2017 to 2021, costs have increased by 91.39%, with an annual average increase of 18.84%. The year characterized by the highest percentage increase was 2021 (by 48.15%), but in the same period its revenues grew by 40.65%.

Agugiaro & Figna' costs increased too, but in a fewer extent than for the companies already studied. From 2017 and 2021, the company's costs have risen by 21.64%, while by 5.94% if we consider the annual average. As happened for Mulino Caputo, Agugiaro & Figna's costs have increased mostly in 2021. On the other hand, Molino Grassi was able to limit costs increase: from 2017 to 2021, they only rose by 5.36%, with an annual average increase of 1.35%. Molino Grassi was able to do so even if its revenues grew by 6.5% annually. For what concerns raw materials, they represent an important part of the total costs in the traditional flour market. The average percentage on total costs that raw materials represent for this industry is 77.66%, with Molino Casillo that can be considered as an outlier – in 2021, raw materials for Molino Casillo constituted 98% of total costs-. In the previous chapters, we saw how in the last years the prices for raw materials, but also for energy and other utilities, increased due to the COVID-19 pandemics and the Ukrainian war. By examining Figure 22, one may notice that the four companies analyzed show the expected cost trend: from 2019 (before the above-mentioned events) to 2021, costs increased, both for total and raw materials costs – with Molino Grassi being the unique exception for what concerns raw materials-.

Figure 21: Traditional flour companies' total and raw materials costs (€)[86]

	Molino Casillo			Mulino Caputo			Molino Grassi			Agugiaro & Figna		
	Total costs	Raw materials	%	Total costs	Raw materials	%	Total costs	Raw materials	%	Total costs	Raw materials	%
2017	299.547.976	261.612.500	87	50.438.503	37.120.173	74	67.793.148	51.789.410	76	92.788.418	69.143.415	75
2018	319.174.921	264.498.571	83	58.172.539	41.660.054	72	65.981.091	51.149.034	78	95.965.509	69.866.863	73
2019	469.752.517	395.362.670	84	64.500.575	47.050.416	73	69.249.231	55.827.937	81	97.773.690	68.386.188	70
2020	619.860.708	526.046.515	85	65.159.263	47.279.864	73	69.911.437	52.963.792	76	87.535.452	58.423.526	67
2021	643.944.596	633.609.539	98	96.536.202	75.756.369	78	71.429.170	54.469.210	76	112.868.762	85.670.448	76

To have a more complete view of what pertains to the traditional flour market cost structure, the personnel and the services costs have been included to the analysis. Personnel costs represent, on average, 4% of total costs, with Molino Casillo having the lowest percentage and Agugiaro & Figna having the highest one. Services costs, for what entails the traditional flour market, regard transport and logistics, equipment maintenance, legal and regulatory services, marketing and advertising, financial services, packaging services, and analysis services. They are higher than personnel costs but lower than raw materials costs; they

[86] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

constitute, on average, 16.52% of total costs, with Molino Casillo having the lowest percentage and Molino Caputo having the highest one.

Figure 22: Traditional flour companies' staff and services costs (€)[87]

	Molino Casillo				Mulino Caputo				Molino Grassi				Agugiaro & Figna			
	Staff costs	%	Services	%	Staff costs	%	Services	%	Staff costs	%	Services	%	Staff costs	%	Services	%
2017	1.989.557	1	37.640.592	13	1.910.539	4	9.284.001	18	3.432.283	5	10.442.882	15	5.084.290	5	16.016.691	17
2018	2.456.008	1	43.812.376	14	2.285.376	4	11.713.718	20	3.504.268	5	10.115.719	15	6.054.066	6	15.595.411	16
2019	4.786.739	1	77.585.278	17	2.356.356	4	12.720.521	20	3.548.648	5	10.685.595	15	6.328.419	6	17.450.168	18
2020	6.575.261	1	101.996.055	16	2.539.205	4	13.443.192	21	3.630.137	5	11.858.329	17	6.245.603	7	15.346.065	18
2021	3.985.994	1	101.137.895	16	2.795.205	3	13.096.818	14	3.644.394	5	10.746.247	15	6.534.603	6	18.174.223	16

Figure 23 reveals the costs faced by the selected alternative flour companies. The company that deals with the highest costs is Molino Spadoni, followed by Molino Merano, Molino Filippini, and Molino Bongiovanni. However, Molino Spadoni was also the first company in terms of revenues. The one that saw the highest increase in costs in the period 2017-2021 is Molino Bongiovanni (53.13%), with an annual increase in average costs by 16.17%. Actually, Molino Bongiovanni was able to limit costs from 2017 and 2019 and from 2020 to 2021, but the increase by 80.61% in 2020 offset the efforts. Molino Filippini and Molino Merano followed a similar trend: in the considered period their costs rose by respectively 10.4% and 10.28% annually, reaching a total costs increase of 42.27% and 47% from 2017. Molino Spadoni experienced the lowest increase in percentage; from 2017 to 2021, costs increased by 6.896% annually, with a total increase by 30.11%. The portion of raw materials over total costs for companies operating in the alternative flour industry is on average 57.5%, with Molino Merano having the highest percentage and Molino Bongiovanni having the lowest one. As for traditional flour companies, total costs increased in the last years, but alternative flour companies suffered less, even for what concerns raw materials. Moreover, alternative flour companies have a lower average percentage of raw materials costs (57.4%) compared to traditional flour companies (77.66%).

[87] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

Figure 23: Alternative flour companies' total and raw materials costs (€)[88]

	Molino Bongiovanni			Molino Filippini			Molino Merano			Molino Spadoni		
	Total costs	Raw materials	%	Total costs	Raw materials	%	Total costs	Raw materials	%	Total costs	Raw materials	%
2017	1.901.482	958.527	50	8.390.060	5.171.600	62	24.690.557	18.269.550	74	48.768.620	27.012.774	55
2018	1.812.324	822.854	45	7.284.188	4.304.639	59	25.384.295	17.239.405	68	49.000.163	28.342.302	58
2019	1.773.827	907.315	51	8.415.267	4.940.535	59	29.924.675	19.832.687	66	53.514.338	24.890.690	47
2020	3.203.756	1.682.723	53	11.009.049	6.577.786	60	31.772.422	19.951.384	63	60.180.589	29.267.988	49
2021	2.911.862	1.507.866	52	11.937.193	7.283.237	61	36.302.821	24.135.387	66	63.453.867	32.256.327	51

Figure 24 provides all the data needed for examining the personnel and services costs of the alternative flour market. On average, the personnel costs for this industry represent 11% of total costs, almost three times more than those for the traditional flour market (4%). Molino Merano and Molino Filippini have the highest staff costs, while Molino Spadoni the lowest ones. During the period 2017-2021, personnel costs increased by 44.96% on average; Molino Merano is the company that most suffered from this increase (+88.11%). Even services costs are higher for alternative flour companies, as they include more expenses in research and development to discover new types of alternative flour, marketing and branding to educate consumers, consultation services to address sustainability concerns, quality testing, and regulation compliances. In fact, services costs for the alternative flour industry represent on average 24.44% of total costs, while 16.52% for the traditional flour market. Molino Spadoni and Molino Merano have the highest services costs, while Molino Bongiovanni the lowest ones. Between 2017 and 2021, services costs increased on average by 74.35%; once again, Molino Merano is the company that most suffered from this increase (+104.92%).

Figure 24: Alternative flour companies' staff and services costs (€)[89]

	Molino Bongiovanni				Molino Filippini				Molino Merano				Molino Spadoni			
	Staff costs	%	Services	%	Staff costs	%	Services	%	Staff costs	%	Services	%	Staff costs	%	Services	%
2017	282.734	15	586.763	31	929.921	11	1.389.995	17	2.053.436	8	2.228.591	9	3.906.726	8	13.722.213	28
2018	232.229	13	658.993	36	985.333	14	1.561.283	21	2.539.061	10	3.080.539	12	4.183.411	9	13.761.575	28
2019	238.186	13	563.551	32	1.131.854	13	1.877.821	22	2.965.760	10	3.632.465	12	4.049.142	8	19.223.120	36
2020	305.379	10	1.089.038	34	1.379.638	13	2.230.765	20	3.510.018	11	4.277.643	13	4.451.014	7	22.107.254	37
2021	292.833	10	936.803	32	1.372.892	12	2.382.070	20	3.862.743	11	4.566.885	13	5.490.551	9	22.156.668	35

[88] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

[89] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

Overall, alternative flour companies face lower raw materials, but higher personnel and services costs compared to traditional flour companies. In fact, traditional flour companies, larger than alternative flour ones, are characterized by high production volumes. Consequently, the incidence of raw materials is lower for alternative flour companies, while it is higher for personnel and services costs. Moreover, traditional flour companies suffered more the increase in total costs (58.34% against 43.14%), in raw materials (77.66% against 43.14%), and in personnel costs (45.33% against 44.96%) during the last years. On the contrary, alternative flour companies faced higher increases in services costs (74.35% against 56.53%). The enormous increase in raw materials prices for traditional flour companies is, indeed, one of the main reasons in the increase in the value of their sales

Of particular interest would also be understand the differences in Research and Development costs (R&D) between traditional and alternative flour companies. Unfortunately, most businesses do not specifically indicate such costs in their income statements, thus a similar analysis to those already done would not be possible. However, what is certain is that this type of costs can vary significantly based on their respective focuses, goals, and nature of the products they are working on. Traditional flour companies primarily focus on improving the milling processing techniques and quality of wheat flour, developing flour with specific baking properties. For example, the Casillo Group has invested in a significant R&D project aimed at valorizing the byproducts of the milling process and implementing a circular business model, an economic system based on regeneration, establishing the Casillo Next Gen Food in 2021. The company will focus on the production and marketing of functional food ingredients with high nutritional and nutraceutical value. On the other hand, alternative flour companies concentrate on researching new non-traditional sources and studying their nutritional and functional properties, together with the flavor profiles of these alternative ingredients. Given the potential environmental benefits of using non-traditional ingredients, alternative flour companies' R&D might also prioritize sustainable sourcing and production methods.

3.3 Profitability of the traditional and alternative flour market

In the previous sections, we saw the revenues and the costs items of traditional and alternative flour companies, which allowed us to be introduced in the understanding of these

industries' profitability. What follows is a deeper and more direct analysis that will complete our journey into flour market profitability.

One of the fundamental indicators examined is EBITDA, measuring a company's ability to generate profits through its entrepreneurial activities by considering only the operational component and excluding exceptional and non-recurring elements, as well as those related to financial and tax management. Usually, there is a tendency to equate EBITDA with the Gross Operating Margin, even if they differentiate for what concerns provisions, already deducted in EBITDA. In the context of the analysis of traditional flour companies, the EBITDA figures reveal distinctive insights: on average, the industry EBITDA mean is €12,358,607, with an EBITDA/sales equal to 9.92%. What is puzzling is the Molino Casillo's circumstance. In the analysis of revenues, Molino Casillo was the company with the highest values; but in the examination of profitability, it has the lowest score. On average, Molino Casillo has an EBITDA margin of 3.93%, less than a half compared to the mean of the industry. By looking at the table, one may notice that its EBITDA increased by 64.27% from 2017 to 2021, but compared to sales it decreased by 21.34%. This means that while the company is generating significant revenue, it is struggling to convert those revenues into meaningful profits at the operating level. For instance, the company should examine its cost structure, operational efficiency, pricing strategy, and overall the business model to address the issues affecting its profitability, which is mainly the increase of raw materials prices and revenues not growing enough to generate a margin increase. Mulino Caputo has the highest EBITDA margin (19.96% on average), even though it has been decreasing in the last period. Nevertheless, the decreasing trend between 2020 and 2021 involved all the four companies: in that period, EBITDA margin decreased by 7.19% for Molino Casillo, 14.38% for Mulino Caputo, 32.45% for Molino Grassi, and 34.54% for Agugiaro & Figna. Molino Grassi has an average EBITDA/sales margin of 5.43%, while Agugiaro & Figna of 10.35%. As one may notice, there is a huge difference in the margins between Molino Casillo and Molino Grassi on one side and Mulino Caputo and Agugiaro & Figna on the other side. Probably, the former were not able to transfer the increase of raw materials prices to consumers, and thus to transform revenues into margins. Mulino Caputo and Agugiaro & Figna were able to do so, while maintaining high

quality standards, raw materials of local origin, the monitoring of production processes, and the commitment to the environment by adopting eco-sustainable technologies.

Figure 25: EBITDA and EBITDA margin for traditional flour companies (€)[90]

	Molino Casillo		Mulino Caputo		Molino Grassi		Agugiaro & Figna	
	EBITDA	EBITDA/Sales	EBITDA	EBITDA/Sales	EBITDA	EBITDA/Sales	EBITDA	EBITDA/Sales
2017	15.289.867	4,92%	12.465.034	20,14%	3.143.415	4,53%	10.517.590	10,57%
2018	11.188.761	3,43%	12.689.488	18,28%	4.175.106	6,08%	12.164.591	11,65%
2019	15.604.818	3,26%	17.819.647	22,04%	3.155.681	4,43%	12.620.738	11,83%
2020	26.531.781	4,17%	17.056.413	21,20%	5.275.905	7,24%	10.088.810	10,71%
2021	25.117.244	3,87%	20.550.438	18,15%	3.578.443	4,89%	8.138.375	7,01%

Figure 26 shows profits and Net Profit Margins for traditional flour companies. The one with the highest profit is Mulino Caputo, with an average profit of 11,116,369 per year. The value reached the peak in 2019, followed by a decrease in 2020 and 2021. However, from 2017 to 2021, its profits increased by 6.58%. The average Net Profit Margin of Mulino Caputo is 14.17%, clearly larger than its competitors' value. It is a measure of how much a company generates net income or profit as a percentage of revenue or, in other words, how much of each euro of revenue translates into profit. On average, traditional flour companies generate €6,422,504 of profit per year, and this industry presents a Net Profit Margin of 5.99%. Molino Casillo has the second highest profit among the companies considered, but its Net Profit Margin is extremely low and below the industry average, which upholds the insights collected during the EBITDA analysis. The company, in fact, produces elevated revenues, but it is not able to convert them into profit. Agugiaro & Figna's profits are similar to those of Molino Casillo (€6,167,974 per year on average), but the company is better at turning revenues into profit: its Net Profit Margin is on average 6.09%, higher than the industry average. On the other hand, Molino Grassi has the lowest profits among the companies analyzed; its Net Profit Margin is lower than Mulino Caputo's and Agugiaro & Figna's, but higher than Molino Casillo's margin. Each of the companies examined has a declining margin in 2021, and each Net Profit Margin of 2021 is lower than the correspondent value at the beginning of the studied period (2017). This shows how challenging it is for companies to cope with all the already mentioned events happened in the last years.

[90] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

Figure 26: Profit and Net Profit Margin for traditional flour companies (€)[91]

	Molino Casillo		Mulino Caputo		Molino Grassi		Agugiaro & Figna	
	Profit	N.P.Margin	Profit	N.P.Margin	Profit	N.P. Margin	Profit	N.P.Margin
2017	8.269.387	2,72%	10.555.437	17,10%	1.235.142	1,82%	5.165.157	5,25%
2018	5.542.775	1,73%	8.860.242	12,79%	1.691.521	2,40%	6.396.717	6,22%
2019	5.537.201	1,19%	13.467.768	16,70%	886.316	1,23%	6.400.971	6,08%
2020	11.266.731	1,79%	11.447.785	14,27%	2.496.566	3,44%	8.353.307	8,97%
2021	3.810.864	0,60%	11.250.612	9,97%	1.291.861	1,50%	4.523.719	3,95%

Figure 27 highlights the ROI, ROE, and ROS of traditional flour companies. They are three financial metrics used to evaluate a company's performance and profitability from different perspectives. ROI (Return on investment) measures the profitability of an investment relative to its cost; ROE (Return on equity) establishes a company's ability to generate profits from its shareholders' equity; ROS measures the profitability of a company comparing its net income to its revenues. Higher ROI, ROE, and ROS entails higher profitability. The traditional flour industry, on average, has a ROI of 9.82, a ROE of 10.19, and a ROS of 7.58. From 2017 to 2021, these indexes have been decreasing: ROI decreased by 40.44% (from an average of 11.12 to 6.62), ROE decreased by 54.82% (from an average of 13.17 to 5.95), and ROS decreased by 33.86% (from an average of 8.07 to 5.33). Mulino Caputo has the primacy for what regards all the three indexes: its average ROI corresponds to 19.33, its ROE to 17.48, and its ROS to 17.75. The three values reached the largest value in 2019 and declined in 2020 and 2021. The second most profitable company, according to these measures, is Agugiaro & Figna (average ROI of 10.34, ROE of 10.32, and ROS of 6.92), which suffered the same decrease trend as Mulino Caputo in 2020 and 2021. Molino Casillo, as we saw for EBITDA and profit analysis, is the worst performant in terms of ROI, ROE, and ROSS, all of them below the average values of the industry. Moreover, Molino Casillo's indexes are the one that decreased most: from 2017 to 2021, ROI decreased by 69.3%, ROE decreased by 80.62%, and ROS by 65%.

[91] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

Figure 27: ROI, ROE, and ROS of traditional flour companies[92]

	Molino Casillo			Mulino Caputo			Molino Grassi			Agugiaro & Figna		
	ROI	ROE	ROS	ROI	ROE	ROS	ROI	ROE	ROS	ROI	ROE	ROS
2017	5,37	9,08	3,67	21,68	24,57	18,43	5,01	7,32	2,74	12,45	11,74	7,44
2018	3,53	6,27	2,21	19,15	17,11	16,56	7,91	9,12	4,24	13,61	12,89	8,43
2019	2,87	5,72	1,77	24,31	21,99	20,4	4,09	4,56	2,36	14,25	11,66	8,15
2020	4,09	5,49	2,78	15,51	12,12	19,18	9,11	10,46	4,91	7,08	10,02	7,15
2021	1,65	1,76	1,28	16,01	11,63	14,16	4,56	5,13	2,5	4,29	5,29	3,41

The last measure to assess the profitability of flour companies is capital intensive, a measure that refers to industries that require large amounts of investments, and thus in fixed assets, for the production of goods. Capital-intensive industries need high volumes of production to obtain adequate returns on investments, meaning that small changes in sales have a great impact in profits and returns. Moreover, capital-intensive industries are affected more by periods of recession, as they still have to pay fixed costs. Figure 28 shows the capital intensity, given by the ratio of total assets over sales, of traditional flour companies. The industry capital intensity, computed on the five years period average of all the four traditional flour companies, is 0.89. From 2017 to 2021, the mean of the industry's capital intensity has been increasing by 18.88%. The company with the highest capital intensity is Mulino Caputo (1.05), but Molino Casillo is the one experiencing the largest increase since 2017 (+43%).

Figure 28: Capital intensity of traditional flour companies[93]

	Molino Casillo	Mulino Caputo	Molino Grassi	Agugiaro & Figna
2017	0,812711119	0,950603931	0,754139993	0,79937294
2018	0,832748071	0,934209638	0,712280136	0,788456854
2019	0,883267997	0,934946942	0,799151742	0,739993894
2020	0,934944492	1,384738971	0,753927263	0,836907209
2021	1,164132953	1,069220934	0,714050938	1,000332145

For what entails the alternative flour market, the industry EBITDA mean equates €2,778,849 and the average EBITDA margin is 9.05%. The company with the highest EBITDA is Molino Spadoni, while the one with the highest average EBITDA margin is Molino Merano. Molino Bongiovanni is the one with the lowest EBITDA and EBITDA margin. However, from the

[92] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

[93] AIDA: Molino Casillo, Mulino Caputo, Molino Grassi, and Agugiaro & Figna's financial statements. https://aida-r1.bvdinfo.com/

beginning to the end of the period considered, the company has been growing: EBITDA grew by 61.18%, while EBITDA margin by 4.91%, with a period of degrowth in 2019. Molino Filippini shows the opposite trend for what concerns EBITDA, as it decreased by 44.45% from 2017 to 2021, and for EBITDA margin (-57%), especially from 2019 to 2021. Molino Merano's EBITDA and margin increased respectively by 81.12% and 22.88% from 2017 to 2021 while for Molino Spadoni the first measure decreased by 1.1% and the second one decreased by 22.58%. By comparing these measures for the traditional and the alternative flour market, alternative flour companies show on average lower EBITDA (2,778,849€ against 24,540,026€) but a similar EBITDA margin (9.05% against 9.92%) compared to traditional flour companies. A value of 9.92% can be considered relatively low for the traditional flour market: it is on the lower end for a mature and established industry; it is low due to competitive pressures, commodity pricing, and costs structures associated with raw materials, production, and distribution. Indeed, it would be better for companies having a margin higher than 10%, and improving it through the optimization of operations, the efficient management of costs, or the exploration of value-added products or market segments. Similar to traditional flour companies, alternative flour companies might reach higher EBITDA margins through innovations and opportunities of niche markets, which can provide the right set of circumstances for premium pricing and higher margins. However, EBITDA margins tend to be lower for industries that are less mature or in the early stages of development, as they face higher operating, innovation, and compliance costs, market uncertainty, investment in growth and lack of scales. For this reason, the EBITDA margin found for the alternative flour industry can be considered as relatively high.

Figure 29: EBITDA and EBITDA margin for alternative flour companies (€)[94]

	Molino Bongiovanni		Molino Filippini		Molino Merano		Molino Spadoni	
	EBITDA	EBITDA/Sales	EBITDA	EBITDA/Sales	EBITDA	EBITDA/Sales	EBITDA	EBITDA/Sales
2017	54.671	2,85%	1.020.870	11,31%	2.814.898	10,88%	4.889.171	9,74%
2018	61.845	3,37%	1.112.669	13,91%	3.283.594	12,20%	4.805.879	9,60%
2019	-708	-0,04%	1.320.379	14,48%	4.719.277	14,54%	5.720.422	10,31%
2020	65.127	2,02%	1.022.314	8,92%	4.871.810	14,16%	9.225.799	14,07%
2021	88.124	2,99%	567.091	4,84%	5.098.460	13,37%	4.835.296	7,54%

[94] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

Figure 30 represents the profits or losses, together with the Net Profit Margin, of alternative flour companies. One may notice that profits and margins are lower compared to those of traditional flour companies. On average, profits perceived annually by an alternative flour company are €726,102 and the Net Profit Margin reaches 2.73% (against €6,422,504 of profits and 5.99% of margin for the traditional market). However, it is important to consider that alternative flours often target niche markets, and while these may be lucrative, they might be smaller compared to the broader market for traditional flour. This fact could limit the scale of operations and profitability. The company with the highest profits is Molino Merano, with an average profit per year of €1,559,860 and a Net Average Profit Margin of 4.98%. Molino Merano was experiencing a period of growth for both values, but in 2021 they suffered a change in direction. Nevertheless, from 2017 to 2021, its profits grew by 341% and its margin by 200%. The second most profitable alternative flour company - in terms of profit - is Molino Spadoni, with average annual profit of €960,830, while Molino Filippini in terms of Net Profit Margin (4.27% on average). Both companies, like Molino Merano and traditional flour companies, had a decline in profits and margins in 2021. Molino Bongiovanni is the least profitable among the four, especially in 2019, year in which the company suffered a loss. However, it is the only one that experienced a growth in 2021 (+187.69% in profits and +202.44% in margin).

Figure 30: Profit and Net Profit Margin for alternative flour companies (€)[95]

	Molino Bongiovanni		Molino Filippini		Molino Merano		Molino Spadoni	
	Profit	N.P.Margin	Profit	N.P.Margin	Profit	N.P.Margin	Profit	N.P.Margin
2017	6.294	0,33%	436.483	4,95%	438.676	1,80%	687.375	1,40%
2018	10.321	0,62%	518.937	6,62%	1.208.920	4,67%	793.151	1,63%
2019	-38.186	-2,43%	605.435	6,76%	2.002.522	6,38%	1.091.976	2,00%
2020	9.789	0,33%	331.981	2,95%	2.210.991	6,67%	1.580.316	2,43%
2021	28.162	0,99%	9.380	0,08%	1.938.191	5,40%	651.332	1,03%

For what concerns indexes, Figure 31 summarizes the trend of ROI, ROE, and ROS of the alternative flour companies over the last five years. As happened to the traditional flour market, also the alternative flour market suffered a decrease in the value of indexes over the last years: ROI decreased by 55.47% (from 8.74 in 2017 to 3.89 in 2021), ROE decreased by

[95] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

49.14% (from 13.61 to 6.92), and ROS decreased by 63.03% (from 5.44 to 2.01). The reason is still to be found in the COVID-19 pandemics and in the recovery phase. Molino Filippini is the company with the highest average ROI and ROE (respectively 13.16 and 23.32), while Molino Merano is the one with the largest ROS (8.36). For what regard the last trends, Molino Filippini's indexes started their decline in 2019, while for Molino Merano and Molino Spadoni they increased in 2020 but decreased in 2021. Molino Bongiovanni has the lowest average indexes, but it is the only company that has been experiencing a growth in their value: from 2017 to 2021, its ROI increased by 48.81%, its ROE by 142.77, and its ROS by 35%. Compared to the numbers of the traditional flour market, alternative flour indexes are lower: the average ROI of the industry is 6.9 (against 9.82), the average ROE is 7.41 (against 10.19), and the average ROS is 4.71 (against 7.58). The measure of ROI for the traditional flour market might be driven by established production processes and distribution networks, while it might be influenced by Research & Development expenses and marketing costs for the alternative flour market. However, the latter's ROI has some potential to become larger due to the possibility of tapping into health-conscious consumer segments. The return on equity is lower for the alternative flour market as it carries higher risks, which could affect ROE negatively during the initial stage. Nonetheless, if special flour gains popularity, the ROE might be higher due to the potential for increased market share and premium pricing. As for ROS, the traditional flour market suffers due to intense competition, but economies of scale more than offset its effect by maintaining a competitive ROS, larger than the one for the alternative flour market.

Figure 31: ROI, ROE, and ROS of alternative flour companies [96]

	Molino Bongiovanni			Molino Filippini			Molino Merano			Molino Spadoni		
	ROI	ROE	ROS	ROI	ROE	ROS	ROI	ROE	ROS	ROI	ROE	ROS
2017	5,92	6,64	1	17,51	39,63	7,04	9,05	6,26	10,71	2,49	1,92	3,03
2018	6,32	9,82	1,36	19,95	34,13	9,15	9,95	8,4	11,43	2,51	2,2	3,11
2019	-10,79	-57,09	-2,1	17,88	29,24	9,37	5,9	5,25	6,13	3,49	2,99	3,94
2020	5,43	6,68	0,73	9,39	13,21	3,96	8,66	7,62	8,62	8,99	3,68	8,76
2021	8,81	16,12	1,35	1,09	0,38	0,63	4,6	9,68	4,95	1,07	1,51	1,12

[96] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

Figure 32 represents the capital intensity of the alternative flour market. Computed by the average total assets/sales ratio of Molino Bongiovanni, Filippini, Merano, and Spadoni over five years, the average capital intensity of the alternative flour market is 0.95, a value that is increasing since 2017 by 3.34% annually on average. The companies with the highest capital intensity are Molino Spadoni (1.42) and Molino Merano (1.25), but Molino Filippini has been experiencing the highest increase (+20%). Comparing the traditional and the alternative flour markets, the former is lower capital intensive (0.89) than the latter (0.95). However, the average value of the traditional flour industry has been increasing at a faster path (+18.88%) compared to the value for alternative flour (+3.34%).

Figure 32: Capital intensity of the alternative flour market[97]

	Molino Bongiovanni	Molino Filippini	Molino Merano	Molino Spadoni
2017	0,373538411	0,673005032	1,251198591	1,51803944
2018	0,455931441	0,721871131	1,149354938	1,549849444
2019	0,472912527	0,758330101	1,054235428	1,417355131
2020	0,338889367	0,664476525	1,395387251	1,248952285
2021	0,33302208	0,807934187	1,402381338	1,398204083

Before coming to conclusions, it is important to consider another important player in the traditional flour market, Grandi Molini Italiani. We will consider it separately from others as the profit and loss statements available stop at 2020. Therefore, it would represent a limitation if compared with other players, especially when considering the post-pandemics effects. The average sales of Grandi Molini Italiani from 2016 to 2020 is €221,692,447, a value that is between the one of Molino Casillo and Agugiaro & Figna, and above the average industry (€182,295,505). The trend has been increasing from 2016 to 2018 and slightly decreasing since then. Grandi Molini Italiani's average EBITDA and EBITDA margin are €7,785,381 and 3.58%, lower than the average industry mean, which are €12,358,607 and 9.92%. The lowest values were observed in 2019. For what concerns costs, they have been increasing from 2016 to 2019, while they decreased in 2020. Raw materials represent 72.83% (in line with the industry average, which is 74.37%) of total costs, personnel costs represent 2.28% (against 3.97% of the average industry), while services costs represent 20.08% of total costs (compared to the 16.52% industry average). Raw materials and

[97] AIDA: Molino Bongiovanni, Molino Filippini, Molino Merano, and Molino Spadoni's financial statements. https://aida-r1.bvdinfo.com/

personnel costs have increased in the last years, with a slowdown in 2019, while services costs have been decreasing since 2018.

Figure 33: Sales, EBITDA, EBITDA/Sales, and costs for Grandi Molini Italiani[98]

	Sales	EBITDA	EBITDA/Sales	Total costs	Raw materials	Personnel	Services
2016	175.435.761	9.366.484	5,16%	186.332.113	123.558.130	4.830.875	42.891.386
2017	185.365.089	9.371.746	4,87%	198.462.082	142.377.279	4.893.436	43.729.597
2018	253.810.544	9.592.179	3,67%	261.594.521	195.985.781	5.478.783	50.691.186
2019	248.455.260	3.394.005	1,33%	261.963.226	185.133.678	5.531.956	49.994.655
2020	245.395.581	7.202.490	2,86%	247.791.201	195.023.126	5.662.644	44.928.702

For what concerns profits, Grandi Molini Italiani is characterized by a fluctuating trend: in 2016 and in 2019, the company suffered a loss, which was then reflected in the Net Profit Margin, in the ROI, ROE, and ROS. Consequently, Grandi Molini Italiani has lower average profits and Net Profit Margin with respect to the industry mean (€5,190,970 against €6,422,504 and 2.90% against 5.99%. The landscape is the same for what concerns margins: the company has lower ROI (-1.35 against 9.82), lower ROE (6.89 against 10.19), and lower ROS (-1.17 against 7.58) compared to the mean of the traditional flour industry. The company's average capital intensity is 1.07, higher than the industry mean (0.89); however, the value has been decreasing over the years.

Figure 34: Profit, N.P. margin, ROI, ROE, ROS, and Capital intensity of Grandi Molini Italiani[99]

	Profit	N.P. Margin	ROI	ROE	ROS	Capital intensity
2016	-4.009.815	-2,29%	-3,02	-15,83	-2,69	1,42
2017	34.496.291	18,61%	-2,52	57,65	-2,39	1,21
2018	2.607.531	1,03%	0,40	3,60	0,29	0,94
2019	-7.218.115	-2,91%	-3,30	-11,07	-2,25	0,88
2020	78.957	0,03%	1,71	0,12	1,21	0,89

Before moving to the conclusion of this analysis, I would like to discuss some limitations about it. First, the dimensions of the companies considered differ from the traditional to the alternative flour market. The traditional flour companies taken into account are larger in terms of volume and revenues than alternative flour companies are. Even more, the non-traditional flour market was born about 30 years ago, and as such it is a developing market,

[98] AIDA: Grandi Molini Italiani's financial statement. https://aida-r1.bvdinfo.com/
[99] AIDA: Grandi Molini Italiani's financial statement. https://aida-r1.bvdinfo.com/

while traditional flour has been part of our diet for decades, and for this reason it is a mature market. Moreover, it was challenging and almost impossible to find companies either producing only traditional flour or only alternative flour: some companies produce both even if in different extent, together with other products such as yeast. The choice of companies was done by considering all of these factors, trying to limit the biases that could obstacle the accuracy and correctness of this analysis.

From the profitability analysis of the traditional and alternative flour companies, what evinced is that traditional flour companies have generally higher revenues. Indeed, traditional flour companies are part of a mature market and had the possibility to build strong brand recognition, customer loyalty, and well-established distribution networks. Moreover, they often benefit from economies of scale due to their large production volumes, allowing them to offer competitive prices while still maintaining healthy profits margins. Alternative flour companies, especially smaller ones, may struggle to achieve the same level of cost efficiency, but are growing steadily in response to changing dietary preferences. Both traditional and alternative flour companies are experiencing an increase in revenues over the years (2017-2021), with the former increasing on average by 59% and the latter by 38.42%. However, not only revenues are increasing, costs are rising too. Generally, traditional flour companies face higher costs and are suffering their increase more than alternative flour companies do. In fact, from 2017 to 2021, costs for traditional flour companies increased on average by 58.34%, while for alternative flour companies they increased by 43.13%, a difference that almost offsets the advantage given by the increase in revenues. Alternative flour companies might have more ability to adapt to changes due to their smaller scale and more specialized focus, allowing them to potentially mitigate some of the cost increases experienced by traditional flour companies. As we saw before, traditional and alternative flour companies have different cost structures. The former ‘s cost structure is characterized by raw materials as the main item, corresponding to 77.66% of total costs on average, followed by services that represent 16.52%, and personnel costs that represent 4% of total costs. Alternative flour companies face lower raw materials costs (57.5% of total costs on average), but higher services (24.44%) and personnel costs (11%). As already mentioned, total costs increased over the years. By analyzing the financial statements of traditional and

alternative flour companies, what evinced is that raw materials were the cost item that increased more for traditional companies - by 68.83%, against the 43.13% increase for alternative flour companies -. The reason may be that traditional flour companies rely on wheat as their primary raw material, the price of which is highly volatile. This lack of diversification can leave traditional flour companies more exposed to price fluctuations in the wheat market compared to alternative flour companies that use a wider range of ingredients, usually more stable and less volatile. For alternative flour companies, the cost item that increased more were services costs, which increased by 74% compared to the 56.53% of the traditional flour market. The cause may be identified in the fact that alternative flour companies use non-traditional ingredients that need higher procurement and transportation costs and might involve a more complex supply chain, quality control, and testing. In the analysis of EBITDA, traditional flour companies showed a higher average value (€12,358,607) compared to the one of alternative flour companies (€2,778,849), and a similar EBITDA/Sales margin (9.05% over 9.92%). Moreover, from 2017 to 2021, the EBITDA value for alternative flour companies have been increasing by 24.19 %, while by only 9.95% for traditional flour companies. Simultaneously, both markets suffered a loss in terms of EBITDA/Sales margin, but alternative flour companies for a lower extent (-12.99% against -14.23% for the traditional flour market). For what concerns profits and Net Profit Margins, traditional flour companies have an extremely higher average profit (€6,422,504) compared to alternative flour companies (€726,102), but in the period analyzed it has been demonstrated that traditional flour companies' profits decreased by 13.78% on average, while alternative flour companies' profits increased by 146.54% on average. A similar result is provided by the Net Profit Margin, which is higher for traditional flour companies (5.99% on average against 2.73% of the alternative flour market) but showed a decreasing trend from 2017 and 2021 (-40.58%) for traditional flour companies and an increasing trend (+69.58%) for alternative flour companies. The analysis of indexes such as ROI, ROE, and ROS highlighted positive and higher average values for the traditional flour market (respectively 9.82, 10.19, and 7.58) with respect to alternative flour companies (respectively 6.91, 7.41, and 4.71). Nonetheless, indexes for both the traditional and the alternative flour market have been decreasing since 2017. Finally, the analysis of the capital intensity recognizes the alternative flour market as more capital intensive with respect to the traditional flour market,

even if in a little extent (0.94 against 0.89). This means that alternative flour companies require more significant investments in assets to generate sales. However, it is important to underline that over time the trend is increasing by a greater extent for traditional flour companies (18.88% against 3.34% for alternative flour companies), which may lead to a change in the overall result.

What we can conclude from this profitability analysis is that, at the moment, the traditional flour market is more profitable than the alternative flour market, and this is true in terms of revenues, profits, Net Profit Margins, and indexes. The reasons behind these advantages are well known and have already been mentioned during this dissertation: economies of scale, efficient production processes, established markets and distribution networks, brand recognition, stable demand, and consumer loyalty. However, the trends of the last five years are in favor of the alternative flour market, showing a remarkable growth in elements like EBITDA, Net Profit Margin, or profits. This rapid expansion comes from the rise in health-consciousness and dietary needs, but also from the agility of alternative flour companies in adapting to emerging trends and embracing innovation. Moreover, their strategies focus on reaching specific consumer segments, which will help building and strengthening a niche market in which companies highly differentiate themselves, taking advantage of the low competition for being more profitable. This dynamic demonstrates all the potential that this market has within the broader food industry landscape.

Chapter IV: Consumer perception of alternative flour

As the landscape of dietary habits evolves, understanding consumer perception towards alternative flour becomes crucial for companies. This chapter delves into an in-depth analysis of consumers' perceptions of alternative flour, seeking to unravel the factors influencing their choices, preferences, and hesitations in adopting this unconventional flour. By examining consumer attitudes, beliefs, and experiences, the aim is to provide valuable insights that can shape product development strategies.

Questionnaires will serve as a cornerstone for this research, enabling us to understand the usage of traditional and alternative flour, identify consumer segments, and analyze demographic influences.

3.1 Methodology and questionnaire results

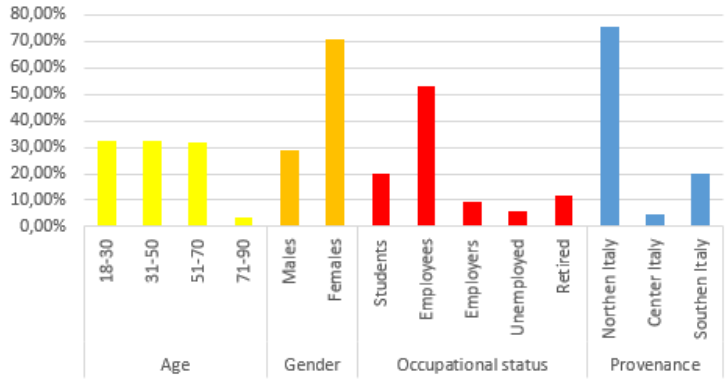
This chapter explores several key research questions, including: How aware are consumers of alternative flours, and what is the level of their familiarity with them? How do factors such as dietary preferences and lifestyle choices influence consumer attitudes toward alternative flour? What are the primary drivers that influence consumers to consider and purchase alternative flour over traditional wheat flour?

To answer these questions, consumers were provided with a questionnaire about their perception about alternative flours. This type of survey was the most appropriate method to gather a wide range of opinions and preferences from a diverse group of consumers in the alternative flour market.

The number of respondents who took part in the survey is 151, a number that ensures that the sample size is statistically significant. Participants of different ages were taken into account, as traditional flour may concern whoever is involved in the culinary world, regardless of age. The 32.5% is composed of people of age between 18 and 30, the 32.5% stands between 31 and 50, the 31.8% is between 51 and 70, and the 3.3% represents people of age between 71 and 90. The considered geographic location is Italy, even though the sample population is predominantly from the North-Italy (75.5%), followed by South-Italy (19.9%), and Center of Italy (4.6%). The objective was to have the same percentage of men and women, but the latter seemed more interested in this survey than the former, resulting

in the sample population being composed of women for 70.9% and men for 29.1%. The reason could be that women are generally still more involved in the preparation of home meals compared to men. To better understand the sample population, the questionnaire also requested to fill the field of employment status. 53% of individuals interviewed are employees, 19.9% are students, 11.9% are retired people, 9.3% are employers, and 6% are unemployed people.

Figure 35: Demographic composition of the sample population

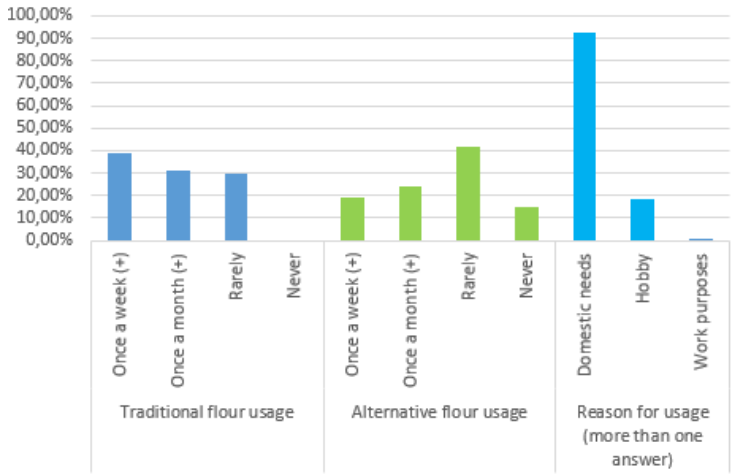


The questionnaire was developed through Google Forms, an online platform that is highly intuitive and quick to spread; answers were collected in July and in August 2023. Questions were designed mainly as closed-ended to effectively capture information related to consumer preferences and habits, both qualitative and quantitative. At the beginning of the questionnaire, respondents were ensured of data anonymity and confidentiality and gave their consent for the use of their answers for research purposes.

After the demographic part, the questionnaire introduces respondents to the world of flour, asking them the frequency of usage of traditional flour. 39.1% of respondents use traditional flour at least once a week, 31.1% use it at least once a month, and 29.8% rarely use it. The survey assessed also the reason behind the consumption of flour: the majority of people (92.3%) buy flour for domestic needs, 18.2% as a hobby, and 0.7% for work purposes. 76.2% of interviewed people have bought alternative flours at least once. For what concerns their usage, 19.2% of people use them at least once a week, 23.8% at least once a month, 41.7% rarely, and 15.2% of people have never used them. By comparing all these percentages, it is very clear that traditional flour still dominates the market, but later we will see that the level

of adoption and integration of alternative flour into consumers' culinary practices is increasing.

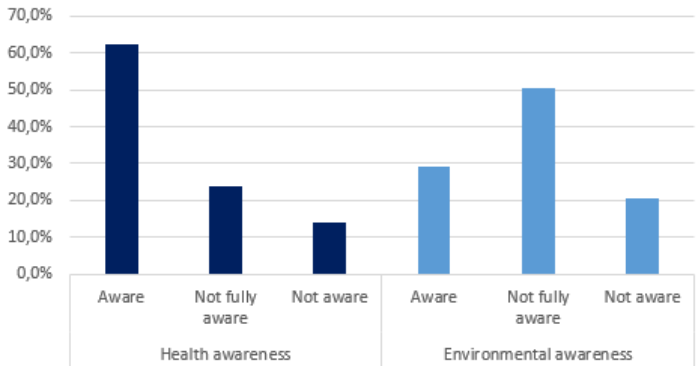
Figure 36: Traditional and alternative flour usage and reason



The questionnaire reveals that all respondents know about the existence of alternative flour, but not all of them are deeply informed about their health and environmental benefits, nor the issues behind the consumption of traditional flour. Indeed, the cultivation of traditional flour is associated with some environmental concerns, including deforestation and conversion of natural habitats into agricultural land, resulting in loss of biodiversity and ecosystem disruption. Significant amounts of water are also needed to irrigate traditional flour crops, which can lead to water scarcity and put stress on local water resources. The use of fertilizers and pesticides, as well as the intensive use of energy and greenhouse gas emissions, contribute to enlarging the environmental impact of traditional flour. Among the respondents, 39.1% are well-informed about these issues, and 50.3% have little knowledge but has not a deep awareness about the topic. However, 20.5% of the people interviewed had no information at all. As for the impacts on health, traditional flour has many positive effects on our bodies, it is rich in nutritional value and fiber, and it is a source of energy essential for brain function and physical activities. Nonetheless, traditional flour causes some negative repercussions on health as well, including weight gain and obesity, spikes in blood sugar levels, and problems like gastrointestinal discomfort for individuals with celiac disease. Moreover, processed wheat-flour food often lacks essential nutrients and may contain added sugar and artificial additives, which can have negative effects on health when consumed in

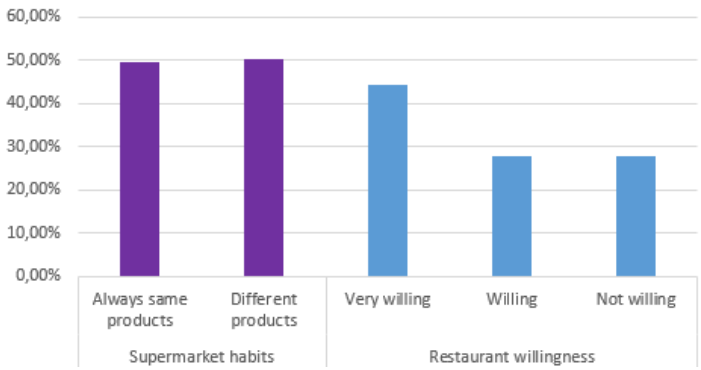
excess. Of the interviewed people, 62.3% are aware of all of these negative consequences, 23.8% have heard about it but are not well-informed about the topic, and 13.9% do not know anything about it.

Figure 37: Health and environmental awareness



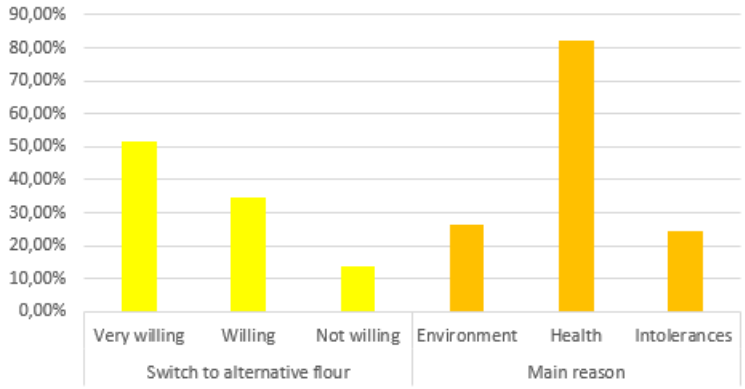
The following part of the questionnaire is an attempt of understanding consumers' habits in environments like supermarkets and restaurants. One of the questions was meant to investigate whether they are creatures of habit or people who like to vary. The sample population here is almost perfectly divided into two: 50.3% of respondents always try to buy new products at the supermarket, while 49.7% prefer to buy the same products. Then, another question tested to which extent consumers are willing to order food containing alternative flour at the restaurant: answers were mainly positive, with 44.3% of respondents being very willingly, 27.8% being willingly, and just 27.8% being reluctant.

Figure 38: Consumers' habits at the supermarket and willingness to order alternative flour dishes at the restaurant



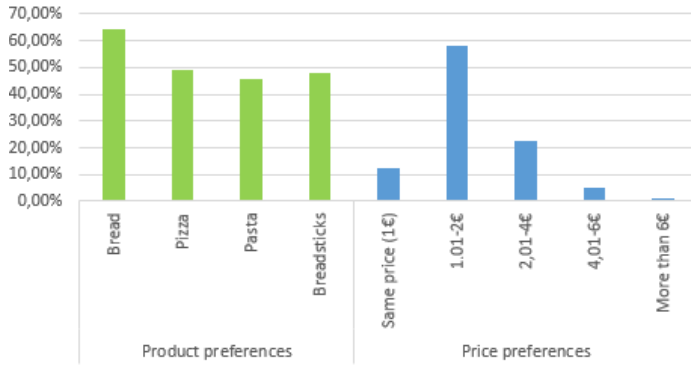
This last question laid the foundations for the investigations on consumers' inclination toward alternative flour. The positive results were confirmed by the answers to the question "How much are you willing to switch from a traditional to an alternative flour?". 51.6% of people, in fact, is highly willing to switch to alternative flour, 34.4% is willingly to do it, and just the 13.9% prefer to keep using traditional flour. Moreover, respondents were interviewed about the reason – among environmental impact, health impact, celiac disease, or other intolerances - that makes or would make them buying alternative flour. The prevalent answer, chosen by 82.1% of individuals, was for health impact. According to them, of less importance was the impact on the environment, chosen by 26.5% of respondents. 24.5% of people purchase or would purchase alternative flour because of celiac disease or other intolerances.

Figure 39: Willingness to switch to alternative flour and the main reasons



Another question regarded the type of product that people prefer or would prefer when consuming alternative flour. Respondents had the possibility to give more than one answer; most of them chose bread (64.2%), followed by pizza (49%), breadsticks (47.7%), and pasta (45.7%). To attribute a monetary value to their flour preferences and to understand their willingness to pay, respondents were asked: "If traditional flour costs €1, how much are you willing to pay for alternative flour?". What evinced is that 12.6% of individuals are not willing to pay more than how much traditional flour costs, 58.3% are willing to pay between €1.01 and €2, 22.5% are willing to pay between €2.01 and €4, 5.3% are willing to pay between €4.01 and €6, and 1.3% is willing to pay more than €6.

Figure 40: Product and price preferences for alternative flour

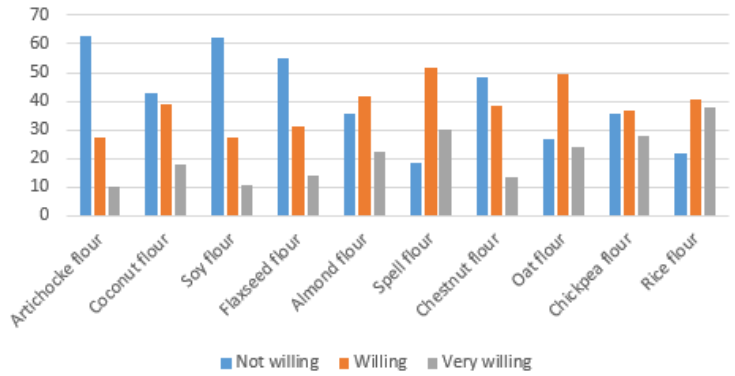


The questionnaire also provided a box to allow people giving additional information, feelings, or comments about non-traditional flour. A shared belief between several participants is that people have little information about alternative flour and their benefits, and that there is the need to be educated about that. Indeed, some people got the chance to approach this world only because of their children with celiac disease, and using alternative flour became a necessity. Respondents also stated that, from the moment that they adopted non-traditional flour, their health improved thanks to the enormous nutritional values provided. According to a participant, if wheat flour is considered less healthy than alternative flour, the latter should cost less. He continued by stating that alternative flour is expensive and rare to be found at the supermarket. In fact, he claimed of never having heard about oat, flaxseed, soy, and artichokes flour. Moreover, one of the main problematics for people willing to try dishes containing alternative flour at the restaurant is the unavailability of places were to try them. Even worse, many celiac individuals find it difficult to go out for dinner given the scares presence of restaurants offering gluten-free courses.

Figure 41 summarizes consumers' preferences about the different alternative flours. The questionnaire provided respondents with a list of non-traditional flours (artichoke, coconut, soy, flaxseed, almond, spell, chestnut, oat, chickpea, and rice flour). People interviewed were asked to reveal whether they were willing, not willing, or very willing to buy each type of flour. The alternative flour that respondents are "very willing" to buy is rice flour, chosen by 37.54% of respondents, followed by spell flour (chosen by 29.8% of respondents) and chickpea flour (chosen by 27.81% of respondents). However, people are "willing" to purchase oat flour (49.66% of respondents), almond flour (41.72% of respondents), and coconut flour

(39% of respondents). If we consider "willing" and "very willing" as a unique variable, spell flour is the most preferred alternative flour (81.45% of respondents), followed by rice flour (78.14% of respondents), oat flour (73.5% of respondents), chickpea, and almond flour (64.23% of respondents each). Among the least chosen alternative flour there are artichoke flour (62.91% of not willing respondents), soy flour (62.25% of not willing respondents), and flaxseed flour (54.96% of not willing respondents).

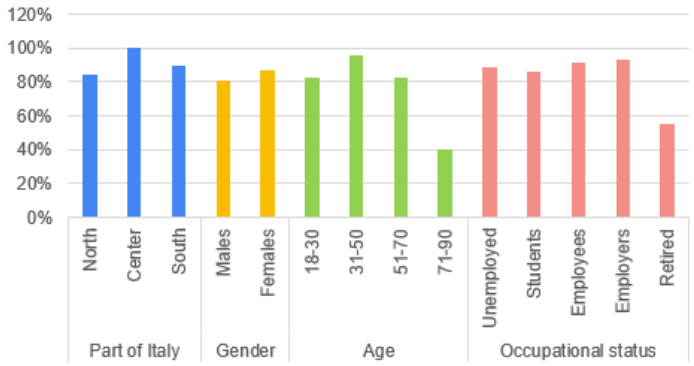
Figure 41: Consumers' preferences about alternative flours



By further analyzing the data gathered by the questionnaire, we can obtain more specific details about consumers' preferences. We will understand which categories are most involved or inclined towards the consumption of alternative flour. First, people that most make use of flour in general are women employees between 31 and 50 years old, who accounts for 14.56% of the entire population. The same category is the one that most declared having bought alternative flour at least once (21.9%), followed by students between 18 and 30 years old (14.56%). Again, people that use alternative flour at least once a week or at least once a month are employees between 31 and 50 years old, followed by employees between 50 and 70, and students. Regarding the propensity to order dishes containing alternative flour at the restaurant, 83% of interviewed people from the South are willing to do so, followed by the Center (71%), and the North (69%). From the occupational status point of view, unemployed were the most inclined (88%), while retired people the least inclined (44%). Men showed a slightly higher interest in doing so with respect to women, with the 75% against the 71%. Finally, people between 31 and 50 years old are the most willing (87.8%) to order alternative flour dishes, followed by people between 18 and 50 (67%),

people between 51 and 70 (62%), and people between 71 and 90 (60%). For what concerns consumers' awareness about environmental issues caused by wheat cultivation, employees between 31 and 50 years old are the most informed about the topic, while students between 18 and 30 are the least informed. The same trend concerns the health issues given by the excessive consumption of wheat flour. 18-30 year-old people are also the ones that prefer to always buy the same products at the supermarket, while 51-70 and 71-90 year-old employees try to purchase also new products. This would suggest that those kind of people are also the one most willing to switch from a traditional to an alternative flour. In fact, according to the questionnaire's answers, people between 31 and 50 years old are more inclined to adopt this change in their culinary habits: 96% of them have declared their willingness to switch to alternative flour, followed by individuals between 18 and 30 (83.6%), and individuals between 51 and 70 (83%), while just 40% of people between 71 and 90 years old are willing to do so. Women are slightly more inclined to adopt this change in their dietary habits, showing a willingness to switch to alternative flour of 87.85% against the 81.81% of men. Lastly, all the people interviewed from the Center of Italy are willing to welcome this change, while 90% for people from the South and 84% for people form the North.

Figure 42: Consumers' willingness to switch from traditional to alternative flour by category



For what regards the reason behind this choice, each category stated that the most important element that they take into account is the impact on their health. In the North of Italy, people prefer bread and pizza for the consumption of alternative flour; in the South of Italy, people prefer bread; while in the Center of Italy, bread and pasta are the most chosen. From the age point of view, people between 18 and 30 choose bread and crackers, but are reluctant to

involve pizza in the consumption of alternative flour. 31-50 year-old people choose bread and pizza in the same extent, followed by pasta and crackers; 51-70 year-old people prefer bread and are reluctant to include pasta, while 71-90 year-old people prefer bread and pasta for the consumption of alternative flour. In terms of occupational status, unemployed people like bread and dislike pasta for the alternative flour's use; employers prefer crackers and bread; employees prefer bread; retired people prefer bread and pizza, while students prefer bread and crackers. Regarding the price for alternative flour, the majority of each category agrees that, if traditional flour costs 1€, alternative flour's cost should range between 1.01€ and 2€. This means that people attribute a higher value to alternative flour compared to traditional flour. Of the various alternative flour, rice, spell, almond, flaxseed, coconut, and chickpea flour are chosen mostly by 31-50 year-old employees; oat flour by people between 18 and 30 years old; chestnut and soy flour by people between 51 and 70 years old, while artichoke flour was chosen by 18-30 and 31-50 year old people in the same extent. For what concerns gender, the majority of men and women have the same preferences for the various alternative flour, except for chestnut flour: most men are willing to purchase it, while the majority of women is not. The same trend occurs for South and North of Italy: people generally agree on their willingness to purchase the different alternative flours, apart for chestnut flour, chosen by the majority of people from the South but not from the North. Even if people from the Center interviewed were just a few, all of them are inclined towards the consumption of alternative flour. In terms of occupational status, students are the category that is most inclined towards the consumption of artichoke flour (50%), while retired people the least inclined (77%); for coconut flour, unemployed people are the most inclined (66%), while retired people are the least inclined (72%). For soy flour, retired people are the most willing (55%), while employers the least willing (64%) to buy it; students are the most willing (50%), while employers are the least willing (71%) to buy flax seed flour. Again, students are the most willing (70%), whereas retired people are the least willing (55%) to buy almond flour; employers are the most willing (93%), whereas unemployed people and employees are the least willing (33%) to purchase spell flour. Chestnut flour is preferred by unemployed people (66%), but not by employers (57%); students are the most willing (83%) to buy oat flour, and at the same time the majority of all the other categories is willing to do so. Students are also the most willing to buy chickpea flour (76%), whereas retired people

are not (61%). Finally, rice flour is mostly chosen by employers (85%), but also the majority of all the other categories is inclined to purchase it.

The main objectives on which the questionnaire was built were understanding consumers' perceptions of alternative flour and their willingness to incorporate it into their culinary practices. Moreover, of great relevance was examining the various categories composing the sample population, grasping the differences in opinions among them, until detecting the ones that are more inclined to adopt alternative flour. What evinces from the analysis of the questionnaire is that the majority of people is still stuck to traditional flour. Indeed, people that make use of traditional flour at least once a week correspond to 39.1% of respondents, while only 19.2% for what concerns alternative flour. Again, the percentage of people using traditional flour at least once a month surpasses the percentage regarding alternative flour (31.1% against 23.8%). Nevertheless, the questionnaire was able to capture encouraging answers: all the respondents are aware of alternative flour's existence, and 76.2% of them have bought alternative flour at least once. Moreover, 72.1% of people interviewed declared to be willing to order dishes containing alternative flour at the restaurant. Even if 49.7% of respondents always buy the same products at the supermarket, 86% of the sample population have a propensity for switching to alternative flour. This shows that, even though individuals are still tied to traditions and are surrounded by traditional flour, they are also willing to welcome and embrace alternative flour in their culinary habits, especially for the health benefits provided. To be more specific, the part of Italy that showed more interest for alternative flour is the Center of Italy, even if, as already stated, this datum is based on just few answers. For what concerns age, people between 31 and 50 years old are the most willing to switch to alternative flour, followed by individuals between 18 and 30. In the same way, employees and students are the most inclined, while retired people (and thus also individuals between 71 and 90), are those that prefer to remain loyal to traditional flour. Finally, men and women showed approximately the same preferences over the topic.

As specified before, the sample population was mainly composed of people from the North of Italy. This fact can constitute a demographic bias: the questionnaire suggests that people from the Center of Italy are the most willing to buy alternative flour, but with more

respondents from different areas, the answers could change. The same result could be obtained if we increase the percentage of men of the sample population.

3.2 Opportunities and challenges

The overwhelmingly positive consumers' perceptions about alternative flours carry several meaningful implications for this industry. First, these favorable considerations indicate growing market potential for alternative flour products. This represents a valuable opportunity for already established businesses to expand their product lines and for startups to enter the market, capitalizing on the rising demand for healthier and more diverse food options. Moreover, positive perceptions provide a platform for innovation: businesses can develop new products that combine alternative flours with other health-enhancing ingredients, being able not only to attract consumers, but also to differentiate in a competitive market. This can be useful also to attract investment and partnership opportunities with retailers, distributors, or even culinary experts that can further amplify market potential by increasing product viability and accessibility. It is of essential importance for businesses to tailor marketing activities, product development, and distribution to leverage this market potential effectively. According to the suggestions left at the end of the questionnaire, a great opportunity for restaurants is providing dishes containing alternative flour. 72.1% of respondents are willing to try those dishes at the restaurant, but many of them declare that places like that are still missing nowadays. Indeed, even though the percentage of people with celiac diseases or other intolerances is increasing over the years, often they are still forced to renounce having dinner at the restaurant due to the scarce offering of gluten-free products. This could represent an excellent opportunity for restaurants and businesses for introducing alternative flour meals.

Since the questionnaire revealed that behind the adoption of alternative flour there are mostly the health benefits provided, businesses could focus on the health-conscious segment of the market. This health and wellness trend reflects a growing consumer awareness and emphasis on making choices that promote overall well-being. For businesses, understanding these trends can lead to various opportunities, thus it is crucial to highlight the nutritional benefits and the functional attributes of products during marketing activities. In particular, companies should use clear labeling to communicate all the health benefits of alternative

flours, helping consumers make informed choices while shopping. In fact, many comments that some respondents gave in the questionnaire regarded this topic: people need to be educated about all the health benefits that alternative flour provide. Of less importance – according to consumers' answers – but still relevant is the sustainability of some alternative flours. Brands can emphasize how choosing them contributes to eco-conscious consumption, underlining the low impact that they have on the environment.

Entering the alternative flour market presents several opportunities, but at the same time, one should also consider the challenges. According to the questionnaire's answers, 56.9% of respondents have never used or rarely use alternative flour, and as such, many consumers might not be familiar with alternative flour and their uses, but rather accustomed to using traditional wheat flour. Consumers might be unsure about how to use alternative flour in their recipes, given the unfamiliar taste, texture, and ratios required. Consequently, convincing and educating consumers about how to utilize them effectively can be a challenge. It may be useful to create educational contents informing consumers about the various types of alternative flours available and their nutritional benefits using social media or workshops. Moreover, it may be helpful to develop a collection of recipes that specifically use alternative flour, together with instructions, guidelines, and measurement conversions. Even for companies, finding the right taste and texture may be problematic in the development of alternative flour. In fact, the addition of new ingredients does not always allow the preservation of the desired qualitative and sensory characteristics of the finished product. Indeed, variability in taste, texture, and performance may lead to consumer dissatisfaction and reduced trust in certain brands and products. Hence, innovation strategies and new components require appropriate technological processes to obtain products capable of preserving their nutritional properties and maintaining a high quality, essential for their success in the market.

Another problem derives from the price of alternative flours: many of them, especially those made from specialty ingredients, are more expensive than traditional flour. Consequently, it might be onerous to price products competitively while conveying their value. In accordance to what evinced from the questionnaire, 12.6% of respondents are not willing to pay more than how much traditional flour costs, meaning that a part of potential consumers should be

already left out. The majority of people (58.3%) is willing to pay only between €1.01 and €2, reaching but not exceeding twice the price of traditional flour, and 22.5% is open to pay up to €4. If alternative flour costs more, only 6.6% of respondents would be willing to purchase alternative flour. This can be a problem in the case a company faces high production costs, particularly if it uses specialty ingredients. To offset the issue, it is important to highlight the benefits that justify the higher price, as better nutrition or unique flavors, or trying to offer alternative flour in smaller packaging options, allowing consumers to buy the product without committing to large quantities and prices.

Another challenge is related to limited consumer acceptance. Actually, the questionnaire reveals that 86% of respondents is willing to switch to alternative flour, but when people were provided with the list of the main alternative flours, the percentage decreased. According to their answers, 81.46% of respondents are willing to buy spell flour, 78.15% to buy rice flour, 73.51% to buy oat flour, 64.24% to buy chickpea and almond flour, and 56.95% to buy coconut flour. 51.66% of respondents are willing to buy chestnut flour, 45.03% to buy flaxseed flour, 37.75% to buy soy flour, and 37.09% to buy artichoke flour. To find these percentages, the "very willing" and "willing" variables were put together. Consequently, people declare to be willing to switch to alternative flour, but not all of them are ready to do it. While positive perceptions are growing, some consumers are still hesitant to change their well-established culinary habits, and this might lead to resistance when trying new ingredients like alternative flour. Addressing such problematics might be challenging; it requires a combination of education, relatability, and positive experiences, as well as communication and gradual transition. In this way, companies can overcome limited consumer acceptance and encourage open-mindedness toward the incorporation of alternative flour into the culinary repertoire.

Other challenges, not related to the questionnaire's results but still worth to be mentioned, are linked to market competition and labeling regulations. The alternative flour market is growing, leading to increased competition from both established and new players. Thus, it is crucial for companies entering this market to identify and emphasize the elements that make their alternative flour unique, focusing on differentiation and brand identity, as well as on nutritional content, taste, sustainability practices, and innovation. Building consumers' trust

by being transparent about the sourcing, production methods, and ingredient quality is also of great importance. In a competitive market, finding space in retail store or online marketplaces can be difficult due to the large number of product offerings and platforms' limited space. The key is targeting the market segment to serve: for example, if we choose the age target 31-50 detected in the questionnaire as the most interested age group to alternative flour, a solution can be selling products in large supermarkets, while in online platforms for age between 18 and 30. Even the marketing strategy has an impact while trying to reach the target audience; it is important to define a specific niche, a demographic or geographic target that can be served exceptionally well. As the questionnaire detected the Center of Italy as the most willing to buy alternative flour, a marketing strategy could be advertising a local recipe to be prepared by using alternative flour. This allows companies to align with the target audience, to build and maintain brand loyalty, and foster a sense of community and engagement with them. The other challenge regards labeling regulation and compliance, which can vary significantly among regions and countries. Labels should clearly indicate ingredients to protect consumers, even more if they consists in allergenic elements like nuts, and provide accurate nutritional information, crucial for consumer decision-making. An accurate labeling is vital for building consumer confidence and trust, avoiding misleading or incomplete information that can lead to skepticism and hinder brand loyalty. Careful consideration is also required when ensuring that the alternative flour offered is truly gluten-free. Companies must ensure that there is no cross-contamination risks during sourcing, processing, and packaging, while obtaining relevant certifications, essential for consumer safety and trust.

In conclusion, the analysis of the questionnaire within the alternative flour market paints a dynamic landscape that presents both promising opportunities and formidable challenges. Thus, the exploration of these opportunities must be undertaken with a keen awareness of the potential risks that can shape the trajectory of market entry and growth.

Chapter V: Circular Fiber's case study

The culinary innovation's world has witnesses a remarkable trend towards diversifying flour sources beyond the traditional staples like wheat. In this fifth and last chapter, we will delve into a fascinating case study that shines a spotlight on an innovative startup, Circular Fiber, which has harnessed the potential of artichokes to produce a unique and sustainable flour. As explored in earlier chapters, increasing awareness of health and sustainability has driven changing consumer preferences. Artichoke flour exemplifies the embodiment of these changing dynamics: not only it captures the essence of dietary diversity, but it also addresses environmental and nutritional concerns.

5.1 Startup's description

Circular Fiber is an innovative startup founded in 2022 by Nicola Ancilotto and Luca Cotecchia and based in Pordenone. Its goal is to collect waste from the agri-food industry transforming it into valuable products. After a thorough analysis of global food waste and the greenhouse gas emissions associated with it, the startup has chosen to focus on the artichoke industry. Circular Fiber has identified that agricultural waste can reach 75% when it comes to the production of artichokes. Italy alone produces over 300,000 tons of waste, which costs around 60 million euros for its disposal.[100] Furthermore, artichoke waste generates approximately 345 billion grams of CO_2 equivalent emissions in Italy. In light of this, the production of artichoke flour would reduce the costs for waste disposal, create value and revenues, and reduce the CO_2 equivalent emissions.

From here, their first product was born: Karshof, a functional, innovative, and ecological flour made from artichoke processing waste. Karshof is the only flour obtained from artichoke waste patented through an innovative industrial process, in line with the principles of circular economy and sustainability. Artichoke flour contributes to liver protection, normal fatty acid metabolism, and overall intestinal well-being, thanks to the presence of Cynarin and Inulin (6%). Furthermore, it is rich in Fiber (60%), Plant-based Proteins (13%), and Antioxidants; it contains Vitamins C and K, Iron, and Calcium.[101] This product is gluten-free,

[100] ISPRA, www.isprambiente.gov.it
[101] Circular Fiber, www.circularfiber.it

suitable for individuals with celiac disease, and has a low glycemic index, which also makes it suitable for people suffering of diabetes. Artichoke flour is also perfect for vegans and vegetarians. Karshof is ideal for making bread, pasta, pizza, desserts, and savory snacks. The idea is to use artichoke flour as a little percentage of the total flour used for making the different dishes: some tests have already been made, producing fresh pasta made of 12% Karshof, dry pasta (in collaboration with Sgambaro) made of 10% Karshof, bread (in collaboration with Grandi Molini Italiani) made of 9% Karshof, pizza made of 10% Karshof, and breadsticks made of 13% Karshof. Circular Fiber is exploring further applications for artichoke waste, such as textile fibers, eco-friendly bricks, bioplastics, and food supplements.

Circular fiber operates in a niche but rapidly evolving segment of the alternative flour and sustainable food markets. The startup finds itself in the alternative flour market, as it provides flour from a different source than the traditional one, but more specifically, it is a player in the sustainability-focused segment of this market. To be precise, Circular Fiber can be inserted also in the market for recycled food products. Indeed, the startup's core mission revolves around preventing artichoke waste. This market has globally reached $60.5 billion in 2023 and is estimated to reach $97 billion by 2031, having an annual growth rate of 6.2% from 2022 to 2031.[102] This trend is driven by the increasing awareness of the importance of reducing food waste and maximizing available resources, and Circular Fiber has well captured it when developing its product. However, the potential of this startup does not limit to environment considerations, but rather embraces also nutritional and health concerns, as we previously saw the high nutritional value that artichoke flour provides. The success of this startup depends, in part, on consumer awareness and education about the benefits of this flour and its various application. In fact, these elements are driving forces in this market, with consumers seeking products that align with their values and lifestyle choices. Moreover, the market is characterized by innovation-driven startups willing to explore non-traditional sources for alternative flours; in this field, entrepreneurial spirit and innovative thinking are the key drivers for success.

[102] EIT Food – European Union, ReFED, Sant'Anna, School of advanced studies

To better understand the market and its profitability, Figure 43 presents the revenues, EBITDA, and EBITDA margin of the Italian competitors of Circular Fiber. In the next paragraph, these competitors and the competition of the market in general, will be discussed in detail. For the moment, the objective is to capture the main features of a niche market, characterized by sustainability, health concern, and innovation. These companies are startups, in their first years of life, part of a market that can be considered niche more than the alternative flour companies can. As we can notice from the table, zero or low revenues, negative EBITDA and EBITDA margin mark the first years of life of sustainable alternative flour startups. Moreover, trends do not follow a regular path, negative or positive, but rather they fluctuate. However, having low and uncertain returns is typical for startups, especially in their early stages. Actually, startups may not have had the chance to generate significant revenues, and it takes time to establish a customer base, refine products, and gain traction in the market. Even validating the business and the product-market fit is not immediate; it might require experiments with different approaches before finding the most suitable strategy. Moreover, some companies may prioritize short-term profitability – as it can be the example of G.S. Natural – while other may focus on growth and market expansion first. It took three years of zero revenues for Circular food to finally having positive values in revenues, with the EBITDA and the EBITDA margin still negative. Packtin and G.S. Natural seem to be more stable in values, even if some amounts are still negative. Nonetheless, there is great potential of having high values for the EBITDA margin, as Packtin had from 2018 to 2021.

Figure 43: Revenues, EBITDA, and EBITDA margin for sustainable flour startups[103]

	Packtin			G.S. Natural			Circular food		
	Revenues	EBITDA	EBITDA margin	Revenues	EBITDA	EBITDA margin	Revenues	EBITDA	EBITDA margin
2017	0	-18.771		-	-	-	-	-	-
2018	24.360	7.117	29,216	-	-	-	-	-	-
2019	82.656	49.937	60,415	15.000	9.288	61,920	0	-7.563	n.s.
2020	100.686	16.066	15,957	4.611	-40.855	-886,033	0	-97.642	n.s.
2021	117.279	111.395	94,983	55.350	33.679	60,847	0	-74.669	n.s.
2022	74.599	-98.791	-132,429	-	-	-	4.233	-107.982	-2550,957

[103] AIDA. Packtin, G.S. Natural, and Circular Food's financial statements. https://aida-r1.bvdinfo.com/

5.2 4C Framework

In today's rapidly evolving business landscape, success depends not only on the quality of a product, but also on the ability to navigate and adapt to complex external factors. The 4C framework offers a comprehensive lens through which to assess a company's strategic positioning and its capability to thrive in a competitive environment. This framework encompasses four critical dimensions: Competitors, Customers, Costs, and Capabilities. To analyze the 4C framework of this innovative startup, we will delve into each dimension to gain insights into its strategic landscape and its ability to flourish in the realm of alternative flours, sustainability, and innovation.

The "Competitors" dimension centers on evaluating the competitive landscape in which Circular Fiber operates. This includes an assessment of competitors, their strengths and weaknesses, market positioning, and strategies. Direct competitors, offering similar products and targeting the same customer segments, include other sustainable food startups that focus on waste reduction and environmentally friendly products. These companies are Packtin, G.S. Natural, and Circular food for what concerns the Italian market.

Packtin is a startup based in Reggio Emilia and founded in 2017 with the aim of limiting and eliminating food waste, valorizing unutilized sub products in order to obtain valuable quality, healthy, and sustainable food. Packtin produces environmentally friendly, 100% vegetable, gluten-free, and OGM-free flours. Among the startup product line, there are orange peel (blond and red), tomato peel, carrot, pinapple, okara oat, and ginger flour, even though in their online website only orange peel (blond and red) and ginger flour are available. Thanks to the low temperature drying process, Packtin orange peel flour retains even the most delicate active ingredients like Vitamin C (81mg/100g). The company suggests to add 3-5% of these flour with respect to the quantity of traditional flour. For what concerns prices, Packtin's flour is sold in packages of 200g or 1kg. Blond orange peel flour's price is 5.81€ for packages of 200g, while 26.5€ for 1kg packages; red orange peel flour' price is 6.18€ for packages of 200g and 30€ for packages on 1kg; ginger flour is sold for 3.92€ for 200g packages, while for 37.90€ for 1kg packages.[104]

[104] Packtin, www.packtin.com

G.S. Natural is a startup founded in 2019 and based in Udine, with the aim of valorizing unutilized resources producing functional products for people's wellness using innovative processing technologies. The startup extracts floured fruit, vegetables and wine intended for use in the food sector. G.S. Natural is specialized in the production of red grapes seeds flour, which presents precious nutritional contents, in particular the high fiber content (55g over 100g), polyunsaturated and monounsaturated fats (30g over 100g) and a fair amount of proteins (10g over 100g). It contains 2% of carbohydrates and 5% of sugars.[105] The product should be added to whole-wheat flour in order to create unique baked products, such as crackers, breadsticks, biscuits, pizza, and cakes. Red grapes seed flour is ideal also for individuals affected by celiac disease and other intolerances.

Circular food is another startup, based in Castelfranco Veneto and founded in 2019, which aims to transform raw materials destined to be discarded into healthy and tasty food products. The company produces flours with the resulting products from the processing of distilled and fermented spirits including whisky, gin, soy sauce, and vodka. Circular food started its project by working on brewery production waste: beer thresh. The product is called Ley, and it is used for the production of flour, pasta, bread, pizza, snacks, and crackers. Beer flour has a high content of fiber (52%) and proteins (20%), and it represents an important source of mineral salts. Unfortunately, this type of flour is not suitable for individuals with celiac disease. At the moment, only pasta made with beer flour is available for online purchase; crackers and beer flour will be available soon. Beer flour pasta is sold in six packages of 250g each for a total of 21€ (3.50€ each package, 14€/kg). It is made of 20% of beer flour and 80% of durum wheat flour. It is rich in fiber and proteins (14g each in a 100g portion).[106]

For what concerns the global market, there are other companies involved in this type of activity: Agrosingularity in Spain, Renewal Mill and Hyfé in the United States, Re:harvest in Korea, and GroundUp in Canada.

[105] G.S. Natural, www.gsnatural.it
[106] Circular Food, www.circularfood.it

Agrosingularity recoveries plant byproducts after post-harvest and uses them as functional ingredients for flour, including artichoke flour.[107] By drying and grinding plant milk byproducts such as soy, oat and almond pulp, Renewal Mill produces flours rich in fiber and protein that serve as ingredients for cakes, biscuits and other recipes.[108] Hyfé has been perfecting a fermentation process aimed at taking the discarded water from beverage production facilities for turning it into mycelium flour, high in fiber and protein.[109] Re:harvest is specialized in the production of flour made from the byproducts of barley that have been used to make beer and sikhye, a Korean traditional rice drink. They declare that, by using 1kg of their flour, 11kg of carbon and water reduction is possible.[110] Finally, GroundUp created a gluten-free flour from used coffee grounds, containing twice as much protein as rice flour.[111]

Overall, the "Competitors" dimension does not involve a large number of competitors, as the market is an emerging one. Consequently, from this point of view, Circular Fiber faces low competition. Moreover, the company is the only one producing artichoke flour in Italy, and this describes in what extent their product is unique. Artichoke flour is innovative and boasts distinctive features that set it apart from other competitors. Moreover, the alignment of the product with current market trends - sustainability and health consciousness – makes the product attractive for conscious consumers. Other innovative flours companies boasts high nutritional values for their flours, but Circular Fiber offers more advantages. Circular food's beer flour contains 52% fiber and 20% proteins (against 60% fiber and 13% proteins of Circular Fiber), but the former is not suitable for individuals affected by celiac disease, as it contains gluten. Packtin's flours, such as orange peel flour, contain less nutritional values than artichoke flour (34% fiber against 60%, 5% proteins against 13%). G.S. Natural's red grape seed flour is the one that most approaches to the nutritional values of artichoke flour (55% fiber against 60%, 10% proteins against 13%). However, Circular Fiber has a stronger focus on sustainability, as some of the objectives are reducing CO2 equivalent emissions and waste disposal's costs, while G.S. Natural's primary aim is valorizing unutilized resources. As

[107] Agrosingularity, www.agrosingularity.com
[108] Renewal Mill, www.renewalmill.com
[109] Rodriguez, A. (2022). «Hyfé Foods aims to combat waste with its innovative flour production process»
[110] John (2022). «Korean startups using recycled material to create cool products».
[111] GroundUp, www.groundupev.com

a result, Circular Fiber has strong competitive advantages from the nutritional and sustainable points of view. Nonetheless, even competitor strategies play a pivotal role in shaping the competitive landscape for Circular Fiber. Some competitors may adopt an aggressive pricing strategy to capture market share and offer lower-priced alternative flours. Indeed, from the questionnaire we discovered that most of respondents are price sensitive, and just a little percentage of them is willing to pay high prices for alternative flour. This is an opportunity for Circular Fiber to pose a direct challenge to other sustainable flour companies, capturing price-conscious consumers, especially if they represent a large share of the market segment. By staying attuned to competitor strategies and strategically adapting to changing market dynamics, Circular Fiber can position itself effectively while leveraging its unique attributes in the alternative flour market. Overall, we can state that the general level of competition that Circular Fiber faces is low.

For what regards the "Customers" dimension, it encompasses an in-depth understanding of the target market, including their preferences, behaviors, and needs. Circular Fiber's primary target are companies that produce and transform flour, while the secondary target is the final consumer. This means that the startup can encompass a range of stakeholders within the food and related industries, including food manufacturers and processors, restaurants, food service providers, food retailers, grocery chains, food innovators, or dietary supplement companies. Circular Fiber's artichoke flour can be used in various baked goods, making it appealing to companies specializing in bread, pastries, and desserts, or to business manufacturing snacks like crackers, chips, and snack bars to enhance product nutritional profiles. Restaurants may use artichoke flour to create unique dishes, and this can be a great opportunity, given the questionnaires' results. People, in fact, are very willing to order dishes containing alternative flour at the restaurant, but only few places offer these type of products. Artichoke flour can appeal also to cafes catering to health-conscious customers looking for gluten-free options. The nutritional benefits contained in this flour may attract dietary supplement companies looking to incorporate it into their products, while its sustainability can attract other foods startups and food recovery programs. For what concerns retailers, Karshof can be sold as a specialty or health food product in stores that cater to niche markets or in the health food sections of grocery chains. To target effectively these businesses,

Circular Fiber should focus on its marketing, sales, and distribution strategies. Highlighting the sustainability and health benefits of artichoke flour is the key strategy to capture the interests of each segment.

The "Cost" dimension for Circular Fiber involves the conduction of specific researches, both for what concerns the costs faced by the company and the comparison with other players operating in the market. As the startup has been founded in February 2022, the costs figures provide a snapshot of its financial situation for 2022. In its first year of operation, Circular Fiber incurred total costs amounting to €1,592. These costs were primarily categorized into two segments: services and other operating expenses. The majority of expenses (€1,199) represent 75.31% of total costs and were attributed to various external services to support the business operations. Such services may include consulting, marketing, legal, or any other professional services necessary for the startup to be established. The remaining €393, representing 24.68% of total costs, were allocated to other operating expenses, which encompass a range of daily operating costs. As the startup grows, Circular Fiber will experience increased costs associated with expanding production, hiring more employees, as well as investments in additional equipment or facilities. Moreover, additional costs derived from marketing & sales, as well as research and development should be incurred for making Karshof known, but also to develop the new products planned by Circular Fiber (textile fibers, eco-friendly bricks, bioplastics, and food supplements). Therefore, the growth and the evolution of the startup will bring changes in the cost structure.

Figure 44: Circular Fiber's cost structure (2022)[112]

	Circular Fiber		
	Total costs	Services	Other operating expenses
2022	1.592	1.199	393

For what entails the "Capabilities" dimension of the 4C framework, Circular Fiber has indeed a great team with the necessary knowledge and experience to succeed in this industry. Nicola Ancilotto, one of the two founders, has an executive MBA, is a corporate strategy and reorganization consultant, and has more than ten years of experience as Sales Director, while

[112] AIDA. Circular Fiber's financial statement. https://aida-r1.bvdinfo.com/

Luca Cotecchia, the other founder, has a degree in Industrial Biotechnology and ten years of experience in the Agro-Pharmaceutical field. The team is composed also by Marco Turriziani, reliable for the financial field, and Michele Prete, reliable for the Marketing part.[113] The startup has then unique skills, knowledge, and expertise in its team. For what concerns operational efficiency and infrastructures, the processing of artichoke waste is still entrusted to third parties. Moreover, Karshof is not yet on the market, and this makes it hard for the valuation of tangible capabilities of the startup. Everything should be assessed between the end on 2023 and 2024: Circular Fiber plans to place Karshof on the market at the end of this year, and to concentrate the entire production in its plant within a year.[114] That will be the moment for the startup to show its true capabilities, to build brand trust and loyalty, to create a network of relationships and partnerships, and to show its level of innovation and adaptability.

5.3 Business model and partnerships

This section undertakes a comprehensive exploration of Circular Fiber's potential business model, a model poised to disrupt the traditional paradigms of agribusiness. By examining the dynamics of this innovative startup, we aim to cover the underlying principles that guide its operations, adaptation to market forces, and strategies for its long-term viability in the competitive food industry landscape.

Driven by a vision of ecological responsibility and a commitment to address consumer dietary needs, Circular Fiber seeks to revolutionize the food industry. These are the values moving the startup and offered to customers. As previously presented, its main product is Karshof, flour made with recycled artichokes. Its objectives are to prevent artichokes' waste, reduce their disposal costs and greenhouse emissions, and to provide customers with a highly nutritive and healthy flour. In the future, the company plans to produce also textile fibers, eco-friendly bricks, bioplastics, and food supplements made of artichoke waste. The primary target of Circular Fiber are companies producing and transforming flour that shares its same values: sustainability and health. Companies producing flour, as well as transforming it into pasta, pizza, snacks, and similar products that want to reduce their

[113] Circular Fiber, www.circularfiber.it
[114] Santolin, R. (2023). «Farina dagli scarti di carciofo: l'idea di una startup veneto-friulana»

impact on the environment, as well as creating qualitative and healthy products, are those of most interest for Circular Fiber. To target these companies, it is crucial building strong partnerships, which can help Circular Fiber gaining visibility, reaching new markets, and enhancing its reputation. The collaboration can be done through various channels, including culinary experts and chefs, food bloggers, sustainability organizations and initiatives, and food manufacturers.

The most relevant partnership for Circular Fiber is the one with food manufacturers. Both companies can collaborate to create a new product that leverages the strengths and expertise of each partner. The idea is that Circular Fiber may collaborate with a pasta, pizza, or snacks manufacturer to develop a line of artichoke flour-based products. Indeed, the startup already cooperated with Sgambaro in order to test the production of pasta made with Karshof. Now that sustainability is a value acquiring increasing importance, even more companies and brands decide to side with the environment and this may be an opportunity for Circular Fiber. Collaborators leverage each other's distribution channels; the startup may collaborate with a pasta or snack manufacturer to distribute its artichoke flour-based snacks through the partner's established retail network. Brands like Nestlé, Buitoni, Barilla, Garofalo, Ferrero, Wasa, Gran Cereale, and Bauli are one of the most involved companies in the sustainability topic. In its sustainability report of 2022, Barilla shows how the company endeavours to reduce the impact of its products on the environment. For example, Barilla declared that its products' packaging is made only of 5.7% by plastic, while the remaining part is made of paper, cardboard, glass, metal, and flexible film. Moreover, in 2022 the greenhouse gas emission per t of finished product recorded were 32% smaller compared to 2010, and in the same time period the company succeeded in reducing by 24% the water per t of finished product used.[115] This year, Barilla has updated its goals in order to achieve its objectives, which include sustainable production through processes that are more efficient, lower energy consumption, and use of renewable energy, as well as collaborations with stakeholders in the Group's strategic supply chain. The aim is to share tools to promote more sustainable agricultural practices in terms of CO2 emissions, water consumption, use of

[115] Barilla Group (2022). «Barilla Group sustainability report 2022»

fertilizers and pesticides.[116] This could be an opportunity for Circular Fiber and for Barilla, as the two companies have the same values and objectives. They may develop a product line, priced at a premium, of Barilla and Circular's Fiber flour – with 90% of Barilla flour and 10% Karshof, for example – and related pasta. It can be highly beneficial for expanding product offerings, entering new markets, and leveraging shared resources. If well structured, the partnership can lead to growth and success for both the parties involved.

Another opportunity concerns how to reach restaurants and chefs. There is a platform called Deliveristo that creates an encounter between the world of producers and of restaurateurs, deleting the need for other intermediaries. 60% of the catalog regards niche and quality products, while 40% raw materials. The management of deliveries is charged to producers, but there is the possibility to entrust specialized carriers through partnerships. Currently, Deliveristo boasts more than 350 suppliers, more than 70,000 products, and 1,000 restaurants benefiting from this platform.[117] It would be a great chance for Circular Fiber to sell its product to restaurateurs. Indeed, Deliveristo would allow Circular Fiber to gain visibility and access to a broad customer base, to promote artichoke flour without further marketing efforts and expenses, and to enhance its credibility. Moreover, the specialization of Deliveristo in the distribution process would help to efficiently distribute Karshof, saving time and resources.

The secondary target of Circular Fiber is the final consumer: people with healthy dietary needs, individuals affected by celiac disease or other intolerances, and people with serious environmental concerns. Even though the startup is focused on the Business to Business, an idea is to plan the adoption of the Business to Consumers after the first years of life of Circular Fiber. Once acquired some experience in the B2B, the company can take advantage of what learnt to add the B2C to its model. This will bring higher revenues in a market full of opportunities. Indeed, in the last years, on social platforms such as Facebook, Instagram, or Tik Tok, there has been a rise in the interests for healthy lifestyles; consequently, users started to create and monetize on contents regarding this topic, providing advices, opinions about products, and recipes. Creating partnerships with such individuals is an opportunity

[116] Barilla Group (2022). «Barilla Group sustainability report 2022».
[117] Deliveristo, www.deliveristo.com

to gain visibility for Karshof, especially by people of age between 18-30, identified by the questionnaire as one of the most willing categories to buy artichoke flour. Examples of healthy food bloggers are Claudia Cecere (174,000 followers on Instagram, 29,000 followers on Tik Tok), Pasquale Cannatà (197,000 followers on Instagram, 224,000 followers on Tik Tok), and Adriana Kulchytska (923,000 followers on Instagram, 1.7 Mln on Tik Tok). Claudia Cecere usually employs oat flour and cares about healthy and fresh ingredients in her recipes, while Pasquale Cannatà and Adriana Kulchytska usually utilize traditional flour; a partnership with Circular Fiber can be an opportunity for them to show to their huge number of followers their commitment to health concerns. Starting a partnership of this kind can be highly advantageous for Circular Fiber. Fit food bloggers have a niche audience that aligns well with the health-conscious aspects of artichoke flour and have established credibility and trust with their followers. Moreover, bloggers can create unique recipes using Karshof, showing its versatility and nutritional benefits while providing positive reviews and comments that can serve as a social proof, encouraging others to try the product.

These are some of the strategies that Circular Fiber may adopt to gain customers and expand its market reach. Partnerships are relevant even from the distribution channel point of view: reaching and interacting with customers is easier when made through a collaboration. In the case that the idea of the Business to Consumer option will be explored, it would be useful having an online shop where it is possible to sell products, as nowadays shopping is becoming more and more digitalized. Having an e-commerce online platform allows consumers to find the product, to know its price and its extraordinary properties, but also to place orders conveniently.

From the end of 2023, Karshof will be on the market, and Circular Fiber will start generate revenues through its sale. As already anticipated, 100% of the revenue stream will come from the selling of artichoke flour to other businesses, in particular flour and flour-based manufacturers. Karshof will be sold in packages format of 1kg, 5kg, 10kg, and 25kg for a price that will range between 12€-18€/kg. The pricing strategy accounts for production costs, market demand, volume, contract duration, and competitive pricing in the field of sustainable and healthy alternative flours. Circular Fiber may offer volume-based discounts to incentivize larger orders from food manufacturers or subscription services with scheduled and

recurring deliveries of Karshof to ensure a consistent supply. In the future, Circular Fiber might increase its revenue stream by open to the Business to Consumers, allowing final consumers to buy artichoke flour through for example its website. By comparing Karshof's price that range between €12 and €18 per kilo to the prices of Packtin's flour (26.5€/kg for blond orange peel flour, 30€/kg for red orange peel flour, and 37.9€/kg for ginger flour)[118], it is clear that Circular Fiber would have a competitive price advantage, even if Packtin's prices regard B2C. If considered as convenient, not only the startup can sell its flour, but also products like pasta or snacks. As Circular Fiber will draw attention to environment-conscious people, the company can make additional profit by offering workshops, seminars, or consulting services to businesses, individuals, or in particular, to flour-based product manufacturers interested in adopting sustainable and nutritional practices in their operations.

For building a proper business model, a key point is the analysis of the cost structure and the projections for the future. As we saw in the previous section, Circular Fiber faced only services and other operational expenses costs in 2022. To have an idea of the potential cost structure that Circular Fiber can have in the following years, Figure 45 shows the costs incurred by its competitors. The three cost items analyzed, as it was for traditional and alternative flour companies, are raw materials, services, and personnel costs. On average, raw materials represent 5.76%, services represent 42.09%, while personnel costs represent 13.1% of total costs. Other relevant items are leased assets from third parties that represent 7.96% and depreciation that represents 18.6% of total costs on average. Even if we should be careful about the comparison with other markets – these companies are in their first years, while traditional and alternative flour companies are more mature and established - this market has lower raw materials costs; they represented 77.66% for traditional and 57.5% for alternative flour companies with respect to the total. On the other hand, services costs are higher compared to the 16.52% of the traditional and 24.44% of alternative flour companies, and the same happens for personnel costs (4% for traditional and 11% for alternative flour companies). The reason behind lower raw materials costs is the fact that the primary ingredients for flours are recycled. In this way, companies are repurposing a byproduct or

[118] Packtin, www.packtin.com

waste material that otherwise would be discarded, which leads to significant cost savings compared to purchasing new raw materials, even more if we consider the costs of wheat. However, there may still be challenges and costs associated with collecting, processing, and handling recycled raw materials. For this reason, these startups rely heavily on external expertise and professional services, which are costly but essential for ensuring product development, legal compliance, and financial stability. In the same way, Circular Fiber might face low costs for raw materials but higher costs for services and personnel in the future. Moreover, the startup has succeeded with the integration of the upstream supply chain, which will guarantee Circular Fiber a direct and zero kilometers supply of artichokes, reducing transportation costs.

Figure 45: Cost structure of Circular Fiber's competitors[119]

	Packtin				G.S. Natural				Circular Food			
	Total costs	Raw materials	Services	Personnel	Total costs	Raw materials	Services	Personnel	Total costs	Raw materials	Services	Personnel
2017	31.168	270	21.035	0	-	-	-	-	-	-	-	-
2018	57.836	1.881	49.202	0	-	-	-	-	-	-	-	-
2019	93.460	297	54.907	12.387	39.849	8.238	11.415	8.745	7.563	386	7.094	0
2020	115.454	2.090	69.413	15.115	125.348	18.379	26.791	30.923	97.642	2.226	88.084	0
2021	196.182	5.865	81.507	23.605	159.827	7.516	25.244	17.984	82.271	3.142	42.177	12.028
2022	325.800	7.432	137.859	36.434					208.089	16.134	81.087	33.057

At its core, this business model is not merely a framework for profit generation; it is the proof of the power of conscious entrepreneurship. By repurposing artichoke waste into a high-nutritional flour, Circular Fiber endeavors to redefine both the raw materials used in the food industry and the expectations of health-conscious consumers.

5.4 Funding

Converting a vision of sustainable and innovative food into reality often requires more than just a brilliant idea. One of the fundamental challenges faced by entrepreneurs in the agri-food sector is obtaining the necessary funding to make their concepts real. In this section, we will delve into the world of funding options available to Circular Fiber.

First, it is important to talk about incubators and accelerators and the role they have for startups. Incubators and accelerators provide startups with mentorship and resources in exchange for equity, and they often connect startups with industry experts and potential

[119] AIDA. Packtin, G.S. Natural, and Circular Food's financial statements. https://aida-r1.bvdinfo.com/

investors. Incubators essentially provides physical workspace, access to services like conference rooms, internet connection, and networking opportunities. Accelerators offer professional strategic consulting services, ranging from business definition to team formation, from fundraising to the product launch in the market. The average duration of an acceleration program ranges from six months to a year, while an incubator can last up to thirty-six months. In Italy, there is a total of 237 active accelerators and incubators, operating with 3600 startups and earning €550 million.[120] These alternatives can be valuable opportunities for Circular Fiber to accelerate its growth and build a strong network, but they are not direct sources of funding themselves. Instead, they often provide valuable resources that can help startups prepare for and secure funding from early-stage investors, venture capitalists, or angel investors.

Common ways that food startups use to secure funding, apart from self-funding or friends and family funding, are through Crowdfunding, Venture Capital firms, Angels Investors, and Government grants and subsidies.

Finding liquidity to support one's business may not be straightforward, especially for fields like agri-food, where competition and average quality are extraordinary high. However, crowdfunding can prove to be particularly advantageous for such fragmented sector. This method of funding is globally spread for investments in the agri-food sector, while for Italy, even though this industry contributes to 15% of the GDP, investments of this kind amount to only 1% of the total invested in Europe.[121] Since 2019, even more businesses operating in the food industry has started using crowdfunding. Crowdfunding can have different forms: equity crowdfunding, in which investors acquire some of the shares of the company, crowdfunding donation based, in which investors do not receive anything in exchange, lending based crowdfunding, a sort of loan repaid by interests, and reward based crowdfunding, providing investors with some rewards, which may consist in food and beverage in the case of the food industry. The most common type of crowdfunding is equity

[120] Marino, F. (2022). «Acceleratori e incubatori: dove andare per far nascere un'impresa»
[121] Artigiani, R. (2020). «Crowdfunding e food: come trovare fondi online per startup agroalimentari»

funding, and the most used platforms in Italy include Crowdfundme, Mamacrowd, Backtowork, and WeAreStarting.

By exploring the different investment opportunities that these platforms offer, some projects with the same purposes of Circular Fiber appeared. The first one is Biova Project, a startup that use bread waste and transform it into beer, obtaining then economic and environmental advantages, saving valuable raw materials and promoting sustainability and waste reduction. The startup used BacktoWork as crowdfunding platform and planned to raise €50,000 at minimum and €300,000 at maximum. At the end, the campaign was concluded with €59,250 raised, 2.17% of equity distributed, and 42 subscriptions. The platform provided for different modalities of investment, ranging from a minimum of 250€ to a maximum of €20,000, and including rewards such as 10%-20% discount for online purchases, t-shirts, Biova beers, glasses, and voting rights. The funds raised will be employed for marketing activities (70%), Research and Development (20%), and Human Resources activities (10%).[122] The startup raised funds also through the platform CrowdFundme, with €600,000 raised in about two months in exchange for 15.4% of equity. The minimum investment was €500 and foresaw two possibilities: one involving shares' purchase and voting rights, and one involving the shares' purchase only. 40% of the funds raised will be allocated to the development of new regional hubs for the collection, storage, and processing of unsold bread, aimed at expanding its distribution channels in new territories. 30% of the funds will be invested in marketing activities and promotion of the Biova Project brand, while the remaining 30% will be dedicated to HR for the recruitment process.[123] Finally, Biova Project has started a campaign exactly today (September 13th, 2023) through Mamacrowd, which will last fifty-eight days. The startup plans to raise between €399,999 and €1,64 mln, with a minimum investment of 494.55€, which includes a reward of 10%-20% discount on the online products. The funds raised will be employed to enlarge the capacity to recover and transform surplus food; to expand the sales and trade marketing agent network; to introduce complementary products to accompany the existing beer range; to expand the Research and Development department, and to start a multi-channel campaign aimed at increasing brand awareness in the mass

[122] Backtowork, www.backtowork.com
[123] Crowdfundme, www.crowdfundme.it

market.[124] Biova Project started the first crowdfunding operation (on BacktoWork) with a pre-money value of €2,673,636; continued on Crowdfundme with a pre-money value of €3,300,000, and on Mamacrowd with a pre-money value of €6,000,000. This shows how much efficient and valid is this type of funding process.

Another startup that resorted to crowdfunding is Small Giants, an innovative SME that commercializes snacks and meat substitutes made from insect flour. Small Giants is different from Circular Fiber, but shares the same values: sustainability and health. The startup's products, in fact, boast high levels of proteins, vitamins, and minerals, and represent a sustainable protein source. Small giants chose Mamacrowd as platform for the campaign, which ended in July 2023, and had a pre-money value of €3.7 million. The startup was able to raise €787,901, exceeding the minimum goal of €200,000. The number of investors is 469, which could invest at least €249.28 and obtain as a reward from 10% to 30% of discount for Small Giants's products online. The fundraising activity will support the growth of the startup (14%), increase marketing (60%) and R&D activities (9%), and strengthen the team composition (17%).[125]

Generally, by looking at Mamacrowd and Crowdfundme, the fundraising activity for the food and sustainability sector is always successful. Eso Recycling, specialized in the recovery of discarded sports accessories and industrial scraps into new products, has raised €181,558, exceeding the minimum goal of €100,000 with still 20 days of active campaign left.[126] Blue Taste, offering healthy food inspired by Blue Zones (regions in the world where people live longer) through an innovative cuisine, raised €511,494, exceeding the minimum goal of €125,000.[127] Livegreen, the company that produces 100% sustainable proteins extracted from spirulina algae used for high-nutritional and environmentally friendly plant-base products, raised €505,500 exceeding the target €200,000.[128]

For what entails venture capital, the Italian landscape is gradually maturing with years. Indeed, in 2022 there was a 48% increase in investment compared to the previous year.

[124] Mamacrowd, www.mamacrowd.com
[125] Mamacrowd, www.mamacrowd.com
[126] Mamacrowd, www.mamacrowd.com
[127] Mamacrowd, www.mamacrowd.com
[128] Crowdfundme, www.crowdfundme.it

Among the startup that obtained the largest amount of investment in 2022 there are Satispay, which raised €320 million (series D); Newcleo, which raised €300 million (series A); Scalapay, which raised €212 million (series B); Casavo, which raised €100 million (series D), and Medical Micro Instruments, which raised €73 million in its series B. The fields that received the largest venture capital investments are the Fintech, which raised €712 million, the Energy & Recycling, which attracted €346 million investment, Health & Life Sciences, which raised €284 million, and Proptech that raised €172 million. Even the Foodtech industry received large investment (€119 million), but it primarily regards home delivery, marketplaces, and apps development.[129] The reason behind the success of these industries among the venture capitalist funds is their high growth potential.

Another way for startups to receive the necessary founding is through business angels, individuals that in Italy are on average characterized by men from the North of Italy, ex-managers associated to IBAN, the Italian Business Angels Association. Over the last years, the importance of ESG (environment, society and governance) has been increasing, and more than 70% of business angels use it as criteria for the investment choice. However, the industry that these kind of investors usually select is the Information and Communication Technology (47%), followed by Edutech and other services (11%), Healthcare (9%), and Food (8%), in particular Foodtech and Agritech.[130]

For what concerns government grants and subsidies, in Italy there is an incentive named "Smart&Start Italia" that supports the constitution and the growth of innovative startups. The project provides funds that range between €100,000 and €1.5 million. The pre-requisite for obtaining this incentive is to be constituted from less than sixty months and to be registered in the special section of the business register. One of the startups funded by Smart&Start Italia is The Circle, one of the greatest vertical farms in Italy and Europe, which is planning to build the first biomimetic transformation facility for the production of aquaponically sourced pestos, oils, and flavored salts. In order to do so, The Circle obtained €1.1 million of incentive from Smart&Start Italia.[131] Obtaining this kind of incentive would be useful for Circular Fiber;

[129] Sprintx (2023). «Venture Capital in Italia: i Fondi Italiani pricipali»
[130] EconomyUp (2023). «Business Angel in Italia, gli investimenti fanno boom: +77% nel 2022 (1.62 miliardi)»
[131] Invitalia, www.invitalia.it

indeed, it would be an opportunity to develop their own plant for the production of Karshof, as they currently entrust it to third parties.

After having analyzed the most common alternatives for a startup to secure funding, it is the moment to find the most appropriate one for Circular Fiber. According to the data, venture capitalists are more interested to industries with high growth potential, related to the technology field. Indeed, venture capitalists often seek high return to compensate the high risk associated with early-stage startups, and if Circular Fiber is part of a market with a predictable CAGR of 6.2%, it might not offer the growth level that some investors are looking for. Moreover, venture capitalists consider the potential for a profitable exit, such as an acquisition or IPO, but this might not be the case for Circular Fiber. For what concerns business angels, they typically have different investment criteria and motivations compared to venture capitalists. They might have personal interests, experience, or expertise in the food industry that induce them to see the potential in Circular Fiber, even if it is not part of the Foodtech sector. A sustainable and eco-friendly product like Karshof can also fascinate those investors interested in environmental impact. Moreover, business angels often invest in people as much as in the business idea, and the strong and capable team of Circular Fiber may attract them. Nevertheless, according to the research in this chapter, the most suitable funding method for Circular Fiber is crowdfunding. Indeed, crowdfunding platforms often attract investors who share the company's values, in this case sustainability and healthy eating, two trends that are dominating market's decisions lately. Moreover, it allows for direct engagement with potential customers and supporters, either final consumers or other businesses, and it can create a loyal customer base and a sense of community. The flexibility of this fundraising method also allows Circular Fiber to prevent others from entering the equity of the company, as it offers various models that include rewards-based and donation-based crowdfunding. Even if the campaign does not end as expected, it is an opportunity to generate significant media and public attention and it can serve as a form of market validation. Circular Fiber would obtain valuable feedback and insights that can help refine the product, packaging, or marketing strategies. Nevertheless, it is essential for the startup to consider that a successful campaign requires thorough planning, compelling storytelling, and effective marketing. Circular Fiber should invest time and effort to create an attractive

campaign that communicates values of sustainability and health, as well as prepare a number of documents to provide to investors, such as a presentation of the company and the business plan. All these preparations imply some costs, which should be added to the fees charged by the crowdfunding platforms for hosting the campaign, usually ranging between 4% and 10% of the capital raised. In conclusion, crowdfunding can be an excellent method for Circular Fiber, as its values align with the ones of potential backers. It also offers market validation and provides an opportunity for engagement and feedback.

Conclusion

In summation, this master's dissertation has undertaken a comprehensive examination of two distinct sectors within the flour industry: the traditional flour market and the burgeoning alternative flour market. The traditional flour market, despite its well-established position, confronts formidable challenges, characterized by intense competition, sluggish growth, and minimal exit barriers. Applying Porter's Five Forces analysis to this sector has elucidated that suppliers constitute the most substantial threat, followed closely by competitors and buyers.

Conversely, the alternative flour market highlights substantial growth potential, with production volumes having a consistent upward trajectory in recent years. While traditional flours enjoy a cost advantage, it is noteworthy that among alternative options, rice flour stands out as the most economically viable, while almond flour entails a premium price. Porter's analytical framework suggests that the alternative flour market is less susceptible to the influence of supplier and buyer power compared to the traditional flour market, but confronted with the specter of substitute products.

The profitability analysis has revealed that conventional flour enterprises boast higher revenues, primarily due to economies of scale, yet followed by elevated costs, exacerbated by escalating wheat prices resultant from post-COVID crises and geopolitical conflicts. On the contrary, alternative flour manufacturers bear comparatively lower raw material expenditures, thanks to their high level of diversification, but must contend with higher services and labor costs. Notably, both industries exhibit analogous EBITDA margins, with the alternative flour segment poised for more rapid expansion.

Furthermore, this research has probed into consumer attitudes towards alternative flours, with preferences grounded in health-conscious and sustainable considerations. While conventional flours continue to dominate everyday consumption patterns, a large proportion of consumers have expressed their readiness to embrace alternative flours. Nevertheless, it is imperative for companies to focus and explore the consumer education and the price sensitivity paradigm, given the limited segment willing to accord a premium for alternative flour products.

The last chapter presented the case study concerning Circular Fiber, a startup specializing in the production of artichoke flour derived from upcycled sources. In competition with incumbents such as Packtin, G.S. Natural, and Circular Food, Circular Fiber is building a niche marked by its nutritional richness and sustainability values. With a strategic focus on the business-to-business segment and synergies opportunities with like-minded entities such as Barilla, the startup has high growth-potential. The prospect of diversifying into business-to-consumer channels, leveraging partnerships with influential health-conscious food bloggers, and establishing an online retail presence holds the potential for enhanced visibility, an expanded customer base, and augmented revenue streams.

As Circular Fiber readies itself for a market debut scheduled for the conclusion of 2023, its imperatives extend to securing requisite financial backing. In this context, crowdfunding emerges as the preferred modality, aligning with the company's values emphasizing health and sustainability. On the other hand, traditional avenues of venture capital and angel investment appear less suitable, given their preference for high-yield ventures characterized by technology-driven markets.

In ultimate synthesis, this dissertation underscores the evolving dynamics within the flour industry, underscored by the ascendant prominence of alternative flours, propelled by shifting consumer preferences anchored in health-conscious and sustainable considerations. Circular Fiber's innovative paradigm exemplifies a potential archetype for triumph within this dynamically shifting market landscape. Therefore, this dissertation not only marks the culmination of an academic endeavor, but it serves as a testament to the dynamism of the flour industry and the transformative potential of innovation and sustainability.

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