LUISS

Department of
Business and
Management

Chair of Entrepreneurship and Venture Capital

Digital Tech in Agri-food
Research on the impact of Digital Transformation on Ancient Grains Firm's Business Model

Prof. Giuseppe D'Alessandro
SUPERVISOR

Prof. Luigi Gubitosi
CO-SUPERVISOR

Federico Milici
CANDIDATE

Academic Year 2019/2020

Table of Content

Introduction

The agribusiness industry is strongly characterized by the presence of many small producers. This is particularly true in the cereals sector, where many small growers and processors cover a significant part of the market, limiting the power of large food corporations, driven and by new health trends that push individuals to buy organic products.

In this scenario, technological development, innovation and the growing trend related to organic products and the "natural dependence" behavior noticed in consumers are reshaping the power system within the grain derivatives supply chain. It is sufficient to consider that Italy is one of the major producers of wheat, the production volumes of Italian wheat are not able to meet the needs required for the production of pasta, a sector in which Italy is the first producer. In this context, the Italian pasta industry and the Corporations within it are forced to import raw material from foreign countries such as Canada and Russia, where wheat is grown in a hostile environment, for example, consider it grown in the snow. To make them survive, the big foreign Corporations use chemical fertilizers composed of different carcinogens like Glyphosate. The involvement of technological improvement in the supply chain could lead to a significant reshaping of competition, facilitating the processes of small farms in order to reach the final consumer, nowadays more and more informed about the origin and quality of agricultural products. Innovations such as Blockchain technology makes small/medium farmers and small/medium processors host the health trends that are influencing the market.

A Blockchain is a distributed database of records in the form of encrypted blocks of all digital transactions or events that have been executed and shared between participating parties and can be verified at any time in the future. Although it originated in Bitcoin, it can be applied in different sectors, including agribusiness. The benefits that are promoting this technology are several: The continuity of information, traceability, information security, linking the flow of information and the flow of materials. Since Blockchain support, all actors within the agribusiness value chain from this innovation involvement.

One digital technology that is undermining the traditional downstream side of the supply chain is e-commerce. Developing a direct digital channel and leveraging indirect digital ones can

enable small businesses to reach domestic and foreign markets without the help of intermediaries.

After an analysis of the Agri-Food industry worldwide and a study about technological and environmental trends that point to a future reshaping of industrial dynamics, we will focus on the Ancient Grains sector as it is one of the most promising niche markets. To do so, we will use the tool of the "Business Model Canvas", to discover the evolution of the business related to customers, resources and partners, and the value proposition, trying to emphasize the benefits brought by Digital Innovation. Based on the information collected and previously reported, a representation of two Business Models will be provided: Traditional Grain Processing Company and Regina Adelasia, a recently established company that aims to become the Sicilian leader in the market of ancient grains.

The objective of this paper is to illustrate and analyze the Business Model of Regina Adelasia, trying to identify the factors capable of defining its future success. The analysis will be supported by solid experiments carried out in the field, in order to ensure clarity about the theme.

A research conducted in order to measure the Desirability of the Queen Adelasia's business model will then be exposed. The research aimed to understand the consumers' purchase process and the consumers' Pains & Gains in the Pasta Industry in order to validate the desirability of Regina Adelasia's Value Proposition, trying to understand if digital channels (direct/indirect) could be a proper way to supply this typology of product. In order to do that, the research was split into two different phases: qualitative and quantitative.

The qualitative phase of the research was implemented to understand consumers' purchase choices in the Pasta market and Digital Technology's involvement in their process.

After the qualitative research, a quantitative survey was carried out through which the significance of the data obtained in the qualitative research was sought. This phase's objective was to generalize the results obtained in a sample relative to the reference population.

Thus, we wonder: Which is the consumer' purchase process in Pasta sector? Can Digital Channels be the right channel for consumer's needs?

Chapter 1 – New Agri-food Market Trends

Agriculture represents the science and art of cultivating plants and breeding livestock.[1]. The history of Agri-food began several thousand years ago, whereby agricultural development allowed humankind to grow more than it could be possible by hunting and gathering. It played a critical role in the rise of sedentary human civilization.

Already by the end of the twentieth century, governments, international organizations, and companies began to understand the dimensions of the problems related to the trends that were beginning to negatively impact the global agri-food sector and the Earth's ecosystem. Nowadays, technological innovations support the transition from needle-food that intensively exploits natural resources to a more sustainable one.

In the following chapter, we will analyze the market and the food industry on a global level, trying to underline also on a political level the possible factors that determine its growth and decline. Besides, the negative trends that undermine the long-term goals that the world has set to support the predictions of population growth will be discussed. Finally, we will discuss the significant technological trends that could ensure a real evolution within the sector, and we will discuss the Agri-food Tech sector, a growing segment of the startup and venture capital universe that aims to disrupt the global food and agriculture industry. The necessity for agrifood tech innovation is more significant than ever; this allows us to explore many entrepreneurs and technologists' opportunities to disrupt the industry and build new efficiencies at various value chains.

1.1 Agri-food Market Definition

According to Market Line, US-owned vertically integrated agribusinesses dominate the global agricultural products industry's competitive landscape. They operate on an international scale.

[1] Wikipedia

Competition from Asia will continue to grow, with companies such as China's COFCO leading the chase. Several large acquisitions have taken place over the past few years, which has disrupted the competitive landscape, particularly in the global seed market, with players such as Bayer, Monsanto, Syngenta, and ChemChina battling for market share through innovative research and development[2]. Thanks to their size and scale, these agribusinesses possess superior research and development capabilities and continue to expand their operations internationally to meet rising demands caused by increasing consumerism.[3]

Although investments in the sector increased in recent years, the need for further funding has become apparent due to the level reached until today is still insufficient to eradicate poverty and hunger by 2030. According to the SDGs (Sustainable Development Goals), reaching this goal will require an additional $5-7 trillion investment[4].

Increasing the profitability and the productivity of agriculture will be a driver to reduce disparity and diminish malnutrition. In order to do that, Digital technologies could be a critical factor in sustaining the strategies to implement to reach this significant achievement.

1.1.1 Agri-food Market

The majority of the Agri-food market is represented by agriculture and its sub-industries. The agricultural products sector concerns cereals, nuts, oil crops, spices & stimulants, sugar, pulses, roots & tubers, vegetables, and fruit.

On the one hand, the economic implications of the lockdowns of many economics are still challenging to predict the return to a level of profitability relate to before the pandemic value, such as there is no indication of how long the pandemics could persist, the number of sectors forced to stay closed, and the dimension of the government aid involved.

The majority of the industries will see a decline in the volume of companies' goods and services. Usually, the lower demand would cause a decrease in the price level. However, amid many

[2] Report Global Agricultural Product, October 2020, Market Line.
[3] Report Global Agricultural Product, October 2020, Market Line.
[4] Ridolfi R. 2019. SDGs for people, planet, and prosperity. FAO's SDG compliance work as a means for leveraging sustainable investments in agrifood systems. Rome, FAO.

governments ordered for many industries to lock down and so the supply chain is distorted, great pictures mitigate lower demand results.

On the other hand, the internet-based businesses and the producers of the vital, subsisted products and services are taking advantage of the current events.

The global agricultural products industry has grown enormously in the historic period. In the forecast period, growth is expected to continue at a similar rate due to the impossibility to seek substitute products and the increasing demand.

The Asia-Pacific region accounts for 57.8% of the global industry, with Europe and the U.S. accounting for 19.9% and 8.3%[5].

The global agricultural products industry had total revenues of $2,348.9bn in 2019, representing a compound annual growth rate (CAGR) of 5.1% between 2015 and 2019[6]. In comparison, the Asia-Pacific and U.S. industries grew with CAGRs of 4.8% and 1.5%, respectively, over the same period, to reach respective values of $1,357.1bn and $194.3bn in 2019[7].

Despite owning less than 10% of the world's arable land, China is responsible for feeding approximately one-fifth of the global population. The China government has committed itself to the development of its agriculture industry, and for 16 consecutive years, the nation has prioritized work on agriculture, rural areas, and farmers. The government's continued development of agriculture over the years has helped fuel growth in the sector.

Over the past couple of years, the tragic fall in U.S. net farm income in 2015 seems to be leveling out at a lower level. However, the continuous drop in commodity prices has taken a toll on the U.S. agriculture products industry. Some parts of the U.S. agricultural products industry have suffered due to the impact of international tariffs. The nature of the trade disputes so far suggests the trading environment for farmers could change rapidly. The renegotiation of the NAFTA trade agreement and the formation of a new trade deal in North America have created numerous agricultural trade changes.[8].

Industry consumption volume increased with a CAGR of 1.4% between 2015 and 2019 to reach 6,913.3 million tons in 2019. In the table below is presented the global agricultural products market value.

[5] Report Global Agricultural Product, October 2020. Market Line.
[6] Report Global Agricultural Product, October 2020. Market Line.
[7] Report Global Agricultural Product, October 2020. Market Line.
[8] Peter Bondarenko, North America Free Trade Agreement, Britannica.

Year	$ billion	€ billion	% Growth
2015	1,921.9	1,716.0	
2016	2,064.6	1,843.4	7.4%
2017	2,111.9	1,885.7	2.3%
2018	2,238.8	1,999.0	6.0%
2019	2,348.9	2,097.2	4.9%
CAGR: 2015–19			5.1%
SOURCE: MARKETLINE			MARKETLINE

Table 1. Global agricultural products market value: $ billion, 2015-19.

The cereals segment was the industry's most lucrative in 2019, with total revenues of $628.2bn, equivalent to 26.7% of its overall value. The fruit segment contributed revenues of $502.1bn in 2019, equating to 21.4% of the industry's aggregate value.[9]. In the table below is presented the global agricultural market category segmentation in terms of revenues.

Category	2019	%
Cereals	628.2	26.7%
Fruit	502.1	21.4%
Vegetables	465.0	19.8%
Oilcrops	366.9	15.6%
Sugar	119.1	5.1%
Roots & Tubers	83.2	3.5%
Other	184.4	7.9%
Total	2,348.9	100%
SOURCE: MARKETLINE		MARKETLINE

Table 2. Global agricultural products market category segmentation: $ billion, 2019.

In 2019, France accounted for 46.0% of the European agricultural products industry, making it the region's largest industry. France represents the largest agricultural area in the E.U., accounting for over 15% of the total E.U. utilized agricultural area and operates a highly diverse sector, which allows the country to sustain steady growth without being too reliant on its primary crops. The industry's production volume is expected to rise to 7,997.5 million tons by the end of 2024, representing a CAGR of 3% for the 2019-2024 period[10], while the industry's performance is forecast to decelerate, with an anticipated CAGR of 4.9% for the five years 2019 - 2024, which is expected to drive the industry to a value of $2,989.1bn at the end of 2024. Comparatively,

[9] Report Global Agricultural Product, October 2020. Market Line.
[10] Report Global Agricultural Product, October 2020. Market Line.

the Asia-Pacific and U.S. industries will grow with CAGRs of 5% and 3.8%, respectively, over the same period, to reach respective values of $1,732.0bn and $234.6bn in 2024[11].

The US-China trade conflict, which has emerged in recent years, has added tariffs on U.S. agriculture exports to China.[12]. Diplomatic tensions between the countries have heightened recently due to the COVID-19 crisis, which President Trump has outspokenly blamed China for the crisis.[13]. As the largest consumer industry globally, these additional charges carry significant cost implications that could contribute to the anticipated drop in industry revenue during 2019 and weaker growth throughout the forecast period. In August 2019, Chinese companies stopped purchasing U.S. agricultural products, causing a significant decrease in U.S. agricultural exports, particularly the U.S. Soybean industry, as China was responsible for 60% of U.S. exports.[14]. According to the Market line's data, the global agricultural products market grew by 4.9% in 2019, reaching a $2,348.9 billion value. Thus, the market's compound annual growth rate in 2015–19 was 5.1%[15]. In the table below is presented the forecasts for 2019-2024.

Year	$ billion	€ billion	% Growth
2019	2,348.9	2,097.2	4.9%
2020	2,468.3	2,203.9	5.1%
2021	2,576.1	2,300.1	4.4%
2022	2,704.4	2,414.7	5.0%
2023	2,839.5	2,535.3	5.0%
2024	2,989.1	2,668.9	5.3%
CAGR: 2019–24			4.9%
SOURCE: MARKETLINE			MARKETLINE

Table 3. Global agricultural products market value forecast: $ billion, 2019-24

In 2024, the global agricultural products market is forecast to have a volume of 7,997.5 million tons, an increase of 15.7% since 2019. Furthermore, the compound annual growth rate of the market in 2019–24 is predicted to be 3%[16]. In the table below is presented the forecasts for 2019-2024 in terms of volume.

[11] Report Global Agricultural Product, October 2020. Market Line.
[12]Menzie Chinn, Bill Plumley, January 2020, What is the toll of trade wars on U.S. agriculture?, Econofact.
[13] Lily Kuo, March 2020, Trump sparks anger by calling coronavirus the Chinese virus, The Guardian.
[14] Huileng Tan, August 2019, U.S. soybean farmers are working new markets now that exports to China have tanked, CNBC.
[15] Report Global Agricultural Product, October 2020. Market Line.
[16] Report Global Agricultural Product, October 2020. Market Line.

Year	million tonnes	% Growth
2019	6,913.3	1.2%
2020	7,121.2	3.0%
2021	7,322.8	2.8%
2022	7,522.7	2.7%
2023	7,746.0	3.0%
2024	7,997.5	3.2%
CAGR: 2019–24		3.0%

SOURCE: MARKETLINE MARKETLINE

Table 4. Global agricultural products market volume forecast: million tons, 2019-24

1.1.2 Agri-food Industry Characteristics

Although large co-operative farming companies exist in many countries, most players within the agricultural products industry are independent farms, rated as small- to medium-sized businesses-players, within the global industry range from small, individually owned farms to large, consolidated corporations.[17].

Most agricultural products are purchased by super industries, food processors, and manufacturers, while food processors and manufacturers are the primary buyers of industrial crops. Buyer power is weakened by agricultural co-operatives' formation, bringing small, independent farming businesses together to increase their agricultural capabilities. *Forward integration* can also occur, limiting buyer power. Small business holders can directly sell fruit and vegetables to consumers through a farm-store outlet, while larger organizations often run their food processing facilities and food products.

A rapidly growing organic agriculture industry has weakened the supplier power of agrichemical producers and G.M. crop manufacturers. Ninety-three countries had standards for organic agriculture in 2018[18], according to the FiBL survey on standards and legislation. Supplier power is expected to continue to weaken as the transition from industrial to organic agricultural practices continue. As a result of the superiority of seed varieties produced by producers of

[17] Report Global Agricultural Product, October 2020. Market Line.
[18] Willer, Helga, and Julia Lernoud (Eds.) (2019): The World Organic Agriculture. Statistics and Emerging Trends 2019. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM – Organics International, Bonn.

genetically superior crops, and the need to purchase these varieties to stay competitive, buyer power is increased.

Entry into the agricultural products industry can vary depending on the availability of good quality, affordable farmlands. The purchase of arable land, machinery, and working capital to sustain initial operations are typically very high in terms of the cost needed to enter the industry. High operating costs pose a significant entry barrier; large scale operations leverage economies of scale to remain profitable, but due to the high cost of land and equipment, it is difficult for small scale farmers to develop into fully-fledged agribusinesses.[19].

There are few alternatives to the industry. An increasing number of global citizens have started to grow their crops; however, there is little self-sufficiency, significantly damaging the agricultural products industry.

Buyer power. Large grocery retailers, such as Wal-Mart, Carrefour, City Super, JUSCO, and Tesco are the primary buyers of industry-ready products, such as fruit and vegetables.[20] Other agricultural products, including cereals, grains, and oil crops, need to be processed into food products fit for human consumption; therefore, they are usually purchased by extensive food processing and manufacturing companies.[21]. Agricultural companies who specialize in animal husbandry also purchase agricultural products such as fodder and grain to feed their livestock.

Buyer power is enhanced considerably by the resultant low switching costs. As buyers have several options to choose from for their products, this increases buyer power as they can negotiate their prices. Buyers who can obtain the most products for the lowest price can produce greater profits.[22].

Agricultural co-operatives weaken buyer power by bringing small independent farming businesses together to increase their agricultural capabilities. Small producers often form associations or co-operatives to obtain better prices, improve post-harvest production handling, and co-operate on more effective industry strategies.

A relatively low level of product differentiation also drives up buyer power, although producers might offer fair-trade, organic, or locally sourced products in order to mitigate this effect to some extent.[23].

[19] Global Agricultural Product, October 2020. Market Line.
[20] Global Agricultural Product Market: Supply Chain Analysis, January 2021. Market Line.
[21] Global Agricultural Product Market: Supply Chain Analysis, January 2021. Market Line.
[22] Global Agricultural Product, October 2020. Market Line.
[23] Global Agricultural Product Market: Supply Chain Analysis, January 2021. Market Line.

Forward integration may also be possible for farmers who sell fresh fruit and vegetables direct to consumers through a farm-store outlet. In several industries, consumers are willing to pay higher prices for local and organic produce, which is seen as more ethical and beneficial for the environment.[24]. As these practices currently operate on a small scale, they are unlikely to affect large buyers significantly. Large agricultural corporations often achieve their scale by developing vertically integrated businesses that control processes across the value chain, from origination to industry. This process reduces the buyer power possessed by food processors, with many competing with self-sufficient agricultural businesses.

In essence, the buyer dictates this industry, as they cannot purchase from specific players in the industry. This, in turn, reduces their profits and financial power, which then means they are less able to purchase new equipment from the suppliers. If players grow to produce, which is not deemed to be 'customer worthy,' this will not be taken by the buyers and could cause the buyers to reconsider their contracts with the supplier, thereby strengthening buyer power.[25].

In light of COVID-19, global agricultural industries have been less affected than industrial commodities. At the end of 2020, prices of primary food commodities have gained momentum, driven by supplier shortfalls and more vigorous than expected demand in oil and grains as well as the U.S. Dollar depreciation.[26], according to the World Bank. Because food prices increase due to the initial economic shock of COVID-19 and resulting export restrictions, governments may become increasingly tempted to use trade policies to stabilize food products' domestic prices. These factors may restrict buyer power. Overall, buyer power is moderate.

Supplier power. Strong demand for global farming has led to a growing demand for agricultural machinery, fertilizers, and other inputs to the agricultural products industry, driving up supplier power.[27]. Large chemical companies manufacture and supply most fertilizer products. Both Producers' size and the high demand for such products raise supplier power.

Fertilizer products typically lack differentiation and are relatively simple chemicals; fairly consistent quality is available from many suppliers. Moreover, production costs for fertilizers are highly dependent on input prices, and these can be volatile. For example, the price of nitrogen-

[24] Global Agricultural Product, October 2020. Market Line.
[25] Global Agricultural Product, October 2020. Market Line.
[26] J. Baffes, J. Wu, November 2020, Global Food Commodity Prices in a Post-COVID World. World Bank Blog.
[27] Global Agricultural Product, October 2020. Market Line.

based fertilizers, such as ammonia and ammonium nitrate, has fluctuated recently in line with natural gas prices.[28] These trends work to undermine supplier power.

Industry players have some alternatives to traditional suppliers. Organic farming practices eliminate the use of artificial fertilizer products, for instance. The organic industry is growing at a prolific rate. According to the Organic Trade Association (OTA), U.S. organic sales reached more than $55bn in 2019, and the number of organic U.S. farms grew by 5% from the previous year.[29]. Therefore, the industry is expected to continue to grow, weakening agrochemical companies' power and suppliers of G.M. crops.

Seeds remain a crucial input for agricultural processes. Although it is possible for agricultural producers to breed their seed varieties (e.g., Sicily), this can take time, resources, and expertise to produce varieties of the highest quality. Companies such as DuPont Pioneer and Bayer, who recently completed a $63bn purchase of US-based genetic agriculture giant Monsanto to achieve significant scale and gain a larger global seed industry share, provide agricultural producers with seeds which allow farmers to cultivate higher yields, which in turn increases the profitability of a seasonal harvest. As a result of the superiority of seed varieties (in terms of yields) produced by producers of genetically superior crops, and the need to purchase these varieties to stay competitive, buyer power is increased.[30].

New technologies are continually emerging, including agricultural automation, digital analytics, and advanced irrigation systems; these products increase in demand as they offer farmers an opportunity to improve their businesses' sustainability, efficiency, and productivity. Implementing these technologies is becoming essential to stay competitive in modern-day agriculture; consequently, supplier power has increased. Overall, supplier power in the agricultural products industry is moderate.

New entrants. The purchase of arable land, machinery, and working capital to sustain initial operations, as already said, are typically high in terms of the cost needed to enter the agricultural products industry. High operating costs represent a significant entry barrier; large scale operations point on economies of scale to remain profitable, but due to the high cost of land and equipment, it is difficult for small scale farmers to develop into fully-fledged agribusinesses.

[28] Global Agricultural Product, October 2020. Market Line.
[29] U.S. Organic Industry Survey 2020, June 2020. Organic Trade Association.
[30] Global Agricultural Product, October 2020. Market Line.

Entry into the agricultural products industry can vary depending on the availability of good quality and affordable farmlands. Russia, for example, presents an abundance of cheap agricultural land available to new entrants. In the south of Russia, prices can range from $2,500 to $5,000 per hectare, around five times cheaper than average European prices due to its vast land area and low demand[31]. The availability and low price of agricultural lands in Russia help the entry of new agricultural businesses. Otherwise, Italy has deficiencies of arable land, and, in addition to favorable weather, it drives up the price per hectare.

Due to the low differentiation level between most agricultural products, new entrants are relatively easy to get their products to the industry. Additionally, brand loyalty is low, meaning industry players are free to source products from an array of suppliers. Hence, new entrants might also choose to focus on a particular product or crop to help their drive into the industry.

Agriculture is a crucial area of the global economy, and 26.86% of the world's working population was employed in agriculture during 2019[32]. However, it only contributes approximately 3.27% of the world's value-added GDP[33]. Industry growth historically has been low. Furthermore, global temperature increases are threatening to reduce agricultural productivity significantly so that industry growth could slow considerably in the mid-term. However, as global populations continue to rise, so will the demand for agricultural produce.

Globally, legislation specific to food and agricultural products exists, which could disincentivize new entrants to approach this industry.

Finally, COVID-19 has caused supply chain disruptions across the agriculture products industry and will suffer negatively in the short term. Overall, the threat from new entrants is moderate.

The threat of substitutes. There are no genuinely threatening substitutes for agricultural producers' output. Produce such as fruit, vegetables, wheat, sugar, potatoes, and rice form a regular and vital part of most people's diets. As such, buyers can be confident that consumer demand will remain strong[34].

Some end users might choose to till their fruit and vegetables and become self-sufficient on a small scale. This process is costly, has a high labor demand, and is challenging to manage when inexperienced. However, switching costs are high in this case. Subsistence level farming is

[31] Global Agricultural Product, October 2020. Market Line.
[32] International Labour Organization, ILOSTAT database, 2020. The World Bank.
[33] World Bank National Account Data, and OECD National Accounts data files, 2019. The World Bank.
[34] Global Agricultural Product, October 2020. Market Line.

time-consuming, requires specialist knowledge, and brings the cost of purchasing seeds, fertilizer, gardening products, etc. Moreover, many people do not have the land required to make this a viable option due to rampant urbanization. Finally, the quantity and quality of the end product are not guaranteed.

Even those who succeed in this approach are unlikely to grow all of the food they need since other crops and products that depend on different environments, or more complex or labor-intensive production processes will still have to be bought. Overall, the threat of substitutes is weak in this industry.

Degree of rivalry. Although large co-operative farming companies do exist in many countries, as already said, most players within the global agricultural products industry range from small, individually-owned farms to large consolidated corporations[35]. The presence of large incumbent industry players aims at driving up the rivalry. The land, machinery, equipment, and other inputs into the agricultural products industry can be expensive. Operating and exit costs are therefore high, particularly at the upper end of the industry. This drives up the rivalry between players.

The loss of agricultural trade with China could significantly increase rivalry in the U.S. over the years. China is a leading consumer of U.S. agriculture[36], and the loss of exports to the region will significantly reduce farmers' geographical industry. As a result, the competition to supply domestic industries could intensify. In other countries where demand for agricultural exports to China has increased, competition is alleviated. The US is Mexico's largest agriculture trading partner, accounting for 78% of Mexican exports in 2019[37]. Although Mexico has experienced positive export growth in recent years, due to its reliance on U.S. consumption, there is a risk of a significant decline if, for some reason, the U.S. decides to source agricultural products from elsewhere; however, this is unlikely as a result of the nation's proximity, cheap transport costs, and beneficial trade agreements.

As one of the largest consumers of agriculture globally, with over 1.4 billion citizens, Chinese agribusinesses receive large volumes of competition from international agricultural organizations. As a result of most farms in China being of small scale, large agricultural producers can influence the Chinese food industry and compete with local producers. Chinese citizens are also

[35] Global Agricultural Product, October 2020. Market Line.
[36] Menzie Chinn, Bill Plumley, January 2020. What is the toll of trade wars on U.S. agriculture? Econofact.
[37] USDA, Economic Research Service using data from U.S. Census Bureau, Foreign Trade Statistics, as compiled by USDA, Foreign Agricultural Service, Global Agricultural Trade System.

beginning to adopt more Western-style diets, which creates a higher demand for agricultural products produced in Western regions, which has resulted in the intensification of rivalry[38]. Russia's embargo on Western food imports has increased competition in countries that have struggled to replace the Russian industry[39]. Russia banned food imports from the E.U., the US, Canada, Australia, UK, and Norway in response to sanctions applied to Russia due to the annexation of Crimea. Consequently, European countries with strong bilateral trade ties with Russia have suffered from weaker international demand for their products[40]. On November 21, 2020, President Putin signed a new decree extending the ban on imported agricultural products for the countries that applied economic sanctions against Russia until the end of 2021[41]. After 2021, competition may be alleviated whether Russia decides to accept agricultural trade from Europe; however, the Kremlin has established strong trade relationships with Asia and the Middle East during last year, stimulating more competition[42].

The low differentiation between producers also increases the rivalry; where differentiation exists, it is typically down to product quality. Furthermore, the similarity of produce means agribusinesses compete more intensely for the same or similar industries.

Finally, modernization usually requires investment, enabling the wealthiest players to pull ahead of the competition. As a result, the industry may undergo a period of consolidation, reducing rivalry.

1.2 Trends for Global Agri-food Consumption

According to FAO, 2050 will be the year in which the world's population will reach 9.7 billion

[38] K.R. Curtis et al., (2007). China Economic Review 18.

[39] Kašťaková E., Baumgartner B., Žatko M. (2018) The Impact of the Russian Embargo on its Agri-Food Trade with the EU: Analysis by Selected Indicators. International Organisations Research Journal, vol. 13, no 4, pp. 256–271 (in English). DOI: 10.17323/1996-7845-2018-04-12.

[40] Kašťaková E., Baumgartner B., Žatko M. (2018) The Impact of the Russian Embargo on its Agri-Food Trade with the EU: Analysis by Selected Indicators. International Organisations Research Journal, vol. 13, no 4, pp. 256–271 (in English). DOI: 10.17323/1996-7845-2018-04-12.

[41] Russia Extended Food Import Ban Through End 2021, December 2020. United States Department of Agriculture.

[42] Global Agricultural Product, October 2020. Market Line.

people[43]. This critical factor shows the birth of several challenges over the next three decades.

This trend will unavoidably undermine natural resources' availability; indeed, projections for 2050 indicate the emergence of growing agricultural land scarcities[44].
In this scenario, climate change also has an enormous impact. Nowadays, natural calamities like droughts and floods cost the agricultural industry an uncountable amount in damaged or lost crop and livestock production.
The food industry is addressing a series of challenges that need to be understood. The most significant and impactful ones are socio-demographic, scarcity of natural resources, and climate change.

Socio-demographic Changes. Following the forecasts, the world's population is expected to grow to nearly 10 billion by 2050[45]. This increase will result in demand growth for resources and raw materials, including food. Precisely, demand for food is estimated to increase by 56% in 2050 compared to 2013[46]. Besides, according to UN (United Nations) data, in 2050, about 68%[47] of the population is expected to dwell in cities. In this scenario, urbanization will also affect food consumption patterns. Thus, higher urban income is reflected in increased demand for food and meat.

Scarcity of Natural Resources. The increasing global population lays a danger to natural resources availability; indeed, forecasts for 2050 indicate the emergence of increasing natural resources scarcities. In this scenario, agriculture plays a crucial role since, to meet the aggregate demand for food, more resources will be worn, causing land degradation, deforestation, and water scarcity. The necessary expansion of agricultural land continues to be the primary driver of deforestation[48], with as many as 56K acres of land being cleared per day. Furthermore, unless innovation in the agricultural system will occur, competition for natural resources will become

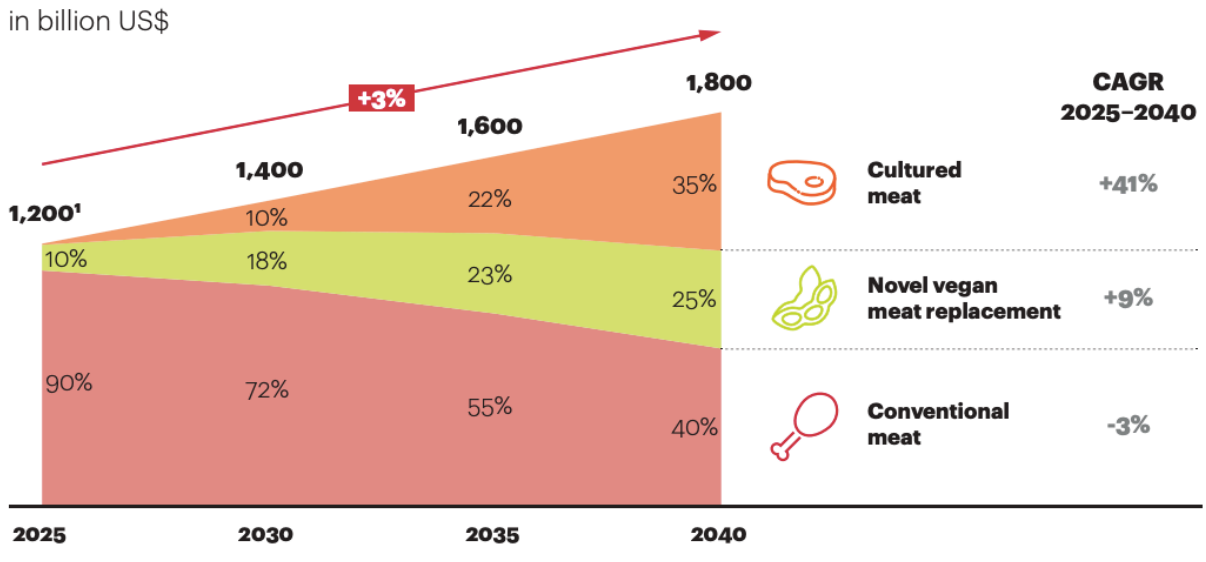
[43] Ridolfi R. 2019. SDGs for people, planet, and prosperity. FAO's SDG compliance work as a means for leveraging sustainable investments in agrifood systems. Rome, FAO.
[44] Ridolfi R. 2019. SDGs for people, planet, and prosperity. FAO's SDG compliance work as a means for leveraging sustainable investments in agrifood systems. Rome, FAO.
[45] Ridolfi R. 2019. SDGs for people, planet, and prosperity. FAO's SDG compliance work as a means for leveraging sustainable investments in agrifood systems. Rome, FAO.
[46] Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050, December 2018. World Resources Institute.
[47]Population Division of the United Nations Department of Economic and Social Affairs, 2018. 2018 Revision of the World Urbanization Prospects. United Nation.
[48] Taylor Meek, Effects of Deforestation: How Does Deforestation Cause Deforestation? September 2019. Sentient Media.

more critical. To this extent, farming livestock systems should also be restructured to reduce the impact on the environment and resource consumption.

Climate Change. The growing population is not the only issue in the source scarcity equation; climate change also dramatically impacts. According to FAO data, between 2005 and 2015, natural disasters cost the agricultural sector $96 billion[49] in damaged and lost crops and livestock production. Furthermore, climate change will affect every aspect of food production and lead to a decline in crop yields of 10/25% by 2050[50]. Due to climate change, oceans are approaching a dramatic increase in temperature, reducing fish catches by 40%. Without efforts to adapt to climate change, food insecurity will likely increase, particularly in the least developed countries.

The increasing demand that agriculture will face shortly will provoke a fundamental challenge in improving agricultural productivity sustainably.

Furthermore, individuals are increasingly moving from the countryside to cities or near cities. This will generate an increase in their income and, hence, changes in diet habits. It will increase Meat product demand, endangering the agricultural capacity to match the increasing food requirements. Livestock farming needs many natural resources: from the land and the water-worn to animal feeding. Thereby, a shift toward the consumption of alternative proteins will occur[51].



Source: A.T. Kearney

[49] The impact of disasters and crises on agriculture and food security, 2018. FAO.
[50] Ray DK, West PC, Clark M, Gerber JS, Prishchepov AV, Chatterjee S (2019) Climate change has likely already affected global food production.
[51] Emiko Terazono, September 2019, Investors seek sustenance in alternative proteins. Financial Times.

Figure 1. Global meat market forecast.

In order to improve agricultural productivity, it is required to boost the efficiency in the employment of the natural resources, expand the output with the same number of inputs, and decrease food waste and food loss. In this concern, approximately 1.3 billion tons of food are wasted yearly[52]. In developed countries, food is wasted mostly at the consumption level, whereas in the least developed and developing countries, food is wasted at the harvest and post-harvest phases[53]. New estimates by FAO indicate that 13.8% of the total food produced in the world is lost between farm and up to, but excluding retail[54].

This issue is crucial: when food is wasted, water, soil, and natural resources used to produce it are wasted too. For example, in terms of electricity consumption, food accounts for 30% of the total energy usage, and 1/3 is wasted yearly[55].

Furthermore, addressing climate change and the intensification of natural hazards through adaptation measures will be unavoidable. Climate change is affecting every aspect of food production, and crop yield is expected to decline. Without efforts to adapt to climate change through agricultural innovation, food insecurity will likely increase substantially.

1.3 Agri-food Tech: Drivers for Agri-food Evolution

Finalized to achieve more sustainable and fruitful production volume, technological development in Agri-food has become determinant. More and more entrepreneurs and technology experts have shown interest in agri-food tech during the last years, as the food industry's traditional approach needs to overturn a critical transformation.

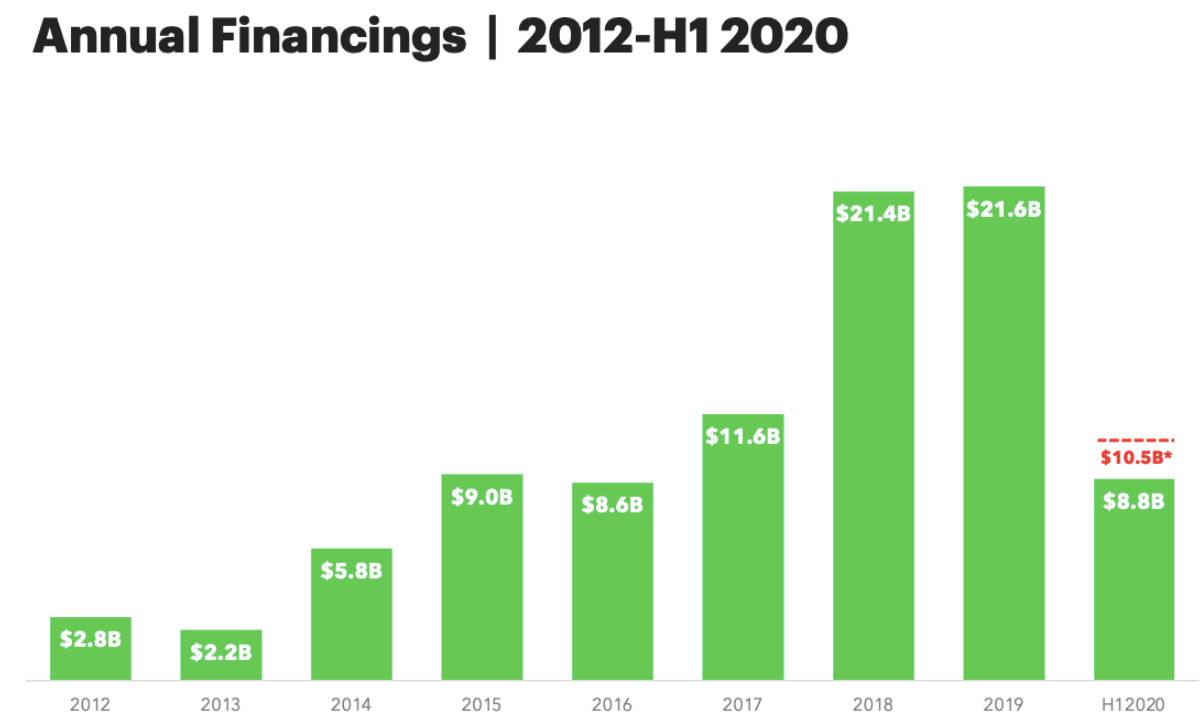
According to FAO data, in the last 40 years, cereal yields rose more than 300%[56] thanks to modern agricultural practices. Nonetheless, efficiency gains deriving from these modern techniques have shrunk, and agriculture faces future years' challenges. New technology

[52] FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome.
[53] FAO. 2011. Global food losses and food waste – Extent, causes and prevention. Rome
[54] FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome.
[55] FAO. 2011. Energy-smart food for people and climate – Issue report. Rome.
[56] FAO. 2017. The future of food and agriculture – trends and challenges. Rome.

implementations must be explored for innovation, improving and addressing consumers' real needs, and redesigning value chains.

Agriculture will no longer have to rely on overusing water, fertilizers, and pesticides. Farmers will apply minimum quantities or even remove them from the value chain, exploiting, for instance, seawater. This present and future possible innovation application will have an overall positive impact on the environment globally, both in terms of GHGs emissions and resource exploitation.

Agricultural technology startups have grown to address these needs and challenges, and investors are showing greater interest in the Agrifood ones. The amount of money disbursed into the Agrifood tech has increased more than sevenfold since 2012, as shown below:



Source: AgFunder

Figure 2. Agrifood tech financing growth.

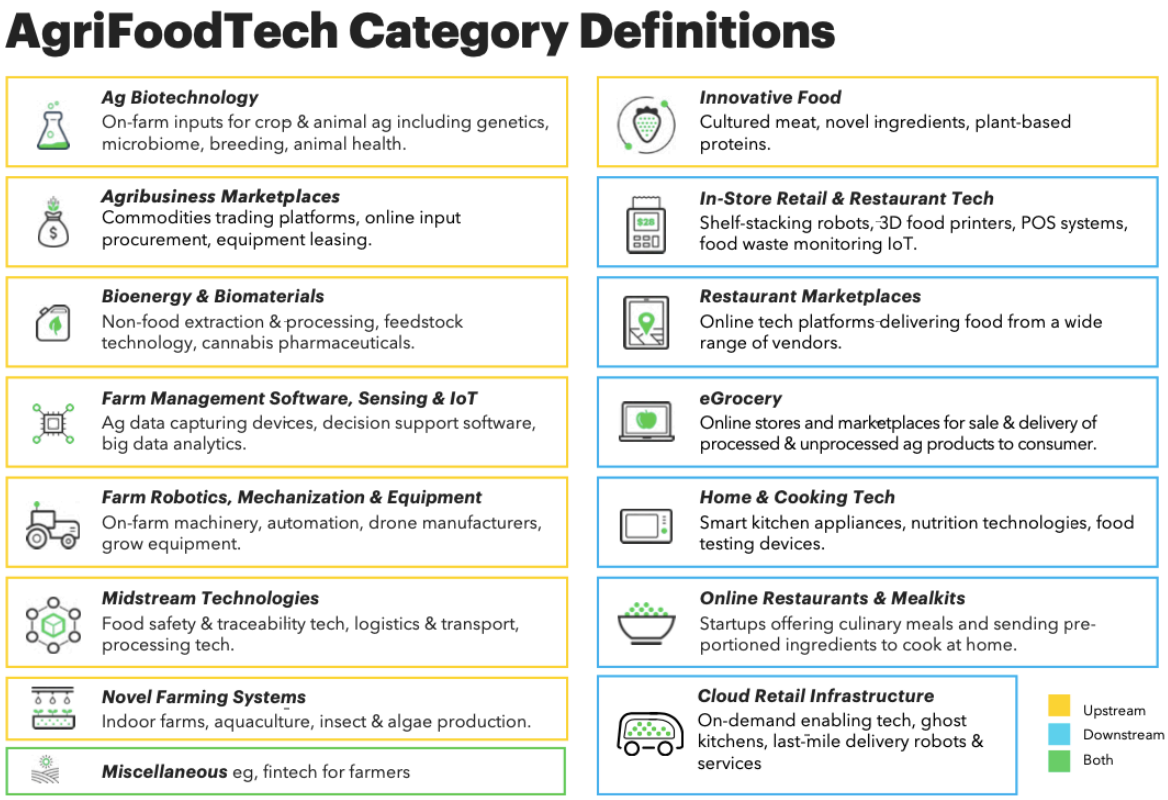
Precisely, according to an AgFunder report, the investments in Agrifood Startups reached an amount of $21.6 billion in 2019 globally[57], increasing more than sevenfold since 2012, achieving $8,8 billion in the H1 of 2020, according to AgFunder.

European Agrifood startups attracted investments of about $3.4 billion in 2019, of which $1.1 billion for startups operating from farming to food processing, with a 22% increase over the

[57] AgFunder, 2020. Agri-food Tech Midyear Review.

prior year[58]. In the U.S., Agrifood startups took $8.7 billion in venture capital in 2019, almost half of total investments worldwide[59].

Agrifood technological trends can be split into *Upstream*, related to farming and food processing, and *Downstream*, related to food delivery and consumption.



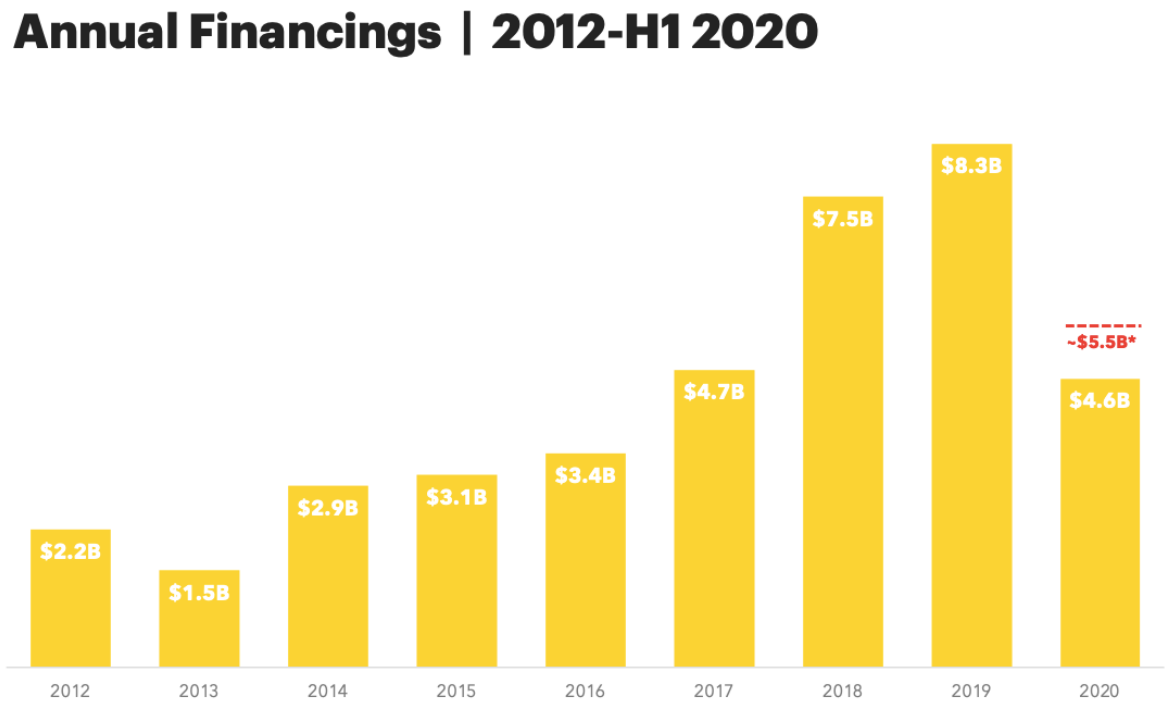
Source: AgFunder

Figure 3. Agri-food Tech Category Definition

Upstream technologies received $8.3 billion in investments in 2019, growing 10,7% concerning previous year, the most relevant among them being Midstream technologies, which attracted $2.1 billion investment in 2019, followed by Ag biotechnologies with $1.1 innovative food with $1.3 billion[60].

The *Upstream* tech trends face the main agricultural challenges of the coming years, including new farming systems, precision farming, alternative proteins, agricultural biotechnology, etc.

[58] AgFunder, 2020. Europe Agrifood Tech Funding Report.
[59] AgFunder, 2020. Agri-food Tech Midyear Review.
[60] AgFunder, 2019. Agri-food Tech Funding Report.



Source: AgFunder

Figure 4. Upstream financing growth.

Upstream technologies are enhancing agriculture to increase productivity and efficiency, also developing climate change adaptation methods. An impactful answer to the rising population trend and increasing food demand would be provided, dealing with scarce resources. In this concern, four technological areas shall be considered more determinant: agricultural biotechnology, vertical farming, precision farming, and alternative proteins.

Agricultural biotechnology is concerned with new approaches to genome editing, allowing more excellent selectivity and reducing the element of chance. These techniques do not only create breeds with high resistance to adverse conditions, but they can also be used to feed them with vitamins and nutrients[61].

One of the agricultural biotechnologies leaders is Indigo Ag[62], a US-based startup established in 2016 supports farmers in the transition to regenerative farming practices through annual partnerships, microbiome treatments, and the sustain on optimizing regenerative systems. Since its foundation, it was able to raise a total of $1.2 billion in funds[63].

[61] U.S. Department of Agriculture.
[62] AgFunder, 2020. Agri-food Tech Midyear Review.
[63] Crunchbase.

Vertical farming consists of cultivating food in vertical layers, working in environments where arable land is unavailable. Hence, it is an exciting answer to provide high-quality food reducing the use of land. In combination with urban farming, it adopts the exploitation of soils, hydroponic, or aeroponic growing methods addressing the opportunity to grow, for instance, vegetables in the cities by using 95% less water, fertilizers, and soil[64].
An exciting reality that exploits vertical farming is Bowery Farming Inc.[65], a US-based startup established in 2014. Its internal technology platform combines sensors, control systems, computer vision, robotics, and machine learning to optimize many farm processes. The company has raised $167.5 million[66].

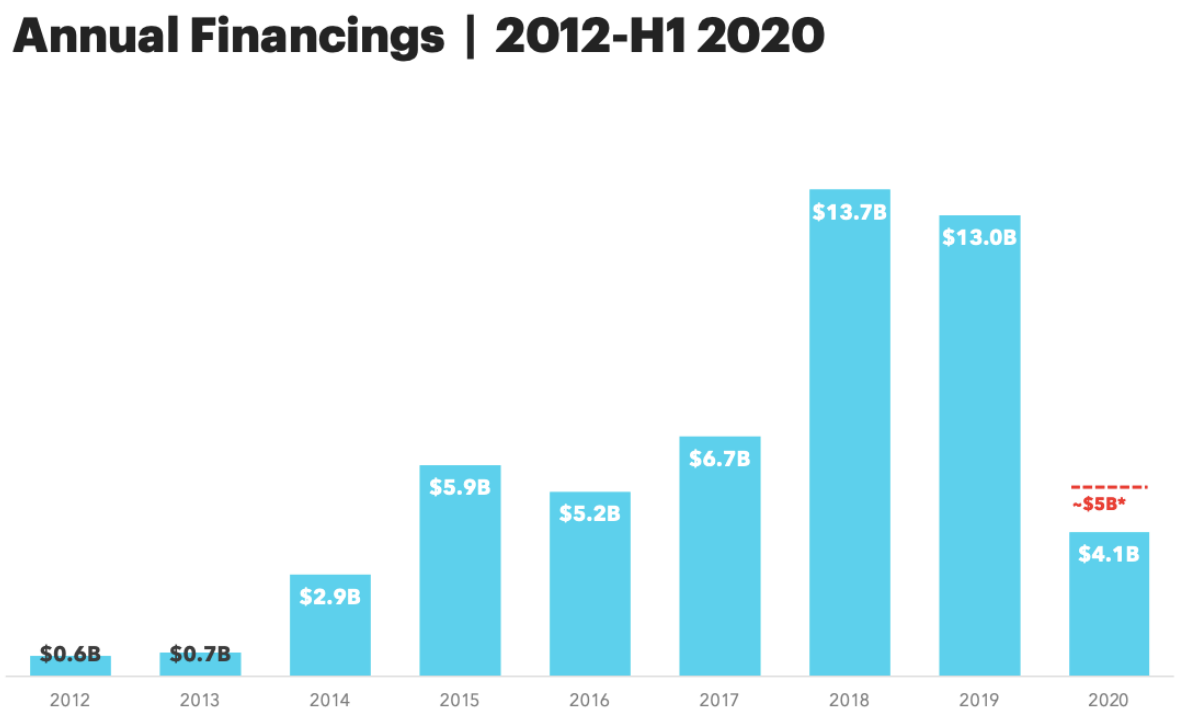
Precision farming includes everything that turns farming more accurate and controlled for cultivating crops and breeding livestock. A critical driver of this pattern is the use of information technology (IT) and a wide range of items on the production chain, such as GPS guidance, control system, sensors, robotics, drones, autonomous vehicles, automated hardware, and software[67].
CropX represents a promising reality in precision farming[68], an Israel-based startup established in 2015. The project consists of a rechargeable wireless sensor solution aimed at soil moisture monitoring to optimize and automate farm management. It has raised $24.3 million.

Alternative sustainable protein startups reinvent the industry with new food technology, allowing for meatless and cell-based products that closely resemble traditional meat in taste. These technologies' involvement allows a sizable reduction in inputs used, rising efficiency within the food chain.
Impossible Foods is the most mature vegetable-based meat startups[69]. Founded in 2011, this US-based startup designs vegan burgers that taste like traditional meat. The firm has raised a total of $1.4 billion[70].

[64] Ricky Leblanc, December 2020, What you should know about Vertical Farming. The Balance Small Business.
[65] Olivia Zaleski, December 2018, Uber CEO and Alphabet Invest in Urban Farming Startup. Bloomberg.
[66] Crunchbase.
[67] Remi Schmaltz, April 2017, What is Precision Agriculture. AgFunder News.
[68] Lauren Manning, September 2020, CropX acquires New Zealand precision effluent and smart irrigation decision Startup. AgFunder News.
[69] Tad Friend, September 2019, Can a Burger help solve Climate Change?. The New Yorker.
[70] Crunchbase.

All these technologies guarantee smarter use of natural resources and *reduced* waste, thus increasing agricultural productivity and sustainability.

On the other hand, *Downstream technologies* are related to in-store retail & restaurant tech, restaurant marketplaces, eGrocery, and home & cooking tech. Deals increased by up to $13 billion in 2019, a 2066.7% growth compared to 2012[71].
These solutions are more about reshaping how the choice and consumption of food occur and less about addressing the main Agrifood challenges, even if some solutions might help decrease food loss.



Source: AgFunder

Figure 5. Downstream Financing Growth

eGrocery dominates fundraising for the second year, becoming a determinant service during lock-down for consumers. According to AgFunder, the segment retained its top funding spot, valuing 20% of all agrifood tech funding in 2020[72]. On the other hand, the food delivery category (Restaurant Marketplaces) dropped from the third spot in 2019 to the fourth spot in H1 2020, taking both Upstream and Downstream.

[71] AgFunder, 2020. Agri-food Tech Midyear Review.
[72] AgFunder, 2020. Agri-food Tech Midyear Review.

As already said, the eGrocery sector covered a strong position going into 2020, as it was the most funded agrifood tech category in 2019. Furthermore, even if the $1.8 billion raised so far this year is not near the 2019 levels, which topped out at $3.9 billion, the sector has undoubtedly fared well going through a global pandemic with many investors in the retreat.

In-Store Retail & Restaurant Tech maintained its place in the top five, but that is likely to change. US-based Toast's $400 million[73] raise accounted for 43% of the category's funding in H1 2020, but after closing its Series F round in February, right before Covid-19, the company laid off 50% of its staff when lockdowns started[74], less than two months after the round. It is hard to imagine many significant deals in this category this year.

Having raised an astounding $3.6 billion last year, Cloud Retail Infrastructure attracted only $80 million in H1[75], despite its increasing importance in supporting at-home dining. Some large July deals in the category can leave to imagination better performance before the end of 2020. China's Bianlifeng secured $100 million second round in May[76] for its 'cashierless' convenience stores and vending machine, a typology of tech that is mature for a moment of 'social distancing.'

[73] Crunchbase.
[74] AgFunder, 2020. Agri-food Tech Midyear Review.
[75] AgFunder, 2020. Agri-food Tech Midyear Review.
[76] Crunchbase.

Chapter 2 – Ancient Grains: Cereals Back to the Future

In the previous chapter, we have explored the Agrifood sector, describing the market, the negative impact trends, and the critical factors that will allow entrepreneurs to drive-up the entire industry and the single sector inside it.

Within the agriculture and agri-food industry, a sector has continuously grown in the last 10/15 years: the Ancient Grains sector.

For now, there is not any official definition of what ancient grains are, and most of the grains may be considered "old" since they have been around since the dawn of humanity. However, according to the Whole Grain Council, they are loosely defined as grains that have remained mostly unchanged over the last few generations[1]. Therefore, Modern wheat would not belong to this category, but certain varieties such as Einkorn, Farro, and Kamut would belong. Ancient varieties of other traditional grains, such as black barley, red and black rice, blue corn, may also be called ancient grains. These Grains, formerly ignored until today by Western palates (such as sorghum, chia, millet, quinoa, amaranth), would also be widely considered Ancient Grains. Furthermore, the category includes chia, a forgotten food of the ancient Aztecs; quinoa, which is originally from the Andean region of Ecuador, Bolivia, Colombia, and Peru; Triticum (wheat), in the form of einkorn, known today as Farro in Italy, as a type of awned wheat and one of the first crops domesticated in the Near East; and several other less famous globally such as Sicilian Ancient Grains.

Sicilian ancient grains or local varieties of Sicilian grains are a series of 52 varieties of hard and non-hard grains, which are claimed to be native to Sicily, of the 291 present in Italy in 1927[2]. They are mostly disappeared because they are not suitable for intensive cultivation with mechanized processes and extensive use of fertilizers. Moreover, they have lower yields per hectare than the most common wheat cultivations of today. In addition to this, the adoption by 50 European countries of the UPOV 91 (International Union for the Protection of New Varieties of Plants) and subsequently of the TIPS (Trade-related aspects of Intellectual Property rights) of the WTO (World Trade Organization, otherwise known as WTO) has contributed to curbing

[1] https://wholegrainscouncil.org/whole-grains-101/whats-whole-grain/ancient-grains

[2] Giuseppe Li Rosi, Terre Frumentarie.
https://web.archive.org/web/20150524135841/http://www.terrefrumentarie.it/index.php/notizie/53-i-custodi-dei-semi

the use of seeds of indigenous varieties[3]. Indeed, this international agreement, safeguarding the intellectual property of seed companies, requires a series of analysis and documentation to allow the sale and exchange of native varieties to demonstrate their true origin. However, it should be noted that peasant agriculture tends to resist these impositions and resists the tradition of reusing as a seed - when the species allows it - a part of the grain produced, thus preserving the individual ability to select over time the most suitable seed for their production conditions without depending on an external source. The Ministry of Agriculture, Food, and Forestry in 2018 has established which are the varieties of ancient Sicilian grains deserving of protection with the enrollment in the National Register of Varieties for Conservation of Agricultural and Horticultural Species[4]. The following varieties have been recognized in this register after the use of single nucleotide genetic markers (Single Nucleotide Polymorphism):

- 14 Sicilian local populations of durum wheat (Biancuccia, Castiglione glabro, Ciciredda, Faricello, Gioia, Martinella, Paola, Perciasacchi, Russello, Scorsonera, Timilia reste bianche, Timilia reste nere, Tripolino, Urrìa);
- 3 local Sicilian common wheat varieties (Maiorca, Maiorcone, Romano);
- 2 historical varieties (Bidì and Capeiti 8).

Research conducted by researchers of the Stazione Consorziale Sperimentale di Granicoltura per la Sicilia, of Caltagirone in the province of Catania published in 2010 suggests some differences between some varieties of ancient Sicilian durum wheat and modern varieties of durum wheat[5]. The grains belonged to 4 old Sicilian durum wheat varieties compared with 13 new Sicilian durum wheat varieties in the research. The four old Sicilian wheat varieties studied were: (Cappelli, Margherito, Russello, Timilia).
Grains of the 13 new varieties of Sicilian wheat studied were: (Arcangelo, Catervo, Ciccio, Duilio, Iride, K26, Lesina, Mongibello, Pietrafitta, Rusticano, Sant'Agata, Simeto, Tresor).
The differences noted in the research were:

[3] http://www.fao.org/3/y5714e/y5714e03.htm
[4] http://www.granicoltura.it/p_decreti_iscr_VL.html
[5] G. Gallo, M. Lo Bianco, R. Bognanni, G. Saimbene, A. Orlando, O. Grillo, R. Saccone, G. Venora, Durum Wheat Bread: Old Sicilian Varieties and Improved Ones, Journal of Agricultural Science and Technology, ISSN 1930-1259, USA, August 2010, Volume 4, No. 4.

- Modern varieties showed a higher weight (1000 seed count), with higher vitreousness as well as producing more semolina. It had substantially the same amount of gluten as ancient varieties, with a slightly higher protein composition than ancient durum grains. Only the semolina of ancient grains showed a lower gluten index and, therefore, different visco-elastic properties from the other group's flours.
- The old varieties showed a lower W alveographic index (it shows the strongness and the elasticity of flour) - 85 vs. 181 10E-4J -, while the other visco-elastic parameters (P, L, and G) did not differ between the two groups. In particular, the P/L ratio did not show differences between the two groups, consistent with the fact that they are wheat grains. This means that doughs obtained with old varieties are softer and less hard, and resistant than modern varieties.
- The old varieties at a sensorial analysis done with a standard method for making bread show how old grains have a thicker crust with a less alveolar crumb, with smaller crumbs and higher humidity.

Other grains, acknowledged as gluten-free ancient grains are amaranth, eaten in Mexico since the Aztecs, quinoa, sorghum, millet, and teff[6].

The three main cash crop kinds of cereal in the world today are wheat, rice, and maize. Wheat (*Triticum*) originating from the Levant region of the Near East and Ethiopian Highlands is now cultivated worldwide[7]. Nowadays, the European Union is the top-ranked wheat-producing country, with a volume equal to 7.5 million tons in 2020[8]. The grain has always provided an essential source of vegetable protein in human food. This food source enabled settlements to be established at the start of civilization as populations grew in the Babylonian and Assyrian empires known as the "Fertile Crescent."

Common wheat, typically used in bread (*T. aestivum*, a hexaploid species), is the most widely cultivated species globally. Durum wheat (*T. durum*, the only tetraploid form) is the second most widely cultivated wheat. Einkorn (*T. monococcum*, a diploid species) was domesticated simultaneously as emmer wheat (*T. dicoccum*, a tetraploid species), but neither of these species is in widespread use[9].

[6] https://wholegrainscouncil.org/whole-grains-101/whats-whole-grain/ancient-grains
[7] Raymond Cooper, Re-discovering ancient wheat varieties as a functional food, July 2015. Vol.5, Issue 3, pag.138-143. Journal of Traditional and Complementary Medicine.
[8] International Grain Council.
[9] Raymond Cooper, Re-discovering ancient wheat varieties as a functional food, July 2015. Vol.5, Issue 3, pag.138-143. Journal of Traditional and Complementary Medicine.

Wheat protein (and wheat starch) is easily digested by nearly 99% of the human population. However, several screening studies in Europe, South America, Australasia, and the USA suggest that approximately 0.5–1% of these populations may have undetected celiac disease[10]. Celiac disease is a condition that is caused by an adverse immune system reaction to gliadin, a gluten protein found in wheat, and some varieties of barley and rye[11]. When exposed to gliadin, the enzyme tissue transglutaminase modifies the protein, and the immune system cross-reacts with the bowel tissue, causing an inflammatory reaction. This interaction leads to "flattening of the small intestine's lining," leading to interference with nutrient absorption. The only effective treatment is a lifelong gluten-free diet. While a reaction to wheat proteins causes the disease, it is not the same as wheat allergy.

There is evidence that Ancient Grains' gliadin protein may not be as toxic to people living with celiac disease in contrast with more modern forms of wheat. For instance, Farro contains gluten but is different from most wheat since it contains only 14 chromosomes instead of 28 in emmer or 42 in modern wheat, altering the gluten structure; hence it does not affect gluten intolerance as other wheat.

2.1 Ancient Grains Market Analysis

Before describing Ancient Grains Market, let us have a view on the World Grains production. World total grains production in 2020/21 is expected to expand by 23million tons[12], to an all-time high of 2,210 million, including record harvests of wheat and barley. Although the COVID pandemic continues to treat Demand in some sectors, particularly for fuel ethanol and brewing, overall consumption is expected to grow for a fifth successive year, to 2,216 million tons (+24million)[13]. This also considers increases of 8 million tons for both maize and wheat and

[10] P. Singh, A. Arora, T. A. Strand, and other, Global Prevalence of Celiac Disease: Systematic Review and Meta-analysis, 2018, Clinical Gastroenterology and Hepatology Vol. 16, No. 6.
[11] https://www.nhs.uk/conditions/coeliac-disease/#:~:text=Coeliac%20disease%20is%20a%20condition,diarrhoea%2C%20abdominal%20pain%20and%20bloating.
[12] https://www.igc.int/en/gmr_summary.aspx
[13] https://www.igc.int/en/gmr_summary.aspx

increases for 2 million each for barley, sorghum, and oats. Another drawdown of world grains stocks is predicted, to 611 million tons (-6 million). The decrease is due to a decline in maize inventories led by contractions in the US, China, and the EU markets.

On the other hand, wheat stocks could reach a new high, although the expansion is principally in China and India, while the aggregate carryover of wheat in the significant exporters is expected to be positively little-changed. With substantial increases for wheat, maize, and sorghum shipments, global grains trade in 2020/21 is predicted to record 408 million tons, achieving a +4%[14].

In 2019, global durum wheat harvests were down 9.3% from the previous year, falling to 33.6 million tons; Canada and Italy, the first and second-largest producers of durum wheat globally, suffered an annual reduction of around 13% and 7%, respectively[15]. Stocks also decreased (-14% in 2018 to 8.6 million tons), with particular reference to those held by Canada, which have halved. In this context, the durum wheat market showed a significant revaluation of price lists at the origin: in the 2019/20 campaign, the price of "fine" durum wheat reached an average of 267.13 €/tons in Bologna (+16.1% on the previous year), 267.53 €/tons in Milan (+15.3%); the price of non-EU durum wheat quoted in Milan also increased, reaching 299.77 €/tons (+8.6%)[16].

The most up-to-date indications from International Grain Council (IGC) regarding world durum wheat production in 2020, still partially provisional, show a slight annual recovery (+2.0% to 34.2 million tons). The production outcome will be influenced mainly by Canada, where it is estimated a substantial increase in supply compared to 2019 (+22.6%); so much will depend on the climatic trend in the coming months. For Italy, for which official ISTAT data are not yet available, the IGC estimates harvest in 2020 at the same levels as last year (3.8 million tons). As a result, very similar to that forecast by operators in the national durum wheat supply chain.

Again concerning the latest indications of the IGC, the market fundamentals of durum wheat show elements that could give a bullish trend to grain prices in the medium term. In fact, against an increase in harvests of 2%, stocks should undergo a further significant contraction (-10.2% in 2019 to 7.7 million tons); this dynamic is to be attributed to consumption, slightly increasing, which would remain at levels higher than supply. In the 2020 month of July, which marks the

[14] https://www.igc.int/en/gmr_summary.aspx
[15] Tendenze: Frumento Duro. July 2020. Ismea.
[16] Tendenze: Frumento Duro. July 2020. Ismea.

start of the 2020/21 marketing year, the market has not taken a clear trend; few quotations are available, and those present concern limited grain quantities.

However, the first quotations of July 2 for the non-EU foreign product remain stable monthly, while the domestic product revalued both in Bologna (311.50 euro/tons, +8.7% compared to June) and in Milan (306.50 euros/tons, +6.7% in June)[17].

The main variables of the Durum Wheat Market

	2018/19	2019/20	2020/21	Var.% 2019-20/ 2018-19	Var.% 2020-21/ 2019-20
Production	**37,0**	**33,6**	**34,2**	**-9,3%**	**2,0%**
EU28*	8,7	7,5	7,4	-13,3%	-1,6%
Italy	*4,1*	*3,8*	*3,8*	*-7,1%*	*-3,0%*
France	*1,8*	*1,5*	*1,3*	*-12,4%*	*-13,5%*
Canada	5,7	5,0	6,1	-13,4%	22,6%
Turkey	3,5	3,2	3,6	-10,0%	14,3%
Algeria	3,2	3,2	3,0	27,0%	-6,0%
Mexico	1,6	1,7	1,6	10,4%	-7,9%
USA	2,1	1,5	1,5	-31,1%	4,2%
Marocco	2,4	1,3	0,8	-44,6%	-40,3%
Tunisia	1,0	1,2	0,9	18,0%	-21,6%
Other Countries	3,0	3,6	4,1	21,6%	13,6%
Exchanges	**7,8**	**9,4**	**9,0**	**19,9%**	**-4,4%**
Consumption	**36,0**	**35,0**	**35,1**	**-2,9%**	**4,0%**
Final Stock**	**10,0**	**8,6**	**7,7**	**-14,0%**	**10,2%**
Canada	1,8	0,9	0,9	-50,7%	5,2%
EU28*	2,1	1,6	1,1	-24,8%	-30,4%
USA	1,5	1,2	1,1	-23,6%	-10,0%
Mexico	0,3	0,3	0,3	0,0%	0,0%

*EU27 for 2020/21

**Principal exporter countries

Source: Ismea elaboration on International Grain Council data

Table 5. The main variables of the Durum Wheat Market

For what concerns Ancient Grain, the market has estimated to have a value of USD 457.35 million in 2018 and is predicted to grow at CAGR 35,5%, reaching USD 6.3 billion by 2024[18].

[17] Tendenze: Frumento Duro. July 2020. Ismea.

[18] Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

Globally, it is recorded a good demand for ancient grains, with half of the customers interested in the product, whose almost 40% claiming the use of ancient grains at least once a week. Furthermore, from those shoppers who are interested, more than 20% are willing to pay a premium for products that include old grain[19].

The global outbreak of the COVID-19 pandemic has a significant impact on the food sector's international trade. The cereals, pulses, and oilseeds sector's effect is generally less than in other agricultural sectors due to the significant importance of raw materials in the world diet. Indeed, these products are fundamental ingredients for human and animal nutrition. However, the availability of workers is a challenge[20].

Agricultural production of cereals, legumes, and oilseeds is generally highly mechanized. Therefore, it is less dependent on a large workforce since the products are usually collected with harvesters and not by hand.

Since the beginning of civilization, Ancient Grains have feeding humans, but in the 20th century, Western countries were mainly ignored where selectively bred and processed grains have an economic advantage. Nevertheless, there have been few product developments in the area. Flowers Foods, for instance, is bringing out an ancient grain bun for the foodservice sector made of amaranth, buckwheat, Khorasan, and millet; Kirkland Ancient Crackers from Costco were made from amaranth, millet, and quinoa; Boulder Canyon Ancient Grains Snack Chips from Utz Quality Food are made of seven grains and seeds, including quinoa, millet, chia, amaranth, brown rice, brown teff, and sorghum[21].

The Drivers[22] are:

- The consumer's attraction towards superfood drives the growth of the ancient grain market.
- Increased aversion to grain and wheat among consumers is expected to favor the pseudo-grain market, such as amaranth and quinoa.
- Minimal effort and requirements for chia, amaranth, and quinoa production compared to other grains are expected to drive the ancient grains market.

[19] Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

[20] https://www.cbi.eu/market-information/grains-pulses-oilseeds/how-respond-covid-19-grains-pulses-oilseeds-sector

[21] https://www.bakingbusiness.com/articles/47981-two-factors-influencing-the-ancient-grain-revival

[22] Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

- Increasing Demand for organic and natural ingredients from the cosmetics industry is expanding the market for chia, amaranth, and quinoa.

Restraints[23]:

- Growing consumption and production limitations lead to an increase in prices for pseudo-grains such as quinoa and amaranth.
- High labor costs and the lack of irrigation facilities in many regions serve as an obstacle for Ancient Grains Market.

Gluten Containing Ancient Grains is the most extensively used form, accounting for about 70.34% of the total market share in 2018[24]. However, Gluten-free ancient grains will increase their popularity in the future. This growth of the gluten-free market can be attributed to the rise in health consciousness in people; with an increase in awareness, people are now moving towards healthier alternatives. Gluten can be responsible for osteoporosis (a kind of bone disease) and intestinal damage, leading many customers to reduce gluten intake.

The food and Beverage segment takes a significant portion of the sector with the highest involvement of ancient grains due to the increased number of applications, going from Pasta and beers to pizza, bread, and simple semi-finished products such as flour. With the production of new and health beneficial whole grain buns and bread, the segment is expected to dominate the Ancient Grain Market.

However, Infant formula is the fastest-growing market, accounting for the increasing acceptance of this product as a milk alternative and the rise in the working women population.

For what concerns the market segment based on region, Europe took the largest market share in 2018, reaching a value of 43.06%. The motives that drive up the consumption of ancient grains in European countries is that the population diet within this region is characterized by an always present use of a flour-based product such as bread. Europe is followed by the Middle East and Africa, which together accounted for 26% of the market share[25].

[23] Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

[24] Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

[25] Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

2.2 Ancient Grains Derivates Market

Since the beginning of civilization, Ancient Grains have feeding humans, but in the 20th century, Western countries were mainly ignored where selectively bred and processed grains have an economic advantage. Nevertheless, there have been few product developments in the sector. Flowers Foods, for instance, is bringing out an ancient grain bun for the foodservice sector made of amaranth, buckwheat, Khorasan, and millet; Kirkland Ancient Crackers from Costco were made from amaranth, millet, and quinoa; Boulder Canyon Ancient Grains Snack Chips from Utz Quality Food are made of seven grains and seeds, including quinoa, millet, chia, amaranth, brown rice, brown teff, and sorghum; General Mills in 2014 started to involve Ancient Grains in a new version of Cheerios, its most iconic cereal format[26].

Wheat can self-pollinate, and this attribute greatly facilitated the selection of many distinct domestic varieties. It is used to make flour for baked bread, and eventually, its use spread to cakes, and in modern times to breakfast cereal, Pasta, and noodles. Wheat is used in the fermentation process to make beer and other alcoholic beverages, and biofuel. Also, it provides food for domestic livestock.

The food and Beverage segment takes a significant portion of the sector with the highest involvement of ancient grains due to the increased number of applications, going from Pasta and beers to pizza, bread, and simple semi-finished products such as flour. With the production of new and health beneficial whole grain buns and bread, the segment is expected to dominate the Ancient Grain Market[27].

Europe took the largest market share in 2018, reaching a value of 43.06%. The motive that drives up the consumption of ancient grains in European countries is that the population diet within this region is characterized by an always present use of flour-based products such as bread.

Pasta represents the durum wheat derivate product for antonomasia along with the flour. The consumption of 100% Italian pasta is booming, in contrast with the downward trend of pasta purchases that has been going on for some time in Italy. This is shown by the Ismea report

[26] V. Vara, October 2014, Why we're willing to pay more for cereal with ancient grains. The New Yorker.
[27] Ancient Grains Market Analysis, February 2020. Market Data Forecast.
https://www.marketdataforecast.com/market-reports/ancient-grain-market

Trends in durum wheat[28]. In a sector that is now mature, the appeal to the national origin of the raw material has provided a strong stimulus to purchase by families. In 2019, packages displaying on the label the words 100% Italian had a double-digit growth (13% both in volume and value), even more, marked if we consider only the first half of the year (+23% the increase in quantity and + 28.5% that of expenditure). The weight held by 100% Italian pasta on the total consumption of dry semolina pasta has steadily increased: from a share of 14% in volume and 17% in value in 2018, it has now exceeded 20% in volume and value[29].

During the months of the lockdown, in analogy to what occurred for the entire food sector, pasta sales were also rising. Indeed, the first six months of 2020 show annual growth of 8% in volume and 13.5% in expenditure. Generally speaking, the Trend report states that the current pandemic and the consequent restrictive measures have exposed the Italian milling and pasta processing industries to an intense vulnerability, given their structural dependence on foreign raw materials. It must be remembered that the quantities of grain coming from abroad oscillate annually between 30% and 40% of the requirements of the processing companies.

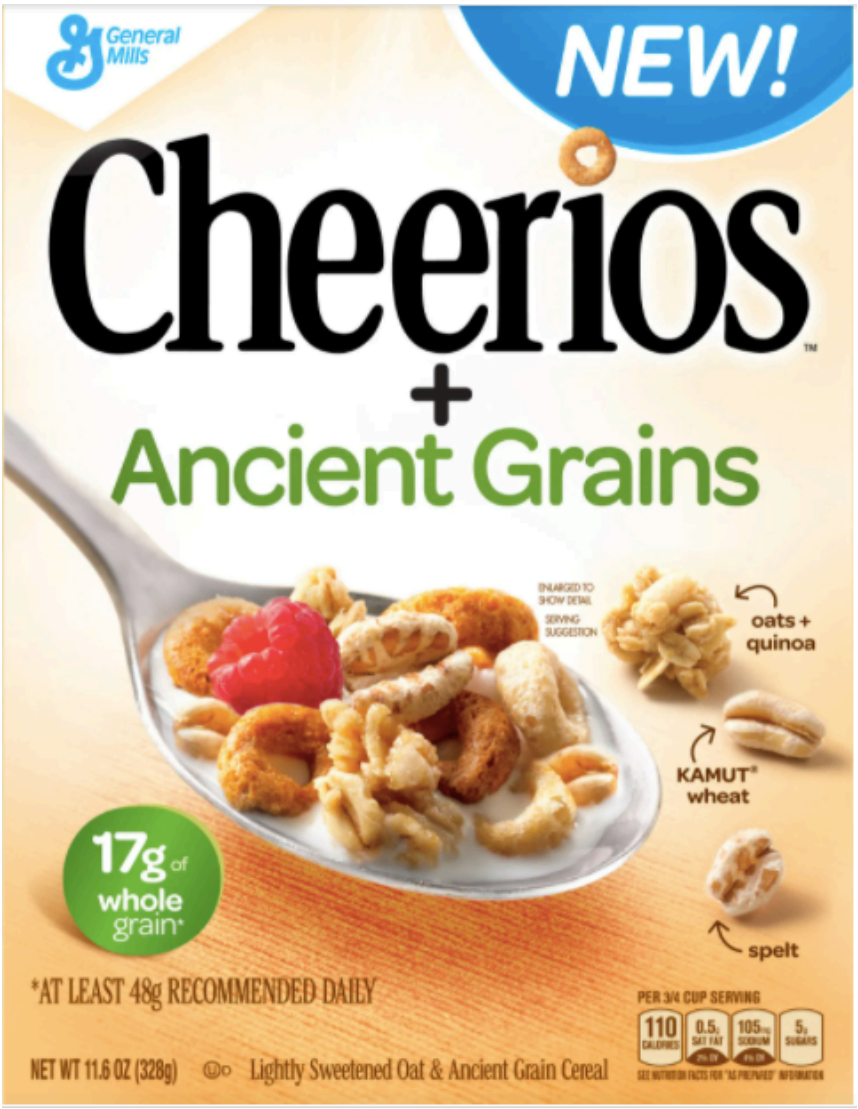
This concern was felt most acutely during the first weeks of the emergency, after which the supply chain showed a high degree of resilience: in fact, both imports of raw materials and exports of semolina pasta increased, as did domestic consumption of durum wheat derivatives.

Among the consolidated trends there is also the rediscovery of ancient grains. In Sicily, one of the most historically significant regions for durum wheat production, there is an increase of cultivated areas with local historical varieties almost forgotten for many years.[30] So a small dedicated supply chain has been developed, which has led to the registration of 16 local varieties of Sicilian wheat in addition to the three already registered in the "National Register of Varieties for Conservation of Agricultural and Horticultural Species." Recently, the first study on the genetic and morpho-qualitative characterization of the germplasm collection of Sicilian "ancient grains," including 27 varieties of durum wheat, 1 of soft wheat, and two historical varieties of durum wheat, has been published in the journal "Plants."[31]

At General Mills, market research and taste tests conducted by Cunningham and his colleagues showed that consumers were taken with the concept of ancient grains, and were willing to pay a premium for products containing them.[32] Even though people often could not define ancient

[28] Tendenze: Frumento Duro. July 2020. Ismea.
[29] Tendenze: Frumento Duro. July 2020. Ismea.
[30] M. T. Manuelli, Grani Antichi, proteine e al Matcha: nuovi colori e gusti della pasta. October 2019. Il Sole24Ore.
[31] M. T. Manuelli, Grani Antichi, proteine e al Matcha: nuovi colori e gusti della pasta. October 2019. Il Sole24Ore.
[32] V. Vara, October 2014, Why we're willing to pay more for cereal with ancient grains. The New Yorker.

grains, Cunningham said, they associated them with "simplicity" and "health." That was enough to persuade General Mills to put ancient grains in Cheerios, its most iconic cereal. Starting in January, Cheerios + Ancient Grains will be the latest addition to a line of about a dozen Cheerios types. They will be on the pricier side because of the premium ingredients, with a suggested retail price of $4.39 for a box of about twelve ounces, compared with $3.99 for a fourteen-ounce box of regular Cheerios[33].



Source: The New Yorker

Figure 6. Box front-side of Cheerios + Ancient Grains.

[33] V. Vara, October 2014, Why we're willing to pay more for cereal with ancient grains. The New Yorker.

Chapter 3 – Case of Study

As already described in the first chapter, the agri-food industry is strongly characterized by many little manufacturers. This is particularly true in the grain sector, in which many little growers and processors cover a significant portion of the market, limiting the power of big food corporations.

In this scenario, technological development, innovation, and the growing trend related to biological products and "natural addiction" behavior noticed in consumers are reshaping the power system within the supply chain of grain derivates. For instance, Italy is one of the largest producers of wheat, the production volumes of Italian wheat cannot meet the needs necessary for the production of pasta, a sector in which Italy is the top-ranked producer. In this context, the Italian Pasta Industry and the Corps within it are obligated to import the raw material from foreign countries such as Canada and Russia, where grains are grown in a hostile environment, e.g., consider it grown in the snow. In order to make them survive, Big Foreign Corps utilize chemical fertilizers composed of several chemical carcinogenic substances such as *Glyphosate*.

The involvement of technological improvement in the supply chain could lead to significant competition reshaping. Innovation such as Blockchain technology makes small/medium farmers and small/little processors host the healthiness trends that are affecting the market.

A Blockchain is a distributed database of records in the form of encrypted blocks of all transactions or digital events that have been executed and shared among participating parties and can be verified at any time in the future[1]. Although it was born in Bitcoin, it can be applied in several sectors, agri-food included. The Benefits that are fostering this technology it is possible to achieve are several: Information continuity, traceability, information security, the link between information flow and material flow. From the Blockchain sustain, all the actors within the agri-food value chain from this innovation involvement.

A *Digital Tech* that is undermining the traditional *Downstream side* of the supply chain is *e-commerce*. The development of a Digital Direct Channel and the exploitation of Digital indirect

[1] Antonucci, F., Figirilli, S., Costa, C., Pallottino, F., Raso, L., Menesatti, P. 2019. A review on blockchain applications in the agri-food sector. J Sci Food Agric.

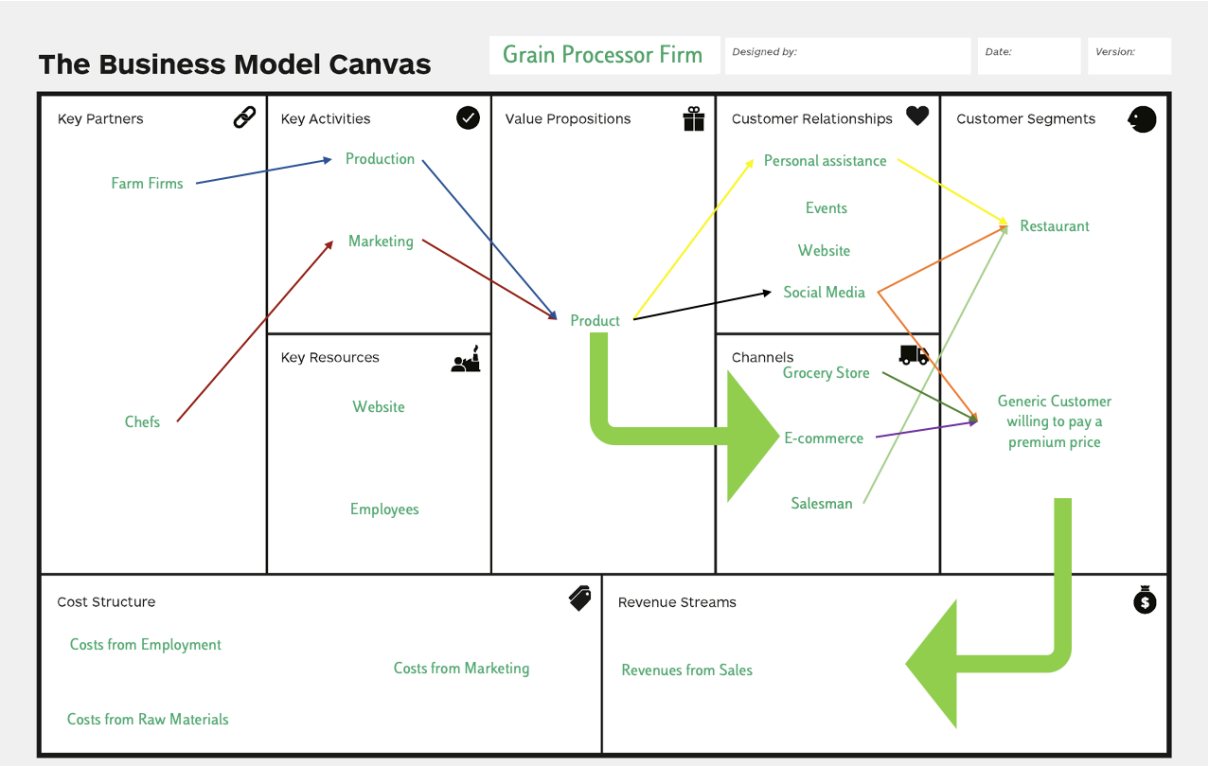
ones can allow small firms to reach the national and foreign markets without intermediaries' help.

In this chapter, we will discuss the changes in doing business in the Grain processing sector through the use of Digital Technologies. We will focus on the Ancient Grain sector since it is one of the most promising niche markets. In order to do that, we will use the "Business Model Canvas" instrument, to discover the evolution of the activity related to the Costumers, the Resources and the Partners, and the Value proposition, trying to underline the benefits brought by Digital Innovation. Relying on the information collected and previously reported, it will be provided a representation of two Business Model: Traditional Grain Processor Firm and Regina Adelasia, a recently founded firm aiming to become the Sicilian leader Ancient Grains Market. Looking at the Business Model Canvas, we will have a complete view of the Grain processing business models, and we will analyze their customer segments, their customer relationship, the channels that they adopt in order to reach their clients, the value proposed, the key activities that they provide, the resources that they need to carry on their business and the partnerships that they stipulate. At the same time, we will highlight the part related to the cost and revenues structure that will give evidence on how the target companies realize their profit. This analysis aims to find evidence on how the business models are different in the various stages of their activities, trying to underline benefits provide by Digital improvements.

3.1 Business Model of Traditional Grain Processor Firm

Here begin the presentation and description of a Traditional Grain Processing Firm Business Model. Generally, it is mainly characterized by a small digital technology presence identified in the basic use of social media channels and personal Website. Its business is design with the old paradigms of the market, and firms with this business model operate mainly focusing on the product and not on the Customer. This section will be provided a presentation of how the Traditional Business works, analyzing its principal aspects. The features of the Business Model derive from an interview with an expert of the sector: Giuseppe Li Rosi, President of *Simenza* (association involved in defense of *Traditional Sicilian Farmer Productions*, which comprises

90% of the Sicilian Ancient Grains Farm Firm) and one of the two Italian "Guardians of the Grains," owners of the original seeds.



Source: Giuseppe Li Rosi

Figure 7. General Grain Processor Firm Business Model

Customer segments. Considering that we are talking about a niche market, let us say that those are markets characterized by few buyers' presences. Whatever market with few customers is considered a niche market. In a niche market, the bargaining power relies on the demand side (on customers).

The firms involved in this niche have four different basic customers:

- *Restaurants*: in recent years, many restaurants have shown interest in the Ancient Grains sector. Since their rediscovery, several new commercial activities have been established in Italy, basing their Value Propositions on providing biological food or, in some cases, Vegan food. Pizza restaurants, medium-high level restaurants have involved this new-old raw material in their offer to the market.

- *Generic Customers are willing to pay a premium price*: there is no real discrimination in the positioning of the product manufactured. Hence, the Firm does not differentiate its supply since it does not identify different customer segments.

Value Proposition. In this business model, the focus is on the product. Derivates of Ancient Grains are per se valuable product, and companies involved in this sector limit their offer to its products without other added value.

Customer Relationship. The relationship with customers mainly occurs with events in the operating facilities or trade fairs and social media. The use of social media is typically basic, without the use of digital advertising or a real and concrete strategy. A website is implemented to inform people about the company's job, and someone has a small internet marketplace inside it. The events and trade are aimed to meet the customers and let them know the product but always focusing on the quality of the product.

Channels. From the Manual, we distinguish four types of channels: 1) partners 2) own 3) direct 4) indirect. This is not the kind of product that a small-medium firm can push into the Large-scale Distribution due to its low production volume. Hence, channels are:

- Grocery store with the high-level product (indirect). It is typical in the Italian market to grocery store high specialized in providing "quality food." Generally, this kind of channel differs its offer on a regional base since it sells products from the region in which it operates. Hence, the distribution from these stores works on regional bases without after-sales service.
- E-commerce (indirect/direct). On the other hand, e-commerce allows them a direct way to approach the market. The development of a Digital Direct Channel and the exploitation of Digital indirect ones allow small firms to reach the national and foreign markets without intermediaries' help.

  Some Ancient Grain Processor Firms begin to build their e-commerce on their Website, used initially as a digital showroom, but they stop at the delivery phase with a high amount of waiting time.
- Salesman. Only for the Restaurants customers, hired salesman operates to seek new clients and provide the product to the old ones. Without any support after the sales, their task is only to sell the product.

Revenue Streams. All the revenues come from the product sold. Obviously, the greater the volume sold, the greater the revenues.

Key Resources. Employers are the first critical resource in this Business Model since their experience in pasta and flour processing. It is not easy to produce Ancient Grains Derivates products because gluten's different typology makes them challenging to transform. Moreover, salesman employers are a fundamental variable in this algorithm since it is the only connection to the restaurant segment.
Finally, Website and social media also represent a crucial resource. Although the Firm only implements basic strategies upon digital communication channels in the majority of cases, they are the only way forward the internet customer awareness about the Firm and its activities.

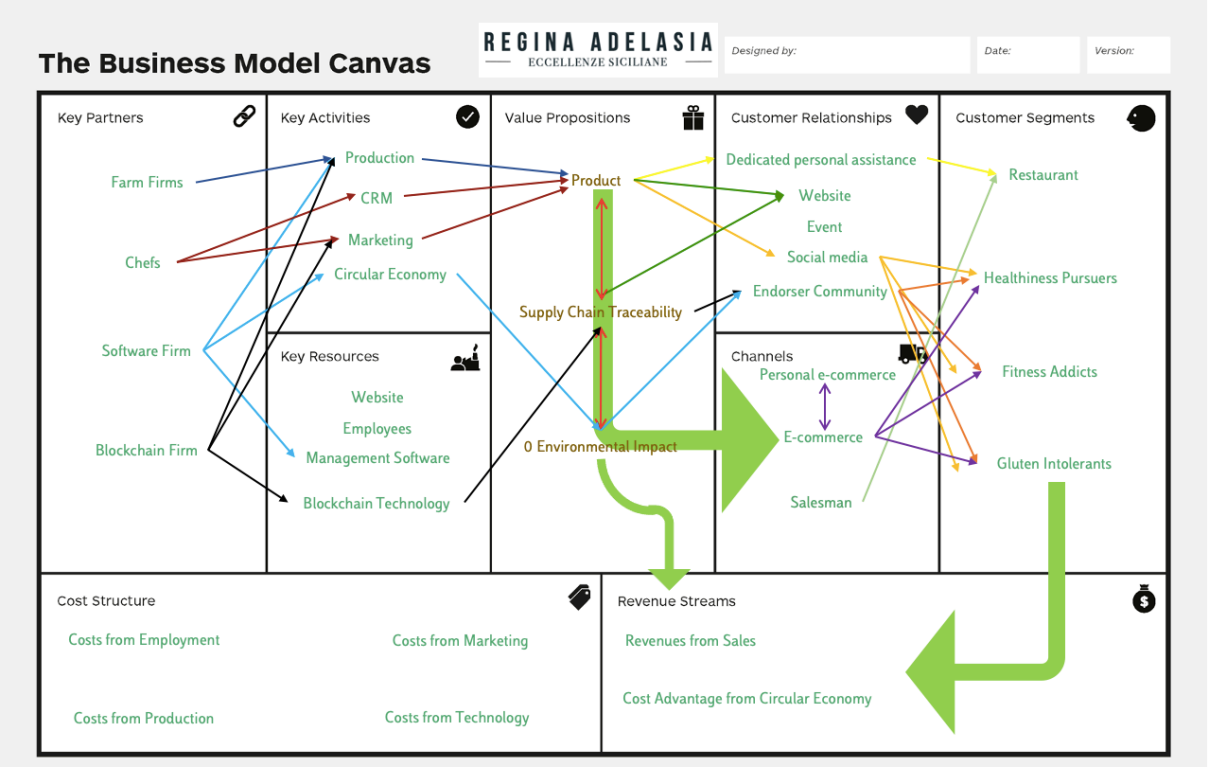
Key Activities. Production is the primary essential activity. The company's focus is on the product and its qualitative performance. Therefore, the company focuses on the production chain, trying to increase the production to increase the sales.
Another critical activity, but only for the most market looking firms, is Website and social media management. As said, only a few firms are looking at the market and work hard to develop the right digital strategy.

Key Partners. Farm Firms represent the critical partner. Indeed, the most determinant problem is to reach the raw material, the Ancient grains. Although Sicilian Ancient Grains' production has considerably increased in recent years, the production volumes are still not fulfilling the growing demand for Ancient Grains. Hence, it begins fundamental to build the right partnership with the right Farm Firm.
Furthermore, some Processor firm has established a solid partnership with several famous Italian Chefs. It is an excellent partner to promote the products and increase awareness in the Customer's mind.

Cost Structure. The majority of costs are costs related to the production, thus fixed costs related to employees and variable costs related to the hoarding of raw materials.
For the firms that also exploit possibilities deriving from marketing strategies, Costs derives from Marketing, but even the firms that implement marketing strategies do not invest in the function. Hence, the cost is insignificant.

3.2 Regina Adelasia – Back to the Future

In this section, it will be introduced Regina Adelasia's Business Model is characterized by a strong presence of Digital Technologies that impact in several ways how the Firm approaches the market and direct the customers. The involvement of Innovation Technologies in the majority of the company's activities outlines how the Firm tries to follow up the trends that will lead to a radical change in market dynamics, not only in this Agri-food sector but also on the whole Agri-food sectors, especially for what concern the channels through which customers can access the supplies and fulfill their needs. Although the COVID-19 pandemic drove up online shopping in several industries, Agri-food was not affected by this trend. While online purchases in the beverage sector are already mature, due to the convenience in terms of prices and the possibility to buy hard-to-find products (e.g., imported Wine, Gin, Scotch, etc.), people do not seem tasty purchasing food online. However, as already said, food online purchases are increasing terrifically. By applying the Business Model Canvas tool, it will be possible to see, graphically, the several difference between the two models.



Source: Federico Milici

Figure 8. Regina Adelasia Business Model

Customer segments. Even if the *Circular economy*'s involvement makes the Firm reach a 0 environmental impact result, which can drive the interest of environmentalist customers, since the product traded is the same, even the customer segments are the same. Hence, considering that we are talking about a niche market, which are markets characterized by few buyers' presences. The firms involved in this niche have four different basic customers:

- *Restaurants*: in recent years, many restaurants have shown interest in the Ancient Grains sector. Since their rediscovery, several new commercial activities have been established in Italy, basing their Value Propositions on providing biological food or, in some cases, Vegan food. Pizza restaurants, medium-high level restaurants have involved this new-old raw material in their offer to the market.

- *Healthiness Pursuers*: nowadays, increasable more people are seeking organic and biological food. Organic farming practices eliminate the use of artificial fertilizer products. Healthiness Pursuers are individuals that want to eat healthy food with no chemical additives. According to Cunningham, they associated Ancient Grains with “simplicity” and “health. As already said, the organic industry is growing at a prolific rate.

- *Fitness Addicts*: people that pay attention to alimentation and their overall lifestyle. It refers to those who covet the perfect balancing of sport and alimentation.

- Gluten Intolerants: people with gluten intolerance cannot synthesize the protein or live with a gluten-intolerant person.

Value Proposition. Differently from Business Model without innovation involvement, the value proposition of Regina Adelasia is entirely customer-oriented. Indeed, it is not only the product itself and the ancient grains' involvement at the center of the Firm's "Solar System." At the same degree of commitment such as product quality and luxury features task, following the recent trend concerning the increase in pasta consumption through the icon "100% Italian Grains" adds on the packaging claiming the involvement of 100% Italian wheat in Pasta production, the Firm bets in the involvement of Blockchain Technology aimed to implement transparent supply chain strategies, in order to show the Customer the origin of every single raw material and the

production methodology. Furthermore, the involvement of Digital Technologies in the production chain explicated by the use of management software through which it is possible to monitor every single stage of the production, that allows efficient production scale, Firm makes possible to avoid wastes, and, along with the recycled packaging and the involvement of renewable energy sources make it allowed to reach the achievement of Circular Economy.

Channels. Since the availability of the Sicilian Ancient grains is limited, it seems hard to push it into Large-scale Distribution. Hence, this hardly constrains the choice of channels. Furthermore, Ancient Grains, due to their characteristics, are considered luxury-food. Hence it needs the right vehicle to reach the offer. For these reasons, the channels through which the firm supply the demand is:

- E-commerce (indirect/direct). This allows Regina Adelasia a direct way to approach the market. The development of a Digital Direct Channel and the exploitation of Digital indirect ones allow small firms to reach the national and foreign markets without intermediaries' help.

  Furthermore, Regina Adelasia owns two different e-commerce websites, one for the restaurant segment through which restaurateurs can directly order the products they need building in their area through with they can manage their orders and hence their raw materials.

  On the other hand, the e-commerce for the final customer segment works more or less in the same, with customers' areas that also help build a strong relationship.

  For both customer segments, the free delivery policy will occur.
- Salesman. Only for the Restaurants customers, hired salesman operates to seek new clients and provide the product to the old ones supporting them in the after-sales stage.

Customer Relationship. The customer relationship in this model occurs both physically and online. For what concerns the restaurant segment, dedicated personal assistants are always present for customers before, during, and after the purchase order, helping restaurateurs in involving the Ancient Grains pasta in their offer. Private events with chefs in the Firm's facilities take place to increase brand awareness and engagement and connect the Firm's environment with customers.

The use of social media is fundamental. The absence of a physical place in which find the product and the digital marketplace's involvement makes the use of social media a determinant

variable aimed to achieve consumers and build a strong awareness about the brand and all the concerns. For these reasons, the involvement of endorsers such as food influencers is also necessary to increase the engagement of the Firm's marketing strategies concerning entering the food community.
The Firm's Website is also a determinant for feed customer relationships. The Website runs a double purpose: inform Customer about the Firm's activities, mission, and vision, a direct channel for the whole customer segment.

Revenue Streams. Revenues come from product selling, but thanks to Circular Economic, the cost reduction comes from production efficiencies and waste reduction deriving from digital technologies involvement in production scale.

Key Resources. Website and social media are vital resources since they are the gateway to consumers. Indeed, since the main channel is e-commerce (personal and private), digital marketing and digital customer relationship become fundamental. Employees are also an essential resource due to the difficulties in creating a product with complete involvement of Ancient grains. Hence the need for hard skilled employees is determinant in maintaining high valued production. Management Software is fundamental in implementing circular economy strategies since it is always allowed to control every single step of the production, considering water, electricity, room temperature, the volume of raw materials involved in the production, and the production itself. Blockchain Technology is aimed to supply chain transparency. Since the product's traceability is increasingly fundamental for customers, the correct management of this technology in the company supply is a critical factor for today and future trends.

Key Activities. Production is a critical activity because, for this niche, the product quality represents the first driver in justifying the premium price that customers have to pay to get it. Hence production management is fundamental. The latter becomes determinant also in achieving the Circular Economy goal since without the right manufacturing management is impossible to eliminate wastes a reduce the environmental impact. Customer Relationship Management (CRM) practices are determinant in trying to understand customers and better supply them. Finally, Social media management is also a determinant activity in feeding customer relationships.

Key Partners. Farm Firms represent the critical partner. Indeed, the most determinant problem is to reach the raw material, the Ancient grains. Although the production of Sicilian Ancient Grains has considerably increased in recent years, the production volumes are still not fulfilling the growing demand for Ancient Grains. Hence, it begins fundamental to build the right partnership with the right Farm Firm.
Chefs represent the endorser par excellence, impersonating the image of product quality. The possibility of forging a partnership with Michelin Chefs for events and exports may be a critical driver for firm future performance and strategies. Finally, Software Firm and Blockchain Firm are critical partners for the progressive improvement of the innovation involvement.

Cost Structure. This business model's cost structure is composed of costs from production, costs from marketing, and costs from technologies involved. The majority of costs are related to production, thus fixed costs related to employers and variable costs related to the hoarding of raw materials. Marketing's variable costs are also considerable since CRM practices, endorsers' partnerships and social media management are an expensive part of the business model. Finally, the high technological involvement leads to high technology management costs, deriving from the servers' cost, cost of the software, and blockchain license.

Chapter 4 – Methodology

The research aimed to understand the consumers' purchase process and the consumers' Pains & Gains in the Pasta Industry in order to validate the desirability of Regina Adelasia's Value Proposition, trying to understand if digital channels (direct/indirect) could be a proper way to supply this typology of product. That was the second phase of more prominent research to understand better the dimensions of the Ancient grains sector, the application of digital technology in agriculture, and the transformation firms located inside the supply chain.

In order to do that, the research was split into two different phases: qualitative and quantitative. The qualitative phase of the research was implemented to understand consumers' purchase choices in the Pasta market and Digital Technology's involvement in their process. In order to do that, eight one-to-one interviews were conducted; the aim was to identify useful attributes for the quantitative phase. Thus, it began the hypothesis generation stage on the motivations of attitudes and behaviors, which have been verified later by using a generalizable survey on a quantitative basis. The qualitative respondents' sample is small (8 subjects), chosen according to the customer personas' hypothesis derived from the product validation phase, which focused on underlining customer prototypes' possible profiles and testing the product itself. Hence, the interviewees were chosen based on the customer personas identified in the previous analysis.

In the first phase of the research, the first aim was to understand consumer choice and the attributes determinant for customer willingness to purchase. The research did not give the desired results with the first view, but it gave valued answers to product validation and customer personas creation. Hence, the second aim was to gauge the product through a test that consisted, in a nutshell, of making other people taste the product and asking them questions about their feelings and emotion before, after, and during the tasting. In particular, 15 people, aged between 20 and 65 years old, selected by personal (age, gender, instruction degree) functional (direct or indirect purchaser) and health (gluten intolerants) factors, had been offered and asked to taste a pack of Regina Adelasia's Ancient Grains Pasta. In trying to eliminate every single interference factor and make it generalizable, the chosen pasta cut had been *Fusillo* due to its diffusion

in the Italian population. The chosen wheat had been the *Evolutivo*[1] which represents one of the most precious existing typologies of ancient grains since it derives from the "melting pot" of several cultivars[2] (45 in this one).
The sample of 15 individuals have been featured as follow:

Age / Gender	20 |-| 30	31 |-| 40	41 |-| 50	51 |-| 65	Total
Male	4	1	2	0	7
Female	2	1	1	4	8
Total	6	2	3	4	15

Table 6. The Sample distribution by gender and age.

To each of the 15 individuals, it has been given two days to cook the product in whatever ways they wanted, only advising them on the cooking time, thus without influencing them for what concerns the pasta seasoning.
Once the two days had passed, the subjects had been asked to answer some questions concerning the experience. Below the results will be briefly explained.
All the 15 interviewees have positively gauged the product in terms of taste and during/after the consumption experience, subsequently described.

Before the consumption: The most significant part of the analysis was done on the product's cooking performance. From the sample, 7/15 have shown issues related to cooking time (*Fusillo* has a cooking time of 3-4 minutes); in particular, the "threat" consisted of the fast cooking time of the product, which leads the latter to overcook faster than the "traditional pasta" (15-20 second error window). This portion of the sample was composed of 20-24 years old individuals, i.e., indirect buyers who live with their parents, and by modal class "51 |-| 65" composed by housewives.
On the other hand, the remaining 8/15 found value in the time saving guaranteed by a low cooking time. Those were the portion of the sample composed of 27 to 50 years old individuals,

[1] Evolutivo: also called "Popolazione evolutiva," it consists of a mix of several different varieties (cultivar) of the same typology of wheat (durum or common).
[2] Cultivar: it is "an assemblage of plants selected for desirable characteristics that are maintained during propagation. More generally, a cultivar is the most basic classification category of cultivated plants in the International Code of Nomenclature for Cultivated Plants (ICNCP). Most cultivars arise in cultivation, but some are from wild plants that have distinctive characteristics.", Wikipedia.

full-time workers, four singles, 2 in couple, two married, most of which without children (only the married ones).

During the consumption: for what concerns the consumption experience, the first research has shown something significant: the old-aged people of the sample, belonging the modal class “51 |-| 65”, in tasting the product have been reminded of their youth, for what concerns the modal classes “20 |-| 30” and “31 |-| 40”, it has emerged that they used to eat less Pasta (carbohydrates in general) since they feel guilty about the possibility of gaining weight. Whereas the consumption of branded Pasta, produced with modern wheat[3]Made them feel guilty; they have claimed that they had not felt guilt during the Ancient Grains Pasta's consumption.

After the consumption: It was registered a digestion time between 20 and 30 minutes. Inside the sample, there were four subjects with severe gluten intolerance who have claimed that no digestion related issue had occurred. Furthermore, no one of the participants has had digestion issues, feelings of bloating, or heaviness/tiredness, which are typical symptoms related to the overconsumption of carbohydrates or products characterized by a high gluten percentage.

In conclusion, the results allow us to determine three different prototypes of Customer Persona:

- *Fitness Addicts*: people that pay attention to alimentation and their overall lifestyle. It refers to those who covet the perfect balancing of sport and alimentation. They are between 20 and 50 years old.
- *Gluten Intolerant (not celiac)*: people with gluten intolerance cannot synthesize the protein or live with a gluten-intolerant person. No age.
- *Healthiness Pursuers*: people that pay attention to alimentation but not to their overall body-image. No age.

[3] Modern wheat: In the 1970s, the genetics of wheat were altered using gamma-ray irradiation, transforming it from a very tall stalk into a much shorter one, reducing the risk of "allurement" (lying down) and increasing the yield per hectare (10.000 m^2). For this last reason, modern wheat varieties were born, which led to the progressive abandonment of the old, but “organoleptically” superior varieties and species.
The rise of modern varieties over the old ones was mainly due to the high gluten content, often also added to the grains. The search for technological flours, which are easier to process (dough that can be made into bread quickly) and, of course, the increase in production yield meant that the old varieties were forgotten.

These results are a preliminary appraisal aimed at better-selecting interviewees for the research based on this thesis's qualitative phase. From these results, it is possible to imagine further Customer Personas inside product lines; for instance, the Fusillo cut allows a lower cooking time concerning other pasta cuts made with the same wheat; for this reason, it is easy to believe that it can perfectly suit the modal class "20 |–| 30" which contains full-time workers without children and frenetic life.

4.1 Qualitative Research

The qualitative phase of the research was implemented to understand consumers' purchase choices in the Pasta market and Digital Technology's involvement in their process. In order to do that, eight one-to-one interviews were conducted; the aim was to identify useful attributes for the quantitative phase. Thus, it began the hypothesis generation stage on the motivations of attitudes and behaviors, which have been verified later by using a generalizable survey on a quantitative basis. The qualitative respondents' sample is small (8 subjects), chosen according to the customer personas' hypothesis derived from the product validation phase, which focused on underlining customer prototypes' possible profiles and testing the product itself. Hence, the interviewees were chosen based on the customer personas identified in the previous analysis.

4.1.1 Research Objective

As already said, the objective of this research was to gauge consumers' Pains & Gains and their Purchase Process, trying to understand if digital channels (direct/indirect) could be a proper way to supply this typology of product.
The purpose of the research was to identify which external factors or attributes influence a consumer to search for and purchase Pasta.

Through a series of questions, an attempt was made to reconstruct a path from attributes to values through benefits. This path is mainly used to find the deepest motivations to prefer one product over another (liking/disliking).

As a collection tool, the method of single interviews, of approximately 60/90 minutes each, was used based on a series of questions. This method was chosen as it allows for greater flexibility and allows for a more in-depth exploration of the interviewees' motivations.

In order to do so, it was necessary to construct semi-structured one-to-one interviews. The intention was to recreate a typical purchase situation by putting the interviewees in front of a reconstructed shelf built in an aseptic location, namely a white room deprived of all possible interference factors. The subjects had to choose between a selection of 12 Pasta boxes divided into three different typologies of grains (*Perciasacchi, Modern Wheat, Alternative, i.e., legumes Pasta*) and four different Pasta Cuts (*Fusilli, Rigatoni, Pennette, Spaghetti*). It has been considered short pasta cuts and long Pasta cuts to measure a possible consumer preference on these two categories. The brand chosen for the research were *Rummo (Modern Wheat)*, *Regina Adelasia (Sicilian Ancient Grains)*, *Barilla (alternative Grains)*; they were chosen due to their Brand Awareness within the Pasta Sector, and Regina Adelasia's Pasta was chosen since the aim of analysis converges to it. During the interview, the interviewees were asked to answer questions. All the interviews were recorded through the support of recording technologies.

Finally, the 6W method (what, where, when, who, why, how) consisted of more specific questions.

After careful analysis, a series of ideal questions relevant to the research were formulated:

1) Con quale frequenza consumi pasta settimanalmente?
   (How often do you consume Pasta weekly?)

2) Che tipo di pasta compri di solito? Perché? (Brand, tipologia di grano, formato)
   (Which kind of Pasta do you usually buy? Why?)

3) Di fronte a te trovi una ricostruzione di un classico scaffale di supermercato. Tra questi prodotti quali sceglieresti? Perché?

(In front of you, there is a reconstruction of a classic supermarket shelf. Which of these products would you choose? Why?)

4) Quali sono gli attributi fondamentali che la pasta deve avere?
   (What are the necessary attributes that Pasta must have?)

5) Qual è il tempo di cottura ideale della pasta? Perché?
   (Which is the ideal pasta cooking time? Why)

6) Ci sono controindicazioni al consumo della pasta?
   (Are there any contraindications to eating Pasta?)

7) In quale pasto mangi la pasta di solito? Perché?
   (In which meal do you usually eat Pasta? Why?)

8) La possibilità di scegliere tra differenti tagli di pasta influisce sulla tua scelta? Quali condimenti utilizzi? Perché?
   (Is the possibility to choose in different Pasta cuts an influent factor on your choice? Why? Which condiments do you use?)

9) Acquisti anche altri tipi di pasta? (grani alternativi, riso)
   (Do you buy Alternative Grains Pasta?)

10) Prima di acquistare fai ricerche online? Dove? Perché?
    (Do you search online about the product before buying? Where? Why?)

11) Acquisti la pasta online? Perché? Dove?
    (Do you buy Pasta online? Why? Where?)

4.1.2 Sample Group

The qualitative respondents' sample is small (8 subjects), chosen according to the customer personas' hypothesis derived from the product validation phase, which focused on underlining customer prototypes' possible profiles and testing the product itself. Hence, the interviewees were chosen based on the customer personas identified in the previous analysis.

As already said, the sample interviewed for the research is composed of 8 subjects of different ages and education/background. They were chosen since they perfectly fit with the customer personas identified in the first research. The sample is distributed by gender and age: gender distribution is four males and four females, and the ages go from 20 to 65 years old. In the tables below, the details of sample distribution:

Age / Gender	20 |-| 30	31 |-| 40	41 |-| 50	51 |-| 65	Total
Male	1	2	0	1	4
Female	2	0	1	1	4
Total	3	2	1	2	8

Table 7. Sample distribution by gender and age.

Study degree / Gender	Diploma	Bachelor's degree	Master's Degree	Specialization	Total
Male	2	0	1	1	4
Female	0	2	1	1	4
Total	2	2	2	2	8

Table 8. Sample distribution by Educational degree

Variables / Gender	Gluten Intolerance	Sport Practice	Healthy food
Male	1	2	4
Female	2	1	3
Total	**3**	**3**	**7**

Table 9. Sample distribution by Customer personas' factor discrimination

Below will be briefly presented the sample:

- Francesco, 34 years old, Academic degree in Sound Engineering, owns and manages a B&B and a Hotel. He leads a Healthy lifestyle characterized by healthy food and sports workout five or six times a week. No gluten intolerance.

- Giovanni, 26 years old, studied Electronic Engineering at Politecnico di Torino. He is CEO of a little firm that he started called Poliwood involved in the polystyrene sector. No fitness practiced, but healthy food addicted. No gluten Intolerance.

- Mariagrazia, 30 years old, Bachelor's degree in economics at the University of Messina, she studies International Management at the University of Messina, she works as a Junior Financial Consultant at Medietica, a firm involved in credit brokerage. No sport practiced, but healthy food addict due to her gluten intolerance.

- Giovanna, 46 years old, Master's degree in Economics at the University of Messina, works as a Senior Financial Consultant at Medietica. No sport practiced, no healthy food addiction, no gluten intolerance.

- Emanuele, 40 years old, Master's degree in Law at the University of Messina, is a Lawyer. He leads a Healthy lifestyle characterized by healthy food and sports workout five or six times a week. Gluten intolerance.

- Federica, 25 years old, Bachelor's degree in Economics at the University of Messina, she studies Law at the University of Messina. She leads a Healthy lifestyle characterized by healthy food and sports workout three or four times a week. No gluten intolerance.

- Laura, 62 years old, has a Master's degree in Medicine at the University of Catania, Specialization in Dermatology. She is a Doctor. She leads a Healthy lifestyle characterized by healthy food without practicing sports. Gluten intolerant.

- Antonio, 65 years old, has a Master's Degree in Medicine at the University of Catania, two specializations in Psychiatrists and Neurology. He is a Doctor. He leads a Healthy lifestyle

characterized by healthy food without practicing sport. Gluten Intolerance.

4.1.3 Data collection

The examination of verbal responses generated by the interviews begins with a *content analysis* aimed at reducing the idiosyncratic responses of the subjects to a standard set of meanings: to each subject's thought/response is assigned a category code, eliminating the personal expressions of similar basic thoughts, and thus identifying a set of standard concepts that summarize all the attributes, consequences and values mentioned in the answers given during the interviews. The concepts transformed into codes, thus, become the nodes of a hypothetical associative network.

The next step consists of the *structural analysis*, which analyzes the cognitive connections between these concepts, called implications that can be defined as the perceptions of a causal or instrumental relationship between two concepts. A *means-ends chain* is simply a sequence of causal implications: one attribute implies a consequence that implies another consequence that implies a value. These implications can be direct or indirect. For example, a *means-ends chain* of the type:

$$A \rightarrow B \rightarrow C$$

It contains two direct implications, namely those from A to B and from B to C, each of which was explicitly stated by a consumer during the interview, and an indirect implication between A and C, which was not mentioned by a consumer but is implicated by the two direct associations.

In order to build the links between the concepts that emerged from the interviews, thus establishing the arcs of the network, a matrix is constructed called *implications matrix*, which represents all the direct and indirect relationships between the set of concepts adequately categorized, and then the aggregate cognitive structure of the entire sample interviewed.

The data inserted in the cells indicate the frequencies, relative to all the subjects of the sample, with which an attribute, consequence, or value (i.e., an element on the row) leads directly or indirectly to another attribute, consequence, or value (i.e., an element on the column).

Therefore, data is recorded in the matrix's particular cell when the concept along the row precedes the concept along the column in the ascent answers.
Finally, starting from the *matrix of implications*, a map is built that aims at reconstructing the hierarchical relations at an aggregate level, namely concerning the entire sample. This map is called *Hierarchical Value Map* (HVM) and graphically shows consumer knowledge is content and structure. It consists of a tree diagram composing of a set of nodes and lines; the nodes represent the conceptual meanings, classified in attributes, benefits, and values; the lines joining the nodes are the associations between these concepts: the concepts at the value level are at the top because they are the final abstract concepts that are connected through a series of associations to less abstract concepts; the attributes related to more concrete concepts tend to be positioned at the bottom of the map because most of the time they are the stimuli that started the process of ascent; in an intermediate position are placed the perceived benefits in association with the attributes that contribute to the final values.
The map's construction is done trying to maintain a balance between data retention and those of synthesis. To this end, a threshold value is selected to determine which relationships must be represented in the map and which, instead, must be eliminated: only the associations mentioned by at least 25% of respondents on a sample of 8 individuals are considered valid and, thus, included in the graphical representation. Besides, redundant associations are eliminated: if, for example, the concept "A" is associated with both the concept "B" and the concept "C," and the concept "B" is associated with the concept "C," only segments AB and BC will be drawn in the map because the segment AC is redundant, i.e., already represented in a route.

4.2 Quantitative Research

After the qualitative research, a quantitative survey was carried out through which the significance of the data obtained in the qualitative research was sought. This phase's objective was to generalize the results obtained in a sample relative to the reference population. The survey is a type of research in which use is made of a formalized questionnaire for the collection of data and, in a subsequent phase, the analysis of the latter through statistical techniques. Based

on a series of discriminating factors, which will shortly be dealt with individually, the population sample to which the online questionnaire was administered was defined.

4.2.1 Research Objective

Through the information extracted from an initial qualitative phase described above, it was possible to identify a series of results whose significance had to be verified and measured. To do this, a questionnaire was created, through the Qualtrics platform, consisting of an initial presentation phase in which the scope, purpose, and interest of the research were described (Figure 9). In this step, the reference legislation regarding privacy was included to protect the respondents regarding the disclosure of sensitive personal data, ensuring that it was treated exclusively for the research's objectives.

Once the presentation of the research was inserted, it was decided to divide the sample into three parts: a first part defined as "socio-demographic" in which questions of a personal nature were included to identify, divide and classify the respondents; a second part defined as “introduction” in which the topic was discussed through a series of general questions used to draw attention to the topic being investigated and to create a favorable climate for the truthful completion of the next part of the questionnaire, considered, for the purposes of the research, the most sensitive part; a third part defined as "of the attributes" in which a series of attributes related to the object of the research were included that in the qualitative survey emerged with greater frequency (more than 2 times) or there was a need to deepen and investigate further. This represents the most essential and critical part of the questionnaire, functional to the research's main objectives, as it is a "technical" part in which information is sought in depth through more challenging questions. Specifically, the respondents were asked to give a score, on a scale of importance, to Pasta's specific attributes.

Figure 9. Survey - presentation

In the first part of the questionnaire, a series of questions of a personal nature were included in order to be able to subdivide the selected sample based on discriminating socio-demographic factors. Specifically, respondents were asked to answer nine questions regarding age, gender, marital status, educational qualification, profession, income, household size, and territory of origin. This socio-demographic distinction will be useful later in the analysis following the extrapolation of the data that emerged from the questionnaire's administration. Figures 10-11-12 show the first part of the questionnaire in detail.

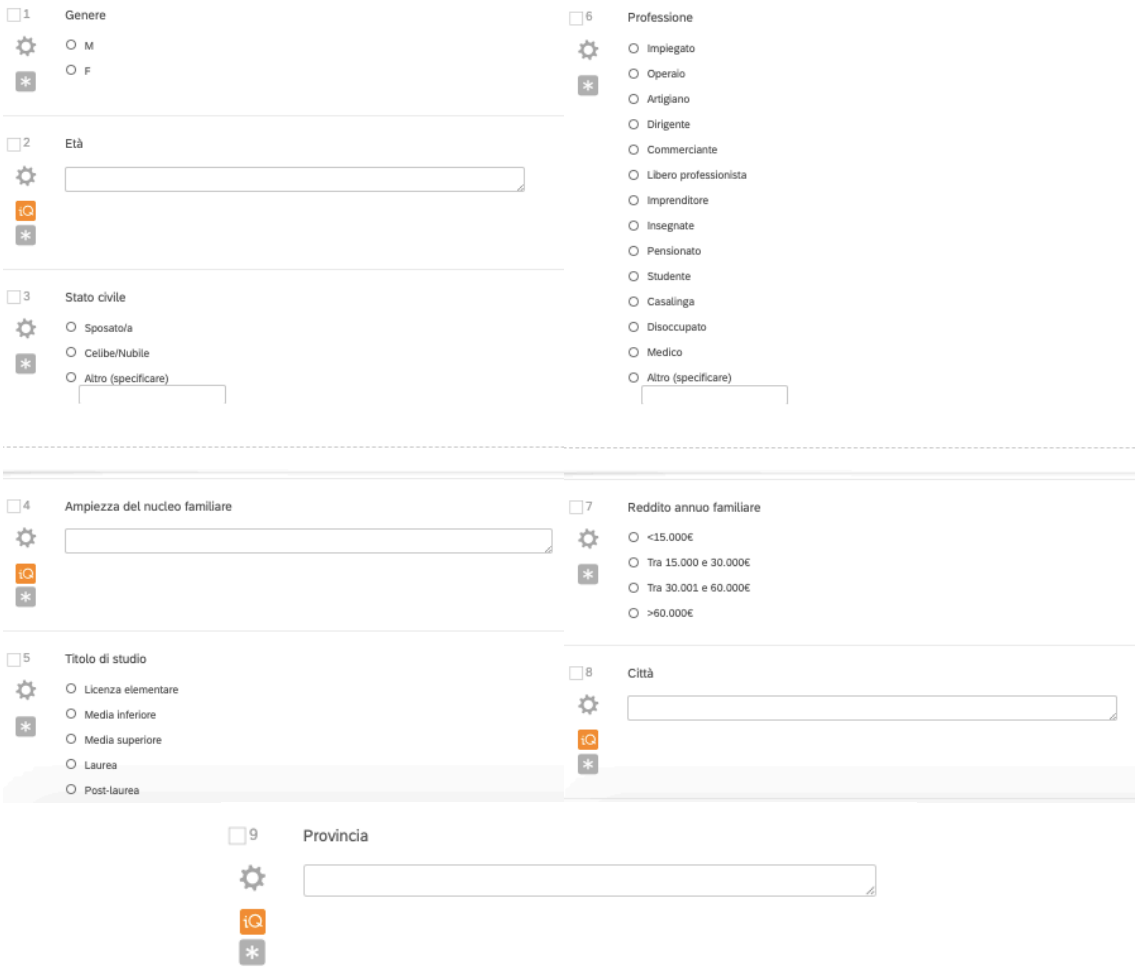


Figure 10-11-12. Survey - Fist Part: Socio-demographic distinction

As explained, the presentation part of a questionnaire should introduce the topic and attract the respondents' attention. In this part, ten+one qualitative questions characterized by answer alternatives, unambiguous or with the possibility of more than one answer at the same time, have been included, divided into three sections of three questions each, with the exception of questions 13 and 13b which had a separate section and question 19 which was shown only if respondents answered “yes” to the question 18; this is because we wanted to avoid creating confusion in the eyes of the respondents. Figures 13-14-15 express the three sections of this first part.

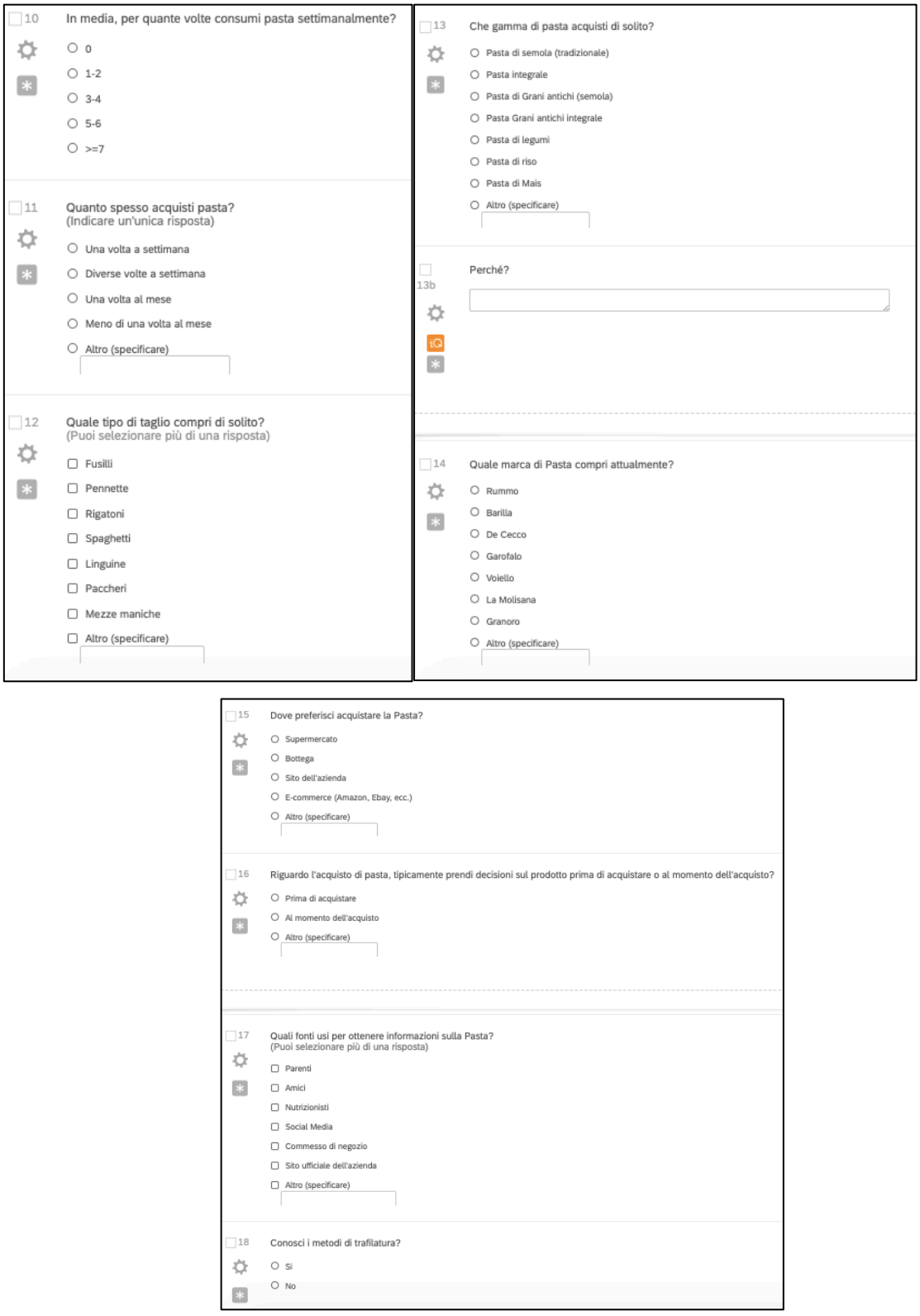


Figure 13-14. Survey – Introduction: questions from 10 to 18

For what concerns the question 19, it was shown only if the respondents had answer "yes" to the question 18, which was related to production methods. The figure below shows the question 19.

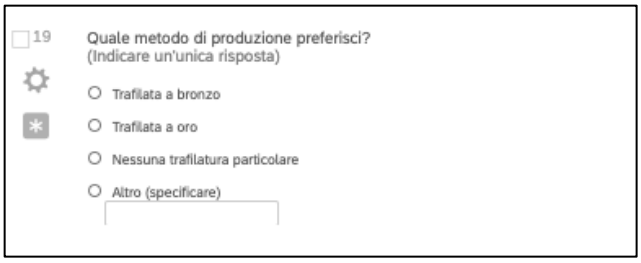


Figure 15. Survey – Introduction: questions 19

The third part, defined as "attributes," included attributes related to the research object that emerged more frequently during the qualitative interviews (only the attributes, functional and psychological, emerged more or equaled them two times) or that needed to be further investigated. As mentioned, this represents the most essential and critical part of the questionnaire. Respondents were asked to score, on a Likert scale measuring importance, ranging from 1=not at all important to 7=very important, the specific pasta attributes identified during the interviews. Specifically, twenty-three attributes were identified and sorted according to the type of feature related to Pasta: the first five attributes refer to the main discriminators in choosing Pasta found during the interviews, the next ones were sorted according to importance or part of the object under consideration. Figures 13 express the second part of the questionnaire related to attributes.

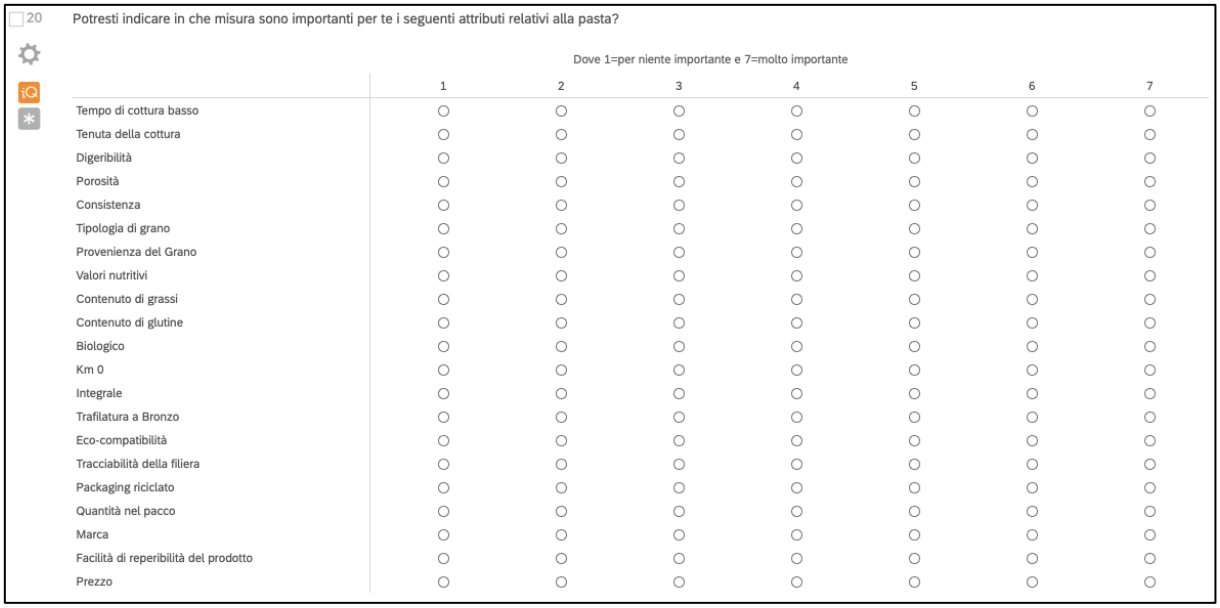


Figure 16. Survey – Attributes: Likert scale measuring the importance

4.2.2 Sample Group

This paragraph will discuss the composition of the population sample selected. The sample mentioned above has a number of N=150, this level of numerosity was identified in order to better measure the significance of the data that emerged. For this same reason, it was decided to divide the sample equally according to gender and, therefore, to have the same amount of males and females. The table below shows the sample gender distribution.

Genere

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	M	75	50.0	50.0	50.0
	F	75	50.0	50.0	100.0
	Total	150	100.0	100.0	

Table 10. Survey – Sample Gender distribution.

The second socio-demographic discriminant is age. It was decided to go out and investigate each age group to avoid obtaining data belonging to a single segment. As shown in Table 11 the minimum age of the respondents is 20, the maximum age is 65, with an average age of 39.91.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Età	150	20	65	39.91	14.070
Valid N (listwise)	150				

Table 11. Survey – Sample Age distribution.

In the next pie chart (Figure 17), however, the distribution by age is shown in detail.

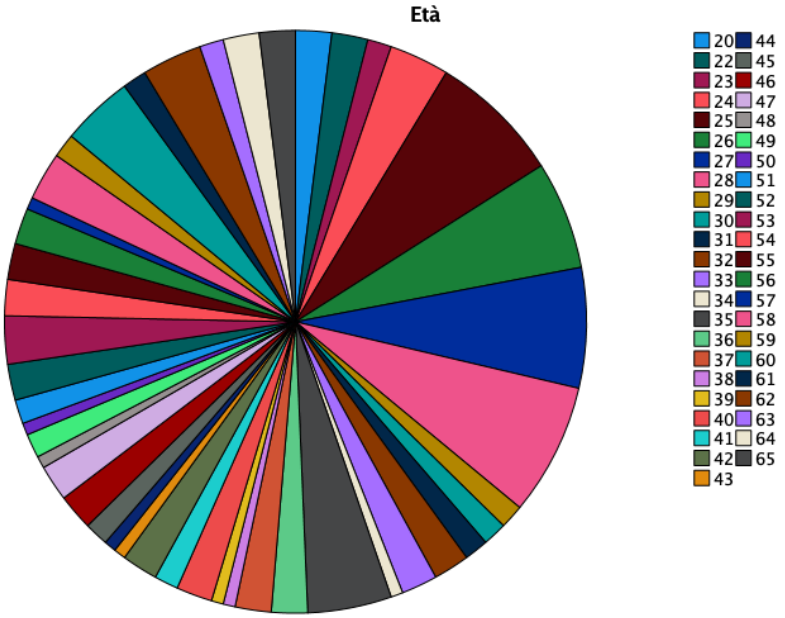


Figure 17. Survey – Sample Age distribution (Pie Chart)

Table 12, instead, shows the marital status of the population under examination. It can be seen that 48.7% of the sample was not married ("Celibe/Nubile"), 46% were married, while the remaining 5.3% indicated the value "other" (“altro”), specifying, for example, "cohabiting" or "divorced". The data regarding the value "other" are expressed in Table 13.

Stato civile - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sposato/a	69	46.0	46.0	46.0
	Celibe/Nubile	73	48.7	48.7	94.7
	Altro (specificare)	8	5.3	5.3	100.0
	Total	150	100.0	100.0	

Table 12. Survey – Sample Marital Status Distribution

Stato civile - Altro (specificare) - Testo

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		143	95.3	95.3	95.3
	Convivente	3	2.0	2.0	97.3
	Separata	1	.7	.7	98.0
	Vedova	2	1.3	1.3	99.3
	Vedovo	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 13. Survey – “Other” Sample Marital Status Distribution

Respondents were asked in indicate the size of the household in order to steam data on the number of Pasta consumed. As shown in Table 10, 20.7% of the population (31 subjects) state

that their household consists of 2 people, 24.7% of the population (37 subjects) state that their household consists of 3 people, while for 32.7% (49 subjects) it consists of 4 people. Thus, about 77% of the reference population has a household of between 2 and 4 persons. Table 14 expresses what has just been stated.

Ampiezza del nucleo familiare

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	17	11.3	11.3	11.3
	2	31	20.7	20.7	32.0
	3	37	24.7	24.7	56.7
	4	49	32.7	32.7	89.3
	5	13	8.7	8.7	98.0
	6	3	2.0	2.0	100.0
	Total	150	100.0	100.0	

Table 14. Survey – Sample Household Size Distribution

With regard to the different levels of education, Table 15 shows the distribution of the sample according to educational attainment. As it possible see, the population under examination is characterized by a medium level of education, in fact, university graduates and post-graduates represent 42.7% and 14.7% respectively for a total of 57.4%, while High School graduates represent the 42.7%.

Titolo di studio

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Media superiore	64	42.7	42.7	42.7
	Laurea	64	42.7	42.7	85.3
	Post-laurea	22	14.7	14.7	100.0
	Total	150	100.0	100.0	

Table 15. Survey - Sample Education Attainment Distribution

Within the sample, different levels of education and professions were found. In particular, 16 types of professions were investigated with the addition of the possibility "other" through which the respondents could have added the profession themselves in case it was missing among the possible choices. As shown in Table 16 we note that the *Mode* for professions is "employee" (“impiegato”) with a frequency of 33 and a relative frequency of 22.0. This indicates that in our survey 22% of the respondents were Employees while, immediately below, with 18.0% we have the modality "Student" (“student”) and with 12.0% the modality "Freelance" (“libero professionista”). The "other" modality has represented by 2.0% of respondents. Tables 16-17 show the distributions just discussed.

Professione - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Impiegato	33	22.0	22.0	22.0
	Operaio	11	7.3	7.3	29.3
	Artigiano	5	3.3	3.3	32.7
	Dirigente	15	10.0	10.0	42.7
	Commerciante	3	2.0	2.0	44.7
	Libero professionista	18	12.0	12.0	56.7
	Imprenditore	9	6.0	6.0	62.7
	Insegnate	11	7.3	7.3	70.0
	Pensionato	3	2.0	2.0	72.0
	Studente	27	18.0	18.0	90.0
	Casalinga	1	.7	.7	90.7
	Disoccupato	4	2.7	2.7	93.3
	Medico	7	4.7	4.7	98.0
	Altro (specificare)	3	2.0	2.0	100.0
	Total	150	100.0	100.0	

Table 16. Survey – Sample Profession Distribution

Professione - Altro (specificare) - Testo

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		147	98.0	98.0	98.0
	Collaboratore scolastico	1	.7	.7	98.7
	Farmacista	1	.7	.7	99.3
	Operatore sanitario	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 17. Survey – "Other" Sample Profession Distribution

For what concers the annual household income, different levels of earnings were found within the sample. The table 18 shows the sample distribution according to annual household income. As it possible to see, the sample is characterized by the presence of a population with a medium-high annual income. Indeed, the most nominated modalities are (income) between 15.000-30.000€ and 30.001-60.000 € representing the 72.7% of the population. The *Mode* of the distribution is the annual income between 15.000 and 30.000 € with a frequency of 57 related to a relative frequency of 38%.

Reddito annuo familiare

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<15.000€	20	13.3	13.3	13.3
	Tra 15.000 e 30.000€	57	38.0	38.0	51.3
	Tra 30.001 e 60.000€	52	34.7	34.7	86.0
	>60.000€	21	14.0	14.0	100.0
	Total	150	100.0	100.0	

Table 18. Survey – Sample Annual Household Income Distribution

The last socio-demographic discriminant considered in the construction of the questionnaire is the territorial one. In choosing the sample, it was decided to select subjects coming from as many Italian regions as possible, in order to be able to verify the data obtained on the entire population of the reference territory and, therefore, to obtain results that are as error-free as possible. As can be seen from Table 11, the highest percentage of the population resides in the Sicily region and, more specifically, in Messina (30.7%), in the Lombardy region (15.3%) and in the Lazio region (10%), because they were identified as reference areas for investigating the phenomenon. The remaining part of the sample comes from the main Italian regions (e.g. Piedmont, Emilia-Romagna, Tuscany, etc.). Table 11, below, describes the territorial distribution of the questionnaires in detail.

Provincia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agrigento	1	.7	.7	.7
	Ancona	1	.7	.7	1.3
	Belluno	1	.7	.7	2.0
	Benevento	1	.7	.7	2.7
	Bologna	3	2.0	2.0	4.7
	Catania	2	1.3	1.3	6.0
	Como	3	2.0	2.0	8.0
	Cosenza	2	1.3	1.3	9.3
	Crotone	1	.7	.7	10.0
	Cuneo	1	.7	.7	10.7
	Forlì Cesena	1	.7	.7	11.3
	Genova	2	1.3	1.3	12.7
	Imperia	4	2.7	2.7	15.3
	Latina	1	.7	.7	16.0
	Magenta	1	.7	.7	16.7
	Mantova	2	1.3	1.3	18.0
	Messina	46	30.7	30.7	48.7
	Milano	17	11.3	11.3	60.0
	Monza Brianza	2	1.3	1.3	61.3
	Napoli	4	2.7	2.7	64.0
	Padova	1	.7	.7	64.7
	Palermo	3	2.0	2.0	66.7
	Parma	1	.7	.7	67.3
	Pisa	1	.7	.7	68.0
	Potenza	1	.7	.7	68.7
	Reggio Calabria	1	.7	.7	69.3
	Reggio Emilia	1	.7	.7	70.0
	Roma	14	9.3	9.3	79.3
	Rovigo	1	.7	.7	80.0
	Salerno	2	1.3	1.3	81.3
	Savona	1	.7	.7	82.0
	Siracusa	11	7.3	7.3	89.3
	Torino	7	4.7	4.7	94.0
	Trapani	4	2.7	2.7	96.7
	Verona	3	2.0	2.0	98.7
	Vicenza	2	1.3	1.3	100.0
	Total	150	100.0	100.0	

Table 19. Survey – Sample Territorial Discrimination.

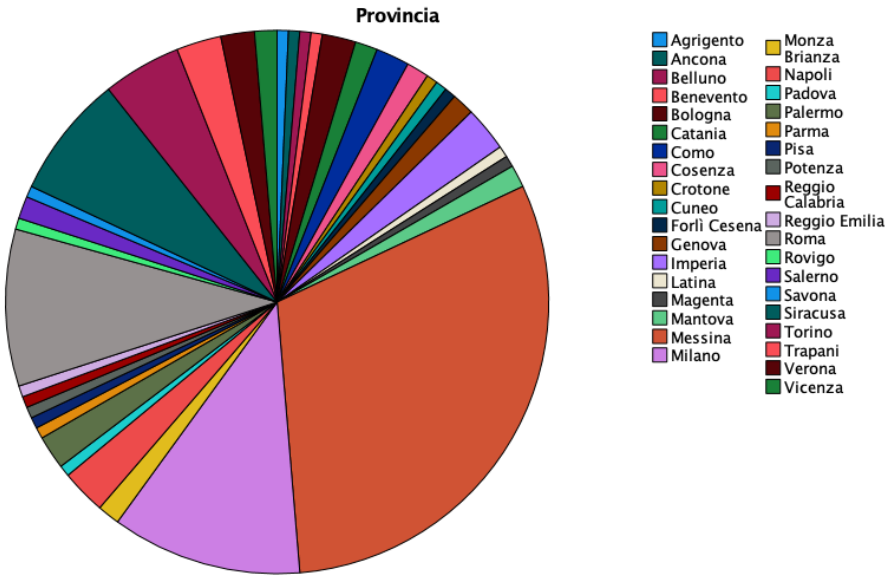


Figure 18. Survey – Sample Territorial Discrimination (Pie Chart).

4.2.3 Data Collection

The first step was to "clean" the data set deriving from the Questionnaires, the process was aimed at reducing the data of the variables collected in a few factors to interpret the data. In order to do so, every open question was analyzed trying to discovery possible common aspects which could be synthetized in common factor. Therefore, the purpose is to group the variables into latent factors representing the common part of several observed variables. Furthermore, some data of the variables (e.g., "Provincia" data) were corrected so that SPSS could group them together.

After analyzing the sample of this research, we proceed with the frequencies analysis of the item related to the first part. Indeed, it allows us to represent the data deriving from the items of the questionnaire, aimed at collecting qualitative data, which are characterized by alternative answers (univocal or with the possibility of more than one answer), however, even if codifiable, cannot be traced back to numbers. Being purely qualitative data, these types of data allow only the calculation of frequency distributions. As it possible to see in the previous subparagraph, some of the answer are not able to determine if the Regina Adelasia Business Model is desirable

for customers, but they are aimed to briefly quantify the market and the tends of Italian customer needs.

The starting point for the analysis of the Items of the questionnaire was the application of descriptive statistics on the questions of the first part to define the size of the pasta market. First, frequencies and relative frequencies on weekly consumption of Pasta were defined, both through contingency analysis, in which weekly consumption volumes were cross-referenced with the gender of respondents. Similarly, purchase volumes of the pasta product were defined. Through this analysis it was possible to imagine the relationship between frequency of consumption and frequency of purchase, hypothesizing the purchase volumes themselves in terms of quantity. Subsequently, frequencies and relative frequencies of purchase preferences were analyzed according to intangible and material attributes of the pasta product, in particular the brand, the cut and the product range meant as the type of wheat used to make the pasta, thus establishing consumers' preferences on attributes. In this case as well, a contingency analysis was carried out between the mentioned above attributes and socio-demographic factors such as gender, age and province of the sample. As can be seen from the previous sub-section, question 13 ("What range of pasta do you usually buy?") was followed by question 13b which concerned an open-ended question in which the respondents had to specify the reasons why they decided to buy that particular range of pasta. The answers to this question were transformed into factors that could be associated with each other and related to the range of pasta selected by the respondent. The purpose of this was to understand the reasons that push the consumer to choose a specific range and more precisely those that push the consumer of ancient grains pasta to buy it, trying to guess if for intolerance reasons or if they really perceive an added value of the product compared to other varieties. On these data the Crosstab function of SPSS was used in order to understand the frequencies of association of the factor to the product range.

The data for the subsequent questions represent data on purchasing habits, the purchasing channel and customer relationships. Qualitative analyses were carried out on these data, as well as cross-analyses with the Likert scale in which the attributes relating to pasta that emerged most from the interviews carried out previously were inserted.

Among the Likert scale attributes ranging from 1 to 7, through descriptive statistics methods, attributes with an average lower than 5 were discarded where 4 corresponds to consumer indifference towards the attribute. Likert scale data were cross-referenced with qualitative data from the descriptive questions in the second part of the questionnaire.

Finally, from the data obtained from the analysis, the desirability of Regina Adelasia's business model was analyzed, checking in particular whether the distribution and relational channels are ideal for reaching the consumer and whether the value proposition is able to satisfy the target audience.

Chapter 5 – Data Analysis and Research Results

This chapter will discuss the results obtained from the two researches, emphasizing the findings of both researches. The first section will discuss the results of the qualitative research, then the details of the interviews and the final results. The second paragraph will discuss the results of the survey developed in order to be able to generalize the data obtained in the interview phase.

5.1 Qualitative Research

As already exhaustively explained, the qualitative phase of the research was implemented to understand consumers' purchase choices in the Pasta market and digital technology's involvement in their process. In order to do that, eight one-to-one interviews were conducted; the aim was to identify useful attributes for the quantitative phase: the survey.
The sample interviewed for the research was composed of 8 subjects of different ages and education/background. The main findings from the interviews will be summarized below:

Francesco, 34 years old, an Academic degree in Sound Engineering, owns and manages a B&B and a hotel in Sicily. He leads a healthy lifestyle characterized by healthy food and sports workout five or six times a week. No gluten intolerance.

In this interview, the subject affirms to consume Pasta weekly 4-5 times, preferably at lunchtime for reasons related to habit and culture, therefore tradition. For the same reasons, he likes to eat Pasta at lunchtime, and the combination with condiments allows him to maintain a high frequency of consumption.
He usually buys Rummo and De Cecco, but he says he is fed up with the top-of-mind brands (such as Barilla), as he cannot eat them anymore for reasons linked to the low quality of the

product. It is determinant for him the combination with different tastes and flavors. The condiments he mainly used with Pasta are tomato sauce, gricia, carbonara, amatriciana, vegetables, tuna, eoliana, arrabbiata, and rarely fish. All these dishes are strictly connected to Italian cuisine and, in particular, to the Sicilian and Roman ones.

During the interview, the interviewee confirms the trend linked to the consumer's awareness of the raw materials that make up the product, underlining that while in the past the determining factors for pasta products were price, Brand, habit, and availability on the shelf, nowadays, according to the interviewee, the determining factors are quality, origin, and nutritional values. For him, the determining factor is the quality of the product. The interviewee also recounts that he has bought and periodically buys artisanal 0-kilometer Pasta.

During the interview, the interviewee recounts his purchasing process: when he reaches the shelf, the first thing he looks at is the price, stating, however, that he does not give too much weight to the attribute, but it is merely the first factor of comparison that stands out to the eye. Next, he notes the package's amount of product, which he considers a fundamental determinant. The third step is to check the label for nutritional values. The interviewee affirms that he does not check the nutritional values for a question related to the sports diet but to verify the chemical agents present in the product that can alter the product he will buy. In this regard, he is conscientious about the amount of salt present but does not check the amount of gluten. Indeed, the subject argues that gluten-free is a matter purely linked to the fashion of the moment, a market bubble according to which people choose organic and gluten-free because, at this time, it is cool.

Among the products on the simulated shelf, he chooses Rummo first because he knows the product and how it behaves. He admits to being attracted to the artisanal ancient grain pasta and would take it to second out of curiosity, as it looks like whole wheat pasta to him but with a lighter color. As for ancient grains pasta, he appreciates that on the label of ancient grains pasta are present the possible recipes because, in this way, he knows what he can prepare it with since he has never tried it. He would discard gluten-free Pasta because of what previously said and because he says he does not have problems related to the consumption of gluten; therefore, he is not interested in trying it. What is evident is that he discriminates based on the Brand and not on the grain.

The interviewee tells what he thinks are the senses most involved in the process of purchase and consumption: sight, the shape that pushes you to choose the cut; smell, during the preparation; touch, when he eats it and, in this regard, he states that for him the consistency in the

mouth is determinant; finally taste.
The goodness of Pasta for him is determined by the matching with the sauce in terms of cut and match with taste; it must match with the idea of the dish to be cooked, e.g., carbonara goes well with long and thick Pasta.
According to the interviewee, the fundamental attributes a pasta must have are, first of all, consistency and cooking seal, which must be in line with the dictates of the label, and then porosity, a quality that determines the capacity of the product to hold the sauce.
The subject states the ideal cooking time is 6/7 minutes because it represents the time available for cooking during lunch break at work.
As for contraindications to Pasta's consumption, the interviewee identifies only one contraindication: always use the same type or combine the same condiments because this risks to give boredom. He does not perceive possible diseases connected to the consumption of Pasta. On a hint, he reminds friends that they weigh the foods they eat because of issues related to physical fitness and sport activity. He admits that overuse leads to problems for the body, but his counter-indication is the use of the same condiments and types of Pasta over time, which limits the search for flavors.
The possibility of choosing pasta cuts is determinant for him, and the absence of the cut he is looking for at a specific moment leads him to choose another brand.
He does not do online research for Pasta. At a moment in his life when he was in Milan, he happened to do his shopping online on the supermarket's website because he did not have much time to do the shopping. So not on e-commerce belonging to the food sector.
Regarding purchasing food products online, the interviewee states that he buys little food online; he buys only drinks online because of issues related to the price and the product's problematic availability. According to him, the purchase of food products is closely related to sight and touch, and he is afraid that buying online the product may arrive broken or not, as in the picture, for products such as wine, it is not so.

Giovanni, 26 years old, studied Electronic Engineering at Politecnico di Torino; he is CEO of a little firm that he started called Poliwood involved in the polystyrene sector. No fitness practiced, but healthy food addicted. No gluten Intolerance.

In this interview, the subject affirms that he eats pasta 2 or 3 times a week, generally at

lunchtime, for habitual/cultural reasons and because he perceives it as heavier to digest in the evening.

He generally buys only Rummo Pasta. The reasons that lead him to this choice are that it keeps the cooking process very well, for the texture and because it binds well with sauces since the taste is neutral. As for condiments, the interviewee uses tomato-based sauces or traditional Sicilian sauces. Rarely he involves fish in his condiments. Previously they purchased Barilla. In this regard, he told the passage from Barilla to Rummo describing his purchasing process and the attributes that unconsciously pushed him to buy the Brand product: he felt the need to change Pasta: the first thing that struck him was the packaging of the product defined as "wonderful" because it reminded him of a bag of flour from a village store; the possibility to see the product already from the package of Pasta made him understand that it was a porous pasta; he read the writing bronze drawn, and for these reasons he bought it.

He tried other brands, but they were discarded because they did not keep the cooking well, or he did not like the taste in combination with the seasoning. He also tried whole wheat pasta but was not enraptured by it because of the mouthfeel. He tried Pasta made of ancient grains at restaurants and at friends' houses and he liked it but because of price issues, he would not buy it every day but for special occasions. Moreover, he does not know where it is possible to buy products made of ancient grains. He imagines that it may be in small groceries, it is possible to find it. The cut of Pasta he prefers are *Pennette*, strictly ribbed, and Fusilli, but he also appreciates long Pasta such as spaghetti.

For him, the taste is decisive, but it must not be too strong except for sauces that allow a more robust taste for which it is possible to use Pasta with a strong taste, e.g., Pasta with fried zucchini.

When faced with the simulated shelf choice, he said he preferred Rummo for everyday life because he knows it, knows how it performs, and reflects the respondent's required characteristics. The ancient grain pasta would pick it up out of curiosity because he has already eaten it outside the home kitchen. As for grains, he states he has tried Perciasacchi and Russello. He affirms he would never choose Pasta made with alternative gluten-free grains unless problems of intolerances forced him, and on a shelf, he would not even look at it.

He gives extreme importance to the drawing process because he describes a substantial difference in the porosity of Rummo pasta compared to Barilla pasta (with the same grain and cut).

Among the cuts, he would choose *Pennette* and then Fusilli because he prefers short cuts and besides, these two cuts represent his favorite ones.

Necessary attributes: first of all, it must keep cooking because he does not like Pasta to be overcooked or flaky; the taste must bind to the seasoning without covering the flavor.
He generally does not pay attention to the wheat used to make the Pasta he buys, nor to its origin, as long as it is a brand he recognizes as Italian. At this point, for him, the determining factor is the reputation of the Brand.
The ideal cooking time is 7 minutes, as the time needed to boil the water and cook the Pasta must be equal to the time needed to prepare the sauce.
He affirms he has never thought about contraindications to Pasta's consumption because he has never abused it. Thinking about it, he claims that overuse can lead to nutritional imbalances and obesity problems.
If he could not find Pasta's cut, he needed she would choose another cut; she would not change brands and would not look for it in another supermarket.
He does not do online research to find out about Pasta and typically not even about other food products unless they are particular products. She does not purchase Pasta online and has not done so in the past. She has always purchased at the supermarket because she has never needed to. She would buy online if there was a marketplace better stocked than a supermarket with particular products, with lower prices and without paying for delivery, and informed about all the products on sale.

Mariagrazia, 30 years old, Bachelor's degree in economics at the University of Messina, she studies International Management at the University of Messina, she works as a Junior Financial Consultant at Medietica, a firm involved in credit brokerage. No sport practiced, but healthy food addict due to her gluten intolerance.

In this interview, the subject affirms to consume Pasta 3-4 times a week, more frequently during the weekend, because being a subject who has a constant diet, the assumption of carbohydrates can be inserted mainly at the weekend (days free from the diet).
He prefers to eat at lunchtime because the subject affirms to be a very sensitive person (gastritis). Therefore, he can hardly consume farinaceous foods in the evening, also because the subject is also intolerant to gluten besides suffering from gastritis. He affirms to have less effort in digestion consuming integral Pasta and rice pasta. In the period in which she did not practice

the diet, the consumption of flour-based on modern grains always caused her discomfort related to digestion problems.
She affirms she bought Pasta made of ancient grains, and the consumption did not cause her any discomfort.
When she buys Pasta, the interviewee does not go to look at the ancient grains, but she goes to see if it is whole grain; if she does not take whole grains, she goes to look for a brand that keeps well the cooking and the Brand. The discrimination she makes is on the wheat origin, if it is imported or produced in Italy, even if she prefers Pasta made with grains produced in Sicily. Regarding the cut of Pasta, being a habitual user, she almost always buys fusilli and penne rigate as short Pasta, as long Pasta she buys "Spaghetti Grossi" and Linguine for fish.
As a brand, she often buys Rummo and Voiello because they are produced with the bronze drawing method. Only if it is on super offer buy Barilla. She likes Gragnano pasta but does not buy it often because it costs a lot, so she goes to look at the offer.
In front of the simulated shelf, the interviewee chooses Rummo because she already knows the product and Ancient Grains Pasta since it respects all the characteristics that are congenial to her, among which: the resistance to cooking, the cooking time, the ability to retain sauces and for digestibility, even if it does not respect the characteristics linked to the price. She discards the gluten-free because she is not celiac, and therefore, not having the problem does not want to buy it.
The interviewee then describes her purchasing process: once she has identified whole-wheat Pasta, the subject looks at the origin of the wheat and the type of drawing and, if all the characteristics meet her taste, she states she is willing to pay a premium price. Among the cuts, she chooses the short ones, and among the short ones, she chooses Pennette and Fusilli.
The attributes she is particularly interested in are the cooking time because a pasta that does not keep cooking should not exist, the capacity to keep sauces (bronze drew), the not excessive price, the origin of wheat, and the possibility to digest it.
The ideal cooking time for her is 7 minutes because when she is at home and does not have much time, she does not want to waste time between boiling water and cooking the Pasta since she is a working woman, she does not have much time at lunch to cook.
The interviewee does not believe that there are contraindications to pasta consumption because, in a healthy diet, the consumption of a measured amount of carbohydrates is fundamental. The only contraindication could be because she is afraid that foreign norms are not restrictive in terms of controls on pesticides and chemical compounds used in the production.

As for cuts, she prefers the short cut of Pasta. She exemplifies what she said by telling a recent episode where the interviewee bought the "Farfalle" cut because she realized there seemed to be a higher quantity in the plate, being obliged to go on a diet, admitting it was a purely mental matter.
She bought gluten-free products in the past but did not like the flavors or tightness of the cooking. The only thing she did like was the fact that she digested it.
The interviewee stated that she has been researching online for the past few years. The research focused on bronze/gold drawing and where the wheat came from. The online research process is traditional: the subject used the google search engine reading the first few articles among the results. She never bought online, admitting that she almost did once but then thought it would cost more, and she would be forced to order a large quantity to spread out the shipping costs. The type of Pasta she was going to purchase was ancient grain pasta. She preferred, therefore, to renounce the online purchase preferring the classic purchase in a physical store.

Giovanna, 46 years old, Master's degree in Economics at the University of Messina, works as a Senior Financial Consultant at Medietica. No sport practiced, no healthy food addiction, no gluten intolerance.

In this interview, the interviewee states that he consumes Pasta every day, including weekends, strictly for lunch. At first, he identifies the choice of consuming it at lunchtime because it is a quick dish to cook, therefore for convenience linked to the little time available to cook at lunchtime, and later, he claims that this is a matter of habit linked to the Italian culture.
The choice of the Brand falls on Poiatti because it is a low-priced Sicilian brand. The choice of wheat is bound to modern refined types, as having two small daughters, they prefer traditional supermarket pasta and do not like whole-wheat Pasta. She would buy whole wheat pasta but having to meet the tastes of the other members of the family, she is obliged to buy Pasta made with modern grains.
The choice of the cut of Pasta depends exclusively on the seasoning that is associated. The condiments mentioned in the interview are various, ranging from those based on vegetables to those based on meat and fish. All the condiments mentioned belong to the traditional Italian culture.

In choosing the simulated shelf, the cut chosen is Tortiglione, choosing Rummo as the Brand because the members of her family would only eat Pasta from modern grains. She admits she has never tried gluten-free and would try it. She would discard the ancient grains because her family members would not buy them as it is a whole grain but admits that she would buy it if she did not have to buy modern grain pasta. Having named the cut of the Pasta as the first discriminating factor in her choice, we can see that this is the main attribute she looks for on the shelf. Therefore, the possibility of choosing among various cuts of Pasta becomes a determining factor in identifying the interviewee's best choice.
The attributes crucial to her in making her choice are cooking firmness, porosity, ability to hold seasonings, and type of seasoning. Indeed, the interviewee affirms she chooses cut and Brand according to the seasoning, e.g., if she cooks fish, she uses linguine and, therefore, long Pasta; if she cooks a vegetable and meat pasta, she uses short Pasta. Strictly she uses condiments made with seasonal raw materials. The cooking time he would like is 8/9 minutes, because it respects the time she has to cook at lunch (about 15 minutes).
The interviewee identifies contraindications by resorting to his memories. Indeed, she tells that one of her daughters suffered from obesity in the past, and for a period, her family had to give up Pasta. The feeling of fear and sadness in remembering that episode was evident.
As mentioned, she has never purchased Pasta from alternative grains, but some of her friends do due to fitness-related issues because they see it as more dietary.
She has never done online research about Pasta more generally, except for particular foods distant from Italian culture, e.g., avocado.
She has never bought Pasta online, let alone food in general, stating that she has never even thought about it. Indeed, she buys exclusively at the supermarket. However, she does not rule out the possibility of buying food online in the future. In this regard, she says that many members buy particular flours on the internet on some Facebook groups, and for this reason, she does not exclude future purchases.

Emanuele, 40 years old, Master's degree in Law at the University of Messina, is a Lawyer. He leads a healthy lifestyle characterized by healthy food and sports workout five or six times a week. Gluten intolerance.

In this interview, the subject states, first of all, to consume Pasta 2/3 times a week, generally at

lunchtime, because it is a meal challenging to digest or typically seasoned with unique sauces. Therefore consuming it in the evening could create digestive problems.

The subject affirms he or she typically buys half-kilo packages and consumes little of it (about 100g per plate), mainly buying short Pasta for a matter of personal taste, unless the condiment does not require long Pasta such as fish condiments. As for the cut, she tends to prefer Penne Rigate or Mezze Maniche. Instead, talking about grains, the interviewee states he pays much attention to the quality and type of grains involved, and he prefers ancient grains because he believes they make the dish more digestible. In this regard, the subject says that some friends told him that these grains are more organic and healthier than the qualities of wheat that typically make up the Pasta available in supermarkets. Therefore, the interviewee states that he mainly buys Tumminia grains (an ancient Sicilian grain similar to Kamut). The choice is also dictated by the fact that the product contains a lower quantity of gluten and a different type of carbohydrates, making it more appealing.

Talking about Brand, the interviewee says he buys Rummo because of its availability in the supermarket, while as far as ancient grains are concerned, he has never dwelt on the Brand but on the type of grain. This is because he buys them in a small luxury grocery store, where he finds products of higher quality than in the supermarket, and he has never dwelt on the Brand but on the type of grain.

Faced with the choice of the simulated shelf, the subject as the first discriminating factor chooses wheat, identifying Pasta with ancient grains, in line with what has been said up to this moment, because for him, the type of wheat and its origin represent a determinant. Thinking about the Brand, he would choose Rummo to have it as a stock in the house because he knows well its characteristics and for its easy availability in supermarkets. As for the cut, he would choose Fusilli and Penne as his favorite cuts. She would never choose gluten-free because the consistency of gluten-free is inferior even to Rummo, and she does not feel like comparing it to ancient grain pasta because she claims it is too poor to be compared to a luxury product. In fact, having tried it in the past, the subject says that the consistency of gluten-free Pasta is inferior to all the other types of Pasta, and in terms of the palate, he feels something is missing from the Pasta itself, even associating it to a tasty condiment he can feel the difference.

The interviewee highlights digestibility as a fundamental and determinant attribute, as having tried many types of Pasta he/she has often struggled in digesting the product, and here, according to the subject, the variable in the choice is dictated by wheat. Another attribute is the keeping of cooking because many types of Pasta tend to flake or take too long to be cooked. Lastly,

another attribute is the origin of wheat and where the Pasta is produced because it is considered healthier and safer. As for cooking time, according to him, the ideal cooking time is 10 minutes, and he is used to Pasta with this cooking time. Talking about contraindication, the subject refers to an article he read in which it was discussed that subjects affected by diabetes are not advised to consume Pasta. The choice of the cut is not determinant for him in the choice of the Brand or in changing the Brand in case the cut he prefers is not available, as long as cuts of short cut pasta are present, due to taste preferences in the association of seasonings. In fact, the interviewee states that in his opinion, 70% of seasonings are better associated with short cut pasta and hence the habit of buying short cut pasta. He uses many seasonings based on vegetables and various Pesto. Rarely, he uses condiments made of meat and fish, the latter, for example, more readily associated with long Pasta. He would not buy Pasta with alternative flours, as in the past, in order to experiment with new flavors, he bought Pasta with legume flours, and he did not respect at all the fundamental characteristics for him.
In terms of product research, the respondent admits to researching online for information about Pasta, the grains involved in its production, and production methods. The research process is the traditional one: the subject searches for the information he needs on Google and then clicks on the first articles resulting from the search. Typically, the medium he or she uses for research is the cell phone, as he or she often finds himself or herself doing research when at the supermarket.
Finally, the interviewee claims to have never bought Pasta online but to have bought other food products, but mainly foreign food products such as cheese and wine.

Federica, 25 years old, Bachelor's degree in Economics at the University of Messina, she studies Law at the University of Messina. She leads a healthy lifestyle characterized by healthy food and sports workout three or four times a week. No gluten intolerance.

In this interview, the subject states to consume Pasta 7 times a week for lunch, in particular on Sundays, as it represents the classic family lunch pasta. Typically, she buys Pasta at the supermarket, paying attention to the type of flours present. In fact, the interviewee affirms to buy only Pasta that is not made of white flours. She buys much wholemeal Pasta and often Pasta with *Khorasan* wheat (Kamut), stating that she started to buy particular Pasta for reasons related to diets, then she kept the habit because she says she noticed she felt better (less weighed down). Her choice is dictated by the Brand: she usually says she buys Barilla wholemeal, but when she

has guests for dinner, she buys Rummo because she does not want to force her guests to eat wholemeal. She prefers Rummo to Barilla white flours because, according to her, it holds the cooking process much better and retains the sauce better. The interviewee does not consider the origin of the wheat important, justifying herself by saying that she does not consider it as an essential variable. She chooses Barilla for reasons of habit, because the Brand is well established, and she knows the product well. She chooses Rummo because, although they are supermarket brands, she perceives Rummo as a higher quality product because it tends not to shrink, it is more consistent, and she feels the taste of Pasta more strongly. She does not always buy Rummo because she does not know that there is also Rummo wholemeal.

When choosing at the supermarket, she only looks at the Brand and the cut, without dwelling on the method of production or the grain; because she says she gets bored looking at the characteristics of the product, she chooses Pasta out of habit.

When faced with the choice of the simulated shelf, she says she chooses Barilla gluten-free *Tortiglioni* because if she thinks about consumption in her routine, she prefers to buy a pasta that she perceives as lighter. Therefore she would always buy gluten-free or whole wheat pasta. If there were also *Rummo* gluten-free Pasta she would choose that.

The respondent reports that she would try ancient grain pasta even if she does not take them because she is inclined to consume what she already knows.

The interviewee identifies attributes that are key for her: it must be short Pasta, it must hold its cooking, it must be digestible. The cooking time she would like is 8 minutes because she does not have much time to cook and always finds herself cooking close to an appointment.

The cut she prefers is *Penne Rigate*, and she often combines tomato-sauces, tuna, or pesto-based sauces, all quick sauces that do not require time in preparation.

Contraindications for her are that being high in carbohydrates and sugars makes her gain weight, and for subjects affected by cancer, the consumption of carbohydrates and sugars increases the risks of the development of cancer cells. For a period of her life, she eliminated carbohydrates from her diet and found enormous benefits, such as lightness, less tired, slimmer. Then she reintroduced it because it is a product that can be prepared in a short time because eating meat and fish all the time was not sustainable economically and for gluttony.

The choice of the cut influences her choice, but even before that, the choice of the seasoning influences the choice of the cut because the type of seasoning determines the choice of long or short Pasta.

She claims to research online before purchasing, but not for products she knows. When she

goes to buy in grocery stores and does not know the product, she does an online search on the product, using her cell phone on Google.
The respondent states that she has never purchased Pasta online, but her parents have because her mother has a medical condition that prevents her from consuming carbohydrates and so she buys no-carb Pasta online.

Laura, 62 years old, Master's degree in Medicine at the University of Catania, Specialization in Dermatology. She is a Doctor. She leads a healthy lifestyle characterized by healthy food without practicing sports. Gluten intolerance.

In this interview, the subject states that he consumes Pasta 3 times a week. Years ago, he used to eat Pasta more times. This is because she prefers to eat less sugar and carbohydrates. She has therefore decided to change her eating style.
She always eats Pasta for lunch out of habit since she was a young girl because you get more energy at lunch. In the evening, carbohydrates have a soporific effect; they give relaxation, so she eats proteins and vegetables. For health reasons, she does not eat any carbohydrates in the evening but instead tries to alternate by adding foods that allow her to vary the nutrients.
She mainly buys short Pasta, in particular, Fusilli or *Caserecce*, whereas, in the past, she used to use *Tortiglione* Pasta more often, sometimes spaghetti. The choice of the cut depends totally on the seasoning you want to match. As for the Brand, in the past, he used to buy *Rummo* or *De Cecco*, nowadays he buys the ancient grains directly from local producers, he takes them to grind them, and he has the Pasta (wholemeal) made by a local pasta factory. As grains, he buys *Perciasacchi*, *Russello*, *Evolutivo*, or *Tumminia*. This is because since ancient grains are rich in gluten that is less "sticky" than grains grown in recent years, this makes it less inflammatory to the body than the grains that make up branded Pasta. The only limitation found in ancient grains is that having its own flavor, it does not mix well with every seasoning; for example, it does not mix well with fish. So, for fish, she buys *Rummo* pasta because it holds its cooking well and mixes well with the sauce.
In front of the choice of the simulated shelf, the interviewee discriminates on the basis of the condiment. Indeed, she chooses *Fusilli* of ancient wheat for condiments with vegetables, *Tortiglione* of ancient wheat if she uses condiments with meat sauce, spaghetti *Rummo* if she has to use fish. She never chooses *Gluten-Free* formats, as she affirms that since she does not need

to eliminate gluten for celiac disease-related issues, it does not make sense to eliminate gluten, preferring to limit the consumption of gluten but not to eliminate it because it is a protein. In itself, says the interviewee, gluten is not harmful, but it should be dosed during the day.
The attributes she mentions are tightness of cooking, quality of wheat, Italian grains; it must blend well with the seasoning; it must be digestible.
In expressing the ideal cooking time, she tells an anecdote of when she was at university where, for reasons related to the little time available, she used to buy Pasta, which took 2 minutes to be cooked. Therefore, the ideal time for her is 7/8 minutes because even today, she does not have much time at lunch to cook.
She affirms that there are no contraindications to the consumption of Pasta, it all depends on the quantity one is going to consume; for the principle of balancing foods, the diet must be as varied as possible. Moreover, it also depends on the lifestyle one has.
As for raw materials, in case the wheat comes from abroad, it should also be considered the additives they contain because they are grains treated during transportation and the ones used for production, such as glyphosate used in northern countries such as Canada and Russia in order to dry wet wheat because of snow.
The interviewee states that she is not influenced by the cut in her choice because if there is not which she is interested in, she goes to look for a similar one. Having the habit of looking at the ingredients and the origin, she always tries to buy Km 0 products.
The most used condiments are meat sauce, fish-based condiments, or legumes. Generally, linked to traditional Italian cuisine and always seasonal products as raw materials for condiments.
She does not buy, for the reasons mentioned above, Pasta made with alternative grains because she does not feel the need as she is not affected by celiac disease.
Before buying, she does not research online about Pasta, but about raw materials. Very often, she follows cooking programs or watches online videos about cooking, and she also gets ideas about the products to be used, and then she goes to look for them at the supermarket.
She does not buy Pasta online because she has the possibility to have it locally, but instead, she buys rice online from companies in the Vercelli area because they are hard to find here, and there is no production in the area. She tells us that they were looking for a specific quality of rice (red rice and black rice), and they could not find it in the area, so she bought it from the company's website.

Antonio, 65 years old, Master's Degree in Medicine at the University of Catania, two specializations in Psychiatrists and Neurology. He is a Doctor. He leads a healthy lifestyle characterized by healthy food without practicing sport. Gluten Intolerance.

In this interview, the subject states that he consumes Pasta 2/3 times per week. Years ago, he used to eat Pasta more times. This is because he prefers to eat less sugar and carbohydrates. He, therefore, decided to change his eating style.

He always eats Pasta for lunch because you get more energy at lunch. In the evening, carbs give you relaxation, so he eats protein and vegetables. For health reasons, she does not eat any type of carbohydrate in the evening but instead tries to alternate by adding foods that allow her to vary the nutrients.

He mainly buys short Pasta, in particular, *Fusilli* or *Caserecce*, whereas, in the past, she used to use *Tortiglione* Pasta more often, sometimes spaghetti. The choice of the cut depends totally on the seasoning he wants to match; however, he affirms he does not cook, but his wife does. As for the Brand, in the past, he used to buy Barilla or Garofalo; today, he only buys Pasta made of ancient grains from local producers. He buys pasta grains such as *Perciasacchi*, *Russello*, *Evolutivo*, or *Tumminia*, but he prefers *Perciasacchi*. This is because ancient grains are rich in gluten, which is less "sticky" than grains cultivated in recent years; this makes it less inflammatory for the body than the grains that make up branded Pasta. The only limitation found in ancient grains is that having its own flavor, it does not mix well with every seasoning; for example, it does not mix well with fish. So, he would rather not eat fish-based condiments than buy Pasta with modern grains.

Faced with the choice of the simulated shelf, the interviewee discriminates according to wheat; indeed, he/she chooses only Pasta made with ancient wheat, discarding both kinds of Pasta made with modern grains and gluten-free Pasta. He never chooses *Gluten-Free* formats since he affirms that since he does not need to eliminate gluten for celiac disease-related issues, it does not make sense to eliminate gluten, preferring, therefore, to limit the consumption of gluten but not to eliminate it because it is a protein. As such, the interviewee states that gluten is not harmful, but it should be dosed during the day.

The attributes he mentions are tightness of cooking, quality of wheat, Italian grains; it must mix well with seasoning; it must be digestible.

The ideal cooking time turns out to be 7/8 minutes because she still does not have much time at lunch to cook.

He affirms there are no contraindications to the consumption of Pasta; it all depends on the quantity to be consumed; for the principle of balancing foods, the diet must be as varied as possible. Moreover, it also depends on the lifestyle one has.
As for raw materials, in case the wheat comes from abroad, it should also be considered the additives they contain because they are grains treated during transportation and the ones used for production, such as glyphosate used in northern countries such as Canada and Russia in order to dry wet wheat because of snow.
The interviewee states that he is not influenced by the cut in his choice because if there is not the one he is interested in, he goes and looks for a similar one. Having the habit of looking at the ingredients and the origin, she always tries to buy Km 0 products.
The condiments he prefers are those based on meat, vegetables, or legumes. Generally linked to traditional Italian cuisine and always seasonal products as raw materials for condiments.
She does not buy, for the reasons mentioned above, Pasta made with alternative grains because she does not feel the need as she is not affected by celiac disease.
Before buying, she does not research online about Pasta, but about raw materials because she wants to know the origin and nutritional values.
She does not buy Pasta online because she has the possibility to have it locally, but instead, she buys rice online from companies in the Vercelli area because they are hard to find here, and there is no production in the area. He tells us that they were looking for a specific quality of rice (red rice and black rice), and they could not find it in the area, so they bought it from the company's website.
With regard to the means-end chain, the connection between consumer and product occurs through the construction of a series of relationships between concrete and abstract product attributes, functional and psychological consequences related to the use of the product, and finally, consumers' instrumental and final values. Product attributes are nothing more than means that consumers use to achieve their final values, i.e., ends, through the consequences or benefits obtained from these attributes. Specific to this research, the most significant attributes in choosing and purchasing Pasta were highlighted through qualitative interviews (in orange color). Subsequently, these attributes were first grouped into subcategories, according to their benefits (in red color), then into instrumental values (in green color), and finally into terminal values (in blue color).

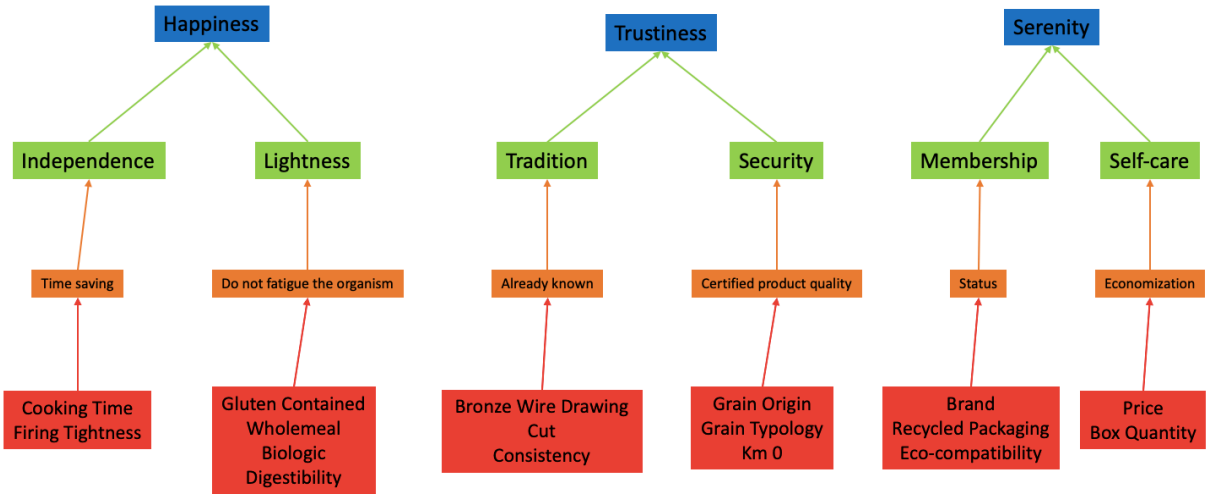


Figure 19. Qualitative Analysis – Means-End Chain

Therefore, the cooking hold, cooking time, and they have been grouped under the functional benefit of "time-saving" because they are all attributes related to the performance of the product that allows an individual to work and, precisely, to save time during the meal. This benefit can then be seen from another perspective, as an instrumental value, calling it "independence," since it allows a person greater autonomy in carrying out their functions. Gluten-free, wholemeal, organic, and digestibility have been grouped under the functional benefit but also psychological "not to tire the organism," which leads to the instrumental value "lightness." Both of these terminal values then lead to the end, that is, the terminal value of "happiness." The origin of the grain, type of grain, and Km 0 have been merged under the functional benefit "certified product quality" because they are all attributes that consumers recognize as safe quality, which leads to the instrumental value "safety." Bronze drawing cut and texture have been grouped under the functional benefit "already known," thinking of the habitual attitude of many consumers, therefore leading them to available choices leading to the instrumental value "tradition." These two instrumental values were grouped under the terminal value "Trust." The quantity in the package and the price have been grouped under the functional but also psychological benefit of the consumer, that is, "economization," therefore on the economic part that may or may not influence or condition a possible buyer. This benefit, therefore, was grouped as an instrumental value called "self-care." Brand, recycled packaging, and eco-compatibility have been grouped together under the psychological benefit named "status," which goes to reconnect with the instrumental value "belonging," that is, how we would like others to see us. Both of these last two instrumental values eventually result in the terminal value of "serenity."

In conclusion, some concepts and attributes common to all the subjects interviewed emerge from the qualitative research. First of all, it was found that the most well-known pasta brands, therefore, mentioned, and most purchased are Rummo, De Cecco, Voiello, Barilla, and Garofalo. At the same time, on average, interviewees consume pasta 4 to 5 times a week. Among the various reasons why people buy Pasta, the speed of preparation of the course stands out, which facilitates and speeds up the lunch break, despite the fact that all those interviewed stated that they wanted a cooking time between 7 and 8 minutes, therefore, less than the cooking time of supermarket pasta (about 10-13 minutes). Consistent with this, consumers look for specific attributes to evaluate before purchasing a pack of Pasta, and the attributes that most influence their choice (in terms of the number of times they are mentioned) are porosity from bronze drawing, texture, cooking time, digestibility, the origin of wheat, type of wheat, eco-compatibility, brand recognition. Finally, by asking the interviewees what they would like to see as some of the characteristics that do not yet exist in Pasta, 4 out of 8 responded by suggesting the addition of a controlled supply chain so that they themselves could verify the provenance of the wheat.

5.2 Quantitative Research

The starting point for the analysis of the data deriving from the Survey was the analysis of the items of the questionnaire, aimed at collecting qualitative data, which are characterized by alternative answers (univocal or with the possibility of more than one answer). However, even if codifiable, they cannot be traced back to numbers. Being purely qualitative data, these types of data allow only the calculation of frequency distributions.

The first analysis was conducted on weekly pasta consumption. In the questionnaire administered to 150 people, respondents were asked, on average, how many times they consume pasta weekly. What emerged is that 41.3% of the sample of consumers consumes pasta 3-4 times a week, with a frequency of 62 subjects; 30% 1-2 times a week, therefore 45 subjects; 23.3% 5-6 times a week, therefore 35 subjects; and 5.3% of the sample population consumes pasta 7/>7 times a week, 8 subjects belonging to the sample. As can be seen, from Table 19, which

describes the frequencies on weekly consumption of pasta, the Mode is represented by modality 3-4. Moreover, the first two modalities ("1-2" and "2-3") represent 71.3% of the answers of the respondents. From this we can state that the sample under examination presents a medium-low consumption of pasta weekly. Table 20 below shows what has just been stated.

In media, per quante volte consumi pasta settimanalmente?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2	45	30.0	30.0	30.0
	3-4	62	41.3	41.3	71.3
	5-6	35	23.3	23.3	94.7
	>=7	8	5.3	5.3	100.0
	Total	150	100.0	100.0	

Table 20. Survey – Weekly Pasta Consumption.

Connected to weekly pasta consumption, sample subjects were asked to indicate how often they purchase pasta. The data emerged show that it is not really possible to identify a dimension of the frequency of purchase of the product as, the Mode is represented by the modality "Several times a week" with a frequency equal to 59 and a relative frequency equal to 39.3%, but, in contrast, the second modality indicated by the respondents is "Less than once a month" with a frequency of 46 and a relative frequency equal to 30.7%. this makes it difficult to identify a general trend. However, adding up the frequencies that concern a frequency of purchase greater than once a month, therefore adding up the modalities "Once a week", "Several times a week" and "Other" (in which the respondents all expressed a frequency of purchase greater than once a month, as expressed in Table 21) we obtain a cumulative frequency equal to 52%, which is relative to a frequency of 78.

In the "other" modality, where respondents had the possibility of indicating frequencies of consumption different from those entered in the other modalities, 3 respondents indicated a frequency of consumption equal to "Twice a week", while 1 responded "Every three weeks".

Finally, for the reasons described above, the hypothesis of theorizing the sample's volume of Pasta purchases was discarded. Tables 21-22 express what has been said.

Quanto spesso acquisti pasta? (Indicare un'unica risposta) – Selected Choice					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Una volta a settimana	15	10.0	10.0	10.0
	Diverse volte a settimana	59	39.3	39.3	49.3
	Una volta al mese	26	17.3	17.3	66.7
	Meno di una volta al mese	46	30.7	30.7	97.3
	Altro (specificare)	4	2.7	2.7	100.0
	Total	150	100.0	100.0	

Table 21. Survey – Pasta Purchase frequency

Quanto spesso acquisti pasta? (Indicare un'unica risposta) – Altro (specificare) – Test					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		146	97.3	97.3	97.3
	Due volte al mese	3	2.0	2.0	99.3
	Ogni tre settimane	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 22. Survey – "other" Pasta Purchase Frequency.

The next analysis was to see what cuts of pasta consumers typically choose. In this question, respondents could answer by selecting more than one response. Among the responses in selection, both short and long cuts were considered; consequently, our analysis was divided between long and short pasta cuts.

Regarding short cuts, as shown in Table 23, the most popular pasta cuts selected by consumers were "Fusilli", "Pennette" and "Rigatoni" 81, 86 and 64 times, respectively, with relative frequencies of 54%, 57.3% and 42.7%, respectively. Already in the interview phase a tendency of the interviewees towards these types of pasta cuts was highlighted. In particular, Fusilli and Pennette were indicated as preferred cuts by 7 out of 8 respondents.

On the other hand, as previously mentioned, long pasta cuts were also considered in the answers. The cuts selected were Spaghetti and Linguine: the most mentioned in the interview phase. Among long pasta cuts respondents prefer Spaghetti to Linguine. Indeed, the relative frequency for the "Spaghetti" modality was 99, equal to 66% of the respondents, a higher value even for long pasta cuts (which, however, does not indicate a greater purchase of long pasta compared to the equivalent short cut), while the "Linguine" modality was selected by 45 respondents with a relative frequency equal to 30%. In order to hypothesize a preference between short and long cuts of pasta, it is sufficient to sum up the frequencies of selection

relative to short cuts and compare it to the sum of the frequencies of short pasta. Adding up the frequencies of the most selected short pasta ("Fusilli" and "Pennette") we obtain a total frequency of 167, whereas adding up the frequencies of long pasta cuts, we obtain a total frequency of 144. By comparing these two values it is possible to hypothesize that the sample prefers short pasta cuts.

As for the modality "other", 21 consumers indicate other cuts they use more. As it is possible to verify in table 24, among the cuts indicated in the "other" modality, "Farfalle" is the cut with the highest frequency of choice.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Fusilli * Genere	81	54.0%	69	46.0%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Pennette * Genere	86	57.3%	64	42.7%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Rigatoni * Genere	64	42.7%	86	57.3%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Spaghetti * Genere	99	66.0%	51	34.0%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Linguine * Genere	45	30.0%	105	70.0%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Paccheri * Genere	44	29.3%	106	70.7%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Mezze maniche * Genere	52	34.7%	98	65.3%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Selected Choice Altro (specificare) * Genere	21	14.0%	129	86.0%	150	100.0%
Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) – Altro (specificare) – Testo * Genere	150	100.0%	0	0.0%	150	100.0%

Table 23. Survey – Sample Choices on Pasta Cut Purchase

Quale tipo di taglio compri di solito? (Puoi selezionare più di una risposta) - Altro (specificare) - Testo					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		131	87.3	87.3	87.3
	Ditali	5	3.3	3.3	90.7
	Farfalle	7	4.7	4.7	95.3
	Gnocchetti sardi	1	.7	.7	96.0
	Lasagne	5	3.3	3.3	99.3
	Offerta	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 24. Survey – "other" Sample Choices on Pasta Cut Purchase

One of the most important and crucial parts of the research involves the analysis of consumer preferences regarding pasta ranges. In fact, respondents were asked to indicate their preference about the type of wheat involved in the production. Table 24 expresses the frequencies of choice of the respondents. From the latter it can be seen that traditional semolina pasta and whole wheat semolina pasta dominate the preferences of the sample, showing a frequency of 78 and 39, respectively, and a relative frequency of 52% and 26%, respectively, which added together represent 78% of the preferences of the sample. Pulses pasta was indicated as a habitual purchase by 2% of the sample population, that is by 3 respondents, rice pasta, on the other hand, was indicated as a preference by 2.7% of the sample population, that is by 4 respondents, while corn pasta was indicated as a preference by 2.7% of the sample with a frequency of 4 respondents. Thus, pasta composed of alternative grains was selected by 7.4% of respondents.

Ancient grains pasta presents a frequency equal to 21, considering both traditional and whole grain formats, showing a total relative frequency equal to 14% where 8% of the sample indicated a preference in the whole grain version, whereas 6% of the sample indicated a preference in the semolina ancient grains pasta.

Table 25 shows the values just expressed, while the graphic representation is expressed by the bar graph represented in Figure 20.

Che gamma di pasta acquisti di solito? – Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pasta di semola (tradizionale)	78	52.0	52.0	52.0
	Pasta integrale	39	26.0	26.0	78.0
	Pasta di Grani antichi (semola)	9	6.0	6.0	84.0
	Pasta Grani antichi integrale	12	8.0	8.0	92.0
	Pasta di legumi	3	2.0	2.0	94.0
	Pasta di riso	4	2.7	2.7	96.7
	Pasta di Mais	4	2.7	2.7	99.3
	Altro (specificare)	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 25. Survey – Sample Pasta Lines Discrimination

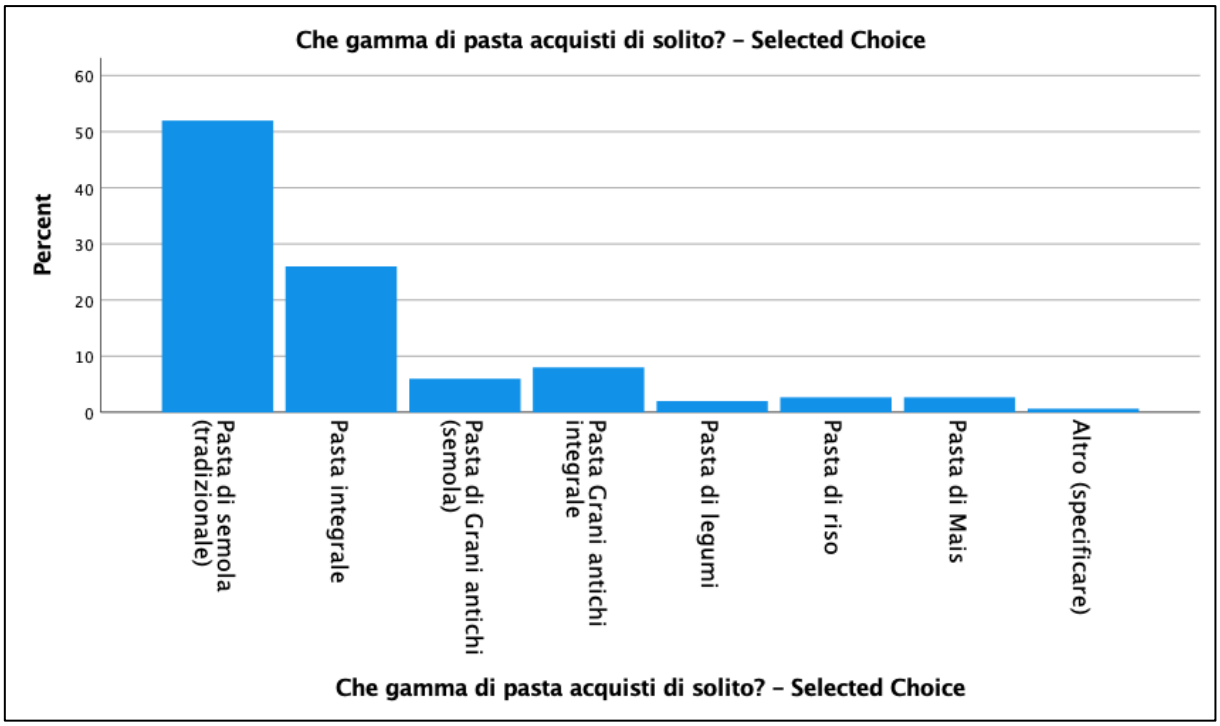


Figure 20. Survey – Sample Pasta Lines Discrimination

Then through the CrossTab function of SPSS, which shows the contingency table, the values related to the modalities of the character "What range of products do you usually buy?" were crossed with the modalities of the character "Annual Household Income", in order to understand possible links between income and product choice. The results emerged from the data derived

from the analysis, show respondents' choices with respect to annual household income. Specifically, among the 19 subjects with income <€15,000, the pasta line most chosen is traditional semolina pasta with a frequency of 11 representing 57.9% of the sample group, followed by whole-wheat semolina pasta with a frequency of 6 including 31.6% of the sample population. Ancient Grains pasta is not chosen by any of the respondents belonging to the bracket, as well as legume and rice pasta is never chosen. On the other hand, 2 subjects indicated Corn Pasta, with a relative frequency of 10.5%.

The bracket of the population with income between 15,000 and 30,000€ is instead made up of 57 subjects. Furthermore, in this case, the pasta line that represents the Mode is traditional semolina pasta, with a frequency of 34 and, therefore, a relative frequency of 59.7%; whole-wheat semolina pasta has instead a frequency of choice, among the pasta lines usually purchased by this group, of 12, representing 21.1%. Ancient grains pasta, which in the previous group was not indicated as a typical purchase by any of the respondents, in this case is selected by 6 subjects, with a relative frequency of 10.5% divided into 3.5% for the traditional Ancient Grains line and 7% for the whole Ancient Grains line, showing a preference of consumers for the whole grain format.

Gluten-free pasta with alternative grains represents 8.8% of the choices of this income bracket, which is divided among the 3 modalities regarding this category. Specifically, 1 out of 57 respondents said they typically purchase legume pasta, 3 subjects said they purchase rice pasta, and 1 subject indicated their preference in maize pasta.

Only 1 subject in the total sample indicated “other” modality as a usual purchase, specifying the purchase of artisanal pasta. This response was not discarded or, more accurately, modified in the data review phase because, although the type of wheat or alternative wheat involved in production is not specified, in the next question in which respondents were to indicate the Brand of pasta typically purchased, the same respondent indicated the Gentili brand, a company in Gragnano that produces artisan pasta made from traditional semolina grains. Therefore, it was decided to keep the line description valid, but it was considered in the calculation of the frequency of choice of Semolina Pasta. In the annual family income bracket ranging from 30,001 to 60,000€, made up of 52 respondents, Mode is still represented by the line of Traditional Semolina Pasta, with a frequency of 24 and a relative frequency of 46.2%, lower than the previous brackets. The Wholewheat Pasta line grows in preference compared to the two bands, showing a frequency of 17 and a relative frequency of around 32.7%. Consumers' preference for the Ancient Grains pasta lines also increased. In fact, traditional Ancient Grains pasta

presents a frequency of 4, while whole grain Ancient Grains pasta presents a frequency of 5. Overall, the two lines express 17.3% of the choices of this income bracket.

Gluten-free pasta lines decreased in popularity. Indeed, rice pasta did not find any preference of choice, expressed by a frequency equal to 0, while both legume pasta and corn pasta received 1 preference each, attesting to an overall frequency of gluten-free lines at 2 and an overall relative frequency of 3.9%. The last income bracket, which expressed incomes >€60,000, shows scenarios consistent with the other income brackets. Indeed, just as in the other income brackets, Mode is represented by the purchase of traditional semolina pasta, with a frequency of 10 and a relative frequency of 45.4%, also confirming the downward trend of this line as the annual profitability of families increases. Therefore, as income increases, the number of semolina pasta buyers decreases. Whole-wheat semolina pasta, on the other hand, presented a reduced purchase frequency compared to the previous income bracket (where it was purchased by 32.7% of the sample population), attesting to the latter at 4 subjects with a relative frequency equal to 18.18%, therefore the income bracket that purchases most Whole-wheat pasta is that between 30,001 and 60,000€. Impossible to define the reasons from this angle, the only thing possible was to report the trends. In the case of Ancient Grains, the trend is the opposite of that of semolina pasta. In fact, as income increases, so does the frequency of purchase. Specifically, for the income bracket >€60,000 the frequency is 6 compared to the number of respondents in the bracket, made up of 22, representing 27.3% of the population in the income bracket.

Therefore, in the research the purchase of pasta went from 0 in the first income bracket, to 10.5% in the second bracket, to 17.3% in the third bracket, up to 27.3% in the last one, showing a growth directly proportional to the annual family income. As far as gluten-free pasta is concerned, its purchase in the last income bracket is also consistent with the relative frequencies observed in the previous brackets. In fact, the overall relative frequency of gluten-free lines in the last income bracket is 9.1% of the total population in the bracket. This data shows us that, within the sample, there may not be a correlation between income and the purchase of gluten-free pasta, exactly as emerged in the interview phase in which all interviewees claimed not to want to buy gluten pasta since they did not have celiac disease problems.

This final, leads us to the next question submitted to respondents in which they were asked to justify their choice of product line.

Che gamma di pasta acquisti di solito? - Selected Choice * Reddito annuo familiare * Età Crosstabulation

Età: Total

Count

		Reddito annuo familiare				
		<15.000€	Tra 15.000 e 30.000€	Tra 30.001 e 60.000€	>60.000€	Total
Che gamma di pasta acquisti di solito? - Selected Choice	Pasta di semola (tradizionale)	11	33	24	10	78
	Pasta integrale	6	12	17	4	39
	Pasta di Grani antichi (semola)	0	2	4	3	9
	Pasta Grani antichi integrale	0	4	5	3	12
	Pasta di legumi	0	1	1	1	3
	Pasta di riso	0	3	0	1	4
	Pasta di Mais	2	1	1	0	4
	Altro (specificare)	0	1	0	0	1
Total		19	57	52	22	150

Table 26. Survey – CrossTab Pasta Lines/Annual Household Income

As stated earlier, respondents were asked to justify their choice in purchasing a particular line of pasta. In order to proceed with the analysis, it was necessary to "clean" this section of data and find common factors among the respondents' answers. Table 27 expresses these responses which will be briefly discussed here. As for traditional semolina pasta, the most frequent response was Taste. In fact, 36 respondents said they buy it because they prefer the taste and how it ties in with the flavor of the sauce. The second most frequent response was habit. In fact, 29 subjects among the 78 who said they typically buy this line said they buy it out of habit, exactly as emerged from the interviews must all respondents who bought traditional semolina pasta said they did so out of habit. Finally, 9 subjects said they buy it because it has a lower price than the other lines, 3 subjects said they had no specific motivation and one subject said they perceived it as a quality product. Regarding whole wheat pasta, the main motivation is that of digestibility. In fact, 18 respondents stated they buy it because it is perceived as more digestible than the equivalent non wholemeal pasta. Moreover, 7 subjects affirmed they buy it because of issues linked to their figure and diet. Linked to diet motivation, 5 subjects stated they purchase it because they perceive it as healthier, while 1 subject stated that they purchase it because they feel lighter after consumption. Finally, 4 subjects stated they purchase it because they perceive a greater sense of satiety after consumption, while 4 respondents stated they purchase it because they prefer its taste. For what concerns the traditional Ancient Grain pasta line, 7 subjects said they buy it because they perceive it as a higher quality product and for its digestive properties. Finally, 1 respondent said they buy it for reasons of gluten intolerance and 1 respondent said they buy it for digestibility.

For what concers the line of whole-wheat Ancient Grains pasta, exactly as for the traditional

equivalent, the trend in the answers is represented by "Quality and Digestibility" with a frequency of 5 subjects. Among the other answers, importance is given to the reasons of Diet identified by 2 subjects who buy it for fitness reasons and 1 subject who buys it for lightness. Finally, 2 subjects said they buy it because they prefer the taste and one subject said they buy it for issues related to gluten intolerance.

For what concerns the gluten-free lines, we can group them into one modality. 6 respondents stated that they buy gluten-free lines for reasons of gluten intolerance, 3 others for reasons related to diet and 1 because he is obliged because he is celiac. The table 27 and Figure 21 express what already explained.

Che gamma di pasta acquisti di solito? – Selected Choice * Perché? Crosstabulation

Count

		Perché?														
		Abitudine	Celiachia	Dieta	Digeribilità	Gusto	Intolleranza al Glutine	Leggerezza	Nessun motivo specifico	Prezzo	Provenienza del Grano	Qualità	Qualità e digeribilità	Salute	Sazietà	Total
Che gamma di pasta acquisti di solito? – Selected Choice	Pasta di semola (tradizionale)	29	0	0	0	36	0	0	3	9	0	1	0	0	0	78
	Pasta integrale	0	0	7	18	4	0	1	0	0	0	0	0	5	4	39
	Pasta di Grani antichi (semola)	0	0	0	1	0	1	0	0	0	0	0	7	0	0	9
	Pasta Grani antichi integrale	0	0	2	2	1	1	1	0	0	0	0	5	0	0	12
	Pasta di legumi	0	0	1	0	0	2	0	0	0	0	0	0	0	0	3
	Pasta di riso	0	0	2	0	1	1	0	0	0	0	0	0	0	0	4
	Pasta di Mais	0	1	0	0	0	3	0	0	0	0	0	0	0	0	4
	Altro (specificare)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total		29	1	12	21	42	8	2	3	9	1	1	12	5	4	150

Table 27. Survey – Sample Motives to Pasta Lines Purchase.

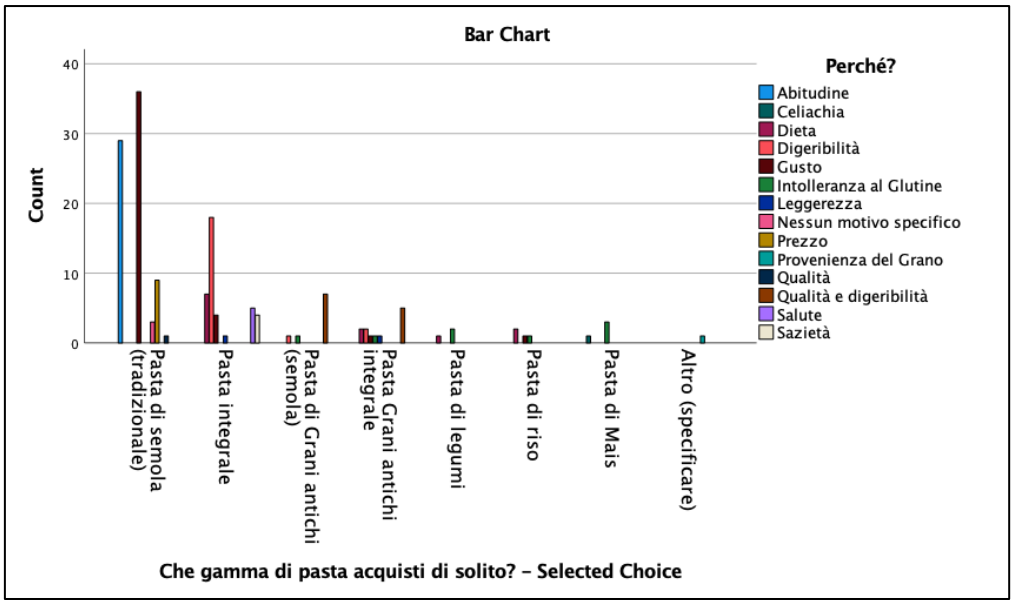


Figure 21. Survey – Sample Motives to Pasta Lines Purchase.

Subsequently, respondents were asked to indicate the brand of pasta they usually purchase. Both purchase by number of subjects and purchase by gender of the sample were considered in the dai analysis phase. Table 28 and Figure 22 show the results obtained, which will be

described here.

Mode is represented by Rummo pasta purchased by 49 respondents with a relative frequency equal to 32.7% of the sample. Other significant frequencies are those concerning the brands Barilla and De Cecco, with the former having a slight preference over the latter. In fact, the frequencies of these two brands are respectively 28 and 26 with a relative frequency equal to 18.7% and 17.3%.

Quale marca di Pasta compri attualmente? – Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rummo	49	32.7	32.7	32.7
	Barilla	28	18.7	18.7	51.3
	De Cecco	26	17.3	17.3	68.7
	Garofalo	6	4.0	4.0	72.7
	Voiello	3	2.0	2.0	74.7
	La Molisana	2	1.3	1.3	76.0
	Granoro	2	1.3	1.3	77.3
	Altro (specificare)	34	22.7	22.7	100.0
	Total	150	100.0	100.0	

Table 28. Survey – Sample Brand Purchase Discrimination

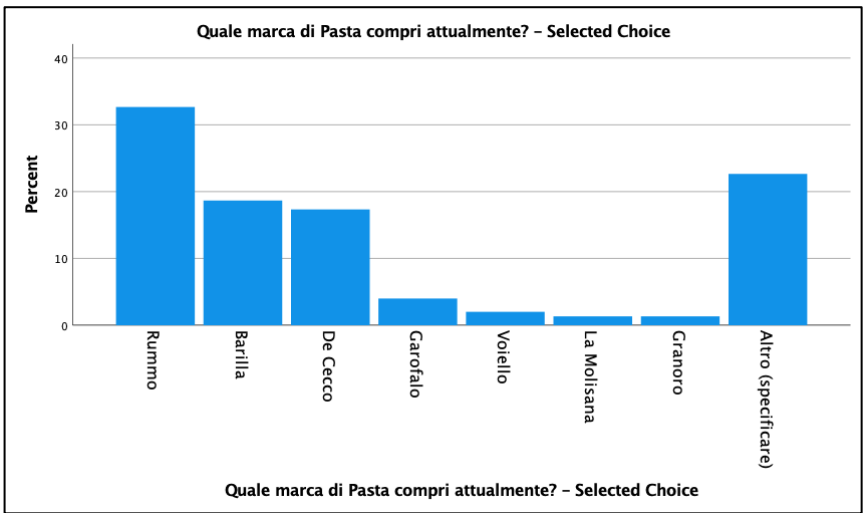


Figure 22. Survey – Sample Brand Purchase Discrimination

From Table 29 it can be seen that the purchase of Rummo pasta in this research was higher in Men (29 vs. 20), the same is true for Barilla where the distance is thinner (15 vs.13). The same cannot be said about De Cecco brand, which was purchased more by the women of the sample.

Genere * Quale marca di Pasta compri attualmente? - Selected Choice Crosstabulation

Count

		Quale marca di Pasta compri attualmente? - Selected Choice								
		Rummo	Barilla	De Cecco	Garofalo	Voiello	La Molisana	Granoro	Altro (specificare)	Total
Genere	M	29	15	11	4	1	2	0	13	75
	F	20	13	15	2	2	0	2	21	75
Total		49	28	26	6	3	2	2	34	150

Table 29. Survey – "other" Sample Brand Purchase Discrimination by Gender

An interesting fact to underline is that 34 respondents have selected "other" as their habitual purchase, about the 23% of respondents. Table 30 shows the Brands nominated by consumers as their habitual purchase in the "other" modality.

As can be seen, there is no brand that dominates over the other among those named by respondents belonging to the sample, but rather the dominant sub-modality is "No specific brand". This answer was only given by some of the respondents who purchase Ancient Grains or Gluten-free Pasta lines.

Quale marca di Pasta compri attualmente? - Altro (specificare) - Testo

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		116	77.3	77.3	77.3
	Afeltra	1	.7	.7	78.0
	Agnesi	1	.7	.7	78.7
	Coop	1	.7	.7	79.3
	Gentile	1	.7	.7	80.0
	Girolomoni	3	2.0	2.0	82.0
	Indifferente	1	.7	.7	82.7
	La valle del grano	1	.7	.7	83.3
	Monograno Felicetti	2	1.3	1.3	84.7
	Morelli	2	1.3	1.3	86.0
	Nessuna marca specifica	12	8.0	8.0	94.0
	Nutrifree	2	1.3	1.3	95.3
	Pasta D'Alba	2	1.3	1.3	96.7
	Poiatti	2	1.3	1.3	98.0
	Tre mulini	2	1.3	1.3	99.3
	Vivi verde coop	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 30. Survey – "other" Sample Brand Purchase Discrimination

In order to understand whether or not respondents impulsively decide to purchase pasta, respondents were asked to indicate when they decide to purchase pasta, whether before purchase or at the time of purchase.

What emerged is interesting in that 62% (93 subjects) of respondents say they decide what to buy at the time of purchase. This mirrors the result of the interviews, in which the respondents

who recounted the purchasing process said they decide at the moment of purchase, discriminating, however, not the Brand but the cut and type.
However, 38% of the sample, a still considerable number, affirmed to decide before buying. Therefore, it is impossible to hypothesize the impulsiveness of purchase of the product by the population of the sample, since there was not a clear portion of the latter that tended towards one of the two possibilities. The table 31 express what already claimed.

Riguardo l'acquisto di pasta, tipicamente prendi decisioni sul prodotto prima di acquistare o al momento dell'acquisto? – Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prima di acquistare	57	38.0	38.0	38.0
	Al momento dell'acquisto	93	62.0	62.0	100.0
	Total	150	100.0	100.0	

Table 31. Survey – Sample Purchase Act.

In order to identify which channels are preferred by consumers to purchase through, a question was asked in which research participants had one of 5 options to choose from. The options were "Supermarket," "Grocery," "Company Site," "E-commerce," "Other" in which respondents had the option to indicate an additional store missing from the list of locations identified as most frequent.
As can be verified from table 32 and table 33 (discrimination By gender), Mode is represented by Supermarket, selected by 125 respondents representing 83.3% of the sample population. In fact, the result of the survey confirms what was stated by the subjects in the interview phase. All 8 respondents affirmed to buy prevalently at supermarket and 6 of them affirmed to buy exclusively at supermarket pasta. An unexpected result was instead the one concerning the online purchase of pasta products. What emerged was that 14 individuals from the selected sample stated they preferred to buy pasta through e-commerce. This last result was unexpected because during the interview phase none of the interviewees had stated they mainly buy pasta online, only 2 had stated they occasionally buy food products online for products which are difficult to find in supermarkets. The relative frequency of the sample's e-commerce purchase was 9.3% which, if added to the relative frequency regarding the purchase of pasta on the manufacturer's website, brings the online purchase to be considered by 10.6% of respondents as the preferred place to purchase pasta. The "other" modality is not

very relevant as it was selected by only one respondent, who indicated G.A.S. (Gruppo d'Acquisto Solidale - Solidarity Purchasing Group) as the preferred place to buy pasta. The purpose of this question was to identify the preferred purchasing places of the pasta consumers within the sample population, but the main objective was to identify the preferred purchasing places of the consumers of Ancient Grains. The results of this portion of the research will be discussed next.

Dove preferisci acquistare la Pasta? - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Supermercato	125	83.3	83.3	83.3
	Bottega	8	5.3	5.3	88.7
	Sito dell'azienda	2	1.3	1.3	90.0
	E-commerce (Amazon, Ebay, ecc.)	14	9.3	9.3	99.3
	Altro (specificare)	1	.7	.7	100.0
	Total	150	100.0	100.0	

Table 32. Sample Purchasing Place Discrimination.

Genere * Dove preferisci acquistare la Pasta? - Selected Choice Crosstabulation

Count

		Dove preferisci acquistare la Pasta? - Selected Choice					
		Supermercato	Bottega	Sito dell'azienda	E-commerce (Amazon, Ebay, ecc.)	Altro (specificare)	Total
Genere	M	60	6	1	7	1	75
	F	65	2	1	7	0	75
Total		125	8	2	14	1	150

Table 33. Sample Purchasing Place Discrimination by Gender.

In order to identify respondents' primary sources of information for the pasta product, subjects were asked to indicate among 7 modalities (with the option to select more than one response) the sources that respondents use to obtain information about pasta.

In this regard, subjects belonging to the sample indicated relatives and friends as their main sources of information, where Mode is represented by Relatives with a frequency of 58 and therefore with a relative frequency of 38.7%. The Friends modality has a frequency of 55 and a relative frequency of 36.7%.

Based on the research findings, nutritionists also play a role as a source of information for respondents. As a matter of fact, it was indicated as a source of information by 44 subjects representing 29.3% of the sample population, this choice was mainly made by subjects who

previously stated they follow a diet and buy whole wheat pasta. It is necessary to underline the incidence, as a source of information, of social media and the website of the producing company, indicated by 33 and 21 subjects respectively, representing 22% and 14%. This data is crucial for the definition of the optimal relational channel of Regina Adelasia, as the main communication channels of the company are connected to digital technology and internet. However, these data do not indicate if they are also the preferred channels of information by those who buy ancient grains. This issue will be addressed later. Finally, to the "other" modality, most respondents indicated the web as a source of information, which further validates digital information sources. Tables 34 and 35 express what has been covered so far.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Parenti	58	38.7%	92	61.3%	150	100.0%
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Amici	55	36.7%	95	63.3%	150	100.0%
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Nutrizionisti	44	29.3%	106	70.7%	150	100.0%
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Social Media	33	22.0%	117	78.0%	150	100.0%
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Commesso di negozio	4	2.7%	146	97.3%	150	100.0%
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Sito ufficiale dell'azienda	21	14.0%	129	86.0%	150	100.0%
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Altro (specificare)	28	18.7%	122	81.3%	150	100.0%

Table 34. Survey – Sample Source of Information Discrimination.

Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) - Altro (specificare) - Testo * Canale di distribuzione Crosstabulatio

Count

		Canale di distribuzione anonymous	Total
Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) - Altro (specificare) - Test		125	125
	Esperienza	4	4
	Libri	2	2
	Nessuna fonte	8	8
	Offerta	1	1
	Valori nutrizionali	1	1
	Web	9	9
Total		150	150

Table 35. Survey – "other" Sample Source of Information Discrimination.

After the two previously described analyses, a cross-analysis was carried out on the main information channels for Regina Adelasia and the channels for reaching consumers, based on the data obtained from the research and the sample population assuming that it represents a cross-section of the Italian population. In the description of the results, we will focus only on the channels belonging to the company's business model, therefore, E-commerce and the company's website. The information channels selected for analysis were Nutritionists, Social Media and the Company's Website. Subsequently, the variable related to the purchase of pasta lines of ancient grains will also be introduced and will be crossed with the variables we will discuss here in order to understand how many of the 21 subjects belonging to the sample who buy ancient grains use the information channels used by Regina Adelasia and how many of them buy the product through e-commerce and the internet site of the producing company.

As stated earlier, the analysis focused on the channels used by Regina Adelasia without discrimination on product lines base. Thus, 9 of the 44 subjects who purchase through e-commerce use the Nutritionist as a source of information, representing 22.5% of the total. There are 3 who use social media as an information channel, representing 9.1% of the 33 subjects who use social media. Finally, 6 of the respondents who say they buy through e-commerce use the company's website as a source of information, representing 28.6% of the total respondents who said they use this channel of information.

Regarding the "company website" channel, 1 of the 44 subjects who said they purchase through the company website uses the Nutritionist as a source of information, representing 2.3% of the total. 1 is the one who said they use social media as an information channel, representing 3%

of the 33 subjects who use social media. Finally, 2 of the respondents who said they purchase through the company's website use the company's website as an information source, representing 9.5% of the total respondents who said they use this information channel.

From this analysis it is possible to verify how, even with digital information channels (i.e., e-commerce, company website), the predominant sales channel is the supermarket, preferred by the vast majority of respondents.

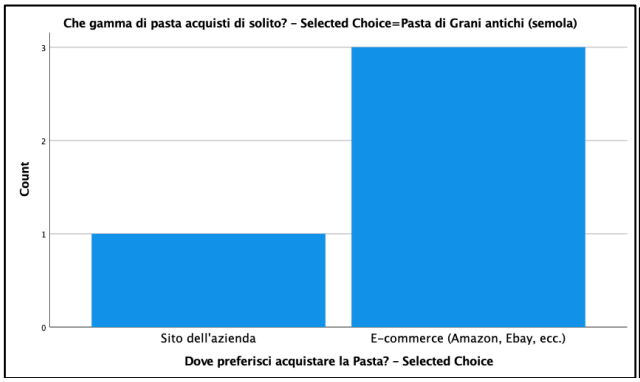
Table 36 describes the frequencies of purchase in the various channels indicated by consumers as preferred for purchasing pasta and the channels considered for analysis, expressing what has just been stated.

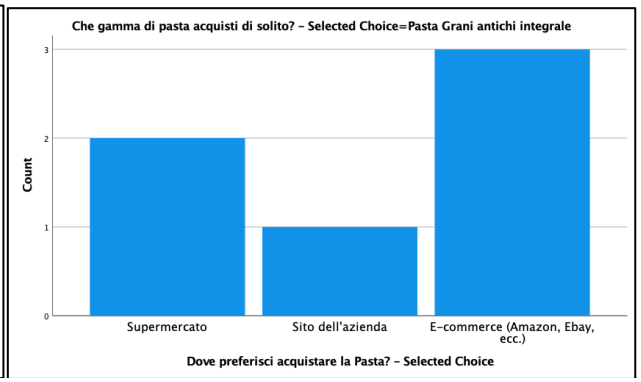
Case Summaries

Dove preferisci acquistare la Pasta? – Selected Choice		Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Nutrizionist	Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Social Medi	Quali fonti usi per ottenere informazioni sulla Pasta? (Puoi selezionare più di una risposta) – Selected Choice Sito ufficiale dell'aziend
Supermercato	N	33	25	12
	% of Total N	75.0%	75.8%	57.1%
Bottega	N	1	4	1
	% of Total N	2.3%	12.1%	4.8%
Sito dell'azienda	N	1	1	2
	% of Total N	2.3%	3.0%	9.5%
E-commerce (Amazon, Ebay, ecc.)	N	9	3	6
	% of Total N	20.5%	9.1%	28.6%
Total	N	44	33	21
	% of Total N	100.0%	100.0%	100.0%

Table 36. Survey – Channels vs. Source of Information

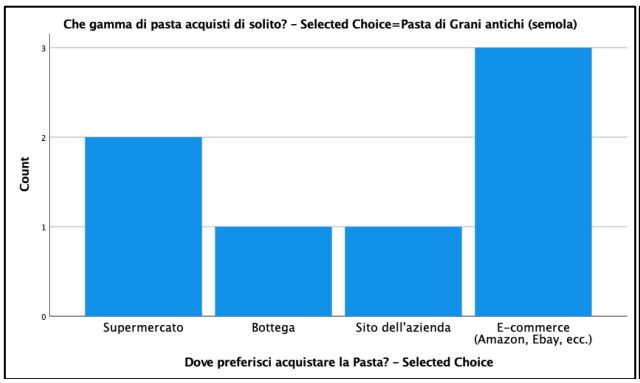
Subsequently, the two variables just described were analyzed by adding the product line discriminant. As shown in Figures 23 and 24, the 6 subjects who use the company's website as a source of information and e-commerce as a purchasing channel were the respondents who said they buy ancient grains (3 buy traditional and 3 whole grains). Similarly, the 2 subjects using the company's website as a source of information and the company's website as a purchasing channel were respondents who claimed to buy ancient grains (1 buy traditional and 1 whole grain) and 2 respondents buy at the supermarket.

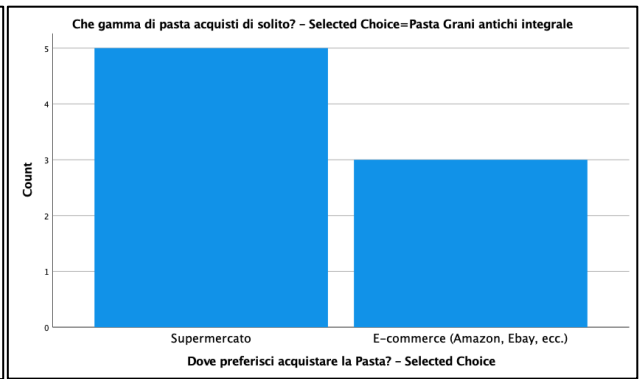




Figures 23-24. Survey – Channels vs. Company Website Source: Product Discrimination.

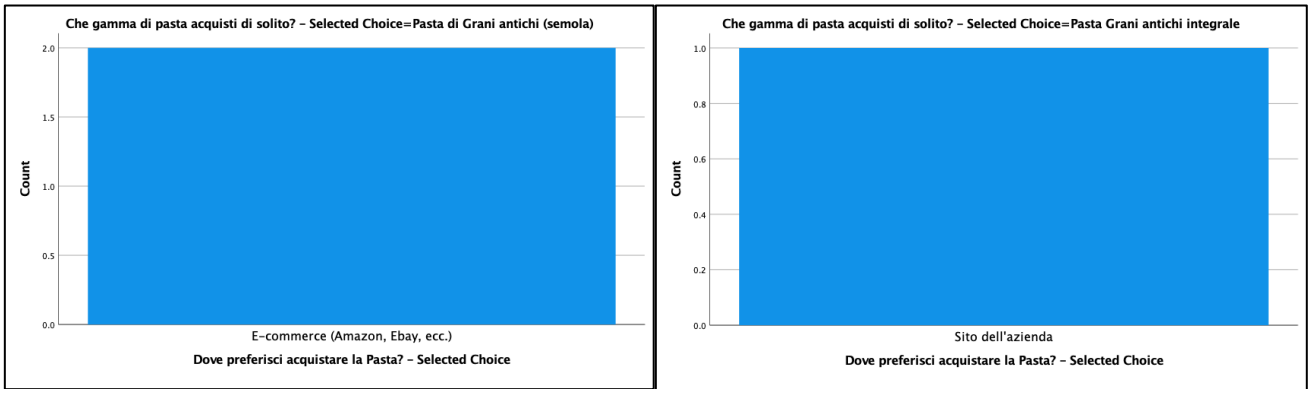
As shown in Figures 25 and 26, among the 9 subjects using the nutritionist as a source of information and e-commerce as a purchasing channel were the 6 respondents who said they buy ancient grains (3 buy traditional and 3 whole grains). Similarly, the subject who uses the nutritionist as a source of information and the company's website as a purchasing channel is the respondent who claimed to buy ancient (traditional) grains, while 7 respondents who claimed to buy ancient grains and use the nutritionist as an information channel claimed to buy at the supermarket while one at the grocery store.





Figures 25-26. Survey – Channels vs. Nutritionist: Product Discrimination.

As shown in Figures 27 and 28, among the 3 subjects who use the nutritionist as a source of information and e-commerce as a purchasing channel, there are 2 respondents who claimed to purchase ancient (traditional) grains. Similarly, the subject who uses social media as a source of information and the company's website as a purchasing channel is the respondent who claimed to purchase ancient (whole grain) grains.



Figures 27-28. Survey – Channels vs. Social Media: Product Discrimination.

This cross-sectional analysis shows that there is a close relationship between the purchase of ancient grain pasta and the use of digital purchasing and information channels.
Clearly, in terms of Regina Adelasia's customer relationships, these findings are critical, but they do not determine all of its possible strategies. Further research will be needed to fully define customer relationships. However, the data collected may be useful for the establishment of new research that is much more applicative. As far as distribution channels are concerned, given the impossibility of reaching large-scale retail, the digital trends even in the food sector, perhaps one of the last sectors still dependent on physical stores, and the data obtained through this research, the digital choice could be correct.

In the successive part, the phase addressed the attributes identified in the interviews, on which respondents were to express the degree of importance they gave to the attribute in the survey phase. There were 21 attributes identified in the interview phase and they concerned both technical attributes of the performance-related (i.e., cooking hold, low cooking time, texture, etc.) and attributes related to the Regina Adelasia value proposition (i.e., recycled packaging, eco-compatibility, supply chain traceability).
As expressed, when defining data analysis methodologies, attributes with an average of less than 4.5 (where 4 represents the respondent's indifference to the attribute) were discarded. Among the selected attributes, the discarded attributes were: "Eco-compatibility", "Quantity in the package", "Bronze drawing", "Km 0", "Gluten content", "Fat content", “Porosity”, “Wholemeal” and "Low cooking time" for the reasons just expressed.

The analysis of attributes is approached by dividing them into 3 categories. The first category is represented by the technical characteristics of the pulp in terms of product performance.

The first attribute to be analyzed, also the first in importance according to the sample of respondents, is cooking tightness. In fact, just like in the interview phase in which all the subjects stated that the main attribute of the pasta product (for them) is the cooking tightness. From the data emerged from the research, as shown in table 37, Mode is represented by 7, the highest level of importance of the Likert scale included in the questionnaire. Moreover, the average importance of the attribute is 5.99 which represents the highest value among the averages of the other attributes under analysis. Therefore, the attribute respected the degree of importance measured during the interviews and therefore represents the fundamental attribute in the measurement of the performance of the pasta product.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? – Tenuta della cottura

N	Valid	150
	Missing	0
Mean		5.99
Median		6.00
Mode		7
Std. Deviation		1.303
Variance		1.698

Table 37. Survey – Attributes: Cooking tightness.

The second attribute by average belonging to this first category of attributes is digestibility. Here, too, exactly the same as in the interview phase in which all subjects stated that one of the main attributes of the pasta product (for them) is digestibility. From the data that emerged from the research, as can be seen in table 38, also for this attribute the Mode is represented by 7, the highest level of importance of the Likert scale included in the questionnaire. In addition, the average importance of the attribute is 5.76 right after cooking tightness. Therefore, the attribute respected the degree of importance measured in the interviews and therefore represents one of the fundamental attributes in measuring the performance of the pasta product.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? – Digeribilità

N	Valid	150
	Missing	0
Mean		5.76
Median		7.00
Mode		7
Std. Deviation		1.740
Variance		3.029

Table 38. Survey – Attributes: Digestibility.

The third attribute by average belonging to this first category of attributes is consistency. Here again, just like in the interview phase where all subjects stated that one of the main attributes of the pasta product (for them) is Consistency, meant as performance to the touch when tasting the dish. From the data that emerged from the research, as can be seen in Table 39, Mode is represented by 6, a very high level of importance on the Likert scale included in the questionnaire. Moreover, the average importance of the attribute is 5.28 right after the digestibility attribute. Therefore, also in this case, the attribute respected the degree of importance measured during the interviews and therefore represents one of the fundamental attributes in measuring the performance of the pasta product.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Consistenza

N	Valid	150
	Missing	0
Mean		5.28
Median		6.00
Mode		6
Std. Deviation		1.511
Variance		2.283

Table 39. Survey – Attributes: Consistency.

The fourth and last attribute by average belonging to this first category of attributes is nutritional values. During the interview phase, this attribute was mentioned by a consistent part of the interviewees (3 subjects) who stated that one of the main attributes of the pasta product (for them) is nutritional values. From the data that emerged from the research, as can be seen in Table 40, there are two modalities represented by 6 and 7, the highest degrees of importance of the Likert scale included in the questionnaire. In addition, the average importance of the attribute is 4.97. Therefore, in this case as well, the attribute respected the degree of importance measured during the interviews and therefore represents one of the fundamental attributes in the measurement of the performance of the pasta product.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? – Valori nutritivi

N	Valid	150
	Missing	0
Mean		4.97
Median		5.00
Mode		6[a]
Std. Deviation		1.843
Variance		3.395

a. Multiple modes exist. The smallest value is shown

Table 40. Survey – Attributes: Nutritional Values.

The second category is represented by the material characteristics of pasta. The first attribute to be analyzed, also first in importance according to the sample of respondents in this category, is the origin of wheat. In fact, this attribute turns out to be very important for the respondents in the sample, just like in the interview phase in which 6 subjects said they particularly cared about the origin of wheat, following the trend discussed in chapter 2 about the increase in the purchase of pasta in which 100% Italian wheat is involved. From the data that emerged from the research, as can be seen in Table 41, the Mode is represented by 7, the highest level of importance of the Likert scale included in the questionnaire. Moreover, the average importance of the attribute is 5.36 which represents the highest value among the averages of the other attributes in analysis related to this category. Thus, the attribute met the degree of importance measured in the interviews and thus represents the fundamental attribute in the measurement of the performance of the pasta product.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? – Provenienza del Grano

N	Valid	150
	Missing	0
Mean		5.36
Median		6.00
Mode		7
Std. Deviation		1.833
Variance		3.359

Table 41. Survey – Attributes: Grain Origin.

The second attribute to be analyzed, also second in importance according to the sample of respondents in this category is the type of wheat. This attribute was found to be very important for the sample respondents from the analysis of the degree of importance of the attribute, but the result did not follow the line of choice of consumers who in 78% of cases stated, for various

reasons, that they mainly buy pasta (whole wheat and traditional) made from modern grains, as shown previously when analyzing the purchase preferences of pasta lines. Moreover, in the interview phase, 50% of the subjects had affirmed to take into particular consideration the type of wheat, even though they also buy traditional grains. From the data that emerged from the research, as can be seen in Table 42, the Mode is represented by 7, the highest level of importance of the Likert scale included in the questionnaire. In addition, the average importance of the attribute is 4.80, slightly higher than the consumer's indifference about the attribute. Therefore, the attribute respected the degree of importance measured during the interviews but did not respect the typical purchase choices of the respondents regarding the pasta lines concerning the type of wheat. For these reasons it was decided not to consider the attribute in the analysis but to discuss the data obtained from the analysis.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Tipologia di grano

N	Valid	150
	Missing	0
Mean		4.80
Median		5.00
Mode		7
Std. Deviation		2.066
Variance		4.268

Table 42. Survey – Attributes: Grain Typology.

The third attribute to be analyzed, third also for importance according to the sample of respondents in this category, is organic. This attribute turned out to be fairly important for the respondents of the sample from the analysis of the degree of importance of the attribute, exactly as in the phase of the interviews in which 3 subjects had affirmed that they took into particular consideration the origin of the grain, following the trend discussed in chapter 1 relative to the increase in the purchase of organic products. From the data that emerged from the research, as can be seen in table 43, the Mode is represented by 5, a degree of importance on the Likert scale inserted in the questionnaire just above the indifference of the respondents. In addition, the average importance rating of the attribute is 4.67, slightly higher than consumer indifference about the attribute. Thus, the attribute met the degree of importance measured in the interviews.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Biologico

N	Valid	150
	Missing	0
Mean		4.67
Median		5.00
Mode		5
Std. Deviation		1.863
Variance		3.470

Table 43. Survey – Attributes: Organic.

The third category is the characteristics of Regina Adelasia's value proposition. The attribute to be analyzed is the traceability of the supply chain. In fact, this attribute is characteristic of the offer that the company makes, as expressed in chapter 3, in order to offer the consumer a total level of transparency regarding the quality of the product and the production chain. During the interviews, this factor was not investigated because it is not yet present in the pasta sector and, more generally, is not applied much in the food sector. From the data that emerged from the research, as can be seen in table 44, Mode is represented by 7, the highest level of importance on the Likert scale included in the questionnaire. Moreover, the average importance of the attribute is 4.87 which represents a high value considering that the consumer has not yet been able to experience this technology.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Tracciabilità della filiera

N	Valid	150
	Missing	0
Mean		4.87
Median		5.00
Mode		7
Std. Deviation		2.028
Variance		4.111

Table 44. Survey – Attributes: Traceability of the Supply Chain.

The fourth and final category is represented by the intangible characteristics of the product (i.e., Brand, Price, Ease of finding the product).

The first attribute to analyze is Brand. Based on previously analyzed data, Brand is a determining factor for respondents as 77.3% of consumers indicated they buy Top of Mind brand pasta from supermarket shelves. Moreover, already in the interview phase 6 out of 8 respondents stated to be drastically influenced by the brand as they put their trust on the quality of the

product, they buy in the Brand that produces it, checking only in the first purchase phase the material and immaterial characteristics of the product itself.

From the data that emerged from the analysis, Fashion was represented by 7, the highest level of importance in the Likert scale inserted in the questionnaire administered. while the average level of importance is 5.09, justifying what emerged in the interview phase. Table 45 express the values already explained.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Marca

N	Valid	150
	Missing	0
Mean		5.09
Median		6.00
Mode		7
Std. Deviation		1.822
Variance		3.320

Table 45. Survey – Attributes: Brand.

The second attribute to be analyzed is the ease with which the product can be found. Based on the data that emerged in this research both in the survey phase and in the interview phase, respondents are still closely tied to the supermarket channel, this means that availability on the shelf is a fundamental characteristic even for those product lines that cannot be found in supermarkets. From the data that emerged from the analysis, Fashion was represented by 7, the highest level of importance on the Likert scale included in the questionnaire administered. while the average level of importance is 5.15. This data indicates a general importance on the part of consumers that is on average high, which justifies what emerged during the interview phase and in the previous part of the survey analysis. Table 46 expresses the values just discussed regarding these attributes.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Facilità di reperibilità del prodotto

N	Valid	150
	Missing	0
Mean		5.15
Median		5.00
Mode		7
Std. Deviation		1.680
Variance		2.824

Table 46. Survey – Attributes: Ease of Product Availability.

The third and last attribute under analysis is price. From the survey analysis it emerges that the

respondents do not give much importance to the price variable, despite the Mode being 7, the average importance given by the subjects belonging to the sample population was 4.46, tending, therefore, towards indifference of the respondents with respect to the attribute. Finally, this value is in line with what emerged from the interviews, in which only 2 subjects claimed to be influenced by the price of pasta when making a purchasing decision. Table 47 expresses the values just discussed regarding price.

Statistics

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Prezzo

N	Valid	150
	Missing	0
Mean		4.46
Median		4.00
Mode		7
Std. Deviation		1.870
Variance		3.498

Table 47. Survey – Attributes: Price.

Finally, a final analysis was done on the part of the value proposition that has not yet been verified with the responses that respondents belonging to the sample populations who said they buy pasta lines with ancient grains: supply chain traceability. To do this, data on the purchase of ancient grains and the degree of importance respondents (purchasers of ancient grains) gave to the traceability of the production chain were cross-referenced. Table 48 expresses the data obtained by crossing the two variables. From what emerged, the majority of respondents who said they habitually buy ancient grains gave a degree of importance equal to 7, the highest degree of importance of the Likert scale included in the questionnaire, representing 52.4% of this portion of respondents. Another 6 respondents (28.6% of the portion) gave a degree of importance equal to 6, a degree of importance however very high, even if not the highest. Finally, 3 subjects gave a degree of importance equal to 5, which represents an above average value, while one subject showed indifference regarding the transparent supply chain. On the whole, buyers of ancient grains evaluate, on average, a degree of importance equal to 6. This figure implies desirability even in this portion of Regina Adelasia Value Proposition.

Che gamma di pasta acquisti di solito? - Selected Choice * Potresti indicare in che misura sono importanti per te i seguenti attrib relativi alla pasta? - Tracciabilità della filiera Crosstabulation

Count

		Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Tracciabilità della filiera							
		1	2	3	4	5	6	7	Total
Che gamma di pasta acquisti di solito? - Selected Choice	Pasta di Grani antichi (semola)	0	0	0	0	3	3	3	9
	Pasta Grani antichi integrale	0	0	0	1	0	3	8	12
Total		0	0	0	1	3	6	11	21

Table 48. Survey – CrossTab: Ancient Grains Pasta Lines vs. Supply Chain Traceability

Conclusion

In conclusion, from the data that emerged from the two research studies, it is possible to partially define the consumer's buying process. Although the data regarding the moment in which the respondents make a purchase decision did not show clear net, if not a tendency towards a more impulsive decision based on factors or purely aesthetic related to packaging, or to the cut they need in a certain moment or to their memory based on the experience related to the features they are buying. From the analysis of the attributes, also in relation to socio-demographic variables, it was noted how the market presents different segments, more or less influenced by all the attributes identified during the interviews. Although not empirically verified and clustered, some segments appear clear (which will need to be verified later). The segment that Regina Adelasia is interested in, and more generally, concerns the scope of this research is that of ancient grains. Within this cluster, through this research, it was possible to hypothesize the purchasing process of the buyers. Precisely, the moment of the purchase decision does not happen on the shelf, but before. Since a predominant Brand was not identified in the preferences of ancient grains consumers, this attribute does not correspond to an attribute that influences consumer choice. The attribute that influences choice, as was pointed out in interviews is the type of grain. In fact, consumers rather than going to look for a specific brand go to look for a specific cultivar of wheat (e.g., Perciasacchi, Tumminia, Russello, Senatore Cappelli) and therefore not a specific brand as in the case of the purchase of semolina pasta lines (whole wheat or not). Finally, price does not influence buyers of ancient grains as the product is identified as a luxury product, in terms of quality of raw materials and production. As a matter of fact, the average degree of importance of respondents who said they buy ancient grains is equal to 3.07. Table 49 expresses the responses of respondents to the degree of importance of the attribute.

Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Prezzo * Che gamma di pasta acquisti di solito? - Selected Choice Crosstabulation

Count

		Che gamma di pasta acquisti di solito? - Selected Choice		
		Pasta di Grani antichi (semola)	Pasta Grani antichi integrale	Total
Potresti indicare in che misura sono importanti per te i seguenti attributi relativi alla pasta? - Prezzo	1	0	1	1
	2	3	2	5
	3	1	2	3
	4	1	3	4
	5	2	0	2
	6	1	1	2
	7	1	3	4
Total		9	12	21

Table 49. Survey – Ancient Grain Pasta lines vs. Price.

For what concerns digital channels, it is possible to state that digital channels can be the right channel to reach the consumer of Ancient Grain Pasta, as shown by the cross-sectional analysis previously described.

This cross-sectional analysis showed that there is a close relationship between the purchase of ancient grain pasta and the use of digital purchasing and information channels.

Clearly, in terms of Regina Adelasia's customer relationships, these findings are critical, but they do not determine all of its possible strategies and scenarios. Further research will be needed to fully define customer relationships. However, the data collected may be useful for the establishment of new research that is much more applicative. Finally, given the impossibility of reaching large-scale retail, the digital trends even in the food sector - perhaps one of the last sectors still dependent on physical stores - and the data obtained through this research, the digital choice could be correct in order to better serve consumers.

Bibliography

- Report Global Agricultural Product, October 2020, Market Line.

- Ridolfi R. 2019. SDGs for people, planet, and prosperity. FAO's SDG compliance work as a means for leveraging sustainable investments in agrifood systems. Rome, FAO.

- Peter Bondarenko, North America Free Trade Agreement, Britannica.

- Menzie Chinn, Bill Plumley, January 2020, What is the toll of trade wars on U.S. agriculture?, Econofact.

- Lily Kuo, March 2020, Trump sparks anger by calling coronavirus the Chinese virus, The Guardian.

- Huileng Tan, August 2019, U.S. soybean farmers are working new markets now that exports to China have tanked, CNBC.

- Willer, Helga, and Julia Lernoud (Eds.) (2019): The World Organic Agriculture. Statistics and Emerging Trends 2019. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM – Organics International, Bonn.

- Global Agricultural Product Market: Supply Chain Analysis, January 2021. Market Line.

- J. Baffes, J. Wu, November 2020, Global Food Commodity Prices in a Post-COVID World. World Bank Blog.

- U.S. Organic Industry Survey 2020, June 2020. Organic Trade Association.

- International Labour Organization, ILOSTAT database, 2020. The World Bank

- World Bank National Account Data, and OECD National Accounts data files, 2019. The World Bank.

- USDA, Economic Research Service using data from U.S. Census Bureau, Foreign Trade Statistics, as compiled by USDA, Foreign Agricultural Service, Global Agricultural Trade System.

- K.R. Curtis et al., (2007). China Economic Review 18.

- Kašťaková E., Baumgartner B., Žatko M. (2018) The Impact of the Russian Embargo on its Agri-Food Trade with the EU: Analysis by Selected Indicators. International Organisations Research Journal, vol. 13, no 4, pp. 256–271 (in English). DOI: 10.17323/1996-7845-2018-04-12.

- Russia Extended Food Import Ban Through End 2021, December 2020. United States Department of Agriculture.

- Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050, December 2018. World Resources Institute.

- Population Division of the United Nations Department of Economic and Social Affairs, 2018. 2018 Revision of the World Urbanization Prospects. United Nation.

- Taylor Meek, Effects of Deforestation: How Does Deforestation Cause Deforestation? September 2019. Sentient Media.

- The impact of disasters and crises on agriculture and food security, 2018. FAO.

- Ray DK, West PC, Clark M, Gerber JS, Prishchepov AV, Chatterjee S (2019) Climate change has likely already affected global food production.

- Emiko Terazono, September 2019, Investors seek sustenance in alternative proteins. Financial Times.

- FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome

- FAO. 2011. Global food losses and food waste – Extent, causes and prevention. Rome

- FAO. 2011. Energy-smart food for people and climate – Issue report. Rome

- FAO. 2017. The future of food and agriculture – trends and challenges. Rome.

- AgFunder, 2020. Agri-food Tech Midyear Review.

- AgFunder, 2020. Agri-food Tech Midyear Review.

- AgFunder, 2019. Agri-food Tech Funding Report.

- U.S. Department of Agriculture.

- Ricky Leblanc, December 2020, What you should know about Vertical Farming. The Balance Small Business.

- Olivia Zaleski, December 2018, Uber CEO and Alphabet Invest in Urban Farming Startup. Bloomberg.

- Tad Friend, September 2019, Can a Burger help solve Climate Change?. The New Yorker.

- G. Gallo, M. Lo Bianco, R. Bognanni, G. Saimbene, A. Orlando, O. Grillo, R. Saccone, G. Venora, Durum Wheat Bread: Old Sicilian Varieties and Improved Ones, Journal of Agricultural Science and Technology, ISSN 1930-1259, USA, August 2010, Volume 4, No. 4.

- Raymond Cooper, Re-discovering ancient wheat varieties as a functional food, July 2015. Vol.5, Issue 3, pag.138-143. Journal of Traditional and Complementary Medicine.

- P. Singh, A. Arora, T. A. Strand, and other, Global Prevalence of Celiac Disease: Systematic Review and Meta-analysis, 2018, Clinical Gastroenterology and Hepatology Vol. 16, No. 6.

- Tendenze: Frumento Duro. July 2020. Ismea.

- V. Vara, October 2014, Why we're willing to pay more for cereal with ancient grains. The New Yorker.

- M. T. Manuelli, Grani Antichi, proteine e al Matcha: nuovi colori e gusti della pasta. October 2019. Il Sole24Ore.

- Antonucci, F., Figirilli, S., Costa, C., Pallottino, F., Raso, L., Menesatti, P. 2019. A review on blockchain applications in the agri-food sector. J Sci Food Agric.

Sitography

- Crunchbase

- Remi Schmaltz, April 2017, What is Precision Agriculture. AgFunder News.

- Lauren Manning, September 2020, CropX acquires New Zealand precision effluent and smart irrigation decision Startup. AgFunder News.

- https://wholegrainscouncil.org/whole-grains-101/whats-whole-grain/ancient-grains

- https://web.archive.org/web/20150524135841/http://www.terrefrumentarie.it/index.php/notizie/53-i-custodi-dei-semi

- http://www.fao.org/3/y5714e/y5714e03.htm

- http://www.granicoltura.it/p_decreti_iscr_VL.html

- https://www.nhs.uk/conditions/coeliac-disease/#:~:text=Coeliac%20disease%20is%20a%20condition,diarrhoea%2C%20abdominal%20pain%20and%20bloating.

- https://www.igc.int/en/gmr_summary.aspx

- Ancient Grains Market Analysis, February 2020. Market Data Forecast. https://www.marketdataforecast.com/market-reports/ancient-grain-market

- https://www.cbi.eu/market-information/grains-pulses-oilseeds/how-respond-covid-19-grains-pulses-oilseeds-sector

- https://www.bakingbusiness.com/articles/47981-two-factors-influencing-the-ancient-grain-revival

- Wikipedia.