Università Ca'Foscari Venezia

Master's Degree Programme
in Management

Final Thesis

The Effects of Covid-19 Pandemic on the Behavioral Consumption of Ice-cream

Supervisor
Prof. Vladi Finotto

Assistant Supervisor
Prof. Christine Mauracher

Graduand
Caterina Boaro

Matriculation number
863448

Academic Year
2020 / 2021

Index

Introduction

The outbreak caused by Covid-19 changed the Italian behavioral consumption of all types of food with no exclusion. The focus of this analysis is to evaluate the impact of the pandemic on the gelato industry. To this purpose, the thesis presents the results of the research project *Consumption of Gelato and the Effect of the Covid-19 Pandemic* carried out within the AgriFood Management and Innovation Lab at Ca'Foscari University. The project started with the administration of a questionnaire during the summer of 2020, immediately after the Italian national lockdown. Based on the answers of a sample of 2511 Italian respondents, the study identifies the factors that influenced the consumer behavior of gelato lovers the most, allowing a comparison between past and current trends. The data collected allowed the development of both a bivariate analysis, that combined the factors with the demographic variables, and a cluster analysis, that grouped respondents' characteristics according to their personal preferences. Moreover, the sample was questioned on another related issue – the delivery services. Due to the enforced restrictions, businesses in the sector were forced to find new ways to sell their products directly to consumers' houses. The analysis on data explains the reaction of consumers to the raise in availability of the home delivery services.

The thesis presents the outcome of the research in five chapters. The first chapter will give an overview on Italian food consumption evolution from post-war until today, including a discussion on the delivery service diffusion. The second chapter will focus more on ice-cream, from its invention to present consumption trends. The following pages will present the analysis carried out on data collected through the questionnaire step by step. The third chapter defines the interviewed sample in short. The fourth chapter looks at the dependent relationships among variables of the dataset. The last chapter concludes with the cluster analysis results on different groups consumption behavior. The research result is a starting point for the main players in the industry to evaluate the impact of Covid-19 gelato consumption and the most important factors influencing the gelato consumption.

Chapter 1 – Food consumption in Italy

1.1 Evolution of food consumption in Italy

1.1.1 From 1940s to early 2000s

The changes in Italians' consumption habits over time can be separated into different evolutionary phases. To evaluate specific consumption trends, Censis, an Italian research institute for socio-economic studies, subdivided the period post Second World War until today into five phases, each displaying unique socio-economic trends.

The *first phase* lasts from the postwar period to the Seventies. This is the time when the race for well-being took off as the main cause of development and of the socio-economic transformation of Italy. Economic welfare was easily reachable, and families' total income growth rates were increasing as never before. As a result, between 1946 and 1961, general consumption grew at a rate of 293,6%. The advertising activities became popular with the spread of televisions. Food consumption started its evolution – for the first time canned foods, baby food, and frozen food were available. Moreover, the rapid diffusion of new technologies, such as household and kitchen appliances, brought additional changes to food choices. In this phase of economic prosper, food consumption grew exceptionally.

The *second stage* covers the Seventies, a period characterized by a profound socio-economic modernization. Italy was experiencing a rapid growth, as shown by phenomena such as the entrepreneurial proliferation, the increasing social mobility, the persistent migration to urban centers, and the visible effects of mass schooling. The sources of family income growth were several, including people working more than one job, massive entry of women into the labor market allowing more than one salary per family, seasonal jobs and the underground economy. The growing financial availability allowed for greater spending, marking the transition towards a society centered on individual behaviors and individual consumption. Expressed in year 2000 terms, in 1979 food expenditure per capita reached 1,626 euros. Food accounted for more than a fifth of the total household expenditure. Despite the frenetic start of this decade, the economic ascent was stopped by the strong impact of a major global crisis, triggered by the rise in oil prices, resulting in a hard contraction in food consumption overall.

In the *Eighties*, an economic boom resulted in stronger financial security, leading to greater spending power and a rise in general consumption, including food. Moreover, Italian families began diversifying their investments. This included the purchase of a second home, a second car or enrolling in complementary courses at public school. Families were also spending more on holidays and having food outside home. As evidence of a continuing growth dynamic, food consumption per capita increased by 10% compared to the previous decade.

Over the *Nineties*, food expenditure grew by 4.8% from the previous decade. Nonetheless, food consumption moved along a descendant parabola compared to the Eighties – which already experienced a robust cut in growth rates compared to the previous decade. Food expenditure fell as a share of total consumption up to 15.4%. Italians eating habits were changed by some key phenomena as the arrival of large-scale distribution. Moreover, the deconstruction of meals at home became more frequent and the turnover coming from eating food out represented over 44% of the total expenses.

The *new millennium* was characterized by globalization, but also by a general level of insecurity. Both phenomena had significant repercussions on people's relationships with food. There has been a deep change in the relationship with food consumption and with general consumption – the former is essentially constant (average annual growth rate of 0.1%), the latter is slightly increasing (average annual increase in total expenditure 0.6%). In the markets, the large-scale distribution accounts for over 70% of food spending, while out-of-home expenses represents half of the total expenditure for food (Censis & Coldiretti, 2021).

1.1.2 In recent years

After the initial focus on Italians' food consumption habits in the last century, some information regarding recent years consumption trends is presented. Every year, Coop Italia, a group of Italian cooperatives managing a giant network of supermarkets and hypermarkets examines internal data to find general consumption trends. Their yearly report summarizes the data collected on Italians' lifestyle and consumption habits in the current economic and social context, recording the uncertainties related to income per capita decline and to social and political insecurity. Figures and considerations reported in this paragraph are based on their report on year 2019. According to Coop Italia, on average, Italians are more pessimistic than their European neighbors, but more aware of what is happening around them. Their biggest concern is the climate emergency. Indeed, the Italian population has already been practicing a series of good green habits such as recycling, purchasing green products, and using low energy impact appliances. These good habits are also present in the population's diet. The formula 'quick, protein and sustainable' sums up commonly sought trend regarding diets (Coop Italia, 2021). However, in practice Italians' preferences were oriented toward non sustainable food. This is only one contradiction found in interviewing the general population. For example, meat per capita consumption increased by 3,5% compared to 2018. The interest in plant substitutes is decreasing (-5%), despite their popularity is booming worldwide. Nonetheless, the interest for the quality of products is still fundamental in Italian culture. The demand for information ascertaining the quality of the product translated into a focus of Italian food companies on displaying labels showing 100% Made in Italy certification and origin specifications. Fresh product spending is increasing, with vegetables leading the rise (+ 8%). Nevertheless, Italians are increasingly buying ready meals and instant food from the supermarket (+ 9.3%). Among the ready-to-eat food, the most popular is sushi (42%). This is also a consequence of home cooking becoming less of a cultural habit for Italians. On average, only 37 minutes are dedicated every day to cooking. Some other conflicting data presented in the report concerned beverages. On the one hand, the consumption of soft drinks was decreasing, on the other hand, the consumption of flavored waters was increasing. Among sparkling wines, prosecco and spumante are the most common choices. Beer consumption is increasing.

The use of food delivery services is increasing – with 26% of Italians making constant use of it – together with the growth in expenditure for non-domestic consumption. Breakfast and quick snack stops are the most frequent eating out occasions, rather than long meals at the restaurant.

While these trends are evaluated for Italy as a whole, it is important to note the considerable consumption gap between the North and South of the Peninsula. Therefore, discount stores were the favorite shopping option in the South of Italy in 2019 (Coop Italia, 2021).

1.2 Food consumption and the impact of Covid-19

The following two paragraphs examine the impact of Covid-19 on food consumption and lifestyle in 2020, from the lockdown period throughout the year. Compared to 2019, food consumption fell by 10.1%. According to Istat data, in 2020, the total calculated consumption decreased to 250 billion euros, compared to 250.4 billion in 2019 (Repubblica, 2021).

1.2.1 Food consumption habits in 2020

The national lockdown in 2020 had a big impact and brought both positive and negative implications on food consumption. CREA, a governmental research institute dedicated to agri-food chains, recorded Covid-19 effects on Italian population habits in the period between March 8th and May 4th, 2020. In these months, almost half of their sample (47%) increased their food expenditure to have enough stocks to face sudden tightening of anti-contagion measures. The number of consumers planning their purchases carefully also increased (45%). This is probably due to a common willingness to reduce time spent indoors in the supermarket and therefore the risk of contagion. The only increasing trend for food consumption was due to families spending more on food to be eaten at home (+3.3%). However, this positive trend could not offset the reduction on outside home spending (Crepaldi, 2021). In fact, the collapse of the horeca channels had a strong impact on total food expenditure since eating out fell by 35%, from 85 billion to 55 billion euros. The lower consumption of the horeca sector had an overwhelming impact on many sectors of the Made in Italy agri-food industry. The amount of unsold food products during this period has an estimated value of about 11.5 billion euros (Qds, 2021).

Eating habits during this specific time frame were also impacted. The general population followed part of the advice on healthy eating and a balanced diet, the purchase of fruit, vegetables, wholegrain products and legumes increased, while fat such as butter and margarine decreased. A higher consumption of water was registered too. Besides all the positive benefits, other parts of Italians' diet were negatively impacted, with a registered increase in sales of red-meat, cakes and sweets, and a lower consumption of fish. The results are confirmed also by the ISMEA report which found higher spending on processed meat and comfort food (CREA, 2020) (ISMEA, 2020). In general, all categories of food consumption increased, with fruit and vegetables in the lead. The use of flour in cooking also grew in Europe, as well as the consumption of dairy products, poultry, sweets, chocolate, and snacks. In many countries, families spent more time preparing foods from scratch as a consequence of being forced to stay at home. Consequently, the number of ready meals normally purchased and the habit of having a snack between meals decreased for about a third of consumers.

The attention for product packaging also increased. However, there is contrasting information regarding this trend. In fact, 33% of consumers said they prefer pre-packaged foods more than usual for hygiene reasons. On the other hand, 29% tried to buy more products in bulk or in 100% recyclable or biodegradable packaging for environmental reasons. (Crepaldi, 2021)

Moreover, the economic difficulties encountered by many European consumers affected their consumption behavior. As 34% experienced a decrease in income, a tendency to buy cheaper foods was registered, and a corresponding decline in purchase of more expensive products (Crepaldi, 2021). This is in line with the results of similar studies on the Italian population. Another trend in consumer habits observed all over Europe concerns the way in which shopping was done. The use of online purchases widely increased throughout Europe, both with home delivery and with collection at the point of sale (click and collect) (Crepaldi, 2021).

1.2.2 Lifestyle changes in 2020

The same report released from CREA also presents information on Covid-19 impact on lifestyle choices. Indeed, the imposed restrictions had major consequences mainly on men aged between 18 and 69. The reason is that this group among the whole Italian population radically changed their habits, or at least much more than others did. A higher number of men normally spends entire working days out of home. Restrictions put in place during the lockdown completely changed their routine.

Regarding physical activity, at least 35% of the sample constantly did some form of exercise. However, the frequency might not have been enough to offset the higher consumption of comfort and sweet food. The latter might be the reason why a part of the sample gained weight.

The results are in line with other research carried out in Italy. The scientific knowledge related to food consumption and to different kind of lifestyles of the population is enriched. These outcomes can be considered as a starting point to elaborate precious information to support consumer in such critical situations since as following healthy habits is extremely important for physical and mental health (CREA, 2020; Terzulli, 2021).

1.3 Italian consumers' spending and savings in 2020

The exceptional event of the national lockdown in Spring 2020 had huge consequences on Italians' spending and savings. The latest Istat report shows how the household consumption expenditure dropped by 10.9% in 2020, bringing the propensity to save to 15.8% compared to 8.2% in 2019 (Terzulli, 2021). The economic crisis caused by the Covid-19 pandemic led Italians to save more. To offset the consequences of the health crisis, the Italian government put in place some measures to balance the strong economic effects. The emergency measures implemented by the institutions managed in some way to mitigate the fall in disposable income of Italian families. Indeed, the rate fell by 2.8% in 2020, meaning a reduction in consumption of around 32 billion euros (Terzulli, 2021). This decline means a change in trend since the rate had been positively increasing since 2014. It seems that supporting measures and reduction in tax contributions overall helped in sustaining families, however, 2020 put to the test many of them. In some cases, Italians did not hesitate to cut back on food. The sharp decrease in food consumption was unexpected since the sector was the most resilient at the beginning of the pandemic. Indeed, food retail sales boomed just before the lockdown with people clearing out entire supermarkets. However, after almost a year, some families are forced to renounce basic necessities such as food. Compared to levels in February 2020, food sales are inferior in

February 2021 in large scale distribution (-6.1%), in small shops (-2.9%) and also in discount stores (-1.5%) (Terzulli, 2021).

1.4 Food consumption and home delivery services

After being disoriented in the first few weeks of the pandemic, many businesses decided to provide the delivery option, not to lose customers and to stay open. Others already did it habitually. All along 2020, the delivery continued to gain popularity and enhanced the trend toward digitalization also for the businesses in the food sector. Covid-19 made clear that the so called ‘smart’ is the modus vivendi all over the world nowadays. It allows us to be in touch with family even if far away, but also to order food on the phone or computer to have it delivered at home easily and safely. From the moment businesses understood that food delivery could have been a concrete support, there has been an increase in the request for activation of the service. Also, popular food brands exploited home delivery service directly, offering their specialties to customers (ANSA, 2020).

During the Covid-19 pandemic, Italian government decrees allowed restaurants to remain open by delivering meals to their customers. According to Fipe, the Italian Federation of Public Exercises, this service was helpful in supporting millions of people forced into their homes and the businesses in the sector which would have otherwise needed to close their premises. Moreover, restaurants were able to attract new customers through delivery platforms and this service prevented many businesses from closing permanently.

New regulation was introduced to ensure safety of workers in the sector and their customers. Assodelivery, the association that brings together the main delivery platforms in Italy (Deliveroo, Glovo, Just Eat, Social Food and Uber Eats), announced in 2020 the commitment on behalf of over 15000 business in the sector throughout Italy to continue to provide home delivery service in compliance with the regulations about health and hygiene requirements for both packaging and transport (ANSA, 2020).

Looking at Italians behaviors related to food delivery during the lockdown, the most important concern for the general population was health and safety – for those who order, for online ordering platforms, for all the businesses in the sector and for the riders making deliveries. A study by Osservatorio Just Eat, which studied the relationship of consumers with home delivery services during the pandemic, highlights how 65% of the sample regarded very important for the delivery man to be wearing mask and gloves. According to the same study by Osservatorio, out of the 34% of the sample which never used the delivery service before the Covid-19 pandemic, 60% declared they never felt the need. However, during the national lockdown, due to the impossibility to go and pick up food, 44% turned to the home delivery service. Other reasons why people decided to use it were the lack of willingness to cook (31%), the idea of having a different lunch or dinner (29%), and the desire to indulge in something delicious to eat (22%) (Just Eat, 2020) (ANSA, 2020).

Besides, the combined use of digital technology and home delivery of food continued to grow in 2020, especially in relation to digital payments. Among those who ordered delivery at home in this period, 60% paid contactless. The electronic payment (57%) is deemed equally important (ANSA, 2020). Other data collected by Ansa show that men use digital payments more (84%), while women spend more and have increased the use of digital payments with Covid-19, from 67% to 82% of the sample adopting this technology. The average spending increased slightly for both categories but remained higher for women. The research also shows that while choosing delivery provider, the payment options available are the most important factor for over 60% of the sample, followed by the ease of use of the app (52%) and food packaging offered (ANSA, 2020). The use of digital tools is not only growing on the side of customers but also for businesses in the sector that are discovering innovative ways of using digital tools. For example, by increasing their presence on social networks, many managed to increase the number of online purchases. Nowadays, it is quite common for restaurants to offer food purchases through a link on social networks such as Instagram (ANSA, 2020).

1.5 Food consumption forecasted trends after Covid-19

1.5.1 Overall view on trends

The virus accelerated many transformations already in place and even if some of the lockdown trends will remain, others will slowly be reversed. After analyzing the Covid-19 impact on food spending and on purchasing choices, it is interesting to try to shed a light on which trends will remain or not in the near future. To this purpose McKinsey, together with Eurocommerce, prepared a report *The path forward for European grocery retailers*. Based on the answer of 10000 European consumers and of 50 managers working in the sector, the study presents the most important trends that will characterize the grocery and food retail world.

First of all, the progressive loosening of restrictive measures will move part of consumption toward the horeca channels. So, a decline in retail food spending is expected within 2021. In the 2021 scenario, the most critical points, according to the managers of the food supply chain, are, above all, the threat of the economic crisis and its negative effects on final demand (27% of them expects a drop in purchases of food or consumer products). With the gradual end of the health emergency, a 2.6% decline in the turnover of the physical network of large-scale distribution is expected (-1.6% more if e-commerce is also considered). An increase is expected only for discount stores (+ 1.8%) and pharmacies (+ 2.9%), contrary to the general trend in the physical network. The South of Italy is certainly in greater difficulty, while the losses of the Northern regions will be less dramatic. The North can count on the strong growth of e-commerce concentrated in those territories. Indeed, after the e-commerce boom and the first online shopping experiences for groceries, more than half Italians are now more willing to buy via internet. Hence, this new trend will inevitably have effects on purchasing experiences in physical stores. Now some business formats are less appealing than in the past, for instance supermarkets and discount stores are showing lower growth rates.

E-commerce itself represents one of the dilemmas of the operators in the supply chain. For food managers it represents both a threat (for 60%) and an opportunity (40%). On one hand, it will experience a strong growth next year (+62% the Nielsen estimate of increase in online sales 2021) and it will give the opportunity to serve consumers better. On the other hand, the is a risk of cannibalization of the existing physical network and the addition of further costs to the sector's already rather precarious budget balances (Coop, 2020).

Italians are also concerned on prices. As one of the paramount factors in their purchasing choices, it influences where and what they will buy. The general tendency will be to save money or to find alternative ways to get the best promotions. However, consumers are more and more demanding. Indeed, they are looking for the cheapest options in the market, but they do not want to renounce the highest quality available. Additionally, healthy, sustainable and organic products are the main preferences. Normally, this particular kind of products are chosen because they come in protective sustainable packages. Italians proved to be more sensitive on both the health and sustainability issue. Another trend will be to support the national (regional and local) production rather than buying imported products. Italians are among the populations that are mostly fond of their own national food production and less interested in international cuisine. Moreover, while many discovered their passion for cooking during lockdown, managers are pushing on convenience food and ready-to-eat products. After a whole year, consumers are now tired of spending time in their kitchens and will probably opt for food with the least preparation involved.

The last phenomenon that will probably remain in the long-term is the progressive use of technology, both to increase efficiency and competitiveness. At the moment, the investments dedicated to process automations are growing slowly. Hence, adopting the most performant solutions and exploiting information technology is important for companies to be distinguished and to gain competitive advantage over others. Data management will be another key tool to create additional sales, since it offers customized solutions for clients and deep analysis on all the supply chain (McKinsey, 2021).

1.5.2 Consumption away from home trends

After a brief analysis of trends that will characterize consumers' shopping for food, the focus is on how eating out consumption will change after Covid-19. TradeLab, an analysis and management consulting company, observed how in the first week of April 2020 restaurants had to face a widespread fear of contagion and concern for food safety. Despite the general feeling of fear, 52% of people interviewed – especially a significant percentage of young people under the age of 25 (66%) – said that, after the health crisis, they would go back to bars and restaurants as they used to do before. Instead, 82% said they would have return only with total safety guaranteed. Almost 45% will rely on the trust and personal knowledge of the owner or staff and for this reason, around 70% of Italians will return to known places. On the contrary, 20% declare themselves willing to try new places, as long as safety regulations are respected (Tarana, 2021). Therefore, reassuring customers is a fundamental aspect on which managers will have to work from now on. With 75% of the sample saying they will pay more attention to gatherings and crowded places, staff should focus on managing the flow of people and avoid crowded situations, even perceived ones (Tarana, 2021). Besides, Italians will pay more attention to cleanliness, so it will be necessary to improve the hygiene standard level. Due to Covid-19 contagion concerns, people are sensitive to compliance with regulations, and they expect businesses to take this into account by monitoring and making it visible to the customer. In addition to the limited number of people inside the premises, the other aspect that will make customers feel more relaxed will be making sure that all customers are in good health.

On another level, around 79% of food delivery users during the Coronavirus emergency period said they intend to continue ordering online even when restaurants will be opened again. However, only half intends to maintain the habit in the future and after the ease of lockdown measures, 30% will use the service only when needed (Tarana, 2021). Meanwhile the offer of delivery option continues to grow, with many businesses that were not yet equipped with the service now ready to take up the challenge, even with autonomous delivery services, independent of the current available platforms. In any case, it is highly unlikely that food delivery services will represent the main source of turnover in the near future. It will be interesting to see whether this phenomenon will remain a short-term tactical move in response to the health emergency, or whether it will turn into a long-term strategy that will change the business models and places of consumption.

1.5.3 Social trends

From the geographic and human consumer perspectives, it is reasonable to assume that the willingness to frequent bars and restaurants will also depend on the health emergency intensity experienced by the territories and their own residents. For example, it is no coincidence that in Rome there is a higher share (31%), compared to Milan (18%), of people that intend returning to go as soon as possible. Looking instead at generations, millennials show more confidence in returning to normal habits as soon as possible, also regarding consumption outside home. Throughout Italy, 2 out of 10 millennials want to return to normal social interactions, compared to the share of 1 in 10 recorded for the other generational categories. However, a common trend shared by everyone is that the next period will be characterized by a more intimate dimension. The closest friends are the first people Italians think of (60%) when imagining who to go out again with at the bar or restaurant, not big events or social evenings (ANSA, 2020). There is an interesting relationship between the concern for the current economic situation and the perceived need for consumption occasions outside home. According to ANSA, in fact, even if the consumers are concerned of their personal economic situation, 6 out of 10 would not renounce consumption outside home. There are mainly three different categories. The first one, around 39%, is really worried for their financial situation and declared themselves willing or forced to give up meals outside the home. The second one is quite worried but, at the moment, does not intend to reduce the consumption outside the home. The last and most optimistic category, 20% of the sample, does not feel worried at all and is willing to go back to their previous habits as soon as possible (ANSA, 2020).

Chapter 2 – The consumption of gelato

2.1 What is gelato, its history and origins

Gelato is a sweet food known worldwide. Its basic ingredients are sugar, milk or cream, and eggs. Sometimes other ingredients such as chocolate, coffee, liqueurs, essences, or fruit juices are added and then poured into a special machine. Then, the mix is brought to freezing temperature and continuously stirred in order to become a consistent and homogeneous paste known as ice cream (Treccani, 2021).

As for any other food invention loved all over the world, there are funny or mysterious stories on who created it. In the case of the ice-cream, some tales date it back to Isaac and Abram in the Holy Bible, others to the Romans. However, according to the most credited version, gelato as it is known today was first made during the XIV century. Italy, in particular the city of Florence, claims it as its own invention by architect Bernardo Buontalenti. At that time, the main ingredients he used were milk, cream and eggs. Soon ice-cream was exported abroad. Francesco Procopio dei Coltelli, a gentleman from Palermo moved at the court of the Sun King in Paris. There he decided to open the first combination of coffee and ice-cream parlor in history, which is still known as 'Café Procope'. However, gelato's modern history began with Filippo Lenzi, who opened the first Italian ice-cream parlor in New York, at the end of the XVIII century. The upcoming technological developments started to be adopted also in this sector. The industrialized mass production of ice-cream became another Italian excellence, alongside artisanal production. Traditionally, artisanal ice-cream was served and sold in cones and cups. However, many other types of gelato were introduced following mass production. The first industrial stick ice-cream was produced in Italy in 1948. Its name was Mottarello and its flavor was 'fiordilatte' (an Italian word for cream gelato). Immediately after, during the 50s, the industrial gelato market introduced waffle cones and created the famous Cornetto. In the 70s, the diffusion of the first industrial cup for families exploded, together with the first bicolored gelato sandwich known as Ringo. During the rest of the 20th Century, eating both artisanal and industrial ice-cream became a common habit in many countries, and it is now recognized as the most loved dairy-based dessert in the world (Istituto Italiano del Gelato, 2021).

2.2 Diffusion of gelato and its current geography

As previously mentioned, nowadays people eat ice-cream all over the world. Soft and creamy, frozen yoghurt, sorbet, unconventional flavors – gelato comes in so many forms it can accommodate anyone's taste (Chepkemoi, 2020). The worldwide turnover generated by the sales of artisanal ice cream was estimated to be approximately 16 billion euros in 2018 (+ 6% compared to 2017) (Acomag, et al., 2020). Ice-cream parlors are spread in 76 countries, in every continent. Europe is the first consumer. The main European markets per consumption and number of ice-cream shops are of course Italy, then Germany, Spain and Poland. Austria, France, Belgium and Denmark's populations also like gelato. Italy maintains the world's leading position both in terms of number of sales points and turnover, with gelato sales generating more or less 2.5 billion euros in 2018, almost 30% of the European market (Acomag, et al., 2020). In the same year, Spain (+4%) and Poland (+6%) recorded the best growth rates. Outside Europe the main markets for gelato are Japan, Argentina, the United States and all the Far Eastern countries. In these countries, a strong presence of Italian immigrants favored the diffusion of artisanal ice-cream production. In the last few years, gelato's diffusion has been moving toward South-East Asia. China, Korea, Indonesia, Malaysia, Vietnam and also Australia recorded the highest growth rates and seem to be the ones with the best potential for development (Gambero Rosso, 2019). Consumption in developing countries, such as Brazil and India, has been increasing too. It is estimated that the global ice-cream market – both artisanal and packaged – will reach $89 billion by 2022 (Chepkemoi, 2020). The sector is expected to prosper because of an increasing demand for sweet treats and growing average income. Moreover, trends are changing among consumers. There is a big growth in low fat and organic options to satisfy these new requirements. Thus, manufacturers are trying to focus on offering products with better nutritional benefits.

2.3 The sector in numbers

Gelato surely is a sort of gastronomic monument of Italy. Ice-cream represents an excellence for Italy, among all the goods sold in the food and beverage sector. Compared to other products, its consumption was not influenced by the 2018 decrease in general consumption. On the contrary, ice-cream consumption rose on average by 4% every year (Gambero Rosso, 2019). The reason is mainly the accessible cost for customers, the speed of consumption and the social ritual associated with its consumption. As one of the most loved sweet foods, it is estimated that the average Italian eats around 7 to 8 kilos of ice-cream per year. The gelaterias around Italy are 39000, of which 10000 serve ice-cream exclusively while 29000 are also bars and pastry shops selling a wider range of foods (Gambero Rosso, 2019). According to CGIA, the current number of companies that are producing and selling artisanal gelato in Italy is 15598. These companies can be divided into three categories:

- the first category, which makes up for of 45%, comprises of artisanal gelato shops with gelato production as their core business (6998);
- the second category of 20% includes bars whose gelato production accounts for at least half of their turnover (3065);
- the third category of 35% are bars and pastry shops also offering their own made gelato among other things (5526) (CGIA, 2020).

There is also a large number of parlors selling artisan ice cream all over Europe. There are currently 65000 shops that sell gelato in Europe – after Italy, the highest number of parlors are in Germany (9000), Spain (2200), Poland (2000), England (1100) and Austria (900), followed by Greece (680) and France (450) (Acomag, et al., 2020). Other 43000 parlors are located in non-European countries – therefore, overall there are 108000 parlors worldwide, often owned by Italians. In Europe alone, ice-cream sales reached 9 billion euros in 2018 (Gambero Rosso, 2019). The total number of employees working in the sector was 315000 and business in Europe equals to about 60% of the overall global market in the same year. (Acomag et all, 2020). As mentioned before, the global turnover coming from sales of artisan ice cream is worth billion euros and it will continue to grow in the upcoming years.

The impact of gelato consumption on the agri-food market is significant. On the one hand, Italy is the world leader for production of ingredients and semi-finished products used in the preparation of gelato – bases, fresh fruit concentrates, nut pastes (hazelnuts, pistachios, and others), but also fresh ingredients. In 2018, 250000 tons of milk, 70000 of sugar, 23 of fresh fruit and 32 of other ingredients (such as Piemonte hazelnuts, Sicilian almonds or Sorrento's lemons) were used exclusively for ice-cream production (Acomag, et al., 2020). On the other hand, Italy is also the world leader in the production of gelato making machines, display cases and complete furnishing for ice-cream parlors. The niche market of ice-cream machines includes 13 Italian companies that control 90% of the global market and reached 250 million euros turnover in 2018 (Acomag, et al., 2020). A large share of turnover is made up by exports. The other niche markets of display cases and ice-cream parlor furnishings is also characterized by a strong Italian influence. With more than 65 companies, the total Italian turnover in this market is 1.8 billion euros. This big figure grew with exports growing from 10% to almost 60% during the last few years until 2018 (Gambero Rosso, 2019).

2.4 Packaged and artisanal ice-cream consumption

This paragraph will talk about the findings of the Institute of Italian ice-cream, that, in collaboration with Eurisko, carried out a research on tendencies of out of home consumption of gelato. All data presented in the following lines is based on the results they found in their study. According to the Institute, ice-cream is youthful, democratic, and increasingly irresistible – Italians cannot give it up. It is so deeply rooted in eating habits that the heated dispute between the supporters of packaged ice cream and those of artisanal ice cream is over – about 98% of Italian consumers buy both types, sometimes preferring one, sometimes the other, according to their needs and mood.

While Italians think about gelato as some food typically consumed during the summer season, in reality the majority of Italians share the passion for gelato independently from the period of the year. In fact, 4 out of 10 Italians consume ice-cream away from home even during winter months. Sitting at a bar table with friends, walking in the city or at the beach under a sunshade, the ice-cream is always the best idea for a refreshing break. According to the research made by the Italian institute of Gelato, together with Eurisko, 23 million Italians consume gelato away from home in the summer (56% of the total population), with an average of 20 cones or cups purchased during the entire season.

Regarding summer consumption, the favorite moment to eat gelato is as a break in the afternoon (62%). The second favorite moment is at night (40%) or after dinner as dessert (13%). Ice-cream is also considered as the perfect substitute for a meal during summer, according to 7% of Italians. The reasons to buy gelato when out of home are many. The first and most important is the willingness to eat together with someone else (61%). The second reason is to satisfy a sudden need (55%), together with the desire of having a break (53%) and to take a moment to refresh and cool off from summer heat (50%). Only 33% think about it as a pamper, as a reward to indulge in from time to time.
Eurisko and IGI discovered that 7 out of 10 Italians consume ice-cream out of home. Young people (25-34 years) and very young people (15-24 years) especially prefer to have it in places that are popular among them. In fact, gelato is loved by everyone, independently from their socio-economic situation. It is appreciated both in the cities' suburbs where 24% love it 'very much' compared to an average of 14%, but also in the cities' centers (18% vs 14%). In general, Italians eat packaged gelato mainly to satisfy the desire of something sweet and tasty (63%), to cool off (48%) and finally as a snack (29%). The elements affecting the choice of ice-cream to purchase away from home in the summer are several. The flavor or taste (62%) comes first, followed by the type of ice-cream (46%) and the brand (39%). Some Italians (14%) curiously look at the size of ice-cream. Other reasons are the direct request of children (11%) and the name of the ice cream (9%). Finally, considering nutritional characteristics, Italians consider ice cream a food suitable for all ages (40%). Moreover, it is deemed to be a tasty product (41%), refreshing (38%), delicious (36%), fresh (33%) and finally varied (31%). According to the Eurisko and IGI survey, on a total of more than 16 million people, about 6.5 million people (equal to 40% of total consumers of ice cream away from home) prefer packaged ice-cream and 9.7 million people prefer artisanal ice-cream (equal to 60% of total consumers of ice cream away from home). The latter are divided into two macro categories. On the one hand, one group that prefers branded ice-cream – almost 4 million Italians (between 25 and 34 years old) whose passion for this type of ice cream is about 2.5 times higher than the average (34% against 14%). This part normally consumes impulsively – to them, every moment is good to unwrap an ice cream. The reason why they eat ice-cream is to indulge

in a moment of relaxation (83% against an average of 56%), to satisfy a sudden desire (85% versus 55%), to give themselves a reward (75% versus 33%) and to appease hunger (42% versus 17%). Younger generations, made up by about 2.8 million people with the highest concentration of young and very young between 14 and 19 years old, mainly consume ice-cream to spend time with others (78% against an average 61%). Besides, since most of them are students, they also choose based on the most convenient quality-price ratio. Finally, they consider some organoleptic characteristics of packaged ice cream as attractive - it being fresh and tasty (Istituto del Gelato Italiano; Eurisko, 2011). It is interesting to note that from North to South of the Peninsula, there is a growing tendency for gelato shops to offer 'specialità della casa' that meet the expectations of different target of consumers - traditional, xenophile, naturalist, or vegan. According to Coldiretti, 94% of Italians usually eat artisanal ice-cream because of its taste and the quality of ingredients. The last Fipe research found that almost 7 out of 10 prefer cones to cups. In recent years, there has been a boom in artisanal ice-cream parlors that guarantee the origin of the raw ingredients from the stable to the cup – it being donkey, goat or buffalo milk. The attention to ingredients also fostered creativity in the choice of flavors, to enhance the Italian primacy in variety and quality of national agri-food production. Moreover, consumers regard ingredients' selection as important - zero-kilometer fruit and milk are preferred because they are coming from local producers. Hence, transportation is not required and the environmental impact of the gelato is reduced (Coldiretti, 2020).

2.5 Covid-19 impact on ice-cream consumption

In Italy ice-cream consumption generates 4.2 billion euros of average annual turnover (Coldiretti, 2020). According to Coldiretti, the artisanal ice-cream demand fell by 20% in summer 2020 and has been deeply affected by the pandemic. The consequences were mostly registered during the first semester of lockdown, when in Italy and in many parts of the world, consumers were forced to stay at home and therefore were not able to spend time in bars, restaurants, ice-cream shops and pastry shops. In addition, due to the imposed travel restrictions, local and international tourism, one of the most important factors for the success of the market, collapsed. In Italy, tourism numbers – both nationals and foreigners along the Peninsula – registered a shocking decrease of 10 million tourists for the first semester of 2020, compared to previous years.

The impact of the decrease in tourism on related industries, especially hospitality, was considerable. However, the downturn in tourism did not impact the renowned Italian quality of ingredients. Thanks to this, Italy managed to hold the world leadership in the production of artisanal ice-cream both in the number of stores and in turnover. On the one hand, the introduction of home delivery services partially offset the decline of in-shop sales. Artisanal ice-cream recorded the highest growth in sales for delivery orders, compared to other foods that are normally delivered to customers. On the other hand, the gradual easing of the restrictive measures before summer 2020 also helped the recovery in consumption.

Unfortunately, after the summer, the health emergency worsened again in Europe, where over 60% of worldwide artisanal ice-cream shops are located. In 2021, the situation in the continent continues to be quite variable – some countries' economies are still suffering from the negative effects of extended closures, some others have partially recovered. In Italy, the successful summer season of 2020 was not enough to balance the losses of the first half of the year. While Southern regions performed particularly well, with Puglia and Sicilia in the first positions with sales almost on the same levels or slightly higher compared to previous years, it was not the same in other areas. Large towns and the art cities registered the opposite performance. For the first time in decades, artisanal ice-cream experienced a downsizing of both sales and turnover, from 2.7 billion euro in 2018 to 1.8 billion euro at the end of 2020. In Europe, the turnover decreased from 9.6 billion euros in 2018 to 6 billion euros at the end of 2020. Even if the gelato sector has not historically been sensitive to economic crises, it has been severely tested by the Covid -19 pandemic (Il Gelato Artigianale, 2020).

2.6 Gelato and home delivery service

As previously mentioned, the home delivery service for artisanal ice-cream has been widely exploited due to Covid-19. Just Eat, a popular home delivery service provider, presented the results of its fourth study intended to find the new trends and habits of

Italians, the market and the performance of food and beverage sector. In 2020, their research *Observatory on the digital food delivery market in Italy and the impacts of the lockdown* investigated the effects of Covid-19in the sector. Just Eat, together with BVA Doxa, focused also on buyers' psychology, analyzing their choices and emotions when they order. According to the results, the most ordered foods remain pizza, hamburgers and sushi, however ice-cream is among the top positions with the highest growth in orders number (+230%). Some interesting results found that the most common emotion in the ordering moment is feeling happy for 62% of interviewees and feeling relaxed for 96% of them (Just Eat, 2020).
Among the cities in Italy, Firenze (+ 600%), Padova (+ 400%) and Genova (+ 218%) ice-cream delivery orders boomed. Another important note to underline is how digital food delivery continues to grow especially outside large cities, in those between 100,000 and 200,000 inhabitants and in municipalities with less than 50,000 inhabitants. In fact, in the latter, there is a greater growth in supply and in demand, with an important increase in orders. There was also an increase in the use of digital technology for digital payments, preferred by new users (+ 36%) (Il Gelato Artigianale, 2020).

Chapter 3 – Descriptive analysis of the sample

Following the analysis on ice-cream consumption, this chapter will present the study carried out as part of Ca'Foscari laboratory's research activities on food behavioral consumption. The next paragraphs will present the research question, the research methods, the questionnaire, and the analysis of data collected from the sample.

3.1 The research question

From March to May 2020, Italy experienced the first national lockdown in its history due to the Covid-19 outbreak. Nowadays, after almost a year, the spread of contagion has not stopped. It was clear that the virus and its consequences were not going to disappear soon. So, business activities had to implement several solutions to comply with governmental restrictions and to adapt to changes in consumers' consumption. The aim of the research is to analyze the change in dynamics of gelato's behavioral consumption due to the impact of Covid-19.

How strong was the impact of Covid-19 on food consumption? And in particular, how strong was the impact of Covid-19 on gelato consumption? Were these changes in consumption determined by the pandemic or were these trends already developing in the market? How does the economic crisis brought by the pandemic influence the gelato consumption? In summary, which changes characterized the gelato consumption in 2020? The purpose of this research is to answer to all of these questions through the analysis of results obtained from the administration of a questionnaire. The focus of the analysis is to find which were the most important factors that influenced the gelato consumption during the last year. Moreover, to better understand the connection among the variables, a bivariate analysis was carried out. The latter allows to evaluate connections between variables and to observe if they are dependent or not. In this case, the demographic variables were related to the list of factors that were assessed throughout the questionnaire. Eventually, by performing a cluster analysis, all respondents' similar preferences were grouped into clusters with specific characteristics and consumption behavior. While the results will allow a comparison with previous trends of consumption, the most important part of the analysis are the findings on the consequences of lockdown restrictions and Covid-19 on behavioral consumption habits.

3.2 Research methods: the questionnaire

The Agri-Food Management and Innovation Lab of Ca'Foscari University conducts research on food consumption behaviors. The laboratory's attention was raised by changes in consumption determined by Covid-19 in Italy. For this reason, the researchers prepared the questionnaire *Consumption of Gelato and the Effect of the Covid-19 Pandemic*. The questionnaire investigates the changes in ice-cream consumptions caused by lockdown restrictions and, in general, by the pandemic.
The questionnaire's structure is divided into several parts to allow a comparison among consumption habits and trends before and after Covid-19. Respondents had to answer referring to their preferences in 2019 and 2020 gelato's season. The questionnaire's sections are six.

The *first section* investigates food distribution channels the respondents got their supplies from during the national lockdown and on choices for post-lockdown consumption occasions.
The *second section* concerns ice-cream consumption. This part of the questionnaire is the most relevant for the research purpose. The questions of the questionnaire collected data about several topics. First of all, the results show frequencies of consumption during the summer season in 2019 and 2020 and thus, allow a comparison among differences in level of consumption with and without the impact of the pandemic. Besides, the data presents preferences of gelato types consumed at and away from home in 2019. The trends explain whether consumers preferred a packaged ice-cream over artisanal gelato and take-away over eat-in ice-cream. The last part of this section lists all the factors that, according to this research, influence consumers on the choice among available options of gelato or gelato stores. In the questionnaire, the answers of respondents rated on a scale from 1 to 5 some factors, such as courtesy, variety of flavors, free-from alternatives. The whole list of all choice factors rated by respondents is reported later in this chapter (graph 3.9). The

aim is to understand their importance for consumers while making gelato consumption choices.
The *third section* evaluates trends during the lockdown period, in particular whether people consumed gelato or not. The results show that many people consumed gelato in the period from March to May, even if this is not high gelato season traditionally.
The *fourth section* observes delivery services during the pandemic. Due to the national lockdown, the whole population was not allowed to move from home and the commercial services, including gelato stores, had to adopt delivery services. The continuous changes in regulation, regarding food services, have forced many businesses to adapt and update their distribution channels to survive. Respondents were asked in the questionnaire if they took advantage or not of delivery services. Whether the answer was yes or no, they also had to provide reasons for their choices. Indeed, the Covid-19 pandemic enhanced the trend of online services, that are now common in big cities as well as in small villages.
The *fifth section* brings together the same list of factors encountered in the second section. Respondents rated them again considering how their consumption experience changed from March to May, 2020. The aim was to consider which behavioral variations occurred during the pandemic. The last questions are about lifestyle changes considered in relation to the Covid-19 impact on personal habits. In view of an unprecedented situation, examples of behavioral changes reported by respondents were buying more from local vendors or in small local shops, changes in eating habits including starting a diet, and starting or increasing physical activity. Nonetheless, other respondents experienced the opposite trends, including a more sedentary life and worse dietary choices.
The *last section* concerns demographic data. This information is usually collected from respondents in order to allow a better study on behavioral consumption of the sample in respect of notions about age, gender and origin.

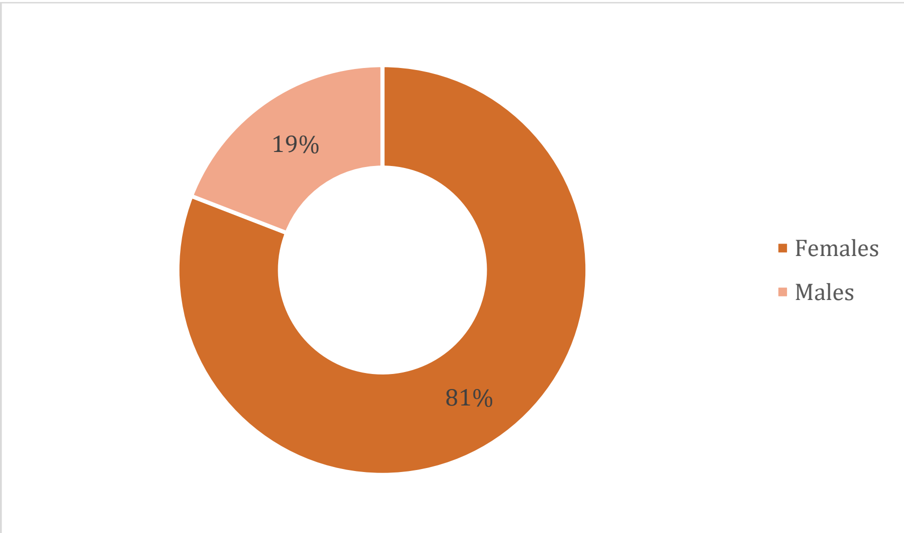
Data collection was carried out in the form of a questionnaire which was randomly administered from July 27th up to September 7th, 2020. Respondents were asked to reflect on their behavioral consumption during the lockdown period. However, at the time of the data collection, restrictions had been relaxed and consumption followed more or less normal dynamics. Therefore, the research will be useful to explain changes in consumer behavior and in ice-cream consumption for both the short- and the medium-term effects of the Covid-19 pandemic.

3.3 The sample

It is important to specify that, from now on, all the reported figures are only and exclusively part of the analysis and the elaborations of data collected from the questionnaire. From the administration of the questionnaire, the total quantity of answers was 2843. Several manipulations were necessary to clean the dataset and to eliminate not significant or not defined data. Answers of individuals that did not consume ice-cream were not useful for the research, and thus, not considered. Other criteria were taken into account and led to the removal of the related data. The final number of considered answers is 2511.

The sample is strongly characterized by a female component, with 2031 female respondents (81%) and 480 male respondents (19%).

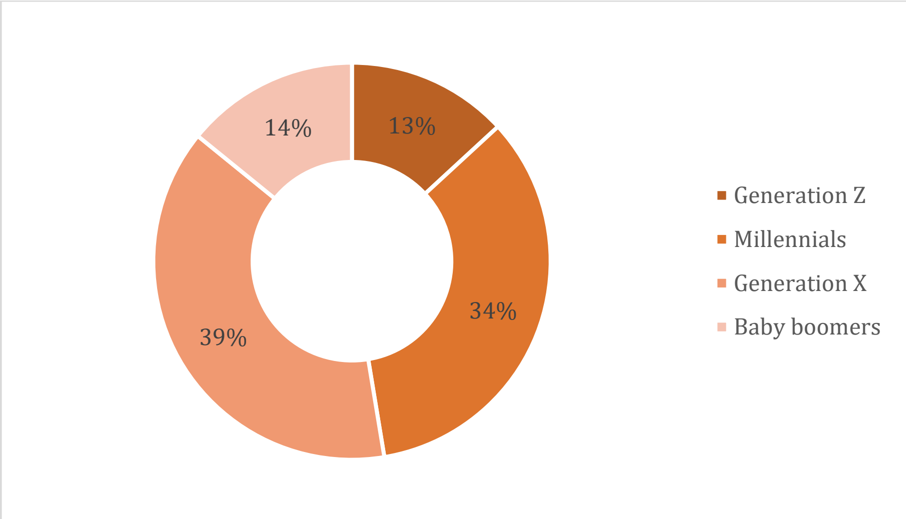
Graph 3.1: The sample by gender



Source: The questionnaire, 2020

Considering the age of respondents, the sample was divided into four different categories. Generation Z whose age is less than 25 years, millennials – between 25 and 40 years of age, Generation X – between 41 and 55 years old, and baby boomers – over 55 years old. Since the questionnaire was administered in 2020, the respondents were consequently classified as: 330 Generation Z (13%), 860 millennials (34%), 966 Generation X (39%) and 355 baby boomers (14%).

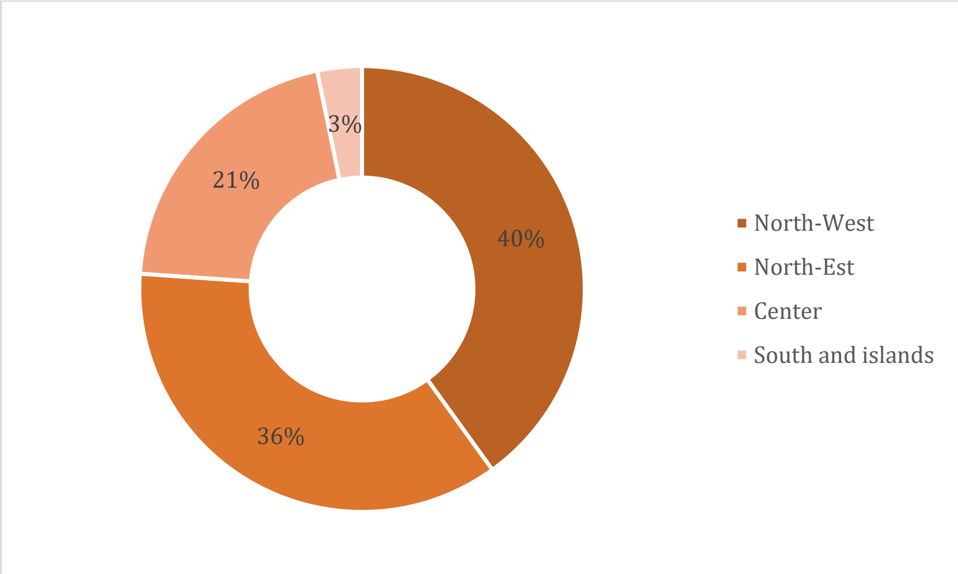
Graph 3.2: Sample by age



Source: The questionnaire, 2020

The graph 3.3 shows the area of residence of interviewees. In the research, answers were divided according to four different areas – North-West, North-East, Centre, and South that was considered together with islands, Sardegna and Sicilia. Respondents from the North-West were 1002 (40%), from North-East 902 (36%), from Centre 517 (21%), from South and the islands 81 (3%). Some answers came also from outside of Italy 9 (3%). Since the percentage was very low and the answers not relevant for the investigation, they were not taken into account. It is interesting to note that more than two thirds reside in northern Italy.

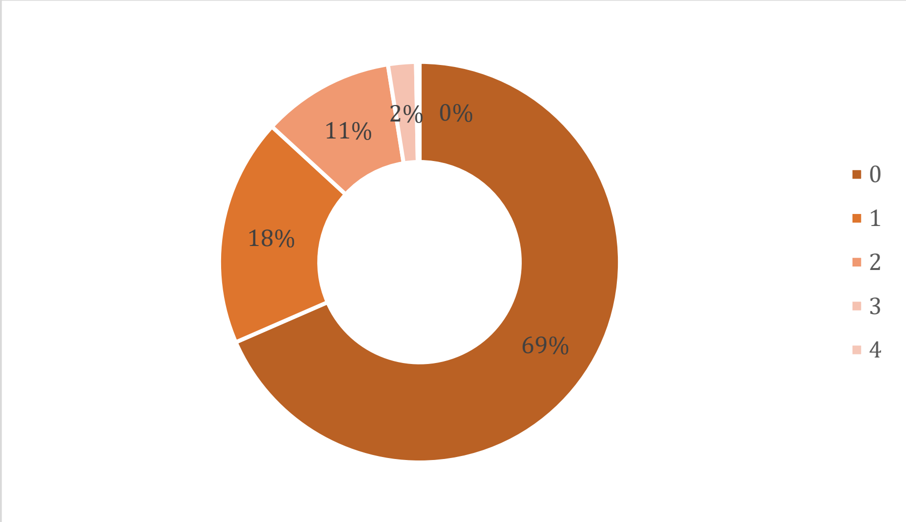
Graph 3.3: Sample by geography



Source: The questionnaire, 2020

The questionnaire's questions also investigated the family composition, enquiring on the number of children per family. The graph 3.4 shows that less than 15% of respondents are part of families in which there are two, three or more children. In particular, the respondents' percentage having four children is 0.3% (in the graph present as 0%). Only 18% are members of only child families. Almost 70% is represented by respondents with no child or being part of families with no children.

Graph 3.4: Sample by number of children



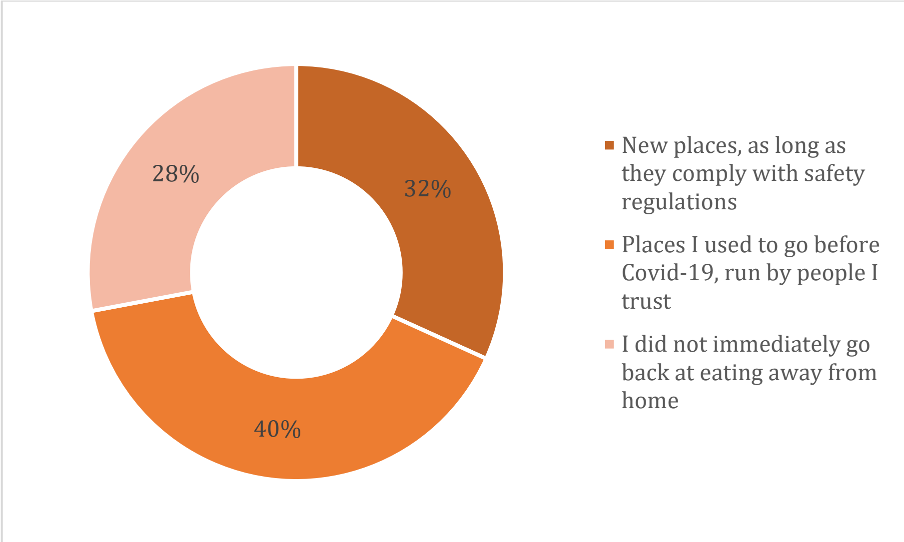
Source: The questionnaire, 2020

3.4 The description of the results

3.4.1 Distribution channels and post-lockdown consumption occasions

The first part of this sections is devoted to collecting information on the food distribution channels from which respondents shopped during the national lockdown. The available options identified were supermarket or hypermarket, online, small shops, local food production vendors, markets and home delivery. The question was a multiple choice one in order to give to respondents the possibility to answer with more than one option, if that was the case. The vast majority shopped at super or hypermarkets, around 81%. Just 6 persons got their supplies from food markets and 36 had their food shopping delivered at home. Many preferred to buy food from local production vendors (16%) and small shops (29%). A positive trend toward online shopping was favored by the fact that people feared catching the virus by physically shopping at the supermarket. Thus, almost 20% decided to exploit the possibility to do their shopping online. In the second part, the respondents were asked to declare which were their choices for post-lockdown consumption occasions. Some did not immediately go back to normal habits and preferred not to eat out (28%), meanwhile 40% chose places they used to go to before Covid-19, since they rely on and trust people that work there. However, 32% decided to try new places, as long as safety regulations were respected.

Graph 3.5: Post-lockdown consumption occasions

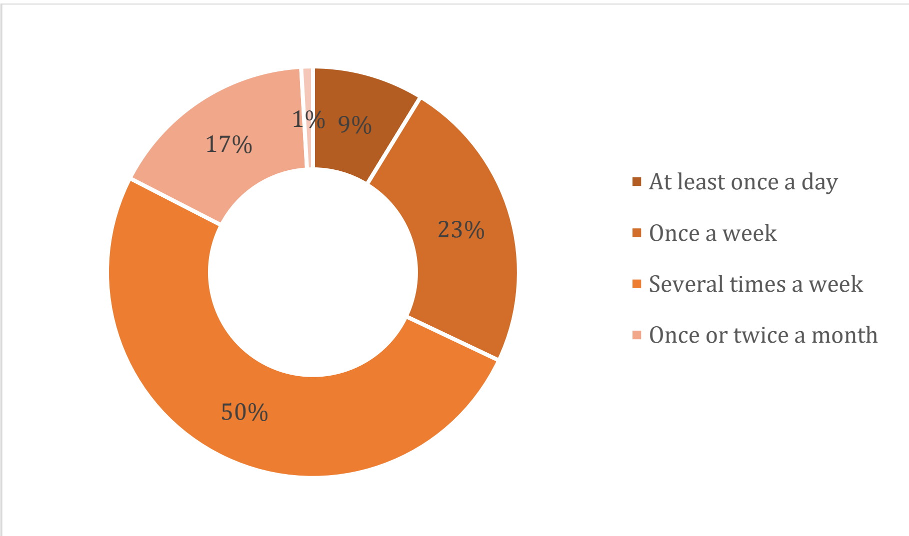


Source: The questionnaire, 2020

3.4.2 Pre-pandemic consumption trends and analysis on factors of choice

This section shows the frequency of consumption during the summer season in 2019. The majority of respondents, around 23%, consumed ice-cream once a week and 50%, consumed ice-cream more than once a week. Only 1% of interviewees did not consume ice-cream.

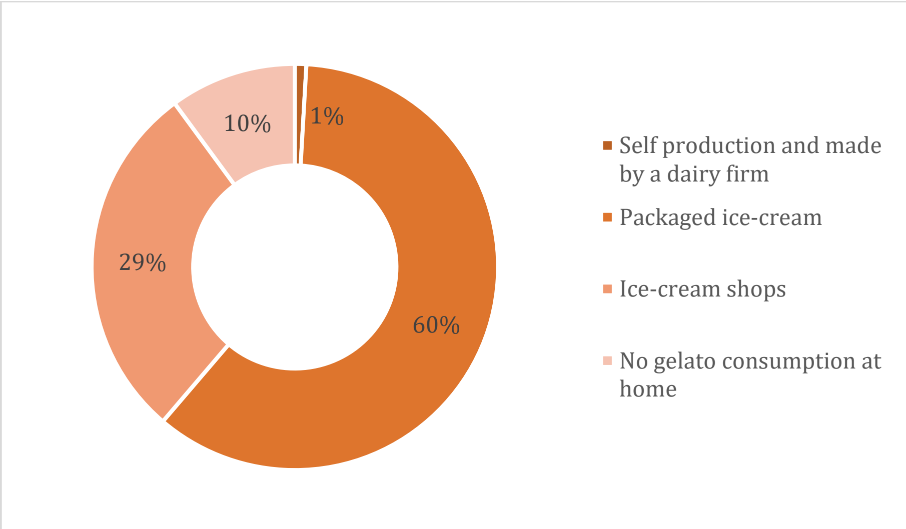
Graph 3.6: Sample by pre-pandemic frequency of consumption



Source: The questionnaire, 2020

Additionally, data presents preferences of gelato types consumed at and away from home during the summer of 2019. The following graph 3.7 shows how when consuming at home people preferred packaged ice-creams (around 60%). The respondents second choice was buying gelato at ice-cream shop to consume it later at home. A small percentage ate homemade or produced at a dairy firm gelato. Around 10% of the total amount of interviewed people did not consume ice-cream at home.

Graph 3.7: Ice-cream consumption at home

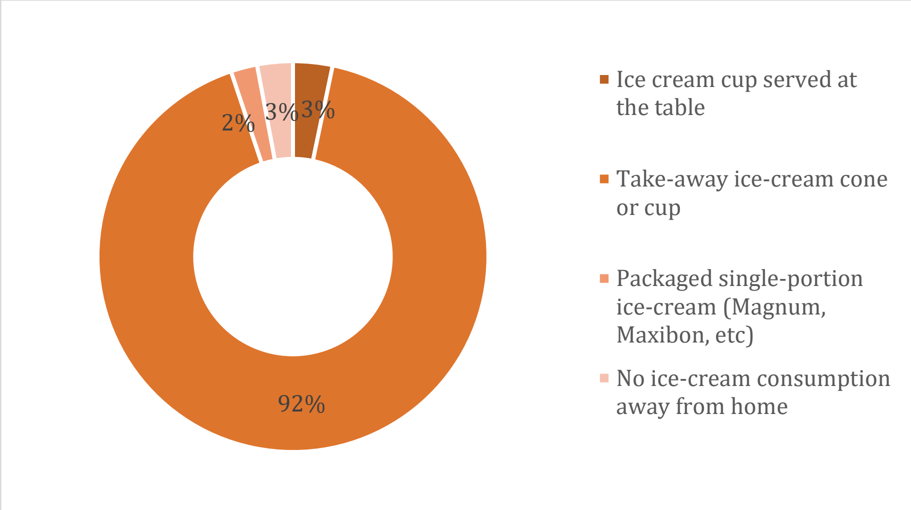


Source: The questionnaire, 2020

On the other hand, the answers collected demonstrate the opposite trends regarding the gelato consumption out of home. Almost all respondents went for take-away ice-cream cone or cup (92%), while a small percentage consumed packaged ice-cream. Just 3% chose to consume an ice-cream sundae served at the table of the ice-cream shop. Moreover, only 3% declared they do not consume ice-cream away from home.

Finally, the majority preferred to consume packaged ice-cream at home and to take away a cone or a cup if eating ice-cream out. In both cases, less than 10% of respondents did not consume ice-cream. In particular, the percentage of people not consuming gelato at home was higher than the percentage of people not consuming gelato out.

Graph 3.8: Ice-cream consumption away from home



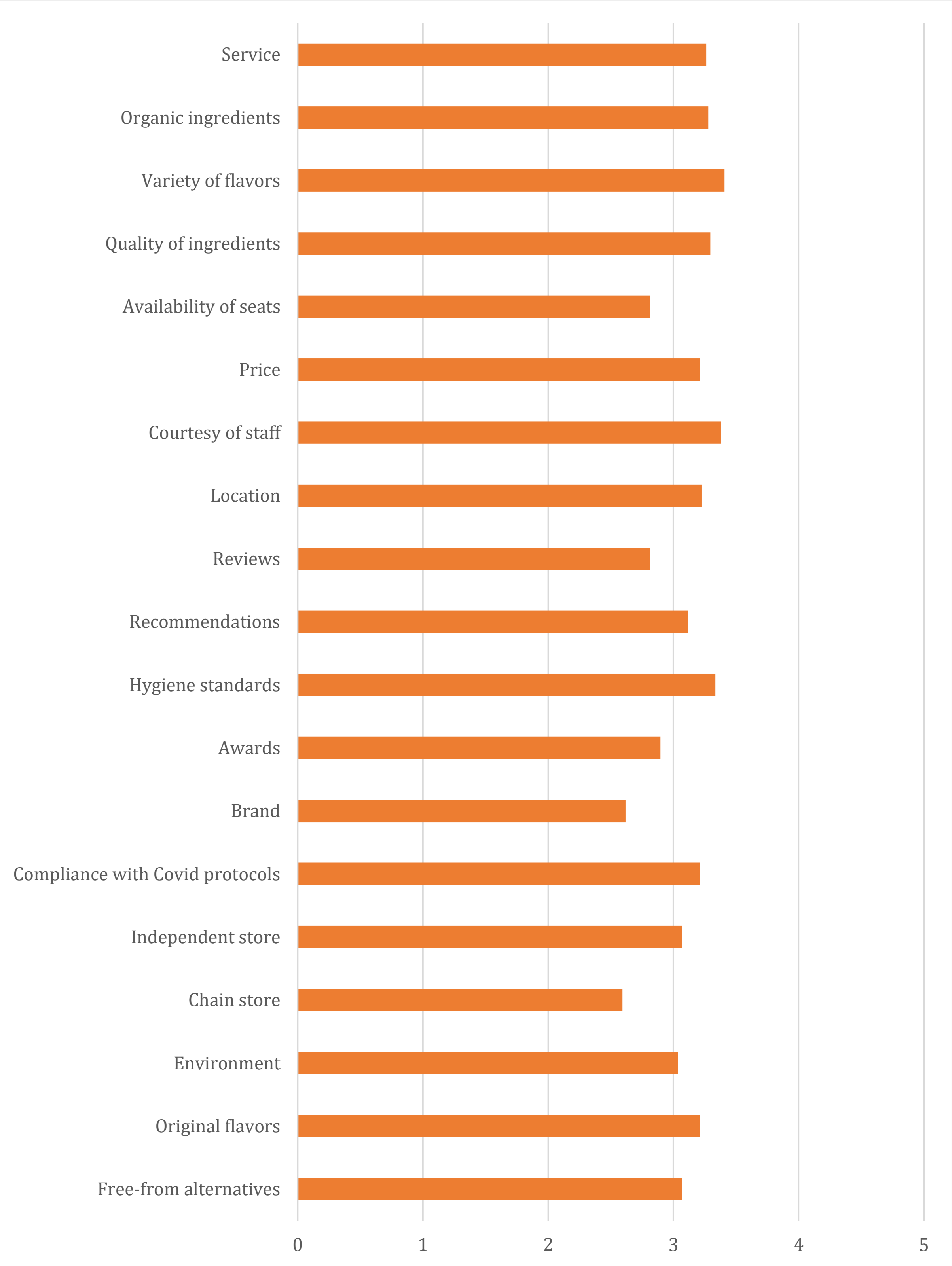
Source: The questionnaire, 2020

The last question about the places of consumption was about the preferences on which ice-cream shop to buy from. On this subject, 2029 declared that they went for the same ice-cream shop while only 482 persons said they did not have any preference about it.

In this section, in order to understand if summer ice-cream consumption is in some way correlated with people normally enjoying eating ice-cream on holiday in this season, there is also a question about ice-cream consumption on holiday. Around 58% of interviewees consumes more ice-cream on holiday. Therefore, more than half of the sample generally connects being on holiday to higher ice-cream consumption. This result can be taken as a reference and compared with the consumption trends on holidays pre-pandemic, since Covid-19 restrictions might have had an impact on the behavior of consumers regarding the purchase of gelato in summer 2020.

The last part of this section lists several factors that people generally consider when deciding which gelato shop to go to, either consciously or not. The sample rated each factor from 1 to 5, where 1 stands for "not important at all" and 5 stands for "very important" according to their own personal preferences. The graph 3.9 shows the mean value of all answers' ratings for each factor. The list of factors includes different aspects that consumers typically take into consideration in the decision-making process regarding both which type of ice-cream to pick and where to buy it from. Some examples are the variety of flavors, the quality of ingredients used to produce it, but also hygiene standards and compliance with Covid protocols. Moreover, other variables such as location, price and nature of business, whether the parlor is independent or part of a large chain, were considered. The factors that were deemed less important were availability of seats, reviews, awards, brand on packaged ice-cream and if the shop is part of a chain or not. The results show that the average consumer does not consider sitting while eating a gelato important. This is also supported by the fact that when eating out people prefer take-away cone and cups. About gelateria review, available feedback and rewards held by the establishment do not generally seem to be taken into consideration for several reasons. Moreover, according to respondents the ice-cream brand is not important, and this is valid also for gelato shops that carry chain names. All the other factors were observed to be important. The three most crucial ones are the variety of flavors, the courtesy of staff and the respect of hygiene standards, in this specific order. Costumers value the availability of a wide flavor selection, kind and friendly staff and clean and safe premises. Hence, respondents value factors that influence the quality of the service and the ice-cream they eat. Instead, they do not mind variables concerning the nature of the business or its name – as long as the ice-cream tastes good, they will buy it.

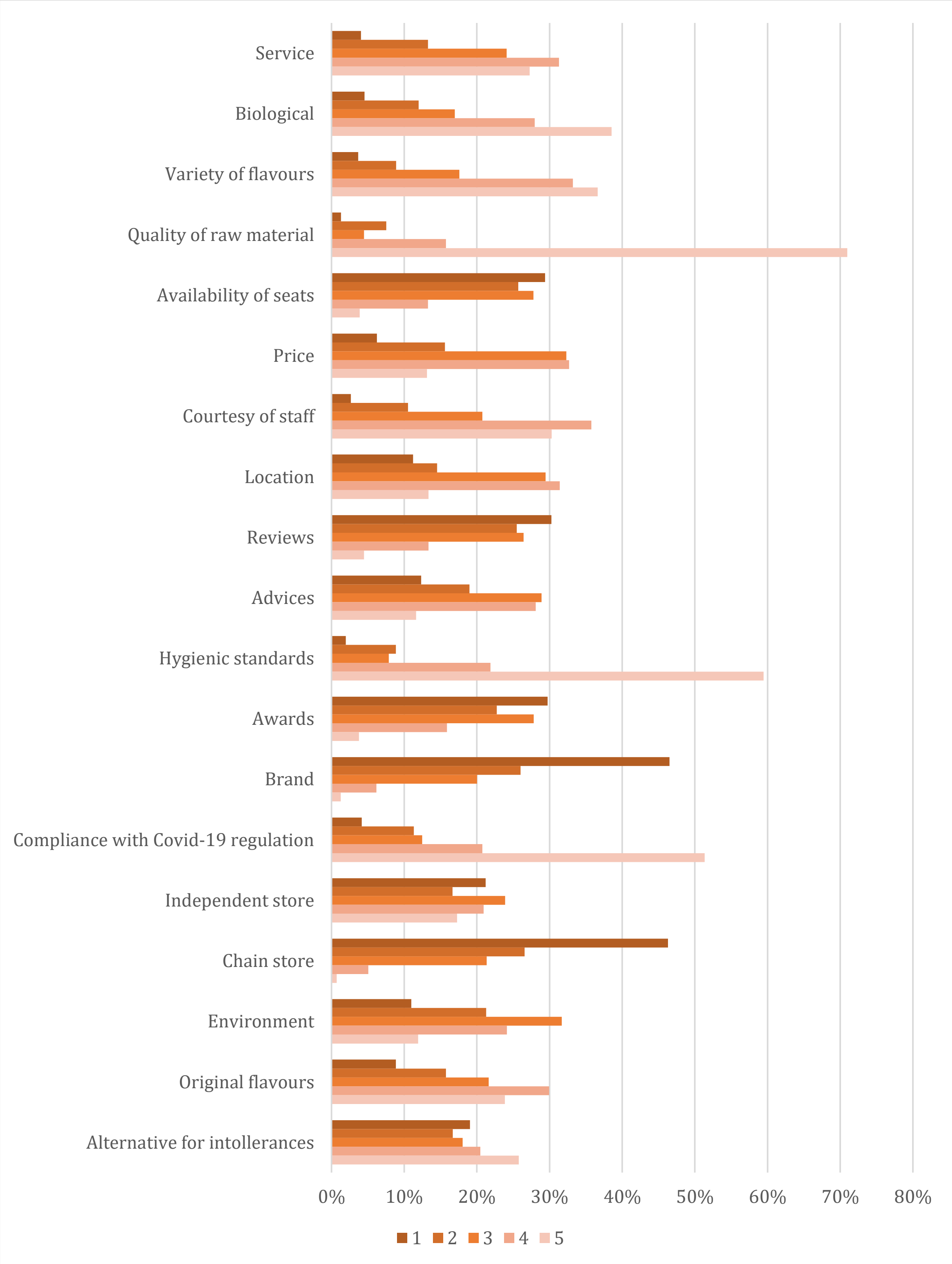
Graph 3.9: Factors that generally influence the ice-cream's choice



Source: The questionnaire, 2020

Graph 3.10 shows the number of answers for every single rate option, for each factor, in more detail. It is interesting to see which were the factors rated with the highest number of 5 and which with the highest number of 1. The highest number of 5, an answer deeming the factor as very important, is for quality of ingredients used to prepare gelato. Then, both respect of hygiene standards and Covid-19 regulations are considered as relevant – respectively second and third by highest number of 5 answers (around 60% of hygiene standards total ratings and more than 50% of Covid-19 regulations being respected total ratings). On the other hand, in line with previous findings, people do not deem important if the gelateria is a branded shop or it belongs to a chain of stores. These two factors were both rated with extremely low amount of 5 and extremely high amount of 1 answers. Additionally, lot of interviewees think that it is quite or very important – and therefore present great number of 4 and 5 ratings – to have a great variety of flavors, a good service together with a kind and polite staff, and an ice-cream production with organic ingredients.

Graph 3.10: Factors that generally influence the ice-cream's choice



Source: The questionnaire, 2020

3.4.3 Gelato consumption during lockdown

The focus in the third section was to evaluate information collected on gelato consumption during the lockdown period in Italy. From March to May 2020, 66% of the sample consumed ice-cream. The part of respondents who gave a positive answer were asked a series of questions on home delivery service for bulk orders of ice-cream. On a total of 1669 respondents who consumed gelato during the lockdown period, 913 did not use delivery services (around 54%), 643 used the home delivery service offered by the ice-cream shop and 114 had their gelato delivered by a food delivery operator. More than half did not use a delivery service. In Italy, the latter is not as common as in other countries and the first changes toward its diffusion happened during the national lockdown caused by the spread of Covid-19.

3.4.4 Food delivery service perception

The fourth section contains some questions posed to understand the respondents' opinion about the gelato delivery service. About 70% of interviewees said they would consider delivery service. Thus, this high percentage of positive responses suggests that this service might not be available in the area or in the stores where people normally go to buy an ice-cream.

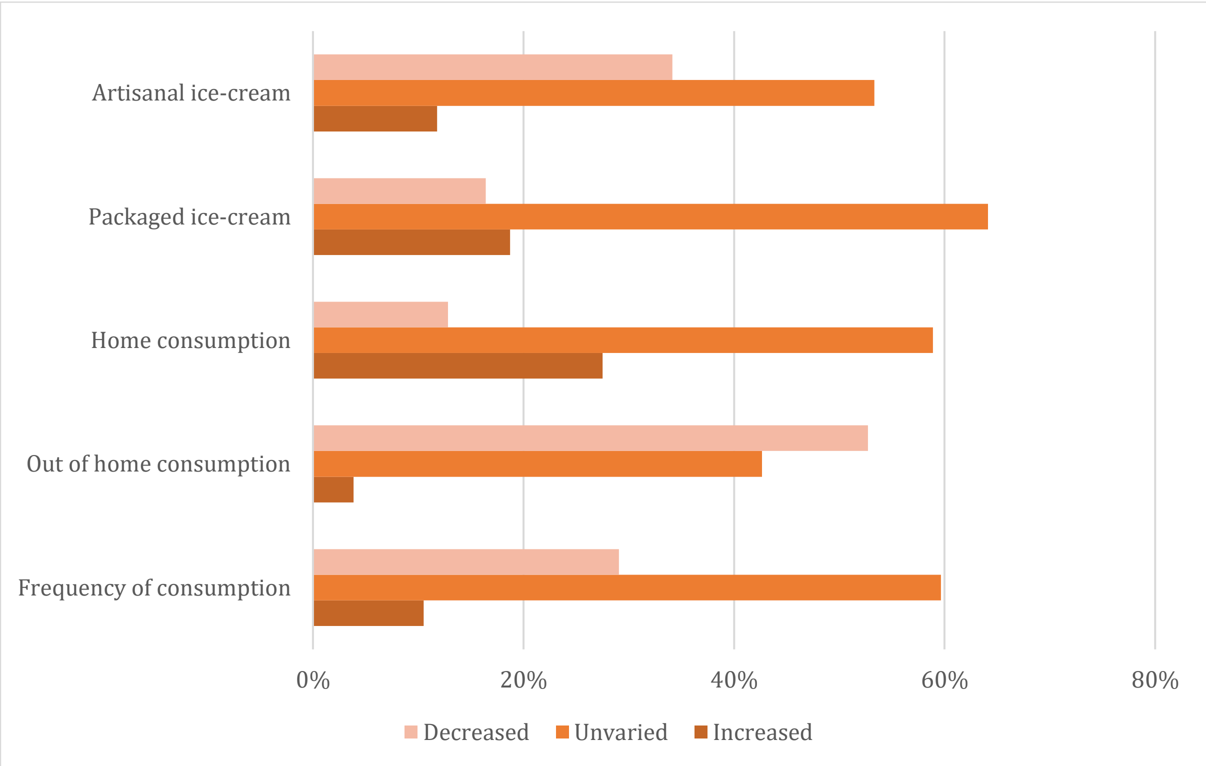
The remaining 30% that would not consider using the delivery service were asked to motivate their answer. The main reason was that the service was not immediately available. Therefore, it usually took a long time to receive the ordered gelato at home. A long delivery time might make the ice-cream melt, which is another reason why people chose not to have their gelato delivered. Moreover, in some areas the food delivery service is not available at all. The second most important motivation is the distrust in health and hygiene safety. Many affirmed that rather than using the delivery service, they would go and buy it autonomously to observe the store standards. At the same time, in store it is possible to view the flavors appearance and decide on the most appealing option. Some reasons are linked to the habits of consumption at home – many prefer to eat packaged ice-cream or do not eat ice-cream at all while at home. The gelateria is conceived as part of the ritual of 'going for a gelato' – from the decision of going out to the moment you reach the shop and buy your cone or cup. A great number of people like to have their gelato while going for a walk or spending time outside, rather than eating it at home. Another reason why people would not use the delivery service is economical – you have to pay a higher price to compensate the service you get. Regarding the payment, some respondents declared they do not know how to pay for it. Some others do not know how to use the service or deem it too complicated for them. A small part of respondents states they simply are not interested or normally never use the delivery service to buy foodstuff. In some cases, their concern about this relatively new kind of service is that it can lead to environmental pollution, and exploitation and rights violation for the delivery drivers. Moreover, ice-cream is not seen as an essential food, so people do not feel the urgency to have it delivered at home. Some would not be able to reach the minimum order amount requested to use the service, because of a diet or because they do not like to eat big quantities of gelato. Suffering from food intolerances to lactose or gluten might also make people reluctant in buying ice-cream for home delivery – information is not always accurate enough on delivery platforms to assess the free-from options at the parlor. Lastly, the preparation of home-made gelato or the proximity to the ice-cream parlor were also pointed out as other motivations.

3.4.5 Behavioral consumption changes after Covid-19

The fifth section presented to the respondents some questions on frequency and preferences of ice-cream consumption after Covid-19 and again the same list of factors they rated in the second section. They had to evaluate all of them again in regard to how their behavioral consumption changed after the Covid-19 pandemic began – each factor was rated with decreased, unvaried, or decreased with respect to pre-pandemic consumption habits.

During the pandemic, consumption of artisanal ice-cream decreased for more than 30% of respondents, while the consumption of packaged ice-cream remained unvaried. The consumption at home increased in about 30% of the sample. Eating out occasions decreased for more than half of the respondents. Finally, the frequency of consumption did not change much. The graph 3.11 reflects trends that were foreseeable in light of the restrictions imposed on the population, which influenced people's consumption habits too. Being forced to stay at home caused a higher consumption of gelato at home and a lower one out of home. The trends of the preferred type of ice-cream in relation to the place of consumption stayed the same.

Graph 3.11: Influence of Covid-19 on behavioral consumption of ice-cream

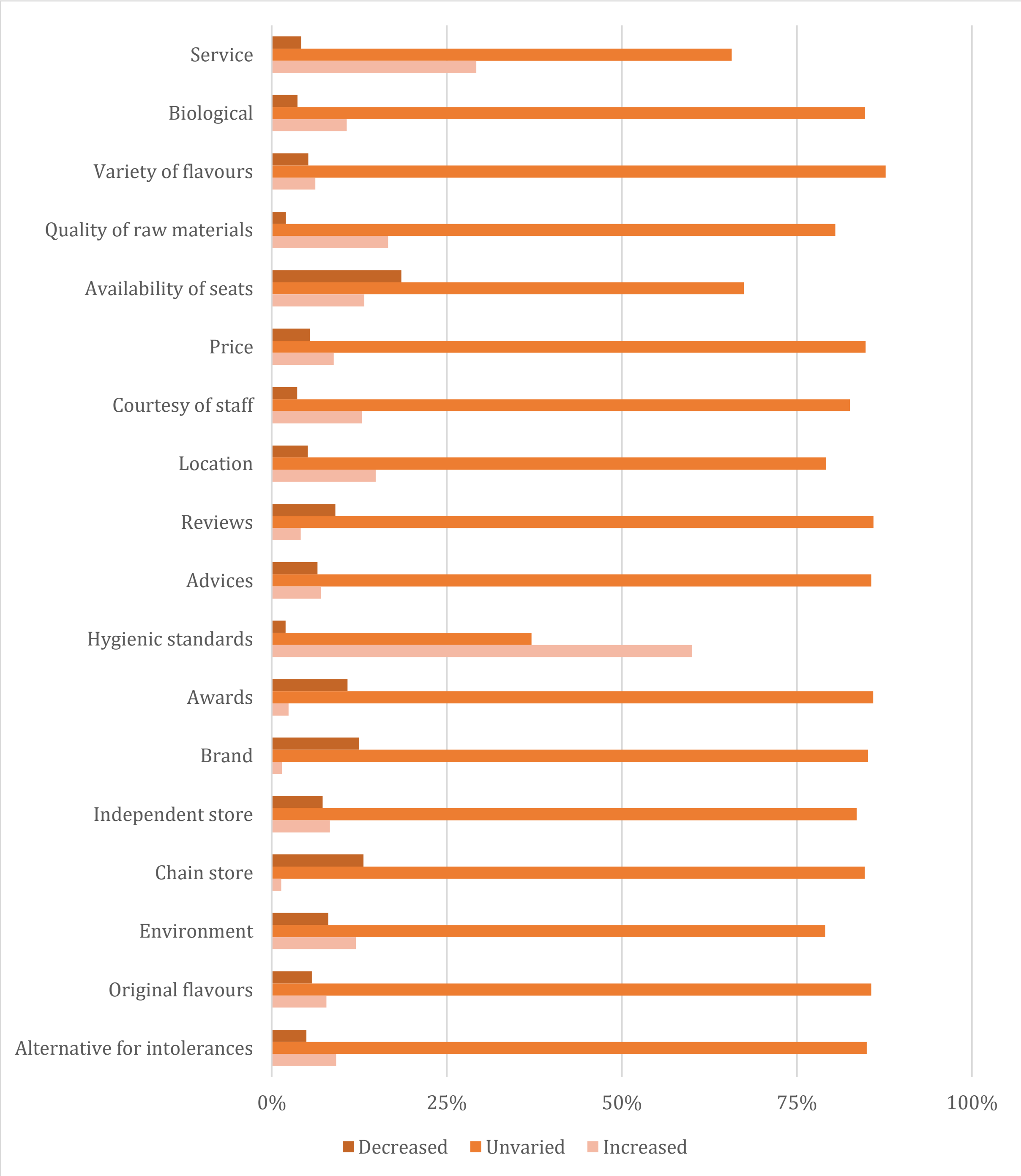


Source: The questionnaire, 2020

The evaluation of factors importance highlights how the most important behavioral change after the pandemic is the increase in concern for hygiene standards due to the spread of the virus. The compliance with hygiene standards was of utmost importance, not only in the food industry but in every sector and in every context all around the world. Another factor whose importance grew to some degree is the quality of service. Apart from the service level offered by the shop, for example the availability of home delivery option, the opinion of almost one third of respondents is that the importance of the way the gelato is served increased to them.

Overall, all the other factors' importance remained unvaried and did not drive changes in gelato consumption from the beginning of the pandemic. Indeed, the consumers' opinion about all factors, apart from one, is markedly unvaried with more than 75% of answers saying they deem them equally important as they were before. Therefore, the expectations are that consumers will likely make the same choices they made in the past, but with a particular attention toward the hygiene standards and service quality.

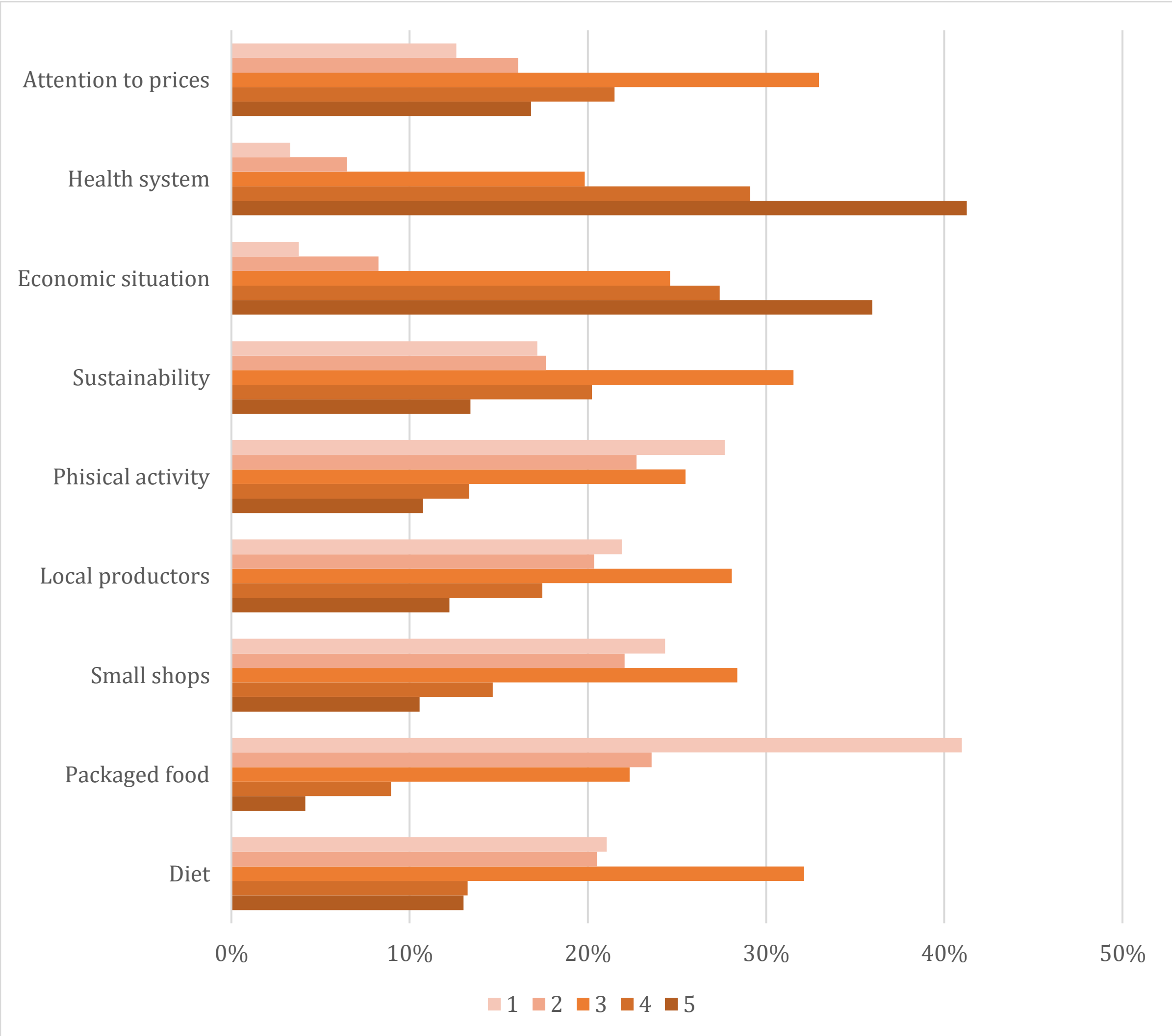
Graph 3.12: Factors that influence the ice-cream's choice after Covid-19



Source: The questionnaire, 2020

The last part of the section investigated lifestyle changes for respondents in the considered period. The rating was from 1 to 5, where 1 stood for "totally disagree" and 5 for "totally agree". This section highlighted several interesting outcomes. For instance, the attention to prices seems to be unchanged with respect to the past as well as the concern for sustainability. For their shopping, most of respondents did not choose local producers and small shops. Over 40% did not purchase pre-made meals, as being at home was a chance to dedicate time to food preparation. About 70% of the sample said that they were worried not only about the Italian health system, but also about the Italian economic situation, which continues to suffer in 2021 because of the spread of Covid-19. Finally, on average time dedicated to physical activity decreased while respondents paid more attention to the adoption of a healthier diet.

Graph 3.13: Influence of Covid-19 on personal lifestyle



Source: The questionnaire, 2020

Chapter 4 – Bivariate analysis

4.1 Introduction to the bivariate analysis

The purpose of this chapter is to present a first simple elaboration of the data collected from the questionnaire. After the previous description of the interviewed sample, the methods used to sort out data is a bivariate analysis. While the descriptive analysis presented all single variables in detail, the bivariate analysis gives an interesting perspective on the relationship among the considered variables. This allows the identification of links between variables and critical aspects such as dependence or interdependence between them.

In more detail, bivariate analysis studies a pair of variables, simultaneously considered, to search dependencies and correlations. In this specific research, the variables were divided into categories and then selected from the dataset. The choice of studying the relationship between the variables and their degree of association depends on their own nature. The term association is referred to how the link between the variables is made, meaning that the variation of one of them implies the variation of the other. If the two variables are dependent, then there is no possibility of having the independence condition – since it requires absolute lack of ties. The choice of the variables and their association fully depends on the researcher, his or her knowledge and on what he or she decided to highlight – therefore, it relies on a subjective process. The final step consisted in assessing these relations among variables by carrying out a chi squared test, that is normally used with non-numerical variables to evaluate a presence of dependence or independence.

4.2 The bivariate analysis

The analysis was carried out by selecting some specific variables. The choice was made accordingly to which variables were best fitting together. Two groups of variables were selected – the first is the list of factors rated by respondents according to their influence in decision-making, the second is a set of the main demographic data. Among the ones provided while filling the questionnaire, gender, age (grouped according to generations), geographical region and presence of children were associated will all the choice factors.

All the first group and the second group variables were combined into a one-to-one association. For every association, two tables were created – the observed frequency table and the theoretical independence table. The observed frequency table shows the joint frequency of both variables and the marginal frequency for each of them. The theoretical independence table presents the joint frequency values in case of total independence among variables. Then, a chi squared test was performed to test if the association was characterized by dependence or not. The test takes into consideration the distance among real and theoretical values in the tables and gives more information on the nature of the association. From now on, all the dependent relationships are presented in this chapter and commented for the sake of completeness. Since all the factors were rated from 1 to 5, answers were distinguished in two categories – medium-low importance, considering all 1 and 2 ratings, and high importance, considering all 3, 4 and 5 ratings.

4.2.1 Factors of choice and gender's association

The first bivariate analysis is based on the association of the choice factors with *gender*. Among the factors affecting consumers in deciding which gelato to have, there are recommendations. The figures from the tables show if that test is significative and if there is an association between the two variables, in other words if there is a dependent relationship among gender and personal advice. Indeed, the value obtained from the chi square test is 0.46. There is a rather significant difference among the table of registered observations and the theoretical one. Indeed, females are giving less importance to recommendations than how it would in case of theoretically independence. On the contrary, males seem to be more interested in personal advice they receive.

Table 4.1: observed frequency table for the association gender and recommendation

Gender	Medium-low importance	High importance	Total
Females	1243	788	2031
Males	270	210	480
Total	1513	998	2511

Table 4.2: theoretical independence table for the association gender and recommendation

Gender	Medium-low importance	High importance	Total
Females	1223.777	807.2234	2031
Males	289.2234	190.7766	480
Total	1513	998	2511

Source: Personal elaboration of questionnaire's data, 2021

The table of registered observations deviates from the theoretical one and the chi square test result is 0.004. Therefore, the test is significative and there is an association between the two variables – gender and the respect of Covid-19 regulations have a dependent relationship. Females care a lot about the respect of rules imposed due to the spread of the Covid-19 pandemic. On the other hand, men appear to pay less attention to these new rules. The evidence is greater, looking at the difference among real and theorical number for men.

Table 4.3: observed frequency table for the association gender and respect of Covid-19 regulations

Gender	Medium-low importance	High importance	Total
Females	563	1468	2031
Males	165	315	480
Total	728	1783	2511

Table 4.4: theoretical independence table for the association gender and respect of Covid-19 regulations

Gender	Medium-low importance	High importance	Total
Females	588.8363	1442.162	2031
Males	139.1637	340.8363	480
Total	1513	998	2511

Source: Personal elaboration of questionnaire's data, 2021

The third dependent relationship is among gender and the choice of independent shops. The difference between the table of registered observations and the theoretical one is quite significant. Indeed, the result of the chi square test is 0.018. For females buying ice-cream from an independent shop is not a determinant factor, at least not as much as expected. The contrary happens for men who declared to prefer having an ice-cream from an independent shop.

Table 4.5: observed frequency table for the association gender and independent shop

Gender	Medium-low importance	High importance	Total
Females	1277	754	2031
Males	274	206	480
Total	1551	960	2511

Table 4.6: theoretical independence table for the association gender and independent shop

Gender	Medium-low importance	High importance	Total
Females	1254.513	776.4875	2031
Males	296.4875	183.5125	480
Total	1551	960	2511

Source: Personal elaboration of questionnaire's data, 2021

The next dependent relationship is among gender and the importance of buying from ice-cream shops serving free-from alternatives. There is a great difference between the tables and the chi square test result is 0.00000007. Females generally prefer ice-cream shops where greater attention is given to people with food intolerances, while males do not mind if the ice-cream shops are giving free-from options or not. All the figures show more or less the same distance from the theoretical frequency table's values.

Table 4.7: observed frequency table for the association gender and free-from alternatives

Gender	Medium-low importance	High importance	Total
Females	1039	992	2031
Males	311	169	480
Total	1350	1161	2511

Table 4.8: theoretical independence table for the association gender and free-from alternatives

Gender	Medium-low importance	High importance	Total
Females	1091.935	939.0645	2031
Males	258.0645	221.9355	480
Total	1350	1161	2511

Source: Personal elaboration of questionnaire's data, 2021

4.2.2 Factors of choice and age association

The second bivariate analysis is based on the association of *age* with the choice factors. To simplify data elaboration, the age of respondents has been grouped into reference generations. The division into generations is the same as in the previous chapter – Generation Z under 25, millennials from 25 to 40, Generation X from 41 to 55 and baby boomers over 55.

The tables show differences between real and theorical values indicating an association among the age of respondents and the opinion about service. The chi square test result is 0.0004. While for millennials and baby boomers the difference is minimal, it is greater for Generation Z and X. The former generally deem service as normally important, or at least they are more distant from theoretical independence values, meanwhile the latter think that service is not important at all.

Table 4.9: observed frequency table for the association age and service

Age	Medium-low importance	High importance	Total
Generation Z	166	164	330
Millennials	364	496	860
Generation X	359	607	966
Baby boomers	151	204	355
Total	1040	1471	2511

Table 4.10: theoretical independence table for the association age and service

Age	Medium-low importance	High importance	Total
Generation Z	136.6786	193.3214	330
Millennials	356.1928	503.8072	860
Generation X	400.0956	565.9044	966
Baby boomers	147.0331	207.9669	355
Total	1040	1471	2511

Source: Personal elaboration of questionnaire's data, 2021

Once again real data differs from theorical ones. Variables are dependent since the chi square test is 0.003. The association among the variety of flavors is stronger for Generations Z – it is important for the ice-cream parlor to offer a great variety of flavors. Millennials also prefer to choose among many flavors. The trend is opposite for Generation X and baby boomers that do not mind not having a wider choice.

Table 4.11: observed frequency table for the association age and variety of flavors

Age	Medium-low importance	High importance	Total
Generation Z	74	256	330
Millennials	251	609	860
Generation X	314	652	966
Baby boomers	118	237	355
Total	757	1754	2511

Table 4.12: theoretical independence table for the association age and variety of flavors

Age	Medium-low importance	High importance	Total
Generation Z	99.48626	230.5137	330
Millennials	259.2672	600.7328	860
Generation X	291.2234	674.7766	966
Baby boomers	107.0231	247.9769	355
Total	1551	960	2511

Source: Personal elaboration of questionnaire's data, 2021

Age and organic ingredients real and theoretical values are almost the same for millennials, which means that there is not a strong dependent relationship among them. Generation Z is not interested in considering if ingredients used are organic or not. Instead, Generation X and baby boomers make their choice also based on the fact that the gelato is made with organic ingredients or not. The result of the chi square test is 0.0007.

Table 4.13: observed frequency table for the association age and organic ingredients

Age	Medium-low importance	High importance	Total
Generation Z	142	188	330
Millennials	288	572	860
Generation X	304	662	966
Baby boomers	107	248	355
Total	841	1670	2511

Table 4.14: theoretical independence table for the association age and organic ingredients

Age	Medium-low importance	High importance	Total
Generation Z	110.5257	219.4743	330
Millennials	288.0366	571.9634	860
Generation X	323.5388	642.4612	966
Baby boomers	118.8988	236.1012	355
Total	841	1670	2511

Source: Personal elaboration of questionnaire's data, 2021

Regarding the association with the ice-cream price, there is an interesting pattern. There is a distinction in older and younger consumers – even if gelato is not so expensive, this scenario could have been expected, considering the disposable income and the concrete ability to pay of customers. According to figures, price is not an influential factor for millennials, Generation X and baby boomers. On the contrary, price is an essential factor for Generation Z. In their case, the difference among real and theoretical values has reached 60 units.

Table 4.15: observed frequency table for the association age and price

Age	Medium-low importance	High importance	Total
Generation Z	119	211	330
Millennials	476	384	860
Generation X	553	413	966
Baby boomers	212	143	355
Total	1360	1151	2511

Table 4.16: theoretical independence table for the association age and price

Age	Medium-low importance	High importance	Total
Generation Z	178.7336	151.2664	330
Millennials	465.7905	394.2095	860
Generation X	523.2019	442.7981	966
Baby boomers	192.274	162.726	355
Total	1360	1151	2511

Source: Personal elaboration of questionnaire's data, 2021

For the association among age and location, real and theoretical figures differ and therefore there is a dependent relationship. Indeed, 0.032 is the result of the chi squared test. Location is an important factor in deciding where to buy ice-cream for Generation Z and X. Millennials and baby boomers give it less importance.

Table 4.17: observed frequency table for the association age and location

Age	Medium-low importance	High importance	Total
Generation Z	172	158	330
Millennials	486	374	860
Generation X	512	454	966
Baby boomers	217	138	355
Total	1387	1124	2511

Table 4.18: theoretical independence table for the association age and location

Age	Medium-low importance	High importance	Total
Generation Z	182.282	147.718	330
Millennials	475.0378	384.9622	860
Generation X	533.589	432.411	966
Baby boomers	196.0912	158.9088	355
Total	1387	1124	2511

Source: Personal elaboration of questionnaire's data, 2021

Personal advice influences the possible choice of consumers. Looking at the relationship among the two variables, younger consumers are more inclined to listen to the recommendations of family members and friends, as opposed to older clients, who do not give great importance to suggestions they receive from others. The value obtained computing the chi square test is 0.0003.

Table 4.19: observed frequency table for the association age and recommendations

Age	Medium-low importance	High importance	Total
Generation Z	175	155	330
Millennials	493	367	860
Generation X	611	355	966
Baby boomers	234	121	355
Total	1513	998	2511

Table 4.20: theoretical independence table for the association age and recommendations

Age	Medium-low importance	High importance	Total
Generation Z	198.8411	131.1589	330
Millennials	518.192	341.808	860
Generation X	582.0621	383.9379	966
Baby boomers	213.9048	141.0952	355
Total	1513	998	2511

Source: Personal elaboration of questionnaire's data, 2021

The relationship among respondent's age and awards gained by ice-cream shops highlights how in some cases the decision-making process of different age groups is affected by the prizes held by a specific parlor. The association among variables is confirmed by the chi square test result which is 0.028. Baby boomers real and theoretical values are almost unvaried. Generation Z does not seem to give much importance to awards, while millennials and Generation X are paying more attention to this factor.

Table 4.21: observed frequency table for the association age and awards

Age	Medium-low importance	High importance	Total
Generation Z	285	45	330
Millennials	680	180	860
Generation X	766	200	966
Baby boomers	286	69	355
Total	2017	494	2511

Table 4.22: theoretical independence table for the association age and awards

Age	Medium-low importance	High importance	Total
Generation Z	265.0777	64.92234	330
Millennials	690.8084	169.1916	860
Generation X	775.9546	190.0454	966
Baby boomers	285.1593	69.8407	355
Total	2017	494	2511

Source: Personal elaboration of questionnaire's data, 2021

The tables show wide differences among real and theoretical values for Generations Z and X. In particular, Generation X is the one that gives more importance to the fact that Covid-19 rules are respected in ice-cream parlors environments. Generation Z are less concerned about compliance. Millennials and baby boomers' values are close, therefore, the relationship is less dependent in their case. The chi square test gave a result of 0.002.

Table 4.23: observed frequency table for the association age and respect of Covid-19 regulations

Age	Medium-low importance	High importance	Total
Generation Z	118	212	330
Millennials	245	615	860
Generation X	241	725	966
Baby boomers	97	258	355
Total	701	1810	2511

Table 4.24: theoretical independence table for the association age and respect of Covid-19 regulations

Age	Medium-low importance	High importance	Total
Generation Z	92.12664	237.8734	330
Millennials	240.0876	619.9124	860
Generation X	269.6798	696.3202	966
Baby boomers	99.10593	255.8941	355
Total	701	1810	2511

Source: Personal elaboration of questionnaire's data, 2021

This association refers to consumers preferences in buying the ice-cream in a parlor if it is an independent shop. Generation X and baby boomers value more than millennials and Generation Z the fact of having their ice-cream from an independent shop. This shows a greater desire in supporting small activities by older generations.

Table 4.25: observed frequency table for the association age and independent shop

Age	Medium-low importance	High importance	Total
Generation Z	246	84	330
Millennials	557	303	860
Generation X	550	416	966
Baby boomers	198	157	355
Total	1551	960	2511

Table 4.26: theoretical independence table for the association age and independent shop

Age	Medium-low importance	High importance	Total
Generation Z	203.8351	126.1649	330
Millennials	531.2067	328.7933	860
Generation X	596.681	369.319	966
Baby boomers	219.2772	135.7228	355
Total	1551	960	2511

Source: Personal elaboration of questionnaire's data, 2021

There is a strong variance among real and theoretical values regarding the association between age and original flavors. The relation dependence is proved by the chi square test result 0.000000002. Indeed, this factor has a strong influence on younger generations' (people under 40 years old) preferences on which parlor to go for. On the contrary, the factor does not have a strong influence on older generations (over 41 years old).

Table 4.27: observed frequency table for the association age and original flavors

Age	Medium-low importance	High importance	Total
Generation Z	115	215	330
Millennials	358	502	860
Generation X	494	472	966
Baby boomers	193	162	355
Total	1160	1351	2511

Table 4.28: theoretical independence table for the association age and original flavor

Age	Medium-low importance	High importance	Total
Generation Z	152.4492	177.5508	330
Millennials	397.2919	462.7081	860
Generation X	446.2605	519.7395	966
Baby boomers	163.9984	191.0016	355
Total	1160	1351	2511

Source: Personal elaboration of questionnaire's data, 2021

4.2.3 Factors of choice and geographical region's association

The third bivariate analysis is based on the association of *geographics* with the choice factors. Geographical origins of respondents were divided into four categories based on the macro areas where they live – North-West, North-East, central regions of Italy and South together with Sardegna and Sicilia islands.

The first association showing a dependent relationship was with the availability of seats factor. The following trend is interesting and might be related also to local food consumption traditions. In fact, Southern respondents on average think that is important for seats to be available at the ice-cream parlor. This might underline a preference for having ice-cream sitting down, compared to Northern clients that might prefer the take-away option. In this case, the value of the chi square test is 0.000006.

Table 4.31: observed frequency table for the association area and availability of seats

Area	Medium-low importance	High importance	Total
North-West	859	143	1002
North-East	753	149	902
Center	408	109	517
South and islands	54	27	81
Total	2074	428	2502

Table 4.32: theoretical independence table for the association area and availability of seats

Area	Medium-low importance	High importance	Total
North-West	830.595	171.405	1002
North-East	747.701	154.299	902
Center	428.56	88.4396	517
South and islands	67.1439	13.8561	81
Total	2074	428	2502

Source: Personal elaboration of questionnaire's data, 2021

Concerning the relationship with price, values show that the North-East of Italy is the only area in which consumers base their decision heavily on price. All the remaining areas do not tend to make decisions on ice-cream parlors based on the price of their product. In these areas, the demand for ice-cream should be inelastic for ice-cream, in other words people should buy ice-cream regardless its cost. The chi square test values is 0.01.

Table 4.33: observed frequency table for the association area and price

Area	Medium-low importance	High importance	Total
North-West	562	440	1002
North-East	455	447	902
Center	300	217	517
South and islands	39	42	81
Total	1356	1146	2502

Table 4.34: theoretical independence table for the association area and price

Area	Medium-low importance	High importance	Total
North-West	543.05	458.95	1002
North-East	488.854	413.146	902
Center	280.197	236.803	517
South and islands	43.8993	37.1007	81
Total	1356	1146	2502

Source: Personal elaboration of questionnaire's data, 2021

Staff interacting kindly with clients and serving them in a proper way is a feature not really valued by Italians throughout Italy, except for people living in the North-East area. Unlike all the other respondents, whose answers exceed theoretical values for medium-low importance preferences, people living in the North-East of Italy gave more high importance answers than theoretically expected. The association is confirmed by the chi square test value of 0.002.

Table 4.35: observed frequency table for the association area and courtesy

Area	Medium-low importance	High importance	Total
North-West	376	626	1002
North-East	265	637	902
Center	183	334	517
South and islands	25	56	81
Total	849	1653	2502

Table 4.36: theoretical independence table for the association area and courtesy

Area	Medium-low importance	High importance	Total
North-West	340.007	661.993	1002
North-East	306.074	595.926	902
Center	175.433	341.567	517
South and islands	27.4856	53.5144	81
Total	849	1653	2502

Source: Personal elaboration of questionnaire's data, 2021

Another relationship that shows dependence is the one between geographic region and location of the ice-cream shop. In particular, in the North-East of Italy, in the South and the islands people give importance to where the parlor is and how far, how near, and how easy to reach from their home it is. The chi square test result 0.0001 proves the dependence. Therefore, in deciding in which ice-cream parlor to consume, consumers will be more inclined to consider the location of the ice-cream shop. All the remaining respondents do not deem that location is a factor that will influence their choice.

Table 4.37: observed frequency table for the association area and location

Area	Medium-low importance	High importance	Total
North-West	593	409	1002
North-East	454	448	902
Center	301	216	517
South and islands	36	45	81
Total	1384	1118	2502

Table 4.38: theoretical independence table for the association area and location

Area	Medium-low importance	High importance	Total
North-West	554.264	447.736	1002
North-East	498.948	403.052	902
Center	285.982	231.018	517
South and islands	44.8058	36.1942	81
Total	1384	1118	2502

Source: Personal elaboration of questionnaire's data, 2021

Generally, opinions might influence the behavior of consumers. Both reviews and recommendations, as third-party perspectives, have this power. The difference lays in the way the final decision maker perceives the information – from the potential customer point of view, reviews are given by unknown persons and circumstances, while recommendations are given by family, friends or in any case by someone trusty. Looking at their associations with the geographical area of respondents, it is possible to see who is more likely to rely on one or the other. Reviews are another factor that is important for just one category out of four. The only consumers that give importance to reviews are based in the North-East. Therefore, there are two opposite trends in the North of Italy – in the Eastern part reviews normally are an important factor. It is the opposite of what happens in all the rest of Italy.

Table 4.39: observed frequency table for the association age and reviews

Area	Medium-low importance	High importance	Total
North-West	836	166	1002
North-East	712	190	902
Center	438	79	517
South and islands	70	11	81
Total	2056	446	2502

Table 4.40: theoretical independence table for the association age and reviews

Area	Medium-low importance	High importance	Total
North-West	823.386	178.614	1002
North-East	741.212	160.788	902
Center	424.841	92.1591	517
South and islands	66.5612	14.4388	81
Total	2056	446	2502

Source: Personal elaboration of questionnaire's data, 2021

Moreover, North-East's consumers are more inclined to listen to friendly or familiar word of mouth regarding ice-cream quality. For the Northwestern and central part of Italy the trend is opposite, with buyers both tending not to pay attention to others' opinions. South and islands real and theoretical number of answers do not differ too much. In summary, North-West, Center, South and islands respondents make their choice more independently rather than consumers in the North-East of Italy.

Table 4.41: observed frequency table for the association area and recommendation

Area	Medium-low importance	High importance	Total
North-West	628	374	1002
North-East	510	392	902
Center	320	197	517
South and islands	52	29	81
Total	1510	992	2502

Table 4.41: theoretical independence table for the association area and recommendation

Area	Medium-low importance	High importance	Total
North-West	604.724	397.276	1002
North-East	544.373	357.627	902
Center	312.018	204.982	517
South and islands	48.8849	32.1151	81
Total	1510	992	2502

Source: Personal elaboration of questionnaire's data, 2021

Confronting the following tables, real and theoretical figures are quite different and two opposite trends might be highlighted – the ones who are influenced by ice-cream brands and the ones who are not. North-East, South and islands customers pay more attention to the brand as opposed to North-West and Center ones. The chi square test value is 0.001.

Table 4.42: observed frequency table for the association area and brand

Area	Medium-low importance	High importance	Total
North-West	936	66	1002
North-East	826	76	902
Center	486	31	517
South and islands	67	14	81
Total	2315	187	2502

Table 4.43: theoretical independence table for the association area and brand

Area	Medium-low importance	High importance	Total
North-West	927.11	74.8897	1002
North-East	834.584	67.4157	902
Center	478.359	38.6407	517
South and islands	74.946	6.05396	81
Total	2315	187	2502

Source: Personal elaboration of questionnaire's data, 2021

Covid-19 had a strong impact on behavioral consumption of ice-cream and the following tables present its association with personal preferences of people grouped into regional areas. Chi square test proves the dependence with 0.002 as a result. Both North-West and Center respondents are more concerned about the implementation of Covid-19 precautionary measures in parlors. Conversely, North-East answers discrepancy shows consumers are much less concerned with Covid-19 safety rules implementation compared to predictions. In the South and islands, the real values are more or less close to the theoretical ones but tend to be slightly higher in medium-low importance.

Table 4.44: observed frequency table for the association area and respect of Covid-19 regulations

Area	Medium-low importance	High importance	Total
North-West	259	743	1002
North-East	289	613	902
Center	123	394	517
South and islands	26	55	81
Total	697	1805	2502

Table 4.45: theoretical independence table for the association area and respect of Covid-19 regulations

Area	Medium-low importance	High importance	Total
North-West	279.134	722.866	1002
North-East	251.277	650.723	902
Center	144.024	372.976	517
South and islands	22.5647	58.4353	81
Total	697	1805	2502

Source: Personal elaboration of questionnaire's data, 2021

Respondents from the North-East area are, amongst all, the most interested in parlors offering original ice-cream. Consumers in the North-West and center areas are not influenced by the presence of special flavors in ice-cream shops. There is no evidence of a strong association with inhabitants of South Italy and islands. The result of the chi square test is 0.011.

Table 4.46: observed frequency table for the association area and original flavors

Area	Medium-low importance	High importance	Total
North-West	482	520	1002
North-East	379	523	902
Center	259	258	517
South and islands	36	45	81
Total	1156	1346	2502

Table 4.47: theoretical independence table for the association are and original flavors

Area	Medium-low importance	High importance	Total
North-West	462.954	539.046	1002
North-East	416.751	485.249	902
Center	238.87	278.13	517
South and islands	37.4245	43.5755	81
Total	1156	1346	2502

Source: Personal elaboration of questionnaire's data, 2021

4.2.4 Factors of choice and presence of children association

The fourth bivariate analysis is based on the association of *presence of children* with the choice factors. All factors have been analyzed and put in relation to the main variable presence of children to observe any interesting behavioral consumption trends. As before, the tables will present only the associations showing dependence. First of all, it is the case of service. People with no children do not think that service is important. The category with one child is the most concerned about service. The chi squared test value for the association is 0.13.

Table 4.48: observed frequency table for the association children number and service

Children number	Medium-low importance	High importance	Total
0	716	994	1710
1	154	305	459
2	106	160	266
More than 2	23	40	63
Total	999	1499	2498

Table 4.49: theoretical independence table for the association children number and service

Children number	Medium-low importance	High importance	Total
0	683.863	1026.137	1710
1	183.563	275.437	459
2	106.379	159.621	266
More than 2	25.195	37.805	63
Total	999	1499	2498

Source: Personal elaboration of questionnaire's data, 2021

The second association is among presence of children and quality of ingredients used to make gelato. Its chi square value is 0.013. In this case, respondents with no children appear to care about the quality of ingredients, while those with one or two children seem to care less. Regarding the category with more than two children, the difference in real and theorical values is not significant enough to assume there is dependence.

Table 4.50: observed frequency table for the association children number and quality of ingredients

Children number	Medium-low importance	High importance	Total
0	207	1503	1710
1	68	391	459
2	49	217	266
More than 2	6	57	63
Total	330	2168	2498

Table 4.51: theoretical independence table for the association children number and quality of ingredients

Children number	Medium-low importance	High importance	Total
0	225.901	1484.099	1710
1	60.637	398.363	459
2	35.140	230.860	266
More than 2	8.323	54.677	63
Total	330	2168	2498

Source: Personal elaboration of questionnaire's data, 2021

The following association is interesting – it emerges that no matter the precise number of children, the availability of seats is important for someone that goes for an ice-cream carrying a child. On the other hand, respondents with no children do not mind if there is the possibility to eat ice-cream sitting or not. The greatest difference among real and theoretical values is in the no children category, with 42 units of margin. The chi square test result is 0.00001.

Table 4.52: observed frequency table for the association children number and availability of seats

Children number	Medium-low importance	High importance	Total
0	1443	267	1710
1	364	95	459
2	192	74	266
More than 2	49	14	63
Total	2048	450	2498

Table 4.53: theoretical independence table for the association children number and availability of seats

Children number	Medium-low importance	High importance	Total
0	1401.954	308.046	1710
1	376.314	82.686	459
2	218.082	47.918	266
More than 2	51.651	11.349	63
Total	2048	450	2498

Source: Personal elaboration of questionnaire's data, 2021

It is not surprising that price turned out to be related with the variable presence of children. Indeed, the fact that respondents have children or not might influence the amount of money they are willing to spend for an ice-cream. Taking care of children represent an extra expense for households. Therefore, for several reasons families' consumption choices can be affected more by prices. Normally the disposable income of a person not having a child is higher and the greater the number of family members, the more price becomes a relevant factor. In this case, it is evident that people with no children are not influenced by price and that the higher the number of children, the more sensitive respondents are in considering price. In fact, the difference observed among real and theoretical values is higher for families with more than two children.

Table 4.54: observed frequency table for the association children number and price

Children number	Medium-low importance	High importance	Total
0	949	761	1710
1	241	218	459
2	141	125	266
More than 2	22	41	63
Total	1353	1145	2498

Table 4.55: theoretical independence table for the association children number and price

Children number	Medium-low importance	High importance	Total
0	926.193	783.807	1710
1	248.610	210.390	459
2	144.074	121.926	266
More than 2	34.123	28.877	63
Total	1353	1145	2498

Source: Personal elaboration of questionnaire's data, 2021

Regarding the next association, the group with no children is the only one giving great importance to recommendations. All the categories of people with children are not so inclined to choose according to other's recommendations. Real values are 76 units far from theoretical ones – looking at values in the tables about the preferences they expressed, under 25 years old tend to buy ice-cream following suggestions they receive from family and friends. The chi square test result (0.042) proved the dependence among the two variables.

Table 4.56: observed frequency table for the association children number and recommendations

Children number	Medium-low importance	High importance	Total
0	1002	708	1710
1	294	165	459
2	175	91	266
More than 2	37	26	63
Total	1508	990	2498

Table 4.57: theoretical independence table for the association children number and recommendations

Children number	Medium-low importance	High importance	Total
0	1032.298	677.702	1710
1	277.090	181.910	459
2	160.580	105.420	266
More than 2	38.032	24.968	63
Total	1508	990	2498

Source: Personal elaboration of questionnaire's data, 2021

Among the list of factors affecting consumers' choices about gelato, there are both attention to hygiene standards and to respect for Covid-19 regulations. From the analysis, both resulted to be in a dependent association with presence of children or not. The chi square test values were respectively 0.007 and 0.032.

In the first case, hygiene standards, the biggest difference is for respondents with no children which seem to give more importance to hygiene standards compared to the ones with at least one child. Generally real values for people having more than two children are coherent with theoretical ones, meanwhile families with one or two children have been observed to pay less attention to hygiene standards when deciding in which ice-cream parlor to go.

Table 4.58: observed frequency table for the association children number and hygiene standards

Children number	Medium-low importance	High importance	Total
0	302	1408	1710
1	84	375	459
2	70	196	266
More than 2	9	54	63
Total	465	2033	2498

Table 4.59: theoretical independence table for the association children number and hygiene standards

Children number	Medium-low importance	High importance	Total
0	318.315	1391.685	1710
1	85.442	373.558	459
2	49.516	216.484	266
More than 2	11.727	51.273	63
Total	465	2033	2498

Source: Personal elaboration of questionnaire's data, 2021

In the second case, about respect of Covid-19 regulations, again respondents with no children are more willing to buy ice-cream from a parlor where rules to limit the outbreak are in place. As before, the number of answers collected from people with one child or more than two are in line with figures in the table of theoretical frequency. Consistently with the aforementioned trends, people with two children do not consider this factor as important when buying ice-cream.

Table 4.60: observed frequency table for the association children number and respect of Covid-19 regulations

Children number	Medium-low importance	High importance	Total
0	456	1254	1710
1	128	331	459
2	94	172	266
More than 2	19	44	63
Total	697	1801	2498

Table 4.61: theoretical independence table for the association children number and respect of Covid-19 regul.

Children number	Medium-low importance	High importance	Total
0	477.130	1232.870	1710
1	128.072	330.928	459
2	74.220	191.780	266
More than 2	17.578	45.422	63
Total	697	1801	2498

Source: Personal elaboration of questionnaire's data, 2021

Serving alternatives for consumers with food intolerances is becoming increasingly important nowadays. Ice-cream consumers with no children deem availability of alternatives for allergy and intolerance sufferers very important. Respondents with one or two kids do not go for specific parlors providing these solutions, or at least do not think about this factor as determinant for their choice. Real and theoretical values for people having more than two children are similar and therefore, there is no relevant association to comment on. Dependency is confirmed by the chi square test value of 0.034.

Table 4.62: observed frequency table for the association children number

Children number	Medium-low importance	High importance	Total
0	892	818	1710
1	267	192	459
2	155	111	266
More than 2	32	31	63
Total	1346	1152	2498

Table 4.63: theoretical independence table for the children number

Children number	Medium-low importance	High importance	Total
0	921.401	788.599	1710
1	247.323	211.677	459
2	143.329	122.671	266
More than 2	33.946	29.054	63
Total	1346	1152	2498

Source: Personal elaboration of questionnaire's data, 2021

Chapter 5 – Cluster analysis

5.1 Introduction to the cluster analysis

The previous chapters provide a detailed descriptive analysis of the sample and its characteristics. This chapter's aim is explaining the statistical methods of the cluster analysis and its results. The cluster analysis considers all the single preferences of the respondents in order to divide them into distinct groups. The groups that share the same combination of preferences, or more specifically the same evaluation of factors, are called clusters. This allows define separate groups and outline the characteristics of people belonging to each of them.

The cluster analysis classifies in different groups the observed statistical units according to the similarity criterium of units – units which are similar among them will pertain to the same statistical unit, called cluster. Hence, the cluster analysis's output is the partitioning of the sample that has a double utility, in terms of synthesis and in terms of reliability. On one hand, the concept of synthesis is based on the number of clusters identified – the lower the number, the better the synthesis. On the other hand, the concept of reliability concerns the internal and the external cohesion, which are opposed and complementary at the same time. The internal cohesion is the degree to which units in the cluster are similar to each other, while the external cohesion how different the units within the cluster are from one another. The best result a cluster analysis could give is a partitioning that maximizes the homogeneity within and the heterogeneity between clusters. In this last chapter of analysis, the statistical methodology of the cluster analysis will describe the best clusters' division for this dataset and the peculiarities of each of them. The purpose of dividing respondents into clusters and run the cluster analysis on some specific variables is to detect if the groups follow some specific consumption trends.

5.2 The methods used to form clusters

5.2.1 Data preparation

The tool used to manipulate data collected by the questionnaire and perform the cluster analysis is R, a programming language specific for statistical data analysis. To perform a cluster analysis using R, data should be prepared. The first step consists in removing any

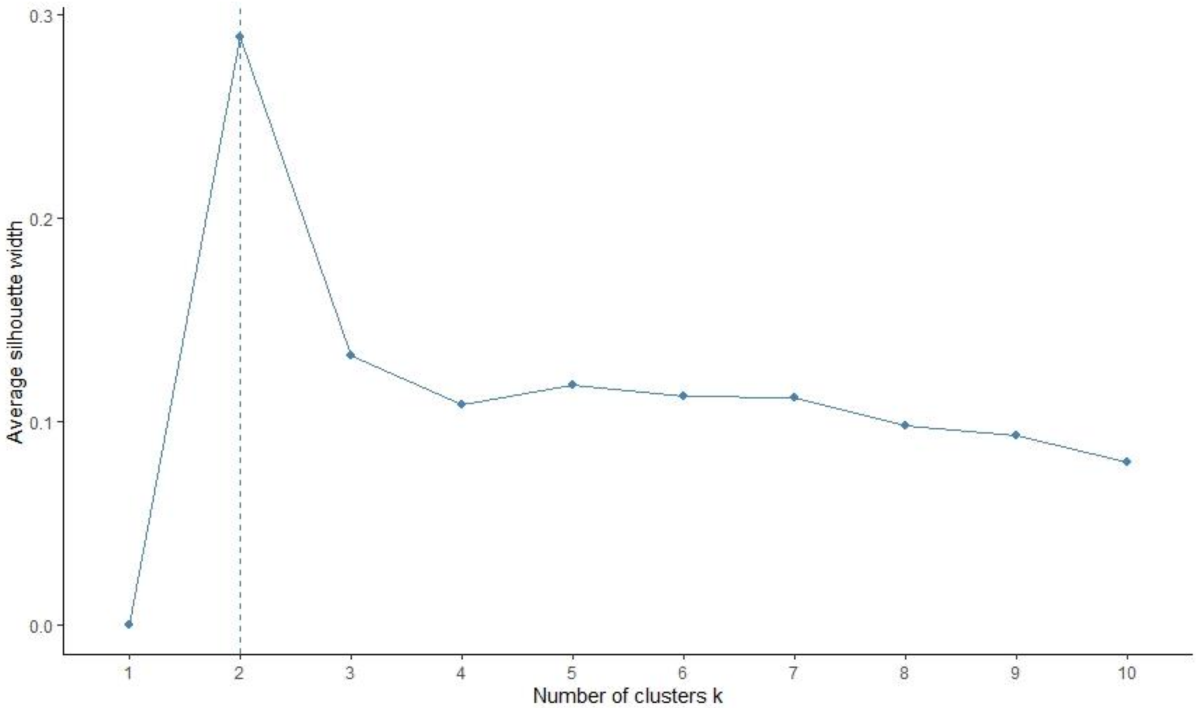
missing value present in the answers of interviewees. Once this step was done, the total number of answers was cut down to 2471. Moreover, the number of columns considered was reduced from 73 to 29. This was done in order to work on data whose manipulation's result is significative to the research purpose. The columns selected regard consumption channels, frequency of consumption, type of ice-cream, price consumers are willing to pay, factors of choice and, eventually, demographic variables.
Prior to performing a cluster analysis in R, two packages have to be installed – *cluster* to compute clustering algorithms, and *factoextra* to have an elegant visualization of clustering results. From the latter package, *fviz_cluster* was used to visualize the clustering results. After their installation, to classify all the observations into groups, it is necessary to compute the distance between each pair of observations. For this reason, the dissimilarity or distance matrix has to be built with R commands. The choice on which command to use to compute the dissimilarity matrix has a strong influence on clustering results. In this case, the best function to find distances between pairs of observations is *daisy*, from the cluster package. This is because the data obtained by the questionnaire includes no-numeric columns. *Daisy* is perfect for the dataset because it handles different types of variables – nominal, ordinal, symmetric. The function automatically uses the Gower's coefficient for the same reason – mixed data types.

5.2.2 Partitioning clustering method: K-medoids clustering

Given the nature of the dataset, to divide its observations into several groups according to their similarity, the most suitable algorithm is k-medoids clustering. The result of its application is that each cluster is identified by one of the data points in the cluster. These points are named cluster medoids. Their main characteristic is that the average dissimilarity within it and all the other points in the cluster is minimal (Kassambara, 2017). Moreover, they enclose all the characteristics of the members of the cluster. (Kaufman & Rousseeuw, 1990)
Before forming clusters with the k-medoids algorithm, it is necessary to find out how many clusters can be generated from the dataset. In R, the silhouette method determines which is the optimal number of clusters. Writing *fviz_nbclust* in the programming

language space of R, the software draws the average silhouette for every possible number of clusters. The drawing indicates the quality of each clustering. The optimal number of clusters k is the one that maximizes the average silhouette over a range of possible values k (Kaufman & Rousseeuw, 1990). The graphical result of *fviz_nbcluster* command is represented in the following figure. As it is visible, the optimal number of clusters is 2.

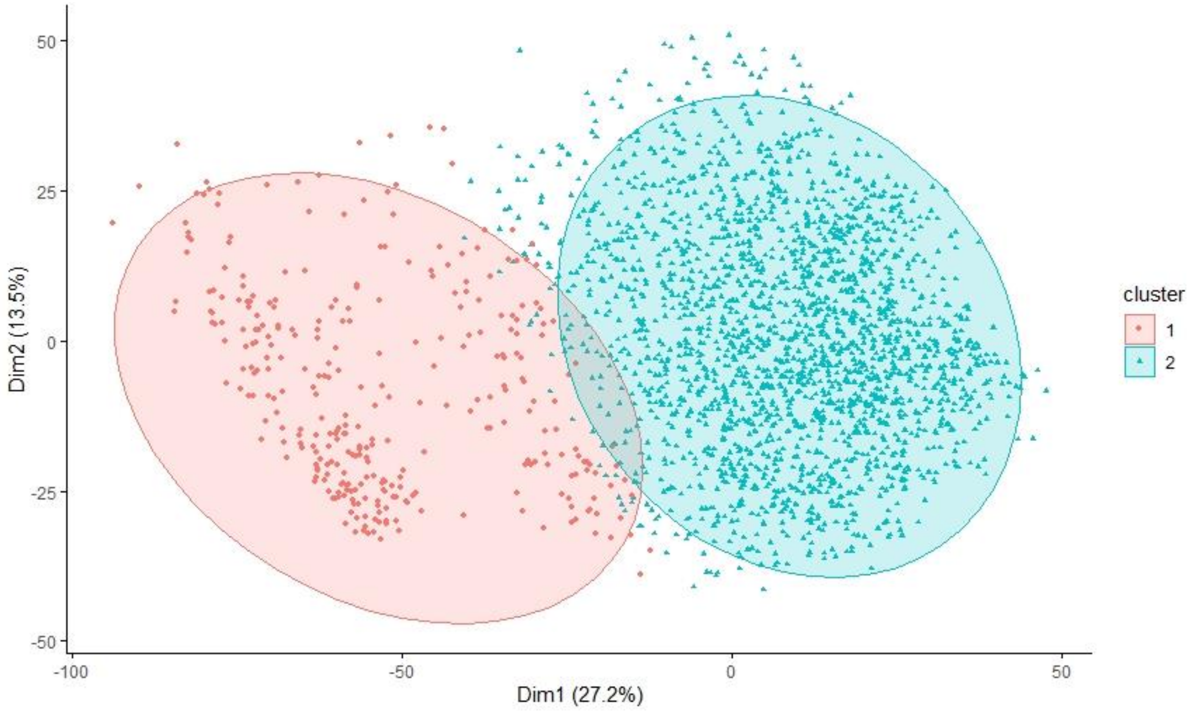
Graph 5.1: optimal number of clusters



Source: Personal elaboration of questionnaire's data, 2020

After having established the optimal number of clusters with the average silhouette method, data is ready to be distinguished into different clusters. The Partitioning Around Medoids, or the so-called PAM algorithm, is the most common among k-medoids clustering methods and the one used in the following cluster analysis. The computation allows the partitioning of results that can be visualized thanks to the function *fviz_cluster*. The function was part of the *factoextra* packages installed at the beginning of the data manipulation process. The figure 5.2 shows the graphical result of the cluster analysis.

Graph 5.2: cluster plot



Source: Personal elaboration of questionnaire's data, 2020

In the graph, every point stands for one of the answers in the dataset, considered in the analysis. All of them are presented in a scatter plot and grouped into two different rounded areas – a red one on the left identified as Cluster 1, and a light blue one on the right identified as Cluster 2. The two areas collect the majority of the points. Some of them are close, but not included into the rounded areas. Nonetheless, the points shape (circle or triangle) and color makes them clearly identifiable with one cluster or the other.
Following the procedure, the R software computes the final result of the cluster analysis. Since it distinguishes interviewees into two clusters, each of them will allow to detect which were the consumption behaviors that characterize their group.

5.3 The clusters

The cluster analysis result divides the sample according to all the variables taken into consideration that provide different information about the respondents. Each of them has been assigned to one cluster or to the other. Therefore, it is possible to find which are the distinguishing features of each cluster. To this purpose, all the variables, that were not considered while performing the cluster analysis were used to highlight the characterizing trends of each cluster. Averages of answers were computed for every single variable examined in the cluster analysis – first, considering only Cluster 1 and 2 answers separately and second, considering the overall answers of the sample. In this paragraph, several tables will present a comparison among averages. Clusters' figures deviations from the sample average – them being higher or lower – mark some peculiar characteristic of the group. The absence of deviations is in itself a confirmation of the fact that the cluster habits are in line with the ones of the whole sample.

For the sake of clarity, a label has been assigned to each cluster. The first group of consumers' label is 'Quality seekers', while 'Demanding consumers' is the label for the second group. As explained throughout the chapter, although many variables were included in the analysis, R divided the members in two clusters mostly according to their factors' ratings. In particular, the distinction is between very low factors' ratings for Cluster 1 and very high factors' ratings for Cluster 2. Thus, the two groups' consumption behaviors are not influenced at all by the factors of choice in the first case, and strongly influenced in the second case. This can be clearly seen looking at the summary table 5.1 which compares average ratings among clusters and with the sample average. Looking at numbers, averages in column "Cluster 1 average" are all extremely low, while for column "Cluster 2 average" are all extremely high. The following paragraphs will describe the two clusters separately and in more detail. All the profiling variables were used to define the clusters. Apart from demographics, the two groups were examined under many points of view such as their choices for shopping channels, consumption frequencies, favorite type of gelato at home, and their willingness to pay.

Table 5.1: factors rating averages

Factors	Cluster 1 average	Cluster 2 average	Sample average
Service	1.709	4.817	**4.501**
Organic ingredients	1.818	4.824	**4.575**
Variety of flavors	1.911	4.947	**4.640**
Quality of ingredients	3.278	4.998	**4.928**
Availability of seats	1.036	1.604	**1.449**
Price	1.444	4.413	**3.739**
Courtesy of staff	2.029	4.925	**4.678**
Location	1.286	3.819	**3.178**
Reviews	1.000	1.701	**1.512**
Recommendations	1.111	3.527	**2.939**
Hygiene standards	2.576	4.981	**4.876**
Awards	1.024	1.644	**1.453**
Brand	1.000	1.134	**1.101**
Covid-19 regulation	2.231	4.855	**4.707**
Independent store	1.182	3.219	**2.797**
Chain store	1.000	1.078	**1.058**
Environment	1.102	3.839	**3.081**
Original flavors	1.500	4.368	**3.912**
Free-from options	1.310	3.651	**3.297**

Personal elaboration of questionnaire's data, 2020

5.3.1 Cluster 1 – Quality seekers

First of all, the cluster is defined according to the demographic variables. There is a slightly higher percentage of females (85%) and hence a slightly lower percentage of males (15%), compared to the sample average. This group is also characterized by a larger presence of respondents belonging to the older generations. Both averages for Generation Z and baby boomers are higher than the sample average. Coherently, millennials and Generation X figures are lower. Regarding the geography, there is a higher concentration of interviewees living in North-West and Center of Italy and lower for North-East and South, compared to the sample mixture. Lastly, the cluster has a higher percentage of respondents with children – in particular with one or two children. The percentage of people with no children for the cluster is 7 points far from the sample average. This is in line with the previous findings about the higher average age of the cluster.

Regarding consumer's choice for food distribution channels during the lockdown, 25% of members of Cluster 1 picked the online shopping option compared to 19% for the sample average. There is a slight difference between cluster and sample average for the other options, but respondents in Cluster 1 preferred smaller shops, over supermarkets and local shops than the average.

Information on consumption frequency is particularly interesting for Cluster 1. For the three options "at least once a day", "once a week" and "no consumption", averages are similar. Thus, frequent consumption and no consumption at all for the cluster are comparable to the sample trends. Values differ a lot for rare consumption, defined as "few times in a week" and "1 or 2 times per month". Both options differ by 4 points from the average – a lower percentage consumes ice-cream few times a week and a higher percentage consumes ice-cream once or twice per month. The fact that lowest frequency of consumption option exceeded the average of the sample for Cluster 1 indicates lower willingness or necessity to consume ice-cream.

Preferences on the types of gelato consumed at and out of home were among the variables chosen for cluster profiling. As previously mentioned, the sample prefers the packaged ice-cream consumption at home and artisanal ice-cream out of home. For the cluster analysis, only preferences for ice-cream consumed at home were considered with the aim to discover which consumers are more loyal to artisanal ice-cream. Comparing averages about the type of ice-cream eaten at home, members of Cluster 1's artisanal ice-cream consumption is lower compared to the sample average. Also, the packaged ice-cream consumption is lower. On the contrary, no consumption option is 14% and higher than 10% population average. Therefore, Cluster 1 consumes less ice-cream at home, no matter the type.

Moreover, another feature of Cluster 1 members is that they are willing to buy gelato at a higher price. In fact, values are a bit lower for the cheaper price options compared to the sample average. On the contrary, for the most expensive options values were higher than the ones of the sample. About 15% of members stated they will spend more than €2 per ice-cream ball, compared to 11% of the sample.

The factors rating averages are the last figures examined. Generally, all the averages are really low. All of the averages are more than 1, but less than 3 – the average ratings are extremely tendent to very low values. This means that members of Cluster 1 are not really influenced by these factors, except for the quality on ingredients – determinant fact to choose the cluster's label "Quality seekers". It is the only factor whose average rating value exceeds 3, precisely 3.278. Hygiene measures and compliance with Covid-19 measures are respectively the second and the third most important values to them. On the other hand, reviews, gelato's brand, availability of seats and nature of the business are the least influencing factors. Cluster 1 considers few factors in deciding which ice-cream to buy or which ice-parlor to choose. The majority is not so relevant, and some are not relevant at all.

5.3.2 Cluster 2 – Demanding consumers

This paragraph talks about the second cluster characteristics. Looking at demographics, gender distribution of Cluster 2 is in line with the one of the sample. The same is observed for generations, geography and presence of children. For all of these variables, averages for Cluster 2 are really close to the ones of the sample.

Concerning preferences for food distribution channels during the lockdown, the figures are really close to the averages computed for the sample. There is a slight preference for shopping in physical shops rather than online.

Consumption frequencies for ice-cream of cluster 2 are in line with the ones of the sample. Again, there is a minimal difference in "few times per week" and "1 or 2 times per month" which are respectively a bit higher and a bit lower. This counterbalances trends for Cluster 1, which in turn recorded the opposite tendencies. Cluster 2's frequency of consumption respects the values of the sample but could be considered more frequent than the one of Cluster 1.

Values for the type of gelato consumed at home are equal for the packaged option. Regarding artisanal ice-cream, Cluster 2 average is a little bit higher than the sample average. Moreover, the average number of people not consuming ice-cream is lower than the sample one. Cluster 2 appears to be more loyal to artisanal ice-cream and in general more willing to have it at home too. The available options for price are almost exactly equal to the values of the sample, meaning that the willingness to pay is mostly between €1,10 and €2.

The most relevant data for this cluster are the factors ratings. Contrary to the trends of Cluster 1, factors rating averages for Cluster 2 are really high. The majority lays among 3 and 5, with exception of some that are still in line with the sample ratings. The factors with the lowest ratings were gelato's brand, availability of seats, reviews, awards, and the parlor being part of a chain of store (the lowest with 1.078 average rating). This means that to the members of Cluster 2 almost all the factors are important when deciding what and where to consume. The most important are, in this exact order, quality of ingredients, hygiene standards and compliance to Covid-19 regulation. Other very important aspects are also variety of flavors, organic ingredients, courtesy of staff and service. All the values mentioned in the upper paragraphs can be found in tables 5.1, 5.2 and 5.3.

Table 5.2: demographics averages

Demographics		**Cluster 1**	**Cluster 2**	**Sample average**
Gender	Females	0.845	0.805	0.810
	Males	0.155	0.195	0.190
Generation	Millennials	0.180	0.135	0.140
	Generation Z	0.307	0.350	0.345
	Generation X	0.410	0.381	0.385
	Baby boomers	0.102	0.134	0.130
Geography	North-West	0.320	0.363	0.357
	North-East	0.425	0.399	0.402
	Center	0.227	0.206	0.209
	South and islands	0.028	0.032	0.031
Children number	0	0.618	0.696	0.685
	1	0.202	0.181	0.183
	2	0.158	0.099	0.107
	3	0.019	0.022	0.021
	4	0.003	0.003	0.003

Table 5.3: profiling variables averages

Clustering variables		Cluster 1	Cluster 2	Sample average
Shopping channels	Shop online	0.248	0.186	**0.194**
	Supermarket	0.786	0.812	**0.809**
	Small shop	0.326	0.291	**0.296**
	Local shop	0.143	0.163	**0.161**
	Delivery service	0.012	0.014	**0.014**
Consumption frequency	At least once a day	0.102	0.085	**0.087**
	Once a week	0.220	0.234	**0.232**
	Few times in a week	0.460	0.515	**0.508**
	1 or 2 per month	0.202	0.158	**0.164**
	No consumption	0.016	0.008	**0.009**
Type of gelato	Packaged	0.581	0.606	**0.602**
	From the parlor	0.258	0.291	**0.287**
	No consumption	0.146	0.095	**0.102**
Willingness to pay	0,50 to 1,00€	0.196	0.191	**0.191**
	1,10 to 1,50€	0.276	0.319	**0.313**
	1,60 to 2,00€	0.289	0.306	**0.304**
	2,10 to 2,50€	0.084	0.074	**0.075**
	More than 2,50€	0.155	0.110	**0.116**

Personal elaboration of questionnaire's data, 2020

Conclusion

The aim of this research study was to assess the impact of the Covid-19 pandemic on the ice-cream food industry. To this purpose, the first two chapters outline food consumption trends in general and in the previous years to evaluate any new developments. This general overview of the consumption trends pre-pandemic was a starting point to analyze the effects of the outbreak and to better evaluate its impact on behavioral consumption. Then, similarly, the focus narrowed down to gelato consumption trends before and after Covid-19. As at the time the research was carried out scientific data on the matter was insufficient, the administration of the questionnaire *Consumption of Gelato and the Effects of the Covid-19 pandemic* helped in gathering information on changes in consumption trends. The database created from the answers of respondents proved to be very useful to compare before and after scenarios and to detect how consumption trends changed.

The initial general analysis of the data confirmed the results found by the main Italian research institutions and by organizations in the industry that carry out statistical analysis on the subject. These results are mainly that – consumption of artisanal ice-cream decreased during the lockdown, while consumption of packaged ice-cream remained unvaried. The trend was foreseeable considering the restrictions imposed on the population. Both pre- and post- pandemic the most important factors were quality of ingredients and attention to hygiene standards. Moreover, due to the Covid-19 pandemic, consumers raised their concern for the respect of hygiene standards and the quality of the service they receive.

Subsequently, the bivariate analysis found many interesting dependent associations among demographic variables and the factors of choice proposed in the questionnaire. Some could have been easily predicted, while others were unexpected.

The last part of data elaboration divided the sample in two clusters according to how much they deemed factors of choice to be influential on their gelato consumption choices. The two groups were distinguished mainly because of their average ratings and did not show distinctive demographic differences. Indeed, clusters averages for profiling variables were really similar to the ones of the sample. Therefore, it has not been possible to define precise user personas to represent each cluster. However, the trends are clear.

A part of the population deems the quality of ingredients as the most important factor, while the other considers all different aspects that are related to gelato consumption. Since more data to better explain this result is not available, some hypotheses were made. This distinction could be based on the fact that there are two kinds of consumers – the first that is normally used to domestic consumption, the second that is more used to eating out occasions. The latter is a more critical and sophisticated type of customers, because their frequent experience has trained their critical eye. Another hypothesis could be that the first type of consumer seeks to enjoy a nice tasting ice-cream and requires the best quality of ingredients only. On the other hand, the second consumer is looking for a complete experience and requires all the aspects of their consumption to be excellent. For sure, the fact that the questionnaire was administered in high consumption season could have been determinant to define the groups of consumers. Indeed, with the customer experience being more frequent in summer, their fresh memories might have influenced their answers regarding the product or the service in general. Another relevant point to raise is that the decision-making process is mainly unconscious. Responses given by interviewees might not fully reflect their behavior, especially in the case of prices – since gelato is accessible to anyone, sometimes consumers simply buy it impulsively without considering other factors but the quality of ingredients. Therefore, it might be more difficult to establish specific user personas and to define their preferences for gelato experience.

Therefore, the take-away results of this analysis for payers in the industry are that Covid-19 has not stopped Italians' willingness to consume gelato. On the contrary, results show how Italians want to reward high quality products and service, regardless of price. However, since the focus was to examine the short-term effects of the pandemic on the gelato industry, this study sets the basis for further research on the medium- or long- term effects of the pandemic on gelato consumption. Moreover, as the definition of types of consumers was poor, to make the study more complete and more significative, some different trials might be computed on the sample. So that, players of the sector might adjust their offer and their communication channel to better satisfy their clients.

In conclusion for the results of this research to bring benefits to the main players in the gelato industry, further studies need to be carried out. This research should focus as a starting point on new distribution channels, such as the delivery service, and towards the improvement of well-established channels, such as shops and retail, based on consumer preferences as outlined above. The findings will give some ideas on how to evaluate the long-term trends among the Italian, European and worldwide population.

Appendix

The following pages present the structure of the questionnaire *Consumption of Gelato and the Effect of the Covid-19 Pandemic,* randomly administered in Italy from July 27th to September 7th, 2020.

Consumi di gelato ed effetti della pandemia da Covid-19

*Campo obbligatorio

Il questionario che le chiediamo di compilare è stato sviluppato da alcuni ricercatori dell'Agri-Food Management and Innovation Lab del Dipartimento di Management - Università Ca' Foscari Venezia e rientra nell'ambito delle attività di ricerca del laboratorio sul comportamento di consumo di beni alimentari.

La compilazione del questionario richiede circa 5 minuti.

Le risposte fornite rimarranno confidenziali, anonime e verranno trattate sempre in forma aggregata nel pieno rispetto della vigente normativa sulla privacy e per soli scopi scientifici.

1. Durante la fase di lockdown attraverso quali canali distributivi alimentari si è rifornito prevalentemente? (massimo 2 risposte) *

Seleziona tutte le voci applicabili.

- [ ] Supermercato/ipermercato
- [ ] Piccolo negozio indipendente
- [ ] Produttore locale (acquisto in loco)
- [ ] Acquisto online

Altro: [ ] ____________________

2. Nel post-lockdown, per le occasioni di consumi al bar o ristorante le sue scelte sono ricadute prevalentemente su: *

Contrassegna solo un ovale.

- ( ) Locali che già frequentavo pre-Covid, gestito da persone di cui mi fido
- ( ) Anche posti nuovi, purché rispettassero le norme di sicurezza
- ( ) Non ho ripreso subito a consumare fuori casa

I consumi di gelato

3. La scorsa estate, con quale frequenza consumava gelato? *

Contrassegna solo un ovale.

- almeno 1 volta al giorno
- più volte alla settimana
- 1 volta a settimana
- 1-2 volte al mese
- non consumavo gelato

4. Qual è la tipologia di gelato che consumava prevalentemente IN CASA la scorsa estate? *

Contrassegna solo un ovale.

- Vaschetta confezionata industriale
- gelato in monoporzione confezionato (es. Magnum, Maxibon...)
- gelato artigianale in vaschetta acquistato in gelateria
- non consumavo gelato in casa
- Altro: ______________________

5. Qual è la tipologia di gelato che consumava prevalentemente FUORI CASA la scorsa estate? *

Contrassegna solo un ovale.

- gelato in monoporzione confezionato (es. Magnum, Maxibon...)
- gelato artigianale da passeggio (cono/coppetta) acquistato in gelateria
- coppa di gelato servita al tavolo della gelateria
- non consumavo gelato fuori casa

6. Nel caso di consumo fuori casa, la scorsa estate: *

Contrassegna solo un ovale.

- Acquistavo prevalentemente il gelato dalle stesse gelaterie
- Non avevo preferenze per particolari gelaterie

7. Il suo consumo di gelato aumenta quando è in vacanza? *

Contrassegna solo un ovale.

- Sì
- No

8. Quanto è disposto a spendere per 1 gusto di gelato sfuso (da asporto)? *

9. Come giudica i seguenti fattori nella scelta della gelateria, in una scala da 1 a 5 (dove 1 indica per nulla importante e 5 molto importante)? *

Contrassegna solo un ovale per riga.

	1 (per nulla importante)	2	3	4	5 (Molto importante)
Servizio					
Prodotto Naturale/biologico					
Varietà dei gusti/assortimento					
Qualità delle materie prime					
Disponibilità di posti a sedere					
Prezzo					
Cortesia del personale					
Localizzazione					
Recensioni					
Segnalazioni di conoscenti/amici					
Standard igienico-sanitari					
Premi e riconoscimenti					
Brand/marca					
Rispetto dei protocolli di sicurezza per Covid-19					
Essere una gelateria indipendente					
Essere parte di una catena di gelaterie					
Ambiente/Atmosfera					
Nuove proposte/Gusti originali					

Offerta di alternative per intolleranze alimentari	⬭	⬭	⬭	⬭	⬭

Scelte e consumi del gelato durante il Covid

10. Ha consumato gelato durante il periodo di lockdown? *

Contrassegna solo un ovale.

- ⬭ Sì *Passa alla domanda 11.*
- ⬭ No *Passa alla domanda 12.*

Consegne a domicilio

11. Ha usufruito di un servizio di consegna a domicilio di gelato sfuso? *

Contrassegna solo un ovale.

- ⬭ Sì, effettuato dalla gelateria
- ⬭ Sì, effettuato da un operatore di food delivery (esempio: Deliveroo, Glovo,...)
- ⬭ No *Passa alla domanda 12.*

Passa alla domanda 14.

Sezione senza titolo

12. Prenderebbe in considerazione tale tipo di servizio (consegna a domicilio)? *

Contrassegna solo un ovale.

- ⬭ Si *Passa alla domanda 14.*
- ⬭ No *Passa alla domanda 13.*

13. Perchè non usufruirebbe della consegna a domicilio? *

Contrassegna solo un ovale.

- Mancanza di capacità e competenze per utilizzare il computer o i servizi offerti dal web
- Disponibilità non immediata del prodotto
- Sfiducia nella sicurezza igienico sanitaria
- Altro: ____________________

14. In che modo la pandemia da Covid-19 ha modificato le sue scelte di consumo di gelato? *

Contrassegna solo un ovale per riga.

	Diminuito	Invariato	Aumentato
Frequenza di consumo			
Consumo fuori casa			
Consumo in casa			
Consumo di gelato confezionato industriale			
Consumo di gelato sfuso artigianale			

15. In che modo la pandemia da Covid-19 ha modificato l'importanza dei seguenti fattori di scelta della gelateria *

Contrassegna solo un ovale per riga.

	Meno importante rispetto allo scorso anno	Invariata	Più importante rispetto allo scorso anno
Servizio			
Prodotto Naturale/bio			
Varietà dei gusti/assortimento			
Qualità delle materie prime			
Disponibilità di posti a sedere			
Prezzo			
Cortesia del personale			
Localizzazione			
Recensioni			
Segnalazioni di conoscenti/amici			
Standard igienico-sanitari			
Premi e riconoscimenti			
Brand/marca			
Essere una gelateria indipendente			
Essere parte di una catena di gelaterie			
Ambiente/atmosfera			
Nuove proposte/gusti originali			
Offerta di alternative per			

intolleranze alimentari

16. In una scala da 1 a 5 (dove 1 indica per niente d'accordo, 5 molto d'accordo) esprima il livello di accordo con le seguenti affermazioni. " A seguito del periodo di lockdown...." *

Contrassegna solo un ovale per riga.

	1 (per niente d'accordo)	2	3	4	5 (molto d'accordo)
Ho adottato una dieta più salutare					
Consumo più prodotti confezionati					
Acquisto di più da piccoli negozi indipendenti					
Acquisto di più da produttori locali					
Svolgo più attività fisica e sportiva					
Presto più attenzione ai temi della sostenibilità					
Sono preoccupato per la situazione economica					
Sono preoccupato per la situazione sanitaria					
Pongo maggiore attenzione ai prezzi di prodotti alimentari					

17. Ha intenzione di andare in vacanza nell'estate 2020? *

Contrassegna solo un ovale.

- Sì
- No

Informazioni generali

18. Anno di nascita *

____

19. Numero componenti del nucleo familiare *

____

20. Di cui bambini in età scolare *

____

21. Genere *

Contrassegna solo un ovale.

- Maschio
- Femmina

22. Qual è la sua professione? *

Contrassegna solo un ovale.

- Dipendente pubblico/privato
- Lavoratore autonomo
- Studente
- Disoccupato in cerca di occupazione
- Non lavoratore (non in cerca di occupazione)
- Altro: ______________________

23. Dove risiede? *

Contrassegna solo un ovale.

- Area rurale/periferia
- Zona urbana/centro città

24. Provincia di residenza *

____

Questi contenuti non sono creati né avallati da Google.

Google Moduli

References

Acomag, et al., 2020. *Dati di mercato del gelato in Italia - 2020.* [Online]
Available at: https://www.ilgelatoartigianale.info/dati-di-mercato/dati-di-mercato-del-gelato-in-italia-2020.kl
[Accessed on April 2021].

ANSA, 2020. *A domicilio, in quarantena vince la pizza e il gelato fa boom.* [Online]
Available at: https://www.ansa.it/canale_lifestyle/notizie/food/2020/04/20/a-domicilio-in-quarantena-vince-la-pizza-e-il-gelato-fa-boom_e95744eb-3911-47de-96c4-b37cc8882e16.html#:~:text=A%20domicilio%2C%20in%20quarantena%20vince,boom%20%2D%20Food%20%2D%20ANSA.it
[Accessed on April 2021].

ANSA, 2020. *Coronavirus: Fipe, ok servizio food delivery è consentito.* [Online]
Available at:
https://www.ansa.it/canale_terraegusto/notizie/in_breve/2020/03/23/coronavirus-fipe-ok-servizio-food-delivery-e-consentito-_38da6b07-7893-499b-a69d-82309355d4f9.html
[Accessed on April 2021].

ANSA, 2020. *Fuori casa, come cambieranno le abitudini nel post coronavirus.* [Online]
Available at: https://www.ansa.it/pressrelease/lifestyle/2020/04/30/fuori-casa-come-cambieranno-le-abitudini-nel-post-coronavirus_eb1cfbd7-af15-4bf0-bb11-a41f17ec3a5a.html
[Accessed on April 2021].

ANSA, 2020. *Nell'estate Covid crolla il consume del gelato del 20%.* [Online]
Available at:
https://www.ansa.it/canale_terraegusto/notizie/business/2020/07/06/coldiretti-in-estate-covid-crolla-consumo-del-gelato-20_6c0978fc-3d3e-4532-a44e-76bbd5a7957d.html
[Accessed on April 2021].

ANSA, 2020. *Pandemia, pagamenti digitali e comodità così il food delivery ha fatto il boom.* [Online]
Available at:
https://www.ansa.it/canale_lifestyle/notizie/food/2020/05/27/pandemia-pagamenti-digitali-e-comodita-cosi-il-food-delivery-ha-fatto-il-boom_efb9561f-3cbe-45da-b3e7-026b0e042ca5.html
[Accessed on April 2021].

Ben, L., 2020. Gdo, in aumento i consumi a Pasqua (+2,2%). Star del carrello gli ingredienti per fare dolci in casa. *il Sole 24 Ore*, 10 04.

Censis & Coldiretti, 2021. *Primo rapporto sulle abitudini alimentari degli italiani.* [Online]
Available at:
https://www.largoconsumo.info/102011/DOCAbitudinialimentaricensiscoldiretti-1011.pdf
[Accessed on April 2021].

CGIA, 2020. *Studio del comparto del gelato artigianale.* [Online]
Available at:
https://www.mostradelgelato.com/wpCcontent/uploads/2020/07/2020CLUGLIOC
[Accessed on April 2021].

Chepkemoi, J., 2020. *Which country eats the most ice-cream?.* [Online]
Available at: https://www.worldatlas.com/articles/the-top-ice-cream-consuming-countries-of-the-world.html
[Accessed on April 2021].

Coldiretti, 2020. *Consumi, crolla del 20% il consumo di gelato nell'estate del Covid.* [Online]
Available at: https://www.coldiretti.it/economia/consumi-crolla-del-20-il-consumo-di-gelato-nellestate-del-covid
[Accessed on April 2021].

Coldiretti, 2020. *Istat: -10% consumi alimentari famiglie.* [Online]
Available at: https://www.coldiretti.it/consumi/istat-10-consumi-alimentari-famiglie
[Accessed on April 2021].

Coop Italia, 2021. *Rapporto Coop 2020 versione definitiva.* [Online]
Available at: https://www.italiani.coop/rapporto-coop-2020-versione-definitiva/
[Accessed on April 2021].

CREA, 2020. *L'impatto dell'emergenza Covid-19 sulle abitudini alimentari degli italiani nel periodo della quarantena di marzo-aprile 2020.* [Online]
Available at:
https://www.crea.gov.it/documents/59764/0/ALIMENTAZIONE+E+COVID+OERSA+Special+Issue+%281%29.pdf/b3f491a9-37c9-4fbc-665c-6b26e1cd2131?t=1611921890682
[Accessed on April 2020].

Crepaldi, G., 2021. *Covid-19 come la pandemia ha cambiato la spesa e le abitudini alimentari dei consumatori in Europa.* [Online]
Available at: https://ilfattoalimentare.it/coronavirus-consumatori-ue.html
[Accessed on April 2021].

Gambero Rosso, 2019. *Gelato in Italia, business da miliardi di euro di fatturato.* [Online]
Available at: https://www.gamberorosso.it/notizie/gelato-in-italia-business-da-miliardi-di-euro-di-fatturato/
[Accessed on April 2021].

Il Gelato Artigianale, 2020. *Dati di mercato del gelato in Italia - 2020.* [Online]
Available at: https://www.ilgelatoartigianale.info/dati-di-mercato/dati-di-mercato-del-gelato-in-italia-2020.kl
[Accessed on April 2021].

Il Gelato Artigianale, 2020. *Quarta edizione dell'Osservatorio Nazionale Just Eat: il gelato artigianale a domicilio cresce del 110%.* [Online]
Available at: https://www.ilgelatoartigianale.info/dati-di-mercato/quarta-edizione-

dell-osservatorio-nazionale-just-eat-il-gelato-artigianale-a-domicilio-cresce-del-110-.kl
[Accessed on April 2021].

ISMEA, 2020. *Emergenza Covid 19: pubblicato il rapporto ISMEA sulla domanda e l'offerta dei prodotti alimentari nelle prime settimane di diffusione del virus.* [Online]
Available at:
http://www.ismea.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/10990
[Accessed on April 2021].

Istituto del Gelato Italiano; Eurisko, 2011. *Gli italiani e il gelato fuori casa.* [Online]
Available at:
http://istitutodelgelato.it/areastampa/Gli%20italiani%20e%20il%20gelato%20fuori%20casa%20-%20Ricerca%20Eurisko%20IGI.pdf
[Accessed on April 2021].

Istituto Italiano del Gelato, 2021. *Origini e storia del gelato.* [Online]
Available at: https://www.istitutodelgelato.it/origini-e-storia-del-gelato/
[Accessed on April 2021].

Just Eat, 2020. *La mappa del cibo a domicilio in Italia.* [Online]
Available at: https://www.justeat.it/CmsAssets/media/Images/Blogs/IT/quarto-osservatorio-just-eat/REPORT-MAPPA-DEL-CIBO-A-DOMICILIO-IN-ITALIA_2020.pdf?bid=f1d4967b66e7435e917216287b58eb71
[Accessed on April 2021].

Kassambara, A., 2017. *Practical guide to cluster analysis in R.* Edition 1 a cura di s.l.:STHDA.

Kaufman, L. & Rousseeuw, P. J., 1990. *Finding groups in data: an introduction to cluster analysis.* New York: Wiley.

Manuelli, M. T., 2020. Gelato, business da 4,2 miliardi alla prova dell'estate Covid. *il Sole 24 Ore*, 22 06.

McKinsey, C. &., 2021. *The path forward for European grocery retailers.* [Online]
Available at: https://www.mckinsey.com/industries/retail/our-insights/the-path-forward-for-european-grocery-retailers
[Accessed on April 2021].

Montagnoli, L., 2019. *Cucinano meno e mangiano più carne: gli italiani a tavola secondo il Rapporto Coop 2019.* [Online]
Available at: https://www.coldiretti.it/consumi/istat-10-consumi-alimentari-famiglie
[Accessed on April 2021].

Qds, 2021. *Covid, la pandemia ha tagliato centrotrenta miliardi di consumi.* [Online]
Available at: https://qds.it/il-covid-taglia-130-miliardi-di-consumi/
[Accessed on April 2021].

Repubblica, L., 2021. Istat, nel 2020 calano i consumi alimentari. Federalimentare: "Sui dati influisce il crollo della ristorazione". *La Repubblica*, 02 03.

Soressi, M., 2021. Come cmabierà il modo di fare la spesa? Ecco i 10 trend del post-covid. *il Sole 24 Ore*, 08 04.

Tarana, S., 2021. *Report TradeLab: quali scenari enl fuori casa post-pandemia?.* [Online]
Available at: https://www.ristobusinessnow.com/report-tradelab-quali-scenari-nel-fuori-casa-post-pandemia/
[Accessed on May 2021].

Terzulli, G., 2021. *Istat: raddoppia la propensione al risparmio.* [Online]
Available at: https://www.financialounge.com/news/2021/04/09/istat-raddoppia-la-propensione-al-risparmio-degli-italiani/
[Accessed on April 2021].

Treccani, 2021. *Gelato.* [Online]
Available at: https://www.treccani.it/vocabolario/gelato/
[Accessed on April 2021].