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The Plant-Based Meat

A study of packaging to communicate a sustainable food product's innovation

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Introduction

The concept of sustainability as it is known today has its roots towards the end of the 80s of the last century. In those years, the main concern was about the future availability of resources that had to cope with the increasing population (Meadows *et al*., 1972). Indeed, at the time, the earlier sustainable development concept focused on equilibrium between use of resources, carrying capacity of the environment and social expectations and needs. Consequently, also future generations' perspective has been included in the definition of sustainable development presented in *The Brundtland Report*: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland *et al.*, 1987). Moving further, the concept of sustainable development has evolved again through the years embracing also other perspectives, up to present days. As a matter of fact, to have a sustainable development today means to find the correct equilibrium among three fundamental pillars: economic growth, social cohesion, and environmental protection. Thus, the three elements of people, planet and profit and their respective interests must be always taken simultaneously into consideration. According to this sustainable development's concept, no one of those elements can be individually pursued without being harmful to each other since all of them must be pursued simultaneously in doing business. Hence, the Corporate Social Responsibility concept emerged as the idea that the company has an economic rationale for being responsible, regardless of the sector in which it operates or its core business. Moreover, being sustainable, for today's company, means to have a sustainable business in a strategic perspective of long-term profitability in its ecosystem.

However, this is not always applied. Many are, indeed, the risks emerging from a reckless use of resources. Looking at the Global Risk Landscape drawn by the World Economic Forum, it emerges that many are the risks, of different nature that can probably happen in the next future. Among them, environmental related risks are most likely. Thus, has highlighted by the World Global Forum (2020), an immediate shift to a new paradigm aiming at pursuing the so-called sustainable development is needed. To do so, it is fundamental to find elements, in all economic sectors, that produce an equilibrium in the ecosystem that might be sustained for a long time. As regard to food sector, these new elements seem to be found in new food alternatives produced in a more ethical way and reducing the use of natural and animal resources.

Focusing to the sustainability trend applied to the food sector, during the last years factors as green consumerism, environmental pollution, and the increased attention on people's health and wellness have led to the diffusion of new eating habits: vegetarianism and veganism are just some of them (Brytek-Matera, 2020). Besides, also flexitarian eating pattern have recently started to emerge. Indeed, among all these new eating habits, one recurrent topic is the intention to significantly reduce meat consumption due to ethical, environmental, health, animal welfare or, even taste motivations (Armstrong Soule & Sekhon, 2019).

In this given framework, some new start-ups and some other companies already operating in the food sector have recently started to make a product able to recreate the aspect, the texture, the taste, and other characteristics of traditional animal-based meat but composed of plant-based ingredients only: the so-called plant-based meat. Hence, processed meat products start being replaced by plant-based products since they seem to need less resources to be produced and to be produced without polluting and without creating other environmental and ethical issues characterizing instead the traditional animal-based meat production process. From a marketing point of view, the increase of consumption of these products can be related both to product and distribution changes. About the product, technology enables to create flavour that mimics meat better than in the past, therefore even omnivores begin accepting these new meat alternatives. As far as the distribution is concerned, they are more often available in restaurants and on supermarkets shelves, and thus one of the barriers in the purchase and adoption of meat substitutes collapses.

At present, plant-based meat appears to fit more the "niche" category of flexitarians (Van Loo *et al.*, 2020). Nevertheless, interest in these products is rising both from vegetarian but especially non-vegetarian consumers. This condition opens new challenges for firms operating in meat or alternative to meat industries. Proof of them is the recent introduction of these kinds of burgers in both supermarkets and fast-food leading chains. Although the main target seems to be flexitarians, companies aiming at consistently increase the market share of these products must target not (only) vegan consumers, but also people interested in reducing meat consumption for sustainability, health, or other causes. Previous research (Hoek *et al.*, 2011) demonstrate that the motives for being flexitarian are multiple: health, weight control, natural content of foods, concern for

animal welfare and environmental issues. On the contrary, vegan and vegetarians are primarily motivated by compassion for animal welfare and the environment. Therefore, potential market is composed by different segments with different needs so businesses must understand not only who they are but also what they search for and look at during the purchasing process. Hence, plant-based meat companies should create their image according to their primary target, defined based on dietary habits. Then they should convey messages accordingly.

One of the most important communication tools in the food sector to convey these messages is the packaging. Previous studies suggest that packaging plays a crucial role in product success, especially in the fast-moving consumer goods industry (Simms & Trott, 2010) where more and more buying decisions are made at the point of purchase. In this new market, there has been much debate about labelling and naming because the use of a term such as "meat" or "burger" might be misleading. However, naming and labelling are just one side of the coin. Design factors such as size, colours, shape, pictures, lettering all contribute to the appeal of the product and create an impression of the product and brand in the consumers' minds. Plant-based meat companies often use meat pictures, drawings, or symbols related to beef (i.e., barbecue or fire) to catch consumers' attention, but there still is a scarcity of research about the consumer preferences and perceptions about different stimuli in the packaging. Some firms want to foster the mismatch between conventionally meat and plant-based meat because part of consumers searches for meat products imitations, that recall hamburger or chicken packaging. On the opposite, others do not want any associations with meat or animals, thus they prefer animal-free packaging because they target vegan users. Even if the appeals used in food packaging might influence the consumers' choice, little is known about the perception of different visual information that could persuade the consumer to adopt these products.

Taking the perspective of such an innovative food product, this thesis aims to study what consumers think about plant-based meat, what elements will grab their attention on the packaging, and how perceptions vehiculated through its packaging change according to consumers' different eating habits and different motivations in choosing this type of food. To reach this purpose, this study exploits both qualitative and quantitative analysis. Thus, the thesis will be organized as follows.

The first Chapter takes a historical perspective to explain the origins of the sustainable development concept, its different approaches until its modern definition and diffusion in businesses in all the economic sectors. Consequently, Chapter 2 focuses on sustainability and its communication in the food sector, both from consumers' and companies' point of view, analysing theoretical models of consumer behaviours in food purchases choices, the food chain structure and its main issues together with different strategies towards sustainable solutions. Furthermore, at the end of the chapter, an analysis of packaging as a powerful marketing tool for food products will be made. Moving further, Chapter 3 is dedicated to the analysis of those innovative animal-based meat alternatives. Indeed, in this chapter is presented the plant-based meat case, the main topic of this research. Moreover, after having analysed current alternative in dietary habits, the chapter concludes discussing further implications of the direction that these traditional meat's alternatives are taking in the road through sustainability. In this framework, the most recent alternative, the synthetic meat, is illustrated.

To conclude, in Chapter 4 will be presented the research aiming at understanding whether and how different dietary habits influence the perception of plant-based meat packaging. Due to the innovative character of this product and the co-existence of various targeting segments, to analyse consumers' perception on this product appears as fundamental from a marketing point of view. To investigate the topic, three different studies have been performed: first, 17 in-depth interviewees have been conducted with consumers both vegetarians, flexitarians, and omnivores about their eating habits and what packaging appeals would persuade their decision to try the food category. Second, plant-based meat packaging of the main brands available in Italy have been analysed in order to classify them based on their visual. Finally, through an online survey, three of them have been tested (namely *Next Level Burger*, *Via Emilia* and *Unconventional Burger*) performing a brand associations test through the "Brand Association Reaction Time Task" (BARTT). This neuromarketing technique's goal is used to define how different packaging variables affect different perceptions in consumers' minds so their buying behaviour. Indeed, this test enables measurement of the frequencies and reaction times of participants' judgments as to whether or not words are implicitly associated with brands or products (Till *et al.*, 2011). Then, the measurement of the associations has been combined to the kind of dietary of participants and results are presented, for both qualitative interviews and online survey.

Chapter 1: A Theoretical Framework for Sustainability

1.1: The origins of *Sustainable Development*

The modern concept of sustainable development as it is known nowadays is complex and multi-faceted. It is the outcome of several theories and concepts expressed over time in many years, starting from the seventies of the twentieth century. The modern sustainable development concept has its roots mainly in the early concept of sustainable development illustrated in *The Brundtland Report*, known also as *Our Common Future*, published in 1987 from the *World Commission on Environment and Development* (WCED). *Our Common Future* become mainstream thanks to the so-called *Agenda 21*, a document drafted "at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, 3 to 14 June 1992" (UNCED, 1992). *Agenda 21* represented "a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment"[1] that the Member States had to take. According to *The Brundtland Report*, "sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland *et al.*, 1987). One of the key elements of this definition is the use of resources and their availability. Even though the availability of the resources is not explicitly underlined in the above definition of sustainable development, it is a fundamental aspect to consider when referring to meeting people's needs. Without resources, either tangible or intangible, it is impossible to satisfy those needs. Therefore, the earlier sustainable development concept focuses on equilibrium between use of resources, carrying capacity of the environment and social expectations and needs.

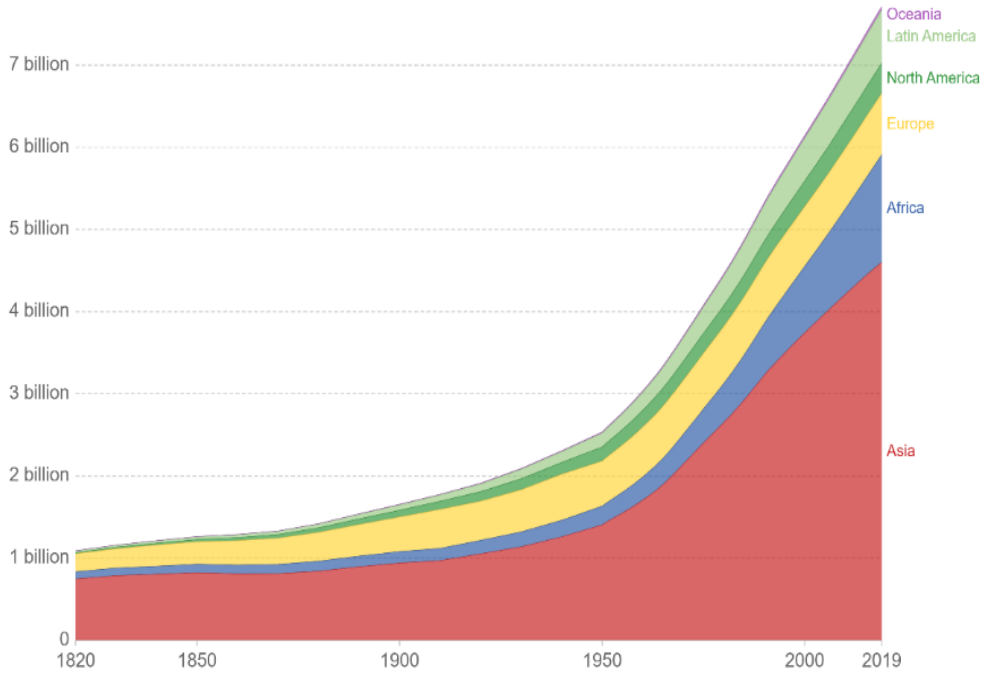
The reasons why the end of the twenty-century witnessed an increase of attention on sustainable development can probably be found on: a huge demographic explosion, some issues due to post-industrialization pollution, the diffusion of green consumerism trend and also in other environmental and social disasters. Concerning the latter, CBS News has ranked the worst environmental disasters in the history. Among these there is the Chernobyl disaster happened in 1986 when reactor No. 4 exploded and caught fire releasing radiations that caused physical or psychological effects to millions of people. In

[1] https://sdgs.un.org/goals [Access on 15/02/2021]

the Seveso disaster, happened in 1976 near Milan, a dioxin leak from a factory "caused the death of 3,300 animals upon contact with the gas and another 80,000 animals were slaughtered to prevent them from entering the food chain."[2] During the same year, "a partial nuclear meltdown inside one of Three Mile Island's reactors […] contaminated the surrounding environment with radioiodine and krypton gas."[3] Another one in this rank is the famous Bhopal disaster, happened in India in 1984 when "a poison gas leak from a pesticides plant in the central Indian city of Bhopal […] cost more than 2,850 lives."[4] All those terrifying environmental disasters are historically considered as some of the most dangerous nuclear and chemicals disasters. Thus, they are peculiar examples of the economic activities' limits for environment preservation. They all highlighted the need for policymakers to take some serious corrective and prevention measures. Among these, the main ones were referring to the implementation of stringent safety regulation for both the employees and the community around the factory and prevention policies of pollution control. Besides these environmental disasters, in the eighties, the higher awareness on sustainability issues can be also due to a huge demographic explosion. As it is possible to see from the graph below (Figure 1.1), "two hundred years ago the world population was just over one billion. Since then, the number of people on the planet grew more than 7-fold to 7.7 billion in 2019."[5]

[2] https://www.cbsnews.com/pictures/worst-environmental-disasters/5/ [Access on 10/03/2021]
[3] https://www.cbsnews.com/pictures/worst-environmental-disasters/5/ [Access on 10/03/2021]
[4] https://www.cbsnews.com/pictures/worst-environmental-disasters/5/ [Access on 10/03/2021]
[5] https://ourworldindata.org/world-population-growth#population-growth-by-world-region [Access on 10/03/2021]

Figure 1.1. World Population by Region



Source: ourworldindata.org, 2021.

1.2: Different Approaches to Sustainable Development

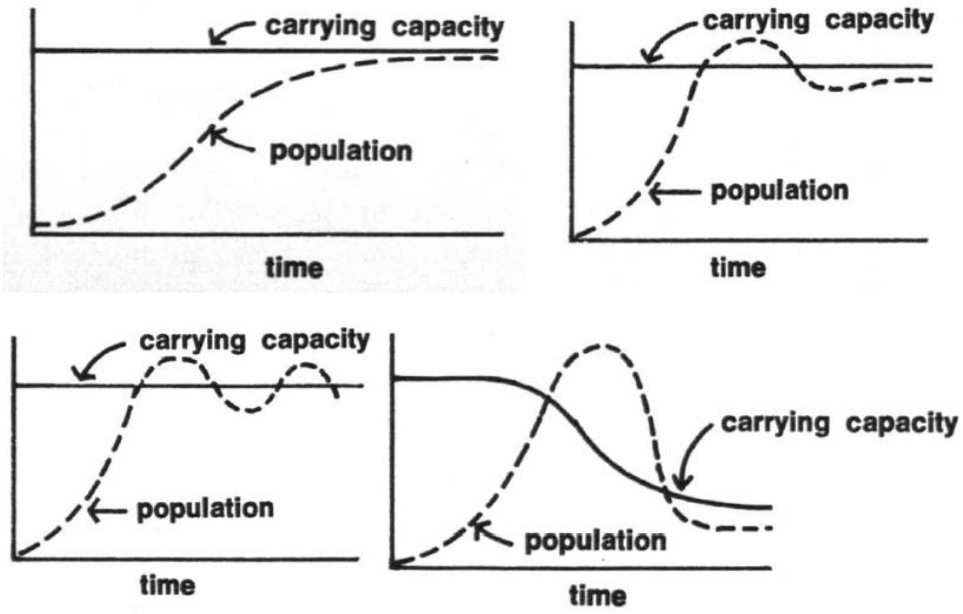
1.2.1: The Economic Approach

Moving backwards through the origins of the sustainable development concept, the main problem related to resource availability on which *The Brundtland Report* definition of sustainable development is built were firstly highlighted by Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III, in their *The Limits to Growth Report* commissioned by the Club of Rome to the Massachusetts Institute of Technology (MIT) and published in 1972. This report aimed at contributing to the project on the predicament of mankind conducted by The Club of Rome itself. The Club of Rome was born in April 1968 from the meeting of "a group of thirty individuals from ten countries – scientists, educators, economists, humanists, industrialists, and national and international civil servants – gathered in the Accademia dei Lincei in Rome. They met at the instigation of Dr Aurelio Peccei, an Italian industrial manager, economist, and man of vision, to discuss a subject of staggering scope – the present and future predicament of man" (Meadows *et al.*, 1972). Therefore, The Club of Rome started to be defined as an "informal organization" having as purposes "to foster understanding of the varied but interdependent components – economic, political, natural, and social – that make up the global system in which we all live; to bring that new understanding to the attention of

policymakers and the public worldwide; and in this way to promote new policy initiatives and action" (Meadows *et al.*, 1972).

Using an innovative computer simulation, the MIT team was able to recreate the growth of the population and the resource supplies availability to compare them together. To synthesize, the two main theses of this report were the following. On the one hand, if the current (at the time the report was published) population growth rate, industrialization, pollution, food production, and resource exploitation continue unaltered, the limits of development on this planet will be reached at an unspecified time within the next hundred years. The most likely result will be a sudden and uncontrollable decline in population and industrial capacity. On the other hand, they assessed the possibility to change the rates of development and to reach a condition of ecological and economic stability, sustainable even in the distant future. The state of global equilibrium should be designed so that the needs of each person on earth are met, and each has an equal opportunity to realize their human potential (Meadows *et al.*, 1972). In other words, the growing trend of population, energy, pollution, and industrial development together with the decrease of available resources would have brought the world economic system to collapse within the twenty-first century if no corrective actions have been taken. "A major purpose in constructing the world model has been to determine which, if any, of these behaviour modes (Figure 1.2) will be most characteristic of the world system as it reaches the limits to growth. This process of determining behaviour modes is "prediction" only in the most limited sense of the word" (Meadows *et al.*, 1972). To build the models in Figure 2, the authors defined the carrying capacity as the maximum population that can survive in a definite space given the available resources (Meadows *et al.*, 1972).

Figure 1.2. Four possible representations of behaviour models of the population-capital system made by MIT indicating the system behavioural tendencies.



Source: Meadows et al., 1972.

Even though this economic approach to resource availability represents the first approach to the sustainable development concept, it has some limits. Thus, it can, unfortunately, be considered a myopic one. Firstly, it did not take into consideration some fundamental characteristics of resources. To start, it would not consider the distinction among resources: some can be renewable while some others cannot. However, all resources are limited. As it was previously said, the sustainability issue is complex and one of the main reasons for this complexity is to be found in how limited resources are managed worldwide. Moreover, looking at the sustainability issue through the systematic adaptation of the traditional economic system, in the long-term people will replace not renewable resources with renewable ones to reach the microeconomic equilibrium. This tendency is known as "economic adaptation" (Katz *et al.*, 2015). This would happen because the dynamic of prices will provide the use of the resources considered as "the better": the renewable resources, cheaper than the not renewable ones. The explanation must be found in the dynamic of prices of both those resources. On the one hand, looking at the renewable resources, their rate of consumption should be equal or inferior to their rate of regeneration, otherwise, it will increase their price making them not convenient. Thus, the higher the rate of regeneration of renewable resources concerning consumption, the lower their cost, so people should be more willing to buy them. On the other hand, the marginal cost of non-renewable resources will increase systematically if

their consumption now does not decrease. Since these non-renewable resources in the ecosystem are limited, the more is consumed now, the fewer will remain in the future. This traditional economic approach is also myopic since it is based on the wrong premise: the perfect equilibrium does not exist in real situations. Besides, the price dynamic does not necessarily follow the actual availability of resources. Moreover, two more assumptions must be considered to avoid misleading concerning resource availability. Firstly, resource depletion does not occur linearly or predictably; it may occur catastrophically, so no equilibrium or adaptation is possible. Secondly, some resources like water, air, atmosphere, soil, bees, which are critical for the sustainability of the environment, are renewable but not fungible, nor replaceable. This concept is against the main idea of the economic traditional approach, saying instead that more or less any possible resource can be mutated by money since everything is reducible to money.

Moreover, if a myopic typical economic approach to sustainability-related risks is adopted, the latter is going to be underestimated by people and also business managers due to significant cognitive biases that tend to create a misleading approach to the sustainability issue[6]. Therefore, another aspect to consider in analysing this economic approach to sustainable development and its consequent interpretation is the influence that it can have on society. A relevant part of the society has spread and still spreads false knowledge, thus mitigating awareness and enhancing the cognitive bias towards sustainability, without driving the change. While knowledge is mainly a rational process about data, information and it looks mainly at the objective, implying understanding and without necessarily implying emotions or sensations, awareness is instead subjective, and it is mainly a perceptive process. Thus, awareness concerns risk and its consequences and it does not necessarily imply understanding but provides emotions and sensations. Therefore, people can be differently aware of sustainability issues leading society to be affected by cognitive biases on this topic. Thus, people need to be aware of the sustainability problem and have to spread the correct knowledge on sustainability-related risks.

Cognitive biases are connected with the idea that, even if some company or some other source is saying the truth about sustainability issues, people would not believe it due to the presence of cognitive biases. In other words, cognitive biases are some mind

[6] https://www.verywellmind.com/what-is-a-cognitive-bias-2794963 [Access on 10/03/2021]

constructions that do not allow some people to see what is evident to someone else. As asserted by Haselton *et al.* (2005): "Where biases exist, individuals draw inferences or adopt beliefs where the evidence for doing so in a logically sound manner is either insufficient or absent". The main theory aiming at explaining the cognitive bias about the sustainability of development is illustrated by Paul and Anne Ehlrich (1981) in their *Rivet-Popper Hypothesis*. The *Rivet-Popper Hypothesis* aims at explaining the relationship between the ecosystem in which all the living beings are embedded in considering the availability of resources for their sustainment. In their hypothesis, the authors have used the metaphor of an aeroplane and its rivets to explain how all the elements in the ecosystem are essential to it, even though the ones that seem more useless. The premise of the just mentioned hypothesis is that the aeroplane is like the ecosystem, where the rivets are compared to the resources available, and the concept of redundancy used by the authors is referred to as the resilience concept. In an aeroplane, all parts are joined by using thousands of rivets. If every passenger travelling in it starts popping a rivet to take home, it may not affect flight safety initially, but as more and more rivets are removed, the plane becomes dangerously weak over a while. Furthermore, which rivet is removed may also be critical. Thus, the main idea of this hypothesis is that it seems possible to keep popping out from an aeroplane's wings those rivets that seem useless to make the flight more efficient and economically convenient. However, this will probably bring the aeroplane itself to collapse and to crush even if who is flying on it is sure that it would not. The bias present in this hypothesis is that rivets are not all the same and, even if they seem redundant, there is no knowledge about which is the exact rivet that will provide a catastrophe if it is taken away. The explanation concerns, firstly, the fact that all rivets have a specific function, a specific role. They are placed in the wings due to a certain reason even though their fungibility is not clear at a first sight. The same happens in the ecosystem: not all resources have the same functions and characteristics, as was previously underlined. Some resources are fungible while some others are not. Secondly, trends are neither linear nor constant. There are no warning signals about fast-evolving collapse, discontinuities, and breaking points, so it is not possible to foresee the trend of all resources in the ecosystem. Another explanation of this allegory can be found in the fact that unknown interactions among the elements play a major role as in aeroplane's rivets as in the ecosystem's resources. Failure of representation and side effects are not always clear. Given all the hidden interactions with the rest of the environment, it is easier

to represent the situation in a way that can easily be misleading, without explaining the hidden risk. Moreover, past experience can be also very misleading, and it cannot be applied in talking about the natural ecosystem. In nature as in society, the marginal increase of an issue would provide a marginal consequence that will be totally non-linear or even catastrophic. To sum up, the *Rivet-Popper Hypothesis* states that in the light of the uncertainty about both the degree of redundancy and the size of future stresses in both aeroplane wings and ecosystems, programs of continual "rivet-popping", meaning forcing species to extinction, in the case of ecosystems, are not wise. In other words, rivets do not have the same role, as non-fungibility and failure of past experience highlight. Nevertheless, trends are neither linear nor constant, there are no warning signals about fast-evolving collapse, discontinuities, and breaking point. To conclude, unknown interactions play a major role: failure of representation of those interactions and side effects are crucial determinants of the efficiency of the flight as one of the ecosystems (Ehlrich *et al*., 1981). Cognitive biases affecting society arising from this theory are so related to a misleading interpretation of the role of various elements in their ecosystem.

In light of this interpretation, sustainability-related risks are often underrated due to cognitive biases, so a new mindset is needed to overcome those biases. Some of the risk biases that must be analysed and considered when talking about sustainable development are the following. On the one hand, *Anchoring or Confirmation Bias*[7] means to use enhanced contingent information to affect the decision for the future, without taking a long-term perspective. Taking into consideration the sustainability perspective, this means to base important decisions and opinions on this issue just by looking at the resources and the information available in a particular moment without the ability to foresee the future of the planet and to contextualize them correctly. On the other hand, *Availability Bias*[8] concerns the use of a distorted representation of reality to affect decisions that cannot foresee risks coming. This bias affects, for instance, decisions when are based on looking at what other people or other competitors are doing. The idea behind this bias is the following: "everybody is more or less in the same situation as me, so it is not a big deal." To conclude, *Hyperbolic Discount Bias*[9] happens when wrong priorities affect people's decisions. This can affect people when they base their opinions on the

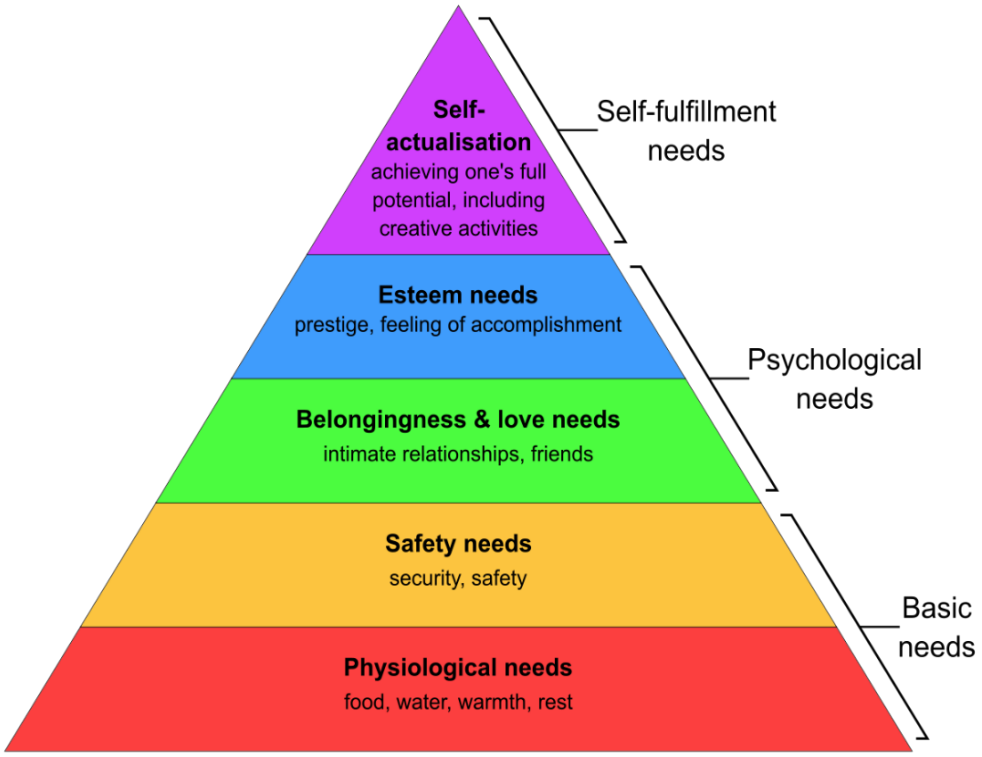
[7] https://www.verywellmind.com/what-is-a-cognitive-bias-2794963 [Access on 10/03/2021]
[8] https://www.verywellmind.com/what-is-a-cognitive-bias-2794963 [Access on 10/03/2021]
[9] https://www.verywellmind.com/what-is-a-cognitive-bias-2794963 [Access on 10/03/2021]

sustainability issue in the short-term without considering long-term effects. All these cognitive biases make sustainability-related risks underrated so a new mindset is needed to create awareness on these issues among society.

1.2.2: The Institutional Approach

Considering the framework described in this paragraph, it is easier to understand why the economic approach to sustainable development is incorrect and why another approach describing and defining sustainable development is needed. Therefore, the second tentative to explain sustainable development that has arisen is the institutional one. As is illustrated in the opening of this chapter, the institutional approach is based on the thesis of *The Brundtland Report* where sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland *et al.*, 1987). Moving one step further from the economic approach of the early seventies, in this concept illustrated in *The Brundtland Report*, the focus of sustainable development is moved on the equilibrium between use of resources, the carrying capacity of the environment and social expectations and needs. Even though this definition of sustainable development tries to overcome the limits related to the economic approach described before, some issues are still present in this interpretation. Among these, the first one is related to how "needs" can be defined. According to Maslow, the father of the *Theory of Human Motivation*, different human needs can be categorized in a pyramid scheme based on the priority applied to those needs' satisfaction (Maslow, 1943). Following this hierarchy of needs, each person can move upwards the pyramid (Figure 1.3) in the attempt to satisfy his/her needs in the following order: *Basic Needs* firstly (physiological and safety needs), *Psychological Needs* as second step (love and belongingness and esteem needs) and *Self-fulfilment Needs* in the end (Maslow, 1943).

Figure 1.3. Pyramid of Needs



Source: Maslow, 1943.

In applying the concept of "need" expressed in Maslow's Theory to the sustainable development definition stated in *The Brundtland Report*, some questions can arise. To start, up to which of Maslow's levels, a "need" justify the use of resources? Taking food into consideration, it is easily understandable how the uses of a big number of resources can be justified to satisfy this physiological need. However, taking into consideration needs in one of the upper levels of the pyramid, like "respect" or "self-esteem", it is no more easily understandable how the use of resources is justified to satisfy those needs. If, for instance, to gain "self-esteem" and "respect", is required to buy branded clothes or expensive items, is this use of resources still justified to satisfy those needs? Nevertheless, it is not possible to know exactly what the present needs are since "need" is not a universally defined category. Again, another issue related to this concept of "needs" is time and space. Probably, it is not possible to consider the "needs" to be all the same regardless of time and space. On the one hand, concerning space, for instance, needs cannot be the same either all-over the world or all-over different parts of the same country. On the other hand, concerning time, needs of people who lived during, for example, World War I or World War II, are not the same as the ones of people who are living today in the third millennium. In the same way, these last needs will probably not

be the same as the people who will live on Planet Earth in the future. Another limit to this institutional approach is related to the relationship between what is done today according to what can be done tomorrow. A question that can arise from *The Brundtland Report*'s definition is the following: "What does "without compromising" mean?" It is not always possible to know today how the use of some resources could affect the future. More specifically, it is not always possible to know now if resources used today will compromise the use of other resources tomorrow or not. As the last limit to the institutional approach, there is the significance of "ability to meet" used in the definition. It is not always clear on which basis and to what extent the satisfaction of those needs justifies actions and resources use.

To conclude, it is now clearer how both the economic and institutional approaches to sustainable development cannot be applied to explain this concept as the correct ones since they have some important limits. Therefore, a new approach to explain what sustainable development is necessary and this new framework able to overcome all those limits illustrated above will be illustrated in the next paragraph. Nevertheless, *The Brundtland Report* has become the reference point for the definition of the concept of sustainability.

1.3: Sustainable Development Today

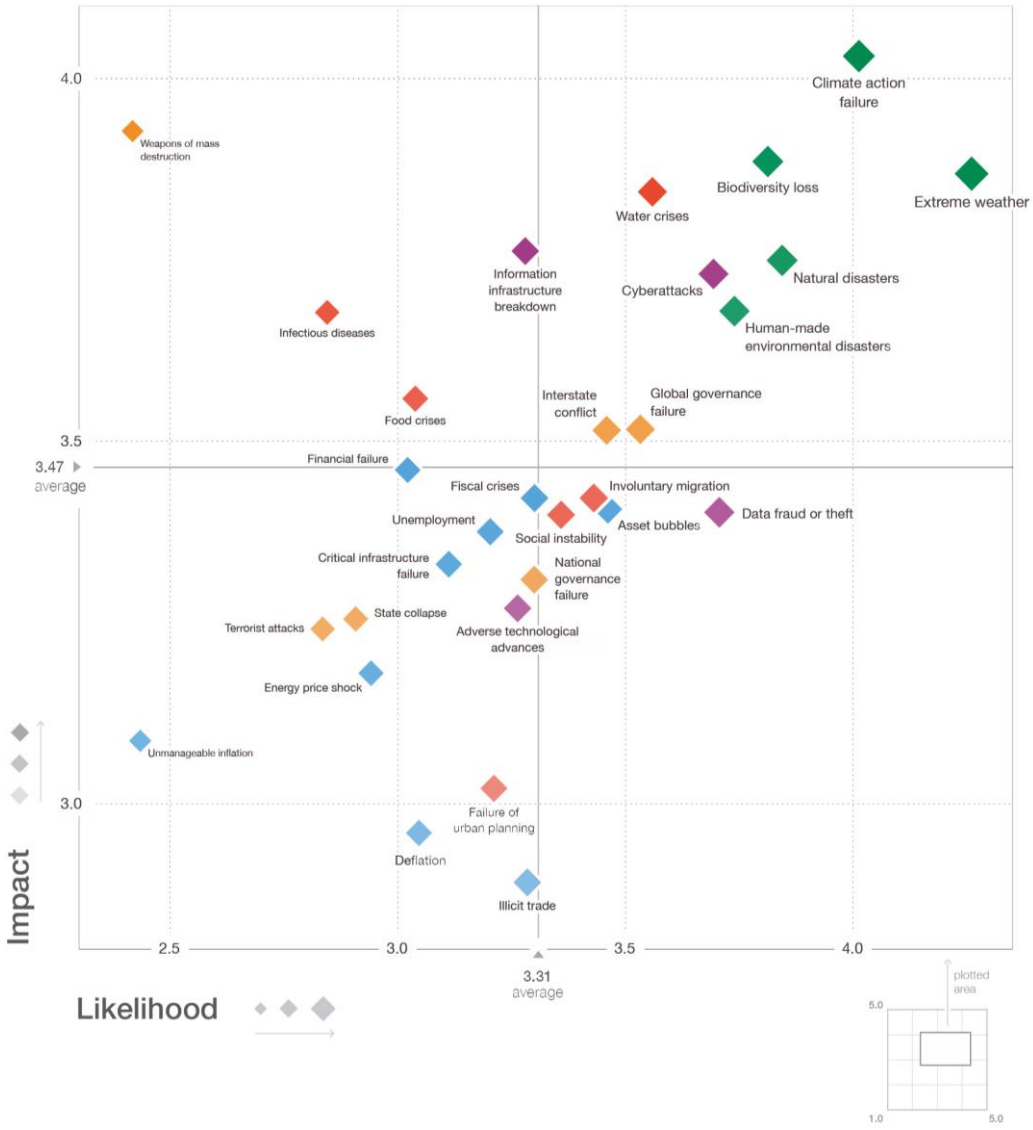
1.3.1: The Global Risk

Given the historical perspective on sustainable development explained in the previous paragraph, it is now clearer why it is important to depict a more exhaustive overview of this complex and multi-faceted concept. Hence, to do so it is fundamental to consider the previous definitions' limits while remembering to consider all the different aspects that this concept embraces. The starting point that has been highlighted for this aim is the importance to start from the analysis of which are the elements that produce an equilibrium in the ecosystem that might be sustained for a long time.

Moreover, at both the firm and the country level, in order to be sustainable, it is essential to be able to foresee risks and face them more effectively and efficiently possible. According to the *World Economic Forum*, "a global risk is an uncertain event or condition that, if it occurs, can cause a significant negative impact for several countries or industries within the next 10 years" (WEF, 2020). An example of these events can be climate change.

Aiming to understand which are those uncertain events, the World Economic Forum has drawn a map (Figure 1.4) in which the events that will probably happen are positioned based on two variables: the impact they have globally and the likelihood they will happen. Those risks are then categorized as *Economic* (blue), *Geopolitical* (orange), *Environmental* (green), *Societal* (red) and *Technological* (purple). As it is possible to notice from the map, the ones which are more probably to happen, on the upper-right area, are mostly related to the *Environmental* category. Among these, there are *Climate action failure*, *Extreme weather*, *Biodiversity loss*, *Natural disaster*, *and Human-made environmental disaster* (WEF, 2020). Therefore, in this so depicted global risk landscape, there is an impellent need to shift to a new paradigm and pursue so-called sustainable development.

Figure 1.4. The Global Risks Landscape 2020



Source: WEF, 2020.

1.3.2: An Early Attempt to Measure Sustainable Development

The general idea under the modern concept of sustainable development comes from the early seventies and it assumes that the impact on the ecosystem of many human activities and behaviours must be considered. In modern times, awareness emerged also in relation with demographic dynamics. The first two authors who attempt to define the human activities impact on the environment were Paul Ehrlich and John Holdren. Their studies concluded that "the total negative impact of such a society on the environment can be expressed, in the simplest terms, by the relation I=P·F where P is the population, and F is a function which measures the per capita impact" (Ehrlich & Holdren., 1971). Successively, the formula developed by the authors become famous in this notation: *I=PAT* (Ehrlich & Holdren., 1971). As this mathematical equation shows, the impact of those human activities is given by the product of *population (P)*, *affluence (A)* and *technology (T)*; where *population* refers to the number of people who live on the planet Earth in the considered time; "*affluence"* refers instead to the level of consumption and lifestyle of those people and *technology* is used as a positive element able to improve the capability of a system to react to some adversities (Ehrlich & Holdren., 1971). The main problem with this equation is that it does not take into consideration some important aspects: the availability of resources and the carrying capacity and bio-capacity of the considered ecosystem, all along with the social development concerning people's needs and lifestyle. It is also important to underline that the given formula of the human's activities impact takes for granted how a particular technology is given. Since the possibility to change and improve technology is not given, it is not possible to change affluence too.

1.3.3: Sustainability as a Balance

To overcome the limits of the formula studied by Ehrlich and Holdren, it is necessary to depict another definition of sustainable development able to also embrace the aspects of the availability of resources and the ability of people to improve the technology. Accordingly, the elements explained in the formula above are just to be considered as a mental framework of what is important to develop at a global as at a local level to increase social cohesion and economic growth while protecting the natural environment, as it was also possible to recall also in *The Brundtland Report* (Brundtland *et al*., 1987). Thereafter, it is finally possible to use all the elements collected in the history of the sustainable

development theories and definitions to give a complete and comprehensive definition to this concept, able to overcome all the previous definitions' limits and obstacles. As it is known today, sustainable development concerns the equilibrium among three fundamental pillars: economic growth, social cohesion but also environmental protection. In socio-economic disciplines the concept of these three areas becomes a universal reference after the publication of *The Brundtland Report*, where the reference to the environment and society recurs almost everywhere. The main assumption beneath this current definition of sustainable development is the capability to pursue adequate and improving performance of social welfare, economic development and environmental protection using resources at a rate of consumption equal or inferior to their rate of regeneration or production (Katz *et al*., 2015). As it is possible to notice, this actual definition of sustainable development includes economic growth, as the first theories have tried to do, but it does not fight with it. For what concerns the economic growth, its meaning refers to the traditional idea of the monetary economic performance of a company or of a country whose aim is to be more profitable as possible. Some metrics that can be used to measure economic growth are the gross domestic product (GDP), national income, salary level, inflation rate, public debt or household debt, stock value, and so on. Besides the traditional conception of economic growth, to deeply understand the last comprehensive sustainable development definition, a complete overview on the other two of the three pillars mentioned above must be given: Natural and Social Capital.

"Natural Capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things".[10] In other words, it is the value provided by nature through natural processes that are more or less directly related to economic value co-creation. "It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible. The most obvious ecosystem services include the food we eat, the water we drink and the plant materials we use for fuel, building materials and medicines. There are also many less visible ecosystem services such as climate regulation and natural flood defences provided by forests, the billions of tonnes of carbon stored by peatlands, or the pollination of crops by insects. Even less visible are cultural ecosystem services such as the inspiration we take from wildlife and the natural environment".[11] Since everything relates to natural capital,

[10] https://www.cbd.int/business/projects/natcap.shtml [Access on 15/03/2021]
[11] https://www.cbd.int/business/projects/natcap.shtml [Access on 15/03/2021]

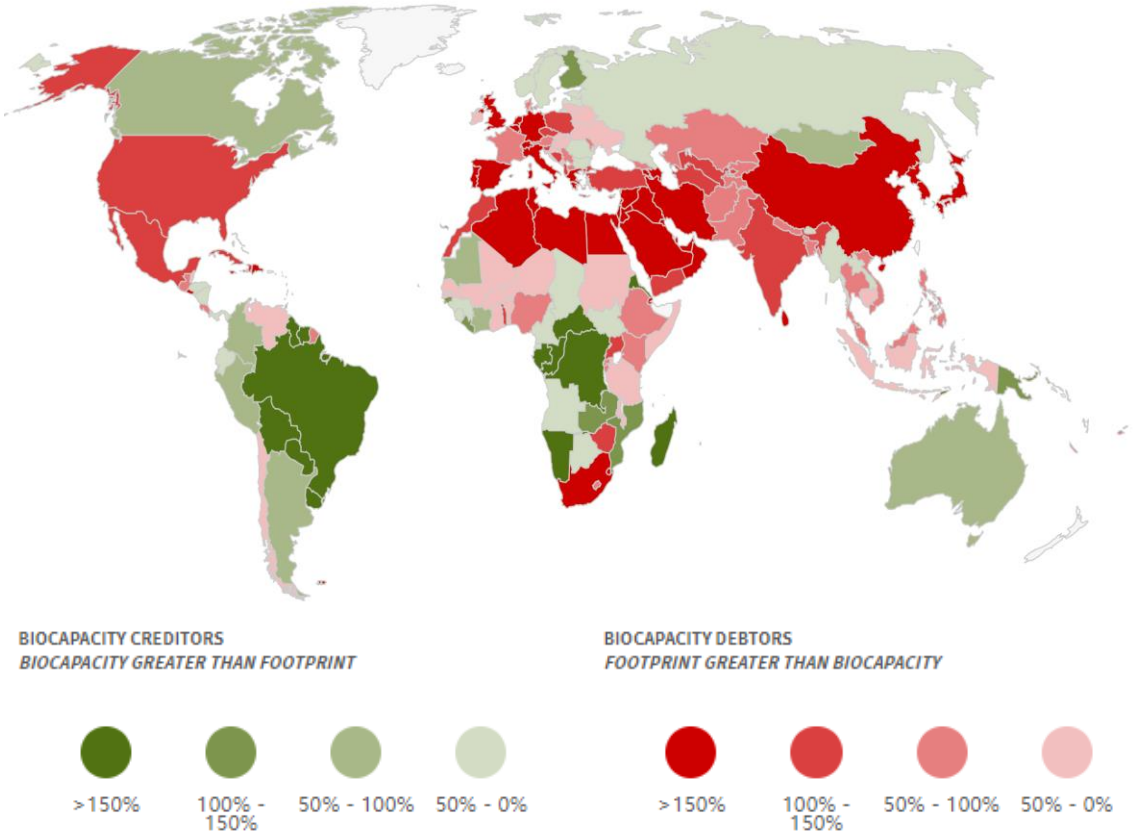
it must be protected properly. Natural resources usually create both limits and opportunities: it is up to every human being to exploit this natural capital in the most appropriate way. However, also concerning natural capital some knowledge biases are still present. Knowledge biases[12] in this case are about the role of natural resources production and its interconnection with business. Firstly, natural resources have been considered unlimited for a long time, due to the relatively small scale of human activities concerning global resources availability. Secondly, the impact of lifestyles and consumption patterns on the social and ecological environment was underestimated. Another point was that the emerging problems of resources scarcity on a local basis were solved through the geographical extension of supply activities. To conclude, the actual capability of natural systems to regenerate renewable resources has seldom been taken into consideration. In giving a complete definition of natural capital it is also important to mention some important metrics used to measure the impact of human activities in the environment. The two which are most used are the *Ecological Footprint* and the *Biocapacity*, referring respectively to the demand and the supply side. On the one hand, the former "measures the ecological assets that a given population requires to produce the natural resources it consumes (including plant-based food and fiber products, livestock and fish products, timber and other forest products, space for urban infrastructure) and to absorb its waste, especially carbon emissions. The Ecological Footprint tracks the use of productive surface areas. Typically, these areas are cropland, grazing land, fishing grounds, built-up land, forest area, and carbon demand on land."[13] In other words, the Ecological Footprint measures whatever people do, all the resources they use, everything that is coming from the land. Thus, it measures people's lifestyles. For this reason, it can be also used as a proxy for the overall welfare of a country. Lower is the Ecological Footprint, lower is the level of development of that country. On the other hand, "a city, state, or nation's biocapacity represents the productivity of its ecological assets (including cropland, grazing land, forest land, fishing grounds, and built-up land). These areas, especially if left unharvested, can also serve to absorb the waste we generate, especially our carbon emissions from burning fossil fuel."[14] Thereafter, biocapacity measures how much a particular land consumes. Moreover, "both the Ecological Footprint

[12] https://www.verywellmind.com/what-is-a-cognitive-bias-2794963 [Access on 10/03/2021]
[13] https://www.footprintnetwork.org/our-work/ecological-footprint/ [Access on 16/03/2021]
[14] https://www.footprintnetwork.org/our-work/ecological-footprint/ [Access on 16/03/2021]

and biocapacity are expressed in *Global Hectares* – globally comparable, standardized hectares with world average productivity."[15] To conclude, it is important to have a balance between those two measures. "Each city, state or nation's Ecological Footprint can be compared to its biocapacity. If a population's Ecological Footprint exceeds the region's biocapacity, that region runs a *biocapacity deficit* (Figure 1.5). Its demand for the goods and services that its land and seas can provide – fruits and vegetables, meat, fish, wood, cotton for clothing, and carbon dioxide absorption – exceeds what the region's ecosystems can regenerate. In more popular communications, we also call this "an *ecological deficit*." A region in ecological deficit meets demand by importing, liquidating its own ecological assets (such as overfishing), and/or emitting carbon dioxide into the atmosphere. If a region's biocapacity exceeds its Ecological Footprint, it has a *biocapacity reserve* (Figure 1.5)."[16] Generally, in each territory, the Biocapacity must be lower than the rate of consumption of resources. However, some countries' population consume more capacity than their land while some other countries consume fewer resources than produced ones. There is a huge concentration of resources in the world that provides resources to the rest of the world. Globally, biocapacity is lower than consumption. Nevertheless, biocapacity is overall increasing but not in terms of biocapacity per person. Although technology improves biocapacity, the overall increasing population decreases the biocapacity per person. On average, the biocapacity per person is decreasing because of different lifestyles and different consumption.

[15] https://www.footprintnetwork.org/our-work/ecological-footprint/ [Access on 16/03/2021]
[16] https://www.footprintnetwork.org/our-work/ecological-footprint/ [Access on 16/03/2021]

Figure 1.5. Footprint & Biocapacity in the world



Source: footprintnetworks.org.

Moving to Social Capital, it can be defined instead as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups" (OECD, 2001). Since people are an essential element in the value co-creation process, without people it is impossible to create value. In a company, social capital refers to the whole system of stakeholders, surrounding community and human society who has a role in the process to create value, known as the Value Creation Process (VCP) both from the supply side and from the demand side (OECD, 2001). Thereafter, social capital concerning a company can be either internal or external depending on the role of the people in that company. On the one hand, internal social capital is referring to human assets that provide the company with value creation. On the other hand, external social capital is people part of the company's ecosystem who co-create values through cooperation, shared norms, and values. Thus, through the relationship with the ecosystem, the company is increasing the possibility of having a value from people. Some considerations about social capital are the following. Firstly, innovation is at the basis of VCP, so it requires social development, education, knowledge creation and economic value generation in the whole economic system. Secondly, social development requires cohesion and a favourable institutional

environment. Thirdly, the lower the social development, the higher the obstacles to the VCP (OECD, 2001). Social capital has also some metrics that can allow to measure it as part of the total sustainable development. Among these metrics, the first one to be mentioned is the Human Development Index (HDI). HDI has to do with the overall environment, and it tells the company what it could expect in terms of VCP for the whole society, not just for the individuals. To have a high HDI means to have a cohesive population. The HDI definition given by the United Nations is the following. "The HDI was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. […] The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions"[17] and it attempts to measure how much the population is developed. Moreover, the *Organisation for Economic Co-operation and Development* (OECD), has also defined some other social capital measures related to four main areas: personal relationships, social network support, civic engagement, trust and cooperative norms. "The OECD Statistics Directorate has undertaken a project to review the Measurement of Social Capital. […] The final report of the project identifies four main ways in which the concept of "social capital" can be conceptualised and measured: *Personal relationships*, referring to the structure of people's networks (i.e., the people they know) and the social behaviours that contribute to establishing and maintaining those networks, such as spending time with others, or exchanging news by telephone or email. *Social network support*, which is a direct outcome of the nature of people's personal relationships, and refers to the resources – emotional, material, practical, financial, intellectual, or professional – that are available to everyone through their personal social networks. *Civic engagement*, which comprises the activities and networks through which people contribute to civic and community life, such as volunteering, political participation, group membership and different forms of community action. Finally, *trust and cooperative norms*, referring to the trust, social norms and shared values that underpin societal functioning and enable mutually beneficial cooperation. The concept primarily refers to different kinds of trust, as well as norms of reciprocity and non-discrimination. The types

[17] http://hdr.undp.org/en/content/human-development-index-hdi [Access on 16/03/2021]

of trust that are most often considered as forms of social capital are generalised trust (i.e., trust in "others", including strangers) and institutional trust, which can refer to political institutions as well as the judiciary, police, the media or other institutions" (Scrivens & Smith, 2013).

To conclude, today it is possible to define sustainable development as the development able to find a balance among three fundamental pillars: economic growth, social cohesion, and environmental protections. All these pillars imply different levels of the overall sustainable development of a company or a country. Each of these important pillars can be measured separately from the others based on peculiar metrics. Then, it is possible to aggregate them together in order to measure also the sustainable development's degree at different levels: at the micro-level (company), at the macro-level (country) or even at the global level (planet).

1.4: Sustainability as a Trend in All the Economic Sectors

Now that a complete and comprehensive definition of sustainable development is given, it is also important to understand why and how this trend affects companies in all the economic sectors. Since economic growth, social cohesion and environmental protection must be considered altogether to measure the degree of sustainable development, this balance must be maintained at the planet's global level or the country's macro level, as in the company's micro-level. Therefore, the relationship with the business ecosystem itself represents a crucial issue and a real challenge for the company that wants to achieve its goals, in all the economic sectors. To adapt to this evolving business ecosystem struggling with the sustainability issue, companies need to face those changes which are not easily predictable, related to a strategic perspective and not very often manageable in the proper way because of the lack of mindset, skills and/or knowledge of the executives.

1.4.1: Corporate Social Responsibility

Many actors are involved in achieving sustainability today: policymakers, businesses, consumers, citizens, employees, local communities, and other stakeholders. Nevertheless, the debate on the Corporate Social Responsibility (CSR) concept was firstly introduced in the 1950s by Howard R. Bowen and it has continued from the 1960s and the 1970s to these days. Bowen, in his *Social Responsibilities of the Businessman,* assessed that "the decisions and actions of the businessman have a direct bearing on the quality of our lives

and personalities. His decisions affect not only himself, his stockholders, his immediate workers, or his customers – they affect the lives and fortunes of us all" (Bowen, 1953). As it is possible to notice, Bowen refers to the responsibility that a businessman has not only in economic terms, aiming at making profits, but also including a broader conception of ethical responsibility towards society. Therefore, he defined the social responsibilities as "the obligations of businessman to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society" (Bowen, 1953). The problem that raised with this Bowen's view on businessman's social responsibility was the legitimation towards the values that, in the managers' view, were valuable for the society, thus pursuable. Later, in the seventies of the twentieth century, a response to Bowen's view on the businessman's social responsibility came from Milton Friedman. The neoliberal economist, on the contrary, assessed that businessman who were pointing at the "social responsibilities of a business in a free-enterprise system" were "unwitting puppets of the intellectual forces that have been undermining the basis of a free society these past decades" (Friedman, 1970). Clearly, Friedman's neoliberal answer to the corporate responsibility concept is at the antipodes of Bowen's one. To Friedman, corporate responsibility is a concept totally against the interest of shareholder's value, no social at all. Hence, for Friedman, "there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud" (Friedman, 1970). The Corporate Social Responsibility concept has then evolved through time and today it embraces both the economic and the ethic perspective highlighted by the previous theories.

According to the modern view of Corporate Social Responsibility, through Corporate Social Responsibility the company has an economic rationale for being responsible, regardless of the sector in which it operates or its core business. Being sustainable, for today's company, means having a sustainable business in a strategic perspective of long-term profitability in its ecosystem (Azapagic, 2003). Thus, Corporate Social Responsibility, defined as a strategy to increase the company's value (Carrol, 2008), becomes the crucial aspect in the company's coordination with the busyness ecosystem and requires companies to be capable to manage the changes exploiting opportunities and facing threats, towards conditions in which the company could create a virtual cycle for

the sustainable development among not just economic growth, but also social cohesion and environment protection (Azapagic, 2003). The sustainable development's implementation, as largely explained before, starts from the analysis of which are the elements that produce an equilibrium in the ecosystem which might be sustained for a long time by the company. Broadly, according to the Corporate Social Responsibility, if a company wants to have sustainable development in achieving its goals, it has to protect and keep the balance between these three elements in a strategic way: economic, social and natural capitals; all together they create value for the company (Azapagic, 2003). The awareness of the importance of social and natural capitals is fundamental: to lose focus on one of them means the unsustainability of a company. Corporate Social Responsibility, based on normative and ethical premises, postulate the responsibility of directors and managers as for the social and environmental consequences of their decisions.

Three are the theories that provide an organizational rationale for Corporate Social Responsibility: *Stakeholder Theory*, *Agency Theory* and *Legitimacy Theory*. All three of these theories can guide the company strategy from an ethic to a strategic perspective aiming at achieving its goals. Firstly, the role of stakeholders must be underlined. As Freeman assesses, "stakeholders" can be defined as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 2010). Therefore, according to the *Stakeholder Theory*, stakeholders make pressure on the company about its economic, social, and environmental performance similarly to how traditionally shareholders make pressure about financial performances (Freeman, 2010). Moreover, major companies and listed or public companies are subject to dynamics indirectly triggered by stakeholders' pressure or actions on institutions, customer, citizens and so on. Like, for instance, pressure about sustainability by customers or welfare issues by employees. Thus, the minimization of conflict with stakeholders decreases overall risk. Moving to the second theory on the basis of Corporate Social Responsibility, in the *Agency Theory,* the relationship between agents and principals and the motivations that move their actions or decisions are explained. According to Michael C. Jensen and William H. Meckling, an agency relationship is "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent" (1976: 308). In the *Agency Theory* applied to Corporate Social Responsibility, "agents" are directors and managers while shareholders are "principals". Accordingly,

agents behave in the interest of the principal but also in their own interest. Behaving in their own interest, for agents, includes the elimination of legal, reputational, and economic risks due to environmental and social damages following their decisions and to which the shareholders are not subject. Therefore, managers might be more likely to consider the social and environmental consequences of their actions, because of their personal consequences on themselves or their reputation. To conclude, the *Legitimacy Theory* states that businesses are bond to social trust and social acceptance: legitimacy. In Davis's *Iron Law of Responsibility*, "society grants legitimacy and power to business. In the long run, those who do not use power in a manner which society considers responsible will tend to lose it" (Davis, 1973). Similarly, Suchman considers that "legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995). Hence, "legitimacy" in Corporate Social Responsibility is the conformation of businesses' actions with these social norms, values, beliefs and expectations. Legitimacy is thus related to coherence between acknowledged values and actual behaviours. The spread of socio-environmental values put directors and managers in front of a new source of legitimacy, in contrast with the traditional profit-oriented source of legitimacy. Shareholders are not subject to the legitimation process as decision-makers are. This is the reason why shareholders, on the one hand, can shift from one company to another through investments, without any legitimation required, while directors' and managers' reputation, on the other hand, affects their careers (Suchman, 1995). All these theories together explain why actors in a business, at different levels, are motivated to behave responsibly: at the stakeholders' level (*Stakeholder Theory*), at the individual level (*Agency Theory*) and the institutional level (*Legitimacy Theory*). Thus, these theories help to understand how, at different levels, a company that chooses to have a Corporate Social Responsibility strategy has an economic rationale for being responsible. Therefore, Corporate Social Responsibility is a real strategy aiming to increase value while adapting to the environment, without destroying it. A company able to exploit a strategy of Corporate Social Responsibility has sustainable value creation in the sense that it uses a way to be coherent with the sustainable process while creating economic and social value. To conclude, Corporate Social Responsibility depicts a company's behaviour that chooses to adopt behaviours and goals coherent with the global sustainable development.

Moreover, companies need to draw changes that require people to be aware of what is the problem. False knowledge, as it was previously underlined, brings to mitigate awareness enhancing cognitive biases towards sustainability. Enhancing individual rationality could also help the company to reach its goals because it might affect global situations much more than organizational rationality, even though individuals are not aware of that. Within the company it is necessary to change the individual behaviour: it might considerably affect the capability of the company to reach sustainability goals. According to Corporate Social Responsibility, with an eye toward being sustainable in achieving its goals, the company must adopt behaviours and goals coherent with global sustainable development (Azapagic, 2003).

1.4.2: Sustainability at the Corporate Level

In order to give a unique direction to all the companies through sustainable development, the *Department of Economic and Social Affairs* of the *United Nations* has defined seventeen so-called *Sustainable Development Goals* that all companies all over the world can decide to pursue in order to increase their sustainable development's level. As declared by the United Nations, "the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries – developed and developing – in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests."[18] Hence, these *Sustainable Development Goals* are embracing altogether social, climatic, and economic issues. This is the reason why they can apply to all companies in different sectors and at different levels. Despite their core business, different companies have decided to embrace some of the *Sustainable Development Goals* above mentioned to improve their production process, their employee's welfare, or their relation to external stakeholders and the community or the environment around them. Regardless of whether these companies produce products or offer services or if they operate in the food, fashion, automotive, food sector and so on. Some examples can be found, for instance, in the automotive sector. In the fashion

[18] https://sdgs.un.org/goals [Access on 28/04/2021]

industry, an example can be found in the denim company *Levi's*, which has declared on its website its intention to meet the following SDGs to improve its sustainable development: *3 - Good Health & Well-Being, 6 - Clean Water & Sanitation, and 8 - Decent Work & Economic Growth* already considered in Levi's plans[19]. Like Levi's, many other companies have joined the *Business for 2030* project[20]. From the Hi-Tech sector, like IBM, Dell, Intel, Microsoft, Google and many others, to the entertainment sector like The Walt Disney Company, to the food sector like The Coca-Cola Company, McDonald's, Nestle and so on.

Even though these sustainable development goals aim at being applied to different economic sectors in order to globally reach a coherent sustainable development level, they can be particularly applied to the food sector. Nowadays, awareness of environmental issues concerning food waste reduction has been incredibly growing among society. Food sustainability has become extremely important lately and food waste and food loss are two of the major food problems connected to the sustainability of the food supply chain that has been highlighted. Moreover, also issues concerning environmental sustainability of food production and both human and animal health have been starting to spread among society. This has brought people to adopt food choices and alimentation trends aiming at reducing the consumption of that food which productions are considered the more polluting ones, like, above all, the meet one.

[19] http://www.businessfor2030.org/levi-strauss-co/ [Access on 28/04/2021]
[20] http://www.businessfor2030.org/explore-by-company/ [Access on 28/04/2021]

Chapter 2: Sustainability and its Communication in the Food Sector

2.1: Introduction

The recent "realization and concern towards the environment and society has led to the emergence of "sustainable development" which emphasizes the need to promote sustainability and advocates that form of development which minimizes negative impact on the environment and society" (Joshi, 2015). As it was illustrated in the first chapter, many are the reasons why the attention on sustainable development has started to increase in the twenty-century. Next to a huge demographic explosion, some issues due to post-industrialization pollution, and other environmental and social disasters, appears also the diffusion of the green consumerism trend. The latter is born from the consumers' side next to the companies' intentions to work "towards minimizing the harmful impact of their business activities on the environment" (Joshi, 2015). Since companies' effort is not enough to solve, or at least reduce, the environmental problem, the individual contribution of consumers is also necessary. As a matter of fact, besides the above-mentioned implications of sustainable development companies' policies from the economic, social, and environmental point of view, sustainability has also important implications from the consumers' side too. Therefore, to adopt a consumer approach is essential to study which are the motivations behind consumers' choices and purchasing behaviours in the sustainability field.

In the food market, this is even more relevant. Consumers needs and wants regarding food are changing and some of these recent changes derive indeed from the sustainability trend into which consumers are embedded. As it is illustrated in the *Consumer Trends and New Product Opportunities in the Food Sector* book by Grunert (2017), sustainability is one of the main recent trends in food consumption next to health, authenticity, convenience, and bundling. Sustainability is to be intended in the sense of producing organic products, implementing organic agriculture, reducing food waste, exploiting the Corporate Social Responsibility in food companies, use of certifications through which a third party proves food important features as origin, quality, fair trade, organic or local production and so on. In the words of Grunert (2017, 13): "we start seeing a focus on the sustainability of food production, with at least some people starting to pay attention to topics like the environmental impact of meat production, food miles, and alternative sources of protein."

For marketers it is thus fundamental to understand how the sustainability trend is expressed in consumers' choices and food purchasing behaviours, which are the motivations behind those choices to efficiently communicate these sustainability-related messages to them.

2.2: Sustainability as a Crucial Aspect in Consumers' Choices

2.2.1: Green Consumerism

Following the sustainability wave started in the 1970s, growing segments of consumers have increased to pay attention to the environmental and the social dimensions of products and services (Lanzini, 2018). Thus, in this framework, a new trend in consumerism has begun to spread: the so-called *green consumerism*. Green consumerism has started to be diffused when people have begun to contribute in reducing the harmful impact of human activities on the environment. Assuming that sustainability is a comprehensive concept embracing many aspects of people's lives, it is not a surprise how the latter can also considerably influence people's consumption habits and their purchasing behaviour in the food field. The green consumerism concept has started to emerge in literature strictly connected to the sustainable development's one. However, these two concepts are not synonymous: on the contrary, they have a slightly different meaning. While Yatish Joshi and Zillur Rahman (2015) assessed that "sustainable development further encourages eco-innovation and green consumption", hence, saying that green consumption is a consequence of sustainable development; Andrew Gilg, Stewart Barr and Nicholas Ford (2005) have tried to clarify this difference explaining the relationship between them. The authors argue that "green buying must be seen in the context of wider debates surrounding the development of sustainable ways of living that incorporate other environmental actions in a holistic conceptualisation of sustainable lifestyles" (Glig *et al.*, 2005). According to this latter interpretation, green consumption can thus be seen just as a simple part of the big framework of the sustainable lifestyle concept. As a result, green consumerism is only one of the many environmental actions that a person can implement in ordered to have a comprehensive sustainable lifestyle. Therefore, in the authors' opinion, it would be probably preferable to use other terms when referring to this concept. More appropriate terms to indicate green consumption may be *sustainable consumption* or *sustainable purchasing*, highlighting how green consumption is just a component of any move towards sustainable lifestyles.

Once green consumerism is framed into the big picture of sustainable development, it is then fundamental to give a more specific definition of this concept. Since what is called sustainable behaviour is expressed in different activities performed by consumers, different labels have been given to defining them according to their consumption patterns or the sustainable activity they perform. The literature is then full of definitions of green consumerism. Thence, the starting point of this analysis is the origin of this trend: as it was previously said, green consumerism is born out of the sustainable development framework. Even though the three main pillars of sustainable development – nature, society, and economy – must be taken simultaneously into account from a company's point of view; instead looking at the consumers' point of view, from literature emerges how green consumerism focuses primarily just on the environmental dimension. As explained by Professor Johanna Moisander (2007), green consumption is traditionally related to environmentally responsible consumption where consumers consider the environmental impact of purchasing, using, and disposing of various products, or using various green services. Another interpretation of green consumerism is given by Hendarwan (2002: 16) who assesses that green consumerism involves "beliefs and values aimed at supporting a greater good that motivates consumers' purchases". According to Elkington and Hailes (1989), instead, green consumers avoid products or services endangering the health of consumers or others, causing environmental damage during production, use or disposal, consuming disproportionate amounts of energy or even causing unnecessary cruelty to animals. Hence, it is evident how attention to the environment is crucial for consumers who embrace this consumption habit, mostly when talking about food consumption. Moreover, looking at the basic objectives and strategies of this ecologically responsible consumption, in the opinion of Moisander (2007), two divergent approaches based on green consumers' purchase behaviours can be individuated: one more *radical* and the other one more *liberal*. On the one hand, according to the radical view, "green consumer refuses to buy anything that is not absolutely necessary" (Moisander, 2007). Thus, if someone truly cares for the environment and call themselves a green consumer, they have to "drastically reduce the number of purchases of everything to bare minimum" (Moisander, 2007). On the other hand, instead, a more liberal conception on green consumers assess that can call themselves a green consumer who carefully choose products and services that are the least destructive to the environment. As believed by consumers embracing this softer view, it may be possible to

have a positive impact on the environment without significantly compromising one's way of life (Moisander, 2007). As it will be explained later, this is also mirrored in food purchase patterns.

Nevertheless, in a previous classification provided by Gigl *et al.* (2005), green consumers are classified according to their personal characteristics merged in three sets of variables that "focus around environmental and social values, socio-demographic variables and psychological factors". Consequently, they have identified four types of what they define as *environmentalists*: committed environmentalists, mainstream environmentalists, occasional environmentalists, and non-environmentalists at all (Gilg *et al.*, 2005). Even though socio-demographic variables and socio-economic status, like gender, age, income, and education, appear frequently in literature studies attempting to profiling green consumers, they have revealed themselves to be mostly inadequate to reach this aim all alone (Lanzini, 2018). The same fate seems to be proper of the psychographic variables like altruism, perceived consumer effectiveness and environmental concern. Therefore, in the author's opinion, sustainable behaviour can be studied by overlooking a simplistic segmentation-based approach while exploiting instead a more complex decisional process to analyse both behavioural intentions and the actual behaviour of the so-called green consumer. Aiming at having a complete overview of this type of consumer, many different variables must be taken into consideration. Due to this reason, for the purpose of the study conducted in this thesis, other theoretical modes will be exploited. Those models in which variables strictly related to socio-economic status, socio-demography and psychography are left aside while variables mainly referred instead to people's behaviour are included.

Hence, despite which approach to categorize green consumers is taken into consideration, a deeper analysis of motivations leading to these green consumption choices is needed to define different shadows of green consumers. In a study conducted in 2015 to discover which are the main factors affecting green purchase behaviour, Joshi and Rahman found out that "consumers' high concern for environmental and social issues and the functional and green attributes of products are the two major sets of motives that drive their green purchase behaviour". Here, again, the authors focus their attention on the environmental dimension of green consumerism while also introducing the products' functional attributes. As a result, the two main categories of factors influencing green consumerism

were individual and situational. On the one hand, the individual factors' "category includes variables specifically related to an individual decision-maker. These variables are generally a result of individual life experiences (attitudes, values, personality, etc.) and affect an individual's decision-making process" (Joshi *et al.*, 2015). On the other hand, situational "factors represent situational forces that affect green purchase decisions of consumers. These forces either encourage or discourage consumers to adopt green products" (Joshi *et al.*, 2015). According to the authors, the two categories influence – positively or negatively – both green purchase intention and behaviour.

To express green consumerism in the food market environment it is firstly important to understand which activities are performed by this type of consumer. Among them Gilg *et al.* (2005) have individuated: "buying organic products, buying locally produced food, purchasing from a local store, buying fairly traded goods, looking for products using less packaging, using one's own bag, rather than a plastic carrier provided by a shop." Furthermore, green consumerism has also important implications in the field of consumers' eating choices. Environmental concern is, as a matter of fact, one of the main reasons why people choose to change their eating habits in order to follow other types of diets. "The decision to adhere to a vegetarian diet is reported to be influenced by ethic reasons (e.g., moral considerations), health reasons (e.g., concern for potential disease, control of weight), concern about animal welfare (distaste for meat), preference for vegetarian food and/or religious and cultural beliefs" (Brytek-Matera, 2020).

Another topic that must be touched on when referring to green consumerism is the distinction between green and ethical consumers. "Ethical consumerism is born out of green consumerism, but it is different from the latter as it covers a broader range of issues and a more complex decision-making process: it extends the definition of green consumerism adding a focus on the people perspective, encompassing wider ethical issues ranging from labour standards to fair trade, and so on" (Lanzini, 2018: 15-16). As a result, while green consumerism is more specific since it focuses mainly on the environmental perspective, ethical consumerism has a wider meaning since it also includes the social perspective. "This shift of focus from the environmental to the social dimension is in line with the evolution over the past three decades of the overarching issue of sustainability" (Lanzini, 2018: 16) which has been deeply analysed in the first chapter.

In conclusion, as it is possible to notice, both companies and consumers have reciprocally influenced one another: lately, they have both shifted their priorities in production and consumption respectively from focusing just on environmental wellness to caring also about people's – and sometimes also animals' – wellness too.

2.2.2: Theoretical Models of Consumer Behaviours in Food Purchases Choices

Aiming at explaining which are the main reasons behind consumption and purchase patterns like green or ethical consumerism and others food purchasing choices, it is useful to know some of the literature theories which scope is to analyse sustainable behaviours. As it was previously said, variables like gender, age, income, education altruism, perceived consumer effectiveness, and environmental concern have revealed themselves to be mostly inadequate to profile green consumers. Consequently, a simplistic segmentation-based approach is not enough to study sustainable behaviour. On the contrary, a more complex decisional process to analyse both behavioural intentions and actual behaviour must be used. "In order to understand the real motives underpinning sustainable behaviours, research should rely on more sophisticated models capable of gasping the inner determinants that actually explain how and to what extent individuals adopt virtuous behavioural patterns" (Lanzini, 2018: 20). Therefore, a sort of behavioural segmentation must be used. Behavioural segmentation is based on the division of consumers based on the way they use or respond to a product or service or the knowledge or the attitude they have towards it.

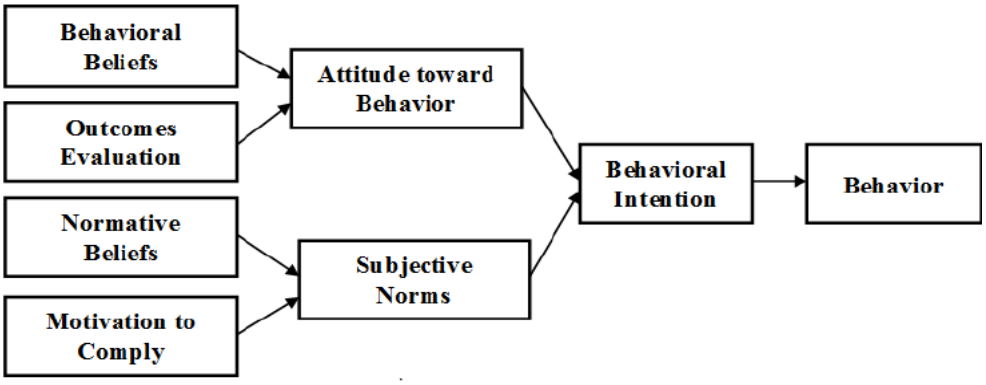
Literature is full of theoretical models aimed at study sustainable consumer behaviours, their features and, above all, their determinants. For the purpose of this thesis, the theory which will be mainly taken into consideration is the Theory of Planned Behaviour (Ajzen, 1991). However, a previous premise must be given. Research about consumer behaviours in the sustainability field in literature can be broadly categorized into two main branches: one based on a more rationalistic perspective, rooted in a rational evaluation of alternatives, while the other one based on the unaware role of habits instead. According to this latter perspective, habits are capable to guide people to automatically perform some kinds of behaviours, in the absence of any awareness on evaluation of alternatives. This is the case of consumers who purchase green products, like biological products or others, just because they are used to do so, without rationally evaluate alternatives. On

the contrary, the rationalistic perspective assumes that cognitive processes are the main determinant of behaviours. Therefore, this perspective underlines how behaviours are based on a rational cognitive evaluation of information at hand useful to help the subject to rationally choose among the available alternatives. This can be the case of people who purchase green products because they have found information about them that have rationally led them to this choice. This latter rationalistic perspective has long dominated research on sustainable behaviours, and it represents the main assumption at the basis of the Theory of Planned Behaviour (Figure 8). The Theory of Planned Behaviour is one of the main pillars in the study of human behaviour and it "is an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) made necessary by the original model's limitations in dealing with behaviours over which people have incomplete volitional control" (Ajzen, 1991). Therefore, to deeply understand the Theory of Planned Behaviour is first necessary to know the Theory of Reasoned Action.

Broadly adopted in economic studies because of its closeness to the traditional assumption of rationality in individual's choices, the Theory of Reasoned Action, in both, its formulations (firstly in 1975 and then in 1980) states that the closest antecedent of *actual behaviour* is the *behavioural intention*. This means that a subject's specific behaviour is due to the rational development of the intention to behave in that way. Even though behavioural intention and actual behaviour are strictly interrelated constructs and seem to be similar, yet they are different so they must be analysed separately. The gap that separates them is due to some factors, both contextual and subjective, that prevent the effective adoption of the specific intended behaviour: not always an individual does actually what they intend to do. In turn, behavioural intention's determinants are *attitudes* and *subjective norms*, as it is illustrated in Figure 6 and Figure 7. On the one hand, attitude represents the predisposition of an individual towards a specific behaviour. Therefore, attitude can be either positive or negative. Moreover, attitude depends on the individual's beliefs towards an outcome and the evaluation of such outcome, meaning if the outcome is desirable or to be avoided. Particularly, if the individual believes in the likelihood that a desirable outcome will be given if behaving in a certain way, this will lead him/her to behave accordingly and vice versa. On the other hand, subjective norms reflect a sort of social pressure since it indicates what the individual thinks referents or groups think of him/her. Attitude and subjective norms are not necessarily concurred. It can be

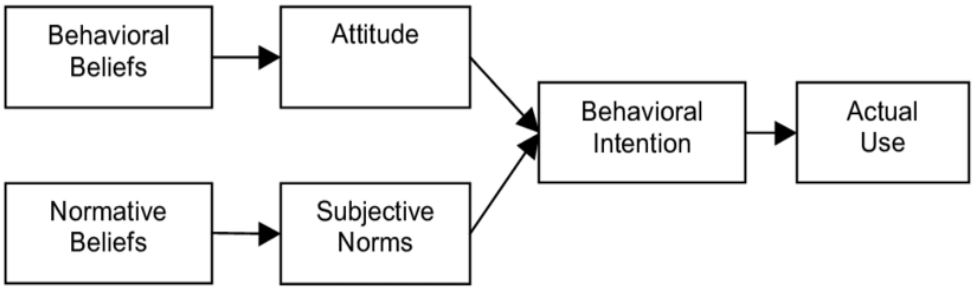
possible to have, for an individual's, a positive subjective norm while having a negative attitude and vice versa.

Figure 2.1. Theory of Reasoned Action – First Formulation



Source: Fishbein & Ajzen, 1975.

Figure 2.2. Theory of Reasoned Action – Second Formulation

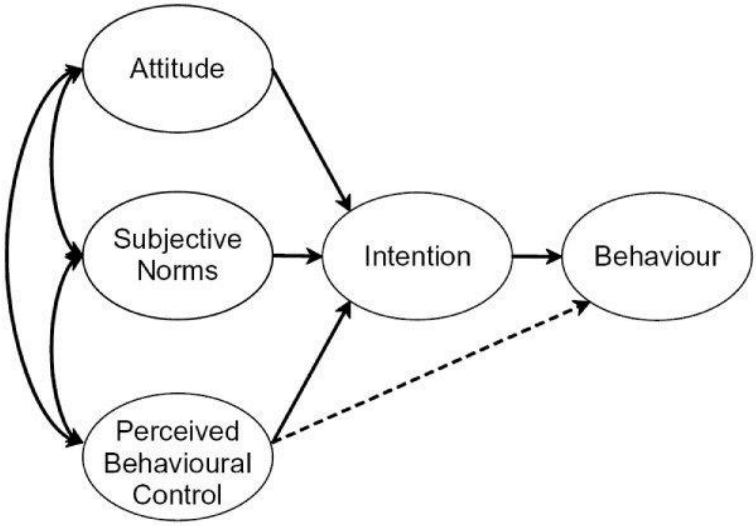


Source: Ajzen & Fishbein, 1980.

Even though this theory has been broadly diffused in many studies, it has been also criticised for two main reasons. Firstly, it has been accused to be oversimplistic since it considers just two antecedents of behavioural intentions. Secondly, it assumes that behaviours are under volitional control since it takes for granted that individuals are rational beings, always capable of developing a conscious and elaborated intention to act based on the information available. Nevertheless, it is realistic to assume that there are both internal and contextual factors that impact the likelihood of performing given activities. Consequently, the Theory of Planned Behaviour is born from the necessity to overcome these original model's limitations. To do so, this latter theory involves the inclusion in the model of another variable next to attitude and subjective norms: the so-called *perceived behavioural control*. This third antecedent of behavioural intention represents the perceived difficulty related to the implementation of a given activity. Thus, this addition helps the previous model of the Theory of Reasoned Action to encompass

the obstacles of the oversimplification and the necessity to include in the model another variable able to consider other factors influencing the behavioural intention.

Figure 2.3. Theory of Planned Behaviour



Source: Ajzen, 1991.

The Theory of Planned Behaviour just explained probably represents the most widely adopted theoretical framework in investigating sustainable behaviours. Furthermore, it has also become a popular framework in marketing studies, like the one carried on in this thesis, since it is characterized by a good predictive capability. Nevertheless, it still does not include further predictors able to catch other factors affecting sustainable behaviours like habits, values, emotions, descriptive norms, cultural and traditional factors, and others. Given its good predictive capability in explaining why an individual performs a specific behaviour, this theory is widely applied to study consumers' food purchase choices in the sustainability field. Assuming that the action of buying a certain product – defined as "green" or "sustainable" – performed by a consumer can be analysed as the actual behaviour of the Theory of Planned Behaviour, it is interesting to analyse which are the different determinants of his/her intention to behave in that way, meaning to analyse why a consumer decides to purchase that product labelled as sustainable, and/or green, in terms of attitudes, subjective norms or perceived behavioural control.

Moreover, this theory is extremely versatile. Indeed, it is possible to find in literature many studies where researchers have added to the original Theory of Planned Behaviour model other constructs useful to drive specific behaviours. An example is a study conducted by Fatemeh Soorani and Mostafa Ahmadvand (2019) where the authors have extended Ajzen's theory adding also the *feeling of guilt* to the original constructs "to

investigate the consumer food-management behaviour in order to reduce food waste" (Soorani & Ahmadvand, 2019). In particular, "this study shows that perceived behavioural control and attitudes toward reducing food waste respectively have the highest total effect on food consumption management behaviour" (Soorani & Ahmadvand, 2019). Furthermore, still aiming at studying people's behaviour in food waste, many other authors have used the Theory of Planned Behaviour model. Some examples can be found in Aktas *et al.* (2018) who used a consumer behavioural approach to analyse food waste; Bhatti *et. al.* (2019) who studied the determinants of food waste behaviour in young consumers in a developing country; La Barbera *et. al.* (2016), who tried to understand beliefs underpinning food waste in the framework of the theory of planned behaviour; Mak *et. al.* (2018), who extended the Theory of Planned Behaviour to understand how to promote food waste recycling in the commercial and industrial sector; Riverso *et. al.*, (2017), who investigated the effect of food waste habit on future intention to reduce household food waste; Mondéjar-Jiménez *et al.* (2016) who have conducted an exploratory study on behaviour towards food waste of Spanish and Italian youths; and Goh & Jie (2019) who explored motivational factors of Generation Z hospitality employees towards food wastage in the hospitality industry.

Furthermore, the Theory of Planned Behaviour has also many applications in the study of various determinants of either organic products purchase intention or consumption. For instance, Maloney *et al.* (2014) and Azizan & Suki (2017) investigated consumers' intentions to purchase organic food products, Wijaya & Sukidjo (2017) focused on organic knowledge as antecedent of purchase intention on organic food, and Prentice *et al.* (2019) used the same theory to investigate the influence of product and personal attributes on organic food marketing. In addition, Nuttavuthisit & Thøgersen (2017) focused on the importance of consumer trust for the emergence of a market for green products in the case of organic food and Sadiq *et al.* (2021) applied and extended version of the planned behaviour approach to study the role of food eating values and exploratory behaviour traits in predicting intention to consume organic foods. Aertsens *et al.* (2011) focused on the influence of subjective and objective knowledge on attitude, motivations, and consumption of organic food, and Al-Swidi *et. al.* (2014) focused on the role of subjective norms in theory of planned behaviour in the context of organic food consumption. Moreover, many authors have also applied this theory to study key factors driving organic food purchase in different culture. In particular, Kabir & Islam (2021) have studied

behavioural intention to purchase organic food taking a Bangladeshi consumers' perspective while Prakash (2021) took a sample of Indian young consumers and Yazdanpanah & Forouzani (2015) of Iranian ones. Similarly, Li & Jaharuddin (2020), Zhou *et. al.* (2013) and Chen & Lobo (2012) used this model to identify the key purchase factors for organic food among Chinese consumers, Saleki *et al.* (2020) did the same conducting an empirical study in Malaysia, Ham *et al.* (2018) in Croatia, Tuan & Vinh (2016) in Vietnam, Aungatichart *et al.* (2020) in Thailand, and Tarkiainen & Sundqvist (2005) in Finland. Boobalan & Nachimuthu (2020), again, used the theory of planned behaviour to compare organic consumerism between India and the USA while Hoang *et al.* (2020) used it to study the interactive effect of level of education and environmental concern toward organic food in Vietnam. In conclusion, Tsai *et al.* (2015) studied of organic food consumption behaviour using the decomposed theory of planned behaviour.

The Theory of Planned Behaviour has also been widely applied to intention to purchase green products and sustainable food consumption in general. Indeed, Alagarsamy *et al.* (2021) used it to study how green consumption value affects green consumer behaviour, focusing on the mediating role of consumer attitudes towards sustainable food logistics practices. Gustavsen (2020) studied motivations for sustainable consumption applied to the case of vegetables, and Elhoushy (2020) studied antecedents and motivational imbalance of consumers' sustainable food choices. In addition, Ukenna & Ayodele (2019) applied the extended theory of planned behaviour to predict sustainable street food patronage in a developing economy. Again, Wang & Wang (2016) applied the theory of planned behaviour to investigate psychological factors affect green food and beverage behaviour. Similarly, Vassallo *et al.* (2016) investigated psychosocial determinants in influencing sustainable food consumption in Italy. While Vabø & Hansen (2016) investigated purchase intentions for domestic food, Chan *et al.* (2016) used an expanded Theory of Planned Behaviour to predict adolescents' intention to engage in healthy eating. Moser (2015) used the model to look for drivers of pro-environmental purchasing behaviour and Hauser *et al.* (2013) conducted a Swiss study of the impact of food-related values on food purchase behaviour and the mediating role of attitudes. In conclusion, Vermeir (2009) applied the theory of planned behaviour to study sustainable food consumption, involvement, and knowledge.

Another topic that has been studied exploiting the Theory of Planned Behaviour model is food packaging's and food labels' influence on consumers. Specifically, Santos *et al.* (2021) focused on sustainable packaging in order to study if eating organic really make a difference on product-packaging interaction. Moreover, Tian *et al.* (2021) used an extension of the theory of planned behaviour to study food label use by consumers. Besides, D'Souza *et al.* (2021) investigated the role of ecolabels in creating self-confidence in green foods using the theory of planned behaviour and market segmentation. Aliaga-Ortega *et al.* (2019) studied instead processed food choice based on the theory of planned behaviour in the context of nutritional warning labels. In addition, Lombardi *et al.* (2017) applied the same theory to explore willingness to pay for QR code labelled extra-virgin olive oil. Again, O'Fallon *et al.* (2007) used this model to study the impact of labelling on purchasing intentions of genetically modified foods and Mohamed *et al.* (2014) to study Malaysian consumers' willingness-to-pay toward eco-labelled food products in Klang Valley.

Therefore, the Theory of Planned Behaviour has revealed itself as a valid model to study some human behaviours among which there are also the ones related to sustainability in food purchase and consumption. This is why this theory has been used in this study aiming to understand which are the main drivers that lead people to buy the so-called plant-based meat.

2.3: Sustainability in the Food Sector: The Supply Side

Leaving aside the consumers' perspective analysed in the previous paragraph, it is now important to move forward by studying instead the supply side of the food sector and which are the implications of sustainability practices in it. As it will be illustrated, food is a unique type of product, so it requires specific characteristics of production and delivery. For this reason, the food supply chain is one of the longest and most complex industry chains. However, all this complexity leads this industry to be one of the most pollutant industries, in terms of water, air and soil pollution. For instance, the greenhouse gasses (GHGs) emissions due to the food industry reach very high levels. Furthermore, other issues like food waste, food loss, and ethical issues related to animal husbandry must not be underestimated by the government, consumers and companies operating in the sector. Therefore, solutions to the food supply chain's main issues must be found by all the actors involved. Nowadays consumers pay extreme attention to all those issues related to

sustainability. Thus, companies operating in the food industry must implement sustainable policies and sustainable procedures to produce food preserving the environment and without compromising the health of both people and animals. To conclude, because of this sector's specific structure and features, the Corporate Social Responsibility of food companies faces specific challenges.

2.3.1: The Food Chain Structure and its Main Issues

Generally, a food supply chain can be defined as "the set of trading partner relationships and transactions that delivers a food product from producers to consumers" (King *et al.,* 2010). Since food is a very particular product, with specific features and requirements, both production and distribution must be organized accordingly. Food must be produced and delivered at the right time and temperature, with the right packaging and so on. To ensure food safety (meaning to have food safe to eat) all the production procedures are defined by strict law, and this made food production and distribution even more difficult to implement and control. Therefore, a lot of different and complicated processes and operations are needed to take food from its raw material state to consumers' plates. Usually, food is not produced by a singular chain of certain entities, but it is most likely to have a complicated web of interconnected entities working to make food available (King *et al.,* 2010). Moreover, many actors are involved. Among them, it is possible to find producers, processors, distributors, retailers, and consumers (Grunert, 2017). Furthermore, the food supply chain is composed of many steps through which the food must pass. The typical food supply chain provides for the transition between these steps: inputs (in terms of seeds, pesticides, agriculture biotech traits and fertilizers), farms (farmers, ranchers, and fishermen), processing (aggregators, processors, manufacturers, and beverages), distribution (distributors, importers, exporters, logistic and transportation), retail (retailers, supermarket, and restaurants) and consumers (Grunert, 2017). The movement among those steps is facilitated by a host of logistics and transportation companies: these companies make sure that the food reaches consumers on time and at the right quality. Besides, many factors can shape food availability, nature, and delivery. These factors can be technological, economic, social, and political (Grunert, 2017). All these features make the food industry unique in terms of structure and complexity. Nevertheless, this can be complicated to manage. Another aspect that contributes to the complexity of the supply chain is globalization. A food supply chain can

be defined as “global” when suppliers and distributors are located all over the world, so producers are disconnected from consumers (Grunert, 2017). It is not so difficult to imagine how the consequences in terms of environmental pollution and use of resources are incredibly increasing when the food supply chain is global instead of either short or local. On the one hand, a food supply chain is short when food involved is identified by, and traceable to a farmer, so the number of intermediaries between farmer and consumer is minimal or ideally null. On the other hand, in a local food system, food is produced, processed, and retailed within a defined geographical area (Grunert, 2017).

Given the entity and the extreme complexity of the food chain, it is not a surprise that this incredible series of processes and actors cause issues concerning environmental pollution, in terms of air, water, and land, use of resources, and ethical issues about animals’ wellness and people’s labour conditions.

In terms of environmental pollution, the food industry is one of the most polluting. According to Poore *et al*. (2018), “today’s food supply chain creates ~13.7 billion metric tons of carbon dioxide equivalents (CO_2eq), 26% of anthropogenic GHG emissions […]. Food production creates ~32% of global terrestrial acidification and ~78% of eutrophication. These emissions can fundamentally alter the species composition of natural ecosystems, reducing biodiversity and ecological resilience. The farm stage dominates, representing 61% of food’s GHG emissions (81% including deforestation), 79% of acidification, and 95% of eutrophication”. Moreover, food production affects also water availability and its ecosystem while creating considerable damages in terms of deforestation and resources available, as is explained later.

Next to the above-mentioned environmental issues, on top of the food supply chain’s issues list it is also possible to find food waste and food loss. These two terms are often used as synonyms even though they are two different concepts. They have different causes but also different solutions. However, both are big contributors to the pollution of the environment. While food waste occurs when food that would fit for consumption is wasted accidentally or intentionally at the retail level, food loss occurs instead along the food chain, and it is not always under the direct control of the actors involved (Grunert, 2017). Food loss can be due to different causes: use of inadequate technology in food processes, lack of knowledge or lack of skills of the actors involved in the processes, bad logistics implemented to transport and manage food and an inefficient market. Food

waste is more dangerous for the environment since it can cause the loss of land, water and/or energy used in food processes, or even the loss of agricultural inputs and the emissions of GHGs (Grunert, 2017). The Barilla Centre for Food & Nutrition Foundation (BCFN Foundation) "has identified three key food paradoxes which encapsulate the main problems to resolve in order to create a development model focused on improving the sustainability of food systems"[21]. One of these paradoxes is precisely *Food Waste*. Since the global food system, with its complex links between producers, processors, retailers, and consumers, generates vast amounts of waste (Gustavsson *et al.*, 2011), it is fundamental to implement a more efficient food supply chain to reduce it. According to the BCFN Foundation, "every year, we waste a third of the world's production of food in the supply chain, during the processes of conservation, processing, distribution and consumption. The amount of food wasted is four-time more than the quantity needed to feed all the people around the world who are malnourished. Consequently, food waste is both an economic and a moral problem, as well as an environmental issue: when waste breaks down in landfill sites, it releases methane gas, which is 20 times more harmful than carbon dioxide."[22]

Next to food waste, the Foundation has also identified two others food paradoxes: *Food Access and Excess* and *Use of Natural Resources*. The Food Access and Excess paradox are related to the food distribution among different countries. According to the Foundation, food production is enough "to feed everyone on the planet, but worldwide hunger is still a serious problem with 811 million people suffering from a shortage of food. At the same time, 2.1 billion people are suffering from obesity or are overweight. This contradiction arises from unbalanced lifestyles and a range of deep and complex faults in our production, commercial and distribution systems, as well as education regarding food and nutrition."[23]

The last paradox is related to the use of natural resources in food production, which is unbalanced and inefficient nowadays. About the inefficient use of resources in the food system and its consequent dangerous impact on the environment, from the analysis of Poore *et al*. (2018) emerges that "today's agricultural system is […] incredibly resource-intensive, covering ~43% of the world's ice- and desert-free land. Of this land, ~87% is

[21] https://www.barillacfn.com/en/dissemination/paradox/ [Access on 18/08/2021]
[22] https://www.barillacfn.com/en/dissemination/paradox/ [Access on 18/08/2021]
[23] https://www.barillacfn.com/en/dissemination/paradox/ [Access on 18/08/2021]

for food and 13% is for biofuels and textile crops or is allocated to non-food uses such as wool and leather. We estimate that two-thirds of freshwater withdrawals are for irrigation. However, irrigation returns less water to rivers and groundwater than industrial and municipal uses and predominates in water-scarce areas and times of the year, driving 90 to 95% of global scarcity-weighted water use." Therefore, using the words of BCFN Foundation, there is an urgent need "to feed a growing global population, and yet 33% of the world's cereal resources are used to feed livestock and produce fuel. Solving this paradox is a significant challenge because it means making responsible choices and allows us to question what sustainability all about is."[24]

As it has been deeply explained in this paragraph, existing food production, distribution, and consumption practices are likely unsustainable given a changing climate and also considering a growing population (Read *et al.*, 2020). Indeed, the Food and Agriculture Organization (FAO) has predicted that the world's population will increase by 34% in 2050 (2011a). Consequently, to keep up in feeding all these people and to respond to this considerable increase in food demand, the food supply chain must increase by almost 70% (FAO, 2009). Consequently, if the food supply chain will increase again at today's rhythm, this would have, once again, tremendous consequences in terms of land depletion, natural resource use, and GHGs emissions. This cannot be sustained by the planet Earth: "indeed, while the population need to increase, available resources are finite and insufficient to cope with the raising demand" (Ferrari *et al.*, 2019).

2.3.2: Different Strategies Towards Sustainable Solutions

Given the unsustainability of today's food supply chain, all the actors involved – governments, companies, and consumers – must find and implement sustainable solutions to preserve both the people and the planet. "It is important to place the concept of sustainability as a guiding principle behind all of our decisions and prioritise the wellbeing of people and the planet."[25] In general, "there is a need to reorient the food system onto a more sustainable trajectory, with all agents involved to reduce the environmental impact of both the production and consumption of food. Producers should pursue more conscious and environmentally friendly practices, while consumers could make a substantial contribution by accounting for sustainability issues when making their

[24] https://www.barillacfn.com/en/dissemination/paradox/ [Access on 18/08/2021]
[25] https://www.barillacfn.com/en/dissemination/paradox/ [Access on 18/08/2021]

daily food consumption decisions" (Ferrari *et al*., 2019). The analysis of the possible sustainable solutions that have been implemented from the various actors involved in the food system will be conducted from the macro condition of governments towards the micro condition of consumers.

"With regard to sustainability issues, governments started to take actions over the last decade by implementing various food and environmental policies targeting the actors of the food chain at different levels, from stakeholders to consumers. Such policies are to be based on the adoption of different policy instruments [which] can be subdivided into three main categories, that is, command-and-control, economic instruments, and information and education tools. The former (i.e., command-and-control tools) include, for instance, permits to pollute. Economic instruments comprise taxes, subsidies (like agro-environmental subsidies given to farmers), or incentives; whereas information and education tools include interventions based on information provision at various levels, such as labelling and public awareness campaigns. Policy instruments can also be based on insights from behavioural economics and psychology" (Ferrari *et al*., 2019). Moreover, The United Nations Sustainable Development Goals, adopted in 2015, has, among its many goals, the objective of reducing food loss and food waste all around the world. The resolution sets the target of 50% food loss and waste reduction at the retail and consumer levels by 2030, along with a nonspecific goal of reducing waste at earlier supply chain stages, including post-harvest losses (Rosa, 2017).

Moving forward, also companies have started to implement policies able to find sustainable solutions to the issues illustrated above. These policies are very often framed into the big picture of the Corporate Social Responsibility mentioned in the first chapter. Due to three main reasons, the Corporate Social Responsibility of companies operating in the food sector faces specific challenges (Grunert, 2017). Firstly, this is the case of a sector having a high impact on the environment and with a strong dependence on natural, human and physical resources. Secondly, people's awareness of what they eat has been raised lately so they have requirements in terms of raw materials production and animal welfare, environmental conditions and social conditions referring to people's labour. Thirdly, as it was previously explained, the food supply chain has a unique and multifaceted structure, and this may create potential conflicts in the same food chain about Corporate Social Responsibility's aim. Therefore, Corporate Social Responsibility

schemas and policies should involve all the possible stakeholders and should be specifically addressed to one product or one supply chain. To name some of these eco-friendly initiatives aiming at having a sustainable food supply chain, companies have started to produce, for instance, safer and healthier products. Those products are usually recognizable by labels assessing their specific certified features like origin, production, and composition. The introduction of these labels and their meaning will be explained in the next paragraph. Moreover, some food companies have started to have higher standards of environmental performance thus reducing their footprint, in terms of less energy consumption, fewer resources inputs used and more use of renewable energy. This is the case of Walmart, the big US retailer having about 29% of operations currently powered with renewable energy, and 80% of waste diverted from landfills and incineration facilities (Campisi, 2020). In addition, Walmart "the company plans to harness enough renewable energy – including wind and solar – to power its facilities by 2035. All of its vehicles will either be electric or zero-emissions, and the company will switch to eco-friendly cooling and heating equipment by 2030" (Campisi, 2020). Also, "PepsiCo is targeting to source 100% renewable electricity across all company-owned and controlled operations globally by 2030 and across its entire franchise and third-party operations by 2040. The transition has the potential to reduce approximately 2.5 million metric tons of GHGs emissions by 2040" (Campisi, 2020). Still referring to US food companies, "manufacturer General Mills has four key ambitions guiding its work to accelerate planetary health, healthy living ecosystems, and thriving farmers and communities over the next 10 years, including: reduce GHG emissions across the full value chain by 30% by 2030 and net zero emissions by 2050 […]; advance regenerative agriculture across the company's sourcing footprint on 1 million acres by 2030 and activating programs across the ingredient categories with the largest GHG footprint; reduce food loss and waste by 50% in the company's operations; and advance respect for human rights in the company's value chain in accordance with the United Nations Guiding Principles on Business and Human Rights" (Campisi, 2020). Meanwhile, "Kellogg Co. committed to reduce GHG emissions by 15% per lb. of food produced but has reduced scope 1 and 2 GHG emissions in its manufacturing facilities by more than 28% since 2015. Kellogg is continuing the effort by investing in renewable energy resources, partnering with suppliers to halve their emissions, purchasing renewable electricity, and increasing energy efficiency" (Campisi, 2020). To conclude, some new start-ups have built their

entire business model on sustainable solutions. This is the case of the Danish start-up *Too Good To Go* which was born from the desire to fight food waste. The *Too Good To Go* app allows those who download it to stay in contact with food businesses – restaurants, bars, bakeries, pastry shops, supermarkets and so on – that offer unsold products at discounted prices[26]. Meanwhile, many other food companies like *McDonald's* have started to substitute their plastic packaging with other eco-friendly materials like paper.

Consumers, in the end, could make a substantial contribution in finding sustainability solutions when making their daily food consumption decisions. As it was explained, the diffusion of green consumerism has brought people to change their consumption and dietary habits in large-scale. Concerning consumption, consumers' orientation has shifted in buying, for instance, more local and biological products instead of global and standardize products that have characterized their consumption in the last decades of the 20th century (FAO, 2017). Concerning dietary habits, instead, the care of the environment and the concern about people and animals' health have started to be at the basis of the diffusion of dietary habits like veganism and vegetarianism. As it will be illustrated in the next chapter, one of the main drivers leading people to embrace these choices is the consistent environmental pollution coming from the production of certain products, meat above all.

2.4: Communication of Sustainability in Food Products

Since sustainability is an important emerging trend in consumers' choices for the many reasons described above, it is then fundamental for companies, particularly for marketers, to study which are the specific motivation for each consumers' segment behind those choices and how to best convey the messages they are looking for when purchasing those products. One of the most useful marketing elements able to efficiently perform this communication activity is packaging. Besides being of the most efficient and useful marketing element in general, regarding food products, packaging is even more relevant. Thanks to its colours, shapes, elements and characteristics, packaging can considerably influence consumers' purchase choice of buying a product instead of another. Given the conditions in which food products are sold, often one next to the other, consumer's purchasing choice is complex. Hence, packaging power is even stronger in food purchase.

[26] https://toogoodtogo.it/it [Access on 18/08/2021]

One of the main packaging elements contributing to enforce this power are labels. Their importance is given by their ability to convey, with an image or few words, important information about the product. As consumers' awareness about food chain's main issues has increased, food companies have begun to use labels on products to communicate to consumers precious information, also about elements of sustainability of either products' features or production processes. Therefore, many different certifications have started to emerge lately aiming at assessing some specific food features. Certifications in food are usually referred to food's freshness, origin, in terms of either location or ingredients, production, trade and many others. So, an analysis of food products' labels is useful to better understand why they are necessaries to attract consumers who may be interested in buying them, particularly for innovative food products, like the plant-based meat analysed in this thesis.

2.4.1: Packaging as a Powerful Marketing Tool for Food Products

As it was studied by Sahakian and LaBuzetta (2013), an adult makes an average of 35,000 conscious decisions per day. Each of these require a considerable effort in terms of energy since the brain attempts to predict the consequences of the choice and all possible alternatives. Moreover, Rundh (2005) founds out that each consumer may pass up to 300 different products per minute walking around shelves in a supermarket. Since the battle of the shelf in supermarkets is extremely cruel, packaging can be sometimes the decisive means to convince consumers to purchase the product (De Bono *et. al*., 2003). Therefore, for brands, to be recognizable from consumers in this enormous network of stimuli and information is very challenging. To overcome this challenge, brands must implement the best marketing strategy they can taking advantage from different weapons and packaging seems to be one of the best to fit this aim. Indeed, as many marketing experts assess, "packaging is a powerful tool for brands, which can not only catch consumers' attention but also influence their purchase decisions" (Moya *et al.*, 2020). Moreover, previous studies suggest that "packaging plays a crucial role in product success, especially in the fast-moving consumer goods industry" (Simms & Trott, 2010) where more and more buying decisions are made at the point of purchase. Thus, if correctly designed, food packaging might play a pivotal role in the acceptance of new food, like, in this case, the innovative plant-based meat.

As a matter of fact, packaging has many different and useful features. Packaging not only is the container to hold, protect, preserve, and facilitate the handling and products' commercialization (Hassan *et al.*, 2012), but it also communicates brand identity, attracts consumers' attention, and helps to position the product within a specific and concrete category (Gómez *et al.*, 2015). Furthermore, packaging is especially important in generating added value for products (Schafer, 2013) and, again, influencing consumers' shopping behaviour. Therefore, two main categories of packaging's roles can be identified: logistics and marketing. On the one hand, logistics-related roles involve protection, transport, storage, and space organization once the product is placed in the shelf. On the other hand, marketing-related roles refer instead to information, attraction, distinction, promotion, and value. To communicate the brand's value, and to reinforce the brand's message are two of the most important packaging's aims and, vice versa, packaging is also a tool used to increase the value of the product-brand. Indeed, packaging contributes to both create and communicate brand identity thanks to its colour, shape, graphics, size and so on. Thus, packaging can help to visualize what the brand stands for in terms of values, mission, and beliefs. To sum up, from the marketing's side, packaging is a powerful communication vehicle for brands (Vila-López & Kuster-Boluda, 2016).

As it was previously introduced, packaging can be identified also as a strategic tool used to help products' identification and differentiation by breaking through the competitive clutter in a store or supermarket (Underwood *et al.*, 2001). This is sustained by many studies confirming that packaging is a critical factor in the consumer decision-making process since it can influence consumers in their purchase decision (Silayoi & Speece, 2007). Indeed, many studies have shown that shopping behaviour is influenced by sales presentation, such as shelf properties, the number and position of facings, packaging design, and shelf signs (Chandon *et al.*, 2009; Clement, 2007; Clement *et al.*, 2013; Gidlöf *et al.*, 2017; Koutsimanis *et al.*, 2012). Considering this together with the importance of the food industry at the global level, the analysis of the factors that drive purchase intent is of vital importance (Peters-Texeira *et al.*, 2005) for companies operating in the food sector. Some studies aiming at exploring the influence of food product packaging in consumers' purchase decisions, assessed that the selection of food in supermarkets is a complex process determined by sensory and non-sensory attributes (Gelici-Zeko *et al.*, 2016), and it is affected by diverse factors, such as the involvement level and time pressures (Silayoi & Speece, 2004). Indeed, under time pressure, packaging can be a

decisive driver in consumers' choices. As summarized by Moya, "both packaging attributes and purchase context characteristics act by influencing consumers' perceptions of the products, which conditions their evaluation of them and, consequently, affects the purchase decision" (2020). Hence, to study consumers' perception of packaging is essential, especially regarding food products where people usually have to choose among relatively similar products (Gómez *et al.*, 2015). By understanding how consumers perceive, evaluate, and choose food products, the industry will optimize its packaging design and achieve an added value that can contribute to brands' business strategies (Rundh, 2016). It has been demonstrated that the most influential part of a packaging is the visual one. Many laboratory-based studies provide evidence on how consumers' attention is influenced by simple visual features of packaging, such as colour, shape, and labels (Huang *et al.*, 2021). Among them, colour is one of the most powerful elements able to catch consumers' attention when purchasing food products.

However, the role of packaging has evolved recently towards creating an emotional connection with the consumer. Thanks to this connection, packaging can become an excellent tool through which the brand can convey a unique selling proposition. Besides, in introducing a new product in the market, design factors such as size, colours, shape, pictures, lettering all contribute to the appeal of the product and create an impression of the product and brand in the consumers' minds.

Nevertheless, the importance of more objective information in packaging, especially regarding food's features, must not to be overlooked. Indeed, packaging needs to monitor freshness and food quality, to visually indicate readiness to use, to give instructions and recommendations for use, ingredients, nutrition facts, advances on the content, production processes, history and description of the product, service information. Thus, it is necessary for food companies to give that information and the best mean to do this are labels.

2.4.2: The Importance of Labels in Food Packaging

Consumers' awareness of label information has increased in recent years together with the attention on food safety and nutritional health in line with consumer sophistication and higher living standards (Grunert, 2017). Consumers are always more and more interested in the presence of certified information on food packaging concerning ingredients, nutritional elements, production method, packaging's materials and how to

recycle them, sustainability and so on. Consequently, many labels have started to be diffused. As it is stated in the FAO's website, "with the increase in global trade and a shift away from the traditional face-to-face food producer and buyer relationship, there is a greater need to create food labels that are clear and can be trusted."[27] To be trusted, labels need to come from a third party, universally recognized by consumers, that certify some features of the food product. Thus, the presence of certification schemas in food products require that a third reliable party not directly connected with the company certify that the product is indeed sustainable, or produced respecting defined standard, with specific ingredients and so on. To be effective, these schemas should be given by a third public party. Reasons for legal recognition are different based on the actors involved. Concerning consumers, the presence of a certain label provides credible information on different food attributes. For farmers and processors, instead, the label can be the assurance of a fair remuneration. Meanwhile, for collectives, the labels can be the sign the territorial origin of a certain product that preserve the cultural heritage of those areas which are usually economically marginal. All labels, to be effective, must be recognized and known by people, otherwise they lose all their power.

Furthermore, labels and certification from third party are also important to recognize effective policies and actions of companies towards sustainability from the so-called greenwashing (Rees *et al.*, 2019). In the words of Becker-Olsen and Potucek, "greenwashing refers to the practice of falsely promoting an organization's environmental efforts or spending more resources to promote the organization as green than are spent to actually engage in environmentally sound practices. Thus, greenwashing is the dissemination of false or deceptive information regarding an organization's environmental strategies, goals, motivations, and actions" (2013). Hence, greenwashing is often described as a bad marketing strategy through which companies deliberately and consciously communicate something aimed at making believe that they are committed and caring about the environment when instead they are not. Indeed, companies performing greenwashing simulate to carry out concrete Corporate Social Responsibility actions while they are actually implementing actions and behaviours in the opposite direction. The term "greenwashing" was originally coined by prominent environmentalist Jay Westerveld in a 1986 essay in which he claimed the hotel industry falsely promoted

[27] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]

the reuse of towels as part of a broader environmental strategy; when, in fact, the act was designed as a cost-saving measure (Orange *et al.*, 2010). To detect greenwashing claims, consumers must get really informed and aware of companies' acts of "misleading consumers about their environmental performance or the environmental benefits of a product or service" (Delmas & Burbano, 2011).

In food packaging, Food Label is one of the most important and direct means of communicating information to consumers since it presents all the information regarding a particular food product. According to FAO, Food Label is "an effective tool to protect consumer health in terms of food safety and nutrition. Food labels convey information about the product's identity and contents, and on how to handle, prepare and consume it safely."[28] In details, "the internationally accepted definition of a food label is any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food or food product. This information, which includes items such as ingredients, quality and nutritional value, can accompany the food or be displayed near the food to promote its sale."[29] Among all the different Food Labels, there are many categories: nutrition labelling, food labelling to reduce food waste, food fraud, labelling assessing the impact of food packaging and origin labelling of food. Firstly, the *Nutrition Facts Label* is a declaration on the label of a food product relating to its energy value and its content in proteins, fats, carbohydrates, dietary fiber, sodium, vitamins, and minerals. "These labels can be effective instruments in helping consumers to make healthful food choices."[30] Depending on different countries, legislation about this label is different regarding elements that must be included in it. "The Codex Alimentarius guidelines recommend the following types of nutrition labelling: Nutrient Declaration, Nutrient Reference Values, Quantitative declaration on ingredients (QUID), Nutrition Claims and Health Claims."[31] Moreover, *Food Labels to Reduce Food Waste* are mainly concerning food manufacturers' use of date marking to advise subsequent food chain operators on the appropriate shelf-life of a food. A study carried out by the European Commission (2018), estimates that up to 10% of the 88 million

[28] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]
[29] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]
[30] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]
[31] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]

tonnes of food waste generated annually in the EU are linked to date marking.[32] Therefore, to educate all food supply chain stakeholders on the difference between "best before" and "use by" dates can help to prevent and reduce food waste. Again, "the Codex Alimentarius provides guidance on two key date marks "Best before date" or "Best quality before date" and "Use-by-Date" or "Expiration date"."[33] Meanwhile, *Food Fraud* labelling policy aims at "prevent food sellers from deliberately misleading consumers through false representations on a package".[34] To conclude, *Geographical Indication (GI) Labels*, also called *Designation of Origin Labels*, "boasting an annual trade value of over $50 billion worldwide, are legal tools that link food products to their place of origin, providing both economic, social and environmental value to rural regions. These labels are given to products with specific attributes, qualities or reputation stemming from their geographical origin. Through the preservation of food culture and the promotion of healthy diets, linking food products to their origin through labels supports the achievement of the Sustainable Development Goals."[35] These labels are a sort of form of intellectual property and contribute to promote and protect traditional foods from imitations. To obtain these labels, the food product must respect some specific prerequisites mainly concerning its geographical origin, designation, and authenticity. The three main types of EU Designation of Origin Labels (Figure 2.4) are: *Protected Designated Origin* (PDO), certifying that all production steps are performed in the same area; *Protected Geographical Indication* (PGI), certifying that at least one production step is performed in a specific area; *Traditional Speciality Guaranteed* (TSG), certifying that the food product in question has a recall to tradition in terms of ingredients and production.[36]

In analysing the most important food labels, other two must be mentioned: *Fair Trade International Mark* and the *European Union Organic Logo* (Figure 2.4). On the one hand, "the Fairtrade Mark is the symbol of the international Fairtrade system – and the most globally recognized ethical label."[37] Fair trade started in the 1950s as a result of broad public criticism of globalisation issues, when an increasing group of consumers started to

[32] https://ec.europa.eu/food/safety/food-waste/eu-actions-against-food-waste/date-marking-and-food-waste_en [Access on 23/08/2021]
[33] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]
[34] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]
[35] http://www.fao.org/food-labelling/en/ [Access on 23/08/2021]
[36] https://ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/quality-labels/quality-schemes-explained_en [Access on 23/08/2021]
[37] https://www.fairtrade.net/about/fairtrade-marks [Access on 23/08/2021]

be interested in supporting fair trade through their purchases. Fairtrade has its origins in a partnership between non-profit importers and retailers in developed countries and small-scale producers in developing ones. The unbalanced trading relationships between poor, small-scale producers in developing countries and big multinational corporate buyers in developed ones has created during time unpredictable and low prices for commodities such as coffee, bananas and so on. Indeed, the farmers' payment is shortened by middlemen in the form of buyers, brokers, wholesalers, and retailers who receive most of the profit from end-sales to consumers. Therefore, the goal of Fairtrade system is to contribute "to sustainable development by offering better trading conditions to, and securing the rights of, disadvantaged producers and workers in developing countries" helping them to move from a position of vulnerability to security and economic self-sufficiency. For this reason, "the original Fairtrade Mark has always stood for fairly produced and fairly traded products. It also means the product is fully traceable (kept separate from non-certified products) from farm to shelf."[38] Nowadays it is possible to see this mark on single-ingredient products, such as bananas and coffee which are the most commonly available fair-trade products together with roses, orange juice, tea, and chocolate. When consumers buy products with the Fairtrade symbol it means that they are supporting farmers and workers as they improve their lives and their communities. On the other hand, the *European Union Organic Logo* is a label assigned to products from organic farming. It certifies an environmentally friendly plant culture and excludes the use of synthetic chemicals, GMOs and limits the use of inputs. Indeed, according to the European Union, "the organic logo gives a coherent visual identity to EU produced organic products sold in the EU. This makes it easier for EU based consumers to identify organic products and helps farmers to market them across all EU countries. The organic logo can only be used on products that have been certified as organic by an authorised control agency or body. This means that they have fulfilled strict conditions on how they are produced, transported, and stored."[39]

[38] https://www.fairtrade.net/about/fairtrade-marks [Access on 23/08/2021]
[39] https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming/organics-glance_en#theorganiclogo [Access on 23/08/2021]

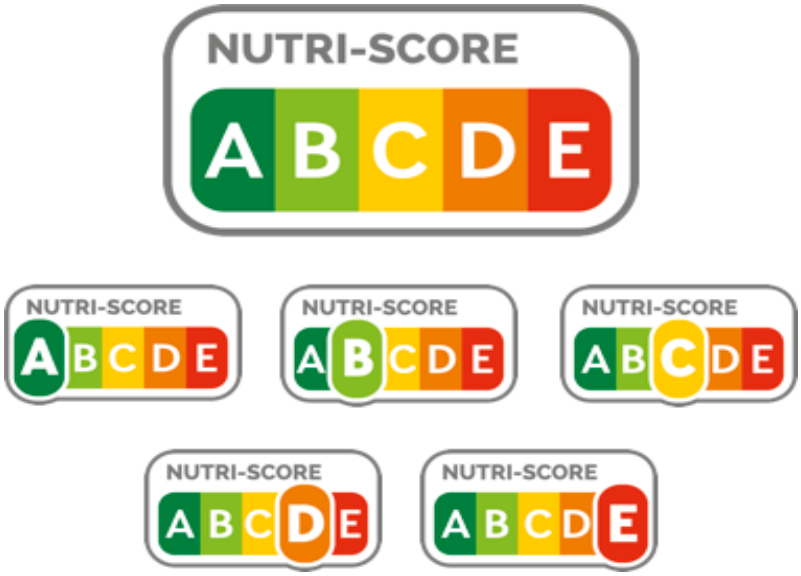
Figure 2.4. Certified Labels of (from the left): PDO, PGI, TSG, Fair Trade, EU Organic Logo

Source: Google Images.

To conclude, other two important food labels which must be included in this analysis are the *Nutri-Score* and the *Nutrinform Battery* one. Both these labels belong to the so-called Front-of-Pack Labels (FoPLs), more specifically to the interpretative FoPLs (Szabo de Edelenyi *et al.*, 2019). Since this type of labels directly give an evaluative assessment of the nutritional quality of foods to consumers, they are considered as a cost-effective measure recommended by the *World Health Organization* as one of the "best buys" measures to prevent Non-Communicable Diseases (NCDs) (World Health Organization [WHO], 2017). In this context, in order to tackle the increasing burden of diet-related NCDs, French government adopted in 2017 the *Nutri-Score* label (Journal Officiel de la République Française [JORF], 2017). The Nutri-Score label can be defined as "a summary, graded, colour coded FoPL with twin objectives: [firstly,] to provide a helpful guidance for consumers towards healthier food choices at the point of purchase, as it delivers at-a glance simplified nutritional information, and, [secondly,] to incentivize manufacturers to reformulate their products towards healthier composition, which would be materialized on the FoPL" (Szabo de Edelenyi *et al.*, 2019). As Julia & Hercberg (2017) explain, this label system has been developed by independent French researchers and it was chosen by French public health authorities as it was supported by a strong scientific background. Indeed, this 5-colour Nutri-Score label (Figure 2.5) relies on the computation of a score based on the United Kingdom Food Standards Agency Nutrient Profiling System (FSA-NPS). Specifically, the just mentioned score is calculated considering the nutrient content per 100g for foods (Julia & Hercberg, 2017). "The algorithm allocates positive points (0–10) for unfavourable elements including energy (kJ), total sugars (g), saturated fatty acids (g) and sodium (mg), and negative points (0–5) for favourable elements including fruits/vegetables/pulses/nuts (%), fibres (g) and proteins (g). The sum from positive points (0 to + 40 points) and negative points (0 to -15 points) is computed, yielding a global score ranging from – 15 for the healthiest foods to + 40 for less healthy foods. From this overall score, five categories of nutritional quality are derived, defining the categories

for the Nutri-Score, ranging from dark green to dark orange" (Szabo de Edelenyi *et al.*, 2019) (Figure 2.5). Consequently, letters from A to E were added to colours aiming at improving the label's readability, in particular for colour-blind people. Finally, the entire scale appears on the Nutri-Score label, with the letter and colour corresponding to the product's nutritional quality enlarged (Szabo de Edelenyi *et al.*, 2019).

Figure 2.5. Graphic Format of Nutri-Score Label



Source: Google Images

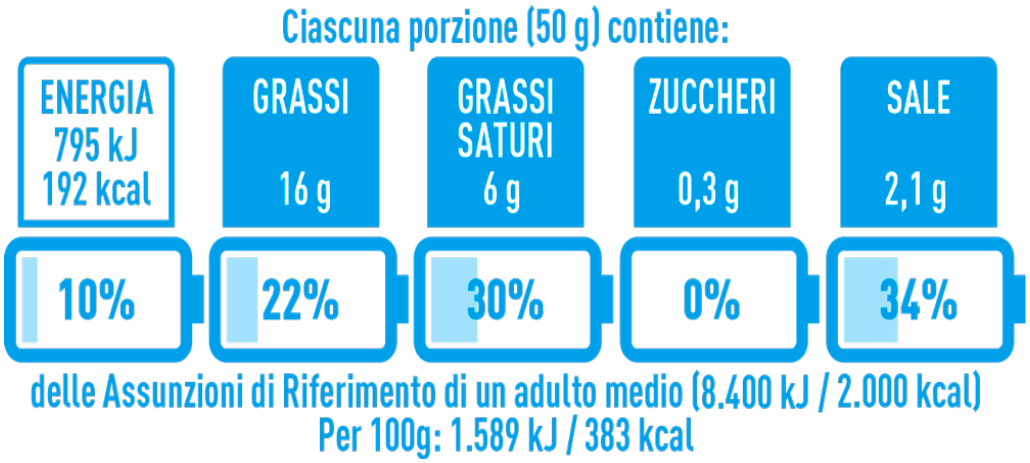
Actually, this label system has been adopted in many European countries: France, Spain, Germany, Netherlands, Belgium, Luxembourg and Switzerland and it has received the support of all the major multinationals like Nestlè (Cappellini, 2021) and Danone. However, the most important PDOs food products' producers have shown their opposition to Nutri-Score. There are, indeed, many traditional PDO foods of the Mediterranean diet that would receive red stamp, according to Nutri-Score, due to their fat, salt, and sugar content: Parmesan Cheese, Parma Ham, wine, extra virgin olive oil, and many others. For this reason, for some time now Italy, as a government and as producer associations, has been fighting in Europe for a different labeling, the *Nutrinform Battery*, which considers not only the percentage of fats or sugars but also the quantities of a given food eaten daily. At the moment, this thesis is supported by Italy, Czech Republic, Cyprus, Greece, Hungary, Latvia and Romania. However, on this controversial issue of labels, the European Parliament in Brussels will have to rule in 2022 (Cappellini, 2021).

In the *Nutrinform Battery*[40], the Italian counter proposal to the *Nutri-Score* label, all the values expressed are relative to the single food portion. In particular, each box contains a quantitative indication of the energy, fat, saturated fat, sugar and salt content of the individual portion. The energy content is expressed both in Joules and in Calories. The contents of fat, saturated fat, sugar, and salt are expressed in grams. Moreover, as it is shown in Figure 2.6, the "battery" symbol indicates the percentage of energy, fat, saturated fat, sugar, and salt provided by the single portion compared to the recommended daily intake. The recommended daily intake amounts in the EU are: 8400 kJ/2000 kcal of energy; 70 g of fat; 20 g of saturated fat; 90 g of sugars and 6 g of salt. The charged part of the battery graphically represents the percentage of energy or nutrients contained in the single portion, allowing it to be quantified even visually. The sum of what people eat during the day can "fill" the battery charge, without going further, in order not to exceed the recommended daily intake quantities.[41]

To sum up, even though both *Nutri-Score* and *Nutrinform Battery* labels aim at informing consumers about the healthiness of a specific food product, they are slightly different. On the one hand, the former gives a general overview on the healthiness of a food product, considering the total amount of nutritional values contained in it. On the other hand, the second one gives to consumers not only the percentage of single nutritional elements contained in a food product, but also the quantities of a given food which must be eaten daily, calculated on the daily intake amounts recommended by the EU. Therefore, while *Nutri-Score* can be considered as more intuitive and easier to understand by everybody, *Nutrinform Battery* requires, instead, more effort from consumers in understanding it. Thus, the first one may result in treating consumer like a sort of uniformed and naïve person, since no particular cognitive effort is required to read it. Conversely, the other one assumes that it is addressing to an informed public, able to receive information and elaborating them according to their previous knowledge on the topic.

[40] https://www.nutrinformbattery.it/ [Access on 17/09/2021]
[41] https://www.nutrinformbattery.it/ [Access on 17/09/2021]

Figure 2.6. Nutrinform Battery Label



Source: Google Images

2.4.3: Brand Associations and Brand Importance in Food Products

As it was previously introduced, packaging can present many different elements that, both individually and together can catch consumers' attention while influencing their perception about a product. Among these elements, one of major importance is the brand logo. Brand logos, for example, are specifically created to be immediately recognizable by consumers. Indeed, logos' graphics, including shapes, colours, size and so on are designed to be unambiguous so consumer can unequivocally associate a product's logo to the specific brand and, consequently, to its values and beliefs. Considering brand associations in general, many scholars (Aaker, 1996; Chaudhuri, 1999; Hart & Murphy, 1998; Hsieh, 2004; Walvis, 2008; Wansink, 2003) assess that brand associations are an important component of brand equity because they conspicuously contribute to increase brand knowledge and in brand image creation. In Keller's (2003) words, brand associations are described as informational nodes, linked to the brand node in consumers' memories, which build the meaning of the brand for those consumers. Since memory is an active constructive process where information is acquired, processed, and stored (Braun, 1999; Dahlén *et al.*, 2005), brand knowledge is not a static concept in consumers' minds. Indeed, since consumers encounter new brand information thanks to communication, this can influence consumers' memory structures related to brands (Anantachart, 2005). Moreover, according to the literature, brand associations are also interlinked with each other and have different levels in the consumers' minds. For this reason, brand images do not arise from one association only, but they consist of much larger numbers of primary and secondary brand associations (Teichert & Schontag, 2010). Furthermore, according

to Keller (1993), associations have different strengths; thus, they have stronger or weaker links to the brand's node in consumers' memories. In particular, strength of association is defined as: "the intensity of the connection between the association and the brand node" (Crawford Camiciottoli *et al.*, 2014). So, for companies is thus fundamental to develop an efficient communication able to either encourage or create the correct brand association in consumers' minds. Doing so, the brand association correctly built is linked to the brand and contributes to enhance the brand image from the consumer's point of view.

In the food industry the importance of the brand is even more relevant than in other sectors. As a matter of facts, brand is often warranty of important food characteristics like freshness, quality, provenience and so on. As it was previously introduced in the chapter, in-store food choice is a complex issue influenced by different factors (Chandon *et al.*, 2009; Ghoniem *et al.*, 2020; Köster, 2009). In this framework, recently, visual attention has become an important topic for marketing research. Indeed, to study consumers' visual attention can be useful to predict in-store food choice since it plays an active role in decision making by providing information and supporting the decision-making process when building consideration sets (sets of possible choice options) (Gidlöf *et al.*, 2017; Orquin & Mueller Loose, 2013; Wästlund *et al.*, 2018). Hence, some studies have indicated that the probability of a consumer purchasing a product can be enhanced by simply looking at it (Armel *et al.,* 2008; Milosavljevic *et al.*, 2012). So, how packaging's features, like the brand logo, are designed is extremely important. The study of consumers' attention during the products' selection process has catch research's interest, particularly regarding processed food products' packaging since these products' purchases are characterized by visual attention to brands (Chandon *et al.*, 2009; Pieters & Wedel, 2004). Indeed, brand properties guide visual attention and simplify purchase decisions. As assessed by Chandon *et al.* (2007), brand is so catchy and so important that consumer's visual attention is spent mainly on the brand and less on the price display. Thus, visual attention on brands is a reliable predictor of the purchase of processed food products. In fact, existing packaging of processed foods are mainly used for communication and marketing purposes, to cue brands and quality (Kleih & Sparke, 2021). Since food choices are made in a complex environment within a short time, it can be possible to assume that insufficient consumer attention to brands at the point of purchase may be another limiting factor in purchasing food products. Mundel *et al.* (2018) showed that branding minimally packaged products influence the attentional process that underlie decision-making: they

investigated visual attention towards branded vs. unbranded live potted plants and found that consumers spend more time looking at the branded products. The stimuli showed brands that were covering the whole plant pot, being salient in terms of size and contrast.

Chapter 3: Sustainability in the Food Sector: The Plant-Based Meat

3.1: An Overall Picture of Food Consumption and New Food Trends

As it was introduced in the previous chapter, due to projected population growth and increases in welfare, all the food demand is expected to grow in less than thirty years. In this scenario, a relevant role is played by meat. Therefore, a punctual analysis of this food product's actual production and consumption must be done also aiming at understanding current alternative meat consumption trends.

3.1.1: Current Meat Consumption

According to FAO's analysis (2011b), since 1961 the production of meat for consumption has more than quadrupled, reaching 341 million tons per year. The same statement is confirmed by the World Wildlife Fund (WWF) Italy. Indeed, in its "*Dalle pandemie alla perdita di biodiversità, dove ci sta portando il consumo di carne"* 2021 report, WWF Italy assesses that in the last 50 years meat consumption has undergone a global increase, so much so that today the quantity of meat produced is almost five times greater than that of the early 1960s. Specifically, on average in the world today 34.5 kg of meat are consumed per person per year, but with great differences between countries. In Italy, for instance, the average consumption is almost 80 kg each while 60 years ago, it was just 21 kg (WWF, 2021). Hence, meat production has been conspicuously increased reaching excessive levels. In order to give some numbers, the WWF Italy (2021) has estimated that in 2019, globally, the production of meat (beef, sheep, poultry, and pork) amounted to 337 million tons, mainly produced in intensive systems. Pork typically accounts for over a third of world production, poultry 39% and beef 21%. Italy, with 23 million animals reared, ranks fourth in the EU for the total number of animals. For every 100 inhabitants, there are about 11 cows, 14 pigs, 11 sheep and 1.75 goats. In developed countries, around 70 kg of meat is consumed per capita per year, compared with 27 kg in developing countries. In the last 50 years, besides meat, the average consumption of milk too has increased by 90% and that of eggs by 340% (WWF, 2021). Furthermore, still according to FAO (2011b), meat demand is also expected to considerably grow in the next future. Specifically, FAO has predicted that meat's demand and consumption are forecasted to increase by 73% by 2050, reaching 465 million tons per year, while production of meat through livestock may remain stagnant (2011b).

However, as many experts have started to claim recently, from the production side it will be probably not possible to meet this food product's increasing demand. Many are, indeed, the problems arising from the current meat production processes and the meat supply chain which make this production unsustainable from many different points of view. In particular, those issues regarding the unethical practices applied in cattle breeding, like, for instance, the intensive farms methos, the inefficient use of resources in livestock production, the pollution due to the harmful GHGs emissions coming from cows and other animals in farms, deforestation, biodiversity loss on land and in water and social injustice (WWF, 2021). Furthermore, unsustainably traded or bred animals are dangerous sources of zoonotic diseases, serious threats to the planet and to our own species (WWF, 2021). Those issues are all usually interconnected since they are often one the direct consequence of the other. Follow a simple logic, it is easy to understand how, to meet the increasing demand for meat mentioned above, the production of this food product must increase too. Consequently, to keep up with this trend and to produce higher quantities of meat products, more cattle are required. It follows that to have more animals means to consume more natural resources in terms of land and water, to have more GHGs emissions and less space available in farms, stables and other facilities hosting animals raised exclusively for meat production.

Concerning animals, nowadays, 70% of the birds in the world are made up of poultry used for human consumption: only 30% are wild birds. Every year 50 billion chickens are slaughtered for food, of which about 70% are intensively reared. Moreover, it seems that this number is expected to rise, given that the consumption of chicken meat is growing, especially in emerging countries (WWF, 2021). Besides, still according to the WWF (2021), among mammals, the proportions are even more impressive: 60% of the weight of mammals on the planet is made up of cattle and pigs for breeding, 36% from humans and just 4% from wild mammals. This means that for 1 kg of wild mammals there is 15 kg of farmed mammals by man. Nevertheless, as it was previously introduced, livestock appears to be extremely inefficient. In the words of Post, "livestock production of beef is particularly inefficient, as cattle reach a conversion rate of feed to animal proteins of approximately 15%. Pigs may reach a conversion rate of 30% and chickens reach even higher rates. Livestock consumes a large part of our natural food resources that we could use to directly feed humans, and which could potentially eliminate food shortages at a global scale. In addition, livestock contributes appreciably to greenhouse gas (GHG)

emission, in particular methane emitted by ruminants" (2014). Indeed, another notable impact of farms is that climate change. Still in terms of land depletion, resources use and environmental pollution, according to WWF (2021), of all the human systems that use natural resources for their own benefit, the main culprit of the ecological crisis is food. According to WWF's analysis (2021), in the agricultural sector, intensive livestock farming is one of the most responsible for GHGs production, generating 14.5% of total emissions. Besides, nitrogen emissions caused by farms are one-third of those produced by humans. At the European level, agricultural production is responsible for 12% of GHGs emissions and over 60% of these emissions derive from livestock, in particular from cattle. Furthermore, in Italy, intensive farming is the second cause of fine dust pollution, preceded only by the heating of buildings. Moving on, concerning animal feed, the growing demand for meat and animal derivatives in recent decades has also led to the uncontrolled expansion of feed crops, affecting the entire world agricultural system. Intensive livestock farming, indeed, is also responsible for land depletion since it is used about 20% of the land as pasture and 40% of land cultivated to produce feed for animals. Each year, 1.5 billion tons of feed, including mainly soy and corn, enter factory farms around the world. In the last 20 years, soy has had a production explosion that is unprecedented in the history of agriculture and is among the major causes of planetary deforestation (WWF, 2021). Moreover, WWF (2021) has also revealed that 15,500 liters of water are needed to produce one kg of beef steak and 70% of fresh water in the world is used for the cultivation of plants intended as feed for farm animals.

To sum up, the effects of the unsustainable actual food system are multiple. There is an environmental issue and that related to human health. Most infectious diseases, according to WWF (2021), are transmitted by animals. Then there is air and water pollution, climate change, the destruction of priority habitats, including forests and savannas to make way for pastures and monocultures destined to produce animal feed, the alteration of bio-geochemical cycles, resistance to antibiotics: these are all phenomena that concretely demonstrate to what level of unsustainability the current zootechnical system has reached (WWF, 2021). Considering these issues, Isabella Pratesi, Conservation Director of WWF Italy and one of the authors of the WWF report above mentioned, states: "Our very survival on this planet places us today the obligation, before it is too late, to rethink our global food system starting with intensive farming. Today we want to give a future to the planet it is no longer enough to think about reducing CO_2 emissions we can reduce the

"emissions" of the food system which are deforestation, loss of biodiversity, pollution, and destruction of ecosystems" (WWF, 2021). Furthermore, among the many solutions appliable to these issues, limiting meat consumption is certainly essential to reduce humanity's footprint on the planet, but it is not the only solution. According to some people, environmental protection can start also from people's choices as consumers and are life choices that make the environment and humanity as a whole feel better. Millions of people, for instance, have decided to limit their meat consumption to make a big and measurable difference, helping to free up spaces of land useful for feeding everyone else.

3.1.2: Looking for Alternative Dietary Habits

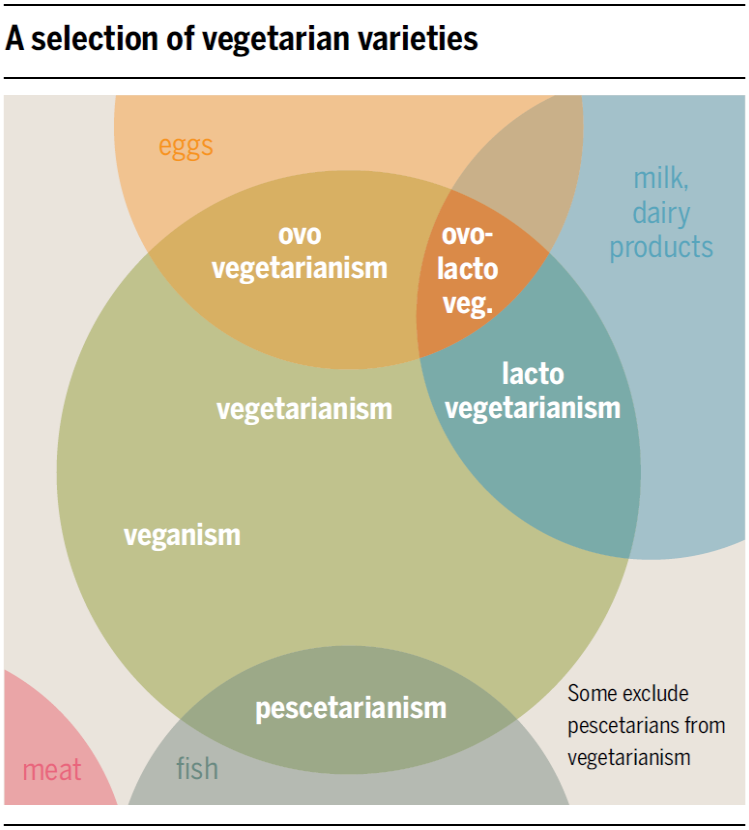
The recent increasing attention on the many sustainability issues related to meat's production and consumption illustrated in the previous paragraph has deeply sensitized people on this topic. Consequently, the increasing awareness on such issues and their harmful effects on the environment has started to be one of the main reasons why some people have decided to change some aspects of their lives, particularly regarding meat consumption and meat products' purchasing choices, shifting towards more "green" products and habits. Indeed, given all the problems with livestock production and meat consumption, individuals have started to make choices about their consumption patterns, pushing for a change (Heinrich Böll Foundation, 2014). As it was previously introduced, United Nations agencies such as the Food and Agricultural Organization (FAO) and the World Health Organization (WHO) have also recognized the need for change in dietary patterns, encouraging people to shift towards a more sustainable diet. Indeed, the FAO defined sustainable diets as "diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources" (FAO, 2010). Moreover, "greater emphasis on healthy lifestyles, which include a well-balanced diet, has led to increased interest in vegetarian diets over the past few decades" (Forestell *et al.*, 2012), as it was introduced in the previous chapter. Hence, people's awareness of sustainability issues of the meat supply chain and the greater interest in having a healthy lifestyle seems to be the two major factors beneath the diffusion of alternative dietary habits like vegetarianism, veganism, and many others. However, these consumption habits are not

totally the result of the contemporary age. Conversely, it has been reported that "vegetarian clubs and associations had their beginnings in England in the 19th century and were soon established in many countries. The term "vegetarian" itself was coined during this time. Repelled by the consequences of the industrial revolution, the growth of the proletariat and urbanization, the vegetarians initially formed a romantic opposition. […] In addition to the critique of civilization, vegetarianism added strands based on asceticism and animal protection – for example, opposition to experiments on living animals" (Heinrich Böll Foundation, 2014). Today, as a matter of fact, words like vegetarians, vegans, flexitarians, and many others have begun to be part of our daily language, and many people have started to approach these eating habits. Even though all these shifts in habits seem to be similar, to some extent, they are not equally defined, neither are moved by the same reasons. Indeed, "in wealthier countries, the animal-rights movement and political veganism are the most recent strands that insist on renouncing meat. The animal-rights movement sees people and animals as equal components of a common society; it rejects the use and exploitation of animals. Veganism sets out ethical, environmental, and anti-globalization arguments. It is based on vegetarianism but also avoids the use of animal products such as wool and leather, as well as anything containing animal ingredients, such as cosmetics. In industrialized countries, veganism is increasingly accepted as a lifestyle" (Heinrich Böll Foundation, 2014: 57).

As it is well explained by Forestell *et al.*, (2012), "vegetarianism is a broad term that encompasses a range of food avoidance and selection patterns that differ primarily in the extent to which animal products are included in the diet. At one extreme are vegans who include only foods derived from plants, such as vegetables, fruits, legumes or dried beans and peas, grains, seeds, and nuts, and avoid all animal products, including dairy and eggs in their diets. Lacto-vegetarians and ovo-vegetarians are less extreme in their food choices than vegans in that they include dairy products, or eggs, respectively, in their diets. Other groups of ''vegetarian-oriented'' individuals include pesco-vegetarians – or pescetarians – who additionally eat fish, and semi-vegetarians, who avoid red meat but include fish, poultry, and sometimes pork in their diets. Thus, although all vegetarian (i.e., vegan, lacto- and ovo-vegetarians) and vegetarian-oriented (pesco- and semi-vegetarian) individuals restrict red meat from their diets, the degree to which they avoid animal products varies along a continuum" (Figure 3.1). Moreover, the ones that are called

"flexitarians", are individuals who have chosen to consume meat irregularly, preferring to cut back on meat, rather than abstaining completely (Forestell *et al.*, 2012).

Figure 3.1. A selection of vegetarian varieties



Source: Heinrich Böll Foundation, 2014.

According to literature, the reasons that have led people to embrace these choices are many and different depending on the singular individual and the specific dietary habit in analysis. Starting from the reasons why people have decided to embrace the vegetarian diet, there is their own well-being for 23% of Europeans and respect for animals for 22%, and an increasing number of people who is choosing to be vegetarian for environmental reasons (Heinrich Böll Foundation, 2014). Furthermore, Brytek-Matera (2020) states that the decision to adhere to a vegetarian diet is reported to be influenced by ethics reasons (e.g., moral considerations, respect for life and non-violence), health reasons (e.g., concern for potential disease, control of weight), concern about animal welfare (distaste for meat), preference for vegetarian food and/or religious and cultural beliefs. Moreover, next to the above-mentioned motivations, there can be sometimes also other ones concerning ecological, economical and fashion aspects. The former refers to respect for the environment and animal life, the second states that the cost of a vegetarian diet can be

considered lower than the omnivorous one, while the last one assesses that, especially in recent years, many people have decided to eat vegetarian because it can be considered chic (Nezlek & Forestell, 2020). In addition, it could be also possible that people avoid eating meat simply because they do not like its taste. To conclude, "food choice can be a way for people to express their ideals and identities. In particular, for those who identify as vegetarian, this label is more than just a set of dietary preferences. Choosing to follow a plant-based diet shapes one's personal and social identity and is likely to influence a person's values, attitudes, beliefs, and well-being" (Nezlek & Forestell, 2020).

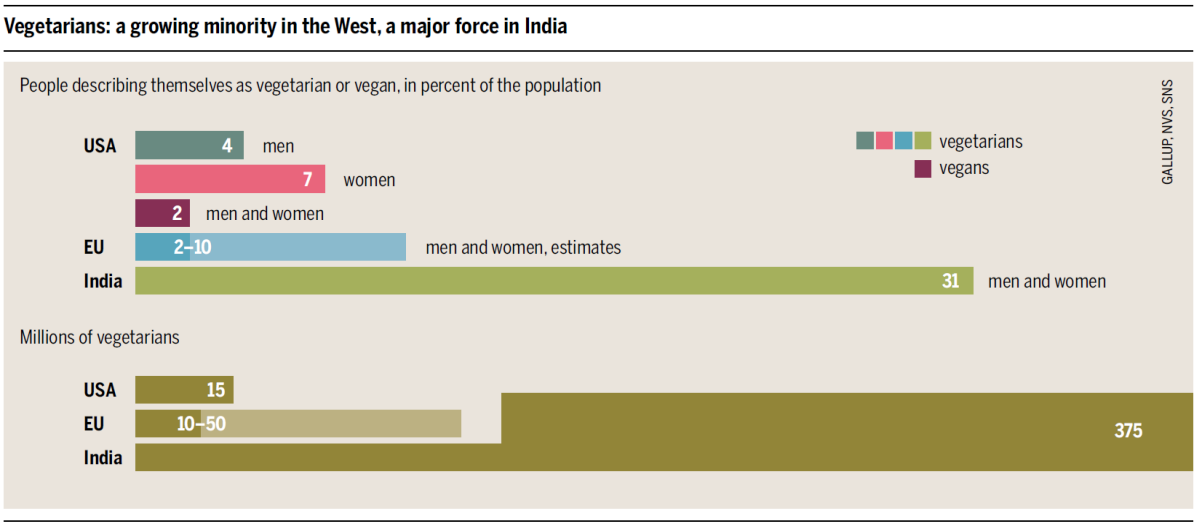
Meike Janssen, Claudia Busch, Manika Rödiger and Ulrich Hamm have conducted a study aiming to "identify different segments of consumers according to their motivation for following a vegan diet" (2016). This study, "conducted at seven vegan supermarkets in Germany, was based on face-to-face interviews with 329 consumers following a vegan diet. The open question on consumer motivations for adopting a vegan diet revealed three main motives: animal-related motives (mentioned by 89.7% of the respondents), motives related to personal well-being and/or health (69.3%), and environment-related motives (46.8%). The two-step cluster analysis identified five consumer segments with different motivations for following a vegan diet. The vast majority of respondents (81.8%) mentioned more than one motive" (Janssen *et al.*, 2016). To sum up, "while those who are concerned about health may be less restrictive, those who have strong ethical or philosophical reasons for avoiding animal products tend to adopt more restrictive forms of vegetarianism, such as veganism" (Forestell *et al.*, 2012). Furthermore, being a flexitarian may be a practical compromise that is motivated by several reasons, such as cost, overall health, weight control, or ethical concerns (Forestell *et al.*, 2012).

Concerning numbers, according to the Heinrich Böll Foundation (2014), in the world, 1 in 20 people do not eat meat, for a total of 380 million vegetarians, while in Italy, 1 out of 10 does not. Similar results emerge from the *33rd Italy Report* of 2021 by Eurispes, which photographed the eating habits in 2020. In general, from the report emerges that the numbers of Italians who eat vegetarian, or vegan remain practically unchanged compared to the previous year. Specifically, "according to the Eurispes survey, in 2021, 85.2% of those interviewed will follow a traditional diet, while the remainder of the population will be divided between 6.6% of those who say they are not currently vegetarian but have been in the past, 5.8% who say they are vegetarian and 2.4% of those who adhere to a diet

in line with vegan precepts. When the answers “I am vegetarian” and “I am vegan” are combined over the period from 2014 to the present, the values in the last two years are higher than the average for the period (7.5%), 8.9% in 2020 (the highest value recorded in the historical series) and 8.2% in the current year” (Eurispes, 2021). Moreover, compared to last year, the data reveal a slight increase in the number of those who choose not to eat the food of animal origin (2.4% in 2021 and 2.2% in 2020), while there is a drop for those who define themselves “Vegetarian” (6.8% in 2020 and 5.8% in 2021). From the Eurispes (2021) survey emerge also that “more women than men choose a vegetarian diet (6.9% compared to 4.7% of men), while when it comes to vegans, slightly more men are adherents (2.7% compared to 2% of women). Among those who eat following the precepts of a traditional diet, we find 86.6% of males and 83.8% of females, in addition to 6% of men and 7.3% of women who, after trying to espouse an alternative diet without foods containing animal meat have decided, by choice or necessity, to change their diet type”. Still according to the Eurispes (2021) report, concerning the motivations beneath these choices, “for 23.1% of those who declared themselves vegetarian or vegan, this choice is part of a broader philosophy of life, which does not end with the love for animals but embraces a broader desire to take care of the world in which we live. For 21.3%, the decision is a health decision aimed at the wellbeing of human beings, and for 20.7%, it is a decision to respect animals. The other reasons that are configured as the leading choice at the basis of the vegetarian practice concern environmental protection (11.2%), the desire to experiment with new eating styles (9.5%) and the conviction to sacrifice quantity of food in favour of quality, eating less and better (5.9%). To a greater extent than women, men claimed to be vegetarian/vegan because of their philosophy of life and because it is suitable for their health. Both answers were indicated as being chosen by a quarter of the male sample compared to 21.5% of women regarding the food choice as part of a broader concept of life and 18.3% of women who see diets without meat or animal derivatives as the key to wellbeing. On the other hand, women were more favourable to the other answers about the reason behind the choice to be vegetarian/vegan: 22.6% (compared to 18.4% of men) choose their diet based on their respect for animals, 11.8% (compared to 10.5% of men) do so by adhering to ideals close to environmental protection, 6.5% (compared to 5.3% of men) count on eating less and better, and 9.7% (close to 9.2% of men) are intrigued by this dietary practice, seen as a new frontier to experiment with” (Eurispes, 2021).

Looking at the worldwide situation in Figure 3.2, it is clear how people describing themselves as vegetarian or vegan are less present in the eastern side of the world, while the vast majority of either vegetarians or vegans is concentrated in the western part of the planet. As a matter of fact, India has been considered the homeland of vegetarianism: about 31% of the population follows a very strict vegetarian or vegan diet. The United Kingdom follows with around 10% of vegetarians in the country. Concerning Europe, Ireland has registered 6% of non-meat consumers and Germany 8% of converts to vegetarianism. In other countries such as France, Spain, Switzerland, Belgium and Norway, vegetarians fluctuate between 2% and 4%. The numbers of vegetarians and vegans overseas are similar: in the USA the percentage of them is calculated around 13% (Heinrich Böll Foundation, 2014).

Figure 3.2. Vegetarians Worldwide



Source: Heinrich Böll Foundation, 2014

Specifically, "in South Asia, vegetarianism has a long tradition. As part of various Indian religions, it was, and still is, widespread. In India [for instance] about a quarter of the population do not eat meat. In Buddhism and especially in Hinduism, belief in rebirth and adherence to non-violence lead people to reject the consumption of meat and the slaughter of animals" (Heinrich Böll Foundation, 2014: 56). Again, "most Buddhist sects allow milk and milk products, some permit the consumption of fish, and others allow meat if the animal has been slaughtered by a non-Buddhist. Although vegetarianism is declining in the region, it is still regarded as virtuous and exemplary in many parts of South and East Asia. For religious reasons, Muslims and Jews do not eat pork" (Heinrich Böll Foundation, 2014: 56). Conversely, "inspired by philosophy rather than religion,

vegetarianism began in the West in the Mediterranean region. The ancient Greek and Roman poets Hesiod, Plato and Ovid mention a vegetarian lifestyle as a feature of the earliest times. […] In the Roman Empire, it was Apollonius of Tyana, in Asia Minor, who spread the idea of renouncing meat in the 1st century AD. This philosopher, one of the first vegans, denounced animal sacrifices and refused to wear leather or fur. […] Other great thinkers are also reported to have been vegetarians" (Heinrich Böll Foundation, 2014: 56-57).

Nowadays, "a small but growing number of people in developed countries are making a choice: they are insisting on products that conserve the environment and respect animal welfare. Many people are starting to choose "flexitarian" diets which includes eating less and better meat and more plant-based protein" (Heinrich Böll Foundation, 2014: 58).

3.2: From the Traditional to the Innovative Meat Alternatives

3.2.1: Types of Farm-Raised Meat Alternatives

Due to the growing number of people adhering to a vegetarian diet, different alternatives to traditional farm-raised meat have begun to be placed on the market. Indeed, in order to satisfy these emerging consumer segments' needs, many were the companies that started to produce different types of animal meat's alternatives. Thus, at the moment, several alternatives exist and are being developed to imitate the traditional beef burger patty. Among these, the more traditional ones are the so-called veggie burger, soya burger, tofu burger and seitan burger. However, from few years, it is also possible to find also other two innovative alternatives to traditional farm-raised meat: the so-called plant-based meat and the most recent synthetic meat.

According to the Cambridge Dictionary, a veggie (or vegetable) burger is "a food type similar to a hamburger but made without meat, just by pressing together small pieces of vegetables, seeds, etc. into a flat, round shape."[42] Similarly, the Oxford Dictionary defines the veggie burger as a savoury cake resembling a hamburger but made with vegetable protein, especially beans, soya, etc., instead of meat."[43] As clearly emerges from both these definitions, a veggie burger is a burger-like dough that seems like the traditional farm-raised meat hamburger but without containing meat. The dough of a veggie burger can

[42] https://dictionary.cambridge.org/it/dizionario/inglese/veggie-burger [Access on 21/09/2021]
[43] https://www.oxfordlearnersdictionaries.com/definition/english/veggie-burger?q=veggie+burger [Access on 21/09/2021]

contain isolated vegetable proteins, legumes, cereals, vegetables, wheat gluten, and thickeners. Moreover, as it is possible to read on their packaging, veggie burgers in the market are often supplemented with vitamin B12 to overcome the lack of this vitamin which is naturally contained in the traditional farm-raised meat. To make a veggie burger there are plenty of different recipes. In fact, either in supermarkets or in restaurants it is possible to find many different versions of this product. Specifically, veggie burgers can be made with spinach, chickpeas, legumes in general, red beans, peas, or even with artichokes, aubergines, pumpkin, and sunflower seeds and many others.[44] According to some sources, the first vegetarian burger was made in England in 1982, born from an idea of Gregory Sams, the owner of one of the first vegetarian restaurants in London: Seed (Low, 1983). This innovative food product was so disruptive that, at the time, earned the headlines of *The Observer* newspaper. When Gregory managed to create the first meatless burger, in his restaurant's laboratory, he named it "VegeBurger" (Low, 1983). The ingredients of this first meatless burger sort of prototype were few and simple, the result of a great six-month search for the perfect texture: gluten from wheat, sesame, soy, and oats. To which he then added aromatic herbs, tomato, and onion (Low, 1983). Sams' burger was very different from today's ones, but he had the same goal as of today's veggie burger companies: to create something new and revolutionary to please everyone and bring other people closer to the vegetable world in a new way. Nowadays, veggie burgers are become the fashion of the moment, so much that there can be restaurants dedicated only to this type of dish. They can be combined in many ways and, according to someone, they are also rich in taste.[45]

Besides veggie burgers made by vegetables, among the farm-raised meat alternatives, there are also burgers made by seitan. According to the Cambridge Dictionary, seitan is "a food made from wheat that is high in protein and that is used in cooking instead of meat."[46] Among the main ingredients of either vegetarian or vegan cuisine, seitan is a food originated by vegetables, free of cholesterol, rich in proteins and low in fat, used instead of meat and obtained from the processing of wheat flour. Indeed, seitan is used as a meat substitute and obtained by cooking wheat gluten in a vegetable broth-based on aromatic

[44] https://www.kioene.com/it/burger-vegetale-storia-di-una-pietanza-rivoluzionaria/ [Access on 21/09/2021]
[45] https://www.kioene.com/it/burger-vegetale-storia-di-una-pietanza-rivoluzionaria/ [Access on 21/09/2021]
[46] https://dictionary.cambridge.org/it/dizionario/inglese/seitan [Access on 21/09/2021]

herbs, soy, and algae. Some sources asses that it was Buddhist monks in China between 1600 and 1700 who invented seitan and called it "mein ching" or "Buddha's food".[47] Indeed, this protein product seems to have been born by chance by mixing wheat flour and hot water. From there it spread to all Buddhist monasteries and arrived in Japan where it took the name of "seitan" and began to be flavoured with soy sauce and spices. It was then the American culture in the 60s and 70s that made it famous also in the West since its consistency is like that of a steak and could be used to re-propose various dishes of the European culinary tradition in a vegetarian version. [48]

Furthermore, the first steak substitute was invented in the United States by John Harvey Kellogg (who was also the inventor of cereals and brother of the founder of the Kellogg's group), a church member and director of a nursing home in Michigan. Specifically, he created "Nuttose", a peanut butter, onion, salt, and cornmeal mock meat cooked for at least four hours. Even though it never became a commercial product, it went down in history as the first vegetable steak invented in the West.[49] Moreover, in 1933, in California was born *Loma Linda Foods*, which specialized in soy-based substitutes, including "Vegelona" and "Nuteena" (very similar to the first "Nuttose").[50] Specifically, soy used to produce farm-raised meat alternatives is a "food or protein derived from soy/soya beans."[51]

Moving forward, 1967 is an important year in the history of vegetarianism, since it signs the discovery of mycoproteins, a food derived from some species of mushrooms and rich in minerals. The *Quorn* brand, born in 1994 in the United Kingdom, produces hundreds of recipes based on this spongy food.[52] Meanwhile, in the 1980s in the United States, the fashion for burgers and soy or seitan turkeys exploded. Thus, in less than twenty years, companies such as *Boca Burger*, *Worthington Foods* and *Gardenburger* made millions of dollars selling farm-raised meat substitutes: *Turtle Island Foods*, for instance, sells 3 million vegetable turkeys between 1995 and 2012.[53] To conclude, at the beginning of the 21st century the number of vegetarians and vegans increases, so in 2002, first *Burger King*

[47] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]
[48] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]
[49] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]
[50] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]
[51] https://dictionary.cambridge.org/it/dizionario/inglese-italiano/soy [Access on 21/09/2021]
[52] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]
[53] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]

and then *McDonald's* decided to launch their vegetarian sandwich in the United States. Besides, the latter had already started selling veggie burgers in the UK, Holland, and India in the 90s.[54]

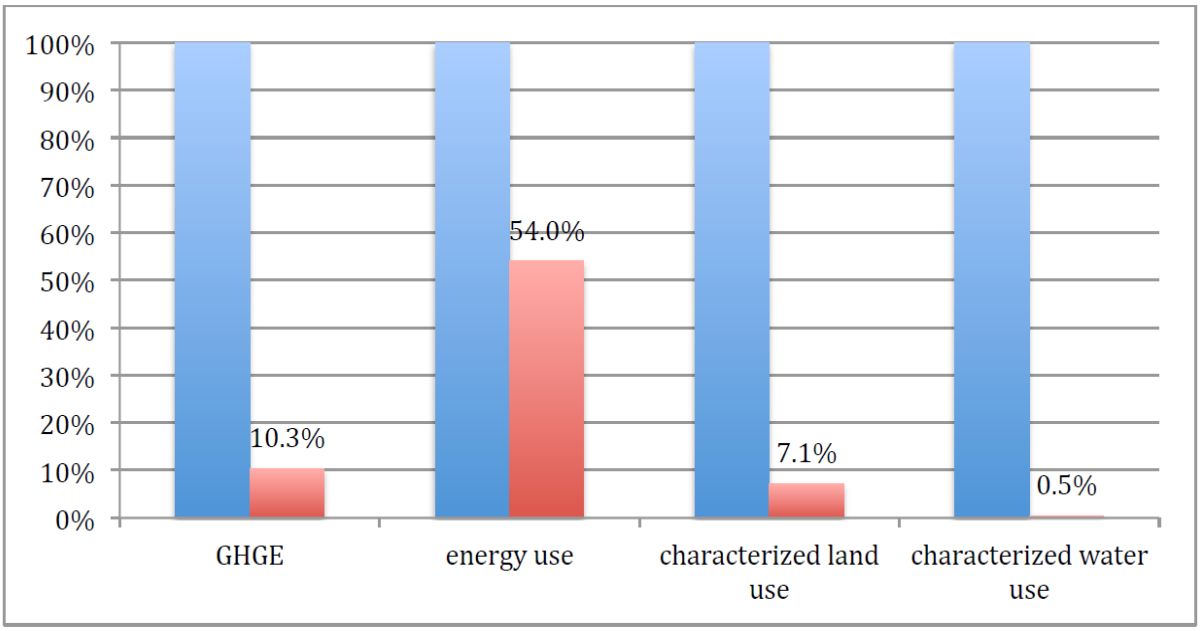
Furthermore, there is also another ingredient in the market used to produce farm-raised meat alternatives: tofu. Tofu is "a soft, pale food that has very little flavour is high in protein, made from the seed of the soy plant."[55] Indeed, tofu is a food product obtained from the curdling of soy milk, low in calories, rich in vegetable proteins and gluten-free. Tofu burgers are made firstly blending the tofu with spices and herbs, perhaps together with an extra virgin olive oil, or with soy sauce, and then agglomerated together and rounded recreating the classic hamburger shape.

Besides veggie burgers and burgers made of either soya, tofu or seitan, a new generation of meat alternatives is gaining popularity as it is better at mimicking beef burger patties compared to the previous alternatives. It is the so-called "plant-based meat". Even though the traditional meat alternatives above mentioned are also mostly made by vegetables, therefore they could be strictly defined as "plant-based" as well, the "plant-based meat" expression is referred instead to a particular food category. Specifically, the "plant-based meat" term refers to food products in which proteins come entirely from plant ingredients. However, contrary to the meat alternatives listed above, these products' goal is to be similar in taste, shape, and consistency to animal meat products, while being made with completely vegetable raw materials. Indeed, since these products are able to recreate the aspect, the texture, and the taste of traditional meat but being composed of plant-based ingredients only, they are also called "meat-non-meat", "meatless meat" or "fake meat". The ingredients are reported to be 22 and vary according to the type of "meat-non-meat" chosen: the main ones are water, peas (for proteins), coconut oil, which gives the food a fat part, sunflower oil, and beet extract to give it a reddish colour, while there are no gluten, soy, and GMOs (Bertera, 2020). These products were created by researchers considering two main goals: one more related to the short-term and the other one, instead, in the long-term. On the one hand, as said, the immediate goal of the researchers was to find the olfactory characteristics, taste and firmness to the touch that were completely similar to traditional meat. On the other hand, the long-term goal of plant-

[54] https://www.vegolosi.it/news/carne-falsa-storia-dei-sostituti-vegetariani/ [Access on 21/09/2021]
[55] https://dictionary.cambridge.org/it/dizionario/inglese/tofu [Access on 21/09/2021]

based meat products is to become the protein food of the future, both because demographic forecasts exclude animals can be enough for humanity's needs (and available space) and because it is extremely important for environmental sustainability (Bertera, 2020). Indeed, *Beyond Meat*, a company that produces plant-based meat, has commissioned a study at the *Center for Sustainable Systems* at the *University of Michigan* to compare the environmental impact of a 100% plant-based meat product to the same product but made of beef (Heller & Keoleian, 2018). As it is possible to read at the beginning of the *Beyond Meat's Beyond Burger Life Cycle Assessment: A detailed comparison between a plant-based and an animal-based protein source* report, "the purpose of the study is to compare environmental impacts – chosen here as greenhouse gas emissions, cumulative energy demand (energy use), water use, and land use – with those from typical beef production in the U.S.A. A secondary purpose is to highlight opportunities for improvement in the environmental performance of the Beyond Burger product chain and provide Beyond Meat with a benchmark against which improvement efforts can be measured" (Heller & Keoleian, 2018). While the meat produced by *Beyond Meat* is considered similar to beef in nutritional values and characteristics, research has shown how they are completely different in terms of impacts on the environment. Indeed, as it is shown in Figure 3.3, it has been calculated that for the same weight, a vegetable burger compared to a meat burger, from the beginning of the process to the plate, generates 90% less GHGs emissions, requires 46% less non-renewable energy, has a 99% less impact on water resources and 93% less land use than the same amount of meat bovine produced in America (Heller & Keoleian, 2018). In analyzing Beyond Burger's Life Cycle Assessment (LCA), the following steps of the production process have been considered: raw materials procurement, packaging operations, cold storage, distribution in points of sale, disposal of packaging. Conversely, the retail and consumer stages, including potential losses at these stages, were excluded as they have been considered as equivalent for both products (Heller & Keoleian, 2018).

Figure 3.3. Relative comparison of impacts between beef (blue bars, set at 100% for each indicator) and Beyond Burger (red bars).



Source: Heller & Keoleian, 2018

Although *Beyond Meat*'s main interest is to support its thesis and its business, the issue of the environmental impact of meat has also been highlighted by other actors, as it was previously introduced. FAO, considering the environmental consequences of animal-based meat consumption, in a video released in 2016, has stressed the urgent need to eat less meat for the planet since eating meat is no longer just a personal choice but has to do with the future of the planet and of humanity (FAO, 2016). Similarly, the same thesis is sustained by scientific research carried out by the *Rural Investment Support for Europe (RISE) Foundation* on the situation in Europe (Buckwell & Nadeu, 2018). Thus, from these studies on the impact of our lifestyles on the environment emerge the urgency to change dietary habits, beneath vegetarian or vegan ideologies, or ecological reasons, but responds also to scientific evidence. Therefore, plant-based meat alternatives could appear as the best solution. Moreover, this change taking place is also due to the greater ability of these burgers to replace meat through the addition of vitamins and minerals, such as B12 and zinc, generally naturally present in animal proteins (De Ceglia, 2019).

However, besides being more ecologically sustainable in terms of pollution, resources depletion and so on, and appearing as a healthier choice, other researchers sustain instead that the plant-based does not represent the best solution. Among them, Mary Jane McQuillen, portfolio manager and head of *ESG* at *ClearBridge Investments* (*Legg Mason*

group), assesses that this new innovative trend could be interesting, however it is fundamental to study all the possible environmental and social consequences (De Ceglia, 2019). Therefore, still according to McQuillen, it is important to analyze the environmental impacts of a large-scale shift to plant-based proteins, including deforestation, the runoff of herbicides and pesticides into groundwater, and the dangers of monoculture crops. Indeed, these factors should be examined before accepting "meatless meat" products as the best solution, and investors need to monitor the risks as the plant-based protein business grows (De Ceglia, 2019). Additionally, the health benefits of switching to meatless burgers may not be so clear as most of these foods are heavily processed and high in saturated fat and sodium which may be dangerous for people's health (De Ceglia, 2019).

3.2.2: The Plant-Based Meat Diffusion

The first plant-based burger to be launched in the market was the one of *Beyond Meat*, the company already mentioned above, which was the pioneer in this sector. *Beyond Meat* is a US company based in Los Angeles, founded in 2009 by Ethan Brown, the actual CEO, in collaboration with Evan Williams and Biz Stone (two of the fathers of Twitter). All linked by a passion for vegan cuisine, they launched the first product on the US market in 2013, and then they have expanded in 2016 with the sale of a vegan burger internationally. As explained in *Beyond Meat*'s website, "*Beyond Meat Inc.* is one of the fastest-growing food companies in the United States, offering a portfolio of revolutionary plant-based meats made from simple ingredients without GMOs, bioengineered ingredients, hormones, antibiotics, or cholesterol."[56] Specifically, "Beyond Meat products are designed to have the same taste and texture as animal-based meat while being better for people and the planet."[57] Today, *Beyond Meat,* is one of the giants in the sector, with a line of products capable of being perfect substitutes for traditional beef and pork products (Bertera, 2020). Furthermore, "as of December 31, 2020, Beyond Meat had products available at approximately 122,000 retail and foodservice outlets in over 80 countries worldwide."[58]

[56] https://investors.beyondmeat.com/news-releases/news-release-details/beyond-meatr-announces-strategic-global-agreement-mcdonalds/ [Access on 24/09/2021]
[57] https://investors.beyondmeat.com/news-releases/news-release-details/beyond-meatr-announces-strategic-global-agreement-mcdonalds/ [Access on 24/09/2021]
[58] https://investors.beyondmeat.com/news-releases/news-release-details/beyond-meatr-announces-strategic-global-agreement-mcdonalds/ [Access on 24/09/2021]

The main product of *Beyond Meat* is the *Beyond Burger*© (Figure 3.4), one of the most popular veggie burger patties made with plant-based protein (pea protein) and beet juice resulting in a burger that "bleeds" like a traditional beef burger (Van Loo *et al*., 2020). Indeed, *Beyond Burger* is a plant-based patty designed to look, cook, and taste like fresh ground beef (Heller & Keoleian, 2018). Furthermore, *Beyond Meat* has also recently increased its products line including *Beyond Beef*, *Beyond Mince*, *Beyond Sausages*, *Beyond Meatballs*, *Beyond Breakfast Sausages, Cookout Classic*, and *Beyond Beef Crumbles*.[59]

Figure 3.4. Photograph of Beyond Burger retail packaging

Source: Heller & Keoleian, 2018

On the other hand, in 2011 is also born *Impossible Foods*, a Californian company that produces *Impossible Meat* made mainly with heme (the ferrous element that simulates the bleeding of meat) soy, wheat, potatoes, coconut oil and sunflower (Bertera, 2020). Indeed, *Impossible Burger*© produced by *Impossible Foods* is another new type of burger using plant-based heme as the key ingredient to create a meaty flavour and appearance (Van Loo *et al*., 2020). Specifically, according to Van Loo *et al.* (2020): "this approach uses a genetically engineered yeast to produce soy leghaemoglobin, a protein which carries heme. Heme is naturally present in conventional beef and is thought to impart a

[59] https://www.beyondmeat.com/products/ [Access on 22/09/2021]

distinctive meat-like flavour". Next to the *Impossible Burger*, there are other two main products from the *Impossible Foods* company: *Impossible Sausages* and *Impossible Chicken Nuggets*.[60] However, while *Beyond Burger* in 2020 was also offered in grocery stores, the *Impossible Burger*, instead, was only available in restaurants (Van Loo *et al.*, 2020).

The "fake meat" of *Beyond Meat* is the protagonist in the menu of successful food chains and clubs in the US and worldwide, such as *Well Done*, *Burger Wave*, *Avo Brothers*, *Meatball Family* and *Ham Holy Burger.* In the latter case, *Beyond Burger* is called *Burger Zero* and is enjoying great success, as reported by the owner of one of the Milanese stores, explaining that *Burger Zero*'s sales were at 35% of the total in 2020 and are forecasted to reach 50% in few years (Bertera, 2020). Furthermore, at *Ham Holy,* there are five different plant-based meat proposals (Bertera, 2020). These proposals seem to have received the consent of many customers due to their good texture, although they may not convince convinced carnivores. However, as reported by Bertera (2020), *Beyond Meat*, beyond the ups and downs on the stock market, closed 2019 with an increase of 250% in net revenues compared to the previous year and is aiming for a turnover of a billion dollars in 2020.

Concerning Europe, some multinationals have also started to follow this plant-based trend launching their innovative plant-based products in the market. Indeed, in the spring of 2019, *Nestlé* took its *Incredible Burger* to some European retail chains and subsequently went on to challenge American rivals in their homeland with its *Awesome Burger* (Bertera, 2020). In the Italian market, *Nestlé* is now out with its *Garden Gourmet* line of plant-based products.[61] Furthermore, *Unilever* bought, at the end of 2018, *The Vegetarian Butcher*, a Dutch brand that in about ten years had become famous for the quality of its fake meat products, from würstel to chicken strips (Bertera, 2020). In addition, the plant-based trend has also reached Italy. *Joy Food*, a start-up from Perugia, has also launched its *Food Evolution* line of plant-based products. Indeed, it produces frozen plant-based burgers and is mainly on sale at *Esselunga*, a famous Italian supermarket mostly active in the North-Est side of Italy.[62] In addition, *Emilia Food*[63] with the *Via Emilia*[64] line, sells its plant-based products, both as frozen products and as products placed in the refrigerated counter line, mainly in *Despar* and *Rossetto* supermarkets. Again, the *Next Level Burger* is

[60] https://impossiblefoods.com/products [Access on 22/09/2021]
[61] https://www.gardengourmet.it/prodotti/sensational-burger-vegetariano [Access on 22/09/2021]
[62] https://foodevolution.it/ [Access on 22/09/2021]
[63] https://www.emiliafoods.it/ [Access on 22/09/2021]
[64] https://viaemiliafoods.com/it/ [Access on 22/09/2021]

Lidl's version of the plant-based burger and is on sale in supermarkets' refrigerated counters.[65] The Already-mentioned *Quorn* British brand produces *Ultimate Burger* for sale in Italy at *Esselunga* among frozen foods.[66] To conclude, *Findus*, with its *Green Cusine Line*, sells plant-based burgers, meatballs, and chicken nuggets as frozen food in supermarkets.[67] In Italy, however, *Beyond Meat* products are the most sold since May 2019, when they have started to be imported by *Bmfood Italia* in Milan, a company that covers 90% of the Italian market, serving about 200 restaurants in 15 regions and 60 provinces, where *Beyond Meat*'s burgers and sausages can be tasted (Bertera, 2020). However, *Beyond Meat*'s products are also sold in supermarkets; indeed, they can be found at some *Esselunga* and *Conad* stores in Northern Italy. Even though *Beyond Meat*'s products are quite accessible to the public, their cost is not as much accessible. In fact, its price is more or less double that of the classic traditional farm-raised burger (Bertera, 2020).

Regarding plant-based meat in fast-food chains, *McDonald's* is reported to have tested in 2020 fake meat, using *Beyond Meat*'s product, in Canada and in Germany; in addition, in 2018 *McDonald's*' tests were carried also out in Sweden and Finland with mixed outcomes (Bertera, 2020). As a result of those tests, on 25th February of 2021, *Beyond Meat* has "announced the establishment of a three-year global strategic agreement with McDonald's Corporation. As part of the agreement, Beyond Meat® will be McDonald's preferred supplier for the patty in the McPlant®, a new plant-based burger being tested in select McDonald's markets globally"[68] (Figure 3.5). "In addition, Beyond Meat and McDonald's will explore co-developing other plant-based menu items – like plant-based options for chicken, pork and egg – as part of McDonald's broader McPlant platform."[69] Moreover, as reported in *Beyond Meat*'s website, "the agreement will bring together McDonald's iconic global brand with Beyond Meat's leading expertise in plant-based protein development to create and market innovative new plant-based menu offerings. This announcement further solidifies the relationship between McDonald's and Beyond

[65] https://corporate.lidl.it/media-center/comunicati-stampa/lidl-lancia-next-level-il-burger-a-zero-emissioni-100-vegetale-e-con-il-gusto-della-carne [Access on 22/09/2021]
[66] https://www.quorn.co.uk/products/quorn-vegan-ultimate-burger [Access on 22/09/2021]
[67] https://www.findus.it/la-nostra-gamma/nostri-marchi/green-cuisine [Access on 22/09/2021]
[68] https://investors.beyondmeat.com/news-releases/news-release-details/beyond-meatr-announces-strategic-global-agreement-mcdonalds/ [Access on 24/09/2021]
[69] https://investors.beyondmeat.com/news-releases/news-release-details/beyond-meatr-announces-strategic-global-agreement-mcdonalds/ [Access on 24/09/2021]

Meat, which began in 2019 with the Canadian test of a sandwich made with Beyond Meat's plant-based patty."[70]

Figure 3.5. The new McPlant burger co-developed by McDonald's and Beyond Meat

Source: Google Images

Additionally, in Ireland and England, *KFC* has listed, in 2020, a vegan burger with "fake chicken" (Bertera, 2020). As a matter of fact, *KFC Corporation*, the world's most popular chicken restaurant chain with more than 23,000 KFC restaurants in over 135 countries and territories around the world, has announced, on the 29th January 2020, "an expanded test of *Beyond Fried Chicken™,* plant-based chicken."[71] As it can be read on *KFC*'s website, "the expanded test comes on the heels of the overwhelmingly successful test launch in Atlanta last summer, making KFC the first national U.S. QSR to introduce plant-based chicken in partnership with Beyond Meat. With customers lining up hours before the restaurant opened and cars double-wrapped around the drive-thru and down the block, Beyond Fried Chicken was in high demand and sold out in less than five hours. The success of the initial test motivated both brands to make additional improvements to Beyond Fried Chicken, creating a plant-based protein that looks and tastes like KFC's world-

[70] https://investors.beyondmeat.com/news-releases/news-release-details/beyond-meatr-announces-strategic-global-agreement-mcdonalds/ [Access on 24/09/2021]
[71] https://global.kfc.com/press-releases/kfc-beyond-fried-chicken-expands-to-two-new-markets [Access on 22/09/2021]

famous fried chicken, but with the attributes of plant-based meat. The new recipe is designed to deliver on the taste and texture of whole muscle chicken."[72]

Figure 3.6. The Beyond Fried Chicken developed by KFC and Beyond Meat

Source: Google Images

Furthermore, *Burger King*, the famous fast-food chain opened in 1954 in Miami by James McLamore e David Edgerton[73], has also introduced in its Italian restaurants, from March 2021, some plant-based products in the menu: the *Plant-Based Nuggets* and the *Plant-Based Whopper*[74] both produced by the Dutch company *The Vegetarian Butcher* (part of *Unilever*), specialized in the production of food based on vegetable proteins which, with an offer based mainly on soy, competes with animal meat for taste, texture and nutritional value (Benfatto, 2021). Indeed, *The Vegetarian Butcher* has already produced a vegan meatball, made of soy, wheat, gluten, vegetable oil, herbs, and onion, already tested in the heart of the *Rebel Whopper*, the sandwich that *Burger King* also sells in Italy, before launching the *Plant-Based Nuggets* and the *Plant-Based Whopper* in the market (Bertera, 2020).

To conclude, according to *TrendWatching*, the "plant-based revolution" is one of the great trends that will characterize 2021 in sectors such as fashion, beauty and, above all, food.[75]

[72] https://global.kfc.com/press-releases/kfc-beyond-fried-chicken-expands-to-two-new-markets [Access on 22/09/2021]
[73] https://www.burgerking.it/data/pages/a-proposito-di-bk/ [Access on 22/09/2021]
[74] https://www.burgerking.it/prodotti/plant-based/ [Access on 22/09/2021]
[75] http://info.trendwatching.com/innovation-of-the-day-veganuary-founder-launches-deep-fried-chicken-alternative-vfc [Access on 22/09/2021]

Indeed, the potential of the market is enormous, given that these plant-based products are not targeting only vegans and vegetarians but flexitarians too. As assessed by Kevin Hochman, president of *KFC* in the U.S., in an interview released to Bloomberg: "over 90% of people who buy Beyond in the grocery store are also eating animal proteins" (Hochman, 2021). Furthermore, on behalf of all the KFC companies, he continues: "younger people tend to be the ones that want to eat more plant-based. We envision this trend to continue to grow. We're pretty bullish on that. We don't think that plant-based is a fad, we think that's something that's going to continue to grow over time" (Hochman, 2021).

In addition to these new plant-based burgers, as will be explained later, several start-ups are currently developing a burger patty by culturing animal cells, a lab-grown burger patty. For lab-grown meat, stem cells of a living cow are harvested and nurtured to create muscle tissue in the lab. Lab-grown meat is not yet available to consumers as the technology remains cost-prohibitive, but it is expected to become available in the coming years (Van Loo *et al.*, 2020).

3.3: Further Perspectives on Meat Alternatives: The Synthetic Meat

In 1931, Winston Churchill, imagining what the world would be like 50 years later, in an article on *The Strand Magazine* wrote: "With greater knowledge of what are called hormones, i.e. the chemical messengers in our blood, it will be possible to control growth. We shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium" (1931). Many years later, in 2021, during an interview released to the magazine *MIT Technology Review*, Bill Gates, the *Microsoft* co-founder and one of the richest and influential men on Earth, states: "I do think all rich countries should move to 100% synthetic beef. You can get used to the taste difference, and the claim is they're going to make it taste even better over time." (Gates, 2021). According to Gates, the issue of CO_2 emissions from the agricultural sector, particularly from livestock, is one of the most critical fronts in the fight against climate change. Therefore, to move to a more sustainable food consumption, in terms of traditional meat alternatives, is essential. Hence, what is common between those quotes from Winston Churchill and Bill Gates is the imagination of a future where it will be possible to eat synthetic meat.

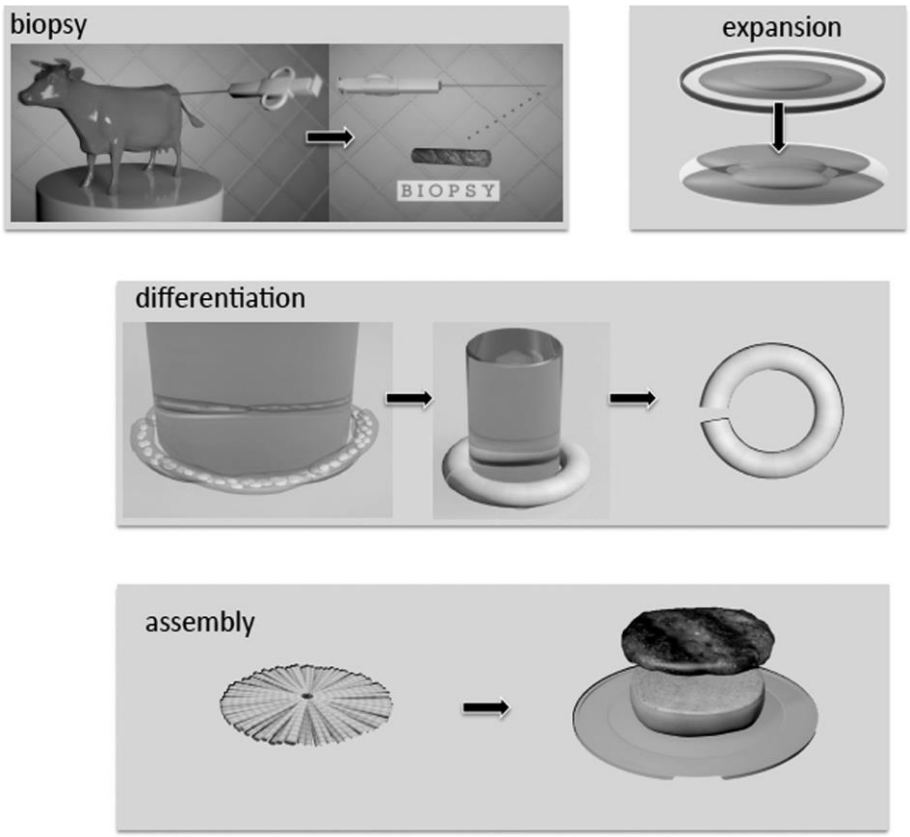
3.3.1: Synthetic Meat: First Attempt to Artificially Produce Meat

Moving one step further in the direction towards a sustainable meat consumption started by the plant-based meat, it is possible to find the innovative so-called "synthetic meat". This product goes far beyond the *Impossible Burgers* or the *Beyond Meat* products described before, which are also created in the laboratory but using ingredients coming from plants. Synthetic meat is different since it is a full-fledged animal, but instead of being produced from a slaughterhouse, it comes from a cell. Since this product is fully artificially originated inside a laboratory, many are the synonyms used also to identify it. Among them, it is possible to find "lab-grown" or "vat-grown meat", "in-vitro meat", "alternative meat", "artificial meat", "cultured meat", "healthy meat", "slaughter-free meat", "cell-based meat", "clean meat", and "cultivated meat". Regarding labels, Bryant & Barnett (2019), investigated the impact of naming of lab-grown meat on the attitude and intention to purchase this product. However, they reported no significant differences in consumer attitude and intention when using the terms "cultured" versus "lab-grown" meat. Nevertheless, the term "clean meat" was found to result in a more positive attitude and intention compared to the term "lab-grown meat" (Van Loo *et. al.*, 2020). The wording may thus have an influence on consumer attitudes towards lab-grown meat (Bryant & Barnett, 2019) and consequently towards consumer demand for lab-grown meat. Likewise, the term for conventional beef ("farm-raised beef") and for the plant-based alternatives (e.g., "plant-based using animal-like proteins produced by yeast") may impact the choice behaviour (Van Loo *et al*., 2020), so other studies have explored the impact of the naming of plant-based alternatives. For example, Faber *et al*. (2020) reported that Belgian and Dutch consumers find terms as "plant-based diet" more appealing than "vegetarian diet" or "vegan diet".

As sustained by Mark J. Post, the aim of synthetic meat "is to create a beef mimic with equivalent taste, texture, and appearance and with the same nutritional value as livestock-produced beef" (2014). Therefore, "cultured beef is an alternative animal protein source that could relieve some of the environmental, sustainability, and ethical issues associated with livestock beef production" (Post, 2014). The first official model of synthetic meat was created by Dutch researchers in 2013 in the laboratory at the *University of Maastricht*, in the form of a hamburger.

As explained Post himself, who first introduced it, the production of synthetic meat began to be considered possible thanks to the discovery of cell cultures at the beginning of the twentieth century. As a matter of fact, cultured beef from bovine skeletal muscle stem cells is produced using many of the same tissue engineering techniques used in regenerative medicine (Post, 2014). The development of this meat product through those techniques is potentially a resource-efficient way to grow meat. "The stem cell technology to produce cultured beef requires four steps: (1) harvesting of stem cells, (2) expansion of stem cell numbers, (3) differentiation of stem cells into skeletal muscle cells and fibres, and (4) assembly into the final meat product" (Post, 2014). Those steps are shown in Figure 3.7.

Figure 3.7. Process of culturing beef.



Source: Post, 2014.

To produce meat in the laboratory, producers plan with breeders to have small amounts of the muscle tissue of the animal they want to replicate. To start, "skeletal muscle-specific stem cells, so-called satellite cells, are harvested from a small piece of bovine muscle tissue" (Post, 2014) through a biopsy needle. Thus, this withdrawn quantity is no more than how much would be collected in a typical biopsy. A needle biopsy is a harmless and small procedure that requires few resources; therefore, it is relatively cheaper in terms of

used resources and there is no danger for animals. Consequently, these cells are stored in liquid nitrogen, a cooling fluid, and then are "revived" from the state of freezing once they arrived in the laboratory. Here, to expand the number of stem cells, researchers identify healthier cells that easily reproduce themselves and place them in bioreactors where they will be fed with nutrients and oxygen, as would happen in animals. Instead of blood, they are fed by a water-based blend that contains glucose, amino acids, minerals, vitamins, and buffers, together with fats, proteins, carbohydrates, and hormones. In the past, the use of fetal bovine serum to feed those cells was diffused. Now, this practice is mostly abandoned due to its economically, ecologically, and ethically problematics (Post, 2014). As muscle cells mature, they bind into long chains, while forming a solid structure of layers of tissues bound together. In the moment of "harvest" the muscle is alive, that is, it contracts spontaneously or in response to stimuli. As in the case of a real animal's muscle after its death, the synthetic muscle will also "die" after its cells stop receiving oxygen from the bioreactor. At the end of the whole process, "the production of the final meat product is equivalent for beef produced through livestock or cell culture and will therefore not result in differences in efficiency" (Post, 2014).

3.3.2: Strengths, Limitations and Diffusion of the Synthetic Meat

Taking into consideration the innovative character of the synthetic meat product, an analysis of the advantages, as well as an analysis of the disadvantages, must be done before introducing this product in the market. Concerning the advantages, the process of creation of this new product seems to be more sustainable than the one used to produce the traditional animal meat. In defining synthetic meat production as "sustainable", the sustainability concept is "used in a very strict sense, meaning that no natural resource will be depleted to threaten long-term production of beef at a scale that is sufficient to satisfy the projected future demand" (Post, 2014). Moreover, synthetic meat could not only eliminate animals suffering from meat production but also reduce more than three-quarters of greenhouse gas emissions and up to 90% of production-related water consumption (Will Media, 2021). In addition, from a health point of view, the risk of bacterial contamination would be eliminated and saturated fat levels in the final product could be controlled (Will Media, 2021). Furthermore, this meat could allow reducing the waste of the parts of the animal that end up unsold or that go bad and could completely

eliminate the problem of transport, growing meat in specialized structures near city centres and distributed throughout the territory (Will Media, 2021).

Nevertheless, there are also several problems. Firstly, the cost of this process must not be overlooked. In the words of Post: "although the resources needed to produce beef could be reduced, this does not automatically mean that the cost of production will be lower as well" (2014). This is because "the economic outcome for cell expansion in terms of spent material resources heavily depends on the specific methods used to scale the production process" (Post, 2014). Even though the production process of synthetic meat seems to have an enormous advantage in terms of sustainability as mentioned before, today's state of the art has revealed itself extremely expensive. Indeed, the first laboratory-produced beef burger by the *University of Maastricht* cost over $ 300,000 and took two years to be produced.[76] Since then, costs and times have come down a lot, but today the meat grown in the laboratory would still be an elite product. Even though it will take a long time before synthetic meat products are available at an affordable price, continuing to eat meat in large quantities waiting for this solution to arrive is not sustainable, as it was previously said. Moreover, by now, using the method described above is a long way from producing a steak but you can produce quite convincing meat that is normally less solid such as mince, hamburger, chicken nuggets or foie gras (Will Media, 2021). Besides, some people have started to notice that maybe it would no longer make sense to stop eating meat or to reduce its consumption (Will Media, 2021). Thus, there may be a very small market for synthetic meat: on the one hand, vegetarians, and vegans already accustomed to not eating meat may decide not to reintroduce it, even if it is produced more ethically. On the other hand, meat connoisseurs may not want to give up their culinary experiences. Synthetic meat, therefore, risks being only a solution for those who are in the middle, those who want to continue to consume meat for social and cultural reasons but at the same time also want to consume more sustainably. Finally, many surveys have already shown that in the face of guidelines that continually suggest us to avoid ultra-processed products, the advice to consume artificial or alternative synthetic meat seems to many a hypocrisy and generates skepticism.

[76] https://www.repubblica.it/esteri/2020/12/02/news/singapore_approva_vendita_carne_coltivata-276745506/ [Access on 26/08/2021]

Notwithstanding the fact that all the disadvantages described above seem to overcome the advantages, this innovative synthetic meat seems to be making its way into the market. Not 50 as Churchill claimed, but nearly 90 years later, in November 2020 *The Chicken*, the first restaurant to sell *SuperMeat* synthetic chicken, opened in the Ness Ziona area, near Tel Aviv, to test its artificial burger menu with a limited number of private customers.[77] Moreover, in December 2020, the *Singapore Food Agency* (SFA), the lead agency for food-related matters in Singapore, has approved the sale of a cultivated meat product in the city-state (Huling, 2020). Particularly, Singapore was the first country to approve the commercialization of chicken nuggets created with laboratory-grown cells. Indeed, from early 2021, in the *1880* restaurant in Singapore, it will be possible to eat the lab-grown chicken nuggets branded *Good Meat* and produced by the US company *Eat Just, Inc.* (Huling, 2020). Besides, *Eat Just* co-founder and CEO Josh Tetrick recently noted that his company is also building a large-scale manufacturing facility in Singapore, where the local consumer's positive feedback on cultured meat serves as a validator for its expansion in other countries in the future, like the U.S.A. and China (Yu, 2021). In confirmation of the increase of this trend, on July 2021 has also come the news that *Eat Just* is targeting "at least" $3 billion in valuation for its IPO that will likely happen on the fourth quarter of 2021 or early next year (Yu, 2021). In addition, many international startups are competing for the development of synthetic meat products that promise to be accessible, to have a reduced environmental impact, to free the land currently used for animal agriculture (and not only) and to avoid the unnecessary slaughter of millions of animals every day (Zinna, 2021). As a matter of fact, this seems to be a promising profitable market. According to the *Facts & Factors* market research report, the Global Cultured Meat Market size and share revenue is expected to grow from USD 103 Million in 2020 to reach USD 248 Million by 2026, at 15.7% annual CAGR growth during the forecast period of 2021-2026.[78]

However, there is still uncertainty about if and when this type of meat will be available on a large scale. What is certain is that by 2050, to feed the entire world population, we would have to produce 73% more food than we do today and with fewer natural resources

[77] https://thechicken.kitchen/ [Access on 26/08/2021]
[78] https://www.globenewswire.com/en/news-release/2021/06/10/2245335/0/en/Global-Cultured-Meat-Market-Size-Expected-to-Reach-USD-248-Million-by-2026-at-15-7-CAGR-Growth-Facts-Factors.html [Access on 26/08/2021]

available. Perhaps in such a scenario, some people will unexpectedly end up feeling less picky about this innovative food. To sum up, for cultured beef to become a viable alternative to livestock beef, its production needs to be resource-efficient, sustainable, scalable, and lead to a product that is indistinguishable from current beef. In addition, consumers need to accept cultured beef as a worthy and ultimately preferable equivalent of the traditional meat product (Post, 2014).

Chapter 4: Research About Communication on Plant-Based Meat Packaging

4.1: Research Questions

Once levels of current meat consumption and their related environmental, ethical, and social issues are framed into the big picture of sustainability, and all the possible alternatives to processed meat have been analysed, even the most innovative ones, it is now important to study which is consumers' position on this topic.

As already introduced, nowadays globally there is an increasing interest in reducing meat consumption for health, environmental and animal welfare motives (Armstrong Soule & Sekhon, 2019). However, since Italy is a country well known for its strong culinary tradition, it is interesting to investigate which ones could be the main motivations, among the ones indicated by Armstrong Soule & Sekhon (2019), that most lead consumers to choose a plant-based diet. Therefore, the first research question is:

> RQ1: *Which are the main motivations beneath the choice to embrace a plant-based diet?*

Moreover, as previously said, animal-based meat products start being replaced by plant-based products that imitate the flavour of natural meat, its texture, and other characteristics. Indeed, they began to be available first in restaurants, then in supermarkets and finally in fast food chains. However, their diffusion is very recent, especially in Italy. Therefore, many consumers could be not aware at all about the existence of those plant-based meat products. Otherwise, if they have already heard about plant-based products, they could have an unclear idea of what kind of product it is. Thus, the objective of research questions number two, three and four is to explore these gaps.

> RQ2: *Are people aware of the existence of plant-based meat products?*
>
> RQ3: *What do people expect about plant-based meat products?*
>
> RQ4: *How is perceived the plant-based meat in terms of health, naturalness, ethics, respect of animals and the environment, taste, and price?*

From a marketing point of view, the increase of consumption of these products can be related firstly to product changes. In fact, technology enables to create a flavour that mimics farm-raised meat better than in the past, therefore even omnivores begin

accepting these new processed meat alternatives. Since interest in these products is rising both from vegetarian and non-vegetarian consumers, it is interesting to study if, as declared by CEOs of companies operating in the sector and other experts, meat eaters are the main target of these products. Indeed, the fifth research question is the following:

> RQ5: *Are meat eaters (flexitarians or omnivores) more willing to try and to include plant-based meat products in their daily meat consumption than non-meat eaters (vegans or vegetarians)?*

Secondly, still from a marketing point of view, the increase in consumption of plant-based meat products can be related also to distribution changes. Since these products are more often available on supermarkets shelves, and their potential market is composed of different segments (both flexitarians and omnivores together with vegans and vegetarians) with different needs, businesses must understand not only who their consumers are but also what they search for and look at during the purchasing process. Plant-based meat companies should then create their image according to their primary target, defined based on dietary habits. Then they should convey messages accordingly. One of the most important communication tools in the food sector to convey these messages is the packaging. As explained in Chapter 2, previous studies suggest that packaging plays a crucial role in product success, especially in the fast-moving consumer goods industry (Simms & Trott, 2010) where more and more buying decisions are made at the point of purchase. Thus, design factors such as size, colours, shape, pictures, lettering all contribute to the appeal of the product and create an impression of the product and brand in the consumers' minds. Plant-based meat companies often use meat pictures, drawings, or symbols related to beef (i.e., barbecue or fire) to catch consumers' attention, but there still is a scarcity of research about the consumer preferences and perceptions about different stimuli in the packaging. Some firms want to foster the mismatch between conventional meat and plant-based meat because part of consumers searches for meat products imitations, that recall hamburger or chicken packaging. On the opposite, others don't want any associations with meat or animals, thus they prefer animal-free packaging because they target vegan users. Hence, the sixth research question aims at analysing consumers' perceptions about plant-based meat packaging:

> RQ6: *Are there different perceptions, in terms of sustainability, cost and innovation of plant-based packaging depending on people's dietary habits?*

To conclude, looking at future perspectives, it is also interesting to investigate whether consumers, depending on their eating habits, intend to definitely introduce these plant-based meat products in their usual food consumption. Thus, the last research question is the following:

> RQ7: *Do consumers, depending on their eating habits, intend to introduce plant-based meat products in their diets in the next future?*

4.2: Materials and Methods

This research aiming at exploring people's attitude towards plant-based meat and their reaction to communication from this innovative product's packaging was conducted in two main steps. As a first step, exploratory one-to-one interviews were conducted with the aim of investigating the different perceptions, according to different dietary habits, regarding the new innovative alternatives to the traditional farm-raised meat and to investigate what packaging appeals would persuade their decision to try this food category. Secondly, an online survey was run in order to have more quantitative and detailed information about consumers' perceptions on the packaging of plant-based meat innovative products. Moreover, the survey aimed also at investigating people's habits, knowledge and opinions concerning plant-based meat.

4.2.1: Qualitative Interviews

Seventeen participants volunteered to answer some questions on their dietary habits and their knowledge about various alternatives to traditional animal-based meat. Among them, six were male while the remaining eleven were female (mean age = 23,71; *Sd* = 1,16). In addition, six out of these seventeen one-to-one in-depth interviews were physically conducted, while the other ones were conducted online, through a virtual call (using *Zoom* or *Skype* platform). However, in both cases, the interviews were conducted in the Italian language since all respondents were native Italian speakers. Moreover, all interviews lasted about 20-25 minutes, and, at the beginning of the interview, all participants were informed about the fact that the interview aims to investigate a research project so their name, surname and personal data would not be disclosed to third parties. Participants were selected mainly due to their different eating habits. Thus, having participants with different meat consumption patterns has been helpful to collect different opinions and different points of view regarding all the meat alternatives

illustrated in the previous chapter. Specifically, eight of them have been declared to be omnivores so to regularly eat meat and one of them has stated to regularly eat meat but having lactose intolerance, so excluding other food from the diet. Furthermore, while three participants have declared to be flexitarian or, at least, to have reduced their meat consumption lately, the other two have declared to be pescetarians (so eating vegetables, animals derivates and fish but excluding meat from their diets). To conclude, among the remain three participants, two of them said to currently being vegetarians, while the last one stated to have been a vegetarian for a year, some time ago, but then to have returned to regularly eat meat, albeit more rarely than before.

Concerning the interview structure (Appendix A), respondents were first asked information about their dietary habits, in terms of current or previous consumption habits. Specifically, they have been asked if they were following or if they have ever followed a particular diet and why. Then they were asked about their openness to try new foods and their preferences in food choices, in terms of either traditional or new food, and, eventually, which elements would make them curious to try new foods. Moving to purchase behaviours but still concerning food choices, respondents were invited to think about a supermarket scenario. Thus, they were asked if they always choose the same brand of a specific product or if they like to try different brands for the same product (e.g., different pasta brands). Remaining in the same supermarket scenario, participants were invited to think about the information they usually look for in the packaging of a food product when making a purchase decision. Moving further, the interview then turned in speaking about which, in respondents' opinion, are the fundamental elements for a diet to be defined as "healthy". Moreover, they were asked if they know special diets: for instance, vegetarians, vegans, pescetarians, fruitarians, raw foodists, and so on, and what is their opinion on these dietary habits. Hence, the focus of the interview shifted on meat substitutes and respondents were then asked if they were aware of some of the so-called "meat substitutes" for those people who choose to follow the types of diets just mentioned. To deeply explore respondents' opinions, they were asked to take a position about the name given to those meat substitutes. Particularly, they were asked if they are for or against the fact that these meat substitutes are called the same as the corresponding meat products, maybe just adding "vegetarian" or "vegan" before e.g., "vegetarian hamburger" or "vegan hamburger", "vegetarian meatballs" or "vegan meatballs" etc. Consequently, in order to explore their knowledge and their perceptions on the

traditional animal-based meat products' innovative alternatives, respondents were asked if they ever heard of "synthetic meat". If they answered affirmatively, they were asked to go deeper so to tell what they have heard about it; if they answered negatively, they were asked what they think synthetic meat is and what would they expect from this kind of product. Still concerning synthetic meat topic, the interview follows asking what they think are the pros and cons of this type of food, in terms of e.g., human health, animal health, environment, economy, etc. and what information they think it would be necessary to indicate in the packaging of a product of this type. Hence, they were also asked what items they would look for in packaging when buying this type. Respondents were then asked if they would be willing to try synthetic meat and, again, if they answered affirmatively, they were asked to explain which elements would attract their curiosity in trying it; if they answered negatively, they were asked which elements would, instead, hinder or scare them. To conclude, respondents were asked if they would be willing to include meat alternatives in their diets and if they would be willing to pay a higher price for this type of products.

4.2.2: Quantitative Survey

Thanks to all the qualitative interviews collected it was possible to gain a preparatory overview about people's perceptions of the traditional animal-based meat alternatives. Then, a more complete survey has been constructed in order to deeply analyse this topic. Considering the target of this survey, it has been translated entirely into the Italian language. Specifically, the survey's goal was to collect all possible data about people's dietary habits, food consumption patterns, motivations beneath dietary habits and food purchase choices, perceptions on plant-based meat products' packaging and eventually their propensity to try it and to engage with it or not. Indeed, the survey (Appendix B) was divided into six different parts, which are the following: dietary choice, implicit associations on plant-based meat packaging, reasons beneath plant-based diet choice, willingness to engage with plant-based meat products and consumers' perceptions of plant-based meat compared to animal-based meat, food consumption habits, and theory of planned behaviour as regard to plant-based meat consumption. Hence, after having declared which dietary habit the respondent was following, three plant-based products packaging were tested performing a "Brand Association Reaction Time Task" (BARTT) test to investigate whether consumers associated specific words with specific brands or

products.[79] Then, the following part of the online survey was aiming at investigating people's motivations beneath their already-made or their possible choice to follow a plant-based diet. Concerning motivations, people could indicate more of them, without any limit of choice. Consequently, they have also been asked about their propensity to eventually purchase plant-based meat products. To avoid any ambiguity about the term "plant-based meat" ("carne vegetale" in the Italian language) this was specified prior to this section of the questionnaire. In addition, to investigate consumers' general food consumption habits, in the online survey was included the *Food Choice Questionnaire* model (Steptoe *et al.*, 1995). In conclusion, in order to study consumers' reasons and motivations beneath plant-based meat products' consumption choices, the *Theory of Planned Behaviour* model has been used.

Once all the qualitative interviews have been collected, an analysis of plant-based meat packaging of the main brands available in Italian supermarkets has been conducted in order to classify them based on their visual appeal. Indeed, those packaging images were necessary for the brand association test in the first part of the online survey. From this analysis, three products have emerged as the most suitable for the purpose of the online survey. Specifically, the three chosen packaging were the ones of: *Next Level Burger* (Figure 4.1), sold at *Lidl* at 2,99 €, *Via Emilia* (Figure 4.2) for sale at *Despar* at 5,49 € and *Unconventional Burger* (Figure 4.3) sold at *Famila* at 3,90 €. Indeed, all three products had to be sold in Italian supermarkets, more over in all the national territory. In particular, they needed to be present in different points of purchase in the Veneto area. Moreover, all three needed to be sold in the same conditions, thus in refrigerators counters, not as frozen products. Once the choice was made, the products were purchased and photographed in the same condition. In this way, the packaging could be equally analysed by the respondents to the online survey, without inducing any cognitive bias. Finally, through the online survey, those three products were tested performing a brand associations test through the so-called "Brand Association Reaction Time Task" (BARTT) which enables measurement of the frequencies and reaction times of participants' judgments as to whether or not words are associated with brands or products (Till *et al.*, 2011).

[79] The research has been conducted in collaboration with TSW Marketing Agency which made the software available to carry out the BARTT test.

Figure 4.1. Next Level Burger

Source: Lidl Supermarket – own image.

Figure 4.2. Via Emilia Plant-Based Burger

Source: Despar Supermarket – own image.

Figure 4.3. Unconventional Burger

Source: Famila Supermarket – own image.

Specifically, respondents have been required to press "S" (for "yes") or "N" (for "no") on the keyboard depending on whether they associated the packaging image with the concept expressed by the words show one at a time on the screen. In fact, they have been required to either associate or not the words "Allevamento Intensivo" (meaning *intensive farming*), "Alta Qualità" (meaning *high quality*), "Conveniente" (meaning *convenient*), "Economico" (meaning *cheap*), "Gustoso", (meaning *tasty*), "Innovativo" (meaning *innovative*), "Naturale" (meaning *natural*), "Salutare" (meaning *healthy*), and "Sostenibile" (meaning *sustainable*) to all the three images of plant-based meat products above. Consequently, the measurement of the associations was combined to the kind of dietary of participants. Indeed, at the beginning of the online survey, all respondents were asked to indicate which category most closely reflects their eating habits. The possible choices, as proposed by Forestell *et al*. (2012), were the following: A) Vegetable only – Vegan; B) Vegetables and animal derivatives – Vegetarian; C) Vegetables, eggs and their derivatives, but not dairy products – Ovo-vegetarian; D) Vegetarian diet and fish – Pesco-vegetarian; E) Diet of both animal and vegetable derivatives but avoiding red meat – Semi-vegetarian; F) Diet of both animal and vegetable derivatives but reducing the consumption of meat – Flexitarian; G) Diet of both animal and vegetable derivatives – Omnivorous. Moreover, as already introduced, according to the structure proposed by Brytek-Matera (2020), the main goal of the following part of the online survey was to explore people's motivations beneath their already made or their possible choice to follow a plant-based diet. In particular, respondents have to indicate which ones, among the following, have pushed them to follow or could push them to follow a plant-based diet: animal welfare, health reasons, ethical reasons, care for the natural environment, religion, economic considerations, weight loss, none of the above and other reasons.

Furthermore, as Wilks & Phillips (2017) have already done studying willingness to engage with in vitro meat, respondents were asked about their attitudes towards the plant-based meat. Indeed, they have been asked if they would be willing to try this innovative product, if they would be willing to introduce it in their daily eating habits and how, how much they would be willing to pay for this product. Moreover, still according to Wilks & Phillips (2017), they have also been asked about their opinion towards the plant-based meat in comparison with the traditional animal-based meat, in terms of ethics, naturalness, healthiness, taste, respect of animals and of environment. To avoid any ambiguity about the term "plant-based meat" ("carne vegetale" in the Italian language) this was specified

prior to this section of the questionnaire as follow: *Plant-based meat is also referred to as "carne vegetale". In these products the proteins come entirely from plant-based ingredients. The goal is to make them similar in taste, shape, and texture to animal meat preparations, but making them with completely vegetable raw materials. For the purposes of this questionnaire, the term "carne vegetale" always refers to plant-based meat.*

Moving to the investigation of food habits in general, as suggested by Hoek *et al*. (2011), respondents have been asked how many times they eat animal-based and plant-based meat weekly. Specifically, vegans and vegetarians (Cluster 2) were only asked about their consumption of plant-based meat, while omnivores and flexitarians (Cluster 3) were asked about both plant-based and animal-based meat's consumption. In fact, these questions aimed at classifying consumers according to their weekly consumption of these products. Following the model proposed by Hoek *et al*. (2011), the possible answers to animal-based meat consumption were less than once a week, between 1 and 4 times a week, and more than 5 times a week. Similarly, the possible answers to plant-based meat consumption were less than once a week, more than once a week, rarely and never (Appendix B). Moreover, the model which has been used to analyse food habits in general is the *Food Choice Questionnaire* (FCQ), presented in Appendix B. The *Food Choice Questionnaire* is a 36 items questionnaire proposed by Steptoe *et al.* in 1995 to assess the reported importance for consumers of *Health* (6 items), *Convenience* (5 items), *Price* (3 items), *Sensory Appeal* (4 items), *Natural Content* (3 items), *Mood* (6 items), *Familiarity* (3 items), *Ethical Concern* (3 items), and *Weight Control* (3 items) in food choices. To each of these items is given a Likert scale from 1 to 4 where 1 correspond to "not at all important" while 4 correspond to "very important". Hence, "subjects were asked to endorse the statement ''It is important to me that the food I eat on a typical day…'' for each of the 36 items by choosing between four responses: not at all important, a little important, moderately important, and very important, scored 1 to 4" (Steptoe *et al.*, 1995).

As last step, respondents were asked to answer some questions according to the Theory of Planned Behaviour Model. Specifically, they have been asked to express their agreement or their disagreement on fourteen statements concerning plant-based meat (Appendix B). To do so it has been used a Likert scale from 1 to 7, with 1 corresponding to "totally disagree" and 7 corresponding to "totally agree", except the statement about Intention, which was measured by one item in terms of "How likely or unlikely is it that

you will eat plant-based meat regularly in the future?" (Åstrøm & Rise, 2000) and here "respondents indicated their subjective probability along a 7-point scale ranging from 7 = "very likely" through 4 = "neither likely nor unlikely" to 1 = "very unlikely"." (Åstrøm & Rise, 2000). All the fifteen statements have been adapted to this research from previous models already present in literature. In particular, statements concerning *Attitude*, *Subjective Norms* and *Intention* were already proposed by Åstrøm & Rise (2000). Statements referring to *Personal Norms*, instead, have been adapted from the model proposed by Santos *et al.* (2021) and previously by Khare (2015). Statements on *Perceived Behavioural Control*, in conclusion, have been also proposed by Santos *et al.* (2021) and previously by Paul *et al.* (2016).

The survey so structured has been launched online on the 5th of July 2021 and remained available online for more than two months. Besides being published on all the researchers' social pages, including Facebook, Instagram, LinkedIn and Twitter personal accounts, the link to the online survey has also been published in other social media pages, groups or profiles. Thus, with the aim of exploiting the so-called *snowball effect*[80] by *snowball sampling*[81] participants. Specifically, it has been required to publish the link to the survey to the following Facebook groups and communities: "Digital Neuromarketing MasterMind", "Vegani al Supermercato", "Prodotti e Cibi Vegan – Consigli per l'Acquisto", "Rimini Vegan", "Diversamente Vegan", "Vegan", "Sei Vegano Se…", "Vacanze Vegane", "Vegani e Leggeri", "Ricette Vegane". Among them, the request to publish the survey's link has been accepted by four groups: "Digital Neuromarketing MasterMind", "Vegani al Supermercato", "Vacanze Vegane", and "Ricette Vegane" which have shared the survey to their community and/or followers. Moreover, the request to share the survey's link, was also made to the following Instagram accounts and pages: "@ioscelgoveg", "@cucinabotanica", "@silviagoggi", "@irenecloset", "@dr_luciana_baroni", "@healthsaveitalia", "@ssnv_italy", "@veggiesituation", "@edoardomoncini", "@cotoncri", "@vegsidestory", "@beprovegan", "@veganitalia", "@italianvegantribe", "@two_cabbages_kitchen", "@vegolosi.it", "@mrs.veggy", "@annapannafood", "@cottoaldente", and "@silvialazzaris". Among them, the request to publish the survey's link has been accepted by two accounts: "@dr_luciana_baroni" and "@two_cabbages_kitchen". In addition, the request has also been sent to "Will Media" by

[80] https://dictionary.cambridge.org/it/dizionario/inglese/a-snowball-effect [Access on 25/09/2021]
[81] https://dictionary.cambridge.org/it/dizionario/inglese/a-snowball-effect [Access on 25/09/2021]

email, but without any answer. All these pages and accounts have been chosen since they all deal with issues related to vegetarianism, veganism, animal-based meat anti-consumption etc., thus suitable for targeting vegetarian and vegan consumers, more difficult to reach, and for asking their opinion about the plant-based meat.

4.3: Results and Analysis

4.3.1: Results from Qualitative Interviews

From the 17 in-depth interviews conducted, many interesting insights emerged regarding the innovative meat's alternative products described above. In the first place, the majority of interviewees have indicated as valid motivations to choose a plant-based diet the ones related to the respect of animals and of the environment. Indeed, as the main reasons for reducing or eliminating meat consumption, they named the reduction of GHGs emitted from factory farms and the ethical reasons concerning the treatment of animals in meat's production. However, some interviewees have also said that they have been or would be interested in reducing or eliminating meat from their eating habits due to health reasons: some people have heard that read meat could be carcinogenic and some others have said that reducing meat could help them to lose weight. Nevertheless, few interviewees have also noticed that, when living with their parents, is extremely difficult to change eating habits since, in that situation, there are some obstacles connected to family habits and traditions (specifically regarding meat consumption) difficult to overcome.

In general, among omnivores and flexitarians interviewees, has emerged the idea that, although the choice of being vegetarian is easier to understand, the choice to be vegan looks more like a stretch. Indeed, in their opinion, veganism is a bit too extreme since often vegan people must take integrators and supplements, such as vitamin B12, to compensate for the lack of substances that would be instead naturally taken by consuming meat. Nevertheless, the slightly softer choices such as vegetarianism and pescetarianism appear as intermediate choices since those who choose these types of diets remove some nutrients that can be easily introduced into the body in alternative ways. For example, according to an interviewee, nutrients from removed meat can be integrated instead by eating legumes and eggs. Even though among omnivores and flexitarians interviewees a widespread scepticism emerges towards vegetarians and vegans, all of them seem to be aware of the huge damages coming from intensive farming, both in terms of environmental pollution and ethical problems regarding the mistreatment of animals. As

consequence, many respondents assessed to have recently started embracing eating habits like the flexitarian one, so drastically reducing meat consumption but without completely eliminate it. As an interviewee assessed: "*I am aware that the production of meat pollutes a lot, but I am not yet willing to give up meat completely: its taste is inimitable*" [Interviewee 1_VEM_O].

As regard vegan meat alternatives made of vegetable clusters, like veggie burgers above mentioned, they are more or less known by the majority of respondents, regardless of their eating habits. For instance, these products could possibly be a good alternative to breaded cutlets that lactose intolerant people cannot eat, as an interviewed highlighted [Interviewee 9_CO_O]. Nevertheless, other alternatives to animal-based meat are mostly unknown among respondents. As said, most meat eaters' interviewees know veggie burgers made by vegetables but just few of them have ever heard about plant-based or synthetic meat. On the other hand, those who do not eat meat seem to be a little more aware of the existence of these products, but without knowing them in depth. When asking those unaware of these products what they would expect and if they would be willing to try them, flexitarians and omnivores (and vegans and vegetarians who still like the meat taste), usually assess they would do it but always looking for traditional animal-based meat's taste. Indeed, in consuming those meat's imitations, the search for farm-raised meat taste is essential for them. Accordingly, many are worried that those products, since they are chemically produced, taste like "plastic", like something "chemical". Moreover, in many interviewees' (both meat eaters and non-meat eaters) opinion, these products could be more suitable for an omnivore or flexitarian audience since they are more likely to look for a product that allows them to have the same taste of meat, which they already like, but significantly reducing environmental pollution and ethical issues in animals' treatment. However, due to concern about taste, omnivores and flexitarians are still unconvinced of permanently introducing plant-based meat or synthetic meat regularly in their daily diet. As a matter of fact, besides taste, they are also worried about other two aspects of these new meat alternatives: cost and health effects in the long term. Indeed, even though some of the interviewees think that meat alternatives could cost a little bit less than the traditional animal-based meat, most of them think instead that their cost is higher. In addition, according to some respondents, another possible point against the innovative meat alternatives are the long-term health effects, which are not yet known. In the words of one of them: *"If it proves to be really useful in terms of health, in the*

sense that both as a food supplement and composition and that it does not cause problems to people's health, in my opinion it could be an excellent step to reduce farms, especially the intensive ones which are the most harmful ones" [Interviewee 9_CO_O]. However, the same interviewee noticed that this trend can be also unpredictable*: "In could be as what happened with vegans and vegetarians: their choice, at the beginning, seemed the best solution to eat without killing the animals and to solve the CO_2 pollution problem coming from meat production, while now they eat tons of soy that are razing the Amazon. So, the environment is destroyed however in another way"* [Interviewee 9_CO_O]. Thus, according to this and other respondents, it is firstly necessary to understand if all the phases of the production chain of plant-based and synthetic meat do not really have a harmful impact on the environment in another way.

As for accepting or not that these products are called by the same names traditionally given to animal meat products, such as "burgers", "sausages", "meatballs" etc., according to an interviewee it depends on the motivations that drive a person to become vegan or vegetarian: *"If, on the one hand, the reasons beneath these choices are ethical or environmental but these people still like the taste of meat, then it would be helpful to use the same names also for plant-based and synthetic meat products alternatives. In this way those people can look for something they had eliminated from their diet but which they continue to like. On the other hand, in the case of people who do not like the taste of meat at all, then perhaps it is better to find other names to indicate alternative meat products. Nevertheless, according to other interviewees, mostly omnivores and flexitarians, the use of the same names is "a stretch, a bad taste imitation".* [Interviewee 6_ZJ_O] Indeed, someone does not agree on calling veggie burgers "hamburger" or "burger", saying that it is *"just for a marketing question, that is to have an appeal on people. Since their appearance and shape are the same as a real hamburger, these products are called with the same name to enhance the similarity and to be easily recognizable by consumers. Indeed, the main goal in the case of clusters of vegetables is not to get close to a real hamburger, but it is to replicate a product that sells and do it only for vegetarians. Contrariwise, it would be probably correct to call "hamburger" those burgers made in the laboratory, since they attempt to recreate true animal meat burgers. Indeed, in this case, these products are correctly called burgers precisely because they are trying to make an imitation"* [Interviewee 7_RF_O]. Nevertheless, many interviewees find it difficult to suggest an alternative valid name as immediate as "hamburger". Another interviewee stated also that the word "hamburger"

gives more of an idea of the shape than of the content, so it can be safe to use the same name for all alternatives [Interviewee 16_TI_O].

Besides how these innovative animal-based meat alternatives are named, most omnivores and flexitarians interviewees confirmed that they would be willing to taste them, at any price. Conversely, in case these products were priced too high, many of them would refuse to add these products to their usual consumption. If the price is reasonable, and if the environmental, ethical, and health-related benefits were all confirmed, they would be instead willing to put those products in their weekly diet but, not totally substituting it for animal meat, rather alongside it, by the moment. In conclusion, for most of the interviewees, these alternatives, if they were truly healthy and able to reproduce the taste of traditional meat, could still be good solutions to intensive farming and the damage it causes to the environment and animals.

As regards food packaging in general, many interviewees declared to usually choose products having as little packaging as possible, possibly of paper or recyclable materials, but without any plastic. According to someone, it is important, since it is the case of fresh food, to have a packaging which allows consumers to see the product. Thus, many interviewees, when purchasing food products, meat in particular, look for packaging that enables consumers to see the appearance, shape, and colour of the food product. In addition, according to some others, the less elaborate the packaging, the more the product seems genuine, homemade, and therefore tastier and healthier. Concerning labels on food packaging, most of the interviewees stated the importance to have labels with nutritional information, while they pay less attention, or not attention at all, on certifications labels: *"If a product is sold in the supermarket, it means that it is already certified."* Again, *"once a food product is in the supermarket the certification is almost implied"* [Interviewee 3_LA_O] However, some added also: *"Perhaps certifications are more important in the case of an innovative and particular product such as plant-based or synthetic meat"* [Interviewee 5_GA_O]. Furthermore, in packaging, many are also looking for colourful, innovative, modern, and captivating graphics capable of capturing their attention. In fact, many interviewees have declared that they are much more likely to buy a product aesthetically beautiful and with appealing packaging. Despite the importance of the graphics and aesthetics of a product's packaging, most of the interviewees stated that, in the ranking of the factors that most influence their purchasing choices, there is price at the first place,

followed by taste of the product or the experience with the brand. Indeed, the majority of the interviewees have said that, for the same price, their choice depends on whether they know the brand. On the one hand, if they already know the brand, they will choose the product of the brand with which they have more experience. On the other hand, if the brand is unknown, they tend to choose the product with a more captivating packaging. In any case, however, it depends on the type of product: for many products that are consumed daily, such as pasta, the choice almost always falls on the product of the brand with which you have the most experience and which is known to be good. Indeed, many remain loyal to the same brands*: "Once I have found the brand that suits me, I think I would choose that"* [Interviewee 7_RF_O].

4.3.2: Results About Eating Habits and Reasons for Food Choices

Sample description

In terms of participants, as shown in Table 4.1, the online survey was filled by 168 people with an age range of 13 to 74 (mean age = 33.14; *Sd* = 12.25), including 106 females, 59 males and 3 who preferred to not specify their gender. Among these 168 respondents, 116 declared to be either flexitarians or omnivores, 26 declared to be vegans and other 26 declared instead to be either vegetarians, ovo-vegetarians, pesco-vegetarians or semi-vegetarian. Thus, the considered sample is composed for the majority by females, 63.10% (males are 35.12% and people who prefer to not specify the gender are 1.79%) and by meat eaters, around 69.05%, while non-meat eaters are around 30.95%, equally divided between vegans (15.48%) and vegetarians (15.48%). Moreover, 100% of participants came from all over Italy.

Table 4.1. Demographic responses of the current sample

Gender	**Frequency**	**% Of Sample**
Male	59	35,12
Female	106	63,10
Other	3	1,79
Eating Habits		
Omnivores/Flexitarians	116	69,05
Non-meat eaters	26	15,48
Vegans	26	15,48
	Mean	**Std. Dev.**
Age	33,14	12,25

For convenience in data analysis, respondents to the online survey have been grouped into three main clusters: Cluster 1 corresponding to respondents following a vegan dietary habit (answer A); Cluster 2 corresponding to respondents following any type of vegetarian diet: vegetarian, ovo-vegetarian, pesco-vegetarian or semi-vegetarian (answers B, C, D, E); and Cluster 3 corresponding to respondents following either a flexitarian or an omnivorous diet (answers F, G). Thus, demographic responses and plant-based or animal-based meat consumption have been analysed according to different clusters, meaning different declared eating habits. Specifically, considering vegan participants in Cluster 1 (Table 4.2), they have an age range of 16 to 65 (mean age = 32.00; *Sd* = 12.71), including 20 females, 5 males and 1 who preferred to not specify the gender.

Plant-Based and Animal-Based Meat Consumption

Accordingly, once a plant-based meat definition has been given (Appendix B), they have also been asked how often they consume it. As emerged from their answers, even though vegans could eat plant-based meat, half of them (50.00%) said they rarely eat it and 38.47% never or less than once per week eat it. Only 11.54% regularly eat plant-based meat products more than once per week. Besides, vegetarian participants analysed in Cluster 2 (Table 4.2), have an age range of 22 to 63 (mean age = 31.58; *Sd* = 10.80), and include 23 females, 2 males and 1 who preferred to not specify the gender. Also in this case, they have been asked how often they consume plant-based meat products. Nevertheless, vegetarians in the considered sample seem to consume these products more often than vegans. Indeed, 34.62% of them assessed to regularly eat plant-based meat products more than once per week. Still, the remaining part (65.38%) do not seem to consume it frequently: 23.08% never eat it, 23.08% rarely eat it and 19.23% eat it less than once per week. To conclude, demographic responses and meat-eating habits have been also analysed for Cluster 3 of meat eaters (Table 4.2). In particular, the flexitarian-omnivorous segment has a wider age range of 13 to 74, corresponding to the range of the all sample. The age mean is 33.75 (*Sd* = 12.50), females are 63, males 52 and 1 of them preferred to not specify the gender. Conversely to what happened in Cluster 1 and Cluster 2, omnivores and flexitarians were asked about their consumption of both animal-based and plant-based meat (Table 4.2). With reference to farm-raised meat consumption, most of them consume it from 1 to 4 times per week (75.86%), 12.93% consume it less than once per week and 11.21% more than 5 times per week. Thus, according to Hoek *et al.*

(2011), the majority of them seem to be *medium users* while the remaining parts are respectively categorized as *heavy-users* and *light-users*. On the other hand, concerning plant-based meat consumption, 67.24% of them never eat it, 5.17% eat it less or more than once per week and 22.41% rarely eat it. Hence, the consumption of processed meat seems to be still high among omnivores and flexitarians while plant-based meat, according to predictions, it is not yet widespread among these types of consumers.

Table 4.2. Demographic responses and plant-based and animal-based meat eating habits of Cluster 1, 2 and 3

	Cluster 1		***Cluster 2***		***Cluster 3***	
Gender	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Male	5	19,23	2	7,69	52	44,83
Female	20	76,92	23	88,46	63	54,31
Other	1	3,85	1	3,85	1	0,86
How often do you eat plant-based meat?						
Never	1	3,85	6	23,08	78	67,24
Less than once per week	9	34,62	5	19,23	6	5,17
More than once per week	3	11,54	9	34,62	6	5,17
Rarely	13	50,00	6	23,08	26	22,41
How often do you eat animal-based meat?						
Less than once per week					15	12,93
From 1 to 4 times per week					88	75,86
More than once per week					13	11,21
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Age	32,00	12,71	31,58	10,80	33,75	12,50

Motivations beneath plant-based diets

As regards to the main reasons that have pushed or still push (for vegans and vegetarians) or would eventually push (for omnivores and flexitarians) consumers to follow a plant-based diet, answers among the three different Clusters are similar but not equal (Table 4.3). Indeed, in all three Clusters respondents have indicated as the most influential motivations beneath this choice the ones concerning animal welfare, health, ethics, and care for the environment. Conversely, religion, economic considerations and weight loss seem not to be influential enough. Nevertheless, the relative importance given to each of them by the three Clusters is different. For vegans in Cluster 1, the major motivation is the ethical one (31.51%) followed by care for the natural environmental (28.77%), and animal welfare (24.66%). In addition, only 13.70% of them have been motivated by health reasons. On the other hand, vegetarians in Cluster 2 have been mainly motivated to follow

a plant-based diet by concern for animal welfare (28.21%). Besides, they have also been equally motivated (25.64%) by care for the environment and ethical reasons to make the same choice. In conclusion, 19.23% of them have been influenced also by health reasons. In Cluster 3, the main reason which would push meat-eaters to change their eating habits and to move to a plant-based diet is the care for the natural environment (29.69%). Furthermore, according to 22.27% and 21.09% of them are also important, respectively, health and animal welfare. To conclude, 13.28% have highlighted the importance of ethical reasons and 7.42% of weight loss one.

Table 4.3. Participants' motivations to choose a plant-based diet

	Cluster 1		***Cluster 2***		***Cluster3***	
Motivations to choose a plant-based diet	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Animal welfare	18	24,66	22	28,21	54	21,09
Health	10	13,70	15	19,23	57	22,27
Ethics	23	31,51	20	25,64	34	13,28
Care for the natural environment	21	28,77	20	25,64	76	29,69
Religion	0	0,00	0	0,00	1	0,39
Economic considerations	0	0,00	0	0,00	5	1,95
Weight loss	0	0,00	0	0,00	19	7,42
None of the above	1	1,37	0	0,00	5	1,95
Other reason	0	0,00	1	1,28	5	1,95

4.3.3: Respondents' Previous Knowledge about Plant-Based Meat Products and Results from BARTT Test

The "Brand Association Reaction Time Task" (BARTT) measures the frequencies and reaction times of participants' judgments as to whether words are associated with brands or products (Till *et al.*, 2011). In this case, respondents have been randomly asked to indicate whether they associated the words "Allevamento Intensivo" (meaning *intensive farming*), "Alta Qualità" (meaning *high quality*), "Conveniente" (meaning *convenient*), "Economico" (meaning *cheap*), "Gustoso", (meaning *tasty*), "Innovativo" (meaning *innovative*), "Naturale" (meaning *natural*), "Salutare" (meaning *healthy*), and "Sostenibile" (meaning *sustainable*) to each of the three images of the selected plant-based products shown above: *Next Level Burger*, *Via Emilia* burger and *Unconventional Burger*. Consequently, the measurement of the associations was combined to the kind of dietary of participants. For analysis purposes, Clusters 1 and 2 have been merged. Nevertheless,

to avoid any bias, after having performed the BARTT test, respondents were then asked about their previous knowledge of the three plant-based meat products analysed. For research purposes, these results on their previous knowledge will be presented first. As it is reported in Table 4.4, most of the vegans' respondents in Cluster 1 (95.63%) already knew all the three products. The most known among them is the *Via Emilia* one (41.18%), followed by the *Next Level Burger* (35.29%) and the *Unconventional Burger* (19.61%). As regard to vegetarians, results are quite different in Cluster 2. Indeed, while 60.61% of them already know these products, 39.39% was unaware of their existence. Among vegetarians who already knew them, *Next Level Burger* and *Via Emilia* burger were equally known by respondents (24.24%) and the *Unconventional Burger* appears to be the most unknown with only 12.12% of respondents aware of it. In conclusion, most flexitarians and omnivores in Cluster 3 (69.67%) appear to be unaware of these products. In fact, only 13.69% already knew *Via Emilia* burger, *Next Level Burger* was known by 9.84% of them and the *Unconventional Burger* one was known by 6.65% of meat eaters.

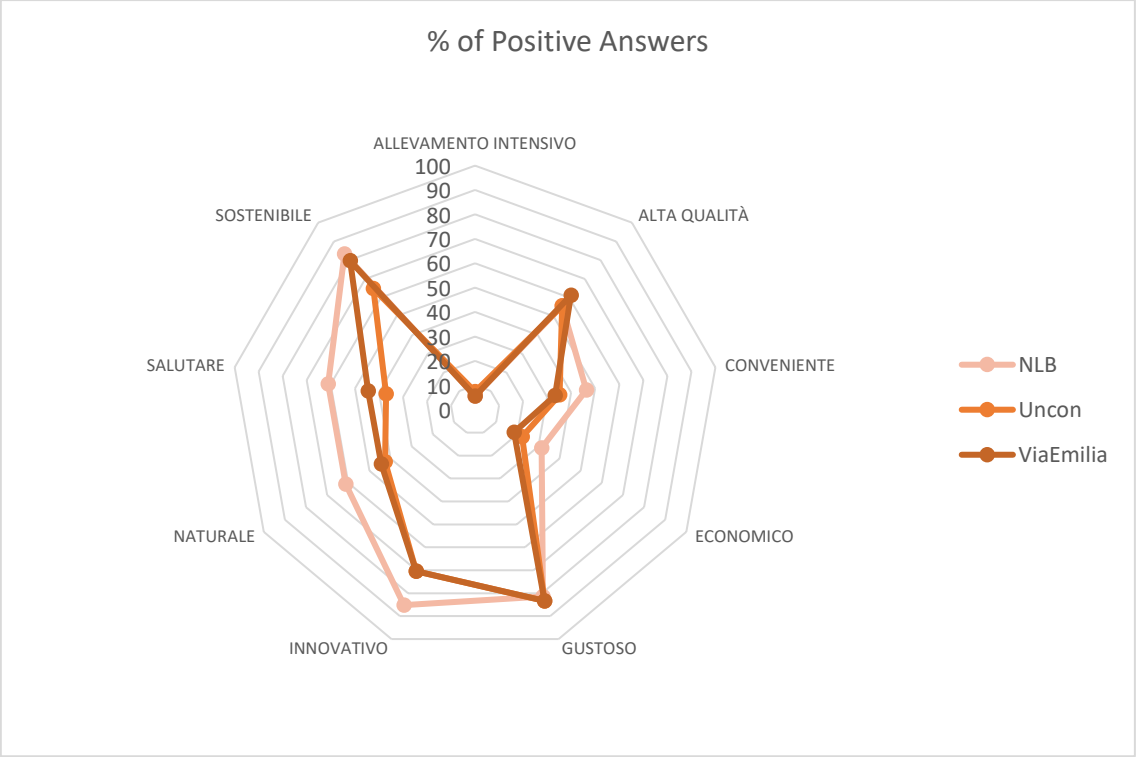
Table 4.4. Respondents' previous knowledge about the three plant-based burger products

	Cluster 1		***Cluster 2***		***Cluster 3***	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Next Level Burger	18	35,29	8	24,24	12	9,84
Via Emilia	21	41,18	8	24,24	17	13,93
Unconventional Burger	10	19,61	4	12,12	8	6,56
None of the above	2	3,92	13	39,39	85	69,67

The percentage of frequencies for positive associations in Cluster 1 and 2 have been represented in Graph 4.1. According to BARTT model, an implicit association, to exist, must be positively selected by at least 20% or 30% of respondents. In the case of this research, the proposed word is considered implicitly associated with the proposed packaging if at least 30% of respondents answered "yes" to that association. Thus, from the graph below it is possible to see that most vegan and vegetarian respondents have positively associated the different proposed concepts to the three different packaging in a similar way. In particular, all three products packaging were not associated to "Allevamento Intensivo" since answers for all three products are below 10% (5.56% for *Next Level Burger*, 7.41% for *Unconventional Burger* and 5.56% for *Via Emilia*). Moving further, the association to the "Economico" concept appears to be as a limit case since packaging of *Unconventional Burger* (22.22%) and *Via Emilia* one (18.52%) are not considered as associated to it while packaging of *Next Level Burger* can be nearly

associated (31.48%) to this concept. Another limit case can be noticed in terms of association with the "Conveniente" word. Although all three packs are surely positively associated by respondents to the idea of convenience, *Unconventional Burger* and *Via Emilia* ones have an association's level lower than their competitor. In fact, only 35.19% and 33.33% of respondents have respectively associated *Unconventional Burger* and *Via Emilia* to the word "Conveniente" while 46.30% did it with *Next Level Burger*'s packaging. Conversely, many respondents in these clusters have valuated all three of them as sustainable. The one which has had the higher number of people associating it to the word "Sostenibile" is the *Next Level Burger* with 83.33%, followed by *Via Emilia* (79.63%) and *Unconventional Burger* (64.81%). However, the majority of respondents has equally associated *Via Emilia* and *Unconventional Burger* to "Gustoso" (83.33% of respondents for both products), against 81.48% for *Next Level Burger*. Also, in terms of innovation, 85.19% of respondents associated *Next Level Burger* to this concept, 70.37% associated it to *Unconventional Burger* and the same percentage did the same with *Via Emilia* one. Other two differences among frequencies between products are the ones of the associations to the words "Naturale" and "Salutare". Indeed, 61.11% of respondents have positively associated *Next Level Burger* to the word "Naturale" and also to the word "Salutare" (61.11%) while only 44.44% did the same with *Via Emilia* for both words. Besides, the *Unconventional Burger* packaging is nearly associated to the health concept (37.04%), but it is more associated to the natural one (42.59% of respondents). Those differences between products have not been registered in relation to products' associations with "Alta Qualità", since all three associations seem to have similar levels: 55.56% for *Next Level Burger* and *Unconventional Burger* and 61.11% for *Via Emilia*.

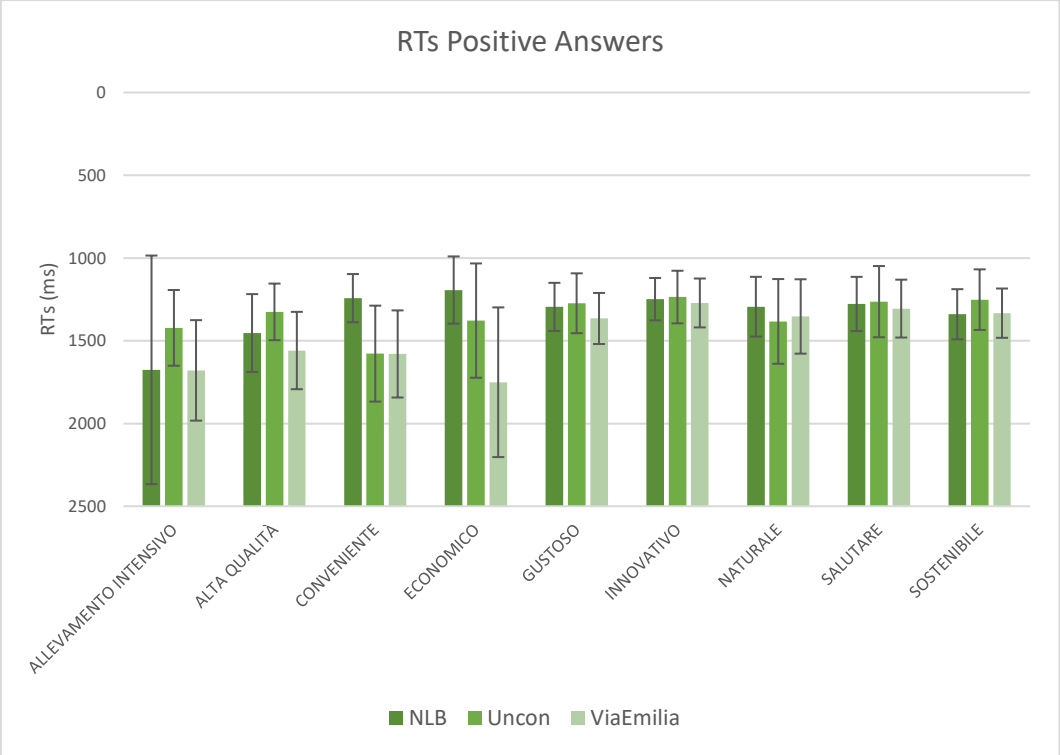
Graph 4.1. Percentage of Frequency for Positive Answers in Clusters 1 and 2



As for BARTT test's results in terms of the intensity of the associations, respondents in Clusters 1 and 2 have recorded a reaction time in average of 1337.83 milliseconds (ms), with a 95% confidence interval ranging from 1298.50 to 1377.16 ms, to positively respond to the proposed associations (Graph 4.2). Taking into consideration results coming from this experiment as benchmark, those associations that turned out to be the strongest are the ones that have registered, in average, reaction times of participants' judgments below the above-mentioned average. Indeed, the associations that were implicitly strongest are those represented by the highest columns in the histogram in Graph 4.2. According to vegans' and vegetarians' opinion, the strongest association measured is the one between *Next Level Burger* and the word "Economico", with an average reaction time (RT) of 1193.41 [990.30; 1396.53] ms. Moreover, other strong associations are the ones between the word "Innovativo" and all three plant-based products' packaging, since it has been registered an average reaction time of 1248.57 [1120.63; 1376.50] ms for *Next Level Burger*, 1235.79 [1076.84; 1394.74] ms for *Unconventional Burger* and 1271.55 [1123.83; 1419.28] ms for *Via Emilia*. Similarly, all three packaging have been on average strongly associated to the word "Salutare" since all their reaction time turned out to be below average: 1263.65 [1048.54; 1478.76] ms for *Unconventional Burger*, 1277.55 [1113.80; 1441.29] ms for *Next Level Burger*, and

1305.67 [1130.80; 1480.54] for *Via Emilia*. Regarding tastiness, *Unconventional Burger* is the one that was most quickly associated by respondents with the word "Gustoso", and *Next Level Burger* and *Via Emilia* follow. In addition, while the first two have registered an average reaction time below the total average, the *Via Emilia*'s reaction time is above it. In fact, their average reaction time has been respectively of 1273.42 [1092.52; 1454.33] ms, 1295.30 [1149.85; 1440.74] ms and 1365.22 [1210.95; 1519.49] ms. Unlike what happened with the associations with tastiness, in terms of associations with "Sostenibile" instead the strongest is the *Unconventional Burger*'s one with an average reaction time of 1251.54 [1068.54; 1434.55] ms. Then follow *Via Email*, with an average reaction time of 1333.28 [1184.33; 1482.23] ms, still below the total average, and *Next Level Burger* with an average reaction time of 1339.89 [1188.32; 1491.46] ms, slightly above the general average in this case. Conversely, *Next Level Burger* has registered the fastest association to both the words "Conveniente" and "Naturale", with and average reaction time of respectively 1242.36 [1096.83; 1387.89] ms and 1294.03 [1113.61; 1474.45] ms. In addition, in both words' cases, associations to *Unconventional Burger* and *Via Emilia* have been weaker. On the one hand, in the case of "Conveniente", respondents have associated it to the *Unconventional Burger*'s packaging with and average reaction time of 1577.68 [1287.79; 1867.58] ms and to *Via Emilia*'s one with an average reaction time of 1579.72 [1316.49; 1842.95] ms. On the other hand, in the case of "Naturale", respondents have associated it to *Via Emilia* faster than to *Unconventional Burger*: reaction time in average has been 1353.13 [1128.28; 1577.97] ms for the first one and 1383.09 [1126.97; 1639.21] ms for the latter. To conclude, the last strong association for vegans and vegetarians has been the one between *Unconventional Burger* and the high-quality concept. Indeed, in average respondents have made this association in 1325.43 [1154.37; 1496.50] ms. Differently, they associated "Alta Qualità" to Next Level Burger in average in 1453.20 [1218.04; 1688.36] ms and to Via Emilia in 1559.00 [1325.36; 1792.64] ms.

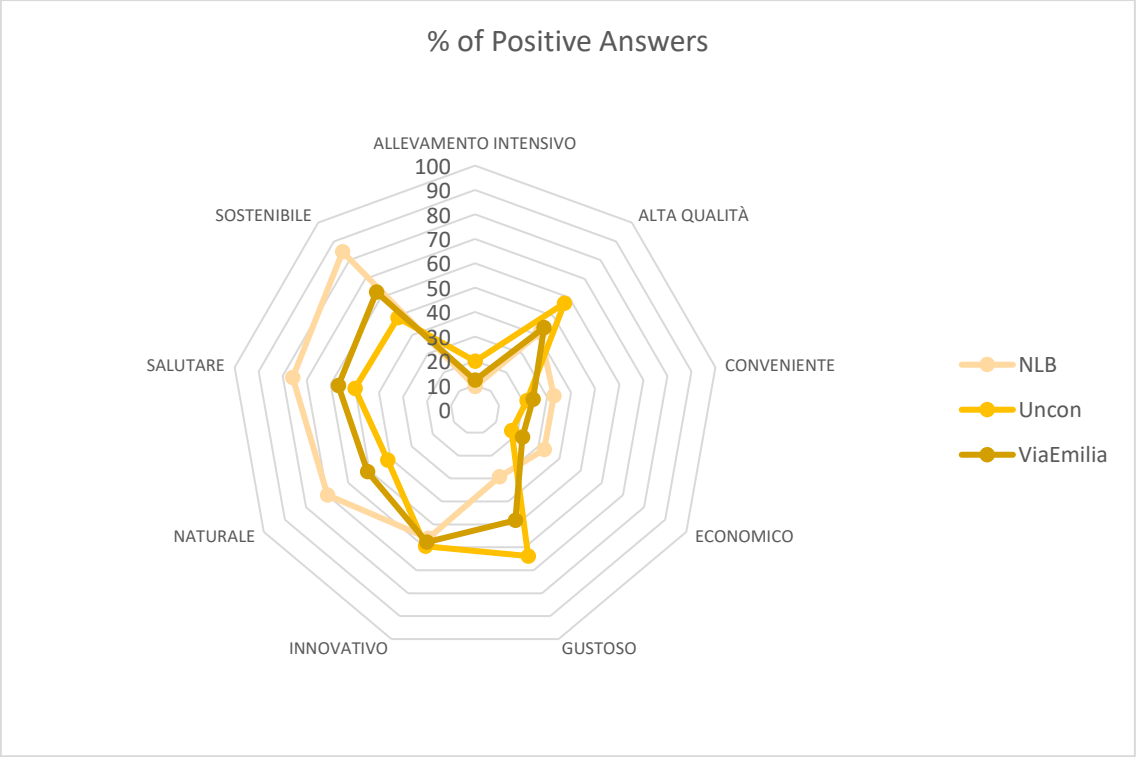
Graph 4.2. RTs measured for Positive Answers in Clusters 1 and 2



As shown in Graph 4.3 below, positive associations in Cluster 3 appear to be more evenly distributed in general than in Cluster 1 and 2 but with opinions on the three packaging more divergent. Similarly to vegans' and vegetarians' opinions previously analysed, the majority of respondents in Cluster 3 do not associate these three products to intensive farming since all the values of these associations are below the established threshold of 30%: 9.48% for *Next Level Burger*, 12.07% for *Via Emilia* and 19.83% for *Unconventional Burger*. Moreover, also in terms of convenience and cost-effectiveness, the associations are mostly inexistent. In fact, packaging of *Unconventional Burger* and *Via Emilia* cannot be considered as associated to words "Conveniente" and "Economico" since only 21.55% of respondents associated *Unconventional Burger* to "Conveniente" and 17.24% did the same for "Economico". As for *Via Emilia*, only 24.14% of respondents associated it with the first concept while 22.41% whit the latter. Nevertheless, results are quite different for *Next Level Burger* which seems to have a slight positive association (32.76%) to both words. Another limit case in Cluster 3 is the one of *Next Level Burger* in relation to the word "Gustoso". Indeed, this cannot be considered as an existing association since the percentage of positive answers is only of 29.31%, slightly below the threshold of 30% above mentioned. Nevertheless, *Via Emilia* and *Unconventional Burger* appear as stronger associated to the tasty concept, respectively with a level of 48.28% and 63.79%. Other

important differences in terms of perceptions of the three products are related to the words “Naturale”, “Salutare” and “Sostenibile”. While *Next Level Burger* seem to have the highest association to all these three concepts, the other two products (firstly *Via Emilia* and secondly *Unconventional Burger*) have registered lower percentages of positive associations with them. As far as “Naturale” is mentioned, *Next Level Burger* has been positively associated to it by 69.83% of meat eaters respondents, *Via Emilia* by 50.86% and *Unconventional Burger* by 41.38% of them. Similarly, 75.86% have associated *Next Level Burger* to the word “Salutare”, 56.90% have associated *Via Emilia* to the same word and 50.00% did the same with *Unconventional Burger*. In addition, more than 50% of flexitarians and omnivores consider these three products as sustainable. In particular, 49.13% of meat eaters think that *Unconventional Burger* is positively associated to the word “Sostenibile”, 84.48% think the same about *Next Level Burger* and 62.93% about *Via Emilia* one. Conversely, there seem to be no big differences among the three packaging concerning associations with the word “Innovativo”. Indeed, all these plant-based meat products’ packaging seems to be equally considered as innovative: *Next Level Burger* for the 56.03% of respondents, *Unconventional Burger* for the 59.48% and *Via Emilia* for the 57.76%. To conclude, all three are still positively associated to high-quality by over 40% of flexitarians and omnivores: 41.38% of meat eaters associate *Next Level Burger* to “Alta Qualità”, 43.97% did the same with *Via Emilia* while the *Unconventional Burger* seems to be the one with the highest association to a high-quality product with 56.90% of positive answers.

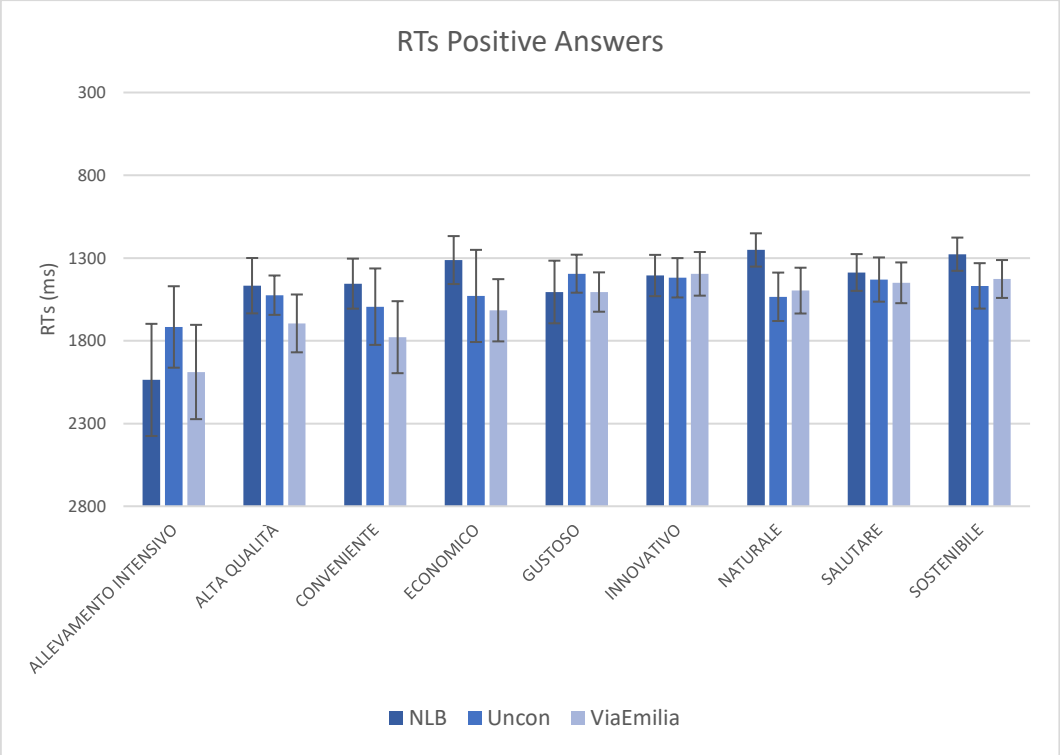
Graph 4.3. Percentage of Frequency for Positive Answers in Cluster 3



Again, as for BARTT test's results in terms of the intensity of the associations (Graph 4.4), respondents in Cluster 3 have recorded in this case a reaction time in average of 1457.75 milliseconds (ms), with a 95% confidence interval ranging from 1429.15 to 1486.36 ms, to positively respond to the proposed associations. Thus, omnivores and flexitarians took on average more time to react to the stimuli proposed in the experiment than vegans and vegetarians in Cluster 1 and 2. Nevertheless, also in this Cluster the association between *Next Level Burger* and the word "Economico" has been the fastest with an average reaction time of 1312.34 [1167.46; 1457.23] ms, so the strongest of the experiment. Similarly, also for the word "Conveniente" the only existing association was the one to *Next Level Burger* and this is also a quite strong one since the average reaction time has been of 1454.84 [1303.65; 1606.04] ms, slightly below the general average. Conversely, the two words "Innovativo" and "Salutare" have been both strongly associated with all three products' packaging analysed, since all the average reaction time analysed are below the total average of the cluster. On the one hand, *Via Emilia* was the one that has been strongly associated to the innovation idea since its average reaction time was of 1395.60 [1263.81; 1527.38] ms. Then, *Unconventional Burger* and *Next Level Burger follow* with an average reaction time of respectively 1405.80 [1281.01; 1530.59] ms and 1419.46 [1300.45; 1538,47] ms. On the other hand, the stronger association with the healthiness concept has

been the one of *Next Level Burger* with an average reaction time of 1387.41 [1276.32; 1498;50] ms. In addition, *Unconventional Burger* and *Via Emilia* have been also strongly associated with the same concept but with a lower average reaction time: 1430.07 [1296.40; 1563.74] ms for the first one and 1449.70 [1326.54; 1572.85] ms for the latter. As for the associations to the word "Sostenibile", *Next Level Burger* was the one which again recorded the lower average of reaction time: 1276.98 [1176.57; 1377.39] ms. Also, *Via Emilia* has been quite strongly associated with the sustainability concept since its reaction time was, on average, 1426.74 [1312.29; 1541.19] ms. Although the association between the sustainability concept and the *Unconventional Burger*'s packaging exists, it is weaker than competitors' ones since it has registered an average reaction time of 1468.42 [1331.13; 1605.72] ms, slightly above the total average. When considering associations between the three products' packaging and the word "Naturale", *Next Level Burger* has the stronger one with an average reaction time of 1251.23 [1150.71; 1351.76] ms, while *Via Emilia* and *Unconventional Burger* have an average reaction time above the total average. In fact, their means respectively are 1496.88 [1358.46; 1635.30] ms and 1534.31 [1387.97; 1680.65] ms. As regard to associations with the word "Gustoso", only *Unconventional Burger* and *Via Emilia* have one. On the one hand, the association between *Unconventional Burger* and the tastiness concept is strong since its average reaction time of 1394.69 [1279.85; 1509.53] ms is below the total average. On the other hand, the association between *Via Emilia* and the tastiness concept is a weak one due to its average reaction time of 1505.63 [1386.74; 1624.51] ms widely above the total average. To conclude, the high-quality concept has weak associations with all the plant-based meat products analysed. Indeed, *Next Level Burger* has an average reaction time of 1467.13 [1299.92; 1634.33] ms, *Unconventional Burger* of 1524.53 [1405.59; 1643.47] ms and *Via Emilia* of 1695.12 [1520.36; 1869.87] ms.

Graph 4.4. RTs measured for Positive Answers in Cluster 3



4.3.4: Results on Consumers' Attitude Towards Plant-Based Meat

To analyse consumers' attitude towards plant-based meat, some questions on this topic have been also included in the online survey. Indeed, these questions' goal was to study consumers' willingness to engage with plant-based meat products and their perceptions of plant-based meat compared to animal-based meat, based on their dietary habits.

Concerning willingness to engage, results are shown in Table 4.5 for all Clusters and suggest that the majority of people in Cluster 1 and Cluster 2 is already aware of plant-based meat products and willing to introduce them into eating habits. Indeed, 65.38% of vegans and 53.85% of vegetarians are already consuming plant-based products, both as substitutes of veggie burgers made of clusters of vegetables and as substitutes of burgers made of soy, tofu, seitan and so on. Specifically, 76.92% of vegans have already introduced plant-based meat in their diets as a substitute for animal-based meat while 30.77% of them consume it as a substitute for burgers made of soy, tofu, seitan etc. On the other hand, 61.54% of vegetarians have substitute animal-based meat products with the corresponding plant-based meat ones while the 23.08% of them uses plant-based meat products instead of burgers made of soy, tofu, seitan etc. To conclude, concerning plant-based meat price, there is a difference of opinions between vegans and vegetarians. On

the one hand, half of the vegans in the sample (50.00%) assess to be willing to pay something more for plant-based meat compared to animal-based meat. On the other hand, only 34.62% of vegetarians would be willing to pay a little bit more for plant-based meat, while 38.46% of them would like to pay equally both types of meat. As it is also shown in Table 4.5 with regard to Cluster 3, results suggest that omnivorous and flexitarian people are somewhat more willing to engage with plant-based meat than vegan and vegetarian ones. However, in analysing this result, it is important to highlight that, as it has been already noticed, a minority of vegans and vegetarians in Cluster 1 and 2 is already consuming these plant-based meat products, so they will not be willing to try something they are already consuming. Besides, the large majority of the sample (73.27%) would try plant-based meat (probably or definitely), with only 8.62% stating they would not try it (probably or definitely). Moreover, 9.48% is already consuming plant-based meat products and 8.62% is not sure whether not sure he wants to try it. Nevertheless, willingness to eat this product regularly was reduced among them, with 42.24% of the meat eaters' sample being willing to eat plant-based meat regularly (28.45% probably or 13.79% definitely) or as a replacement for farmed meat (12.93%). In fact, 31.03% of respondents in Cluster 3 is not sure yet to be willing to eat this product regularly and 25.86% is not sure to be willing to completely substitute animal-based meat with plant-based one. This suggests that, while the majority of the meat eaters' sample are willing to try plant-based meat products, there are stronger reservations around fuller engagement, as already suggested by the qualitative interview. Concerning willingness to pay, most of the respondents in Cluster 3 (36.21%) are willing to pay a plant-based product neither more nor less than the corresponding animal-based product, while 30.17% would be willing to pay a plant-based product a little bit less than the animal-based meat one.

Table 4.5. Participants' willingness to engage with the plant-based meat product

	Cluster 1		***Cluster 2***		***Cluster 3***	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Would you be willing to try plant-based meat?						
Definitely yes	5	19,23	6	23,08	54	46,55
Probably yes	3	11,54	4	15,38	31	26,72
Unsure	0	0,00	0	0,00	10	8,62
Probably no	0	0,00	1	3,85	8	6,90
Definitely no	1	3,85	1	3,85	2	1,72
I already eat this type of product	17	65,38	14	53,85	11	9.48

Would you be willing to eat plant-based meat regularly?						
Definitely yes	1	3,85	5	19,23	16	13,79
Probably yes	4	15,38	4	15,38	33	28,45
Unsure	3	11,54	3	11,54	36	31,03
Probably no	5	19,23	1	3,85	23	19,83
Definitely no	8	30,77	3	11,54	8	6,90
I already eat this type of product regularly	5	19,23	10	38,46	0	0,00
Would you be willing to eat plant-based meat as a replacement for farmed meat?						
Definitely yes	5	19,23	6	23,08	5	4,31
Probably yes	0	0,00	3	11,54	10	8,62
Unsure	0	0,00	1	3,85	30	25,86
Probably no	0	0,00	0	0,00	37	31,90
Definitely no	1	3,85	0	0,00	34	29,31
I have already replaced it	20	76,92	16	61,54	0	0,00
How willing would you be to eat plant-based meat compared to soy substitutes?						
Much more	0	0,00	3	11,54	15	12,93
Somewhat more	3	11,54	5	19,23	32	27,59
Neither more nor less	6	23,08	9	34,62	24	20,69
Somewhat less	6	23,08	1	3,85	35	30,17
Much less	3	11,54	2	7,69	10	8,62
I have already replaced them	8	30,77	6	23,08	0	0,00
How much would you be willing to pay for plant-based meat compared to farmed meat?						
Much more	2	7,69	1	3,85	1	0,86
Somewhat more	13	50,00	9	34,62	17	14,66
Neither more nor less	8	30,77	10	38,46	42	36,21
Somewhat less	1	3,85	5	19,23	35	30,17
Much less	2	7,69	1	3,85	21	18,10

Moving forward, also general perceptions and attitudes of people have been analysed. Regarding general perceptions of vegans and vegetarians about plant-based meat compared to farmed meat (Table 4.6), respondents of those two clusters are similar. Indeed, they both felt that plant-based meat appears less healthy, less natural, and less tasty compared to farmed meat. In addition, both vegans, and vegetarians think plant-based meat is even less environmentally friendly, ethical and appealing than farm-raised meat. However, perceptions of omnivores and flexitarians on plant-based meat compared

to farmed meat are slightly different (Table 4.6). Indeed, respondents of Cluster 3 state that plant-based meat, compared to animal-raised meat is tastier, more appealing, and more natural. Furthermore, meat eaters think that plant-based meat is less healthy, less environmentally friendly, and even less ethic than the corresponding animal-based one.

Table 4.6. Mean perceptions of plant-based meat compared to farmed meat (1 much more - 5 much less)

	Cluster 1		***Cluster 2***		***Cluster 3***	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
How healthy do you think plant-based meat is compared to farmed meat?	3,80	1,10	4,00	0,72	3,19	1,07
How natural do you think plant-based meat is compared to farmed meat?	3,56	0,96	3,25	1,26	2,83	1,16
How environmentally friendly do you think plant-based meat is compared to farmed meat?	4,69	0,47	4,23	0,86	3,77	1,07
How ethical do you think plant-based meat is compared to farmed meat?	4,88	0,33	4,64	0,70	3,81	1,11
How appealing do you think plant-based meat is compared to farmed meat?	4,15	1,00	4,15	0,88	2,45	1,11
How tasty do you think plant-based meat would be compared to farmed meat?	3,72	1,17	3,38	0,97	1,85	0,76

4.3.5: Results from the Food Choice Questionnaire

Food Choice Questionnaire model presented by (Steptoe *et al.,* 1995), has been used in this research to analyse food habits in general. Specifically, respondents have been asked to assess the reported importance that each the 36 items had for them. In the in the full version of the FCQ items are divided in 9 Factors: *Health* (6 items), *Mood* (6 items), *Convenience* (5 items), *Sensory Appeal* (4 items), *Natural Content* (3 items), *Price* (3 items), *Weight Control* (3 items), *Familiarity* (3 items), and *Ethical Concern* (3 items) in food choices. To each of these items is given a Likert scale from 1 to 4 where 1 correspond to "not at all important" while 4 correspond to "very important" and respondents are asked to endorse the statement ''It is important to me that the food I eat on a typical day…'' for each item.

For the purpose of this thesis, only 12 out of 36 items have been analysed for each cluster. The items selected are the ones most in line with the research object of this thesis, so the ones concerning food's taste, naturalness, preparation time, cost, sustainable packaging etc. While results in terms of mean and standard deviation of each item by different cluster are illustrated in Table 4.7, results in terms of frequency and percentage of answers are presented in Appendix C.

As for average results, all respondents' answers, regardless of the Cluster which they belong, seem to be similar. Indeed, on average, they all assessed that is moderately important for a food to be nutritious (means: 3.27 in Cluster 1 and 2 and 3.05 in Cluster 3). At the same time, it is also moderately important, on average, that the food they eat on a typical day is easy to prepare (means: 3.19 in Cluster 1, 3.08 in Cluster 2 and 2.74 in Cluster 3), easily available in shops and supermarkets (means: 3.19 in Cluster 1, 3.35 in Cluster 2 and 3.06 in Cluster 3), and also has a pleasant texture (means: 2.96 in Cluster 1 and 2 and 3.08 in Cluster 3). Furthermore, for all respondents it is also moderately important, on average, that it do not contain artificial ingredients since means are: 2.65 for Cluster 1, 2.96 for Cluster 2 and 2.97 for Cluster 3. To conclude, similar opinions among respondents can be noticed in reference to the item "Is good value for money" since means are respectively 3.35, 3.12 and 3.33 for Cluster 1, 2, 3. Another similarity can be found in respondents' ideas about the food cost. Indeed, all three means (2.46 for Cluster 1, 2.58 for Cluster 2, and 2.60 for Cluster 3) appear as equally distributed, on average, between "a little important" and "moderately important" judgments about the item "Is not expensive". About food familiarity, results are also similar among clusters. Indeed, all respondents think, on average, that is a little important that that the food they eat on a typical day is familiar, since means of Cluster 1, 2 and 3 are respectively: 2.15, 2.19, 2.28. Conversely, respondents' answers seem to be slightly different in terms of the other selected items. While vegans' (3.38) and vegetarians' (3.27) judgments about the importance to have food with a good taste are, on average, closer to "moderately important", meat eaters' ones are instead closer to "very important" (3.59). In addition, while vegans, omnivores and flexitarians seem to agree on the fact that is moderately important to have a food containing natural ingredients (mean in Cluster 1: 3.31, mean in Cluster 2: 3.21), vegetarians, on the other hand, are, on average, more convinced that this is very important since their mean for this item is 3.46. In terms of weight control, for vegans and vegetarians is a little important to have food helping them to control their

weigh (means of answers respectively of 2.15 and 2.27) while for meat eaters in Cluster 3 this is moderately important (2.46). In conclusion, for vegans in Cluster 2 is very important to have food packaged in an environmentally friendly way, since their average answer is 3.62 while vegetarians and meat eaters judge it as moderately important since their means of answers are respectively 3.00 and 2.89.

Table 4.7. Respondents' mean and std. dev. calculated on selected Food Choice Questionnaire Items

	Cluster 1		***Cluster 2***		***Cluster3***	
FCQ Items	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Is nutritious	3,27	0,67	3,27	0,60	3,05	0,74
It easy to prepare	3,19	0,80	3,08	0,89	2,74	0,92
Is easily available in shops and supermarkets	3,19	0,85	3,35	0,80	3,06	0,73
Tastes good	3,38	0,64	3,27	0,67	3,59	0,56
Has a pleasant texture	2,96	0,82	2,96	0,72	3,08	0,81
Contains natural ingredients	3,31	0,79	3,46	0,71	3,21	0,84
Contains no artificial ingredients	2,65	0,98	2,96	1,04	2,97	1,01
Is not expensive	2,46	0,76	2,58	0,81	2,60	0,80
Is good value for money	3,35	0,80	3,12	0,82	3,33	0,68
Helps me control my weight	2,15	1,05	2,27	0,67	2,46	1,01
Is familiar	2,15	0,92	2,19	0,85	2,28	0,97
Is package in an environmentally friendly way	3,62	0,50	3,00	0,98	2,89	0,96

4.3.6: Results from the Theory of Planned Behaviour

In this research, the Theory of Planned Behaviour Model has been used to investigate consumers' attitude, subjective or personal norms, perceived behavioural control and intention towards present and future plant-based meat consumption. Specifically, for items regarding attitude, subjective or personal norms and perceived behavioural control, respondents have been asked to indicate their opinions in a 7-point Likert scale, where 1 corresponded to "totally disagree" and 1 to "totally agree". Similarly, with regard to the item aiming at investigating consumers' intention, respondents indicated their subjective probability along a 7-point Likert scale ranging from 7 = "very likely" through 4 = "neither likely nor unlikely" to 1 = "very unlikely". While results in terms of frequency and percentage of answerers for each item and for each point are shown in Appendix D, results in terms of mean and standard deviation are illustrated instead in Table 4.8.

As regard to *Attitude*'s items, vegan respondents in Cluster 1 seem to strongly agree on the fact that eating plant-based meat regularly in the future is reasonable (5.92) and useful (6.27) while they strongly disagree that it is boring (1.54). Cluster 2 seems to be of the same opinion, since on average also vegetarians strongly agree on the reasonableness and usefulness of eating plant-based meat in the future (respectively 5.81 and 5.92) but disagree on the fact that this consumption can be boring (1.92). Similarly, the same trend seems to characterize opinions of flexitarians and omnivores in Cluster 3 but more smoothly. Indeed, on average they agree and disagree on the same positions as previous Clusters but less strongly: means about reasonableness, usefulness and boredom are respectively 4.51, 4.88 and 1.75.

In terms of *Personal Norms*, respondents, regardless of their eating habits, seem to all disagree in saying they feel an obligation to eat plant-based meat instead of animal-based meat whenever possible. In fact, this statement's mean for all Clusters is more or less equal: 2.88 for vegans, 2.69 for vegetarians and 2.22 for flexitarians and omnivores. Regarding instead the obligation to purchase plant-based meat products, vegans and vegetarians equally disagree on this statement (3.77) while meat eaters are more extreme in disagreeing on it (2.42). However, respondents' opinions about "I should do what I can to eat plan-based meat" are more different among Clusters. All respondents agreed on average on this statement but vegans and vegetarians more strongly (6.46 and 6.23) than flexitarians and omnivores who remain more neutral (4.18). As for *Subjective Norms* category, one item was included in this research. Specifically, on average respondents in Cluster 1 agree on saying that most people important for them approve their eating plant-based meat regularly in the future (5.00). Also, vegetarians in Cluster 2 seem to agree with this item (4.46). Conversely, meat eaters in Cluster 3 are more into disagreement since their average answer is 3.19.

Moving to *Perceived Behavioural Control*, the average trend among the answers for the three clusters seems to be more or less similar for all the six items. Both vegans (5.92) and vegetarians (5.27) agree on having the ability, in terms of money, willingness and knowledge, to purchase plant-based meat products. However, meat eaters in Cluster 3 neither agree nor disagree on that since their average answer is 4.09. The same happens concerning their confidentiality about purchasing plant-based meat products if it were entirely up to them. As a matter of fact, the average answer in Cluster 1 is 5.62, in Cluster

2 is 5.77 but in Cluster 3 is 3.16, meaning that vegans and vegetarians agree on that confidentiality, but flexitarians and omnivores do not. As regard to points of purchase were buying plant-based meat products, on average vegans, as well as vegetarians, agree (5.85 for Cluster 1 and 5,08 for Cluster 2) on saying that plant-based meat products are generally available in the shops where they usually do shopping. However, respondents in Cluster 3 agree less on that with an average answer of 4,47. Moving further, vegans quite strongly agree (6.08) on having resources, time, and willingness to purchase plant-based meat products, followed by vegetarians with an average answer of 5,38 and then by meat eaters who neither agree nor disagree on that item (4,03). Still, vegans, as well as vegetarians, agree (5.81 in Cluster 1 and 4,96 in Cluster 2) on assessing that there are likely to be plenty of opportunities for them to purchase plant-based meat products, while flexitarians and omnivores neither agree nor disagree with an average answer of 3,84. As for the last two items of *Perceived Behavioural Control*, all respondents disagree in saying they are feeling that purchasing plant-based meat products is not totally within their control since the average answer in all three Clusters is around 2 or 3: 1,92 for Cluster 1; 2,08 for Cluster 2; and 2,84 for Cluster 3. Furthermore, while vegans and vegetarians see themselves, on average, as capable of purchasing plant-based meat products in future (5,96 for Cluster 1 and 6,00 for Cluster 2), flexitarians and omnivores instead neither agree nor disagree on that since their average answer is 4,16.

In conclusion, in terms of *Intention*, the results are clear. The most intentioned to eat plant-based meat regularly in the future are vegetarians with an average answer of 5.69, followed by vegans who had an average answer of 5.08. On the other hand, flexitarians and omnivores in Cluster 3 seem to be the ones still undecided about this product's future consumption. Their average answer of 3.97 is close to the middle value of 4, meaning "neither likely nor unlikely", making them the least likely to eat plant-based meat regularly in the future.

Table 4.8. Mean and Standard Deviations for each item of the Theory of Planned Behaviour

	Cluster 1		***Cluster 2***		***Cluster3***	
TPB Items	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Attitude						
To eat plant-based meat regularly in the future is reasonable	5,92	1,57	5,81	1,39	4,51	1,69
To eat plant-based meat regularly in the future is useful	6,27	1,46	5,92	1,32	4,88	1,66
To eat plant-based meat regularly in the future is boring	1,54	1,24	1,92	1,57	3,34	1,75
Personal Norms						
I feel an obligation to eat plant-based meat instead of animal-based meat whenever possible	2,88	2,80	2,69	2,49	2,22	1,49
I should do what I can to eat plan-based meat	6,46	1,42	6,23	1,39	4,18	1,79
I feel a strong personal obligation to purchase plant-based meat products	3,77	2,52	3,77	2,44	2,42	1,50
Subjective Norms						
Most people important to me approve of my eating plant-based meat regularly in the future	5,00	2,00	4,46	2,16	3,19	1,60
Perceived Behavioural Control						
I believe I have the ability (money, knowledge, willingness) to purchase plant-based meat products	5,92	1,57	5,27	1,59	4,09	1,81
If it were entirely up to me, I am confident that I will purchase plant-based meat products	5,62	2,04	5,77	1,70	3,16	2,03
Plant-based meat products are generally available in the shops where I usually do my shopping	5,85	1,83	5,08	1,90	4,47	1,87
I have resources, time, and willingness to	6,08	1,60	5,38	1,55	4,03	1,79

purchase plant-based meat products						
There are likely to be plenty of opportunities for me to purchase plant-based meat products	5,81	1,72	4,96	1,93	3,84	1,78
I feel that purchasing plant-based meat products is not totally within my control	1,92	1,76	2,08	1,76	2,84	1,78
I see myself as capable of purchasing plant-based meat products in future	5,96	1,91	6,00	1,65	4,16	2,03
Intention						
How likely or unlikely is it that you will eat plant-based meat regularly in the future?	5,08	2,37	5,69	1,69	3,97	1,73

Conclusions

As it has been highlighted in the introductive part, this thesis had the purpose of presenting research aiming at understanding consumers' attitudes and perceptions towards an innovative food product born from the sustainability context, as the plant-based meat is. Specifically, the main object of the research here presented has been to study whether and how consumers perceive such an innovative food product and how, from a marketing perspective, companies should correctly communicate its features, especially in a delicate phase as the product's introduction in the market is. Hence, for food companies operating in the plant-based sector, to deeply know which is their target and what are motivations, needs, eating habits, values and beliefs beneath their food purchasing choices is fundamental. As it has been highlighted in this work, the plant-based meat alternative products have an incredible capacity of imitating colour, shape, taste, texture, smell, and other characteristics typical of the traditional animal-based meat. For this reason, this product seems to properly target, next to vegans and vegetarians, people unwilling to eliminate processed meat products from their eating habits but intentioned in reducing its consumption due to ethical, environmental, health, animal welfare or, even taste motivations, the so-called flexitarians. Thus, the message from plant-based meat companies should be tailored accordingly. Given the essential role of packaging in food purchase above illustrated, is then important to know how different consumers' dietary habits influence the perception of plant-based meat packaging.

As regard to consumers' knowledge of plant-based meat, it emerges from both qualitative interviews and online survey that who has already embrace a plant-based diet is usually aware of the existence of this innovative product, while most of omnivores and flexitarians has never heard of it. Consequently, while some vegans and vegetarians are already consuming it, flexitarians and omnivores are still far from this. Nevertheless, it emerges clearly that many meat eaters are moving towards the reduction of their weekly meat consumption so embracing a flexitarian diet.

In terms of motivations beneath the choice to embrace a plant-based diet, respondents to both online survey and qualitative interviews have indicated as the most influential motivations beneath this choice the environmental one. However, according to different eating habits, the relative importance given to each motivation is different. On the one hand, for vegans the major motivation which have pushed them to follow a plant-based

diet appears to be the ethical one, followed by care for the natural environmental and animal welfare, with a small percentage of them motivated by health reasons. On the other hand, vegetarians have been mainly motivated to follow this diet by concern for animal welfare in the first place and by care for the environment and ethical reasons in the second place. Furthermore, meat eaters would consider changing their eating habits and to move to a plant-based diet, firstly because of care for the natural environment, then for health reasons and in conclusion for animal welfare. In addition, only some of them have highlighted the importance of ethical reasons and of weight loss one.

When introducing people to plant-based meat alternatives, they seem quite sceptical in the first place. Many of them, especially during qualitative interviews, have remained confused and expect something chemical, artificial, a product made in laboratory and not genuine or natural at all. However, after they understand what this product is, they appear as more curios and interest to try it. In terms of consumers' perceptions of plant-based meat, both meat and non-meat eaters both felt that plant-based meat appears less healthy, less natural, and less tasty compared to farmed meat. In addition, both vegans, and vegetarians think plant-based meat is even less environmentally friendly, ethical, and appealing than farm-raised meat. On the other hand, omnivores and flexitarians think that plant-based meat, compared to animal-raised meat is tastier, more appealing, and more natural. Furthermore, they think that it is less healthy, less environmentally friendly, and even less ethic than the corresponding animal-based one. Thus, opinions and perceptions among consumers on this product are still divergent and confused.

Although plant-based meat arouses curiosity and interest among consumers, in particular among omnivores and flexitarians, and many will be willing to try it, the percentage of who will be truly willing to introduce it in their habitual consumption habits is significantly lower. Indeed, many have stated they will be willing to try it once or maybe introduce it in their usually eating habit next to the animal-based meat but few of them have declared to be ready to completely substitute animal-based meat with plant-based meat one. Indeed, as it emerges from both online survey and qualitative interviews, flexitarians and omnivores consumers are aware that animal-based meat production is extremely harmful to the environment and animals but most of them are not yet willing to give up on animal-based meat, mostly due to its taste. Another interest point that emerges from this research is that this product would probably fit more for those who

like the meat taste and are unwilling to renounce to it than for those who are already vegetarians and vegans since most of them are not looking for the true taste of meat.

As for the three packs analysed, BARTT test results have confirmed the products analysed were probably already known by vegans and vegetarians since their rection time has been, on average, less than the one registered by flexitarians and omnivores. Nevertheless, both non-meat eaters and meat eaters strongly associate an easier packaging, without many labels and made of apparently recyclable materials, like the *Next Level Burger* one, to the idea of something cheap. Confirming this there is the fact that the association with the cheap idea with other two packaging has not been as strong as the one of *Lidl*'s plant-based burgers. Indeed, packaging of *Via Emilia* and *Unconventional Burger* appear as more elaborated, less simple, with stronger colours (like black and green of *Via Emilia*), more elaborated graphics and materials and it is probably due to this that they implicitly appear more expensive. Moreover, other strong associations registered have been the ones between the innovation concept and the healthy concept with all three packaging, meaning that, regardless their eating habits, consumers have the same implicit perception of those products. In addition, also the existing implicit association of all of them with the sustainable concept from all respondents is proof of the fact these companies are correctly communicating the nature of those products and they are clearly taking their position in the market.

To conclude, consumers are generally aware of the harmful damages that the meat industry brings to the environment and to animal welfare. Due to this awareness, many of them are moving towards embracing diets like flexitarian one that implicate to conspicuously reduce meat consumption. However, although consumers' interest about these new alternatives to animal-based meat products is growing, they do not seem ready at all to completely change their eating habits leaving the animal-based meat products completely aside. As generally happens when a new product is introduced to the market, the consumers response, regardless it is positive or negative, could take sometimes, even more in the case of a delicate and personal topic like food is. Nevertheless, the plant-based meat trend seems to be on the rise, so it is just a matter of time to figure out if consumers will fully embrace this and all other food alternatives. Otherwise, other sustainable solutions in the food sector must be proposed.

Appendices

Appendix A: Questions Track for Qualitative Interviews

1. Do you follow, or have you ever followed a particular diet? Why?
2. Are you a person who generally likes to try new foods or do you consider yourself to be a fairly traditionalist when it comes to choices in the food area?
3. Regarding single products, do you always choose the same brand, or do you like to try instead different brands for the same product (e.g., different pasta brands)?
4. What information are you looking for in a food product's packaging when making a purchase decision?
5. What do you think are the fundamental elements of a healthy diet?
6. Do you know particular dietary habits, for instance, vegetarians, vegans, pescetarians, fruitarians, raw foodists, etc.?
7. What is your opinion on these dietary habits?
8. Do you know some of the so-called "meat substitutes" for those who choose to follow this type of diet?
9. Are you in favour or against that these substitutes are called in the same way as the corresponding meat products (e.g., "burgers", "meatballs" etc.)?
10. Have you ever heard of synthetic meat?
    a. Yes: what have you heard about synthetic meat?
    b. No: what do you think synthetic meat is? What would you expect?
11. What do you think could be the pros and cons of this type of food (in terms of human health, animal health, environment, economy)?
12. What information do you think it would be necessary to have in the packaging of a product of this type?
13. What packaging elements would you look for when buying this type of meat?
14. Would you be willing to try synthetic meat?
    a. Yes: what intrigues you?
    b. No: what hinders/scares you?
15. Would you be willing to include it in your diet?
16. Would you be willing to pay a premium price for this type of product?

Appendix B: Questions Track for Online Survey

1. Quale categoria rispecchia più fedelmente le tue abitudini alimentari?
    a. Vegana/o
    b. Vegetariana/o (vegetali e derivati animali)
    c. Ovo-vegetarian (vegetali, uova e loro derivati, ma non prodotti caseari)
    d. Pesco-vegetarian (dieta vegetariana e pesce)
    e. Semi-vegetarian (onnivoro che evita la carne rossa)
    f. Flexitariana (onnivoro che riduce il consumo di carne)
    g. Onnivora
2. Avevi già visto i prodotti che hai appena analizzato? Seleziona quelli che ti erano già noti.
    a. Next Level Burger (immagine)
    b. Via Emila Burger (immagine)
    c. Unconventional Burger (immagine)

"La plant-based meat è definita anche come carne vegetale. In questi prodotti le proteine provengono interamente da ingredienti vegetali. L'obiettivo è di renderli simili per gusto, forma e consistenza ai preparati di carne animale, ma realizzarli con materie prime completamente vegetali. Ai fini di questo questionario con il termine "carne vegetale" si fa sempre riferimento alla plant-based meat."

3. Quali tra queste motivazioni ti ha spinto, ti spinge o ti spingerebbe a scegliere di seguire una dieta a base di vegetali?
    a. Benessere degli animali
    b. Motivi di salute
    c. Motivi etici
    d. Attenzione all'ambiente naturale
    e. Religione
    f. Motivi economici
    g. Perdita di peso
    h. Nessuno dei precedenti
    i. Altro
4. Saresti disposto a provare la "carne vegetale"?
    a. Assolutamente sì

b. Probabilmente sì
c. Non ne sono sicuro
d. Probabilmente no
e. Assolutamente no

5. Saresti disposto a mangiare la “carne vegetale” regolarmente?
    a. Assolutamente sì
    b. Probabilmente sì
    c. Non ne sono sicuro
    d. Probabilmente no
    e. Assolutamente no
6. Saresti disposto a sostituire completamente la carne animale con la “carne vegetale”?
    a. Assolutamente sì
    a. Probabilmente sì
    b. Non ne sono sicuro
    c. Probabilmente no
    d. Assolutamente no
    e. Non applicabile (non mangio carne animale tradizionale)
7. Quanto saresti disposto a mangiare la “carne vegetale” al posto dei sostituti della carne animale fatti di soia?
    a. Moltissimo
    b. Abbastanza
    c. Né più né meno
    d. Poco
    e. Per niente
8. Quanto saresti disposto a pagare la “carne vegetale” rispetto alla carne animale?
    a. Moltissimo
    b. Abbastanza
    c. Né più né meno
    d. Poco
    e. Per niente
9. Quanto pensi che la “carne vegetale” sia più salutare rispetto alla carne animale?
    a. Moltissimo

b. Abbastanza
c. Né più né meno
d. Poco
e. Per niente
f. Non so rispondere

10. Quanto pensi che la “carne vegetale” sia più naturale degli animali carne animale?
    a. Moltissimo
    b. Abbastanza
    c. Né più né meno
    d. Poco
    e. Per niente
11. Quanto pensi che la “carne vegetale” sia più rispettosa dell’ambiente rispetto alla carne animale?
    a. Moltissimo
    b. Abbastanza
    c. Né più né meno
    d. Poco
    e. Per niente
12. Quanto pensi che la “carne vegetale” sia più etica rispetto alla carne animale?
    a. Moltissimo
    b. Abbastanza
    c. Né più né meno
    d. Poco
    e. Per niente
13. La “carne vegetale” mi invoglia più rispetto alla carne animale.
    a. Moltissimo
    b. Abbastanza
    c. Né più né meno
    d. Poco
    e. Per niente
14. Quanto pensi che la “carne vegetale” sia più gustosa rispetto alla carne animale?
    a. Moltissimo
    b. Abbastanza

c. Né più né meno
d. Poco
e. Per niente

15. Con quale frequenza consumi carne animale?
    a. < 1 volta a settimana
    b. 1 - 4 volte a settimana
    c. > 5 volte a settimana
16. Con quale frequenza consumi "carne vegetale"?
    a. Mai
    b. Raramente
    c. < 1 volta a settimana
    d. > 1 volta a settimana
17. È importante per me che il cibo che mangio normalmente… (Scala da 1 a 4, dove 1 = "per niente importante" e 4 = "molto importante")
    1. Sia semplice da preparare
    2. Non contenga additivi
    3. Abbia poche calorie
    4. Sia gustoso
    5. Contenga ingredienti naturali
    6. Non sia costoso
    7. Abbia pochi grassi
    8. Mi sia familiare
    9. Sia ricco di fibre
    10. Sia nutriente
    11. Sia facilmente disponibile nei negozi o al supermercato
    12. Abbia un buon rapporto qualità prezzo
    13. Mi rallegri
    14. Abbia un buon odore
    15. Possa essere cucinato facilmente
    16. Mi aiuti a far fronte allo stress
    17. Mi aiuti a controllare il mio peso
    18. Abbia una buona consistenza
    19. Sia in un contenitore ecosostenibile

20. Arrivi da un paese che approvo politicamente
21. Sia come il cibo che mangiavo quando ero bambino/a
22. Contenga molte vitamine e minerali
23. Non contenga ingredienti artificiali
24. Mi tenga sveglio/a o in allerta
25. Sembri bello
26. Mi aiuti a rilassarmi
27. Abbia molte proteine
28. Non necessiti di tempo per prepararlo
29. Mi aiuti a rimanere in salute
30. Vada bene per la mia pelle, denti, capelli, unghie, ecc.
31. Mi faccia sentire bene
32. Abbia un paese di origine dichiarato
33. Sia spesso lo stesso
34. Mi aiuti ad affrontare la vita
35. Possa essere comprato in negozi vicino a dove vivo o lavoro
36. Sia economico

18. Quanto sei d'accordo con le seguenti affermazioni?

(Scala da 1 a 7, dove 1 "molto in disaccordo" a 7 = "molto d'accordo")

a. Mangiare regolarmente "carne vegetale" in futuro è ragionevole.
b. Mangiare regolarmente "carne vegetale" in futuro è utile.
c. Mangiare regolarmente "carne vegetale" in futuro è noioso.
d. Mi sento obbligata/o a consumare "carne vegetale" invece che carne tradizionale, quando possibile.
e. Dovremmo fare quanto possibile per consumare carne derivante da proteine vegetali.
f. Sento come forte obbligo personale l'acquisto di "carne vegetale".
g. La maggior parte delle persone importanti per me approverebbe la mia decisione di mangiare regolarmente "carne vegetale" in futuro.
h. Credo di avere la possibilità (monetaria, di conoscenza, di volontà) di acquistare la "carne vegetale".
i. Se dipendesse totalmente da me, credo che comprerei la "carne vegetale".

j. Nei punti vendita in cui solitamente faccio la spesa sono presenti prodotti di “carne vegetale”.
k. Ho le risorse, il tempo e la volontà di acquistare la “carne vegetale”.
l. Ci sono numerose possibilità per me di acquistare la “carne vegetale”.
m. Mi sembra che la decisione di acquistare “carne vegetale” non sia totalmente sotto il mio controllo.
n. Vedo me stessa/o come possibile acquirente di “carne vegetale” in futuro.

19. Quanto è probabile o improbabile che mangerai regolarmente “carne vegetale” in futuro?
    (Scala da 1 a 7, dove 7 = “molto probabile”, 4 = “né probabile né improbabile”, 1 = “molto improbabile”)
20. Sesso:
    a. Femmina
    b. Maschio
    c. Preferisco non specificarlo
21. Anno di nascita: …
22. Regione italiana di residenza: …

Appendix C: Results for Selected Items of the Food Choice Questionnaire

	Cluster 1		*Cluster 2*		*Cluster 3*	
FCQ Selected Items	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Factor 1 – Health						
Is nutritious						
1 - *Not at all important*	0	0,00	0	0,00	4	3,45
2 - *A little important*	3	11,54	2	7,69	17	14,66
3 - *Moderately important*	13	50,00	15	57,69	64	55,17
4 - *Very important*	10	38,46	9	34,62	31	26,72
	26	100	26	100	116	100
Factor 3 – Convenience						
It easy to prepare						
1 - *Not at all important*	0	0,00	1	3,85	9	7,76
2 - *A little important*	6	23,08	6	23,08	41	35,34
3 - *Moderately important*	9	34,62	9	34,62	37	31,90
4 - *Very important*	11	42,31	10	38,46	29	25,00
	26	100	26	100	116	100
Is easily available in shops and supermarkets						
1 - *Not at all important*	1	3,85	0	0,00	2	1,72
2 - *A little important*	4	15,38	5	19,23	21	18,10
3 - *Moderately important*	10	38,46	7	26,92	61	52,59
4 - *Very important*	11	42,31	14	53,85	32	27,59
	26	100	26	100	116	100
Factor 4 –Sensory Appeal						
Tastes good						
1 - *Not at all important*	0	0,00	0	0,00	0	0,00
2 - *A little important*	2	7,69	3	11,54	4	3,45
3 - *Moderately important*	12	46,15	13	50,00	40	34,48
4 - *Very important*	12	46,15	10	38,46	72	62,07
	26	100	26	100	116	100
Has a pleasant texture						
1 - *Not at all important*	1	3,85	1	3,85	5	4,31
2 - *A little important*	6	23,08	4	15,38	19	16,38
3 - *Moderately important*	12	46,15	16	61,54	54	46,55
4 - *Very important*	7	26,92	5	19,23	38	32,76
	26	100	26	100	116	100
Factor 5 –Natural Content						
Contains natural ingredients						
1 - *Not at all important*	0	0,00	0	0,00	4	3,45
2 - *A little important*	5	19,23	3	11,54	19	16,38
3 - *Moderately important*	8	30,77	8	30,77	42	36,21
4 - *Very important*	13	50,00	15	57,69	51	43,97
	26	100	26	100	116	100
Contains no artificial ingredients						

1 - *Not at all important*	4	15,38	2	7,69	12	10,34
2 - *A little important*	6	23,08	8	30,77	25	21,55
3 - *Moderately important*	11	42,31	5	19,23	34	29,31
4 - *Very important*	5	19,23	11	42,31	45	38,79
	26	100	26	100	116	100
Factor 6 –Price						
Is not expensive						
1 - *Not at all important*	2	7,69	3	11,54	9	7,76
2 - *A little important*	12	46,15	7	26,92	42	36,21
3 - *Moderately important*	10	38,46	14	53,85	51	43,97
4 - *Very important*	2	7,69	2	7,69	14	12,07
	26	100	26	100	116	100
Is good value for money						
1 - *Not at all important*	1	3,85	1	3,85	2	1,72
2 - *A little important*	2	7,69	4	15,38	8	6,90
3 - *Moderately important*	10	38,46	12	46,15	56	48,28
4 - *Very important*	13	50,00	9	34,62	50	43,10
	26	100	26	100	116	100
Factor 7 –Weight Control						
Helps me control my weight						
1 - *Not at all important*	8	30,77	3	11,54	22	18,97
2 - *A little important*	10	38,46	13	50,00	42	36,21
3 - *Moderately important*	4	15,38	10	38,46	31	26,72
4 - *Very important*	4	15,38	0	0,00	22	18,97
	26	100	26	100	117	100
Factor 8 –Familiarity						
Is familiar						
1 - *Not at all important*	7	26,92	6	23,08	30	25,86
2 - *A little important*	10	38,46	13	50,00	36	31,03
3 - *Moderately important*	7	26,92	6	23,08	38	32,76
4 - *Very important*	2	7,69	1	3,85	12	10,34
	26	100	26	100	116	100
Factor 9 –Ethical Concern						
Is package in an environmentally friendly way						
1 - *Not at all important*	0	0,00	2	7,69	12	10,34
2 - *A little important*	0	0,00	6	23,08	24	20,69
3 - *Moderately important*	10	38,46	8	30,77	45	38,79
4 - *Very important*	16	61,54	10	38,46	35	30,17
	26	100	26	100	116	100

Appendix D: Results for Items of the Theory of Planned Behaviour

	Cluster 1		*Cluster 2*		*Cluster 3*	
TPB Items	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Attitude						
To eat plant-based meat regularly in the future is reasonable						
1 – *Totally disagree*	1	3,85	1	3,85	4	3,45
2	0	0,00	0	0,00	11	9,48
3	1	3,85	0	0,00	19	16,38
4	2	7,69	1	3,85	25	21,55
5	5	19,23	9	34,62	21	18,10
6	2	7,69	4	15,38	17	14,66
7 – *Totally agree*	15	57,69	11	42,31	19	16,38
	26	100	26	100	116	100
To eat plant-based meat regularly in the future is useful						
1 – *Totally disagree*	1	3,85	1	3,85	4	3,45
2	0	0,00	0	0,00	7	6,03
3	0	0,00	0	0,00	14	12,07
4	3	11,54	1	3,85	20	17,24
5	0	0,00	5	19,23	22	18,97
6	4	15,38	9	34,62	27	23,28
7 – *Totally agree*	18	69,23	10	38,46	22	18,97
	26	100	26	100	116	100
To eat plant-based meat regularly in the future is boring						
1 – *Totally disagree*	18	69,23	15	57,69	19	16,38
2	6	23,08	6	23,08	24	20,69
3	1	3,85	2	7,69	24	20,69
4	0	0,00	1	3,85	20	17,24
5	0	0,00	0	0,00	13	11,21
6	0	0,00	1	3,85	9	7,76
7 – *Totally agree*	1	3,85	1	3,85	7	6,03
	26	100	26	100	116	100
Personal Norms						
I feel an obligation to eat plant-based meat instead of animal-based meat whenever possible						
1 – Totally disagree	17	65,38	17	65,38	54	46,55
2	1	3,85	0	0,00	20	17,24
3	0	0,00	1	3,85	20	17,24
4	0	0,00	0	0,00	13	11,21
5	0	0,00	2	7,69	4	3,45
6	0	0,00	2	7,69	3	2,59
7 – *Totally agree*	8	30,77	4	15,38	2	1,72

	26	100	26	100	116	100
I should do what I can to eat plan-based meat						
1 – *Totally disagree*	1	3,85	1	3,85	7	6,03
2	0	0,00	0	0,00	17	14,66
3	0	0,00	0	0,00	19	16,38
4	2	7,69	2	7,69	24	20,69
5	1	3,85	1	3,85	20	17,24
6	0	0,00	6	23,08	12	10,34
7 – *Totally agree*	22	84,62	16	61,54	17	14,66
	26	100	26	100	116	100
I feel a strong personal obligation to purchase plant-based meat products						
1 – *Totally disagree*	9	34,62	9	34,62	45	38,79
2	1	3,85	1	3,85	24	20,69
3	3	11,54	2	7,69	17	14,66
4	3	11,54	3	11,54	18	15,52
5	1	3,85	2	7,69	8	6,90
6	2	7,69	4	15,38	3	2,59
7 – *Totally agree*	7	26,92	5	19,23	1	0,86
	26	100	26	100	116	100
Subjective Norms						
Most people important to me approve of my eating plant-based meat regularly in the future						
1 – *Totally disagree*	1	3,85	3	11,54	17	14,66
2	2	7,69	4	15,38	32	27,59
3	5	19,23	1	3,85	17	14,66
4	3	11,54	5	19,23	26	22,41
5	2	7,69	3	11,54	13	11,21
6	3	11,54	3	11,54	8	6,90
7 – *Totally agree*	10	38,46	7	26,92	3	2,59
	26	100	26	100	116	100
Perceived Behavioural Control						
I believe I have the ability (money, knowledge, willingness) to purchase plant-based meat products						
1 – *Totally disagree*	0	0,00	1	3,85	10	8,62
2	2	7,69	0	0,00	17	14,66
3	0	0,00	3	11,54	18	15,52
4	3	11,54	3	11,54	21	18,10
5	3	11,54	6	23,08	21	18,10
6	3	11,54	6	23,08	16	13,79
7 – *Totally agree*	15	57,69	7	26,92	13	11,21

	26	100	26	100	116	100
If it were entirely up to me, I am confident that I will purchase plant-based meat products						
1 – *Totally disagree*	2	7,69	2	7,69	34	29,31
2	1	3,85	0	0,00	21	18,10
3	2	7,69	0	0,00	17	14,66
4	2	7,69	3	11,54	11	9,48
5	1	3,85	1	3,85	13	11,21
6	3	11,54	9	34,62	9	7,76
7 – *Totally agree*	15	57,69	11	42,31	11	9,48
	26	100	26	100	116	100
Plant-based meat products are generally available in the shops where I usually do my shopping						
1 – *Totally disagree*	0	0,00	0	0,00	10	8,62
2	3	11,54	3	11,54	11	9,48
3	2	7,69	5	19,23	14	12,07
4	0	0,00	1	3,85	19	16,38
5	2	7,69	5	19,23	24	20,69
6	3	11,54	2	7,69	17	14,66
7 – *Totally agree*	16	61,54	10	38,46	21	18,10
	26	100	26	100	116	100
I have resources, time, and willingness to purchase plant-based meat products						
1 – *Totally disagree*	0	0,00	1	3,85	6	5,17
2	2	7,69	1	3,85	26	22,41
3	1	3,85	1	3,85	15	12,93
4	1	3,85	1	3,85	21	18,10
5	2	7,69	9	34,62	19	16,38
6	3	11,54	6	23,08	17	14,66
7 – *Totally agree*	17	65,38	7	26,92	12	10,34
	26	100	26	100	116	100
There are likely to be plenty of opportunities for me to purchase plant-based meat products						
1 – *Totally disagree*	0	0,00	2	7,69	11	9,48
2	2	7,69	2	7,69	23	19,83
3	2	7,69	0	0,00	14	12,07
4	2	7,69	7	26,92	29	25,00
5	2	7,69	3	11,54	13	11,21
6	3	11,54	4	15,38	17	14,66
7 – *Totally agree*	15	57,69	8	30,77	9	7,76
	26	100	26	100	116	100

I feel that purchasing plant-based meat products is not totally within my control						
1 – *Totally disagree*	18	69,23	17	65,38	35	30,17
2	2	7,69	1	3,85	30	25,86
3	2	7,69	3	11,54	10	8,62
4	2	7,69	2	7,69	16	13,79
5	0	0,00	1	3,85	14	12,07
6	0	0,00	1	3,85	7	6,03
7 – *Totally agree*	2	7,69	1	3,85	4	3,45
	26	100	26	100	116	100
I see myself as capable of purchasing plant-based meat products in future						
1 – *Totally disagree*	2	7,69	2	7,69	15	12,93
2	0	0,00	0	0,00	18	15,52
3	2	7,69	0	0,00	11	9,48
4	1	3,85	0	0,00	17	14,66
5	1	3,85	4	15,38	16	13,79
6	2	7,69	6	23,08	22	18,97
7 – *Totally agree*	18	69,23	14	53,85	17	14,66
	26	100	26	100	116	100
Intention						
How likely or unlikely is it that you will eat plant-based meat regularly in the future?						
1 – *Very unlikely*	5	19,23	2	7,69	13	11,21
2	1	3,85	0	0,00	15	12,93
3	0	0,00	0	0,00	11	9,48
4 – *Neither likely nor unlikely*	1	3,85	2	7,69	31	26,72
5	5	19,23	5	19,23	23	19,83
6	2	7,69	6	23,08	15	12,93
7 – *Very likely*	12	46,15	11	42,31	8	6,90
	26	100	26	100	116	100

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