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Dietary changes of Millennials to the Planetary Health Diet as a step towards a more sustainable future – A matter of food consumption orientations, positive enabling factors, and willingness to change.

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Preface and Acknowledgements

This research proposal is written for the final bachelor thesis which concludes the study course International Food Business at Aeres University of Applied Science in collaboration with the Canadian Dalhousie University Faculty of Agriculture.
My name is Kimberly Zoe Schnell, a fourth- year student from Osnabrück, Germany. Since the start of studying International Food Business, my knowledge and concern about sustainable dieting has significantly increased. Throughout my experiences in the food business, I have seen that consumers are hesitant in changing their food consumption to a more sustainable way.

This thesis focusses on enabling factors which are important for millennials to be willing to change their diets, with special emphasis on the Planetary Health Diet from the EAT Lancet Commission. These results will help to gain a deeper insight in consumers reflecting on their diet choices and the consequences of their choices on the environment. Additionally, the findings may help marketers to understand the targeted customer group's food preferences and the reasons influencing these choices. Based on this information, marketeers will be able to form well- developed strategies to meet millennials' interests and demands.

I would like to thank my coach Mandy van Vugt for her guidance and advices in order to complete this thesis. Additionally, I want to acknowledge my family and friends for their support throughout this period.
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Summary

The impacts of the current food system and the consequences for future generations lead to the need of taking action in form of a dietary shift towards more plant-based diets. It is believed that this transition will not only benefit people's wellbeing, but also prevents an exhausting exploitation of natural resources throughout the world. It will also serve countries and companies to meet international sustainable development goals. The EAT Lancet commission developed the Planetary Health Diet as one action to contribute to a more sustainable food system. The diet suggests that half the plate is filled with vegetables, whereas animal source foods are reduced and subsidized by a plant- based option.
The population of millennials is the largest group of consumers characterized by valuing their lifestyle, interconnectedness throughout the world and their overall goal of making a difference to the world. Since studies about people's willingness to change diets were already present, this research focused on the great population of millennials and their food consumption orientations to answer the main research question: "To what extent are millennials willing to change their regular diet to the Planetary Health Diet from the EAT Lancet Commission?".

Therefore, an online survey was created to reach millennials including questions about food consumption orientations, current eating habits, enablers to change and willingness to change. Answer options were given in form of a 5-point Likert Scale to rate people's (dis)agreement to those topics. Food consumption orientations were related to 2-3 criterion variables based on a Chi^2-test. This methodological approach was adapted from Graça et al., 2019.

The results of this study showed that millennials were health and pleasure oriented. They were following the typical "Western Diet" defined by a high intake of animal source foods at least once a week. A rather large proportion considered themselves as flexitarians or vegetarians showing that over 30% ate vegetarian meals every day. Thus, millennials oriented towards health, convenience and natural concerns agreed to following the Planetary Health Diet. Their eating habits of consuming vegetarian meals already were in line with their willingness to change.
Despite, the orientations towards pleasure, sociability and social image were not willing to change their diet or maintain status quo. This indicated that the target group was determined by their own choice of meals without feeling any external pressure on their choice. They act in line with their own interests, values and knowledge.
All enablers have to be strengthened to achieve a successful change throughout the group of millennials. Otherwise only governmental regulations could help to start the needed dietary shift.

It was recommended that future research is needed to explain millennials' food consumption orientations related to current eating habits and willingness to change. To strengthen the enablers, food retailers should have more plant-based foods in their shelves and governmental policies should be adapted to higher taxation for animal source foods. The consumer group should reflect on their behaviour and their influences on the environment by realizing the need of a potential dietary shift in order to maintain a healthy and liveable environment.

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List of Abbreviations

COM-B- System	Capability, Opportunity and Motivation – Behaviour System
EU	European Union
FCO	Food consumption orientation
GDP	Gross Domestic Product
GHG	Greenhouse gases
PB	Plant-based

1. Introduction

The topic of this research is the willingness of millennials to change their current diet towards a more sustainable one; emphasised on the Planetary Health Diet recommended by the EAT Lancet commission.

The suggestion to change or adjust towards more sustainable nutrition is based on the impacts of the current food system and the consequences for future generations. Without action the United Nations (UN) Sustainable Development Goals and the Paris Agreement could fail to be met (EAT, 2019).
Food production is one of the biggest contributors to the total energy used and greenhouse gas (GHG) emissions. 32% of the total GHG emission are from the agricultural sector (González et al., 2011). It is also one of the largest contributors to climate change, biodiversity loss, land and freshwater use and interferes in the global nitrogen and phosphorus cycles (Willett et al., 2019).
While producing enough calories for everyone is possible right now, 820 million people are experiencing hunger or having a low-quality diet which results in nutrient deficiencies followed by diet- related diseases and illnesses. Simultaneously, the current food production and processes are pushed to its limits and beyond the planetary boundaries (Willett et al., 2019). Thus, the way of dieting and our current food system is questioned, and different actions have been developed to tackle the problem of achieving healthy diets from a sustainable food system for the growing population, which is particularly important considering the impacts of global change and challenge.

One action is the global shift towards the Planetary Health Diet. This diet suggests that half the plate is filled with fruits and vegetables and the rest consists of primarily whole foods such as grains, plant proteins (beans, lentils, pulses, nuts), unsaturated plant oils, modest amounts of meat and dairy, and eventually some added sugars and starchy vegetables. It is a flexible diet which can be followed as a vegetarian or also as a vegan, whatever preference one has (EAT Forum, n.d.). This daily intake of food nurtures people, strengthens its health and supports environmental sustainability (EAT, 2019).
It could be realized by doubling the global consumption of any plant- based foods such as fruits, vegetables, nuts and legumes, and reducing the consumption of animal-sourced foods like red meat and sugar (Willett, 2019). This means that meat in small portions are still allowed as a source of protein and other nutrients (McAfee et al., 2010).
Comparing animal source foods to plant- based products, it has been assessed that the latter show a lower environmental impact than the first. Foods such as grains, fruits and vegetables have the lowest environmental effect (Clune et al., 2017). During their production, lower levels of GHG emissions, less land and water usage have been identified. A more plant-based nutrition also shows significant health benefits by reducing the risk of diabetes, cancer, obesity the chances of cardiovascular disease, and it supports the overall well-being of humans (Willett et al., 2019). It is proven that reducing red meat intake and replacing it with other animal source products such as dairy products or a plant-based alternative is better for humans' health, lowers animal suffering and is more sustainable (Willett et al., 2019; Graça et al., 2015). As a consequence, it would prevent up to 11 million deaths per year (EAT, 2019).

A second action is the reducing food loss and waste by halve. A behavioural change among consumers could prevent food waste (Willett et al., 2019). Thirdly, improved and more efficient and eco-friendly production practices have to be assessed, including application of fertilizers, water management, and use of renewable energy resources, among other processes. Another action is based on a high ambition and motivation to halt climate change by implementing options to mitigate food related GHG emissions (EAT, 2019).

The overall benefits of shifting food systems towards a more sustainable approach where food production and consumption are within the planetary boundaries to feed the continuously population have been assessed (Willett et al., 2019). The question follows- what about consumer preferences? In this study the focus is on the so-called millennials - the largest group in the continuously growing population with more than 50% of global consumption in 2017 (Orozpe, 2014). The group of millennials was born between the years 1980 and 2000 (Lee & Kotler, 2016), characterized by past world events and social economic changes (Moreno et al., 2017). They are shaped by environmentalism and globalization (Tanner, 2010). Following products and brands which are representing their values, personality and lifestyle is one of the characteristics this group has (Ayaydın & Baltaci, 2013). Most of their purchases are made in categories of health, beauty, clothing and food (Valentine & Powers, 2013). They like to spend more than any other group to fulfil their lifestyle (Ayaydın & Baltaci, 2013). Many consumers between the age of 21 and 30 are greater involved in sustainable lifestyles and the awareness of human- made problems which are threatening the environment (Peano et al., 2019). Those adults want to make a difference to the world (Tanner, 2010).

Since the group of millennials is the largest one in the growing population and characterized by wanting to contribute to make a the world a better place (Tanner, 2010), understanding their food consumption orientation and their thoughts about food/ dieting related to their willingness to change would be helpful in starting the transition towards a sustainable food system.
It will support consumers reflecting on their dieting and their influences on the environment. Food businesses could use this information to meet millennials' shifted consumption demands for new or other food products and develop marketing strategies to target this strong consumer group.
Also, it is significant information for farmers and other food businesses to know if the demand is potentially increasing for plant-based products in order to supply them (Audsley et al., 2010) and how they can convert their agricultural practices towards a sustainable approach. Additionally, governments would know if they need to develop new policies to support and strengthen this transformation as well (Willett et al., 2019).

1.1. The Food System

The food system is defined as "[…] *a complex web of activities involving the production, processing, transport, and consumption. Issues [...] include the governance and economics of food production, its sustainability, the degree to which we waste food, how food production affects the natural environment and the impact of food on individual and population health."* (University of Oxford, n.d.). As the explanation says, it involves the whole supply chain, from production to consumption.

This current food system helped many nations worldwide to create zero hunger and food security. Food has become available at any time and a great variety of food items from all over the world is supplied in many Western countries such as Northern Europe and North America. However, the global South is still suffering from malnutrition and hunger (Tansey & Worsley, 2014).

The global, non-profit organization EAT established by the Stordalen Foundation, Stockholm Resilience Centre and Wellcome Trust wants to catalyse a food system transformation. The idea is to transform the global food system through science, impatient disruption and partnership. The vision is to create a global food system for healthy people and planet by leaving "no one" behind (EAT, 2019).

The different impacts of the food system on the environment, economy and the social aspects will be explained in the next subchapters.

1.1.1. Environmental Impacts

The current food system is challenged by sustainability issues and food security concerns. Because the global population is expected to raise to up to 10 Billion people by 2050, more food is needed which has to be produced with finite resources (Oxford Martin Programme on the Future of Food, n.d.). With the growth in population, increase of wealth and a greater demand for animal-based protein sources such as meat, dairy and fish products is the consequence (Godfray et al., 2010).
Especially on the supply side, natural resources such as water and land will become scarce (Oxford Martin Programme on the Future of Food, n.d.).
Clune and colleagues have researched that grains, fruits and vegetables have the lowest environmental effect compared to meat from ruminants (Clune et al., 2017). Animal source foods have a high environmental footprint per serving for GHG emissions, cropland use, water use, and nitrogen and phosphorus application (Clark & Tilman, 2017).
Livestock farming is using 70% of the agricultural land of planet earth (FAO, 2006). 30% of any land on the Earth's surface is (in)directly connected to livestock farming.
The sector of intensive livestock production influences climate change in terms of higher emissions and soil and water usage (Ilea, 2009).

<u>Emissions</u>

Food production is one of the biggest contributors to the total energy used and GHG emissions. 32% of the total GHG emission are from the agricultural sector (González et al., 2011); 19% of GHG emission are linked to the livestock sector (FAO, 2006a). This total percentage of GHG emissions is concluded from various gases which include 57%

carbon dioxide (CO_2), 25% methane (CH_4) and 19% nitrous oxide (N_20) (González et al., 2011).
It can be noted that the livestock sector is one of the top two or three most significant contributors to environmental problems, also leading to land degradation and water pollution (FAO 2006a).

Next to the high emission of carbon dioxide, intensive livestock farming is also responsible for 68% of the dangerous anthropogenic nitrous oxide which remain in the atmosphere for around 150 years and has a 296 times higher potential for global warming than carbon dioxide (FAO, 2006). Another consequence of intensive livestock farming is the acidity of rain and acidification of ecosystems. Animal farming is responsible for almost 64% of anthropogenic ammonia emissions which lead to acidification (LEAD, 2006). In addition to those acid emissions, farm animals are one of the most critical contributors to anthropogenic methane emissions. More than a third of the global methane emissions are collected because of intensive animal farming (FAO, 2006). Methane has a higher potential to cause global warming which is 23 times than carbon dioxide (LEAD, 2006). This occurring situation with methane emissions only develops to a problem when a vast number of animals are raised intensively together which is the case in the current intensive animal farming (US EPA, 2007).

Another increase in emissions which is also linked to livestock farming due to feed (US EPA, 1998). Cheap feed includes soybeans and corn (USDA; n.d.; WWF, n.d.) and make the animals grow fat faster. They can develop a number of illnesses in their digestive system which will lead to higher methane emission (US EPA, 1998).
The increase of GHG emissions in the atmosphere (Earth Science Communications Team, 2020) and the effects of climate change can strongly be seen in developing countries (IPCC, 2008). People in those areas are more depending on steady and stable climate which can be easily changed due to the climate change (IPCC, 2008). Food shortages, floods and storms, the loss in biodiversity, degradation to land, air and water pollution are just a few effects to name which can risk food security in developing countries (Revkin, 2007). They are dependent on climate- sensitive resources such as local water or food supplies (IPCC, 2008).

Land Degradation and Water Usage

On the one hand, intense livestock farming is one of the major causes for deforestation. Forests are cut down to let the animals graze or to plant animal feed (Ilea, 2009). In a report from the UN, it is stated that especially in Latin America, the Amazon rain forest is up to 70% cut down for farming animal feed for beef production and to create pastures (FAO, 2006b). The feed is mainly consisting of soy and corn (Ilea, 2009) and their farming contributes to major biodiversity loss, deforestation and soil erosion (Kaimowitz & Smith, 2001).
On the other hand, intensive livestock farming is causing water shortage and water pollution (Ilea, 2009). Only growing feed crops are using 7% of the global water use. Consequently, intensive livestock farms, more water is needed to raise those animals (FAO, 2006b). The Stockholm International Water Institute outlined that *"a kilo of grain takes 500–4,000 liters, a kilo of industrially produced meat 10,000 liters"* (WWW, 2006). Intensive livestock farms are responsible for water pollution as well since they release pathogens and other substances into waterways (FAO, 2006b; Ilea, 2009).

1.1.2. Economic Impacts

The agricultural sector is in many countries a key contributor to the economy. In 2007, the three biggest export food commodities worldwide were fruit and vegetables US$151 billions of total global food exports, cereals US$119 billion, and meat US$88 billion. In the European Union (EU), agriculture contributes only 10% of the gross domestic product (GDP) even if the EU is one of the biggest global producers of food by agricultural output and trade volume (Lock et al., 2010). Animal production in the EU accounts for 43.1% (€167 billion) of the total agricultural output (Marquer et al., 2015). High numbers, even when the price is at its lowest compared to previous years (Godfray et al., 2018). Compared to low-income countries, agriculture is usually the biggest sector of the economy, contributing 30–77% of GDP in many countries in sub-Saharan Africa and southeast Asia. Next to that, the agricultural industry is a large sector where many people are employed in and is supporting rural development. More than half of the work force in Africa and Asia is working in the agricultural food sector, compared to only 2% of the workforce in Europe. Due to global trade and other international and national health policies, domestic production but also international production and demand for food commodities is ensured and safe (Lock et al., 2010).

1.1.3. Social Impacts

Looking at the social context of the food system, food security is one of the topics which has to be discussed. Food security means that "*all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (FAO, 1996). Food security is an allocation of many different aspects like food access and affordability according to everyone's preference. Additionally, food is available meaning that enough food is produced, distributed and exchanged. Lastly, foods are high in nutritional value so that it supports the overall well-being and health of a person and is safe to consume. Those aspects lead to social welfare like income, employment, wealth and social and human capital (Ericksen, 2008).
Agricultural food policies, international emphasis on trade liberalization and transnational food companies through ongoing globalization made it possible that agri-food systems have grown. Food is accessible and affordable in many countries but not everywhere in the world (Willett et al., 2019).
In many countries in the global South, food security is still an issue. Food is not safe and lacks in nutrients. Additionally, the access to food is hindered by not well-developed infrastructure. Food losses during transport is another issue which occurs. This leads to less supply for the same demand and consequently food prices increase and low- income households have challenges is purchasing meals. Those affected families are spending more of their money on food compared to high income societies (Willett et al., 2019).

Looking at high income countries, policies and the excellence of trading between nations made it possible that food is always available and affordable (Kearney, 2010). The food system in the global North includes a great diversity of foods found in the supermarket without any dependence on seasons. Food is safe and a high variety of food items can be found in the retail stores so that any form of diets can be followed (Kearney, 2010).
Social and cultural implications on food and the food system have to be considered as well. Food is an important part in culture and shows differentiation from group and other

people (Fischler, 1988). It is part of somebody's self-identity and expresses their lifestyle and values with it (Kittler et al., 2011).

1.1.4. Diets

Diets have been developed over years and are part of people's identity and culture. It shows differentiation between a group of people and the individual. Diversity, hierarchy and organization can be identified through food and how people eat. It is part of the identity formation of cultures (Fischler, 1988).

Even when there are many small differences between countries, a typical "Western Diet" could be identified which will be explained in the following sequence.

The "Western Diet"

In 2003, the World Health Organization had summarized food guidelines for the European Region which stated that the majority of foods should be from a plant and can vary between cereals, vegetables and fruits or legumes. Additionally, fatty meats or meat products should be replaced by a plant- based option or lean white meat such as poultry or even fish (WHO, 2003). However, at this moment in time the "Western standard diet" is defined by the high proportion of meat, dairy products and eggs, causing an intake of saturated fat which are now exceeding the recommended portions and the calorie intake (Westhoek et al., 2014; Kearney, 2010). Globally speaking, the average consumption of meat is 122 grams a day including all different kind of meats such as beef, pork, poultry and other meats like goat or sheep. However, a shift of which meat is consumed can also be seen; more poultry and processed meats are eaten than before (FAO, 2018).
On the one hand, cheaper food stuffs of vegetable origin with a lower quality are responsible for the increase of more calories. On the other hand, another phenomenon in the diet are food substitution. Foods rich in carbohydrates like potatoes, roots and cereals are replaced by animal- sourced products, vegetable oils and sugar; however, it can differ due to religion, beliefs and cultures (Kearney, 2010).

Even if the "Western Diet" includes many animal source food items, plant-based foods such as grains, fruits, vegetables, legumes and nuts are eaten as well (Willett et al, 2019).
The advantages and disadvantages of the different types of animal- sourced products such as red meat/processed meat, dairy products, poultry and fish are described in the following sequence.

Red Meat (Unprocessed or Processed): Based on meta-analysis, while consuming a big portion of (un)processed red meat, a higher risk of stroke, type 2 diabetes and a higher mortality rate can be identified. Consuming a variety of red meats can lead to cardiovascular disease and some cancers. Especially, processed meats which have been added with sodium, nitrates, nitrites, and other preservatives could can lead to a higher risk of some cancers. However, a small portion of meat, less than 35g/day can lead to longevity (Willett et al., 2019). It contains important essential nutrients such as zinc, iron and B12 vitamin, and is packed with protein (McAfee et al., 2010).

Poultry: Poultry meat, also so called "white meat" is considered as rich in protein, less fatty and low in cholesterol especially without the skin. It has a good nutritional value

and is low in energy. Additionally, it has a rich amount of n3- polyunsaturated fatty acids (Bordoni & Danesi, 2017), which are inflammatory mediators and supply energy (Calder, 2018).

Fish: Another product in the white meat family is fish. Fish is filled with omega-3 fatty acids which can help to reduce the chance of dying from heart disease by more than 33%. Consuming fish also reduces the risk of cardiovascular disease (Willett et al., 2019). Additionally, it is also a great source of protein, vitamins and other nutrients (Domingo et al., 2007). Fish should be carefully selected because of the high chance of mercury which has neurological toxicity. Species like king mackerel, shark, swordfish, tuna, and tilefish could contain a high level of mercury (Willett et al., 2019).

Eggs: Eggs are a good source of protein, amino acids (Willett et al., 2019) and other nutrients such as vitamin D, vitamin B12, selenium and choline (Ruxton et al., 2010). It is not proven that eating eggs is increasing the risk of heart disease due to the high level of cholesterol (Willett et al., 2019). To the contrary, evidence shows that it is helping in weight management, increasing the feeling of satiety and betters the overall diet quality (Ruxton et al., 2010).

Dairy Products: Dairy products are widely consumed in the “Western Diet”. About three portions per day are currently taken in due to the promotion of strengthening bones and preventing fracture because of the high calcium intake. However, the optimal calcium intake is uncertain. For children milk consumption is promoted for the growth of the skeleton, for adolescent girls, no evidence is found that it is preventing hip fractures, despite male adults have a higher risk of fractures while consuming milk. For men, it can higher the risk of prostate cancer (Willett et al., 2019). Despite, Yoghurt has a better reputation due to the arguments of helping with loosing body weight and fat and strengthening the gut health with probiotic bacteria (Mckinley, 2005).

The different animal source foods have a different impact on human health related to the portion size and the density and benefits of nutrients (Willett et al., 2019).

Next to this “standard” diet the majority of the people are following (Ilea, 2009), the trends of flexitarianism, reducetarianism or part-time vegetarianism are growing in the EU due to consumers’ concerns about health and the environment (Berkhout et al., 2018). Also, the development to follow plant-based diets or any form of vegetarian diets can be seen (Ginsberg, 2017).

Vegetarian Diets

A vegetarian diet is a diet without any animal source foods like meat, fish, fowl or products containing any of these foods are being consumed (American Dietetic Association, 2003).
However, in this field of vegetarianism, different varieties can be outlined. All of those diets are paired with any kind of fruits, vegetables, grains and nuts (Willett et al., 2019). A semi-vegetarian diet or flexitarian diet (Ginsberg, 2012) means that red meat like beef and pork is eaten less than once a month, despite, poultry and fish is eaten more than once a month (Donovan & Gibson, 1996). So, most of the time meatless meals are being consumed but occasionally meat or fish is eaten (Ginsberg, 2012). Compared to a pescatarian, those eaters are consuming any form of seafood instead of meat as their protein source, eggs and dairy along with plant-based foods like vegetables, grains or

legumes (Willett et al., 2019). A lacto-ovo-vegetarian is mainly following a plant-based diet with adding dairy products and eggs. The lacto-vegetarian is excluding eggs as well (American Dietetic Association, 2003). A full plant-based diet where all animal sourced products are excluded is called vegan. All foods are coming from a plant (Willett al., 2019).

There is a significant rise in the number of people who are following a vegan, vegetarian and flexitarian diet and many people are interested in meat- free days (Wunsch, 2019). The share of European people who are avoiding red meat and pork is currently at 13% (Wunsch, 2019). Also, in restaurants and supermarkets, vegetarian options are becoming more famous. The market is growing for vegetarian alternatives and new products are entering the shelves (Ginsberg, 2012). For example, the meat substitutes market has grown immensely and is expected to reach US$ 255.6 million by 2020. The trend of shifting towards a more plant-based diet is predicted to rise more in the coming years due to personal health concerns and influences on the environment (Wunsch, 2019).

1.1.5. Health Effects of Diets

Different health effects of the different types of dieting like omnivore, vegetarian or vegan diets will be shortly discussed in this chapter. The main differences related to health are connected to the protein source, either plant-based or animal source and to the size of the portions. It is important to note that a large amount of fruits and vegetables, legumes and unsaturated fats in form of nuts should be consumed as well. Whole grains and a low intake of refined grains and sugar is recommended as well (Willett et al., 2019).

As discussed in the previous chapter, different animal sourced products have different health benefits. In case of meat, white meat is considered healthier as red meat or processed meats. Red meat is connected with an increased risk of stroke, type 2 diabetes and total mortality. Cardiovascular disease and some cancers are attributed to an exceeded intake of red meat (Willett et al. 2019).

In the lacto- (ovo)- vegetarian diet, eggs can be used as a good source of protein, fat and other nutrients. Their high amount of cholesterol is also not connected with the risk of heart disease. Additionally, dairy products like yoghurt can help to support gut health and weight gain (Mckinley, 2005; Willett et al., 2019). Higher or lower consumption of dairy products does not show a significant risk in overall mortality; however, milk consumption can lead to a higher risk of prostate cancer for men. It would be more beneficial if dairy products would be replaced by nuts or legumes to lower the risk of cardiovascular disease (Willett et al., 2019).

A vegan diet would fully exclude any form of animal source products. This means that protein, fats and carbs are fully sourced from plant- based products. Legumes are high in protein and are connected with a lower risks of coronary heart disease. However, past studies have shown that a fully plant- based diet could also lead to a higher risk of type 2 diabetes and coronary heart disease. Despite, the overall mortality rate was 12% lower compared to omnivore or semi-vegetarians. Following a pescatarian diet lowers the overall risk of mortality more than 12% more than following a strict vegetarian or vegan diet. Fish contains the good omega 3- fatty acids which helps to reduce the risk of cardiovascular disease (Willett et al., 2019). Therefore, a full vegan or vegetarian diet

is not consequently the best choice for consumers due to the lack of some nutrients and also in terms of meeting any consumers food preferences (Willett et al., 2019).

Based on the recommendation of the EAT Lancet Commission, the overall well- being and health benefits for the human being can be assured if the main protein sources are from a plant source like soy or other legumes, nuts and fish or alternative sources of omega-3 fatty acids. Modest consumption of consumption of poultry and eggs is recommended and a small portion of red meat, preferably unprocessed is favoured. In the recommended “Planetary Health Diet” the portions of animal source protein are preferably unprocessed meat of 14g/day, from dairy products 250g/day, poultry 29g/ day and the portion of fish 28g/day, or one or two servings of fatty fish per week paired with many vegetables and fruits. A change towards this reduced consumption of animal protein would help people to enjoy healthy diets from a sustainable food system (Willett et al., 2019).

How a change can be realized and how to overcome barriers of change will be explained in the following chapter. The change of diets is also explained at the end of the following chapter.

1.2. Change

When people are exposed to a coming change, the inevitable response is the resistance to it. It is a psychological phenomenon (Dent & Goldberg, 1999) or is also seen as a universal tendency (Rogers, 1968). Resistance to change can also be linked to the threat to self- identity (Murtagh et al., 2012). Self- identity influences intention and thus behavior (Sparks & Guthrie, 1998). If a person’s values or imagine is threatened, they respond more defensive towards that negative influence self- identity influences intention and thus behavior (Giner-Sorolila & Chaiken, 1997; Tesser & Cornell, 1991).

1.2.1. Changing Behaviour

To overcome this resistance to change and actualizing a change, different methods can be followed. Two aspects of changing behaviour are discussed in the following paragraphs, namely the COM-B system and using habits.

The COMB- System

Behaviour can be influenced and changed by understanding how it is formed. It is a system which is built of **c**apability, **o**pportunity and **m**otivation features and is called the ‘COM-B’- System (Michie et al., 2011). **Capability** means the psychological and physical capacity of an individual to engage and do the activity. Psychological capability means that an individual is engaged in the necessary thought processes and has reasoning behind it. Physical capability includes having all the needed knowledge and skills. **Opportunity** relates to the external factors that make a behaviour possible. It can be distinguished in physical opportunity enabled by the proper environment and social opportunity like cultural influences which determines the way of thinking and coinages. The last part is **motivation** meaning that the person is motivated and energized about the direct behaviour (Michie et al., 2011). It is about emotions and feelings linked to the aimed change in acting (Kotter & Cohen, 2012) as well as habitual processes, emotional responding and analytical decision making. Goals and conscious decision

making will not motivate people's behaviour. Also, for the component motivation two sides can be indicated. At first, the reflective processes like valuations and plans and secondly, the automatic processes like emotions or impulses are distinguished. The three major components are interacting and influencing each other towards a specific behaviour (Michie et al., 2011). Another research states that to establish a change the answer is using habits (Rubin, 2015).

Habits

Habits are the individual's life architecture. Over 40% of people's behaviour is linked to using a habit. Habits are actions which are done without thinking. Less or no self-control is needed to perform it. Humans perform a habit without thinking about it since it is deeply anchored in somebody's system. However, self-control is needed to create and establish a habit (Rubin, 2015). But how can habits be changed?
It is hard work and not easy since the human brain creates strong tendencies to do the same thing repeatedly. Motivation is key to any form of change mentally, emotionally or physically. Desire, intent and persistence are three key things which have to be identified to form or change a habit. Change can happen because people really want, desire to do something and/or they want to achieve a goal in life. Feelings of achievement, better health or rewards can help to create that change (Ryan, 2006). Decision making or the lack of decision making is linked to changing a habit. One mindful decision beforehand can be the start of creating a new habit which needs no self- control anymore (Rubin, 2015). Additionally, a long-time of repetition is required which leads into the automated behaviour (Lally et al., 2010). Once this step is achieved it is easy for a person to do it over and over again (Ryan, 2006) and a new habit is formed.

Both approaches lead to the same answer that motivation is one of the most important aspects to start a change. The willingness to change or the motivation to change and realizing the need for a change is one of the first steps in starting a transition (Ryan, 2006).

1.2.2. Willingness to Change Diets

The need of a transition of the global food system is undeniable. Global health and environmental sustainability are not ensured with the current agricultural practices. One of the actions which can help in this transition is the dietary shift of consuming more plant- based foods than animal source foods (Willett et al., 2019). This trend of eating flexible and reducing meat intake can already be seen in some countries from the EU, despite it is still far away from the new norm (Berkhout et al., 2018).

Previous results from Graça et al. (2015) about the (un)willingness to change the normal standard diet (with a higher portion of meat) towards a more plant- based diet show that meat attachment is one of the challenges to overcome to start the change towards a more plant-based diet. Meat is a granted food which many consumers feel naturally entitled to. It became a central piece on the menu and plate in many Western countries. People formed meat consumption to an everyday habit (Graça et al., 2015). Some people are having a positive connection to consuming meat and feel unhappy when they cannot consume it anymore. This positive meat attachment leads to an overall unwillingness to lower meat consumption or eating more plant-based foods (Graça et al., 2015). Human dominance over animals, masculinity (Loughnan, 2014)

and social pressure to consume meat are other aspects which support this attachment. Also, men tend to score higher in those aspects than women (Graça et al., 2015).

A different study showed that some meat eaters will increase their entrenchment towards meat when they are approached by initiatives which are promoting meat reduction in food consumption (Rothgerber, 2014). To prevent this from happening, plant-based diets should become mainstream and the promoting of reduced meat intake should be indirectly linked (Vinnari & Vinnari, 2014) to meat consumers so that they do not feel attacked or threatened which leads to resistance (Murtagh et al., 2012). Another challenge in the shift to a more plant- based diet is the lack of knowledge of customers about the environmental influence of their food choices. Many consumers believe that meat consumption and production are not negatively influencing the environment. To promote the reduction of meat consumption, health benefits and less animal suffering would be a stronger factor in advertising rather than environmental benefits since most consumers assume that food packaging would be the most harmful for the environment (Tobler et al., 2011).

People's general and food consumption patterns can be linked to their (un)willingness to change diets as well. Based on the latest findings from Graça et al., people who are interested in consuming products where they can communicate their own values and image, promoting health and are not influencing their environment and others negatively, are also more willing to generally change their habits. Connecting people's consumption orientations towards their diet or interests in food shows that people who are consuming products oriented to naturalness and health are eating meat less frequently and are eating more plant-based meals. For the same consumer group, a higher consumption of fish is seen. Ethical concerns among consumers have a strong influence as well. Those are eating fully plant-based meals more often. Connecting those results towards willingness to change, people which motives of consumption are connected to communicating their values/lifestyle, ethics, health and naturalness are willing to reduce their meat consumption and/or following a plant- based diet. General orientations toward communication and exploration, and food orientations toward price and sociability show a promising opportunity and willingness to shift towards a healthier diet.

Despite, people who value pleasure and joy when eating paired with convenience, are likely to eat more meat (Graça et al., 2019). It supports the previous study that entitlement (Graça et al., 2015) and hedonic components are a barrier to achieve change. Other people were unwilling to change if they value choice, enjoyment of experiences as well as social image more. However, to create an essential dietary shift, motivation to do so, enablers and opportunities to consume more plant-based meals need to be strengthened to enable the actual behaviour of reducing meat consumption and eating more plant-based foods. Also, if plant-based foods instead of animal source products should be in the centre of the standard "Western Diet", a change to enable this fundamental challenge of healthier diets have to be supported with strategies from market actors and relevant public or private organizations to reach all customer groups. Attractive and positive representation is needed to shape and sustain this change (Graça et al., 2019).

1.3. Knowledge Gap and Main Objectives

Based on the EAT recommendations, dietary food choices can contribute to improve the health of people and planet. The identified knowledge gap is to what extent millennials are willing to change to the Planetary Health Diet. Closing this gap will help food businesses, governments and the consumers (the millennials) understand if they are in favour of a change or not. It will support the start of transforming the food system towards sustainability in which people experience well- being and the planet will not be pushed to its limits.

It is unknown to what extent millennials are willing to change their current diet to the Planetary Health Diet. Hopefully, the target group is concerned about their environment and want to act to start living a sustainable life by changing their diet. Marketeers will need insights in the millennials' concerns and opinions about their willingness to contribute to a more sustainable future. That would aid to define what further consumer education is needed to make the change happen (catalysed by themselves). It will also direct governmental regulations to guide people and the agricultural industry in the right direction to a sustainable future.

Therefore, the purpose of this research is to identify to what extent millennials are willing to change their diet to the suggested Planetary Health Diet from the EAT Lancet Commission.

The main question of this research is:

To what extent are millennials willing to change their regular diet to the Planetary Health Diet from the EAT Lancet Commission?

To be able to answer this question, it will be necessary to explore 3 different areas that are related to successfully changing diets of millennials:

1. What is the current food consumption pattern among millennials?
2. What external changes need to be made in order to change the consumption to more vegetarian/vegan meals?
3. What changes are required for millennials to change to eat more vegetarian/vegan meals?

Answering these questions may help marketeers to better reach millennials and to provide them with a better understanding of the consequences of diet choices on human and global health. This will hopefully contribute to a gradual transformation towards a more sustainable food system.

2. Methodology

To gather the required information to answer the main research question: “To what extent are millennials willing to change their regular diet to the Planetary Health Diet from the EAT Lancet Commission?”, the methodological approach of the study from Graça and colleagues “Consumption orientations may support (or hinder) transitions to more plant-based diets” (Graça et al., 2019) from last year was adapted.

Millennials, here considered as born between 1980-2000, were targeted as it is the largest consumer group (Orozpe, 2014) which is focused on expressing themselves, valuing their lifestyle, food (Ayaydın & Baltaci, 2013), and wanting to make change to the world (Tanner, 2010). Based on this statement, the question arises if the millennials’ mindset of changing the world would also be represented by their willingness to change the way of dieting to help catalyse a dietary shift.

2.1. Survey

As millennials are considered the first generation which grew up around the digital environment (Moore, 2012), an online survey was developed to reach this target group. The link to the survey was distributed via social media sites such as Facebook, Instagram or LinkedIn. The social media introduction can be found in Appendix 1. Millennials were asked to complete the survey and share it on their own pages to recruit more respondents which led to the snowballing sampling method.
Because millennials are very active online and using technology such as mobile devices (Moore, 2012), it leads to the assumptions that they could easily complete the survey when they are busy and without having a laptop or a computer next to them. Therefore, to motivate, reward and attain sufficient complete questionnaires, an incentive of winning a €100 Amazon gift card could have been won. By the end of the time the survey was closed, the winner was randomly chosen. Participants were requested to only answer the questionnaire once and that double answering would not increase their chances of winning the reward.

To reduce the chance of self- selection biases, no information was shared about the objectives of the survey. A very open headline was used which only indicated the direction of the topic of food and that the survey was created to gather data to write a bachelor’s thesis. However, the target audience are millennials, therefore, the survey is directly linked to them. Just over 260 participants were needed for this research based on the great population size of millennials. The confidence level was set at 95% (SurveyMonkey, 2020). The survey was developed, self- administered and conducted online using the free software Survio.com.

The survey was open for one week between 16th – 24th of May. Every two days, it was promoted on different social media accounts like Facebook, LinkedIn or Instagram. After closing the survey, the winner of the gift card was randomly chosen, and the gift certificate was sent to them via E-Mail.

2.2. Survey Questions

The survey contained 44 questions divided in 5 main sections, see for all details Appendix 2. To start, the participant was asked to fill in their name and E-mail address,

so that they could be contacted in case of winning the incentive, followed by general information such as gender, age, and the geographical location. After the introduction part, specific questions were asked to classify the respondents' general food orientations, eating habits, motivations to change (enablers), and their willingness to change, similar as described in Graça et al. (2019) and adapted to match this study's objectives. The multiple-choice questions used a 5-point Likert-type scale (1=totally disagree to 5= totally agree).

2.3. Analysis of Data

Data was imported into MS Excel and pivot tables were made to describe the general background of the participants and the descriptive statistics of the responses.
Next, the answer choices for the Likert Scale questions were categorized into "yes" or "no" groups to what type of food orientation they are following based on 2 or 3 subquestions. There are 7 main categories of food orientation; namely health, convenience, pleasure, natural concerns, sociability, price and social image. The different answer choices were coded as 1=Totally Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Totally Agree. The minimum answer choice was 1 and the maximum option was 5. A score higher than 6 (2 questions) or 9 (3 questions) yield a "yes"; if lower a "no". For example, this means that 2+3+5 will yield a "yes".

After categorizing the outcomes of the survey into nominal and ordinal variables, Chi^2-tests were performed using the statistical package of JASP (2019) to check which of the millennials' food consumption orientations are in relation to the different variables like eating habits, and their sensitivity towards enablers. The same test and way of analysis was run to identify positive or negative relations towards willingness to change to either following a full PB diets, the Planetary Heath Diet, or their urge to maintain the status quo.

2.4. Considerations

Different limitations had to be considered. The goal was to reach just over 260 participants for this survey. Due to the incentive for the participants to win an Amazon gift certificate of €100, this number of respondents should be possible to gather. The survey was open to the general population of millennials. This wide range of the target group without limitations of the location was chosen to reach data saturation and to get a great overview of the behaviour of this group. However, due to the reach of the online audience of the author, it may happen that the majority of the respondents' location will be in Canada or Central Europe. Despite, there are no restrictions on the location. This could also lead to a comparison between the two parts of the world and it would be interesting to see if similarities or differences appear in terms of the willingness to change diets.

3. Results

To gather data to answer the research question, a survey was created targeted towards the population of millennials. Three subquestions were developed in order to help answer the main research question. After the results of the general information is displayed, the outcomes of the other four main parts are given.

As the survey was available online, millennials from all over the world could participate as seen in Figure 1 below. The aimed number of over 260 responses was exceeded to a total number of 323 complete questionnaires were collected from 24 localities. The majority of people were based in Europe, specifically from Germany with 32.2%, followed by the Netherlands with 23.2% and Italy with 15.8%. Other locations include Canada, Mexico, Belgium, The United States of America, China, Denmark, France, Spain, South Korea, Bulgaria, Hungary, Poland, Argentina, Colombia, Romania, Latvia, the United Kingdom, Australia, Slovakia, Turkey and Egypt. It is notably that the mass is coming from the so-called “Western World”.

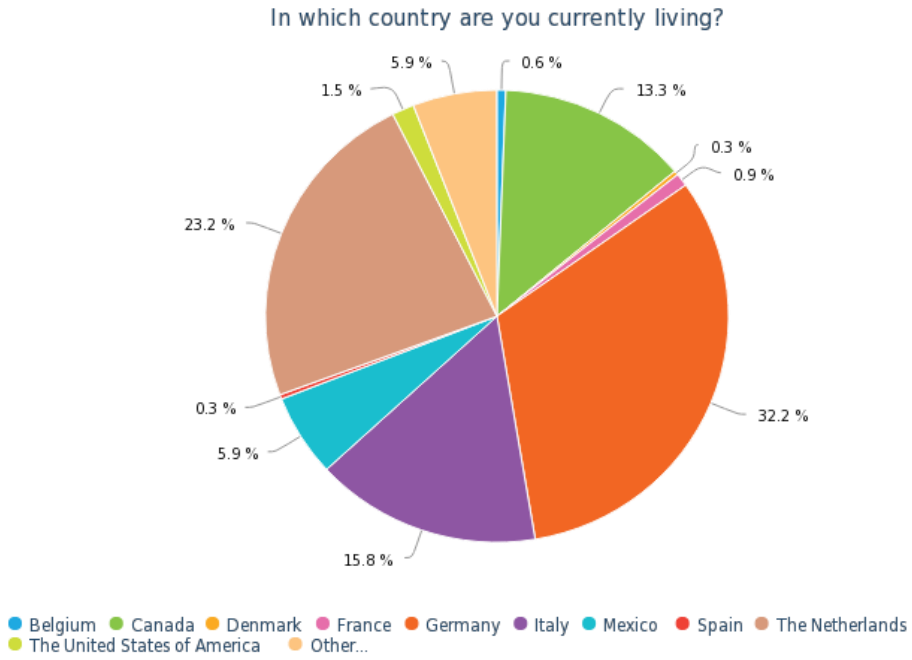

Figure 1. *Frequency Distribution of Countries of Residence.*

More than two thirds of the participants (72%) were between 20-25 years old, 11% were between 26-30 years old and more than 10% were over the age of 30. Regarding the gender, 69% of the participants were females; 30% were men; 1% other.

3.1. Classification in Food Consumption Orientations and Consumption Patterns among Millennials

To identify the current food consumption patterns, seven different food consumption orientations (FCO) were rated according to the participants’ agreement using the Likert scale. Table 1 on the next page shows the allocation of the answers chosen. It seen that the big majority agrees to be health and pleasure oriented with 237 and 258 answer

choices, respectively. The third highest orientation is convenience, followed by sociability, naturalness and price. The least agreed food consumption orientation is for social image.

Table 1 *Observed values to determine Food Consumption Orientations for the 7 main orientations "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. (Orientation is classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal than 6 or 9, respectively)*

	Score					Orientation	
	1	**2**	**3**	**4**	**5**	**No**	**Yes**
Healthy (FO 1.1)	0	13	68	189	53		
Keeps me in shape (FO1.2)	8	49	83	134	49		
FCO 1. Health oriented	**4**	**31**	**76**	**162**	**51**	**86**	**237**
Quick to prepare (FO 2.1)	9	59	96	119	40		
Most convenient (FO 2.2)	31	68	113	89	22		
Easy to prepare (FO2.3)	13	47	98	132	33		
FCO 2. Convenience oriented	**18**	**58**	**102**	**113**	**32**	**140**	**183**
I enjoy it (FO 3.1)	4	4	25	111	179		
I indulge myself (FO 3.2)	7	42	109	123	42		
I reward myself (FO 3.3)	13	47	98	132	33		
FCO 3. Pleasure oriented	**8**	**31**	**77**	**122**	**85**	**65**	**258**
Natural (FO 4.1)	40	56	85	89	53		
No harmful substances (FO 4.2)	32	48	89	94	60		
Organic (FO 4.3)	40	56	97	90	40		
FCO 4. Naturalness oriented	**37**	**53**	**90**	**91**	**51**	**150**	**173**
Social (FO 5.1)	37	69	92	97	28		
Spending time with others (FO 5.2)	29	49	75	112	58		
More comfortable (FO 5.3)	32	60	78	108	45		
FCO 5. Sociability oriented	**33**	**59**	**82**	**106**	**44**	**148**	**175**
Inexpensive (FO 6.1)	30	71	115	79	28		
Not more spending (FO 6.2)	38	109	91	64	21		
On sale (FO 6.3)	30	63	82	124	24		
FCO 6. Price oriented	**33**	**81**	**96**	**89**	**24**	**179**	**144**
Trendy (FO 7.1)	131	113	53	22	4		
To look good (FO7.2)	187	93	25	16	2		
Others like it (FO 7.3)	170	90	37	25	1		
FCO7. Social Image oriented	**163**	**99**	**38**	**21**	**2**	**303**	**20**

Now the food orientation patterns are established, the next step to take is to relate food orientation with eating habits. First, an overview is given of the current eating habits of the respondents, see Figure 2 below. In this Figure, the current eating habits of the millennials are given according to the frequency of consuming red meat meals, white meat meals, fish meals, vegetarian meals and vegan meals. The exact percentages for this allocation can be found in Appendix 3. More than a third of the asked people said that they eat red or white meat 2-3 times a week. Also, over a quarter of the participants consume any kind of meat once a week. Fish is consumed less frequently; the majority of responses are shown in the answer options of once a week and once a month. Vegetarian meals are consumed more often. Over 60% of the answers show that the participants eat those meals every day or 2-3 times a week. Less than 10% of people are never eating vegetarian meals. Over half of the respondents stated that they eat vegan meals not regularly meaning never or once a month. Just over 20% said that they eat vegan meals 2-3 times a week.

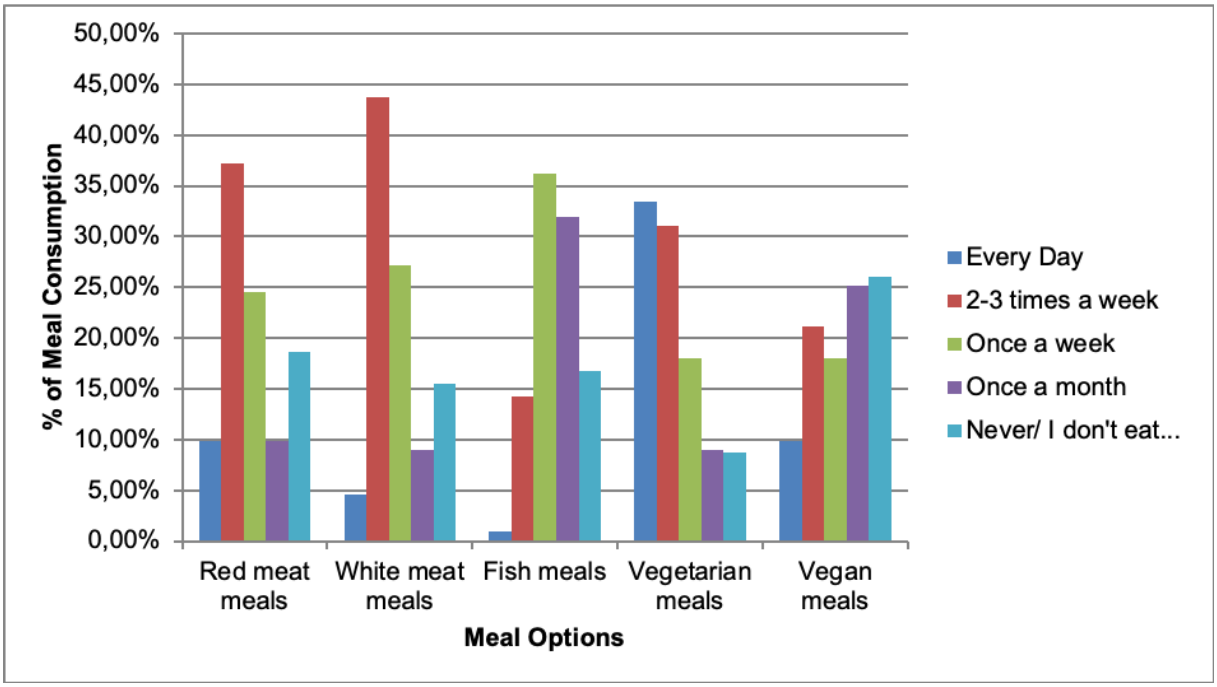

Figure 2. *Relative frequency distribution of eating habits.*

The different food consumption orientations as the independent variables were related with the current eating habits as a dependent variable in a Chi_2-test. Each food orientation has been looked at and it has been related to their different eating habits. All values for each of the orientations can be found in Appendix 4. In this case the degrees of freedom are 4 since 5 different meal choices were looked at and related to each of the food orientation. The critical value for this Chi_2- test is 9.49. If the calculated Chi_2-value is higher than the critical value (based on alfa of <0.05; 4 degrees of freedom), a significant relation between the variables can be detected.
For the food consumption orientation towards health a significant Chi_2- value was calculated for consuming red meat meals, vegetarian and vegan meals as the Chi_2-values are 13.549, 11.788 and 16.605, respectively. Convenience oriented people are obviously consuming all variations of meals except fish/seafood meals.
The third food consumption orientation is towards pleasure. It is shown that there is no statistically significant relation to any of those meal choices. Next, the naturalness

orientation is looked at. There is a significant relation between orientation toward naturalness and the consumption of red meat meals, white meat meals, vegetarian meals and vegan meals seen. Similar as for pleasure-oriented people, no relation to the meal choices are observed for the food orientation towards sociability. The food consumption orientation towards price is positively linked towards the consumption of white meat meals, but not to the consumption of other meals. Social image orientations are positively related to red and white meat meals, fish meals and vegetarian meals.

Conclusively, it can be said that people oriented towards health, convenience, naturalness, price and social image, are related to specific meals. People oriented towards pleasure and sociability have no specific relations to the food choices.

3.2. Changes Needed in order to Change the Consumption to more Vegetarian/Vegan Meals

Enablers are driving forces to motivate people to make changes, and can be characterized in terms of opportunity, capability and motivational aspects. The changes needed to be made in order to change the consumption to more vegetarian/vegan meals can be seen in the opportunity aspects of the COM-B- System. Table 2 below shows the allocation of different food consumption patterns and its positive or negative relation to the opportunity enabler based on a Chi_2- test. The critical value for this Chi_2-test is 3.84. If the calculated Chi2- value is higher than the critical value (based on alfa of <0.05; 1 degree of freedom), a significant relation between the variables can be detected. In this case, the food consumption orientation towards health, natural concerns and sociability are positively related to the enabler.

Table 2 *Observed values to determine **Food Consumption Orientations** for the 7 main orientations like "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. Orientation is (classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 6 or 9, respectively) **related to the "opportunity" enabler**. Enabler classified as "Yes" when the total score based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 9*

Food consumption orientation		**Opportunity enabler**			
		No	**Yes**	**Chi_2- value**	**P-value**
Health				7.930	0.005
	No	58	118		
	Yes	28	119		
Convenience				1.130	0.288
	No	81	95		
	Yes	59	88		
Pleasure				0.014	0.907
	No	35	141		

	Yes	30	117		
Naturalness				4.310	0.038
	No	91	85		
	Yes	59	88		
Sociability				10.364	0.001
	No	95	81		
	Yes	53	94		
Price				0.014	0.904
	No	97	79		
	Yes	82	65		
Social image				0.002	0.962
	No	165	11		
	Yes	138	9		

As seen in this Table, food consumption orientations towards health, natural concerns and sociability are in need of more external opportunities in order to change to consume more plant- based meals. The following sequence gives insights in the results for subquestion three.

3.3. Requirements of Millennials to Change towards more Vegetarian/Vegan Meals

The next step is to link the capability and motivation enabler of the COM-B- System to the 7 food orientations.

3.3.1. The COM-B System Feature Capability

The first enabler is the factor “capability”. The relation between the food orientations and the factor “capability” to change diets based of the Chi_2-test is shown in Table 3 on the following page. The critical value for this Chi_2- test is 3.84 based on the p-value <0.05; 1 degree of freedom. If the calculated Chi_2- value is higher than the critical value, a significant relation between the variables can be detected.
The numbers of the chosen answers illustrate that food orientations towards health, pleasure and natural concerns that a positive relation is detected. For the other orientations no significant relation to the capability enabler is seen.

Table 3 *Observed values to determine* ***Food Consumption Orientations*** *for the 7 main orientations like "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. Orientation is (classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 6 or 9, respectively)* ***related to the "capability" enabler*** *of the COM-B System. Enabler classified as "Yes" when the total score based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 9*

Food consumption orientation		**Capability enabler**			
		Yes	**No**	**Chi$_2$-value**	**P-value**
Health				13.155	<.001
	No	45	72		
	Yes	41	165		
Convenience				0.401	0.526
	No	48	69		
	Yes	92	114		
Pleasure				6.087	0.014
	No	15	102		
	Yes	50	156		
Naturalness				27.679	<.001
	No	77	40		
	Yes	73	133		
Social oriented				2.204	0.138
	No	60	57		
	Yes	88	118		
Price				0.253	0.615
	No	67	50		
	Yes	112	94		
Social image				1.162	0.281
	No	112	5		
	Yes	191	15		

The following subsequence discusses the results for the motivation enabler from the COM-B System.

3.3.2. The COM-B System Feature Motivation

Secondly, the requirements the individual makes to themselves are seen as the motivation feature of the COM-B- System. Table 4 below summarizes all results. Here, the significant Chi_2- values show a relation between the motivation enabler and the food consumption orientations towards health, natural concerns and sociability. Natural concerns show a very high motivation need seen as the high Chi_2-value. The other food orientations do not have a statistically significant linkage to the motivation enabler.

Table 4 *Observed values to determine* ***Food Consumption Orientations*** *for the 7 main orientations like "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. Orientation is (classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 6 or 9, respectively)* ***related to the "motivation" enabler*** *of the COM-B System. Enabler classified as "Yes" when the total score based on 4 subquestions >12, and as "No" when the total scores are smaller or equal to 12*

Food consumption orientation	**Motivation enabler**				
		No	**Yes**	**Chi_2- value**	**P-value**
Health				6.576	0.010
	No	31	52		
	Yes	55	185		
Convenience				1.634	0.201
	No	31	52		
	Yes	109	131		
Pleasure				0.292	0.589
	No	15	68		
	Yes	50	190		
Naturalness				30.008	<0.001
	No	60	23		
	Yes	90	150		
Sociability				6.491	0.011
	No	48	35		
	Yes	100	140		
Price				0.589	0.443
	No	43	40		
	Yes	136	104		
Social image				1.278	0.258

	No	80	3		
	Yes	223	17		

This means that for this subquestion the FCO towards health, pleasure and natural concerns are in need of the capability enabler and orientations towards health, natural concerns and sociability need to have a stronger motivation.

The last results are evaluated about the willingness to change towards following a full plant-based diet, reducing meat consumption/following the Planetary Health Diet or maintaining the status quo.

3.4. Willingness to Change Diets

First, the results are evaluated to see which food consumption orientations are related to the willingness to change towards a following a full PB diet. The calculated Chi_2-vlaues have to be higher than the critical value of 3.84 (based on alfa of <0.05; 1 degree of freedom), in order to be statistically significant. Orientations towards health, convenience and natural concerns are linked to follow a full PB. The other orientations are not linked. Table 5 below shows the number allocation.

Table 5 *Observed values to determine **Food Consumption Orientations** for the 7 main orientations like "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. Orientation is (classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 6 or 9, respectively) **related to "willingness to change to full plant based diet"**. Willingness classified as "Yes" when the total score >3, and as "No" when the total scores are smaller or equal to 3*

Food consumption orientations	**Following a full Plant Based Diet**				
		No	**Yes**	**Chi_2- value**	**P-value**
Health				7.014	0.008
	No	71	160		
	Yes	15	77		
Convenience				9.097	0.003
	No	88	143		
	Yes	52	40		
Pleasure				0.584	0.445
	No	44	187		
	Yes	21	71		
Naturalness				15.109	<.001
	No	123	108		
	Yes	27	65		

Sociability				0.208	0.648
	No	104	127		
	Yes	44	48		
Price				3.028	0.082
	No	121	110		
	Yes	58	34		
Social image				0.024	0.877
	No	217	14		
	Yes	86	6		

The next willingness to change looked at is the one to reduce meat consumption /following the EAT Lancet Diet. Same as the previous results showed, the same orientations are also willing to reduce meat consumption meaning that health, convenience and naturalness orientations are linked based on the higher Chi_2- values than the critical value of 3.84 (based on p-value <0.05; 1 degree of freedom). The other orientations are not in favour, see Table 6 below.

Table 6 *Observed values to determine **Food Consumption Orientations** for the 7 main orientations like "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. Orientation is classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 6 or 9, respectively)* ***related to "willingness to change to reduce meat consumption"****. Willingness classified as "Yes" when the total score >3, and as "No" when the total scores are smaller or equal to 3*

Food consumption orientations		**Reducing meat consumption/following the Planetary Health Diet**			
		No	**Yes**	**Chi_2- value**	**P-value**
Health				17.014	<.001
	No	43	61		
	Yes	43	176		
Convenience				7.086	0.008
	No	34	70		
	Yes	106	113		
Pleasure				2.143	0.143
	No	16	88		
	Yes	49	170		
Naturalness				17.868	<.001
	No	66	38		
	Yes	84	135		

Sociability				1.633	0.201
	No	53	51		
	Yes	95	124		
Price				1.822	0.177
	No	52	52		
	Yes	127	92		
Social image				0.594	0.441
	No	96	8		
	Yes	207	12		

The final test detects which consumption is related to maintain status quo. Table 7 below shows the specific values. Since the calculated Chi_2- value has to be higher than the critical value of 3.84, the only significant relation is between the orientation towards natural concerns and maintaining status quo. All the other orientations do not show a positive and statistically significant linkage.

Table 7 *Observed values to determine **Food Consumption Orientations** for the 7 main orientations like "health", "convenience", pleasure", "naturalness", "sociability", "price" and "social image", based on 2-3 subquestions per orientation. Orientation is (classified as "Yes" when the total score based on 2 subquestions >6 or when the total score in based on 3 subquestions >9, and as "No" when the total scores are smaller or equal to 6 or 9, respectively) **related to "willingness to maintain status quo".** Willingness classified as "Yes" when the total score >3, and as "No" when the total scores are smaller or equal to 3*

Food consumption orientations		**Maintaining status quo**			
		No	**Yes**	**Chi_2- value**	**P-value**
Health				0.073	0.786
	No	73	204		
	Yes	13	33		
Convenience				0.0891	0.345
	No	123	154		
	Yes	17	29		
Pleasure				0.010	0.919
	No	56	221		
	Yes	9	37		
Naturalness				4.490	0.034
	No	122	155		
	Yes	28	18		

Sociability				0.377	0.539
	No	125	152		
	Yes	23	23		
Price				0.637	0.425
	No	156	121		
	Yes	23	23		
Social image				2.021	0.155
	No	262	15		
	Yes	41	5		

The following subchapter discusses the found results.

4. Discussion of Results

Due to environmental concerns as well as global health issues, a dietary shift towards more plant-based meals instead of animal source foods is needed (Willett et al., 2019). This study examined the willingness to change towards a following full plant-based diet, reducing meat or maintaining status quo to answer the main question. Specifically, determining current food consumption patterns among millennials, identifying changes needed to be made in order to change the consumption towards more vegetarian/vegan meals and understanding the requirements millennials make to change eating more vegetarian/vegan meals will assist in answering the main research question. The results indicate that some food orientations are in favour of willing to change their diet towards a full plant-based diet as well as reducing their meat consumption. Only one food consumption orientation would also maintain status quo meaning the typical "Western Diet" where the majority of foods are from an animal source (Westhoek et al., 2014; Kearney, 2010).

This study was adapted to a research project from Graça and colleagues from 2019 (Graça et al., 2019). This methodology of using a survey was very efficient and gathered enough data to achieve data saturation. The clear structure of the survey with its given response options made it easy for the participants to answer the questions. Creating the online survey using the free software Survio.com was a simple tool to reach out to the public. Data were automatically collected and downloaded to an Excel sheet and then put into JASP for further analysis. A Chi_2- test was used to identify the relation between the independent variables. Since the gathered data are categorical variables, the Chi_2- test was a reasonable option to identify potential relations between those variables (Statistics Solutions, 2020). Thus, Graça et al. suggested that further research with a different methodological design could extend their results (Graça et al., 2019) and would consequently lead to extensive findings about this research topic. The promotion of the survey was self- administrated and went very well. The request to the participants of sharing the survey led to a smooth spread all over social media. Consequently, 323 millennials from all over the world were able to participate which was seen in the outcome of the different age groups as well as country of residence. This number was unexpected to be reached in just a week, which was probably due to the interest of participating and the chance of winning an incentive.

The responses of participants from Central Europe and Canada were not compared to each other due the big majority of answers collected in the EU.

All questions were answered and could give insights in the millennials food consumption orientations related to their current eating habits, enablers needed to eat more vegetarian/vegan meals and their willingness to change their diet to follow a full plant-based diet, reducing meat consumption which means following the Planetary Health Diet or maintaining the status quo.

4.1. Current Food Consumption Patterns among Millennials

To start the investigation of finding answers to the main question, the current food consumption patterns of millennials need to be determined. In this sample the majority of millennials are health and pleasure oriented. This proves that this group is linked towards fulfilling their lifestyle by enjoying good food as well as living a good life with

travelling and experiences new flavours and foods (Saulo, 2016). The next orientations which are agreed to are convenience, naturalness and sociability oriented. Those orientations are nearly equally agreed and disagreed on. Other studies have shown that 60% of the millennials agree to purchase more natural and organic food products (Saulo, 2016). This idea is also represented in this sample. The most disagreed food consumption orientation is towards social image. Millennials are not consuming food because it is trendy, or others would like it. Opposite results have been found in another study where it is stated that millennials are trendsetters and want to experience new foods and beverages (Saulo, 2016). They also *"share these experiences with their social network"* (Saulo, 2016).

Looking at the eating habits of the asked people, many are still eating any form of animal source products at least once a week. However, a third of the people stated that they eat vegetarian meals every day. Also, fish and vegan meals are eaten sometimes. The statements of the previously discussed typical "Western Diet" most people follow (Westhoek et al., 2014; Kearney, 2010) is therefore also seen in this data sample. Reasons for this could be that the global trend of meat consumption is rising (FAO, 2018). Next to this, many vegetable origin foods are substituted with animal source foods (Kearney, 2010) due to the rise in wealth and income (Godfray et al., 2010). However, a significant number of people are also consuming vegetarian meals often which indicates that the trend of flexitarianism or part- time vegetarianism is growing (Berkhout et al., 2018).

The results of the relations between different food orientations with current eating habits show various relations. In this sample, orientations towards health are significantly related towards red meat meals, vegetarian and vegan meals. This could be explained by the fact that a small amount of red meat can enhance longevity (Willett eat al., 2019). It is also a source of essential nutrients like zinc, iron and B12 vitamin (McAfee et al., 2010). The beforehand stated health benefits of vegetarian and vegan meals clarify the relation of those meals with the food consumption orientation towards health. Slightly different results have been found by Graça and colleagues. On the one hand they noted that this food orientation is already an actor in the transition to reduce meat consumption and increase PB eating. One the other hand, they also found out that this orientation has a decreased meat meal consumption (Graça et al., 2019) which is different from the results for this sample.

The second orientation is convenience which shows a significant relation to all meals except fish meals. This could be explained by the rising trend of PB foods in the food sector. Ready-to-eat meals are now in stores to provide more choices to meet anyone's preferences (Ginsberg, 2017). Since fish/seafood is a perishable good (Ashie et al., 1996) and millennials are in favour of portable foods (Saulo, 2016), it could be that those orientations are not choosing fish meals in order to prevent food from spoilage. Comparing this to Graça et al., findings from last year, their outputs show that people oriented towards convenience in food consumption would have a decreased PB meal intake and a higher meat intake (Graça et al., 2019).

For the food consumption orientations towards pleasure and sociability no relation to the suggested meals have been found in this sample. It could be that unpleasant taste experiences could be reasons why the orientation towards pleasure is not linked to the meals (Graça et al., 2019). However, Graça and scientists found out that the

orientations towards pleasure shows a positive relation to any form of meat meals (Graça et al., 2019).

The food consumption orientation towards natural concerns shows a significant relation to all meals except fish meals based of the Chi_2-test results. The organic movement has become more popular and people are committed to purchase certain foods. However, it could be that price and availability could inhibit consumers buying certain foods (Davies et al., 1995). This could also explain why people oriented to naturalness in this sample are not linked to fish meals because it is hard for them to find organic seafood. Graça discovered the same situation; a positive linkage between naturalness and PB eating, despite they see a negative relation towards meat meals in their studied group.

The orientation towards price does show a significant consumption to white meat meals probably due to the attractive and low process of poultry meat compared to other meats (Magdelaine et al., 2008).

For the final food consumption orientation towards social image, a significant relation could be detected for meat meals as well as fish and vegetarian meals. Graça et al., found similar results for this orientation. A positive relation towards meat and fish meals (Graça et al., 2019).
Living for their lifestyle and representation is one of the strongest characteristics of the group of millennials (Ayaydın & Baltaci, 2013). Since they are considerate about what other people think about them, the issue of impression management in answering surveys comes up as well. Previous research has shown that this issue is also related when it comes to the topic of food. It says that many people are choosing various foods in order to improve their public image in front of others even if they would eat differently alone. Next to that, eating differently in the presence of others could help people to portray a desired self- image (Vartanian et al., 2007). Therefore, it could be that the rising plant-based and vegan lifestyle (Ginsberg, 2017) could be one which liked to be followed because of own interest or because it would look good in front of others. Being informed about what is good for their own health for example following a well-balanced diet (Willett et al., 2019) and simultaneously doing good for the planet could assist them in becoming peer leaders (Ordun, 2015; Saulo, 2016).

The population of millennials show some different patterns of food consumption orientations linked to eating habits than previous studies showed. The fact that no relation between the suggested meals and the food orientation towards pleasure and sociability were detected in this sample leads to questions. Therefore, the assumption is rising that millennials are fluctuating in their interest (Haworth, 2018) and through their knowledge about trends, brand and products, they are confident in their choice and do whatever they feel like and what they are valuing (Ordun, 2015). The same is already proven in the case of brand loyalty. They are more interested in living their life according to chosen values and beliefs at that time (Ayaydın & Baltaci, 2013). Being digitally hyperconnected throughout the world gives them a broader field of interesting inputs. New trends and developments can always be discovered and consequently followed (Moreno et al., 2017).

4.2. Changes Needed in order to Change the Consumption to more Vegetarian/Vegan Meals

This subquestion focuses on the needed changes of the external environment of millennials in order to change to consume more vegetarian/vegan meals. This means that the focus is on the opportunity features, the external environment, of the COM-B-System which enables a desired change (Michie et al., 2011). The relation between the food orientation and enabling factor opportunity will give insights in this issue.

Looking at the relation between the different food consumption orientations and the opportunity aspect as a whole, the food orientations towards health, naturalness and sociability are in need for more opportunities to eat more vegetarian/vegan meals. For the other food orientations, no significant relation for this enabler could be detected. Therefore, the environment needs to change in order to give those in need the possibility to do so. Strategies like introducing more plant-based meal options in university/workplace's canteens and more choices in restaurant would aid that plant-based meals could be eaten more often. Additionally, dietitians could be invited to people's workplaces and schools to give short classes about the preparation of those foods. Those workshops could be underlined by addressing health and environmental benefits of reduced meat intake and the use of plant- based alternatives instead (Ginsberg, 2017). They could convince consumers of the benefits of following a diet which promotes longer longevity, a lower risk of cancer and a better well-being, all without exploiting planetary resources (Willett et al., 2019). This gives people the possibility to meet with fellow colleagues who are also interested in healthy and sustainable diets. So, a new community for people would be created where recipes could be exchanged as well as having discussions about their experiences of living a plant- forward life. Especially people who enjoy the sociability food consumption orientations could spend time with others. Consumers who want to eat more plant-based meals are supported by peers and are valued without experiencing prejudices or negativity due to following a plant-based diet (Graça et al., 2019). Additionally, the number of choices available of PB meals could be increased by having tastings in supermarkets which would introduce new products and give millennials the chance to experience and buy more plant-based meals.

In line with the needed external changes which have to be made in order to increase PB meal consumption, the requirements made to change eating more vegetarian/vegan meals have to be understood. This issue will be discussed in the following sequence.

4.3. Requirements of Millennials to Change to eat more Vegetarian/Vegan Meals

The objective is to understand the requirements millennials make to change eating more vegetarian/vegan meals. To give a clear and cohesive answer, they are divided into two parts. At first, the COM-B- System enabler capability is discussed and secondly, the motivational requirements are analysed.

4.3.1. The COM-B System Feature Capability

Capability is about psychological and physical capacity of an individual to engage and do the activity. On the one hand, psychological capability is about the necessary

thought processes and the reasoning behind the aimed change. On the other hand, physical capability includes having all the needed knowledge and skills (Michie et al., 2011).

The need for those capacities to increase is clearly shown for the food consumption orientations towards health, pleasure and natural concerns. The others are not significantly related. Comparing this study's results to the one from Graça et al., the food orientation of social image disregards the capability feature as well. They said that this is due to those orientation's only concern is about their image and about the thoughts other people are having about them (Graça et al., 2019).

To meet the requirements for the food consumption orientations in need, innovative cookbooks with instructions to prepare new meals should be launched to meet those significant gaps in consumer's capability. Additionally, health benefits and planetary benefits of the PB meals could be written down. This would meet the needs of the health and naturalness-oriented consumers. By being able to prepare original meals, the people oriented towards pleasure would not experience bad tastes and would potentially lose their prejudices against PB foods (Graça et al., 2019). To market those new products, influencer marketing could be one channel to use to reach the population of millennials since they are one of the strongest users of social media (Glucksman, 2017) and are very active online (Moreno et al., 2017). Food bloggers could promote those new PB meals and share tasty recipes to motivate and attract millennials. Their global online presence (Moore, 2012) will also help them to find their favourite influencers to follow and it would help to increase their capabilities of preparing those vegetarian/vegan meals.

4.3.2. The COM-B System Feature Motivation

The second enabler is the motivation feature in the COM-B- System. It seen as a personal requirement the individual makes to themselves. It is about the person's motivations, goals and desires to behave in a certain way. Reflective processes like valuations and plans are distinguished and automatic processes like emotions or impulses have to be certain so that they will act in a certain way (Michie et al., 2011).

The Chi_2 -test shows a significant relation between some food consumption orientations and the motivation enabler. Those orientations are health, natural concerns and sociability. The others are not in need of this enabler. Comparing this result to the one from Graça and colleagues, all food orientation except social image are in need (Graça et al., 2019). In the present sample, price is disregarding the motivation enabler, possibly due to their strong motivation of finding the cheapest food item.

To enhance the motivational factor for those orientations in need, taste experiences could be immensely improved by preparing foods differently based on more try outs and experimenting with them. This could be done by the consumers themselves when cooking, eating out in restaurants or if ready-to-eat meals would be finer. Additionally, the perception and expectations of PB meals would be changed and prejudices of untasteful foods would be eliminated (Graça et al., 2019).

Another idea is to overcome the hesitant feelings of consuming PB meals and the felt loss of eating meat which is related to positive meat attachment (Graça et al., 2015) is the introduction of plant-based meat alternatives. Exchanging actual meat with meat

substitutes could be an opportunity for consumers to try more vegetarian or vegan options and to feel the benefits (Willett et al., 2019). Previous observations have shown that some meat substitutes are similar in fat and calories to actual meat. Despite, they are higher in sodium and highly processed (Staff, 2020). Next to that, they usually have a higher price (Apostolidis & McLeay, 2016). Therefore, those food orientations towards health and naturalness have to decide which option would be the best for them to follow. Either choosing unprocessed PB foods like legumes and nuts (Willett et al., 2019) or to use a plant-based meat substitute.

Following up on the fact that some PB foods are sometimes more expensive than animal source foods, an answer for that could be that prices for animal- sourced foods could be risen by higher taxation due to their risky influences on the environment (Willett et al., 2019). The increase in prices would lead to a smaller motivation to consume those products and the positive impacts on the environment and people's wellbeing through the consumption of more PB meals would be elucidated (Westhoek et al., 2014). Additionally, trade rules in the global food system should to be stricter so that healthy diets are better promoted and followed by consumers without the influence of trans-national companies which are advertising unhealthy foods (Willet et al., 2019). The market for vegetarian and plant-based products is growing and leads to more competition within the market to meet new demands from customers (Ginsberg, 2017).

The questions about the measurements as well as the previous results of the subquestions will lead to the final answer of the main questions about to which extent millennials are willing to change their diet to the Planetary Health Diet from the EAT Lancet commission.

4.4. Willingness to Change Diet

This part will give insights about millennials food consumption orientations linked to their willingness to change their diet. This study shows that food orientations like health, convenience and natural concerns are related to willing to change their current diet towards following a full PB diet as well as reducing meat consumption. Graça and colleagues have found the same results for those food orientations. They argue that those orientations are already in favour of a transition towards a more plant- forward lifestyle supported by their PB meal consumption (Graça et al., 2019).

The food orientation towards naturalness is in favour of maintaining the status quo probably due the options of following the typical "Western Diet" based on their criteria like having organic and no genetically modified food items. Despite, previous studies have shown that people oriented to natural concerns are not related to maintaining status quo (Graça et al., 2019).

Since some food orientations are in favour of a transition, marketers and organizations should focus on building and sustaining these associations to promote a plant-forward lifestyle (Graça et al., 2019). Sociability shows a negative linkage to any change or to maintain status quo meaning that they just want to spend time with their friends and family (Ordun, 2015) regarding what those people's dietary preferences are. Following up to this scenario, food orientations towards pleasure and social image are also showing negative associations towards willing to change to follow plant-based diets and reduce meat consumption, but also maintain status quo. To clarify this resistance to

change, previous studies have shown that the enjoyment of eating meat as well as having negative prejudices against plant-based eating (Markowski & Roxburgh, 2019) could be reasons why those food orientations are still hesitant to reduce their meat consumption. Additionally, people who like to eat meat and are approached by initiatives to reduce consumption, are more likely to be against it (Rothgerber, 2014). According to other scientists, media and market structures are still reinforcing the practice of eating meat and seeing it as a standard act in the “Western Diet” (Gravely & Fraser, 2018; Tjärnemo & Södahl, 2015).

The above leads to the assumption that only governmental rules and regulations will help in overcoming the barrier of resistance to change towards a plant-forward lifestyle. With the support of the synergy of governments, new trade regulations and businesses, a transformation towards a shift towards healthy diets from sustainable food system can be formed (Willet et al., 2019).

By lowering the consumption of meat and dairy products in the EU by 50%, nitrogen emissions would decrease by 40%. This is a great positive consequence for rivers; improving the water quality which was negatively influenced from agricultural sources. Next to that, the risk of eutrophication would be lowered as well. The other emissions to be looked at are the GHG emissions. 25- 40% less GHG emissions would be monitored when only half of the number of ruminants would be raised for consumption. In relation to the decreased consumption of livestock, 23% per capita less use of cropland for food production. Land which is used for feed production can be used for growing crops like cereals for human consumption. Additionally, grazing land is available for food production as well. With the reduction in consuming 50% less meat and dairy, 9.2 million hectares of mainly intensively managed permanent grassland and 14.5 million hectares of arable land are no longer required for feeding livestock (Westhoek et al., 2014).

Thus, the demand for feed would also not be as high anymore. For example, the imported soybean meal would decrease by 75% in the EU, and they would become a net exporter of basic food commodities. Since the domestic market for animal products is decreasing, EU farmers could export their products (Westhoek et al., 2014). However, based on a study from Great Britain, the livestock sector will be severely affected by the decrease in demand of animal products and it will not be compensated by the increased production of crops since this production is highly depending on the quality of land (Audsley et al., 2010). Despite, supported through sustainable agricultural practices and new technologies, farming could become more efficient and adapted to soil characteristics or water availability (Braumann et al., 2013). New sustainable measures such as covered manure storage, anaerobic digestion, and biogas production (possibly to power machinery) could help prevent nutrient loss (Tubiello et al., 2013; Robertson & Vitousek, 2009). Additionally, subsidies could be helpful when farmers starting to plant different varieties of vegetables and fruits due to the increasing demand of these foods (Willett et al., 2019).

This study observed the current consumption pattern of the millennial’s population. Half of the group eat meat 2-3 times till once a week. However, more than 30% of vegetarian meals are eaten every day. This is also mirrored in the food consumption orientations towards health, convenience, naturalness and social image which have a positive relation towards vegetarian meals. The different enablers of the COM- B- System to start eating more plant-based meals were examined and related to food consumption

orientations. Results showed that especially health and naturalness-oriented millennials are in need of them. Opportunities like having more PB meal choices in supermarkets or restaurants are asked for. Additionally, requirements for more tasty recipes and feeling the benefits for the person's wellbeing and the planet have to be ensured to increase plant-based meal consumption.
Millennials' food consumption orientations towards health, convenience and natural concerns are positively related to follow a full PB diet and to reduce meat consumption. All food orientations are not positively related with maintaining status quo except the orientations towards naturalness.

5. Conclusions and Recommendations

This research aimed to identify to what extent millennials are willing to change their regular diet to the suggested Planetary Health Diet from the EAT Lancet Commission. Current food consumption patterns, changes needed to be made in order to eat more plant-based meals and requirements made from millennials were examined in order to answer the main question.

5.1. Conclusions

In relation to subquestion 1: According to the findings, millennials appear to follow a food consumption orientation towards health and pleasure. It is also shown that they follow the typical “Western Diet” defined by the intake of a high proportion of animal source food. However, the trend of flexitarianism as well as part time vegetarianism are well recognized within the group.
Orientations towards health show an increase PB meal consumption as well as red meat meal intake. Convenience and natural concerns orientations show a significant relation to all meals except fish meals. Pleasure and sociability food consumption orientation do not show any significant relation to the suggested meal options. Next, the food consumption orientation towards price is only significantly related to white meat meals. Finally, the food orientation towards social image shows a significant relation for meat meals as well as fish and vegetarian meals. The reasoning behind this is that many millennials are concerned about health and wellbeing, as well as the impacts the agricultural industry has on the environment. Consequently, millennials may gain respect from their fellow peers for following a conscious diet.

In relation to subquestion 2: The external changes required to shift consumption patterns towards a more vegetarian/vegan lifestyle are needed for food consumption orientations towards health, naturalness and sociability. The most important aspect is that PB meals are more accessible and convenient for example, in restaurants or supermarkets. Additionally, cooking classes were new community groups could be formed would help those orientations in need to have a better opportunity to choose to eat PB meals.

In relation to subquestion 3: Participants from food orientations towards health, pleasure and natural concerns show a great need for the capability enabler. Millennials must be capable of eating more vegetarian/vegan meals, which can be accomplished through the use of new recipes and self-educating on different food preparation techniques. A digital marketing strategy should be followed to reach the target group.
Millennials oriented towards health, natural concerns and sociability need more motivation in order to consume more PB meals. Therefore, the taste experience should be improved, and the feelings of meat entrenchment should be reduced. Cheaper prices for plant-based meals or higher prices for animal- source foods could also motivate millennials to consume more vegetarian/vegan meals.

In relation to the main research question: The overall findings show that millennials who follow the food consumption orientation towards health, convenience and natural concerns are willing to change their diet to following a full PB diet and the Planetary Health Diet. This is also represented in their eating habits of consuming vegetarian meals already. Marketers should focus on those orientations which are in favour of a

transition to strengthen and sustaining a plant-forward lifestyle. The orientation towards naturalness is the only food consumption orientation linked to maintain status quo.

The food orientations towards pleasure and sociability are not related to the suggested meals, though the orientation towards social image is positively related. Those three food orientations are not willing to change their diet or to maintain status quo. It indicates that millennials could only be determined by their own choice based on knowledge and values of consuming certain meals without the feeling of missing out on any types of food or feeling any external pressure on their choice.

Some food orientations are in need of stronger enablers to change, such as having more access to PB meals in retail stores or restaurants. In addition, peer support on these consumption patterns is also a promising influence. The most important motivational feature is the taste of PB meals as well acknowledging the benefits for people and the planet.

5.2. Recommendations

This study leads to various recommendations for scientists, food businesses, governments and the consumer themselves:

Further research is needed in order to specifically understand millennials' food consumption orientations. Since some food orientations do not show any relations towards the suggested meals nor willingness to change, questions arise since previous studies show opposite results. This could mean that food consumption orientations have to be adjusted or new consumption motivations for this target group are suitable. Next to this, cultural aspects as well as previous food experiences with PB dieting could influence consumer's willingness to change and should be integrated in the research.

To meet the millennials' consumption pattern, marketers should target food orientations which are already willing to change their diet to strengthen this community. Retailers could respond with demonstrations and tastings of healthier food items in stores and lead consumers to the aisles of plant- based foods. Next to that, re-structuring the layout of the supermarkets while reducing the options of unhealthy foods and promoting perishable goods like fruits and vegetables could increase the motivation and opportunities for them to choose PB foods more often. Produce displays should look attractive without any products being discoloured or bruised. Additionally, food companies have to work on their product development to better the tastes as well as launching more products to attract the target group. Restaurants should adapt their menus to have a wider variety of vegetarian or vegan meal options.

Millennials' reflecting on the results of this study could help in order to understand their consumption pattern. Self-education on the food system while admitting that a change is needed and making a conscious choice when buying food could help in the process of realization. By becoming more adventurous and being open-minded to try new products and meals, new tastes and experiences with food could be discovered which may lead to a positive end result.

Due to the wide resistance to the needed change of the global food system, new governmental regulations and policies should be developed to enhance and start this

transition. Higher taxations of animal source products as well as lowering food prices for vegan items could be solutions to start the transformation. Additionally, farmers who implement sustainable food practices to lower their environmental footprint could receive subsidies to further motivate them to do better. Next to this, global trade regulations could be changed in order to prevent that great trans-national companies have the chance to promote unhealthy diets.

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Appendices

Appendix No 1: Social Media Introduction

Hello guys,
I am conducting a research for my Bachelor Thesis at Aeres University of Applied Sciences looking at your food preferences! If you are a Millennial (Born between 1980-2000) please participate in this survey! To give you a little motivation: you can win a 100€ Amazon gift certificate! Take your chance and be so kind in helping me fulfilling my Bachelor thesis! Please promote this survey also on your page to help me in this survey:
Follow this Link:

Appendix No 2: Survey

Hello,
thank you for helping me with the research for my Bachelor Thesis. By filling out this 5-10-minute survey, you will help me obtain the very best results.
Please only participate in this survey if you are born between 1980 and 2000.
Please answer all questions till you reach the end page and then click the "Submit" Button.
Only participate once and double answering will not higher your chance of winning the 100€ Amazon gift card. The winner will be randomly chosen and contacted at the end of the period of time this survey will be online.
All information will remain confidential and will be anonymized.

General information:

1. How old are you?
a) 20-25
b) 26-30
c) 31-35
d) 36-40
e) Prefer not to say

2. What is your sex?
a) Male
b) Female
c) Other
d) Prefer not to say

3. In which country or province are you currently living?
a) Belgium
b) Canada
c) Denmark
d) France
e) Germany
f) Italy
g) Mexico
h) Spain
i) The Netherlands
j) The United States of America
k) Other

4. What level of education have you completed?
a) High school Degree
b) College Degree
c) Bachelor's Degree
d) Master's Degree
e) PhD/Doctor
f) None
g) Prefer not to say

Food consumption orientations:

Please rate the extent to which you agree with each of the following sentences.

I eat what I eat, because of:

1. **Health**

Because it is healthy.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it keeps me in shape (e.g. energetic, motivated).

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

2. **Convenience**

Because it is quick to prepare.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it is the most convenient.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it is easy to prepare.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

3. **Pleasure**

Because I enjoy it.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

In order to indulge myself.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

In order to reward myself.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

4. Natural concerns

Because it is natural (e.g. not genetically modified).

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it contains no harmful substances (e.g. pesticides, pollutants, antibiotics).

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it is organic.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

5. Sociability

Because it is social.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

So that I can spend time with other people.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it makes social gatherings more comfortable.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

6. Price

Because it is inexpensive.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because I don't want to spend any more money.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it is on sale.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

7. Social image

Because it is trendy.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because it makes me look good in front of others.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Because others like it.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Current eating habits:

How often do you eat meals which contain red meat (Pork, beef, processed meats (sausages, sliced meats)?

a) Everyday
b) 2-3 times a week
c) Once a week
d) Once a month
e) I don't eat red meat

How often do you eat meals which contain poultry (chicken or turkey)?

a) Everyday
b) 2-3 times a week
c) Once a week
d) Once a month
e) I don't eat white meat

How often do you eat meals which contain fish or seafood?

a) Everyday
b) 2-3 times a week
c) Once a week
d) Once a month
e) I don't fish or seafood

How often do you eat meals without any form of meat or fish (any form of a vegetarian diet including dairy products or eggs)?

a) Everyday
b) 2-3 times a week
c) Once a week
d) Once a month
e) Never

How often do you eat vegan meals (without any animal source foods)?

a) Everyday
b) 2-3 times a week
c) Once a week
d) Once a month
e) Never

Enablers to start eating more vegetarian/vegan meals:

"Vegetarian meals may include foods coming from plants, such as legumes (e.g., chickpeas, beans), cereals (e.g., rice or wheat), fruit and vegetables, root crops (e.g., potatoes), nuts and seeds, among others. Typically, these meals do not include any form of meat or fish, however it could contain dairy and eggs. A vegan option would be fully plant-based".

Considering the following specific features, please indicate to what extent each feature would be important for you to eat vegetarian/vegan meals more often.

1. **Capability**

Knowing more recipes for vegetarian/vegan meals.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Knowing how to prepare these meals.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Having information about the nutritional properties of vegetarian/vegan meals.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

2. **Opportunity**

Ensuring that close others support me (e.g., family; friends).

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Ensuring that vegetarian/vegan meals are more accessible and convenient (e.g., supermarkets, restaurants).

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Knowing more people who follow a vegetarian/vegan diet.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

3. **Motivation**

Feeling pleasure for eating vegetarian/vegan meals.

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree

5) Totally Agree

Feeling that these meals bring benefits for myself.
1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Feeling that these meals bring benefits for the planet.
1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Feeling like eating vegetarian/vegan meals.
1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Willingness to change:

"In recent times, meat consumption is being increasingly debated on the grounds of environmental concerns (e.g., water resources, deforestation) and social concerns (e.g., health; animal welfare). The EAT Lancet commission, a panel of scientists, developed a diet which would be beneficial for health and the planet. It suggests that half the plate is filled with fruits and vegetables and the rest consists of primarily whole foods such as grains, plant proteins (beans, lentils, pulses, nuts), unsaturated plant oils, modest amounts of meat and dairy, and eventually some added sugars and starchy vegetables. It is a flexible diet which can be followed as a vegetarian or also as a vegan, whatever preference one has (EAT Forum, n.d.)."

Please indicate to what extent you would be willing to perform the following actions.

Following a full plant-based diet (no animal source foods/vegan)
1) Totally Disagree
2) Disagrees
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Reducing meat consumption and replacing "missing" meat portions with plant- based foods like legumes, nuts and/or dairy products & eggs (Following the EAT Lancet diet).
1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

Maintaining the Status quo: “Continue eating meat without concern for these questions”

1) Totally Disagree
2) Disagree
3) Neither Agree nor Disagree
4) Agree
5) Totally Agree

THE END! - You made it! :-)
Thank you for participating in this Survey and please do not forget to click the "submit" button!

Appendix No 3: Millennials’ Current Eating Habits in Percentages

	Red meat meals	**White meat meals**	**Fish meals**	**Vegetarian meals**	**Vegan meals**
Every day	9.9%	4.6%	0.9%	33.4%	9.9%
2-3 times a week	37.2%	43.7%	14.2%	31.0%	21.1%
Once a week	24.5%	27.2%	36.2%	18.0%	18.0%
Once a month	9.9%	9.0%	31.9%	9.0%	25.1%
Never/I don’t eat...	18.6%	15.5%	16.7%	8.7%	26.0%

Appendix No 4: All Food Consumption Orientations related to Eating Habits

Table 1. Food Consumption Orientation towards Health in Number of Respondents related to Eating Habits							
	Everyday	**2-3 times per week**	**Once a week**	**Once a month**	**Never**	**Chi$_2$-value**	**P-value**
Red meat meals						13.549	0.009
No	15	36	21	5	9		
Yes	17	84	58	27	51		
White meat meals						4.858	0.302
No	5	43	24	6	8		
Yes	10	98	64	23	42		
Fish / seafood meals						2.965	0.564
No	1	9	28	31	17		
Yes	2	37	89	72	37		
Vegetarian meals						11.788	0.019
No	22	24	15	14	11		
Yes	86	76	43	15	17		
Vegan meals						16.605	0.002
No	3	10	19	22	32		
Yes	29	58	39	59	52		

Table 2. Food Consumption Orientation towards Convenience in Number of Respondents related to Eating Habits							
	Everyday	**2-3 times per week**	**Once a week**	**Once a month**	**Never**	**Chi$_2$-value**	**P-value**
Red meat meals						13.350	0.010
No	8	43	40	15	34		
Yes	24	77	39	17	26		
White meat meals						16.413	0.003
No	5	46	42	18	29		
Yes	10	95	46	11	21		
Fish / seafood meals						1.439	0.837
No	2	20	52	41	25		
Yes	1	26	65	62	29		
Vegetarian meals						11.087	0.026
No	59	43	21	9	8		
Yes	49	57	37	20	20		
Vegan meals							
No	22	35	25	35	23	18.958	<.001
Yes	10	33	33	46	61		

Table 3. Food Consumption Orientation towards Pleasure in Number of Respondents related to Eating Habits							
	Everyday	**2-3 times per week**	**Once a week**	**Once a month**	**Never**	**Chi$_2$-value**	**P-value**
Red meat meals						3.056	0.548
No	4	22	16	9	14		
Yes	28	98	63	23	46		
White meat meals						4.289	0.368
No	2	30	19	2	12		
Yes	13	111	69	27	38		
Fish / seafood meals						2.818	0.589
No	1	13	23	19	9		
Yes	2	33	94	84	45		
Vegetarian meals						2.510	0.643
No	22	20	15	4	4		
Yes	86	80	43	25	24		
Vegan meals						3.234	0.519
No	9	12	12	19	13		
Yes	23	56	46	62	71		

Table 4. Food Consumption Orientation towards Natural Concerns in Number of Respondents related to Eating Habits							
	Everyday	**2-3 times per week**	**Once a week**	**Once a month**	**Never**	**Chi$_2$-value**	**P-value**
Red meat meals						45.275	<.001
No	25	73	31	8	13		
Yes	7	47	48	24	47		
White meat meals						30.607	<.001
No	11	85	32	10	12		
Yes	4	56	56	19	38		
Fish / seafood meals						4.480	0.345
No	0	23	49	51	27		
Yes	3	23	68	52	27		
Vegetarian meals						51.008	<.001
No	27	42	36	24	21		
Yes	81	58	22	5	7		
Vegan meals						50.455	<.001
No	6	16	23	44	61		
Yes	26	52	35	37	23		

Table 5. Food Consumption Orientation towards Sociability in Number of Respondents related to Eating Habits							
	Everyday	**2-3 times per week**	**Once a week**	**Once a month**	**Never**	**Chi2-value**	**P-value**
Red meat meals						2.819	0.588
No	17	58	34	16	23		
Yes	15	62	45	16	37		
White meat meals						8.720	0.068
No	11	71	33	12	21		
Yes	4	70	55	17	29		
Fish / seafood meals						1.788	0.775
No	2	24	50	48	24		
Yes	1	22	67	55	30		
Vegetarian meals						7.310	0.120
No	46	48	24	11	19		
Yes	62	52	34	18	9		
Vegan meals						7.228	0.124
no	13	30	35	31	39		
yes	19	38	23	50	45		

Table 6. Food Consumption Orientation towards Price in Number of Respondents related to Eating Habits							
	Everyday	**2-3 times per week**	**Once a week**	**Once a month**	**Never**	**Chi2-value**	**P-value**
Red meat meals						5.008	0.287
No	20	59	42	21	37		
Yes	12	61	37	11	23		
White meat meals						15.447	0.004
No	7	68	48	25	31		
Yes	8	73	40	4	19		
Fish / seafood meals						7.329	0.119
No	2	29	73	50	25		
Yes	1	17	44	53	29		
Vegetarian meals						8.525	0.074
No	72	49	29	14	15		
Yes	36	51	29	15	13		
Vegan meals						9.101	0.059
No	23	44	32	39	41		
Yes	9	24	26	42	43		

Table 7. Food Consumption Orientation towards Social Image in Number of Respondents related to Eating Habits

	Everyday	2-3 times per week	Once a week	Once a month	Never	Chi2-value	P-value
Red meat meals						9.895	0.042
No	29	108	77	29	60		
Yes	3	12	2	3	0		
White meat meals						5.681	0.224
No	13	130	82	28	50		
Yes	2	11	6	1	0		
Fish / seafood meals						20.212	<.001
No	1	42	111	97	52		
Yes	2	4	6	6	2		
Vegetarian meals						11.632	0.020
No	105	89	52	29	28		
Yes	3	11	6	0	0		
Vegan meals						4.688	0.321
No	32	61	55	75	80		
Yes	0	7	3	6	4		