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SUSTAINABILITY AND THE DIGITAL AGE

Exploring Sustainable Production and Consumption Behaviors

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Abstract

The digital age had a profound impact on communications and businesses, exacerbating the worldwide rate of consumption and production that depletes Earth's natural resources. This paper explores how the digital age relates to businesses' and consumers' sustainable practices. Results from an online questionnaire and a company interview, support that companies have adapted to the digital world and to the increasingly demanding and conscientious consumers. Society is making progress, nevertheless, although individuals are more aware of their consumption's negative impact on the environment and are changing the way they dispose of and use products, their purchase habits are still mainly unaltered.

Keywords: *Digital Age; E-commerce; Social Networks; Sustainability; Sustainable Production and Consumption; Consumer Behavior*

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Introduction

“When you make a choice, you change the future”- Deepak Chopra

The digital revolution transformed people’s lives. Over the past decades, the widespread use of the internet allowed unprecedented interconnectivity that drastically changed how today’s societies communicate. The traditional rules of personal relations and businesses evolved, as well as the way everyone uses their time. Consequently, most industries have adapted their processes and operations, focusing on how to capitalize on the information age.

Unfortunately, as in the past, this era of progress isn’t without side effects. The current rapid economic growth, enabled by consumers’ over-consumption patterns and behaviors worldwide, has caused a decrease in natural resources and aggravated the environmental conditions (Chen and Chai 2010). These alterations of the Earth's average conditions are what is called climate change. Climate change is threatening biodiversity all around the globe, as multiple species are no longer adapted to their changing environment (Thomas et al. 2004).

This realization has prompted society to implement a sustainable development approach, as numerous nations *“have started working towards minimizing the harmful impact of their business activities on the environment”* (Y. Joshi and Rahman 2015). Conscious capitalism has been on the rise for some time, however, social media launched it to a whole new level. Platforms such as Facebook, Twitter, and Snapchat are enabling consumer activists to share information about the benefits of the green lifestyle, alongside reviews and recommendations of green products (Chwialkowska 2019). This trend of conscious consumers leads corporations to make responsible business investments, balancing profit with environmental responsibility, as individuals realize the consequences of their shopping habits.

The ongoing pandemic, COVID-19, motivated social and economic crises upon various countries (OECD 2020). One important manifestation of that was the severe impact on consumer attitudes concerning socially responsible behaviors and unsustainable consumption habits. The

uprising of the coronavirus has become not only a public health emergency but also a real-life experiment in scaling down consumerism (Cohen 2020). A practical outcome is that, because of the disrupted international supply chains across sectors, we were forced to redesign our activities and evolved to virtual platforms and interfaces for conducting business, delivering education, and maintain a widening range of daily purchases and social activities (OECD 2020). As governments advised preventive lockdowns, e-commerce transactions spiked, leading companies to re-think their business models and invest in digital marketing tools and solutions in order to leverage the increase of citizens' time online and physical restrictions. While aiming to become more efficient, reduce waste, improving the quality of the products and services, and having to resort to local products, consciously or not, enterprises drifted towards sustainability.

In light of the above, the purpose of this dissertation is to better understand the relationship between sustainability and the digital age. Academically speaking, even though extensive research was already made on the sustainability topic, that research was mainly focused on specific trends, marketing approaches, and the motivation factors that capture both consumers and producers/brands to the industry. Simultaneously, multiple articles from many authors were published about the repercussions of the digital age in today's lives. Nonetheless, this work project will contribute as far as bringing the two fields together, unveiling how the digital era contributed to a more sustainable production and consumption reality.

To do so one research question was developed to tackle each side of the challenge. For the production, RQ1: Did the digital age allow companies to provide more sustainable services/products. As for consumption, RQ2: Did the consumer behavior drifted to sustainability during the digital age. The remainder of this report consists of a literature review and conceptual framework, followed by the methodology and results of the two studies conducted. Then, a discussion including the final conclusions, its academic and theoretical implications, succeeded by the limitations and future research suggestions are reported.

Literature Review and Conceptual Framework

In this chapter, a review of the previous literature concerning the main topics and theoretical concepts presented in the introduction chapter is performed, as a starting point of the research. A set of definitions, ideas, and theories are presented from relevant academic journals, books, and articles, and divided into subsections regarding sustainability, the digital age, and consumer behavior. According to the research, adequate hypotheses were developed.

Digital Age

The current era, known as the digital age or the information age is characterized by the introduction of the personal computer and subsequent spread of the internet and information technology. For the first time in history, individuals were able to access, spread, and store information with ease and speed (Biscontini 2020) and it revolutionized the world. In 1992 the global internet traffic was reported as 100GB per day, in 10 years it evolved to 100GB per second and in 2022 it is estimated to strike an astonishing 150 700 GB/sec (UNCTAD 2019). The digital transformation can also be defined as the use of technology to substantially develop either the performance or reach of business (Westerman et al. 2011). It used to take an average of 20 years for companies in the Fortune 500 list to obtain a billion-dollar valuation, nowadays, digital start-ups are achieving it in four years (World Economic Forum 2016).

H1: Society is adapted to the digital age.

Although information and communication technologies are vital to prosper in today's world, that doesn't mean everyone is adjusted or has access to them. A study performed in 2013, shows that computer and information literacy depends on multiple factors, such as the social background of students and the age of the teacher (Fraillon et al. 2014). Humans created the internet, yet we don't truly understand it as it is an omnipresent, intangible, ungoverned space in constant mutation (Schmidt and Cohen 2013). It is a complex outlet for creating and consuming content that, although improved the overall quality of life, also created a new

dimension of challenges, such as the dissemination of inaccurate information, privacy issues, identity and data veracity, in addition to increasing the gap between developed and underdeveloped countries (Schmidt and Cohen 2013; Fraillon et al. 2014).

***H1 A:** Society has developed basic computer and information literacy.*

E-commerce and Social Networks

Digitalization is both an enabler and a disruptor of businesses. Strategically speaking, as technology becomes obsolete faster than ever, there is a crescent need to adapt and incorporate new trends in business models. E-commerce is no longer an alternative but an imperative disruptive innovation, a paradigm shift from traditional businesses (Lee 2001). The internet alongside personal mobile devices has tremendously impacted the way of doing business and especially commerce. Maamar (2003) characterized today's consumers as always on top of the current trends, not making any decisions before searching the market and comparing prices/brands. Waiting in lines is also a thing of the past, as several websites welcome online orders. E-commerce is this and much more. E-commerce is anything that involves the transfer of information/products and services across the internet, from customer-based retail sites to online auctions to goods/services exchanges between corporations (Maamar 2003). UNCTAD (2019) has estimated that the global value of e-commerce was equivalent to 36 percent of the GDP in 2017 and, even though one-quarter of the world's population aged 15 years and older were shopping online, global business to business (B2B) e-commerce was \$25.5 trillion, representing 87% of all e-commerce.

***H1 B:** E-commerce is a used and viable option for traditional businesses.*

E-commerce technologies allow brands to leverage direct advertising and digital marketing communication tools by establishing interactive lines of communication with segmented and targeted audiences. Being social media/networks one of e-commerce's most powerful tools. Laudon & Traver (2018) defend that social networks raised significant

audiences worldwide by enabling users to share their own content (mass to mass) as opposed to the traditional media format (one to many). According to the same source, around one-third of the world's population was reported as a social network user in 2016, with Facebook recording 1.7 billion monthly active users and Instagram and LinkedIn more than 450 million members worldwide each. Social networks generate word of mouth, the so-called earned media (reviews shares, likes) that improves e-commerce sales. By 2015, website traffic from social networks to the top 500 retailers had registered an increase of 20% (Laudon and Traver 2018).

H1 C: Social networks allow individuals and companies to stay connected.

Sustainability

Nowadays everyone is talking about products that don't harm the environment, actions to take care of nature, and sustainability. Climate change is attributed to direct and indirect human activities, as consequence, according to Cade and Bowden (2011), it generates extreme weather patterns, changes in ecosystems, and impacts water supplies, agriculture productions, and thus the overall levels of nutrition and health of populations. Therefore, no doubt that sustainability is the only way of "saving" the planet.

H2: Society is aware of climate change and the need to reverse it.

Sustainable consumption and production was defined as "*the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations*" at the Oslo Symposium in 1994 ("ABC of SCP: Clarifying Concepts on Sustainable Consumption and Production" 2010). In the majority of nations, household consumption represents over 60% of all impacts of final consumption with the production of internationally traded goods accounting for around 30% of global CO₂ emissions (Hertwich et al. 2010). It is imperative to change society's consumer behaviors to reverse climate change.

The increasing awareness of climate changed related problems created a wave of pressure for both sustainable production and consumption that snowballed into the green marketing concept. This new marketing strategy affects product innovation, packaging alterations, green logistics, and eco-targeted communications (Narula and Desore 2016). Ecolabels aim to provide a market advantage for products and services based on their environmental impact, however, as buyers start to change their behaviors, a commercial strategy based on misleading advertising and false sustainable claims without any back-up or justification provided is rising (Akenji et al. 2015), commonly known as greenwashing.

People and literature commonly use the terms “green” and “sustainable” interchangeably, although their differences are not a matter of “mere semantics”. Yanarella, Levine, and Lancaster (2009) emphasized that sustainability is tied to whole systems, is radical in the sense it implies balancing economic vitality, environmental health, and social equity and undertaking the necessary changes to achieve a healthy relationship with nature, breaking the veil of mass production and consumerism. On the other hand, green practices are becoming more popular as they are less complex and time-consuming, as they do not fundamentally disturb the driving forces of corporate profit-making (Yanarella, Levine, and Lancaster 2009). Green intends to make the world less unsustainable by implementing small incremental improvements. Nevertheless, as they have a similar intention, to protect the earth and its natural resources, both concepts are relevant for the scope of the present dissertation. The demand for sustainable products is real, in the USA the sales value of sustainable products has increased approximately 20% from 2014 to 2018 and it is estimated to hit around 142.3 to 150.1 billion dollars in 2021 (Wunsch 2020a; 2020b).

In order to successfully tackle climate change and prepare for a sustainable future, in 2015 leaders from 193 countries came together and created a 15-year plan with 17 sustainable development goals (UN 17 SDG), being the 12th Responsible Consumption and Production

(*Sustainable Development Goals*, n.d.). To achieve it is necessary to modify how businesses work by reducing supply chain losses (from harvesting, transport, and storage to processing), diminishing fossil fuels used, and promote the recycling of electronic waste ("Goal 12" n.d.).

H3: Society is actively developing and implementing sustainable consumption and production practices.

Consumer Behavior

Throughout history, the consumers' values and lifestyles have been evolving as well as markets, culture, and consumption. As noted by Rajagopal (2019), nowadays customers don't buy products but solutions so, companies should study consumer behavior as many marketing campaigns drive purchases overlooking consumer preferences and values, losing on the value of customer loyalty. Kotler & Keller (2010) defined consumer buying behavior as the study of the ways of buying and disposing of goods, services, ideas, or experiences by individuals, groups, and organizations in order to satisfy their needs and wants. Thus, knowledge about the external and personal factors that lead consumer buying behaviors can be used as a competitive advantage over competitors.

Deaton & Muellbauer (1980) noted that consumer behavior is often a matter of preferences and possibilities; being maximizing our utility functions our priority, only limited by the actual choices available. Throughout the past century, mobile technologies have revolutionized the customer retail experience, enabling customers to research and shop anytime and anywhere, hence, influencing the consumer decision-making processes (Faulds et al. 2018). This multiplied the access to global markets and catapulted the possibilities available. A study by Deloitte (2014) revealed that e-commerce, mobile apps, and social media, referred to as omnichannel retailing, is increasingly altering customers buying behaviors as more than 20% of Europeans follow brands on social media; 56% of adults in the UK and Germany use their

mobile for shopping-related searches, often while they are in a store and, up to 25% of their recent purchases couldn't have been done locally.

H4: *Society has changed its consumer habits since adopting digital technologies.*

The digital age can also be outlined by the rise of environmental consciousness and awareness of the consumption's negative impact on several environmental problems worldwide (Leonidou, Leonidou, and Kvasova 2010). A study conducted in 2019 by Weideli shows that customers that perform all buying steps online possess a carbon footprint almost two times smaller than a traditional shopper. Therefore, consumers are modifying their purchase and consumption behaviors to reduce their environmental impact. Bedard & Tolmie (2018) pointed out that social media usage has a significant positive influence on green purchase intentions.

H4 A: *Increase in sustainable consumption and e-commerce*

H4 B: *Businesses have adapted to new consumers*

Despite the above trend we cannot ignore or forget that globalization, scale economies, and free trade created a post-world war two phenomenon called consumerism. Consumerism associates personal happiness with purchasing material assets and consumption. As a base of modern societies, some researchers consider it ecologically unsustainable while others defend it, as they believe consumerism motivates people and is the core of social life (Perera and Gunawardana 2014). To that end, 21st-century consumers are a complex aggregation of individuals and a very rich research topic.

Conceptual Framework

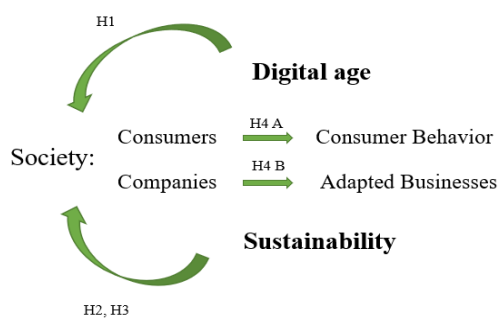


Figure 1: Conceptual Framework

Methodology

This third chapter will explain in detail how the research was conducted. The methodology used to answer the two proposed research questions and to prove or disprove each of the five formulated hypotheses is explained. It starts with an outline of the research approach, followed by an explanation of the qualitative and quantitative methods used for compiling secondary and primary data. For both methods, a basic characterization of the participants was carried out, accompanied by an overview of the reliability of the designs used in the study.

Research Approach

For the purpose of exploring the relationship between the digital age and sustainable production and consumption behaviors, it is important to first consider what type of methodology and research methods are the most suitable to better address the research objectives of this paper.

While every research study has its distinct purpose, according to Kothari (2004), all of them can be categorized into four main groups: exploratory, descriptive, diagnostic, and hypothesis-testing. As each research goal is more suitable for each purpose, both exploratory and hypothesis-testing research methods have been used in the current dissertation. Whereas exploratory research aims to reveal new ideas and observations about a specific case; as the name suggests, hypothesis testing intends to test certain hypotheses that value a causal relationship between variables (Kothari 2004).

Differentiating between research methodology and research methods is important. The research methodology is a way to solve the research problem methodically, it comprises the research methods, nonetheless, it also acknowledges the logic and reasons behind the methods chosen in the context of the research study. Research methods are all methods and different techniques used for conducting the research problem (Kothari 2004). Furthermore, the same source defines a quantitative approach to research as a formal and rigid style of collecting and

analyzing data rigorously and quantitatively, while a qualitative approach to research is concerned with subjective assessment of attitudes, opinions, and behaviors; generating results in either a non-quantitative form or in the form which is not subjected to rigorous quantitative analysis. Due to the nature of the research questions, a qualitative methodology was preferred.

Some phenomena or social processes are simply not measurable by numbers. In this way, an exploratory qualitative method was used, in the form of a collection of secondary data, throughout the literature review and, in the form of an interview to address RQ1. To structure the research, hypotheses were created for both research questions. To address RQ2, a common quantitative research method was applied, a survey-based questionnaire. Consequently, a mixed-method approach was implemented in this dissertation. The results of both data gathering methods were analyzed qualitatively, meaning that the focus was on interpreting subjective opinions and behaviors rather than on rigorous quantitative analysis. Nevertheless, the survey results were also analyzed using simple math (averages and proportions) and graphs.

Data Collection

Qualitative Method - Interview

The first research question aims to explore the relationship between the digital age and sustainability from a company/producer point of view. A company is a complex entity and given the need to cover the subjects of interest with depth and outstanding clarity, an interview was the data collection technique believed to be the best to capture data with these characteristics. Given that face to face interviews are substantially expensive and time-consuming, coupled with the social distancing measures in place in this period of the coronavirus pandemic, it was decided to conduct an online interview. To prepare a fluent interview, a semi-structured interview script with open-ended questions was formulated (see Appendix 1), built with a set of 10 questions, distributed into 3 different categories: digital age, sustainability, and consumer behaviors vs business practices.

The respondent was chosen based on their availability and the company's business model. The interview occurred on the 24th of November 2020, lasted around 40 minutes, and was audio-recorded. The answers were transcribed in Portuguese (see Appendix 2) and later translated to English (see Appendix 3) for the subsequent analysis. Interpretative phenomenological analysis (IPA) was the qualitative research approach used for the analysis as it is committed to exploring how individuals make sense of their significant life experiences and; as a result of a data collection process in the form of semi-structured interviews (flexible), the interviewee has an important stake in what is covered (Smith, Flowers, and Larkin 2009).

Company Characterization

Four Bites was founded at the beginning of 2020 in Porto by Ana Justino and Ricardo Alves (further co-founders' characterization on Appendix 4), starting to sell around August of the same year. The idea arose from the realization of how difficult it is to find healthy snacks away from home and, evolved into a subscription service of several healthy snacks, personalized to the customer's universe, and delivered where the customer needs them most. It was at the beginning of the Covid-19 pandemic outbreak that Ana and Ricardo restructured the entire business model and led this FoodTech to win the general category, Product, of the Montepio Acredita Portugal 2020 entrepreneurship competition.

Four Bites was born with a vision: If you are unique if your needs are unique, why are the snacks you eat the same as all the others?! Hence, customers point out their preferences and flavors, the AI algorithm customizes the experience, and as you receive your Four Bites snack boxes, you have the possibility to give feedback and create your own "youniverse".

Quantitative Method - Questionnaire

The second research question aims to explore the relationship between the digital age and sustainability from a consumer point of view. Hence, a questionnaire was the selected

technique for collecting data, as it allows the collection of numerous answers from a wide geographical range while providing personal and subjective consumer insights, opinions, interests, and perceptions towards specific topics.

Due to the impossibility of inquiring the whole population, together with time and monetary constraints, the sample was obtained as a combination of two non-probabilistic methods, convenience and snowball sample. In a first phase, a pilot survey was conducted with 10 respondents, 5 of each available language, to identify and correct possible weaknesses. Afterward, the final survey with the necessary adjustments was made available in my social network profiles, with the request of being spread. Consequently, this sampling method has its limitations and can potentially be considered biased.

Available online for a one-week period, the questionnaire consisted of 26 questions divided into 4 blocks. The topics covered were: digital age, sustainability, consumer behaviors, and demographics. As the target sample for the survey was any consumer independent of age or any other specific or demographic particularity, there wasn't any control question, only a voluntary consent to anonymously participate in the research. The full English and Portuguese questionnaire can be found in Appendix 5 and 6, respectively.

As this type of technique can be quite limiting and not allow deeper explanations, some of the questions displayed had the option "Other", to allow the respondent to go beyond the limited options provided by the survey. Additionally, most of the questions were purposely formulated as either a yes or no, multiple answer/multiple-choice or a 7-point Likert scale type of response. A 7-point Likert scale response according to the level of agreement with a statement was chosen over a 5-point scale, due to the belief that it reveals more about the participants' motifs (A. Joshi et al. 2015). The last question was an open one, as to give participants the freedom to express any opinion, comment, or concern that emerged while

completing the survey. Finally, the computer software for statistical analysis, SPSS, was used to analyze the quantitative data obtained from the online survey.

Sample Characterization

The questionnaire closed with a total of 254 responses, several of which were not considered given they represented answers that were in progress. Furthermore, 4 respondents didn't want to continue to respond after having read the purpose of the survey. The final database achieved a total of 205 complete and valid answers. It was possible to categorize the sample population relative to their demographic profile by using descriptive statistics in SPSS, specifically applying the frequency tool.

Respondents were mostly women (70%) and the big majority was either Portuguese (73%) or European (95%), considering Russia and Turkey a part of Europe. In what concerns age groups, there were only two responses from individuals under 18 and none from citizens 75 years or older. The most significant group in the sample was people ranging from 18 to 24 years old (42%). The rest of the sample was quite dispersed, with 18% of people ranging between 25 and 34, 10% belonging to the group 35 to 44, and 11% corresponding to the 45 to 54 years old group. Participants aged 55 years or over accounted for 18% of the sample.

Moving on to the present occupation of the participants, it can be seen that the vast majority were either working (46%) or full-time students (35%). While 7% were student-worker the remaining conditions of part-time worker, unemployed and retired had a way lower representativeness (less than 5% each). The results show that almost half of them (44%) completed a bachelor's degree, followed by 28% of individuals who completed either a master's degree or an MBA, while 25% completed their high school education, with respect to the question where respondents were asked the highest degree of education they completed.

Finally, respondents were also asked their gross monthly income, to which 22% mentioned having no income, 17% selected the 500-999€ option, and 20% chose the following

range 1000-1499€. Besides, some members also had income in the levels 1500-1999€ (11%) and 2000-2999€ (10%). 9% of respondents chose not to reveal this detail. The outstanding wage ranges were not relevant with percentages lower than 5%. A graphical representation of all of the previous information is available for consultation in Appendix 7. That being said, it is also important to take into account that this study used a non-probability sample. As a result, it is not possible to consider the sample to be representative of the population.

Results

This fourth chapter presents the findings obtained from the primary data gathered by the online survey-based questionnaire and, by the interview with Four Bites. Subsequently, a detailed review of the suggested theories was executed alongside a comparison with the literature assumptions of the digital age, sustainability, and consumer behavior topics.

Qualitative Method - Company Interview Findings

The Digital Age. Four Bites is a company that was born digital. Given both founders' academic and professional experiences, data analysis was always a key factor. The digital era generated an abundance of data and, that is the most valuable piece of their business. Their business model drives on the analysis and optimization of customer data to deliver snack boxes that meet individual needs and preferences, as well as an overall personalized experience, from the moment you place an order to the delivery at your chosen location.

At the moment, given it's a start-up in its early days, Four Bites has only two employees that are its two founders. Ricardo is a data scientist and *“Ana has a background in biomedicine, she is used to experimenting with data and samples”*, so no course or workshop was needed on digital technologies and computer software to jump-start the company. In the future, they plan on maintaining analytics, data, and information system among the skills held by all staff members as they are crucial competences in a company where everything is based on data, *“We*

want our employees,(...) to have that mindset and to be able to do analytics in order to have the autonomy to make decisions based on data.”

Nowadays, it seems easier to be e-commerce than a traditional business. Four Bites decided to create a platform as a means to not be dependent on retailers. As a start-up, *“It will be very difficult for a Sonae or a Jerónimo Martins or an Auchan group to market our products. It is complicated because we do not yet have the economic and scale capacity for this project”*. In addition, for this specific start-up, the closeness and one-on-one interaction with customers is fundamental for collecting the data required to prepare the boxes with snacks chosen by the algorithm: *“to be closer to our customers it is necessary to break down that retailer barrier. In essence, we are our own retailers(...)*It is in that contact with the customer that we have access to the data”. This would not be possible in a traditional business, where retailers stand as a barrier for accessing customer data, resulting in non-personalized products. Ana and Ricardo’s project wouldn’t have worked 20 years ago, where digitalization was not a reality.

Despite stressing that social networks are core for companies to attract and engage with consumers, the firm confesses not to be currently active on their social pages. Given their beginning stage, the priority has been focused on reaching a sufficient number of customers to better understand what is working or not, understanding the drive to buy and their preferences. After adjusting and optimizing the core product and thus exiting survival mode, Four Bites founders, plan on investing in social media as they believe: *“it is difficult for a client to trust a brand that has no presence on social networks and we are aware of that (...) and if you ask me that question again in 2 months or follow our social networks, you will see many publications”*. Instagram will be the focus as *“our audience is much more on Instagram than on Facebook”*, however, some of the content created for Instagram will be absorbed by Facebook, as there are some similarities between platforms and users, being LinkedIn a tool directed for *“more professional and investor-oriented communication”* (seek employees or attract investors).

Sustainability. When asked about climate change in general and, its possible impact on future agricultural productions needed for the supply of their boxes, the interviewee demonstrated passion for the subject. *“If we believe in climate change, no doubt! Science tells us so and it's a concern we have and believe in”*. Ricardo proceeded to explain to me that before the development of the idea behind Four Bites, Ana and him, had worked on the production of live crickets as an MBA project that aimed to promote sustainability in the food industry.

The interviewee pointed out that: *“many studies say, that by 2050 the world is no longer sustainable due to climate change and population growth. We live on 3 macronutrients: carbohydrates, fats, and protein. Protein is very hard to find and is usually found in fish and animals. (...) animals need a large consumption of resources for their survival. For fish, there is currently a problem of ocean scarcity and the industry is relying on aquaculture, which produces fish of lower nutritional quality.”*. Four Bites co-founders believe the production of insects would have made food production sustainable, however, both society and the present existing insects' factories (mostly for the production of crickets, flies, and flame flies which are having enormous success in feeding animals) were not prepared for it. Leaving this concept behind, the duo evolved to healthy, nutritious snacks but never abandoned sustainability.

At the present, the company thinks and implements various sustainable actions and processes. To start they make a conscious effort to buy from local producers, *“These types of customers/suppliers are people who are closest to us and where the carbon footprint will be smaller.”*. They also decided to provide individual portions/units to reduce food waste, *“individualized snacks and specifically for the amount they need vs. a whole box of biscuits where probably many of them will not be eaten and no longer crunchy, end up in the trash can”*. Also, despite not being where they want, mainly because of limited resources and difficulty to maintain food quality and safety; the company is thinking and looking for alternative solutions to plastic, *“We have been talking to several packaging producers to see if*

it is possible to offer our snacks in another type of packaging". Regarding transportation, the company is delivering by scooter as a matter of being viable and realistic, nevertheless *"with the increase in customer numbers, we will be able to optimize the process and some deliveries will be made by bicycle or in other ways discussed in the topic of micro-mobility of cities"*.

Four Bites' goal *"is to improve society's quality of life"*. Sustainability is key to their strategic plan and as an enterprise, besides working on responsible consumption and production they are also laboring to accomplish other of the UN 17 sustainable development goals. For example, the founders do everything in their power to promote equality and are currently exercising gender equality; 2 females and 2 men being each gender represented in the direction of the company and as a courier. They seek *"To give equal opportunities, whether it is gender equality or all other existing types of equality (...) what interests us is to provide equal opportunities for people capable of working and doing good service"*. This mentality extends to the importance of responsible economic growth based on decent working conditions. Not disconnected from the real world, the interviewee admits that, *"As a company, we also have to think about the logic of results. We are not idealistic enough to think that it is not important."* nevertheless, *"A company is a social actor and must do everything in its power to promote issues such as equality(...) Profit is important, but it has to be responsible profit"*.

Consumer Behavior Habits. This particular company was founded at the beginning of the COVID-19 pandemic and as 100% digital so we can say that it was born already adapted to the new consumers of the digital era. The pandemic forced some companies, especially the more traditional ones, to adapt their business model (go online) as distancing measures, mandatory curfew, and confinements were put in place. Additionally, given the significant public health crisis, individuals tended to change their day-to-day lives, ultimately altering their purchasing behaviors and patterns. Four Bites didn't feel these attitudes shifts as it was launched already fitting these differences (online service that delivers at a requested address). *"The*

pandemic led online sales to grow and we were already online; people started to worry about eating better, or at least say they want to eat better for the sake of having more defenses in the body, etc. which is exactly what Four Bites offers". Notwithstanding, this health pandemic also created some challenges. For example, telework requires more complex delivery route planning and resources, " *in distribution, we delivered a lot to companies, 10 boxes were transported to the same location and now with people working from home, there is an added challenge of that same delivery being made at multiple and dispersed points.*" Gains and losses were felt during these particularly difficult times.

Concerning pre-COVID customer trends, from the start, the founders were aware of more conscious and rational buyers, intensified by the type of product they provide (healthy, nutritious, personalized snacks). "*We are talking about a digital customer who values our product enough to make a weekly subscription, so they already have some purchasing power and have sustainability as the basis of their everyday life, it bothers them to be throwing away packaging.*". The company sends out an informational flyer with every Four Bites box, explaining a little bit about the origin and production of the food, together with packaging and sustainability info. Ergo, customers usually only ask questions when, for some reason, they don't have access to those pieces of information. In any case, "*We try to talk to customers to get their opinion and we are available to answer their questions. There are things we cannot solve, we explain why not and what measures we are implementing to improve.*".

Quantitative Method - Questionnaire Findings

The Digital Age. From the primary data gathered we have information that 98% of the population sampled has unlimited access to the internet and that above 90% of them own both a smartphone and a laptop computer. Tablets and desktop computers are also common personal technology devices with individuals saying that they own multiple combinations of these devices and even videogame consoles, like PS4, to surf the internet. In fact, only 9 individuals

admitted to being always uncomfortable using IT and the internet, while 127 affirmed to be comfortable using IT and the internet in both their professional and personal life and 26 even declared themselves as technology enthusiasts. When asked about the use of platforms or online services, more than 75% of the sample claim they use home banking and streaming services, being that over 50% also use ride-sharing and vacation rentals services. Some added that they do everything possible regarding shopping and bureaucracies on the internet (e.g.: pay bills, book medical appointments, interact with government organizations, order food, clothes,...) and a few also apply for jobs, play games, study, read the news, see weather forecasts, etc.

Moving on to e-commerce, only 9% of the participants never bought or sold through e-commerce before, while 33% bought or sold one or more items through e-commerce in the last week. The number sky rocks to 91% if we consider e-commerce purchases or sales in the last year. In general, the respondents admit e-commerce is a method that allows them to save time, money, compare prices, offer more options and order from distant places. Despite being considered easy and convenient by 65% of the sample, some people confess to prefer physical going shopping experiences, as they can try the products and support local producers along with the fact that they don't trust online money transactions and believe delivery's take too long.

To understand what type of connections social networks allow individuals to establish, respondents were asked if they had any accounts and on which platforms. The results showed that only 2 people didn't have any account and another 2 have accounts but never access them. The remaining 201 disclose to have multiple social accounts. Almost all of them use both Facebook & WhatsApp and, above 64% are also sign in on Instagram, YouTube, and LinkedIn. As for the profile of whom they follow on their social networks, respondents were asked to answer to what extent, on a 7-point Likert scale, they followed friends & family, brands, celebrities, or social media influencers. The results were an average of 6.1, 4.9, 4.6 and 3.9 with

standard deviations of 1.1, 1.9, 2.0, 2.1, respectively, meaning that in all parameters the sample was more inclined to strongly agree than strongly disagree.

Sustainability. Evaluating sustainability might be a challenging task. However, as an attempt to do so, the survey firstly scanned the participants for their awareness of climate change, as it is a key driver for becoming more sustainable. Thus, 85% of the surveyed are either worried about climate change and trying to change some of their actions or extremely worried and doing everything possible to fight it. The respondents mainly believe that the earth's biodiversity is going to decrease drastically, food and drinkable water are going to become scarce in the next 50 years, culminating in a next generation of humans prone to develop more health problems, due to air toxicity among others. Plus, a few people commented that these issues could culminate in more wars and the extinction of our species accompanied by the increase of major natural disasters.

From the 205 people who answered the survey, 74% know about the existence of the UN 17 SDG, and 96 of them are trying to make changes towards them. The majority of respondents agree or strongly agree that their actions impact the sustainability of the planet, 6.1, they plan on implementing more sustainable measures in their life, 6.0, or are already making changing life habits, 5.8 (averages in a 1 to 7 scale). More than half of these individuals are recycling and reducing waste, water consumption, and saving energy, leading a more conscious consumption focused on buying local products and reducing the single-use plastics. Thereupon, when going shopping, they attempt to check for sustainable certificates (4.6), try to select less pollutant products (5.1) from companies with less impactful packages (5.3) and from local brands as much as possible (5.6). We can see a significant trend of rational consumers that desire more information about how products are made as an average of 6.3 on a scale where 7-Strongly agree is the max, is obtained. The biggest obstacle flagged for sustainable consumption was the price. 77% of respondents consider that sustainable products and services are more

expensive and that together with the lack of choice, information, and availability in popular stores sometimes creates a barrier for fulfilling purchase intentions.

Consumer Behavior Habits. To investigate society's perceived changes to consumer behaviors in a fully digitalized world, the COVID-19 pandemic was used, as preventive lockdowns and social distancing operated as a catalyzer for the digital transformation and acceptance of technologies. People were asked, once again in a 1 to 7 Likert-scale, if they: a) they did the majority of their purchases in physical stores, b) frequently purchase through e-commerce, c) bought sustainable products, d) usually bought from brands they followed online, e) their consumer decisions were based on the opinions of social media influencers and celebrities. The comeback from before and during the COVID-19 pandemic, respectively, was an average of a) 5.9\4.8, b) 3.9\4.6, c) 4.9\5.0, d) 3.1\3.0, e) 2.1\2.2. Since these are two variables from one person, they are dependent and so a paired sample t-test was computed (see Appendix 8). Since the p-value was lower than 0.05, it proved that there is a significant difference between a) and b) before and during the pandemic. Unfortunately, [despite close with c) having a p-value of 0.055] c) and the remaining habits didn't reflect significant changes. Furthermore, 58 people feel like these unusual circumstances didn't alter their consumer behavior at all. Additionally, confirming the previous results, while 42% believe they increased their online purchases, only 32% conceive to be buying more local products and around 20% speculate to be buying healthier and more sustainable products and services.

Discussion

The most important findings of this research are outlined in this last chapter of the dissertation, bringing together all previous chapters in order to draw the study's key conclusions. Some academic and managerial implications are also illustrated, ending with a summary of the obstacles encountered in the process, together with future academic research suggestions.

Main Findings and Conclusions

Considering society, a conglomerate of consumers and producers/service providers, all hypotheses were validated (see the summary of hypothesis results in Appendix 9). To conclude the validity of the first hypothesis we have to analyze the outcomes of **HI A, B** and **C**. This is because there isn't a clear precise way of evaluating if someone is adapted to the digital age or not. Results from both studies show us that both individuals and companies are comfortable with computer and information literacy & the internet, use e-commerce as a convenient option for traditional business and, are active on social network platforms. Thus, are fully adapted to the digital age. Nevertheless, although people follow brands and companies on social networks, they are not buying the products that they see or that social influencers and celebrities advertise. This is a valuable key insight against the previous academic studies and can have managerial implications. Companies should use social networks to communicate with their audiences, give information about the products, and clarify any doubts. However, an alternative marketing strategy to drive sales and purchase intentions may be considered.

As predicted in the literature, there is a rising trend of conscious consumers. People and business owners are clearly aware and worried about climate change and trying to shift their actions and behavioral patterns in a sustainable direction. Nevertheless, notwithstanding the new opportunities and bigger reach brought with digitalization, individuals don't seem to have significantly incremented their online sustainable purchases. However, they seem to be implementing more sustainable actions in their daily lives, hence physical and online companies that carry out and communicate sustainability can capture customer value and achieve a competitive advantage. The main impediments for sustainable markets are high prices, lack of information, options, and availability.

To summarize, society is adapted to new technologies and the internet, plus sustainable awareness and purchase intentions are also an increasing tendency. E-commerce is now as

common as traditional businesses, meaning that consumer habits have changed in the last years. As consequence, some companies have ceased to exist, others were born and the majority (to some degree) adapted to the new consumers. Unfortunately, despite these big achievements, there is still a long way to go from incrementally adopting sustainable measures at home to valuing sustainable products and enterprises above others with less expensive but more harmful footprints. There was a significant increase in digital consumption but not that clear in sustainable consumption, in spite of the uprising of responsible and adaptative new companies.

Bringing together all data and information collected, we can now answer the two research questions that are the backbone of this dissertation. Yes, the digital age allowed companies to provide more sustainable services/products (RQ1) and it has drifted consumer behavior towards sustainability (RQ2). Digitalization allowed companies to be more informed about their business impact on the planet, to receive feedback from their employees and customers, to share and design solutions to their challenges with competitors and individuals. Furthermore, a better informed and technological society with considerably more purchasing options has seen their consumer behaviors change. Individuals, groups, and organizations have different purchasing habits, new more complex emotions and preferences linked to the impact of their choices plus, they use and dispose of goods and services more rationally.

Both themes, digitalization and sustainability, are far from being new but, the convergence of both, along with all the examined particularities throughout this study, is what makes this piece of work academically relevant. Additionally, it also fills a gap regarding the current disparity between customers' sustainable purchase intentions and their effective purchases. In terms of managerial recommendations, companies should invest in digital technologies and develop some sort of online sales channel, as it is the present and the future. Disregarding e-commerce and social networks are going to be the end of multiple businesses, as their competitors will be more present and convenient. Finally, understanding to what degree

your customer target is comfortable with the digital world and, to what degree they are committed and concerned with sustainability will be key for targeted and customized marketing communication and promotions, ultimately maximizing managerial efforts to capture value.

Limitations and Future Research

Naturally, there are several limitations to the research performed in this dissertation, which provides pathways for potential future studies. Firstly, due to monetary and time constraints, both primary data gatherings are not representative of the population. In the survey, a non-probability sample was used, plus the number of answers did not exceed by much a couple hundred respondents. Regarding the interview, only one company was interviewed resulting in interesting and valuable particular opinions but not at all generalized for all companies. In the future, it is best to apply a probability sampling strategy and reach a greater number of participants to increase the external validity of the survey results and, to interview a much more significant number of organizations from different countries, industries, and sizes.

Secondly, sustainability was vastly addressed as a whole throughout the paper. It would be very interesting to study if different industry sectors or product categories have a significant impact, both in the sustainability measures & processes being implemented and in the perception of value or brand effort, perceived by the general public. Thirdly, as mentioned in the Literature Review section, the rise of conscious and pollution concerned costumers has culminated in the appearance of greenwashing. Consequently, this practice should be taken into consideration and deducted from sustainable purchases in future studies. It is recommended further analysis of the sustainability claims made by companies and, check if ethical means of production and workers' human rights are being respected. Finally, instead of testing if people are adapted to the digital era, if they are implementing sustainable measures, or if these two are connected, it would also be valuable to investigate the actual degree of correlation between technology literacy and comfort to sustainable purchases.

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Appendices

Appendix 1: Semi-Structured Interview Guide

Derived from the Literature Review

1. Introduction – Presentation of university and research project; general information about the interview; allowance to audio-record the interview.

2. General Information – Confirm the identity of the interviewee, corroborate the founders' background information; explore the development of the company from its initial idea to the current business model.

3. Interview Prepared Questions:

Topic 1: Digital age

1. Is Four Bites adapted to the digital age?
2. Four Bites is an online platform. Are all employees comfortable with using computer technologies and the internet?
3. Four Bites can be labeled as e-commerce, why was this the business model chosen?
4. Does Four Bites have a profile in any social network? Why?

Topic: Sustainability

5. Does Four Bites believe in climate change and the need to reverse it? What about your personal opinion?
6. Does Four Bites have a strategic plan to improve society's quality of life?
7. Is Four Bites actively developing or currently implementing any sustainable production practices?

Topic: Consumer behaviors vs Business Practices

8. Does Four Bites feel pressured by consumers to adapt its business in any way? How?
9. The outbreak of the Covid-19 pandemic deeply affected various companies. How did Four Bites respond to these challenging days?
10. Did Four Bites identify any shift in consumer habits in the last few months?

4. Ending – Express gratitude for time and attention granted, acknowledgment of the importance of their opinions, comments feedback, and particularly company/business insight.

Appendix 2: Semi-Structured Interview with Company Co-Founder

- Original Portuguese Version -

- Entrevista com a Four Bites, Novembro 24, 2020, Cofundador Ricardo Alves

Entrevistador: Caracterizando a era digital como a introdução da internet e das tecnologias de informação, bem como a capacidade de utilizar essas novas tecnologias e a internet para impulsionar o seu negócio; a Four Bites está adaptada à era digital?

Cofundador da empresa: Sem dúvida, aliás essa é uma das grandes forças que nós acreditamos ter na Four Bites. Muito ligado ao nosso passado, quer académico quer profissional, meu e da Ana. Eu sou ligado à área de análise de dados, por isso todo o meu trabalho do dia a dia é essencialmente recolher informação e analisar a informação recolhida por diversos touch points com o cliente. A era digital trouxe-nos esta vantagem, foi a partir da era digital que surgiu esta abundância de dados, o chamado big data, e o que se faz com estes dados. No fundo como é que se consegue extrair conhecimentos destes conjuntos de dados. E, sem dúvida até pela lógica da personalização que nós queremos ter na Four Bites, toda a parte digital é fundamental para nós. Isto porque nós para personalizarmos, não só a caixa de snacks, mas toda a experiência que queremos dar ao consumidor final, tem de ser através de dados que vamos recolhendo ou que eles nos fornecem. Por isso, tencionamos desde já, apesar de sermos uma start-up numa fase muito inicial, tirar muito partido dos dados dos nossos clientes. Quando um cliente vai ao nosso website e faz o seu registo, nós começamos logo por perguntar quais os sabores que gosta e não gosta, recolhendo logo dados para conseguir que cada caixa seja diferente da dos seus vizinhos ou colegas de trabalho. Porque na realidade elas são mesmo diferentes, não enviamos caixas que não sejam personalizadas de acordo com preferências individuais. E isso só se consegue através de dados.

Entrevistador: De momento os únicos trabalhadores da Four Bites são os dois cofundadores. Dado o seu background em Data Science, o Ricardo já referiu estar à vontade com as tecnologias. Sendo esta uma empresa que utiliza tanto os dados dos seus consumidores, uma vez que o seu negócio é no fundo uma plataforma online, a Ana sentiu necessidade de algum tipo de formação adicional para o ajudar a lançar este projeto ou planejam oferecer algum curso para ajudar futuros funcionários a trabalhar com recolha e análise de dados?

Cofundador da empresa: Neste momento somos dois, sendo eu mais técnico, quer por formação quer por perfil. A Ana está completamente a vontade, não tanto na área de machine learning e inteligência artificial (minha área de especialização), mas perfeitamente apta no que diz respeito à componente analítica. Aliás, a Ana possui uma formação ligada à biomedicina, está habituada a fazer experiências com dados e amostras. Estamos completamente à vontade, quer um quer o outro, com essa parte de analytics, de dados e sistema de informação. Queremos que os nossos funcionários, não sendo agora o recrutamento uma prioridade nossa, mas no futuro, que os nossos colaboradores tenham esse mindset e sejam capazes de fazer essa parte analytics para poderem ter a autonomia para tomar decisões com base nos dados.

Entrevistador: Porque é que e-commerce foi o modelo de negócio escolhido? Já referiu algumas vezes que é a forma mais fácil de utilizar os dados dos consumidores para um produto personalizado, no entanto, gostaria de saber um pouco mais sobre o que considera ser as principais vantagens, desvantagens e maiores desafios que o e-commerce vos proporcionou.

Cofundador da empresa: Atualmente ser e-commerce é relativamente fácil. É muito simples criar uma plataforma que permite não estar dependente de retalhistas. Será muito difícil uma Sonae ou uma Jerónimo Martins ou um grupo Auchan comercializar os nossos produtos. É complicado por ainda não termos capacidade económica e de escala para esse projeto. Na verdade, para estarmos mais próximos dos clientes é necessário quebrar essa barreira do

retalhista. No fundo, nós somos os nossos retalhistas. Somos nós que preparamos as caixas, o nosso algoritmo que escolhe os snacks... É nesse contacto com o cliente que nós temos acesso aos dados, se não, limitávamo-nos a colocar um conjunto de caixas não personalizadas no Jumbo ou no Continente e nem sequer sabíamos quem as estava a comprar, perdíamos o que para nós é mais importante que é o contacto com o cliente. Esse acesso ao cliente é para nós fundamental, é óbvio que e-commerce é o nosso caminho.

Entrevistador: Pensando no mundo de há uns anos atrás, quando a internet ainda não tinha atingido o potencial desvendado atualmente, pensa que seria possível ter lançado este serviço com um modelo de negócios tradicional?

Cofundador da empresa: Não, penso que teria sido muito complicado. Toda a parte dos dados surge com a digitalização. Se nós olharmos para quando é que surgem os dados, observamos 3 grandes eventos: uma capacidade brutal dos computadores - aumento incremental e progressivo da capacidade e custo dos processadores; o aparecimento da internet, google, smartphones e Facebook; e por último a parte dos algoritmos. Sem uma destas 3 ferramentas não estaríamos onde estamos hoje. Sem a digitalização não seria possível ter o nosso negócio como existe hoje. A Netflix é o que é porque houve a digitalização, percorreram um longo caminho começando no mundo físico e transformando o produto para digital, derrotando o Blockbuster neste caso. Daí não considerar ser possível, da forma como imaginamos o nosso conceito, ter funcionado há 20 anos, por exemplo.

Entrevistador: A internet é fulcral para o vosso negócio e, portanto, a vossa presença digital é fundamental. Apesar de tão recente, a Four Bites já possui perfil em alguma rede social? E se sim, porque escolheram determinada rede para determinado objetivo.

Cofundador da empresa: Na realidade, somos um péssimo exemplo. Temos conta no Facebook, Instagram e LinkedIn, mas não tratamos das redes sociais e eu vou-te explicar porquê: simplesmente não temos tempo. É absolutamente core que isto venha a acontecer num curto período de tempo. Quando em agosto/setembro lançámos a caixa Four Bites ao cliente, para os nossos cliente poderem ir ao site e comprar o produto, a nossa maior preocupação foi atingir rapidamente umas dezenas de clientes para perceber o que funciona e o que não; para melhorar o serviço e perceber que tipo de pessoas está a comprar a nossa caixa, o porquê; o que estamos a acrescentar á sua vida e, perceber quais são os nossos potenciais clientes. Aí sim, depois da empresa estar muito mais madura, faz sentido angariar clientes e estar presente e ativo nas redes sociais. Diria que é algo fundamental, não temos unicamente porque neste momento não é vital para a sobrevivência da empresa e porque não temos tempo. Mas sem duvida que será algo core, e que se me voltar a fazer essa pergunta daqui a 2 meses ou seguir as nossas redes sociais, vão ter muitas publicações, ao contrário do que acontece agora porque sendo brutalmente sincero é difícil um cliente confiar numa marca que não tem presença nas redes sociais e nós estamos conscientes disso. Neste momento estamos contentes com a quantidade de clientes que temos e estamos a conseguir fidelizá-los, estão a gostar do serviço, conseguimos ter um conjunto de clientes suficiente para um piloto, nesta fase inicial.

Entrevistador: Referiu que realmente tencionam ser mais ativos nas redes sociais num futuro próximo. O objetivo é ter uma comunicação semelhante em todas as redes ou adaptar o tipo de comunicações às diferentes plataformas?

Cofundador da empresa: Não sendo nenhum de nós especialista em marketing digital, que é que seria importante ter, iremos usar de formas diferentes as redes diferentes. Neste momento o nosso público está muito mais no Instagram, do que no Facebook, por exemplo. O LinkedIn será uma comunicação muito mais profissional e virada para os investidores. No fundo uma

start-up vai angariando capital ao longo do tempo e é importante manter uma relação com os investidores atuais e futuros. Claramente a comunicação no Facebook e no Instagram será completamente diferente, num contexto diferente. No Twitter não estamos a pensar ter conta por uma questão de limitação de recursos, característica de uma start-up, pelo que não vamos tentar estar em todo o lado mas sim focar nos canais onde os nossos clientes estão mais presentes. Em conversas com os nossos clientes perguntámos onde é que eles estão presentes nas redes sociais e, claramente o Instagram foi a resposta mais comum, pelo que é onde temos de estar neste momento. Claro que o Facebook vai absorver parte do que é gerado para o Instagram, mas claramente o Instagram vai ser o nosso target principal.

Entrevistador: Mudando agora o foco para o tema da sustentabilidade, a Four Bites acredita nas alterações climáticas e na necessidade de as reverter? Os cientistas defendem que as alterações climáticas irão ter impacto nas futuras produções agrícolas, visto que vocês de certa forma precisam de matéria-prima e de fornecedores alimentares para formular as vossas caixas; é esta uma preocupação vossa?

Cofundador da empresa: Sem dúvida. Vou contar-te como surgiu a ideia por trás desta empresa que te vai mostrar a que ponto estamos preocupados com a sustentabilidade. A Four Bites na realidade surge como um projeto do MBA onde o objetivo era produção de grilos para consumo humano, uma vez que acreditamos e, muitos estudos dizem isso que em 2050 o mundo já não é sustentável devido às alterações climáticas e crescimento da população. Nós basicamente vivemos à base de 3 macronutrientes, resumidamente hidratos de carbono, gorduras e proteína. Proteína é muito difícil de encontrar e, geralmente é encontrada nos peixes e nos animais. Temos o problema de os animais necessitarem de um grande consumo de recursos para a sua sobrevivência. Relativamente aos peixes, existe neste momento um problema de escassez nos oceanos e a indústria está a apoiar-se na aquacultura, que produz

peixes com menos qualidade nutritiva. Pelo que claramente existe um problema de sustentabilidade. O problema inicial que deu origem à Four Bites foi como tornar a produção alimentar sustentável, o que seria solucionado com a produção de insetos. Na faculdade começámos a produzir grilos, chegámos a ter cerca de 20 mil grilos vivos a reproduzirem-se. Porque é que deixámos a lógica dos grilos? Porque claramente a sociedade (principalmente) ocidental ainda não está preparada para esse produto. Seria necessário um investimento brutal em marketing para criar este mercado e considerámos que, além de pessoalmente não termos acesso a esse capital, as próprias fábricas mundiais que servem neste momento para a produção de insetos (não só de grilos mas de moscas e moscas-de-farinha que estão a ter um enorme sucesso lá fora na alimentação de animais e não de humanos) não estão preparadas. Foi devido a vários problemas desta natureza que abandonámos o projeto, porque a questão da sustentabilidade continua a estar em cima da nossa mesa e presente na idealização da Four Bites. A empresa nasce da lógica: Se as pessoas não querem comer insetos, como é que nós fazemos com que queiram mesmo o nosso produto? O projeto evoluiu como uma maneira de ultrapassar o retalho e levar a casa ou ao trabalho das pessoas uma maneira de elas comerem insetos. Achámos que essa ideia não era fantástica e decidimos avançar com a ideia, deixando os insetos de fora. Atualmente, pensamos no tema da sustentabilidade de várias formas. Começando pela forma como embalamos os produtos, temos um packaging primário que envolve os snacks e um packaging secundário que envolve todos os snacks, que no fundo é a caixa. Tentamos ao máximo possível que os snacks (que não são produzidos por nós, compramos a fornecedores) sejam comprados de produtores locais. Isto é, queremos ter como cliente alguém com uma pequena produção de bolachas caseiras altamente saudáveis, indivíduos que produzam 1000 bolachas caseiras diariamente. Esse tipo de clientes/fornecedores são pessoas mais próximas de nós e onde a pegada de carbono será menor. Se perguntares se estamos neste momento onde queremos estar a resposta é não, claro que não.

Mais uma vez, porque os recursos são limitados e existe uma dificuldade muito grande em manter o nível e segurança alimentar (manter os nutrientes dos alimentos) se estes não forem embalados em plástico. No entanto, temos procurado soluções alternativas. Temos conversado com diversos produtores de packaging para perceber se é possível oferecermos os nossos snacks noutra forma de packaging. É um percurso que já iniciámos e estamos a percorrer. Se acreditamos nas alterações climáticas, sem dúvida! A ciência diz-nos que sim e é uma preocupação que temos e acreditamos. Por exemplo, a sustentabilidade também está relacionada com o facto de vendermos em unidades. Na alimentação saudável e sustentável e na alimentação em si, existe muito desperdício. Nós entregamos a um indivíduo 5 snacks já individualizados e especificamente para a quantidade que eles precisam vs. uma caixa de bolachas inteiras onde provavelmente muitas delas não irão ser ingeridas e deixaram de ser crocantes, acabando no lixo. Aqui, o facto de servirmos unidades é um ponto a favor da sustentabilidade. É um tema que não está fechado para nós, é algo que falamos muito internamente porque sem dúvida é algo muito importante para nós.

Entrevistador: Sem dúvida percebe-se que estão ativamente a implementar medidas e a desenvolver soluções para uma produção sustentável, que não passa só pela redução do plástico, mas também pela compra de mais produtos locais, saudáveis e naturais; pela redução do desperdício. O facto de possibilitarem diversas dietas de acordo com as preferências individuais é também uma medida que leva à sustentabilidade. Neste momento, como está a ser levado a cabo o transporte das boxes Four Bites? Já pensaram em formas deste transporte ser mais ecológico? Por exemplo, o transporte ser efetuado de bicicleta ou por veículos elétricos?

Cofundador da empresa: Sem dúvida. Neste momento, o nosso transporte é realizado por um estafeta numa scooter. Poderá não ser a maneira ideal, mas existe também uma questão de escala. É muito mais fácil começar a distribuir por bicicleta quando tens 100 clientes a 2km de

distância de ti, no teu raio. Quando tens clientes a 10 km de ti, a bicicleta deixa de ser uma opção tao viável e realista. Mas é claramente um processo de otimização, quantos mais clientes, mais fácil é esta gestão. Atualmente, fazemos tudo ao nosso alcance para que a entrega seja feita na melhor rota possível, não só por uma questão de custos, mas também por uma questão de redução de desperdício. Acreditamos que com o aumento do número de cliente, vamos conseguir otimizar o processo e que algumas entregas serão feitas por bicicleta ou de outras formas discutidas no tema da micromobilidade das cidades. Por que não de trotinete? Acho que hoje em dia uma empresa é um ator social e, que a sustentabilidade já não é uma extra, mas sim uma necessidade imperiosa para estar hoje em alta no mercado. Até porque, hoje em dia os clientes já exigem isso, se notarem que tu não estás a ter comportamentos sustentáveis sem uma muito boa justificação para tal, os clientes protestam. Nós sentimos muito isso com os nossos clientes. O que é bom, no final do dia consumidores mais exigentes levam a uma melhoria na sociedade.

Entrevistador: Vejo que realmente estão muito a par de todos estes problemas e desafios ligados à sustentabilidade e que estão a trabalhar com esse objetivo em mente.

Cofundador da empresa: Sim, é um tema que está muito ligado à nossa origem. Tentamos refletir como vamos estar todos cá em 2050, é muito importante para nós.

Entrevistador: Exato, portanto faz parte do vosso plano estratégico. O objetivo da vossa empresa é melhorar a qualidade de vida da sociedade, é esse vosso intuito.

Cofundador da empresa: Sem dúvida.

Entrevistador: As Nações Unidas definiram 17 objetivos para o desenvolvimento sustentável. Já percebi que realmente estão a trabalhar no consumo e produção responsáveis, gostaria de saber se estão a trabalhar em algum dos outros objetivos, por exemplo igualdade de género?

Cofundador da empresa: A igualdade de género é um tópico muito interessante. Neste momento somos só dois, eu e a Ana, pelo que existe claramente uma igualdade de género. Eu estou mais na área de analytics e na parte de IT (mais técnica) e a Ana como CEO da empresa. Por isso, acho que para nós é importante toda a questão de igualdade. Dar oportunidades iguais, quer seja igualdade de género ou todos os tipos existentes de igualdade. Para nós é importante e como vê, somos dois. A Ana é neste momento e será cada vez mais a cara da empresa, CEO da Four Bites. Para nós é importante e achamos que devemos fazer tudo o que está ao nosso alcance para promover a igualdade.

Entrevistador: Mesmo no vosso futuro, é importante o crescimento económico estar assente em condições de trabalho decentes e não só propriamente o lucro monetário.

Cofundador da empresa: Nós sendo uma empresa também temos de pensar na lógica dos resultados. Não somos idealistas ao ponto de pensar que não é importante. Agora, consideramos que tem de haver um equilíbrio. Uma empresa é um ator social e tem de fazer tudo ao seu alcance para promover temas como a igualdade. Para nós nem faz sentido que seja de outra forma sinceramente, está na nossa raiz. O lucro é importante, mas tem que ser um lucro responsável. Vou dar um exemplo, os estafetas que temos são neste momento também um rapaz e uma rapariga, o que nos interessa é que haja uma igualdade de oportunidades para as pessoas capazes de trabalhar e de prestar um bom serviço.

Entrevistador: Mudando agora o foco para o comportamento dos consumidores. Dado a empresa ter sido lançada já no início da pandemia é impossível ver propriamente uma mudança

nos padrões de consumo. No entanto, já referiu que nota os consumidores cada vez mais conscientes e atentos, por exemplo, à forma como embalam os produtos e não só. Sentem alguma pressão por parte do cliente para adaptar o modelo de negócio de alguma forma? Seja uma comunicação com mais ênfase na sustentabilidade ou um serviço ainda mais tecnológico? Por exemplo, comunicar explicitamente no vosso site o facto de as embalagens evitarem ao máximo o plástico, o valor nutricional e frescura dos vossos snacks saudáveis.

Cofundador da empresa: Não. Como nós já nascemos digitais e durante o surto de COVID-19 para nós foi muito natural, não houve uma mudança de estratégia. A pandemia levou as vendas online a crescer e nós já estávamos online; as pessoas passaram a preocupar-se em comer melhor ou pelo menos dizem que querem comer melhor por uma questão de ter mais defesas no organismo, etc. o que é exatamente o que a Four Bites oferece. Nós já nascemos num turbilhão, por isso para nós não existiram alterações significativas.

Entrevistador: Já tiveram algum feedback da parte dos consumidores? Por exemplo a perguntar mais informações sobre a origem ou produção dos alimentos, ou a questionar a sustentabilidade das vossas embalagens, antes de efetuarem um pedido?

Cofundador da empresa: Não, geralmente o que acontece é que ao enviarmos a caixa de snacks, colocamos um folheto informativo com o tipo de informações que estás a mencionar. O cliente cada vez mais está informado e é exigente. Estamos a falar de um cliente digital que valoriza o nosso produto o suficiente para fazer uma subscrição semanal, pelo que já possui algum poder aquisitivo e tem a sustentabilidade como base do seu dia-a-dia, incomoda-o estar a deitar embalagens ao lixo. Temos cliente a perguntar o que fazer com as embalagens. Nós sabemos que os clientes estão completamente cientes disso, não conseguiríamos sobreviver se já não tivéssemos pensado sobre isso. O cliente geralmente pergunta-nos algo quando não tem acesso à informação por algum motivo. Tentamos falar com os clientes para perceber a opinião

deles e disponibilizamo-nos a responder às suas questões. Há coisas que não conseguimos resolver, explicamos porque não e que medidas estamos a implementar para melhorar. O caso dos plásticos nas embalagens, toda a indústria está agora a tentar resolver esse problema. Não é uma coisa fácil que se resolva do dia para a noite sem um aumento significativo dos custos porque, também é importante manter o produto acessível ou o trade-off não será desejável.

Entrevistador: Uma vez que a empresa foi lançada durante o surto de COVID-19 e a tendência parecer estar a ser de levar uma alimentação mais saudável; para o vosso negócio a pandemia não foi muito prejudicial, pelo contrário.

Cofundador da empresa: As informações são algo contraditórias. Ainda hoje saiu uma notícia (penso que no observador) que afirma que 55% dos espanhóis aumentaram de peso por causa do confinamento. O que nós sentimos é que os nossos clientes estão cada vez mais preocupados em comer saudável por uma questão de saúde, i.e., se eu tomo conta da minha saúde é mais provável não ser infetado ou conseguir lutar contra o vírus sem grandes consequências. Isto é o que o nosso target de clientes nos diz, cientificamente não sei qual das informações será mais correta.

Entrevistador: Portanto, para a vossa empresa o coronavírus não foi tanto um desafio, mas uma oportunidade.

Cofundador da empresa: Sim, eu diria que sim. Claro que ninguém deseja a COVID-19, mas no geral tornou o nosso produto mais valioso. No entanto, também sofremos alguns desafios. Por exemplo ao nível da distribuição, entregávamos muito em empresas, 10 caixas eram transportadas para uma mesma localização e agora com as pessoas a trabalhar de casa há um desafio acrescido dessa mesma entrega ter passado a ser feita em múltiplos e dispersos pontos. Resumindo, há ganhos e perdas que é preciso ponderar muito bem.

Appendix 3: Semi-Structured Interview with Company Co-Founder

- English Version-

The interview was conducted in Portuguese and later translated with the help of DeepL (<https://www.deepl.com/translator>), to ensure authenticity without bias.

- Interview with Four Bites, November 24, 2020, Co-founder Ricardo Alves

Interviewer: Characterizing the digital age as the introduction of the internet and information technologies, as well as the ability to use these new technologies and the internet to propel your business; is Four Bites adapted to the digital age?

Co-founder of the company: Without a doubt, this is one of the great forces that we believe to have at Four Bites. Very connected to our past, both academic and professional, mine and Ana's. I'm connected to the data analysis area, so all my day-to-day work is essentially to collect information and analyze the information collected by several touchpoints with the client. The digital era brought us this advantage, it was from the digital era that this abundance of data, the so-called big data, arose and what is done with this data. Basically, how do you extract knowledge from these data sets? And, no doubt, even by the logic of personalization that we want to have at Four Bites, the whole digital part is fundamental for us. This is because to personalize, not only the snack boxes but all the experience that we want to give to the final consumer, it has to be through data that we collect or that they provide us. That's why we intend now, despite being a start-up at a very early stage, to make great use of our customers' data. When a customer comes to our website and registers, we start by asking them which flavors they like and which flavors they don't, collecting data to make each Four Bites box different from their neighbors or co-workers. Because they are really different, we don't send boxes that are not customized according to individual preferences. And that can only be achieved through data.

Interviewer: At the moment the only Four Bites workers are the two co-founders. Given your background in Data Science, you [Ricardo] have already mentioned being comfortable with the technologies. As this is a company that uses so much of its customers' data, as its business is an online platform, did Ana feel the need for any additional training to help you launch this project, or do you plan to offer any course to help future employees work with data collection and analysis?

Co-founder of the company: There are currently two of us, me being more technical, either by training or by profile. Ana is completely at ease, not so much in the area of machine learning and artificial intelligence (my area of specialization), but perfectly capable with regard to the analytical component. In fact, Ana has a background in biomedicine, she is used to experimenting with data and samples. We are completely at ease, both with that part of analytics, data, and information system. We want our employees, not now being recruitment a priority of ours, but in the future, to have that mindset and to be able to do analytics in order to have the autonomy to make decisions based on data.

Interviewer: Why was e-commerce the business model chosen? You've already said it's the easiest way to use consumer data for a customized product, but I'd like to know a little more about what you consider to be the main advantages, disadvantages, and biggest challenges that e-commerce has given you.

Co-founder of the company: Today being e-commerce is relatively easy. It is very simple to create a platform that allows you not to be dependent on retailers. It will be very difficult for a Sonae or a Jerónimo Martins or an Auchan group to market our products. It is complicated because we do not yet have the economic and scale capacity for this project. In fact, to be closer to our customers it is necessary to break down that retailer barrier. In essence, we are our own retailers. We are the ones who prepare the boxes, our algorithm chooses the snacks... It is in

that contact with the customer that we have access to the data. If we just put a set of non-personalized boxes in Jumbo or Continente and didn't even know who was buying them, we would lose what for us is more important, the contact with the customer. This access to the customer is fundamental for us, it is obvious that e-commerce is our way.

Interviewer: Thinking about the world of a few years ago, when the internet had not yet reached its present potential, do you think it would have been possible to launch this service with a traditional business model?

Co-founder of the company: No, I think it would have been too complicated. All the data comes with digitization. If we look at when the data appears, we see 3 major events: a brutal capacity of computers - incremental and progressive increase in processor capacity and cost; the emergence of the internet, google, smartphones, and Facebook; and finally the algorithm part. Without one of these 3 tools, we would not be where we are today. Without digitalization, it would not be possible to have our business as it exists today. Netflix is what it is because there has been digitalization, they have come a long way starting in the physical world and turning the product into digital, defeating Blockbuster in this case. That's why we don't consider it possible, the way we imagine our concept, to have worked 20 years ago, for example.

Interviewer: The internet is central to your business and therefore your digital presence is fundamental. Despite being so recent, does Four Bites already have a profile in any social network? And if so, why did you choose a certain network for a certain purpose?

Co-founder of the company: In fact, we are a very bad example. We have Facebook, Instagram, and LinkedIn accounts, but we don't deal with social networks and I'll explain why: we simply don't have the time. It's absolutely core that this will happen in a short period of time. When in August/September we launched the Four Bites box to the customer, so that our

customers could go to the site and buy the product, our biggest concern was to quickly reach a few dozen customers to understand what works and what doesn't; to improve the service and understand what kind of people are buying our box and why; what are we adding to their life and, understand what our potential customers are. Then, after the company is much more mature, it makes sense to attract customers and be present and active in social networks. I would say that it is something fundamental, we don't have it solely because at this moment it is not vital for the survival of the company and because we do not have time. But, without a doubt, it will be something core, and if you ask me that question again in 2 months or follow our social networks, you will see many publications, contrary to what happens now because being brutally honest, it is difficult for a client to trust a brand that has no presence on social networks and we are aware of that. At the moment we are happy with the amount of customers that we have and we are managing to make them loyal, they are enjoying the service, we have managed to have a sufficient number of customers for a pilot at this early stage.

Interviewer: You have said that you really intend to be more active on social networks in the near future. Is the goal to have similar communication on all networks or to adapt the type of communication to different platforms?

Co-founder of the company: Not being any of us an expert in digital marketing, which would be important to have, we will use the different networks in different ways. At the moment our audience is much more on Instagram than on Facebook, for example. LinkedIn will be much more professional and investor-oriented communication. In the end, a start-up will raise capital over time, and it is important to maintain a relationship with current and future investors. Clearly, the communication on Facebook and Instagram will be completely different in a different context. On Twitter we are not thinking of making an account because of resource constraints, characteristics of a start-up, so we will not try to be everywhere but focus on the

channels where our customers are most present. In conversations with our customers, we asked where they are present on social networks and Instagram was the most common answer, so that's where we have to be right now. Of course, Facebook will absorb some of what is generated for Instagram, but clearly, Instagram will be our main target.

Interviewer: Turning to sustainability, Four Bites believes in climate change and the need to reverse it? Scientists argue that climate change will have an impact on future agricultural production, as you somehow need raw materials and food suppliers to formulate your boxes; is this one of your concerns?

Co-founder of the company: Absolutely. I'll tell you how the idea behind this company came to show you how concerned we are about sustainability. Four Bites came up as an MBA project where the goal was to produce crickets for human consumption since we believe, and many studies say, that by 2050 the world is no longer sustainable due to climate change and population growth. We live on 3 macronutrients: carbohydrates, fats, and protein. Protein is very hard to find and is usually found in fish and animals. We have the problem that the animals need a large consumption of resources for their survival. For fish, there is currently a problem of ocean scarcity and the industry is relying on aquaculture, which produces fish of lower nutritional quality. So, there is clearly a problem of sustainability. The initial problem that gave rise to Four Bites was how to make food production sustainable, which would be solved by producing insects. In college we started to produce crickets, we even had about 20,000 live crickets breeding. Why did we leave the logic of crickets? Because the (mainly) western society is not yet prepared for this product. It would take a brutal investment in marketing to create this market and we considered that not only do we personally have no access to this capital, but the world's factories which serve at the moment for the production of insects (not only crickets but also flies and flame flies which are having enormous success out there in feeding animals, not

humans) are not prepared. It was because of several problems of this nature that we abandoned the project, the issue of sustainability is still on our table and present in the idealization of Four Bites. The company is born out of the logic: If people don't want to eat insects, how do we make them want our product? The project has evolved as a way to go beyond retail and deliver to people's homes or workplaces, as a way for them to eat insects. We thought this idea was not fantastic and decided to go ahead with it, leaving the insects out. Today, we think about sustainability in various ways. Starting with the way we package the products, we have a primary packaging that involves the snacks and a secondary packaging that involves all the snacks, which is the box. We try as hard as possible to get the snacks (which are not produced by us, we buy from suppliers) from local producers. That is, we want to have as our client someone with a small production of highly healthy homemade biscuits, individuals who produce 1000 homemade biscuits daily. These types of customers/suppliers are people who are closest to us and where the carbon footprint will be smaller. If you ask if we are now right where we want, the answer is no, of course not. Again, because resources are limited and there is a great difficulty in maintaining the level and food safety (keeping nutrients in the food) if they are not packed in plastic. However, we have been looking for alternative solutions. We have been talking to several packaging producers to see if it is possible to offer our snacks in another type of packaging. It's a journey we've already started and we're following. If we believe in climate change, no doubt! Science tells us so and it's a concern we have and believe in. For example, sustainability is also related to the fact that we sell units. In healthy and sustainable food, and in food itself, there is a lot of waste. We deliver to an individual 5 individualized snacks and specifically for the amount they need vs. a whole box of biscuits where probably many of them will not be eaten and no longer crunchy, end up in the trash can. Here, the fact that we serve unidoses is a point in favor of sustainability. Sustainability is a subject that is not

closed to us, it is something that we talk about very internally because it is undoubtedly something very important to us.

Interviewer: It is perceivable that you are actively implementing measures and developing solutions for sustainable production, which not only involves the reduction of plastic, but also the purchase of more local, healthy, and natural products; the reduction of waste. The fact that your company enables different diets according to individual preferences is also a measure that leads to sustainability. How is the transport of the Four Bites boxes currently being carried out? Have you thought about ways to make this transport more environmentally friendly? For example, is transport carried out by bicycle or by electric vehicles?

Co-founder of the company: Absolutely. At the moment our transport is carried out by a courier on a scooter. It may not be the ideal way, but there is also a question of scale. It is much easier to start distributing by bike when you have 100 customers 2km away from you, in your radius. When you have customers 10 km away from you, the bike is no longer such a viable and realistic option. But it is clearly an optimization process, the more customers, the easier this management is. Today, we do everything in our power to deliver on the best possible route, not only for cost reasons but also for waste reduction. We believe that with the increase in customer numbers, we will be able to optimize the process and some deliveries will be made by bicycle or in other ways discussed in the topic of micro-mobility of cities. Why not by electric scooter? I think that today a company is a social actor and that sustainability is no longer an extra, but an imperative need to be on the rise in the market today. Even because today customers already demand it, if they notice that you are not behaving sustainably without a very good justification for it, customers protest. We feel this very strongly with our customers. What's good, at the end of the day more demanding consumers lead to an improvement in society.

Interviewer: I see that you are very aware of all these problems and challenges related to sustainability and that you are working with this goal in mind.

Co-founder of the company: Yes, it is a subject that is very much linked to our origin. We try to reflect on how we will all be here in 2050, it is very important to us.

Interviewer: Exactly, so it's part of your strategic plan. The objective of your company is to improve society's quality of life, that is your aim.

Co-founder of the company: Absolutely.

Interviewer: The United Nations has defined 17 goals for sustainable development. I understand that you are working on responsible consumption and production, I would like to know if you are working on any of the other goals, for example, gender equality?

Co-founder of the company: Gender equality is a very interesting topic. Right now, there are only two of us, Ana and I, so there is clearly gender equality. I am more in the analytics area and the IT part (more technical) and Ana more as the CEO of the company. So, I think the whole equality issue is important for us. To give equal opportunities, whether it is gender equality or all other existing types of equality. For us it is important, and as you see, there are two of us. Ana is now and will increasingly be the face of the company, CEO of Four Bites. For us it is important, and we think we should do everything we can to promote equality.

Interviewer: Even in your future, is it important that economic growth is based on decent working conditions and not just on monetary gain.

Co-founder of the company: As a company, we also have to think about the logic of results. We are not idealistic enough to think that it is not important. We consider that there has to be a balance. A company is a social actor and must do everything in its power to promote issues

such as equality. For us, it makes no sense that it should be otherwise, it is at our root. Profit is important, but it has to be responsible profit. Let me give you an example, the messengers we have at the moment are also a boy and a girl, what interests us is to provide equal opportunities for people capable of working and doing good service.

Interviewer: Now shifting the focus to consumer behaviors. As the company was launched already at the beginning of the pandemic, it is impossible to see a change in consumption patterns. However, you have already pointed out that you notice consumers becoming increasingly aware and attentive, for example, to the way you package products and beyond. Do you feel any pressure from the customer to adapt the business model in any way? Whether it is a communication with more emphasis on sustainability or an even more technological service? For example, communicating explicitly on your website that packaging avoids plastic, nutritional value, and freshness as much as possible.

Co-founder of the company: No. As we were already born digital and during the outbreak of COVID-19 for us it was very natural, there was no change in strategy. The pandemic led online sales to grow and we were already online; people started to worry about eating better, or at least say they want to eat better for the sake of having more defenses in the body, etc. which is exactly what Four Bites offers. We were already born in a whirl, so for us, there were no significant changes.

Interviewer: Have you had any feedback from consumers? For example, asking more information about the origin or production of food, or questioning the sustainability of your packaging before placing an order?

Co-founder of the company: No, generally what happens is that when we send out the box of snacks, we put up an information pamphlet with that kind of information you are mentioning.

The customer is increasingly informed and demanding. We are talking about a digital customer who values our product enough to make a weekly subscription, so they already have some purchasing power and have sustainability as the basis of their everyday life, it bothers them to be throwing away packaging. We have customers asking what to do with the packaging. We know that customers are fully aware of this, we wouldn't be able to survive if we hadn't already thought about it. The customer usually asks us something when they don't have access to the information, for some reason. We try to talk to customers to get their opinion and we are available to answer their questions. There are things we cannot solve, we explain why not and what measures we are implementing to improve. In the case of plastics in packaging, the whole industry is now trying to solve that problem. It is not an easy thing to solve overnight without a significant increase in costs and, it is also important to keep the product affordable or the trade-off will not be desirable.

Interviewer: Since the company was launched during the COVID-19 outbreak and the trend seems to be towards healthier eating; for your business, the pandemic was not very damaging, on the contrary.

Co-founder of the company: The information is somewhat contradictory. Just today there was a news article (I think in the "Observador") that 55% of Spanish people have increased in weight because of the confinement. What we feel is that our customers are increasingly concerned about eating healthy for health reasons, i.e. if I take care of my health it is more likely that I won't be infected or be able to fight the virus without major consequences. This is what our customer target tells us, scientifically I don't know which of the information will be most correct.

Interviewer: Therefore, for your company, the coronavirus was not so much a challenge, but an opportunity.

Co-founder of the company: Yes, I would say so. Of course, nobody wants COVID-19, but in general, it has made our product more valuable. However, we also suffered some challenges. For example, in distribution, we delivered a lot to companies, 10 boxes were transported to the same location and now with people working from home, there is an added challenge of that same delivery being made at multiple and dispersed points. In short, there are gains and losses that need to be weighed up very carefully.

Appendix 4: Characterization of the Interviewees- Founders of the Company

As said before, Four Bites was founded by Ana Justino and Ricardo Alves at the beginning of 2020. Colleagues in the Executive MBA of Porto Business School, 2018-2019, the co-founders of Four Bites started to talk about the difficulties of finding healthy snacks when most of your time is passed away from home.

Ana has a biomedicine background and never thought she was going to be an entrepreneur as she always assumed to end up working for a large company. Nevertheless, emerged as a ramp to career development, the Executive MBA planted in her the “entrepreneurship bug”. Ricardo, on the other hand, grew up in a family that owns their own business. As a data scientist used to an entrepreneurial environment, he founded his first startup at the age of 27.

Bringing together their previous experiences and qualifications, Ana and Ricardo created a final project that leveraged technology and Artificial Intelligence together with nutrition and convenience. This project was restructured and developed at the beginning of the coronavirus outbreak, resulting in the participation and win of the biggest entrepreneurial contest in Portugal, “Montepio Acredita Portugal”, 2020. Collectively, they created Four Bites, a company that delivers:

1. Healthy snacks for the week with less than 150 kcal each;
2. Different snacks in the same box and distinct boxes every week;
3. Delivered weekly where you need them most;
4. And of course,... Always personalized to your taste and nutritional preferences.

Appendix 5: Online Questionnaire

– English Version–

Dear respondent,

My name is Alexandra Calisto and the following survey is to help understand consumer behaviors on sustainability in the digital age. Developed as a part of my Management master's thesis at NOVA School of Business and Economics, it aims to gather information about consumers of all age groups and from any part of the world.

These are quick-response questions, it will take you **less than 10 minutes** to complete.

There are no right or wrong answers, I am just interested in your sincere opinions and experiences.

All the information collected will be for academic purposes only, **and all responses are anonymous and confidential.**

Please feel free to contact me at 41198@novasbe.pt in case you have any questions.

Thanks in advance for your collaboration and I hope you have a nice day!

- I voluntarily choose to participate in this study
- I do not want to participate

1st Block: Digital age

Q1) Do you have regular unlimited access to the internet?

- Yes
- No

Q2) To access the internet you have:

(Please select all options that apply to you)

- Smartphone Desktop Computer Laptop Computer
 Tablet Other_____

Q3) Being information technology (IT) the use of computers to store, retrieve, transmit, and manipulate data or information.

Which of the following statements describes you better?

- I am always uncomfortable using IT and the internet
- I am not comfortable using IT and the internet in my personal life
- I am not comfortable using IT and the internet in my professional life
- I am comfortable using IT and the internet in my personal life
- I am comfortable using IT and the internet in my professional life
- I am comfortable using IT and the internet in both my professional and personal life
- I am a technology enthusiast, I like to learn about new software & hardware

Q4) What digital platforms/services do you use?

(Please select all options that apply to you)

- Home banking
 Streaming Services (Spotify, Netflix, Disney+,...)
 Ride-sharing services (Uber, eCooltra,Lime, ViaVerde Boleias,...)
 Vacation Rentals (Airbnb, HomeAway,...)
 Other _____

Now thinking about e-commerce, the ability of individuals and companies to buy and sell products, services, and experiences over the internet.

Considering the following statements please select all options that apply to you.

Q5) You have bought or sold:

- Items only through physical stores
- One or more items online in the last year
- One or more items online in the last month
- One item online in the last week
- More than 1 item online in the last week

Q6) In your opinion, e-commerce:

- Is a good option to traditional commerce
- Is easy and convenient
- Is complex and time consuming
- Is a method I use
- Is a method I don't want to try
- Allows me to compare prices
- Allows me to save money
- Allows me to save time
- Allows me to buy/sell items from distant places
- Other _____

Q7) Why wouldn't you buy or sell through e-commerce?

- N/A, I would always buy or sell through e-commerce
- I don't feel comfortable buying/selling online
- I don't trust online transactions
- I have heard about poor experiences
- I don't want to contribute to online services that can replace physical jobs/commerce

- I don't think e-commerce is that convenient
- Other _____

Q8) Do you have any social media/social network account (E.g.: Facebook, Twitter, Instagram, LinkedIn, WhatsApp, TikTok...)

- No
- Yes, but I don't use it
- Yes

Q9) What social media/social network do you have?

- | | | | |
|-----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|
| <input type="checkbox"/> Facebook | <input type="checkbox"/> Instagram | <input type="checkbox"/> Snapchat | <input type="checkbox"/> WhatsApp |
| <input type="checkbox"/> LinkedIn | <input type="checkbox"/> TikTok | <input type="checkbox"/> Twitter | <input type="checkbox"/> Pinterest |
| <input type="checkbox"/> YouTube | <input type="checkbox"/> Reddit | <input type="checkbox"/> WeChat | <input type="checkbox"/> Other_____ |

Q10) Please indicate to what extent you agree with the following statements:

(7-point Likert scale: 1-Strongly disagree; 4-Neither agree nor disagree; 7-Strongly agree)

- I follow friends and family on my social profiles online
- I follow brands on my social profiles online
- I follow celebrities on my social profiles online
- I follow social media influencers on my social profiles online

2nd Block: Sustainability

Sustainable consumption and production is defined as “the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations” - UNEP, 2010

Q11) Which of the following statements describes you better?

- I don't believe in Climate Change
- I believe Climate Change is natural and inevitable
- I am aware of Climate Change
- I am concerned about Climate Change
- I am worried about Climate Change but there is nothing I can do
- I am worried about Climate Change and I am trying to change some of my actions
- I am extremely worried about Climate Change and I am doing everything that I can to fight it

Q12) In your opinion, if Climate Changes are not stopped or reversed:

(Please select all options that apply to you)

- The earth biodiversity is going to decrease drastically
- In 50 years, food and drinkable water are going to be scarce
- The next generations of humans are going to develop more health problems
- Humans are going to be extinct in a matter of 100 years
- The planet and its species are going to adapt to the changes
- The earth conditions are going to stay unaltered
- Other _____

These are the 17 Sustainable Development Goals defined by the UN member states in 2015 as a universal call to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030.



Q13) Were you aware these goals existed?

- No
- Yes
- Yes, and I am trying to make changes in my life towards them (E.g.: saving water, recycling, use clean energy, reducing waste...)
- Yes, and I want to elaborate _____

Q14) Please indicate to what extent you agree with the following statements:

(7-point Likert scale: 1-Strongly disagree; 4-Neither agree nor disagree; 7-Strongly agree)

- I worry about the impact of my actions on the sustainability of the planet
- I'm planning on implementing more sustainable measures in my life
- I am currently making changes to my life habits

Q15) Select all measures that you are currently implementing to lead a more sustainable life:

- Reducing waste (E.g.: reduce the number of pages printed, reduce portion sizes to avoid food waste...)

- Reducing water consumption
- Saving energy by turning off lights and electrical outlets
- Choosing renewable energy sources
- Consuming more consciously
- Reducing single-use plastic
- Buying local products
- Prioritizing public transportation as a way of commuting
- Choosing a vegetable-based diet over an animal-based one
- I am not taking any measures towards sustainability
- Other _____

Q16) Please indicate to what extent you agree with the following statements:

(7-point Likert scale: 1-Strongly disagree; 4-Neither agree nor disagree; 7-Strongly agree)

- It is important for me that companies provide information on how their products are made (E.g.: workers' conditions, fair trade,...)
- I prefer to buy from local brands whenever I can
- I check for sustainable certificates before buying any item
- I try to consume less pollutant products (E.g.: bamboo toothbrush vs plastic toothbrush)
- I chose companies with less impactful packages (E.g.: Cardboard package vs plastic package)

Q17 Why wouldn't you buy sustainable products or services?

(Please select all options that apply to you)

- It is expensive
- It is not worth it

- It is not convenient
- There are not available in my preferred store
- I like specific brands
- There aren't enough options
- I don't have enough information about them
- Other _____

3rd Block: Consumer Behaviors

Q18) Thinking about your consumer habits before the COVID-19 outbreak.

Please indicate to what extent you agree with the following statements:

(7-point Likert scale: 1-Strongly disagree; 4-Neither agree nor disagree; 7-Strongly agree)

- I do the majority of my purchases in physical stores
- I frequently purchase items through e-commerce
- I buy sustainable products
- I usually buy from brands that I follow on social media
- My consumer decisions are based on the opinions of social media influencers and celebrities

Q19) Now focus on your consumer habits during the COVID-19 outbreak (from February of 2020 until today).

Please indicate to what extent you agree with the following statements:

(7-point Likert scale: 1-Strongly disagree; 4-Neither agree nor disagree; 7-Strongly agree)

- I do the majority of my purchases in physical stores
- I frequently purchase items through e-commerce
- I buy sustainable products

- I usually buy from brands that I follow on social media
- My consumer decisions are based on the opinions of social media influencers and celebrities

Q20) In my opinion COVID-19 altered my consumer behaviors. I now buy...

(Please select all options that apply to you)

- More sustainable products and services
- From digital platforms and websites
- Healthier products
- More local products
- Bigger quantities
- None of the above, the pandemic didn't alter my consumer behaviors
- Other _____

4th Block: Demographics

To finalize, let me know a little more about yourself!

Q21) What gender do you identify with?

- Female
- Male
- Prefer not to say
- Other _____

Q22) What is your age?

- Under 18
- 18 - 24

- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 - 74
- 75 or older

Q23) Where are you from?

- Portugal
- Spain
- France
- Germany
- Italy
- United Kingdom
- Netherlands
- Brazil
- USA
- Other _____

Q24)What is the highest degree you have completed?

- Lower than high school
- High school or equivalent
- Bachelor
- Master or MBA
- PhD

Q25) What is your current occupation?

- Full-time student
- Student-worker
- Part-time worker
- Employed
- Unemployed
- Retired

Q26) What is your individual gross monthly income?

- No income
- Less than 500€
- 500-999€
- 1000-1499€
- 1500-1999€
- 2000-2999€
- 3000-3999€
- 4000-4999€
- 5000€ or more
- Prefer not to answer

You reached the end of this survey. Feel free to leave any additional feedback or comment about the topics covered or else click the arrow to submit your response.

Thank you so much for your participation!

Appendix 6: Online Questionnaire

– Portuguese Version–

Caro entrevistado,

O meu nome é Alexandra Calisto e o questionário que se segue tem o propósito de compreender o comportamento dos consumidores em relação à sustentabilidade na era digital. Desenvolvido como parte da minha dissertação de mestrado em Gestão na NOVA School of Business and Economics, tem como objetivo recolher informações sobre consumidores de todas as faixas etárias e de qualquer parte do mundo.

É constituído por perguntas de resposta rápida, pelo que demorará **menos de 10 minutos** para ser concluído.

Não existem respostas certas ou erradas, estou apenas interessada nas suas opiniões e experiências sinceras.

Toda a informação recolhida será utilizada apenas para fins académicos, sendo que **todas as respostas são anónimas e confidenciais**.

Não hesite em contactar-me para 41198@novasbe.pt caso tenha alguma questão.

Agradeço desde já a sua colaboração e espero que tenha um bom dia!

- Eu escolho participar neste estudo voluntariamente
- Eu não quero participar

1º Bloco: Era Digital

Q1) Tem acesso regular e ilimitado à internet?

- Sim
- Não

Q2) Para acessar a internet utiliza:

(Selecione todas as opções que se aplicam)

- Smartphone Computador Fixo Computador Portátil
- Tablet Outro_____

Q3) Sendo tecnologia da informação (TI) o uso de computadores para armazenar, recuperar, transmitir e manipular dados ou informações.

Qual das seguintes afirmações o descreve melhor?

- Sinto-me sempre desconfortável ao usar TI e a internet
- Não me sinto confortável ao usar TI e a internet na minha vida pessoal
- Não me sinto confortável ao usar TI e a internet na minha vida profissional
- Sinto-me confortável ao usar TI e a internet na minha vida pessoal
- Sinto-me confortável ao usar TI e a internet na minha vida profissional
- Sinto-me confortável ao usar TI e a internet tanto na minha vida profissional quanto na pessoal
- Sou um entusiasta das novas tecnologias, gosto de experimentar novos softwares e hardwares

Q4) Que plataformas/serviços digitais utiliza?

(Selecione todas as opções que se aplicam)

- Home banking
- Serviços de streaming (Spotify, Netflix, Disney+,...)
- Serviços de viagens partilhadas (Uber, eCooltra, Lime, ViaVerde Boleias,...)
- Serviços de arrendamento temporário (Airbnb, HomeAway,...)
- Outro _____

E-commerce é a capacidade de indivíduos e empresas comprarem e venderem produtos, serviços e experiências pela internet.

Considerando as declarações a seguir, selecione todas as opções que se aplicam.

Q5) Comprou ou vendeu:

- Itens apenas em lojas físicas
- Um ou mais itens online no último ano
- Um ou mais itens online no último mês
- Um item online na última semana
- Mais de 1 item online na última semana

Q6) Na sua opinião, e-commerce:

- É uma boa opção ao comércio tradicional
- É fácil e conveniente
- É complexo e demorado
- É um método que eu uso
- É um método que eu não quero experimentar
- Permite-me comparar preços
- Permite-me economizar dinheiro
- Permite-me economizar tempo
- Permite-me comprar/vender itens de lugares distantes
- Outro _____

Q7) O que o leva a não comprar ou vender artigos através de e-commerce?

- N/A, eu compro/vendo artigos através de e-commerce
- Não me sinto confortável a comprar/vender online

- Não confio em transações online
- Ouvi falar de más experiências
- Não quero contribuir para serviços online que podem levar à substituição de empregos/comércio físico
- Não considero o e-commerce conveniente
- Outro _____

Q8) Possui conta em alguma rede social (Ex.: Facebook, Twitter, Instagram, LinkedIn, WhatsApp, TikTok ...)

- Não
- Sim, mas não uso
- Sim

Q9) Que redes sociais possui?

- | | | | |
|-----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|
| <input type="checkbox"/> Facebook | <input type="checkbox"/> Instagram | <input type="checkbox"/> Snapchat | <input type="checkbox"/> WhatsApp |
| <input type="checkbox"/> LinkedIn | <input type="checkbox"/> TikTok | <input type="checkbox"/> Twitter | <input type="checkbox"/> Pinterest |
| <input type="checkbox"/> YouTube | <input type="checkbox"/> Reddit | <input type="checkbox"/> WeChat | <input type="checkbox"/> Outro_____ |

Q10) Por favor indique até que ponto concorda com as seguintes afirmações:

(Escala Likert de 7 pontos: 1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Sigo amigos e familiares nos meus perfis sociais online
- Sigo marcas nos meus perfis sociais online
- Sigo celebridades nos meus perfis sociais online
- Sigo influenciadores digitais nos meus perfis sociais online

2º Bloco: Sustentabilidade

O consumo e produção sustentáveis é por definição “O uso de serviços e produtos que respondem às necessidades básicas e proporcionam uma melhor qualidade de vida, minimizando o uso de recursos naturais e materiais tóxicos, bem como as emissões de resíduos e poluentes ao longo do seu ciclo de vida, de forma a não comprometer as necessidades das gerações futuras ” - UNEP, 2010

Q11) Qual das seguintes afirmações o descreve melhor?

- Não acredito em alterações climáticas
- Acredito que as alterações climáticas são naturais e inevitáveis
- Estou ciente das alterações climáticas
- Estou perturbado com as alterações climáticas
- Estou preocupado com as alterações climáticas, mas não há nada que eu possa fazer
- Estou preocupado com as alterações climáticas e estou a tentar mudar algumas das minhas ações
- Estou extremamente preocupado com as alterações climáticas e estou a fazer tudo o que posso para as combater

Q12) Na sua opinião, se as alterações climáticas não forem travadas ou revertidas:

(Selecione todas as opções que se aplicam)

- A biodiversidade terrestre vai diminuir drasticamente
- Em 50 anos, comida e água potável vão ser escassas
- As próximas gerações de humanos irão desenvolver mais problemas de saúde
- Os humanos serão extintos em cerca de 100 anos
- O planeta e as suas espécies vão-se adaptar às mudanças

- As condições da Terra permanecerão inalteradas
- Outro _____

Estes são os 17 Objetivos de Desenvolvimento Sustentável definidos pelos estados membros da ONU em 2015 como apelo universal para acabar com a pobreza, proteger o planeta e garantir que todas as pessoas desfrutem de paz e prosperidade até 2030.



Q13) Sabia da existência destes objetivos?

- Não
- Sim
- Sim e estou a tentar fazer mudanças na minha vida para os atingir (Ex.: economizar água, reciclar, usar fontes de energia renováveis, reduzir o desperdício, ...)
- Sim e quero comentar _____

Q14) Por favor indique até que ponto concorda com as seguintes afirmações:

(Escala Likert de 7 pontos: 1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Preocupo-me com o impacto das minhas ações na sustentabilidade do planeta
- Estou a planear implementar medidas mais sustentáveis na minha vida
- Atualmente estou a mudar alguns hábitos na minha vida

Q15) Selecione todas as medidas que está a implementar para levar uma vida mais sustentável:

- Redução do desperdício (diminuição do número de páginas impressas, redução do tamanho das porções para evitar o desperdício de alimentos, ...)
- Redução do consumo de água
- Economia de energia desligando as luzes e tomadas elétricas
- Escolha de fontes de energia renováveis
- Consumo de forma mais consciente
- Redução do plástico de uso único
- Compra de produtos locais
- Prioridade do transporte público como forma de deslocamento
- Escolha de uma dieta à base de vegetais em vez de uma dieta animal
- Não estou a implementar nenhuma medida sustentável
- Outro _____

Q16) Por favor indique até que ponto concorda com as seguintes afirmações:

(Escala Likert de 7 pontos: 1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- É importante para mim que as empresas forneçam informações sobre como os seus produtos são feitos (Ex.: condições dos trabalhadores, comércio justo, ...)
- Prefiro comprar marcas locais sempre que possível
- Procuro por certificados sustentáveis antes de comprar qualquer produto
- Tento consumir produtos menos poluentes (Ex.: escova de dentes com cabo de bambu em vez de plástico)
- Escolho empresas com embalagens menos poluentes (Ex.: embalagem de papel em vez de plástico)

Q17) O que o levaria a não comprar produtos ou serviços sustentáveis?

(Selecione todas as opções que se aplicam)

- É mais caro
- Não vale a pena
- Não é conveniente
- Não estão disponíveis na minha loja preferida
- Eu gosto de marcas específicas
- Não há opções suficientes
- Não tenho informações suficientes sobre os produtos ou serviços
- Outro _____

3º Bloco: Padrões de Consumo

Q18) Pensando nos seus hábitos de consumo **antes do surto de COVID-19**.

Por favor indique até que ponto concorda com as seguintes afirmações:

(Escala Likert de 7 pontos: 1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Fazia a maioria das minhas compras em lojas físicas
- Comprava frequentemente itens por meio de comércio eletrônico
- Comprava produtos sustentáveis
- Comprava regularmente marcas que acompanhava nas redes sociais
- As minhas decisões de consumo baseavam-se nas opiniões de influenciadores e celebridades

Q19) Focando agora nos seus hábitos de consumo **durante o surto de COVID-19** (De fevereiro de 2020 até hoje).

Por favor indique até que ponto concorda com as seguintes afirmações:

(Escala Likert de 7 pontos: 1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Fazia a maioria das minhas compras em lojas físicas
- Comprava frequentemente itens por meio de comércio eletrónico
- Comprava produtos sustentáveis
- Comprava regularmente marcas que acompanhava nas redes sociais
- As minhas decisões de consumo baseavam-se nas opiniões de influenciadores e celebridades

Q20) Na minha opinião, a COVID-19 alterou os meus padrões de consumo. Agora eu compro...

(Selecione todas as opções que se aplicam)

- Produtos e serviços mais sustentáveis
- A partir de plataformas digitais e sites
- Produtos mais saudáveis
- Mais produtos locais
- Quantidades maiores
- Nenhuma das opções acima, a pandemia não alterou os meus padrões de consumo
- Outro _____

4º Bloco: Dados Demográficos

Para finalizar, deixe-me saber um pouco mais sobre si!

Q21) Com que género se identifica?

- Feminino
- Masculino
- Prefiro não dizer
- Outro _____

Q22) Qual é a sua idade?

- Menor de 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75 ou mais

Q23) Qual é o seu país de origem?

- Portugal
- Espanha
- França
- Alemanha
- Itália
- Reino Unido
- Holanda
- Brasil
- EUA
- Outro _____

Q24) Quais são as suas habilitações académicas?

- Inferior ao ensino secundário
- Ensino secundário ou equivalente

- Licenciatura
- Mestrado ou MBA
- Doutoramento

Q25) Qual é a sua ocupação atual?

- Estudante
- Trabalhador-estudante
- Trabalhador a tempo parcial
- Empregado
- Desempregado
- Reformado

Q26) Qual é o seu rendimento bruto mensal?

- Sem rendimento
- Menos de 500 €
- 500-999 €
- 1000-1499 €
- 1500-1999 €
- 2000-2999 €
- 3000-3999 €
- 4000-4999 €
- 5000 € ou mais
- Prefiro não responder

Chegou ao final deste questionário. Sinta-se à vontade para deixar qualquer feedback ou comentário adicional sobre os tópicos abordados, ou então clique na seta para enviar a sua resposta.

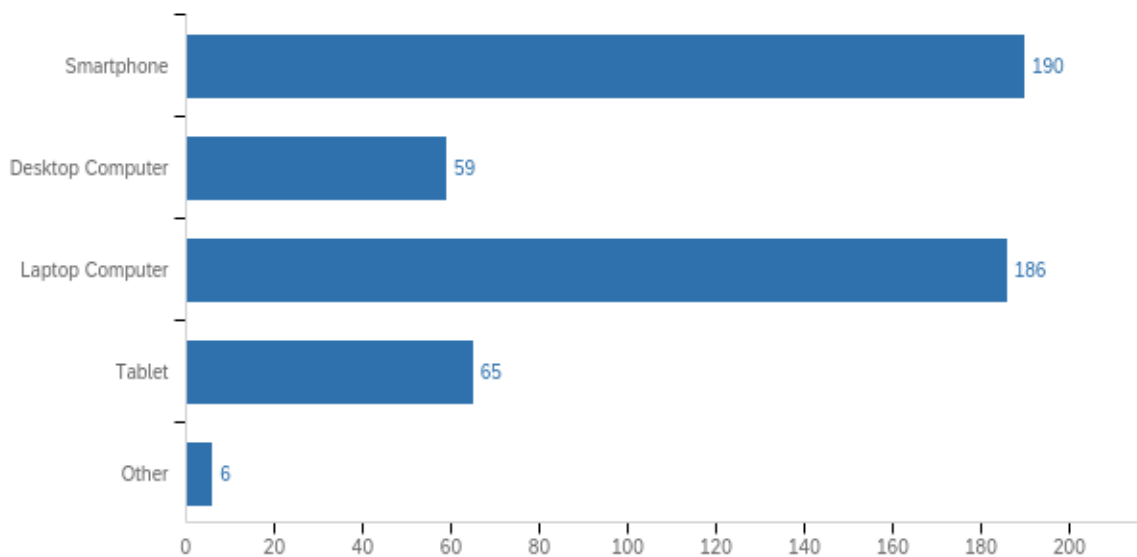
Muito obrigado pela sua participação!

Appendix 7: Answers from the Online Questionnaire

Q1) Do you have regular unlimited access to the internet?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	200	97.6	97.6	97.6
	No	5	2.4	2.4	100.0
	Total	205	100.0	100.0	

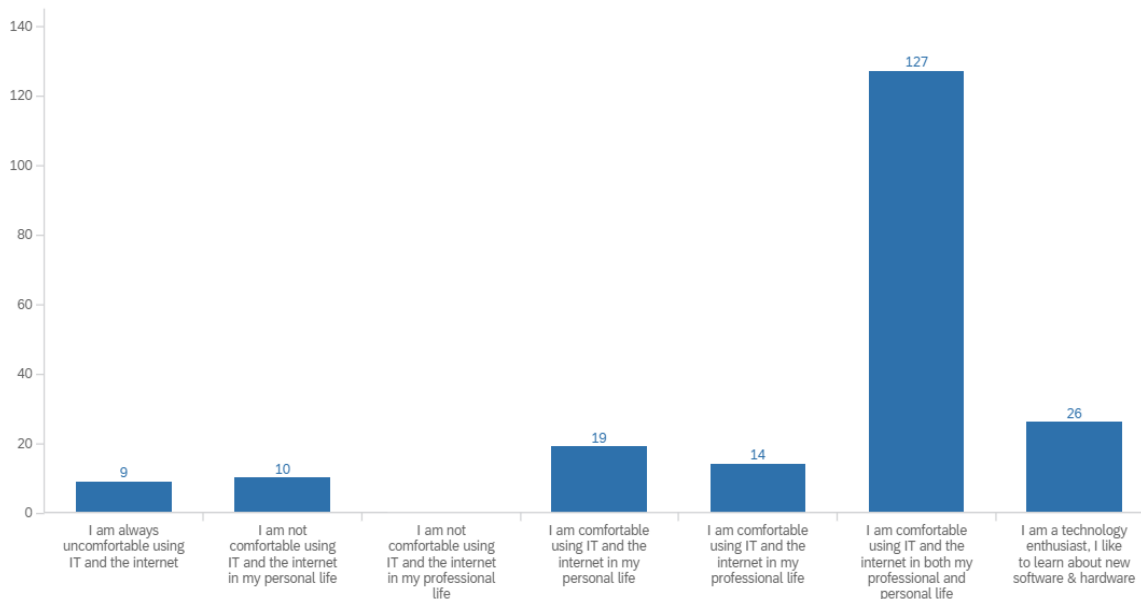
Q2) To access the internet you have:



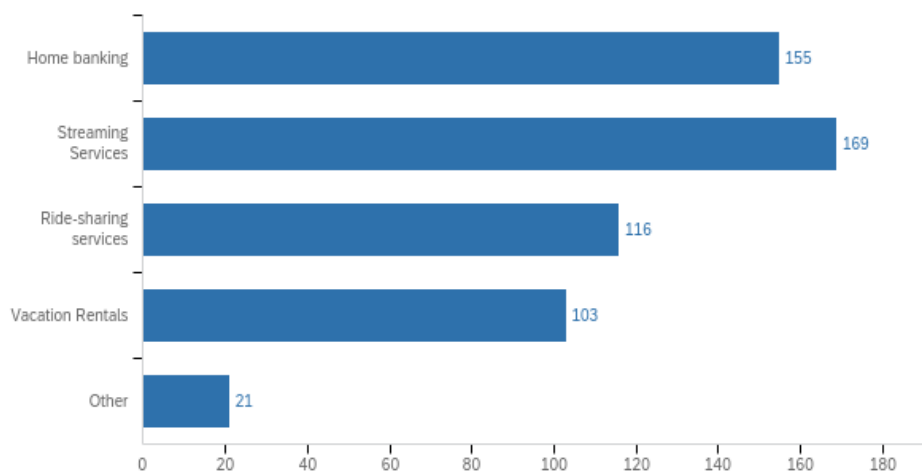
Other: PlayStation 4

Q3) Being information technology (IT) the use of computers to store, retrieve, transmit, and manipulate data or information.

Which of the following statements describes you better?



Q4) What digital platforms/services do you use?



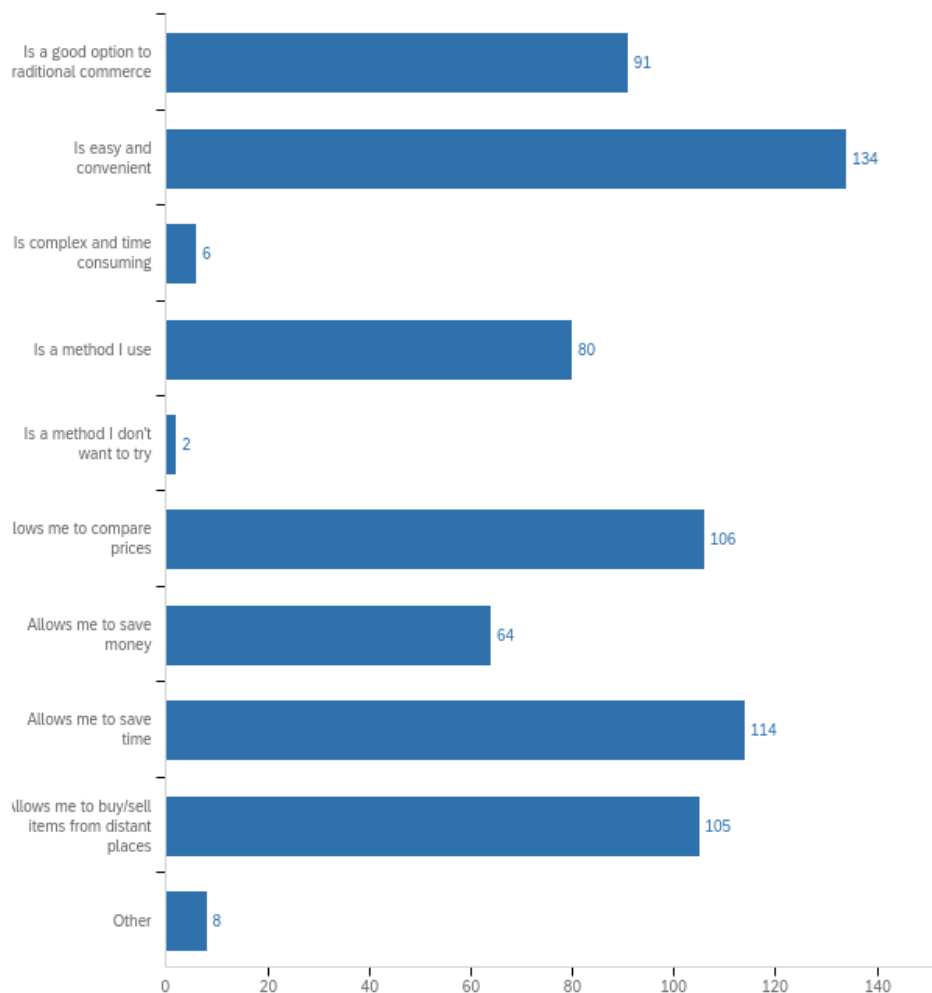
Other: Glovo, UberEats, ... \ Social media \ Social networks \ Clothes one as Mango \ Spotify \ Videogames \ Moodle \ E-Recruitment platforms \ Weather Forecasts \ Online Newspapers \ Everything that can be done over the internet in terms of purchases and bureaucracy \ EDP, SMAS, Via CTT, Portal das Finanças, Via Verde, SNS, Segurança Social, Ticket Line, Jogos Santa Casa, Hospitais da Luz e CUF.

Q5) You have bought or sold:

	Responses		Percent of Cases
	N	Percent	
\$Q5 ^a Items only through physical stores	18	4.6%	8.8%
One or more items online in the last year	187	47.5%	91.2%
One or more items online in the last month	122	31.0%	59.5%
One item online in the last week	31	7.9%	15.1%
More than 1 item online in the last week	36	9.1%	17.6%
Total	394	100.0%	192.2%

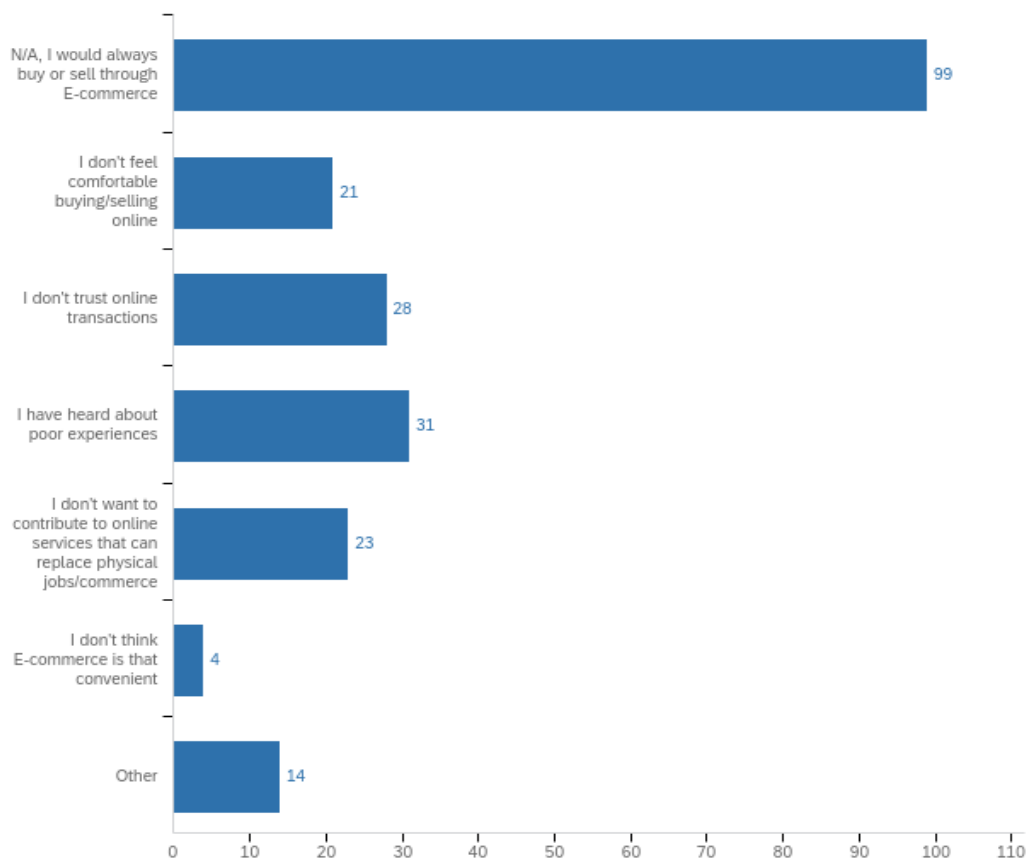
a. Dichotomy group tabulated at value 1.

Q6) In your opinion, e-commerce:



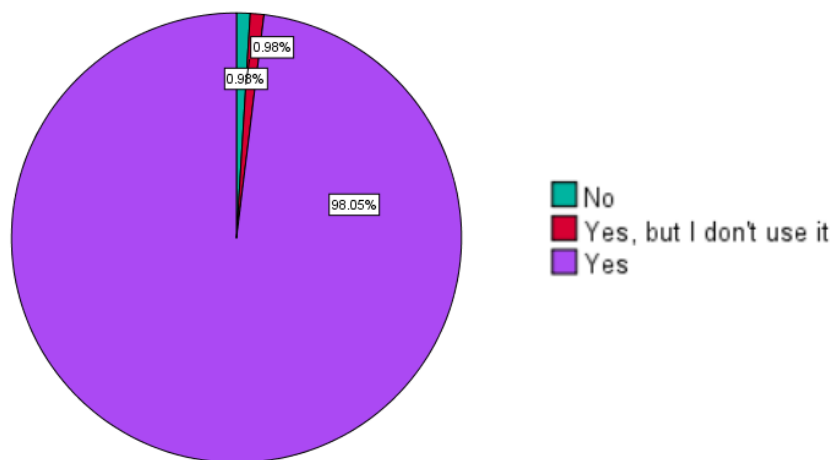
Other: Doesn't have the same experience feeling as opposed to traditional shopping \ It is good to evaluate the options, but I prefer to buy at the store where I can see the product I will take with me \ In Portugal it is too slow \ Gives me more choice \ It's easy, but it takes time.

Q7) Why wouldn't you buy or sell through e-commerce?



Other: I like the experience of going shopping but depending on the sector: comfortable with almost everything except fashion items that I prefer to try first \ I want to support local businesses in my town \ Delays in delivery, I like to watch the articles live \ I don't trust the transaction processes in some cases and so I buy less than I could. On the other hand there are products that I like to see and touch \ Not always sure where to receive orders \ I'm comfortable buying but not selling \ I'm afraid it either doesn't fit, or the material is not good/expected \ I prefer to see the product in real life \ When I wanted to try the product in person.

Q8) Do you have any social media/social network account?



Q9) What social media/social network do you have?

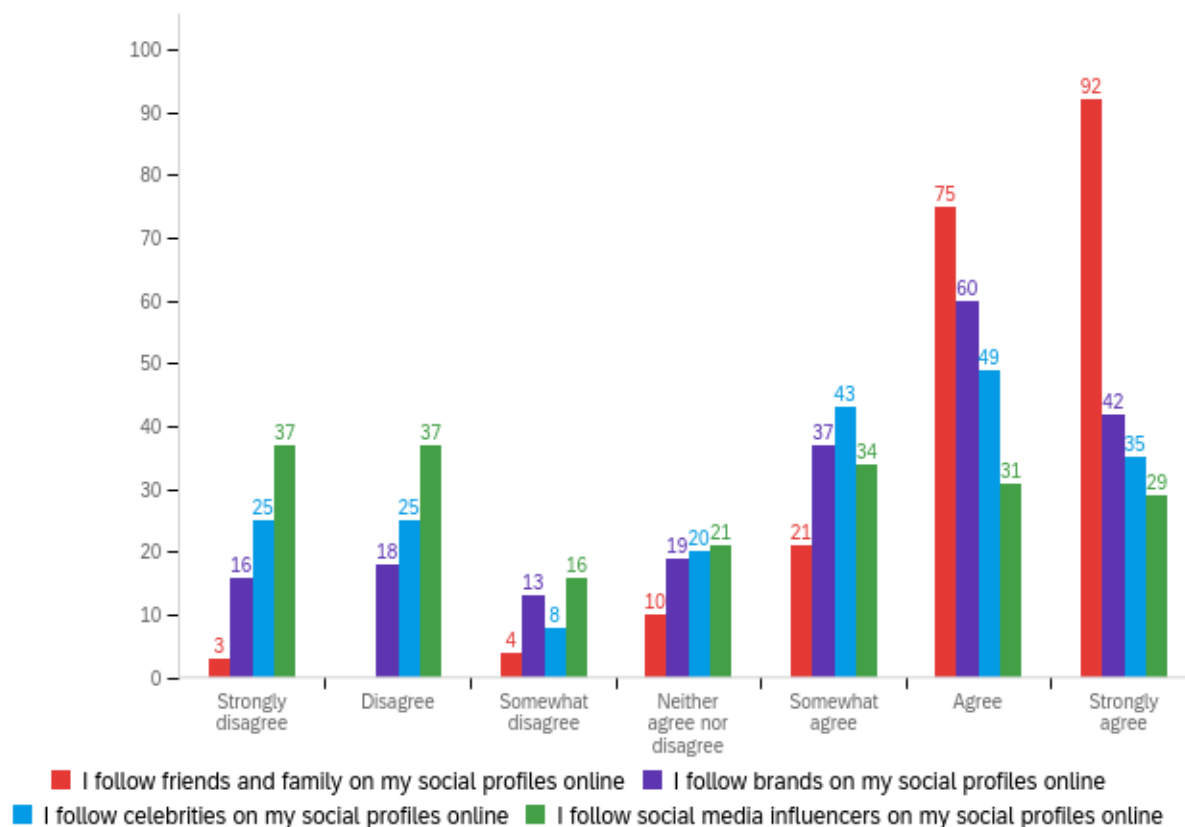
		Facebook	Instagram	Snapchat	WhatsApp	LinkedIn	TikTok	Twitter	Pinterest	Youtube	Reddit	WeChat	Other	Total
Responses	N	198	162	55	196	132	46	54	83	154	17	2	4	1103
	Percent	18.0%	14.7%	5.0%	17.8%	12.0%	4.2%	4.9%	7.5%	14.0%	1.5%	0.2%	0.4%	100.0%
	Percent of Cases	96.6%	79.0%	26.8%	95.6%	64.4%	22.4%	26.3%	40.5%	75.1%	8.3%	1.0%	2.0%	538.0%

a. Dichotomy group tabulated at value 1.

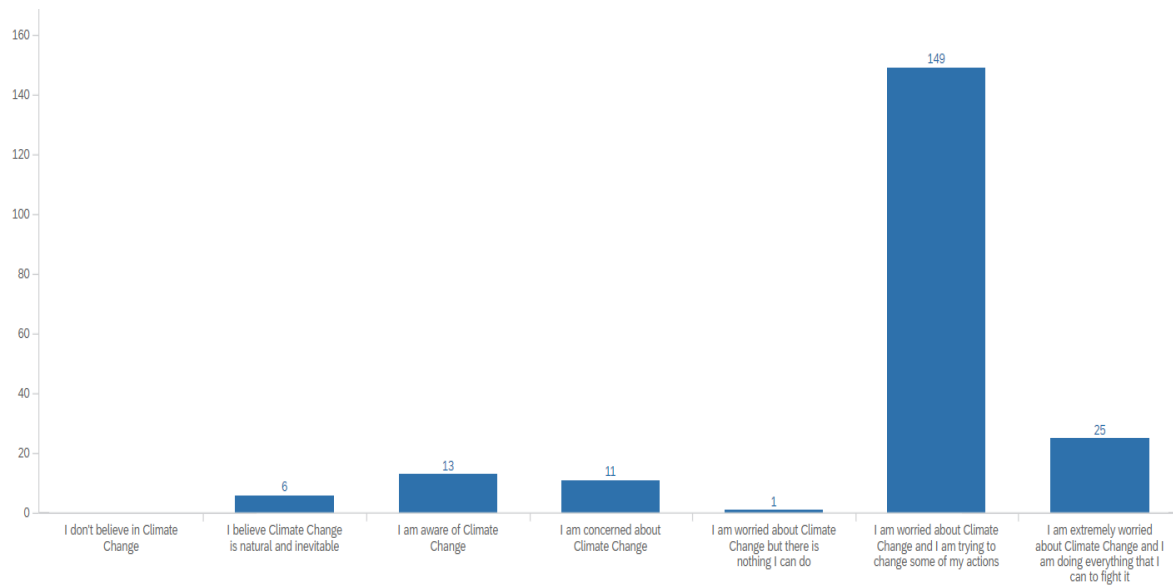
Other: Telegram \ VK \ Strava

Q10) Please indicate to what extent you agree with the following statements:

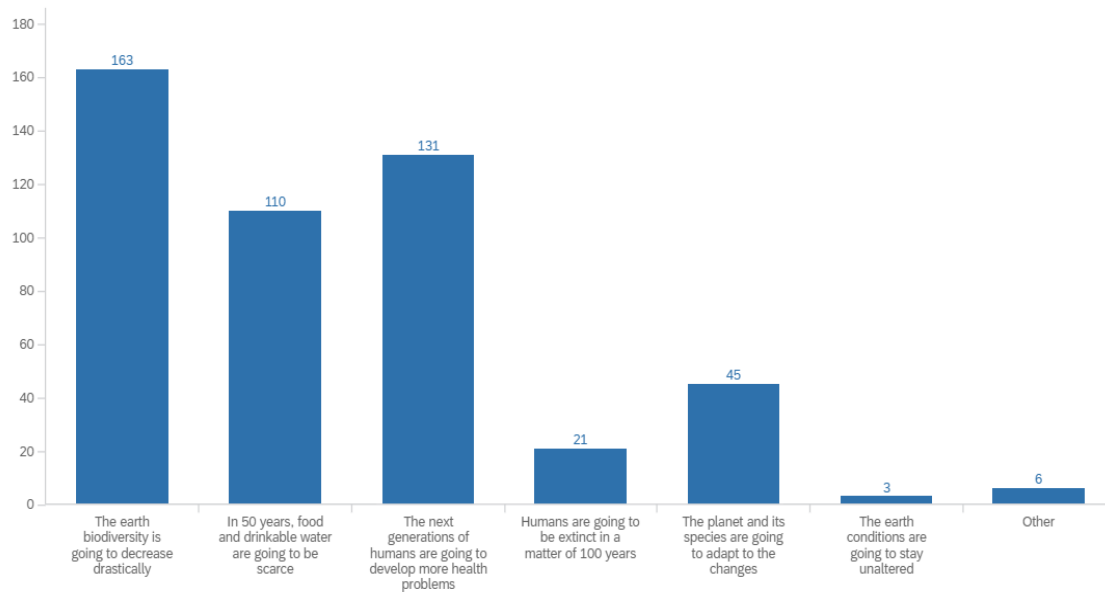
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I follow friends and family on my social profiles online	1.00	7.00	6.12	1.13	1.27	205
2	I follow brands on my social profiles online	1.00	7.00	4.91	1.87	3.49	205
3	I follow celebrities on my social profiles online	1.00	7.00	4.55	2.01	4.02	205
4	I follow social media influencers on my social profiles online	1.00	7.00	3.91	2.11	4.46	205



Q11) Which of the following statements describes you better?

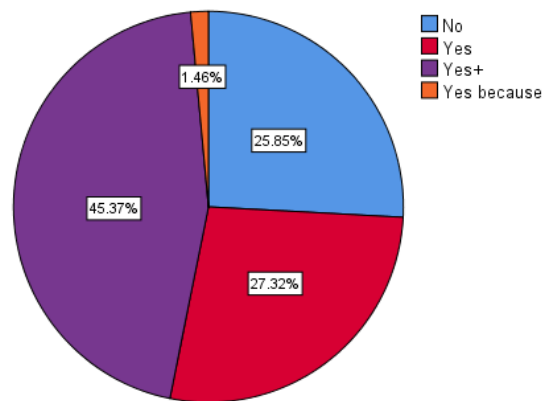


Q12) In your opinion, if Climate Changes are not stopped or reversed:



Other: There will be more wars \ More natural disasters will occur through which people could potentially die \ The air will start to be toxic \ However I also think that there will be an adaptation by the Human Being \ Life on earth will no longer be possible for most humans for the next 30-40 years.

Q13) Were you aware these goals existed?

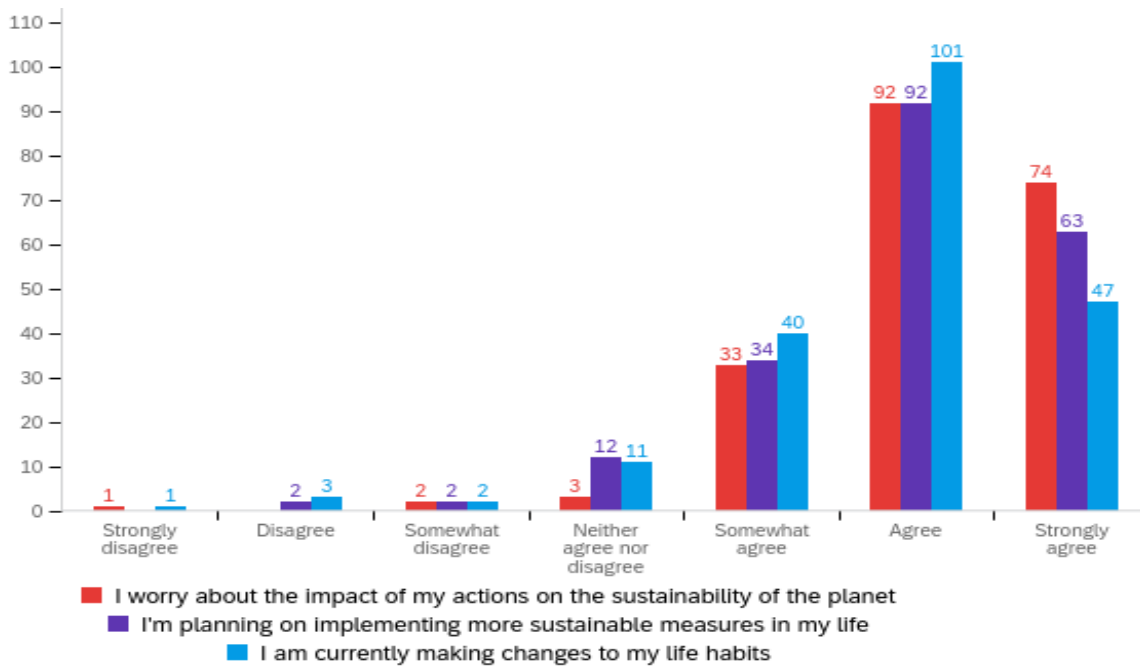


Because: Recycling, reducing food waste, saving on water consumption \ Recycle all I can \

The only problem we should worry about is global warming because if it is not mitigated, I am no longer talking about solved, absolutely nothing else matters. Of course, the other problems are important, just not as important as global warming.

Q14) Please indicate to what extent you agree with the following statements:

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I worry about the impact of my actions on the sustainability of the planet	1.00	7.00	6.12	0.88	0.78	205
2	I'm planning on implementing more sustainable measures in my life	2.00	7.00	5.96	0.97	0.95	205
3	I am currently making changes to my life habits	1.00	7.00	5.81	1.02	1.05	205



Q15) Select all measures that you are currently implementing to lead a more sustainable life:

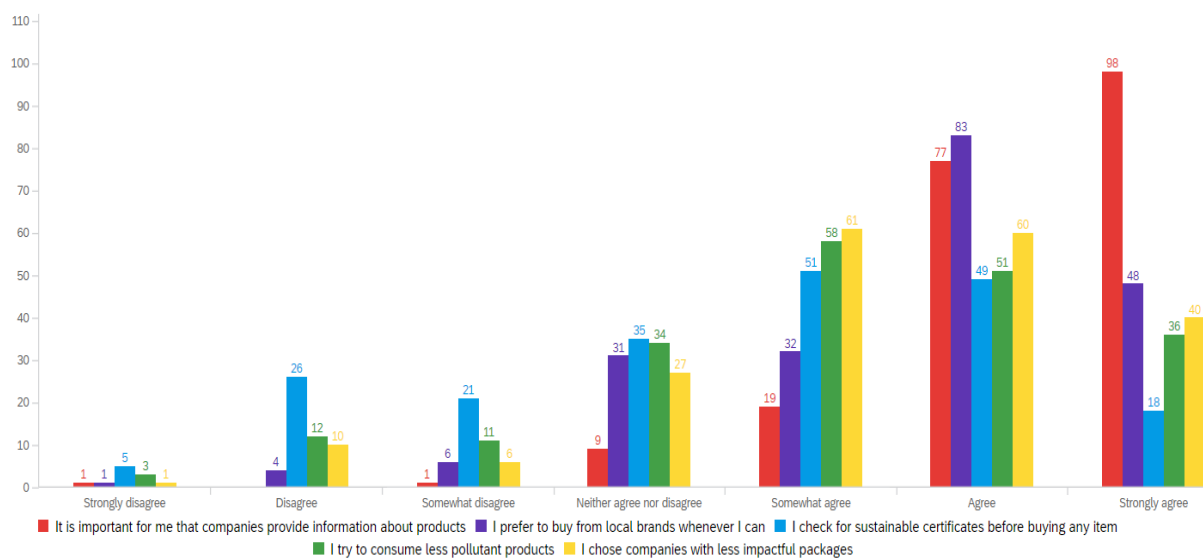
		Responses		Percent of Cases
		N	Percent	
\$Q15 ^a	Reducing waste	167	14.9%	81.5%
	Reducing water consumption	143	12.7%	69.8%
	Saving energy by turning off lights and electrical outlets	164	14.6%	80.0%
	Choosing renewable energy sources	67	6.0%	32.7%
	Consuming more consciously	145	12.9%	70.7%
	Reducing single-use plastic	170	15.1%	82.9%
	Buying local products	107	9.5%	52.2%
	Prioritizing public transportation as a way of commuting	78	6.9%	38.0%
	Choosing a vegetable-based diet over an animal-based one	69	6.1%	33.7%
	I am not taking any measures towards sustainability	2	0.2%	1.0%
	Other	12	1.1%	5.9%
Total	1124	100.0%	548.3%	

a. Dichotomy group tabulated at value 1.

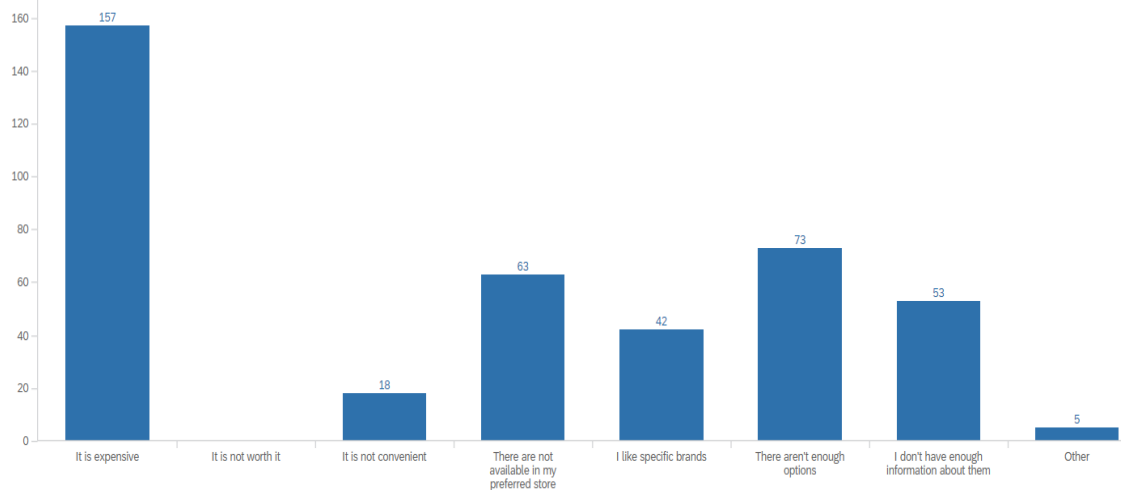
Other: Recycling(4)\ Composting \ I separate the waste \ Cycling to work(2) \ Buying second-hand Clothes \ Try to buy things without packaging and reuse the packaging when I can't avoid it (e.g. use the grain bottle to store nuts at home, or the tomato glass bottle to use as a water bottle). Try to buy more made-in Portugal (clothes, accessories, decoration, food...)

Q16) Please indicate to what extent you agree with the following statements:

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	It is important for me that companies provide information on how their products are made (E.g.: workers' conditions, fair trade,...)	1.00	7.00	6.26	0.92	0.85	205
2	I prefer to buy from local brands whenever I can	1.00	7.00	5.59	1.23	1.52	205
3	I check for sustainable certificates before buying any item	1.00	7.00	4.56	1.58	2.51	205
4	I try to consume less pollutant products (E.g.: bamboo toothbrush vs plastic toothbrush)	1.00	7.00	5.09	1.44	2.08	205
5	I chose companies with less impactful packages (E.g.: Cardboard package vs plastic package)	1.00	7.00	5.33	1.32	1.73	205



Q17) Why wouldn't you buy sustainable products or services?

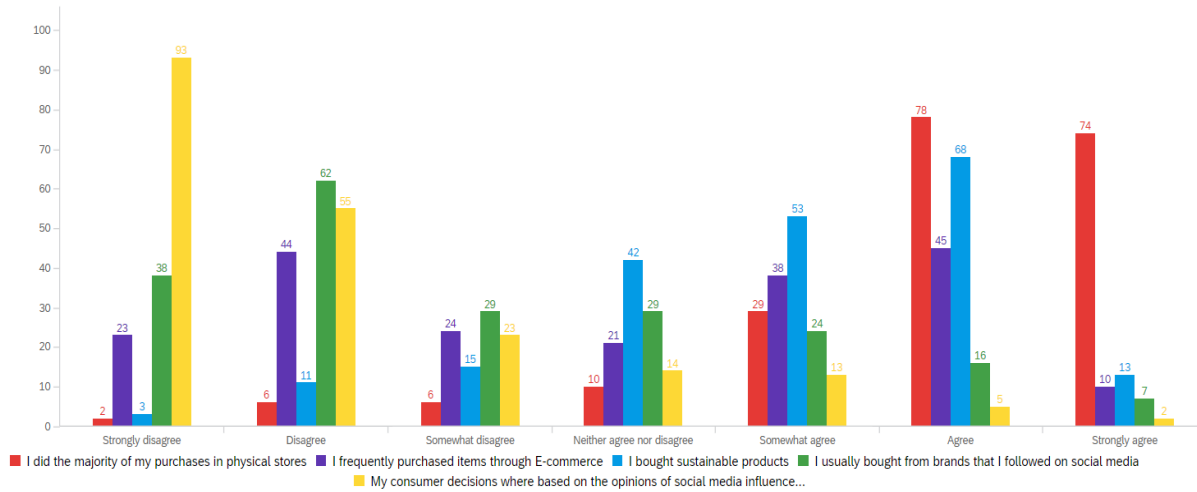


Other: Buy a pig in a poke. For example, organic products that are not. They have to be able to convey Confidence in certification \ You never know when it's greenwashing and when it is really sustainable \ I have big feet so I always have to buy online and I always look for sustainable shoes but there is never my size.

Q18) Thinking about your consumer habits before the COVID-19 outbreak.

Please indicate to what extent you agree with the following statements:

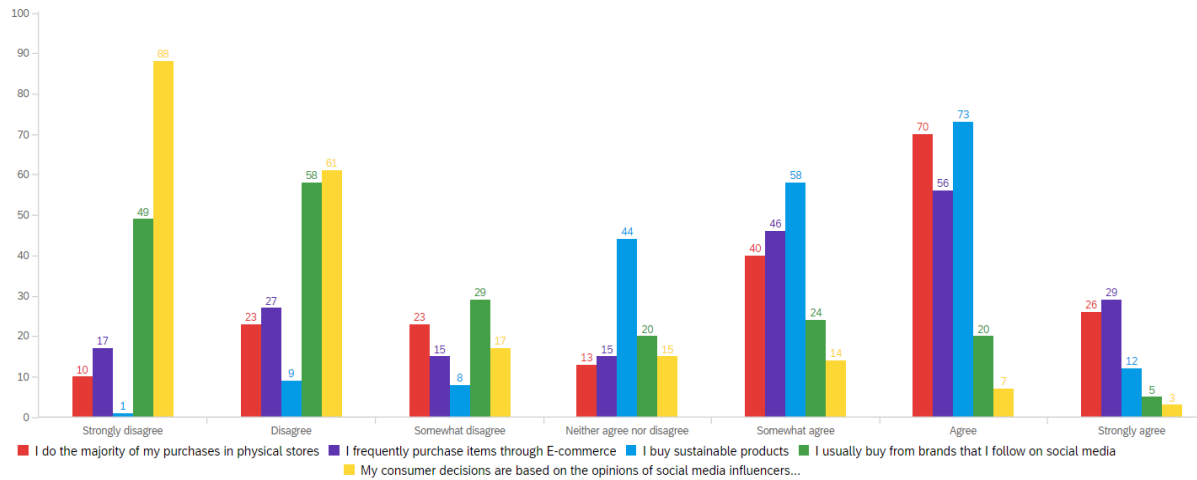
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I did the majority of my purchases in physical stores	1.00	7.00	5.87	1.29	1.66	205
2	I frequently purchased items through E-commerce	1.00	7.00	3.89	1.86	3.48	205
3	I bought sustainable products	1.00	7.00	4.89	1.34	1.79	205
4	I usually bought from brands that I followed on social media	1.00	7.00	3.07	1.70	2.90	205
5	My consumer decisions were based on the opinions of social media influencers and celebrities	1.00	7.00	2.13	1.42	2.03	205



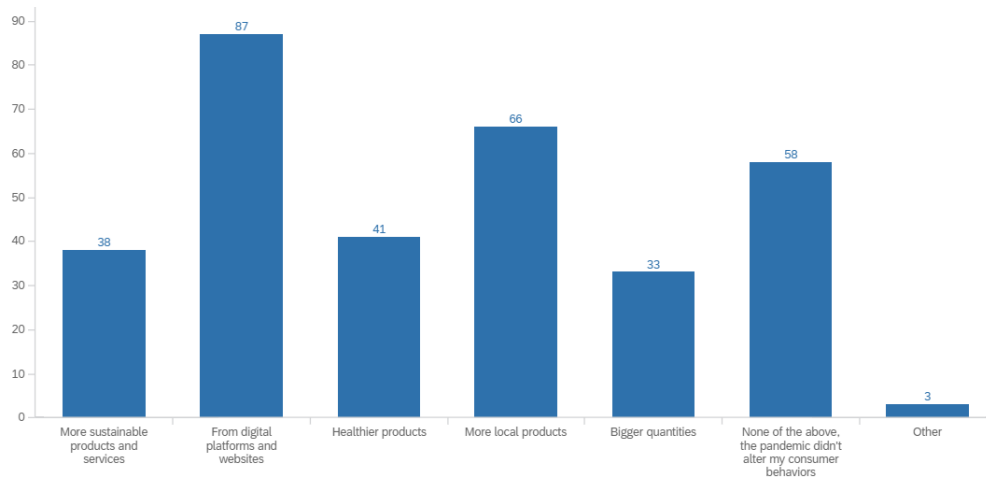
Q19) Now focus on your consumer habits during the COVID-19 outbreak (from February of 2020 until today).

Please indicate to what extent you agree with the following statements:

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I do the majority of my purchases in physical stores	1.00	7.00	4.78	1.76	3.10	205
2	I frequently purchase items through E-commerce	1.00	7.00	4.61	1.89	3.56	205
3	I buy sustainable products	1.00	7.00	5.03	1.20	1.43	205
4	I usually buy from brands that I follow on social media	1.00	7.00	2.96	1.75	3.07	205
5	My consumer decisions are based on the opinions of social media influencers and celebrities	1.00	7.00	2.21	1.51	2.29	205

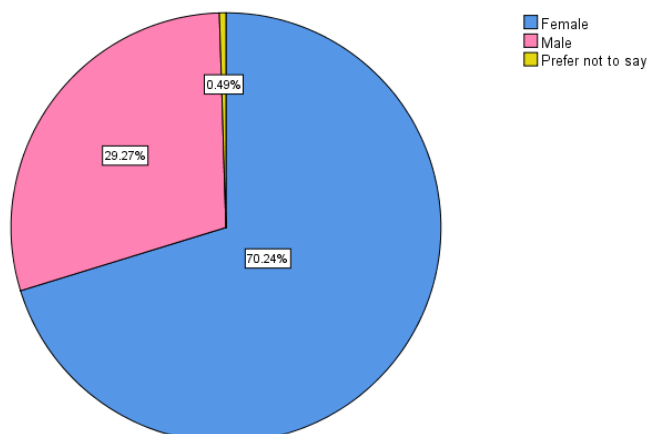


Q20) In my opinion COVID-19 altered my consumer behaviors. I now buy...

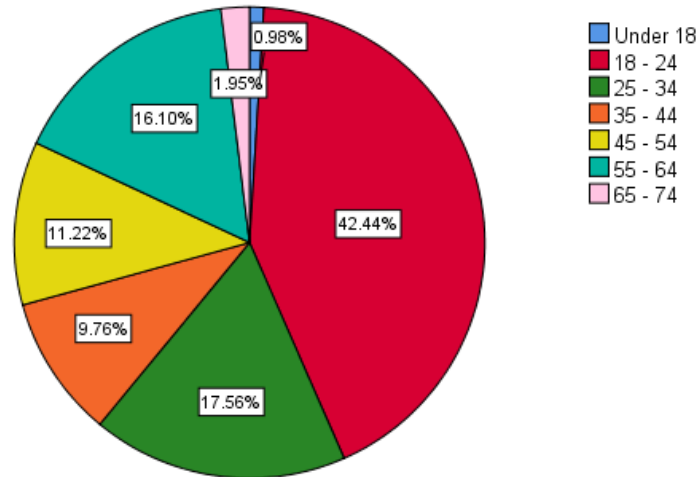


Other: Buying products in traditional and local trade \ I research more about sustainable options online, but it is not yet the preferred way to shop.

Q21) What gender do you identify with?



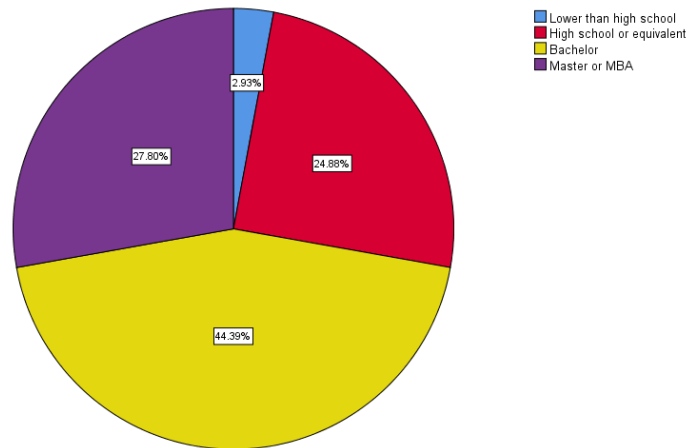
Q22) What is your age?



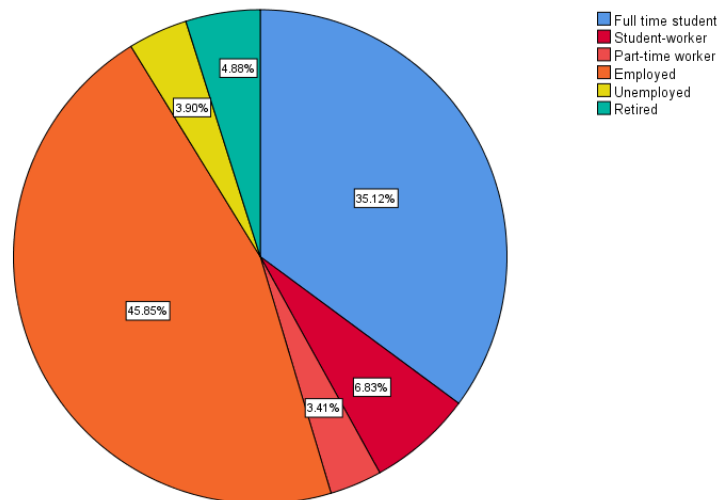
Q23) Where are you from?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portugal	150	73.2	73.2	73.2
	Italy	13	6.3	6.3	79.5
	France	5	2.4	2.4	82.0
	Netherlands	4	2.0	2.0	83.9
	Spain	4	2.0	2.0	85.9
	Czech Republic	3	1.5	1.5	87.3
	Germany	3	1.5	1.5	88.8
	Romania	3	1.5	1.5	90.2
	USA	3	1.5	1.5	91.7
	Slovakia	2	1.0	1.0	92.7
	United Kingdom	2	1.0	1.0	93.7
	Argentina	1	.5	.5	94.1
	Brazil	1	.5	.5	94.6
	Canada	1	.5	.5	95.1
	Egypt&Guinea-Bissau	1	.5	.5	95.6
	Ireland	1	.5	.5	96.1
	Mozambique	1	.5	.5	96.6
	Pakistan	1	.5	.5	97.1
	Poland	1	.5	.5	97.6
	Russia	1	.5	.5	98.0
	Switzerland	1	.5	.5	98.5
	Turkey	1	.5	.5	99.0
	Ukraine	1	.5	.5	99.5
	Venezuela	1	.5	.5	100.0
	Total	205	100.0	100.0	

Q24) What is the highest degree you have completed?



Q25) What is your current occupation?



Q26) What is your individual gross monthly income?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No income	44	21.5	21.5	21.5
	Less than 500€	9	4.4	4.4	25.9
	500-999€	35	17.1	17.1	42.9
	1000-1499€	40	19.5	19.5	62.4
	1500-1999€	23	11.2	11.2	73.7
	2000-2999€	21	10.2	10.2	83.9
	3000-3999€	8	3.9	3.9	87.8
	4000-4999€	1	.5	.5	88.3
	5000€ or more	6	2.9	2.9	91.2
	Prefer not to answer	18	8.8	8.8	100.0
Total	205	100.0	100.0		

Appendix 8: Paired Sample t-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	a) Before the COVID-19	5.87	205	1.290	.090
	a) During the COVID-19	4.78	205	1.765	.123
Pair 2	b) Before the COVID-19	3.89	205	1.869	.131
	b) During the COVID-19	4.61	205	1.893	.132
Pair 3	c) Before the COVID-19	4.89	205	1.340	.094
	c) During the COVID-19	5.03	205	1.200	.084
Pair 4	d) Before the COVID-19	3.07	205	1.706	.119
	d) During the COVID-19	2.96	205	1.757	.123
Pair 5	e) Before the COVID-19	2.13	205	1.427	.100
	e) During the COVID-19	2.21	205	1.516	.106

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	a) Before the COVID-19 & a) During the COVID-19	205	.357	.000
Pair 2	b) Before the COVID-19 & b) During the COVID-19	205	.676	.000
Pair 3	c) Before the COVID-19 & c) During the COVID-19	205	.663	.000
Pair 4	d) Before the COVID-19 & d) During the COVID-19	205	.770	.000
Pair 5	e) Before the COVID-19 & e) During the COVID-19	205	.889	.000

Paired Samples Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	a) Before the COVID-19 - a) During the COVID-19	1.093	1.776	.124	.848	1.337	8.810	204	.000
Pair 2	b) Before the COVID-19 - b) During the COVID-19	-.722	1.513	.106	-.930	-.514	-6.831	204	.000
Pair 3	c) Before the COVID-19 - c) During the COVID-19	-.141	1.050	.073	-.286	.003	-1.929	204	.055
Pair 4	d) Before the COVID-19 - d) During the COVID-19	.112	1.177	.082	-.050	.274	1.365	204	.174
Pair 5	e) Before the COVID-19 - e) During the COVID-19	-.083	.699	.049	-.179	.013	-1.699	204	.091

Appendix 9: Results from the Hypotheses Testing

Hypothesis	Description	Outcome	
		Consumers	Companies
H1	Society is adapted to the digital age	Validated	Validated
H1 A	Society has developed basic computer and information literacy.	Validated	Validated
H1 B	E-commerce is a used and viable option for traditional businesses.	Validated	Validated
H1 C	Social networks allow individuals and companies to stay connected.	Validated	Validated
H2	Society is aware of climate change and the need to reverse it.	Validated	Validated
H3	Society is actively developing and implementing sustainable consumption and production practices	Validated	Validated
H4	Society has changed its consumer habits since adopting digital technologies	Validated	Validated
H4 A	Increase in sustainable and digital consumption	Partially validated	-
H4 B	Businesses have adapted to new consumers	-	Validated