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Business Plan

Feed Yourself

**Versatile Vertical Farming for Global Smart
Cities**

Master Thesis

Geneva Business School

International Management

Submitted by:

Doruk Bozatli

Supervised by:

Bhanu Kiran Desiraju Ventaka

Barcelona, Spain

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Table of Contents

Declaration of Authorship	3
Acknowledgements	4
List of Abbreviations	5
Executive Summary	6
1. Business Overview	7
Assessment of the problem	7
Solution	9
Proposed business type and form	10
2. Market Research and Analysis	155
PESTEL analysis of Spain	15
PESTEL analysis of Netherlands	18
3. Business Proposal	21
Summary and key takeaways from the business plan	22
Consumer analysis	23
Research design and methodology	25
Summary and results of the survey	39
Proposed business	43
4. Financial Analysis	51
5. Conclusion	55
Limitations and Recommendations	59
References	61
Appendices	64

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Declaration of Authorship

Doruk B.

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Date: 16/07/2021

Name: Doruk Bozatli

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List of Abbreviations

UN (United Nations),
European Union (European Union - EU),
Benelux (Belgium Netherlands Luxembourg Economic Union),
CE (Council of Europe),
EAPC (Europe - Atlantic Partnership Council),
EBRD (European Investment and Development Bank)),
EIB (European Investment Bank),
IADB (America Region Development Bank),
IAEA (International Atomic Energy Agency),
IBRD (International Bank for Reconstruction and Development),
IFC (International Finance Corporation),
IMF (International Monetary Fund),
OECD (Economic Cooperation and Development Organization),
NATO (North Atlantic Treaty Organization)
OSCE (Organization for Security and Cooperation in Europe) and
WTO (World Trade Organization).

Executive Summary

The population of the World in 2020 was 7,794,798,739, the total population increased 1.05% from 2019. The current population of the World in 2021 is 7,874,965,825 and will increase 1.03% from 2020. The world population increased very slowly until the 1900s. But in the following years, the population growth rate intensified. After the 1950s, the nutrients grown with the soil were not enough for the population. For this reason, it is aimed to increase the harvest obtained from traditional agriculture by methods such as genetically modified seeds and chemical fertilization. The goal here is to increase the growth rate of foods and to increase the number and rate of annual harvests. With the increase of air pollution and chemicals in the soil, food has lost its nutritional value. Research suggests that foods grown in the 1950s and earlier are richer in minerals and vitamins.

Vertical farming is a revolutionary approach used to produce food and medicinal plants in vertically stacked layers such as in a skyscraper, used warehouse or shipping container. (Allied Market Research, 2019). Vertical farming differentiates itself from traditional farming by the ability to grow larger quantities of nutritious and quality fresh food and while producing these foods it does not rely on weather, water usage, skilled labor, and high soil fertility and protects the food from external factors such as diseases, pests, or predator attacks.

Feed Yourself company manufactures vegetables and fruits in Rotterdam-Netherlands after the produced goods are transferred to the distribution center and the cold storage in Spain. Feed Yourself company not only sells vertically grown fruits and vegetables to consumers in the supermarkets they go to in their daily lives, but also enables consumers to produce their own food with vertical farming at home. Apart from profit, the company has the aim of raising awareness of the society about vertical agriculture and its benefits. In the long term, it is aimed to reduce water consumption in Europe, to bring foods with high nutritional value to the consumer and to minimize environmental pollution by doing mostly vertical agriculture and most importantly they aim to put a vertical farming machine in each of households.

1. Business Overview

Assessment of the Problem

Population growth refers to the increase or decrease in the total population of an area in a specific time interval. With the Neolithic Period people started sedentary living and growth in population began.

The growth of populations varies depending on factors that can be grouped into internal and external. While internal factors are related to the individuals included in the population, external factors are more related to the ecological factors surrounding them. Intrinsic and social behaviors of living species, as well as birth rates, genetic characteristics and mortality rates are internal factors affecting population growth. Instinctive and social behaviors determine the future of the population by affecting the birth rate.

Living species interact with other living species through their social behaviors such as coexistence, hunting and protection. In the following process, they feed, develop, and reproduce due to their instincts. Birth refers to the number of individuals joining the species in the population. The rapid growth of living after birth is also a factor that increases the number of individuals in the population. Because every living thing that comes to the age of reproduction rapidly adds a new living to the population. The age distribution is also an important variable in growing populations. If the population is developing, the number of young people living at is higher than the number of adults and old ones. In shrinking populations, the number of young people living at is less than the number of adults and old ones. In this case, the number of living things in the population is expected to decrease with time.

Environmental factors that occur outside the will of the living species in that population also affect the growth rate of populations. These factors are major disasters, food shortages, wars, migration, and environmental elements such as carbon dioxide, oxygen, water, heat, and seasonal differences. Migrations; affects population growth in two different ways. If a population is migrating, that is, new individuals are joining the population, the growth will accelerate as the number of individuals will increase. If immigration is given, the growth rate will decrease as the number of individuals will decrease. Migration has a large share in the growth rate of human populations. People may migrate due to new job opportunities, ease of transportation, climatic conditions, and social reasons. In fact, humans migrate to find food, shelter, and suitable climatic conditions, as in other living species. As a result of unconscious use of resources and the release of used chemical or solid wastes into nature, the ecological balance is disturbed. As a result, differences such as temperature, weather and climatic changes arise in the geographical regions where the populations live. Species that cannot adapt to these differences also disappear over time, reducing population growth. When this situation is worldwide, it also affects the human population.

The growth course of the world population is like the numbers in the geometric series. Although humans are one of the least reproducing creatures, the number of humans in the world is increasing rapidly. The average increase rate of the world

population in recent years is around 1.7% or 0.17%. This rate was even less in the past. The population of the World in 2020 was 7,794,798,739, the total population increased 1.05% from 2019. The current population of the World in 2021 is 7,874,965,825 and will increase 1.03% from 2020. The world population increased very slowly until the 1900s. But in the following years, the population growth rate intensified. While the doubling time of the world's population was realized in 2000 years before, it decreased to 40 years between 1950-1990. (Roser M, Ritchie H. and Ortiz-Ospina E. 2013.) According to the reports of the United Nations, the world population will be approximately 9 billion in 2050 (Chart 2). With an increase of 1.7%, which is the average growth rate of the world population, approximately 97 million people are added to the world population every year. Due to the rapid growth of population and diet shifts, the world has to produce 69% more food calories in 2050 than 2006 (Chart 4). As seen in Chart 2, the curve showing the population growth almost resembles the letter "J". Such an increase in the graphs is considered excessive or abnormal. This increase creates anxiety and fear among world economists, ecologists, demographers, and politicians. How much can the world population increase? How many people can the world feed? Are the clean water resources in the world sufficient for this population?

The situation where the resources that can be mobilized in any country or region are not sufficient for the population living there and some economic and social problems are experienced is called "overpopulation".

In cases of overpopulation, the abundance of food decreases, it becomes difficult to feed and sustain life, food and water resources are rapidly depleted, the decrease in resources and the increase in poverty lead to an increase in aggression and crime rates in societies, and chaos begins due to famine. With famine, infertility, deaths, stillbirths, and diseases increase with the decrease in the body's resistance of individuals.

Thomas Malthus (1766-1834) wrote in his article "An essay on the principle of population as it affects the future improvement of society" written in 1789, "While the population increases with a geometric sequence, food items increase with an arithmetic sequence. If no precautions are taken, people will face the danger of starvation in the future." This theory was later called "Malthusian Theory".

Malthus' views did not happen, and later developments showed that Malthus was wrong, and he was criticized by scientists. However, the rapid increase in the world's population after the 1970's has also led to an increase in the number of people who think like Malthus. Thinkers such as Ehrlich, Meadows and Mesarovich, who are called "Neo-Malthusians", think that Malthus is wrong in a short time, but that he can be right in a long time and that he can be right in the widest part of the world. They argue that the world will not be able to feed, provide water and energy for the population on it at a point (Abramitzky R. and Braggion F.). After the 1950s, the nutrients grown with the soil were not enough for the population. For this reason, it is aimed to increase the harvest obtained from traditional agriculture by methods such as genetically modified seeds and chemical fertilization. The goal here is to increase the growth rate of foods and to increase the number and rate of annual harvests. With the increase of air pollution and chemicals in the soil, food has lost its nutritional value. Research suggests that foods grown in the 1950s and earlier are richer in minerals and vitamins.

According to FAO data, in order to meet the nutritional needs of the world population, which is expected to reach 9 billion in 2050, the current food production must increase by 70%. However, while the number of food-insecure populations is unacceptably high, large amounts of food are lost every year in the world due to spoilage in the journey during the delivery of the food to the consumer. The magnitude of post-harvest losses in fresh fruits and vegetables is estimated to be between 5 and 25 percent in developed countries, and 20 to 50 percent in developing countries, depending on the product.

Another threat facing the world is water resources. According to the "World Bank" article, 20 percent of its total planted land is used by irrigated agriculture. Irrigated agriculture is preferred because it is at least twice as efficient as rain fed agriculture. Currently, agriculture is responsible for an average of 70 percent of clean water usage globally.

Rapid population growth resulted in more need for food. However, the world's resources are limited so that a more sustainable way of agriculture is needed to feed all of the population but also use less of the resources.

Solutions

Vertical farming is a revolutionary approach used to produce food and medicinal plants in vertically stacked layers such as in a skyscraper, used warehouse or shipping container. (Allied Market Research, 2019). Vertical farming differentiates itself from traditional farming by the ability to grow larger quantities of nutritious and quality fresh food and while producing these foods it does not rely on weather, water usage, skilled labor, and high soil fertility and protects the food from external factors such as diseases, pests, or predator attacks.

According to Dickson Despommier's book *The Vertical Farm: Feeding the World in the 21st Century* benefits of vertical farming are:

- Continuous Crop Production

Vertical farming allows crop production year-round regardless of the climate of the place it's been used. Production is much more efficient than traditional farming.

Despommier states that a single indoor acre of vertical farming can produce more than 30 acres of farmland.

- Elimination of Herbicides and Pesticides

Vertical farming reduces total abandonment of the use of chemical pesticides.

- Protection from Weather-Related Variations in Crop Production

Vertical farms grow crops under controlled environments so that they are safe from weather occurrences.

- Water Conservation and Recycling

Hydroponic techniques use %70 less water than traditional farming. Also, aeroponic technique even uses less water.

- Climate Friendly

Vertical farming grows crops indoors and reduces and eliminates the use of tractors and other equipment that's been used in traditional farming. Moreover, in traditional farming fossil fuels are being burned. Despommier states that using vertical farming more could result in significant reduction in air pollution and in CO2 emission. Also,

carbon emission can be reduced because vertical farming will go ahead of transportation of crops and will be delivered close to areas where the food will be consumed.

- People Friendly

In traditional farming due to using large and dangerous farming equipment and exposure to poisonous chemicals there are some work accidents which result in deaths of the employees in the farm. Vertical farming prevents these work accidents. The increase in vertical agriculture can reduce the use of water in agriculture and prevent food shortages that may occur in the future. The use of the most sustainable agricultural technology possible needs to increase. For this reason, it is necessary to increase the awareness of vertical agriculture in the world, to produce with vertical agriculture and to produce food as much as their own or their families' consumption. Ways without chemical additives and consuming foods whose genetic codes are not changed will increase body resistance and prevent diseases.

Awareness of vertical farming and production with vertical farming are higher in Northern Europe than in Southern Europe. For this reason, this business plan primarily targets Southern Europe, but also focused on the European market of foods produced by vertical farming and the machine that provides domestic vertical farming production to the European market.

Proposed Business Type and Form

The name of the company is Feed Yourself.

The proposed business type of Feed Yourself is merchandising and manufacturing. The company manufactures vegetables and fruits in Rotterdam-Netherlands after the produced goods are transferred to the distribution center and the cold storage in Spain. Lastly foods will be sold across Europe in supermarkets in the long term but at first they will be sold only in Spain and Netherlands. Moreover, the company also sells merchandises of vertical farming which are suitable for household usage through its website and distribute the products globally with merchandising. No change will be required for the merchandise. The headquarters of the company will be in Barcelona-Spain. The form of the proposed business is limited liability companies (LLCs).

In Spain LLC company names must be different from any other Spanish legal entity name. Minimum number of shareholders is one while forming an LLC however shares can be transferred to other shareholders. The identity of the shareholder, companies' purpose and registered address should have been documented in the registration process. The required minimum share capital is 3.000 Euro and foreigners can own 100% of the shares. Moreover, shareholders' liabilities are limited to the company's capital investment and as a member of European Union (EU), there are special opportunities to engage with other EU members. The Netherlands is also a member of the EU so that will be a benefit for the company. However, Spain does not adopt EU accounting regulations and standards so that traditional Spanish GAAP accounting applies to LLC's. New created companies are taxed at a %15 tax rate for both the first tax period and following tax period.

In order to manufacture vegetables and fruits in Rotterdam – Netherlands, as a foreign company with Dutch branch the company should have a permanent establishment in the Netherlands. To register the company in Dutch Commercial Register, the company address in the Netherlands should be provided to the government. Moreover, a new name for the Dutch business should be created. The form of the proposed business in the Netherlands is limited liability companies. Ultimate beneficial owners (UBOs) needed to be registered with the Netherlands Chamber of Commerce (KVK). The details of the Dutch Tax is provided from KVK. In the Netherlands non-resident companies are responsible for the withholding tax rate of % 15.

The Netherlands and Spain signed a double taxation convention in 1975. The agreement was signed to avoid the double taxation on income or other important revenues. Companies who have functional business in The Netherlands and Spain, fiscal evasion on capital gains and income taxes are prevented with the convention.

Unique Selling Proposition (USP)

“Grow or purchase fruits and vegetables which are almost 30 times more nutritious and grown sustainable for your health and the health of earth.”
Feed Yourself allows people higher their life standards by allowing them to feed themselves with extremely nutritious foods and enabling them to grow their own food at homes.

When other vertical farming companies in the industry are examined, companies either produce with vertical farming technology and offer the products to the market or sell the technology and industrial product that enables this production to be done indoor (households) or outdoor (manufacturers or companies). However, Feed Yourself will make both merchandising and manufacturing to show the beneficial features of vertical farming. Which will be the first vertical agriculture company to do both manufacturing and merchandising under the same brand name. Also, the company distinguishes itself from other companies by aiming to increase this awareness with its marketing activities.

Vision Statement

Changing customary behavior of consumers towards agriculture and to place a vertical agricultural machine in every house, just like a dishwasher, in order to ensure that each household produces its own fruits and vegetables for more sustainable and nutritious production of food.

Mission Statement

At Feed Yourself, we sell fruit and vegetables grown by applying vertical farming technology and sell vertical farming machines which are suitable for domestic growing of greengrocery to reduce resource usage of the world, to make farming sustainable and provide more nutritious and organic fruits and vegetables for the table.

Core Values

A commitment to sustainability and working passionately to change farming in an environmentally friendly way to save the world's resources, taking care and nourishing everyone with high nutrient greengrocery with reliability, compassion, and love.

Uniqueness of the company:

Manufacturing companies offer these products from the organic category while offering them to the market. To illustrate, a lettuce which is grown by vertical farming is in the organic vegetables section or near other vegetables sections of supermarkets. This situation does not explain how these products are produced by consumers and how their nutritional values are placed on the shelves by contributing to the environment. This causes the desire and need for vertical agriculture to go unnoticed. Consumers' understanding and demand for an unconventional farming method will cause the market to grow and investments in vertical farming will increase. Thus, while production decreases with traditional farming, production of vertical farming will increase, and resource usage will decrease with vertical farming and a transition to sustainable agriculture is achieved.

Many vertical farming companies make their investments on R&D and technology. It should not be forgotten that all vertical farming companies operate this business for the purpose of sustainable farming. This purpose is common to all companies. Therefore, the increase of vertical farming companies in the industry is necessary and important for the realization of this common goal. Increasing demand for vertical farming is an opportunity for all companies in the industry. To create this demand, Feed Yourself will invest in marketing and distribution to increase awareness and demand for vertical farming, unlike companies that are already working hard for R&D and technology. With the increasing demand in the market, the required technology can be obtained by licensing or purchasing. However, it has been observed that a company in this market should take action to increase awareness and demand among consumers.

Feed Yourself company distinguishes itself from other companies by aiming to increase this awareness with the stand areas it will buy in supermarkets and the marketing activities it will carry out. It will also be the first vertical agriculture company to do both manufacturing and merchandising under the same brand name.

Apart from profit, the company aims to use the world's resources in a sustainable way and to ensure that people consume fruits and vegetables rich in vitamins and minerals. What makes Feed Yourself unique is that it will make all its operations, organizations, and investments in order to change consumer behavior, increase awareness and demand toward farming.

Motivation And Importance Of The Business And Its Impact On The Context Or Society

The increasing population of the world makes it difficult for resources to be sufficient for everyone. In traditional farming methods, the use of chemicals in soil and water, tampering with the genetic codes of seeds, are the methods that are made to make the food sufficient for the population and to accelerate production and aim at economic interests. However, these methods cause foods to lose their nutritional

value and lead to resource pollution. Continuing these methods in order to protect economic interests is a controversial issue within the scope of the concept of ethics.

Although these methods endanger human health and the ecosystem in traditional farming methods, traditional agriculture continues. There is a vicious circle here. The population continues to increase, in order to feed this population, low nutritional value and chemical agricultural products continue to be produced, the body resistance of people decreases due to the consumption of food without nutrients, and the decreased body resistance causes diseases, food is produced again with traditional farming methods with polluted resources. This whole process continues to use both resources and pollute the ecosystem and decreases body resistance of individuals.

The most innocent method within the framework of the ethical concept, which is made to increase production, is drip irrigation. However, apart from rainwater, clean water used in agriculture constitutes 70% of the world's water consumption. In addition, the land cannot grow food non-stop. For this reason, traditional agriculture is stopped at regular intervals and the land is laid fallow. Many trees that provide the world's oxygen are cut down and empty lands are created in order to be able to farm. During harvest times, many fruits and vegetables are thrown away due to unconscious collection. Some of the collected fruits and vegetables deteriorate or rot while being transported from farms to cities and living areas.

In addition, differences in climate, humidity, and soil fertility of countries, as well as surface volumes of countries, create inequality of opportunity between countries. For example, it is very difficult to grow oranges in the northern European climate. Northern European countries need to import from other countries for vitamin C intake.

Considering all the above-mentioned factors, it is seen that traditional agriculture uses the world's own resources, and the effort to provide food for the world population causes a lot of damage to the world ecosystem. Therefore, an alternative farming method should be adopted. Vertical farming technology makes it possible to harvest organic and nutritious crops faster, using fewer resources. In addition, it adopts the understanding of ongoing production since there is no fallow period. The nutrients are more nutritious, and their tissues and shapes do not deteriorate because there is no contact with the soil.

“The number and size of vertical farms in Europe is at present still rather small, but in recent years they have experienced rapid expansion.” (Butturini M. 2020) Awareness of vertical agriculture needs to be increased for sustainable resource use and consumption of foods with high nutritional value. In addition, with the increase in awareness, easily accessible opportunities should be offered to consumers.

Feed Yourself company not only sells vertically grown fruits and vegetables to consumers in the supermarkets they go to in their daily lives, but also enables consumers to produce their own food with vertical farming at home. Apart from profit, the company has the aim of raising awareness of the society about vertical agriculture and its benefits. In the long term, it is aimed to reduce water consumption in Europe, to bring foods with high nutritional value to the consumer and to minimize environmental pollution by doing mostly vertical agriculture and most importantly they aim to put a vertical farming machine in each of households.

2. Market Research and Analysis

Macro-environmental analysis (PESTLE)

Feed Yourself company will be established in Spain and a vertical farming warehouse will be established in the Netherlands as electricity prices are lower than other European Union countries and it is a port city for sea shipping. Both the sales of the machine and the sales of the fruits and vegetables produced will be realized in these two countries in the first year. In the second and fifth years, the company's goal will be to expand to European Union countries. PESTEL Analysis will be done for these two countries. Spain and Holland PESTEL analysis aims to examine some of the political, economic, social, technological, legal and environmental conditions and their impact on our business today and in the future. As a result of the analysis, it is aimed to understand why these countries were chosen.

PESTEL Analysis of Spain

Political Factors

The official name of the country is Kingdom of Spain. The form of government is monarchy based on parliamentary democracy. The head of state is King Felipe VI. The legislature consists of a bicameral national assembly, the House of Representatives, and the Senate. The executive is carried out by the prime minister and the council of ministers. The Assembly consists of 350 deputies and 264 senators. An election is held every 4 years.

Spain is divided into cities, provinces, and autonomous regions. Administratively, there are 17 autonomous regions. Each autonomous region applies its own laws. The state maintains the laws of the autonomous regions as part of its own legal regulation. From 1982 until the beginning of 1990, the Spanish Socialist Workers Party remained in power and became a member of the European Union in this process. Also Spain is a part of several institutions such as the United Nations (UN), World Trade Organization (WTO), the Organization for Economic Co-operation and Development (OECD), the Eurozone, the Council of Europe (CoE) and the North Atlantic Treaty Organization (NATO). There is political instability in the country. Catalonia (one of the autonomous groups) wanted to declare its independence. In addition, there is a socialist and nationalist distinction in the country.

Economic Factors

The currency of Spain is the euro. Spain's economy is the thirteenth largest in the world and the fifth largest in the European Union in terms of Gross Domestic Product. In Spain, 76.3% of the employment sectors are services, 13.72% industry, 5.73% construction and 4.24% agriculture.

Spain has a modern service-based economy. After the Second World War, the importance of the agricultural sector decreased and the importance of the services sector increased. The agricultural sector accounts for only 2.5% of GDP. Retailing, tourism, banking and telecommunications sectors are among the most important elements of economic activity. In 2018, the country's economy grew by 2.5%.

According to the Economist Intelligence Unit (EIU), 2019 data, the inflation rate is 0.8%. Agricultural sector is lower than in many European countries. The low productivity Among the reasons for this are the drought and irregular rainfall experienced in recent years, as well as low soil quality and inefficient use of land in

most of the country. Spain has become one of the important countries to which foreign capital is directed.

Thanks to its large domestic market, export opportunity and growth potential, many foreign investors prefer Spain for investment. When foreign investments in Spain are examined, it is seen that foreign investments have increased in the last 25 years. It appears to have played a major role in the modernization of the Spanish economy.

Spain's major export partners are France, Germany, Italy, Portugal, United Kingdom, USA and major import partners are Germany, France, China, Italy, Netherlands, United Kingdom.

The prominent sectors in the investments made in Spain are; trade (18.2%), real estate (17.5%), financial services (14.8%), production (11.6%), construction (7.9%), electricity, gas and air conditioning (5.7%), information and communication technologies (4.6%). Due to its backwardness in agriculture, no one invested in agriculture.

Many free zones operate in Spain, both on the mainland and on the islands. The largest free zones are in Barcelona, Cadiz, the Canary Islands and Vigo. Spanish customs legislation allows companies to have their own free trade areas. Customs duties are only applicable if goods produced or brought into the region are imported into Spain for consumption purposes. Spain's corporate tax rate is 25%. The income tax rate is 47%. Sales tax is 21%.

Social Factors

In Spain, according to the National Statistics Office (INE) 2020 data, the population is 47,450,795. The foreign population in the country is 4.4 million. In 2019 the unemployment rate is 14.2%, the second highest in the European Union. Spanish is spoken by 82% of Spain and Catalan is 10% spoken. Its capital city, Madrid is the most populated city. The population is increasing at a rate of 0.096% per year. It can be observed that the population is aging. Also the birth rate is decreasing. 49% of the population is male and 51% is female. The life expectancy across the country is 79.92 years. Cows live an average of 76.6 years and women 84.4 years. %80.9 Spain's population lives in urban areas and the rest lives in rural areas. The number of university students in Spain is constantly increasing. The majority of Spain is Catholic. There are regional cultural differences in the country. There is a big gap between the rich and the poor, and the minimum wage is low. In Spanish business culture, hierarchy and positions are of great importance. Majority cannot speak English. Spanish people prefer formal and serious behavior in business life. Moreover, work conditions are strict due to competition. Spanish people are social and value relationships.

Technological Factors

Spain is one of the first countries in European Union that issued all national identity cards in electronic format. Moreover, the country spends 19.2 billion dollars on Research and Development on international security, renewable energies, ports and railways, civil engineering, road traffic control and mobile communication. In January 2021 there were 42.54 million internet users in Spain. There are 37.4 million

social media users, which is equivalent to %80 of the total population. Since 2020 social media usage has increased %28.

Environmental Factors

Spain has the most diverse natural and wildlife areas in Europe. Climate and physical beauty contribute to a dynamic tourism sector, especially on the Mediterranean coast and on the islands. However, the overdevelopment of the Mediterranean coast brings with it the debate that it harms natural resources. About 10% of the country's land is fertile, 45% medium productivity, 35% low productivity and unproductive, 10% rocky. Soil erosion has become one of the most important environmental problems of the country, with the effect of intensive agricultural techniques used in the Mediterranean coasts, where precipitation is low and irregular. 30% of the country's land is covered with arable land, 8% is permanently cultivated area, 13% is meadow and pasture, and 33% is covered with forests.

Although Spain does not have significant oil and gas resources, it is the richest country in Western Europe in terms of mineral natural resources. Efforts are being made to ensure more efficient use of energy. The number of parks where energy production is made by utilizing the wind has increased rapidly in recent years, and the country has taken the second place after Germany among Europe's leading energy producers in this respect. In the world ranking, it is in fifth place after India, with China in first place. Spain is one of the leading countries in the world in the field of renewable energy. By 2050, it is aimed to switch the entire electricity system to renewable sources. Spain's renewable energy generation capacity is a strong mix. Of the country's renewable energy capacity, 22% is wind energy, 18% hydroelectric, 3% solar PV, 2% solar thermal and 2% others.

Natural resources belong to the state within the framework of the “Regalia Principle” regulation. Productivity in the agricultural sector is at lower levels compared to many European countries. Among the reasons for the low productivity are the drought and irregular rainfall experienced in recent years, as well as the low quality of the soil and the inefficient use of lands in most of the country. The number of agricultural enterprises in Spain is around 1.3 million.

The main environmental issues are pollution of the Mediterranean Sea from the offshore production of oil and gas, water quality and quantity nationwide, air pollution, deforestation, and desertification.

Approximately one third of the country's land is covered with forests, and in recent years, farmers have been encouraged to shift their agricultural lands to commercial forest products, especially thanks to EU-supported afforestation efforts. Within the framework of the National Forest Plan, it is planned to increase the number of trees per capita from 125 to 250 in the next 30 years. It is thought that afforestation works carried out as a precaution against desertification and erosion, on the one hand, and on the other hand, will provide a new income source for the farmers by balancing the agricultural production surplus.

Legal Factors

The legal system is the same with other EU countries. Spain has heavy laws on data protection and copyright. During the Catalanian political conflict, Spain's legal system lost reputation. Employees are working maximum 9 hours a day and working week hours are 40.

The rules regarding the standard and certification of food products in Spain are in full compliance with EU directives. In this sense, it is possible for a food product that is released for free circulation in any EU country to be imported into Spain and sold in the domestic market without being subjected to any other tests. Quality and labeling of fresh fruit and vegetable products placed on the market throughout the EU. The relevant marketing standards have been determined by the decree issued within the framework of the EU Common Agricultural Policy. Products that do not meet the standards stipulated by this law cannot be put on the market and are removed from the market.

PESTEL Analysis of Netherlands

Political Factors

The Dutch government is a constitutional monarchy based on parliament. The head of state is King Willem-Alexander. The governors appointed by the king and the ministers of the regions where the governors are appointed together take place in the Dutch Council of Ministers. The state legislature consists of the King, the Parliament and the Council of Ministers. It consists of a 75-member Senate, elected for a four-year term by the members of the Parliamentary Council, and a 150-member House of Representatives elected by the public for a four-year term by secret ballot and proportional representation.

Administratively, the Netherlands consists of 12 Provinces these are Drenthe, Flevoland, Friesland, Gelderland, Groningen, Limburg, Overijssel, Utrecht, Zeeland, Noord Brabant, Zuid Holland, Noord Holland. International Organizations of which the Netherlands is a Member are

- UN (United Nations),
- European Union (European Union - EU),
- Benelux (Belgium Netherlands Luxembourg Economic Union),
- CE (Council of Europe),
- EAPC (Europe - Atlantic Partnership Council),
- EBRD (European Investment and Development Bank)),
- EIB (European Investment Bank),
- IADB (America Region Development Bank),
- IAEA (International Atomic Energy Agency),
- IBRD (International Bank for Reconstruction and Development),
- IFC (International Finance Corporation),
- IMF (International Monetary Fund),
- OECD (Economic Cooperation and Development Organization),
- NATO (North Atlantic Treaty Organization)
- OSCE (Organization for Security and Cooperation in Europe) and
- WTO (World Trade Organization).

Economic Factors

The Dutch economy is a mixed market economy in which both the private and public sectors play important roles. The economy has a strong international orientation. The Netherlands stands out as one of the richest and most prosperous countries in the world, renowned for its trade and high level of financial and

professional services. The currency of the Netherlands is the euro. Economic activities are concentrated in the area known as Randstad, which consists of the four largest cities, Amsterdam, Rotterdam, The Hague and Utrecht. Many activities related to distribution and storage are concentrated near major waterways and sea-river junctions, such as the Rijnmond district of Rotterdam, Zeeland, or the North Sea canal near Amsterdam.

The Netherlands' GDP was 909.5 billion dollars in 2020. According to the IMF report, GDP growth was 1.7% in 2019. In 2020, it was -3.8% due to the pandemic. While the average price inflation was 2.7% in 2019, it decreased to 1.1% in 2020.

The main sectors of the economy are transport/logistics, chemical industry, trade and services. The manufacturing industry is less dominant in the Netherlands than in other European countries such as Germany, France and Italy. Industrial activities are mainly concentrated on food processing, chemicals, oil processing and electrical machinery.

The information and communication technologies sector still contributes around 20% to the GNP increase. Biotechnology plays an increasingly important role in more traditional sectors such as agriculture and food and chemicals. The economy, which is quite open, is dependent on foreign trade and financial services.

The Netherlands plays the role of Europe's most important transportation hub with its foreign trade surplus, stable industrial relations and low unemployment rate. The highly mechanized agricultural sector, which employs only a small portion of the workforce, has made the country the second largest exporter of agricultural products in the world.

EU countries are leading in the export and import of the Netherlands. EU member countries are among the markets to which the Netherlands exports the most. However, Dutch exporters have recently shifted their activities to more distant markets and there have been significant increases in sales to countries outside the EU. However, especially China and oil and gas exporting countries such as Russia and Saudi Arabia are increasing their share in imports.

According to the UNCTAD 2020 Investment Report, the Netherlands ranks 4th among the countries attracting foreign direct investment with \$84 billion in 2019. With a total foreign direct investment of 198 billion dollars in 2018-2019, the Netherlands ranks 4th in the world with a total foreign capital stock of 1.8 trillion dollars in 2019 (UNCTAD). The ratio of total investments to GDP in the country was 21% in 2019 (IMF). More than 60% of the foreign direct investment stocks directed to the Netherlands originate from the EU.

Social Factors

The official name of the Netherlands is the Kingdom of the Netherlands. According to the IMF 2021 report, its population is 17,281,000. 80% of the population is Dutch and 20% is made up of minorities. Dutch, Frisian and English are spoken in the Netherlands. Of the 8 million workforces in the country, 1.2% work in agriculture, 17.2% in industry and 81.6% in services. Population growth is declining in the Netherlands, according to the CIA World Factbook population growth rate was 0.38% in 2018. Urban population was 91.9% of total population in 2019. The Netherlands is one of the countries with highest incomes in the world because of the high minimum wage cutoffs. More than 10% of the country's population is an

immigrant. Dutch society is a liberal society so that immigration does not create a social conflict or problem.

Environmental Factors

The Kingdom of the Netherlands consists of six islands (Aruba and the Netherlands Antilles) in the Dutch and Caribbean Sea. The Netherlands, one of the smallest countries in the European Union, is located in Western Europe on the North Sea coast, between Germany and Belgium. 38% of the Dutch mainland is below sea level. The highest point of the country is 321 meters and the lowest point is -6.7 meters (below sea level). It is one of the most densely populated countries in the world with a population of over 17 million and 491 persons per km². The Netherlands has a humid and rainy climate, with precipitation occurring all year round. In the country, which has a flat land structure, the wind blowing from the North Sea can be felt with all its effect, especially on the seaside. The Netherlands is one of the largest natural gas producers and exporters in the world. It meets about half of its energy needs with its own natural gas resources. The Netherlands is an important agricultural country, and 32% of the land is used for agriculture, while 3 major rivers passing through the mainland play an important role in the agricultural life of the country. The major problem in the Netherlands environmentally is water and air pollution. The reason for the pollution is the industrial and agricultural chemicals.

Legal Factors

The legal system is a civil law system which is based on the French system. However, despite other European countries, many things are legal in the Netherlands. Due to the fact that the country has a highly liberal judiciary independent of political interference or being a citizen or not.

3. Business Proposal

Industry and Market Analysis

Vertical farming is the intensive plan production system, which manufactures vertically inclined shelves. (Besten D. 2019). Unlike traditional agriculture, vertical agriculture produces without using soil and is a method in which technology and observation and controlled production are used. Vertical farming requires less land, improves efficiency, resistance to weather, and uses less water. Economic League Organization (2018) states that %80 of total arable land is being used and by 2050 109 million arable hectares will be needed to fulfill the need for food.

According to Fortune Business Insights report on vertical farming, in 2020 the global vertical farming market size will be 3.04 billion dollars. The global Covid-19 pandemic had a positive impact on all regions. The report outlined that there had been %19.1 growth in the market. It's been forecasted that the market will witness 25.2% CAGR growth till 2028 and will have a market value of 17.59 billion dollar. (Fortune Business Insights, 2021).

According to Butturini and Marcellis the number and size of vertical farms in Europe is small but the industry has gone through a rapid expansion. Market Data Forecast (2020) outlined that Europe vertical farming market is 0.85 billion dollars in 2021 and forecast that till 2026 the market will grow at a CAGR of %22 and will reach to 2.31 billion dollars. In 2020 Europe had the second highest share of the global vertical farming market. In Europe the highest market share is the United Kingdom and list go on as Germany, France, Netherlands, Italy and Spain.

Investment toward vertical farming in Europe increases. Also Butturini and Marcellis states that the European vertical farming industry is a market full of potential. Vertical farming requires LED lightning technologies. A few of the reasons for these expansions in the industry are the price drop in LED lighting technologies and consumers' demands for fresh, healthy food, foods free from pesticides and genetically modified organisms (GMOs). In addition, as Thomas Maltus mentioned, the rapid increase in population and the risk that the food produced will not be enough for the population increases the possibility of famine. For this reason, the agricultural industry needed a new, innovative, and sustainable method.

Vertical farming industry needs capital. Unlike other industries, the companies in the vertical farming industry are much more likely to work on the technology, research and development and innovation regarding the production and cultivation. Despite start-ups, supermarket chain, office furniture companies also entered the industry. There had been companies who had faced financial problems and bankrupted.

According to Benis and Ferrao (2018) some factors of intensive vertical farming such as cost-effectiveness, scalability and environmental sustainability are still uncertain. Also, Rabobank (2018) states that the investment required for vertical farming is 10 times higher than high-tech greenhouses. Also, the cost per unit is almost twice as much as greenhouses. Vertical farming requires high amounts of energy usage of LED's, but the companies are installing solar panels to reduce the

energy usage. However, Rabobank also underlined the fact that added value should be added to the vertical farming products due to make the business cost effective. Added values can be accomplished by producing better quality products (fresh, no soil residue, shapely) and with marketing efforts. The prices of vertical farming products are either premium or the same as the organic products prices (Benis and Ferrao, 2018). According to European Community, vertical farming products cannot be certified as organic because whether the product is organic or not is determined by the organic nature of the soil. Some of the scholars and agricultural engineers strongly disagree with the statement and are offering European Community to reevaluate.

Association for Vertical Farming (AVF) and the Farm Tech Society (FTS) are the two international nonprofit industry associations of vertical farming which are in Europe. These two associations support the vertical farming industry and consist of international professionals who establish standards and advocate for policies. AVF works only on vertical farming and FTS works on controlled environment agriculture and vertical farming is a subgroup of it.

Types of Vertical Farms

There are three types of vertical farms according to growing systems. Hydroponics grows plants in nutrient solutions and just like all of the vertical farm types it is free of soil. Aeroponics which is developed by The National Aeronautical and Space Administration (NASA) grows plants in an air/mist environment with no soil and very little water. It is the most efficient type because it uses %90 less water than hydroponic systems. (Birkbly, 2016). Lastly aquaponics uses both fish and plants. Fish produces nutrient rich waste and it's been used to feed the plants in vertical farms. In order to maximize efficiency most of the vertical farms do not use aquaponics because it grows the plants relatively slower than other types.

Despite growing systems, vertical farms are also classified according to the type of structure that houses the system. Building based vertical farms are being built in abandoned buildings. Also, mostly in China new building constructions are also used for vertical farms. The second type is shipping container vertical farms. With the help of computer-controlled growth management systems the farm is built inside of a container and can monitor all systems remotely from a computer or smartphone. Lastly there are machinery types for households which are similar to containers and the system is being sold for household or office usage.

Summary and Key Takeaways for the Business Plan

Information that will benefit the business plan from this section can be listed as follows.

- In 2020 the global vertical farming market size will be 3.04 billion dollars. The global Covid-19 pandemic had a positive impact on all regions. The report outlined that there had been %19.1 growth in the market. It's been forecasted that the market will witness 25.2% CAGR growth till 2028 and will have a market value of 17.59 billion dollar. (Fortune Business Insights, 2021).
- In 2020 Europe had the second highest share of the global vertical farming market and investment toward vertical farming in Europe increased.

- Added value should be added to the vertical farming products due to make the business cost effective. Added values can be accomplished by producing better quality products (fresh, no soil residue, shapely) and with marketing efforts.
- The prices of vertical farming products are either premium or the same as the organic products prices (Benis and Ferrao, 2018).
- According to European Community vertical farming products cannot be certified as organic

Consumer Analysis

The long-term goal of Feed Yourself company is to expand to all of Europe and then to the Middle East. But in the first place, the first target countries for both business models will be Spain and the Netherlands. Consumer analysis was made for Europe, Spain and the Netherlands.

European Union

Macro Analysis:

The European Union consists of 27 countries. The estimated population by July 2021 is 450 million people. The average age is 44 years and the average age for women is 45.5, while for men it is 42.6. The population growth rate is -0.69%. Life expectancy for women is 82.5 and for men it is 73. According to 2021 estimates, each woman gives birth to an average of 1.62 children. The countries with the highest population are Germany, France, Italy, Spain and Poland, respectively. 15% of the population is 0-14 years old, 10% is 15-24, 40% is 25-54, 13.5% is 55-64 and 20.5% is 65 years old. (The World Factbook, 2021).

Purchasing Power:

Annual income among member states differs from 28.000 dollars to 109.000 dollars. Inflation rate was estimated to be 1.1% in 2019. Real GDP was approximately 20 trillion dollars and real GDP per capita was 44.439 dollars. The average per person spending and saving in 2020 were 13.894 euros. Compared with other unions, purchasing power is high in European Union countries. The gap between rich and poor is high. According to The World Fact Book in 2016 (latest data) household consumption was %54.5, government consumption was %20.4, investment in fixed capital was %19.8, export of goods and services were %43.9 and imports of goods and services were -40.5%. (The World Factbook, 2021).

In 2019 the approximate average basket price for groceries is 67.8 euros in EU countries. The spending on food had increased by 2% from 2018 June to 2019 June. In the EU total spending on food was 1.123 billion euros in 2016. It's been calculated that food and drink spending are 13.5% of household budgets. (Askew, 2019).

Spain

Macro Analysis:

Spain is the 30th country with the highest population rate. According to the World Factbook its population is estimated to be 47 million people in July 2021. 86.4% of the population is Spanish, 1.8% is Moroccan, 1.3% is Romanian and the rest have different ethnicities. Nationwide the language is Castilian Spanish with %74 and Valencian with %17. 15 % of the population is between 1-14 years, 9.9% of the population is 15-24 years, 43.61% is 25-54, % 12.99 is 55-64 and 18.49% is 65 years and over. Elderly dependency ratio is 30.4 and it can be said that the population is elder. Median age is 42.7 for male and 45.1 for females. Its estimated population growth rate in 2021 will be – 0.03%. The capital Madrid with 6.69 million people and the port city Barcelona with 5.6 million people, has the highest population. 81.1% live in urban areas and urbanization rate is 0.24%. Average age of mothers having their first birth is 30.9 years. Life expectancy for male is 79 and for females is 85 which is higher than Europe Union countries average. Fertility rate is 1.51 children and lower than the average in Europe. (The World Factbook, 2021).

Purchasing Power:

Real GDP per capita of Spain is 40.903 dollars which is above average of EU countries. Inflation rate according to consumer prices was 0.7% in 2019. According to World Factbook household consumption during 2017 was 57.7%, government consumption was 18.5%, investment in fixed capital was 20.6% and investment in inventories were 0.6%. Exports of goods and services were 34.1% and imports of goods and services were – 31.4%. 19.057 million were employed. Agriculture employees were 4.2%, industry employees were %24 and services were 71.7%. It's been estimated that in 2019 the unemployment rate will be 14.13%. (The World Factbook, 2021).

In 2019 the approximate average basket price for grocery was 52.4 euros in Spain (Askew, 2019). Eurostat price level indices (PLIs) makes a comparison of countries' price levels of European Union countries. European Union average price index is taken as 100. Spain's PLI is 95 for fruits and vegetables. Fruits and vegetables prices in Spain are 5% lower than EU average. (Eurostat, 2015).

Consumer Behavior of EU, Spain, and Netherlands

According to the Eurostat 2018 Fruit and Vegetable Consumption Report, two thirds of Europe consume at least one portion of fruit and vegetable on a daily basis. The report shows that people with tertiary education in the EU are more likely to eat at least portions of fruit and vegetables daily. 51.4% of the population consumes 1 to 4 portions and 14.1% of the population consumes 5 portions or more. Women are eating more fruit compared to men on a daily basis. Women who consumed at least one daily fruit rate is 61.5% and men's rate is less than 50%. Just like fruit consumption, women also eat more vegetables on a daily basis. (Eurostat, 2018). According to Our World in Data 2017 statistics, Spain consumes 146.54 kg of vegetables and 90.64 kg of fruits on average per year. The country is one of the most vegetable and fruit consumed countries in European Union. (Our World in Data, 2017).

Target Audience – Market Research on General Sentiments Towards Vertical

Farming

Marketing research was conducted to measure the consumer's knowledge and approach to vertical agriculture. In this research, consumer behaviors, consumer's perception, consumer's price expectation, wishes and demands, consumption habits, demands for the products that the company will offer were investigated. In order to be a market-oriented company, the marketing mix is intended to be created according to the results of the research. The results were evaluated in order to understand the wants, demand and needs of the consumer and to create value to satisfy these needs. In line with consumer segmentation and these segmentation differences, it was measured which segment had more demand for the products offered by the company to determine target market.

Research Design and Methodology

The research was conducted from the start of May 2021 and lasted until the end of May 2021 among members of different age, gender, education, income level, life style, occupation, ethnicity, social class and countries.

Primary data was collected by using quantitative research, online survey methods.

The survey had two parts. The first part was aiming to examine the classification variables and their customer behavior. The second part was focusing on their attitudes, interests, and opinions about vertical farming. The survey had 24 questions at total.

Sampling and The Administration of the Questionnaire

Sample size was 82 both gender participants participated in the survey. All of the participants were aged more than 18 years old. Snowball sampling method was used. Most of the participants were international and living in Europe. Participants received a consent letter before starting to survey. The ones that did not approve the consent had been left out from the research.

Demographics and Information of Respondents

Demographics of the respondents were asked by eight questions which included, age, gender, education level, employment status, marital status, income, place and family size.

Gender

Gender?
82 yantit

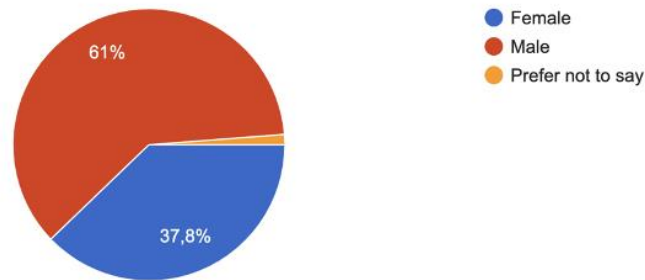


Figure 1.1

Figure 1.1 displays the gender distribution of participants. Most of the participants were male with 61% and 37.8% of the participants were female. 1.2 % of the participants did not decelerate their gender.

Age

Age?
82 yantit

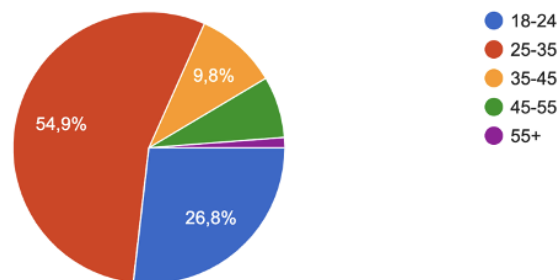


Figure 1.2

Figure 1.2 displays the age distribution of the 82 participants.. Majority of the participants were between 25-35 years old and 18-24 years old with respectively 54.9 % and 26.8 %.

9.8 % were between 35-45 years, 7.3 % of the participants were 45-55 and 1.2 % were more than 55 years old.

Education Level

Your education level ?(please state the last one you have graduated)

82 yant

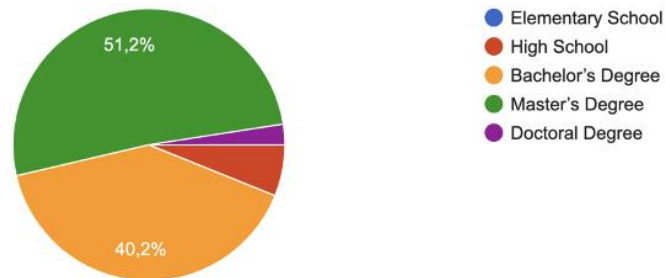


Figure 1.3

Figure 1.3 displays that 51.2 % of the participants graduated with a master's degree and 40.2% of the participants graduated with bachelor's degree. 6.1% graduated from high school and only 2.4% had doctoral degrees.

Employment Status

What is your employment status?

82 yant

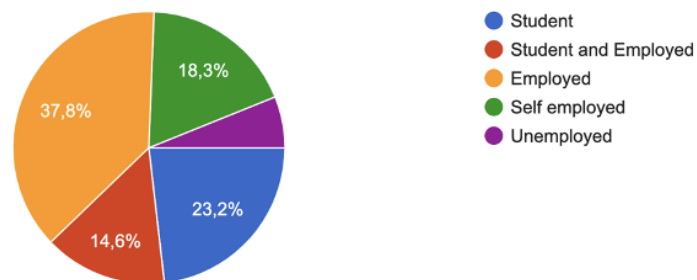


Figure 1.4

As seen in Figure 1.4 37.8% of the participants were employed and 23.2% of the participants were students. However, 14.6 % of the participants were both students and employed and 18.3 % of the participants were self-employed. Only 6.1% of the participants were unemployed.

Marital Status

What is your marital status?

82 yantit

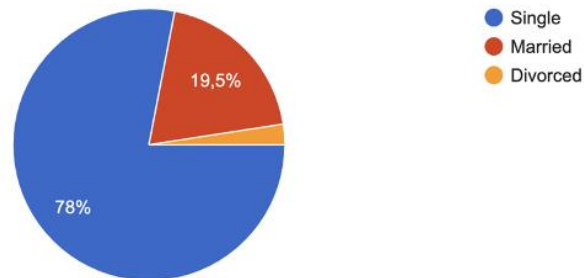


Figure 1.5

Figure 1.5 displays that most of the participants were single with 78 %. Rest of the participants 19.5% were married and 2.4 % were divorced.

Family Size

How many children do you have?

82 yantit

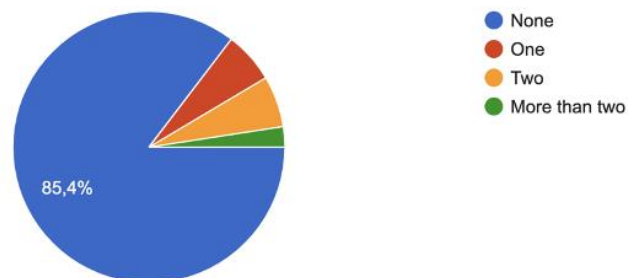


Figure 1.6

As seen in Figure 1.6, %85.4 of the participants do not have any child. This is more than the rate of marriage so that there are participants who are married but do not have children. The rate among having one and two children were the same. %6.1 of the participants had 1 child and again %6.1 of the participants had 2 children. %2.4 of the participants had more than 2 children.

Income

Please indicate your monthly income
82 yanit

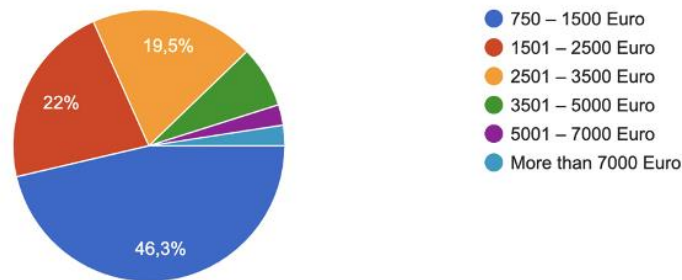


Figure 1.7

Figure 1.7 displays that, % 46.3 of the participants have monthly income of 750 – 1500 euros. % 22 of the participants have 1501 – 2500 Euros. % 19.5 of the participants have 2501 – 3500 Euros. % 7.3 of the participants have monthly income of 2501 – 5000 Euros. Having monthly income of 5001 – 7000 Euros and more than 7000 Euros are the same with the rate of 2.4 %.

Place

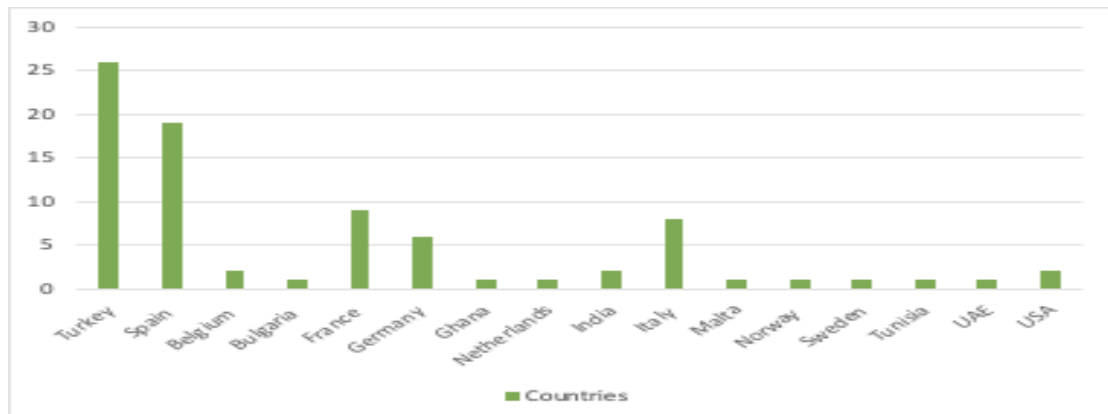


Figure 1.8

As seen in Figure 1.8 majority of the participants (26) are from Turkey. However, all of the participants who were a part of the research lives in Spain. 19 of the participants were from Spain, 9 of the participants were from France, 8 of the participants were from Italy and 6 of the participants were from Germany. 2 of the participants for each were from Belgium and USA and the rest were from Bulgaria,

Ghana, Netherlands, Malta, Norway, Sweden, Tunisia, and UAE. Majority of the participants in total were from Europe.

Behavior and Psychographics of Respondents

Do you cook for yourself?
82 yant

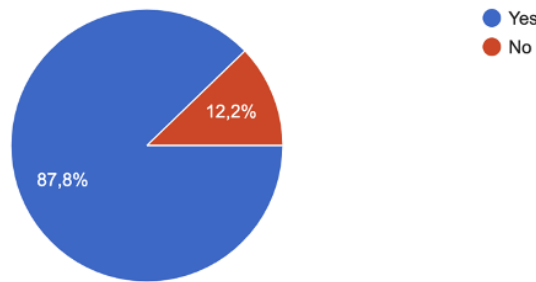


Figure 1.9

Figure 1.9 displays that 87.8 % of the participants cook for themselves and 12.2 % of the participants do not cook for themselves.

Frequency of Cooking At Home

How often do you cook at home?
82 yant

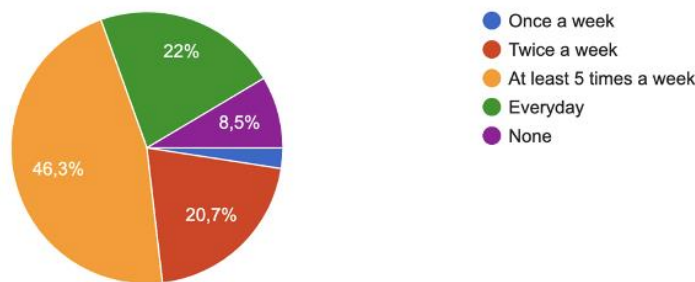


Figure 1.10

According to figure 1.10, 46.3 % of the participants cook at home at least 5 times a week. 22 % of the participants cook every day at home and 20.7 of the participants cook twice a week at home. The majority of the participants cook at home. 8.5 % of the participants never cook at home and 2.4 % of the participants cook once a week.

Grocery Shopping

Do you do your grocery shopping?
82 yanıt

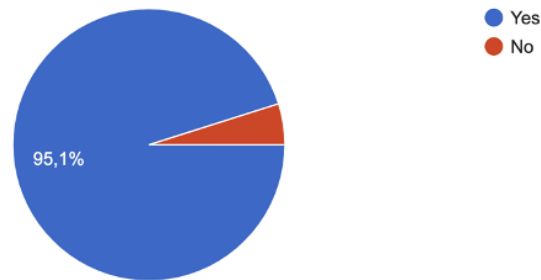


Figure 1.11

95.1 % of the participants do their grocery shopping. Just 4.9 % of minorities do not do their grocery shopping.

Frequency of Grocery Shopping

How often do you shop for grocery?
82 yanıt

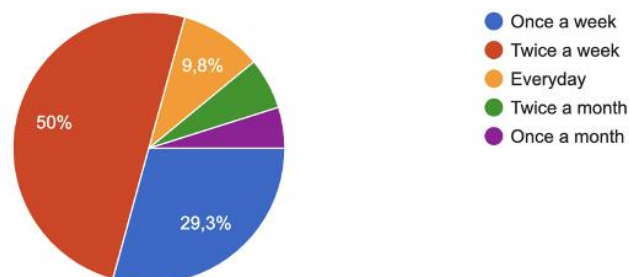


Figure 1.12

Figure 1.12 displays that, 50% of the participants shop for groceries twice a week, 29.3% once a week, 9.8% of the participants everyday, 6.1 % twice a month and 4.9% of the participants shop for groceries once a month.

Place of Purchase

Where do you buy fruits and vegetables the most?

82 yanıt

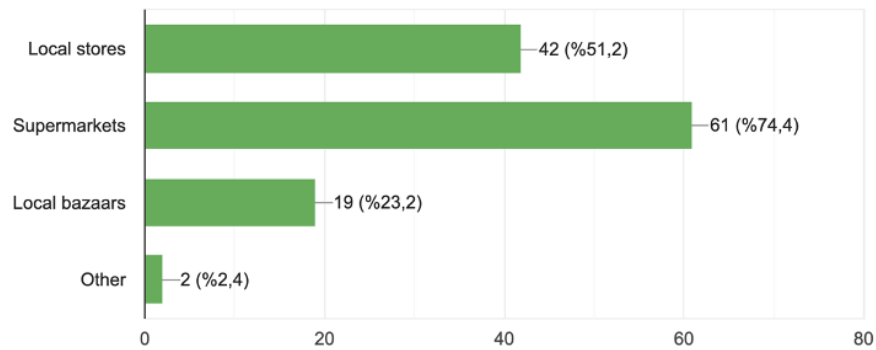


Figure 1.13

As seen in Figure 1.13, 74.4 %, 61 out of 82 participants buy their fruits and vegetables from supermarkets. 51.2%, 42 out of 82 participants buy their fruits and vegetables from local stores. 23.2 %, 19 out of 82 participants buy their fruits and vegetables from local bazaars and 2.4%, 2 out of 82 participants prefer elsewhere.

Spending on Fruits and Vegetables

How much do you think you spend on fruit and vegetables per month?

82 yanıt

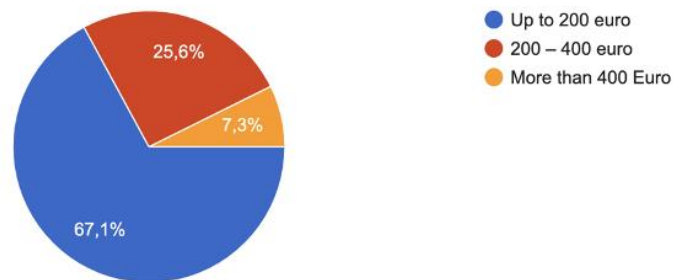


Figure 1.14

Figure 1.14 displays that 67.1% of the participants spend up to 200 euros per month on fruit and vegetables. 25.6 % of the participants spend 200 – 400 euros per month and 7.3% of the participants spend more than 400 Euros.

Most Purchased Fruits and Vegetables

Please select the fruits and vegetables that you purchase the most

82 yant

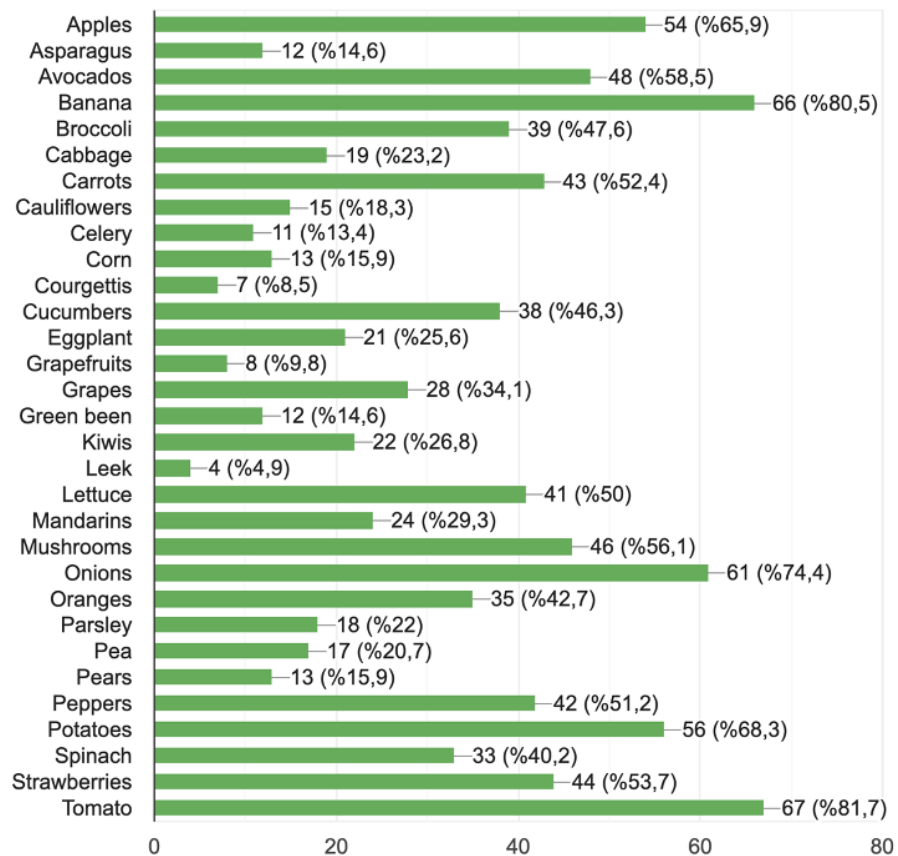


Figure 1.15

Figure 1.15 displays the most purchased fruits and vegetables. Assuming demand for fruits and vegetables are remaining above thirty percent, most purchased fruits and vegetables with the rate of 50 – 70 percent are, respectively, tomato, banana, onions, potatoes, apples, avocados, mushrooms, strawberries, carrots, peppers and lettuce. Fruits and vegetables, which are between 30 and 40 percent, respectively, broccoli, cucumbers, oranges, spinach and grapes.

Organic Preference

While you are making grocery shopping do you prefer organic fruit and vegetables?

82 yantit

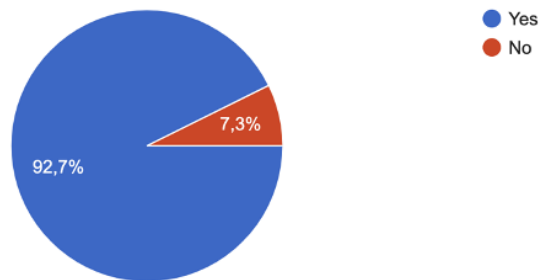


Figure 1.16

As seen in Figure 1.16, 92.7 % participants prefer organic fruit and vegetables and 7.3% of the participants do not prefer organic fruit and vegetables.

Awareness Toward Vertical Farming

Have you ever heard of vertical farming?

82 yantit

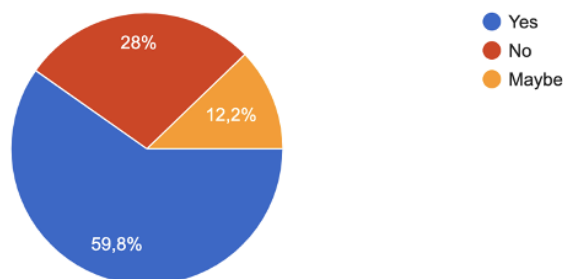


Figure 1.17

Figure 1.17 displays that 59.8% of the participants heard of vertical farming, 28% of the participants did not hear of vertical farming and 12.2% of the participants are not sure. Almost %40 of the sample do not know vertical farming.

Demand for Fruits and Vegetables Grown With Vertical Farming

According to the definition and statement above would you consider buying fruits and vegetables which has been grown with vertical farming?

82 yanıt

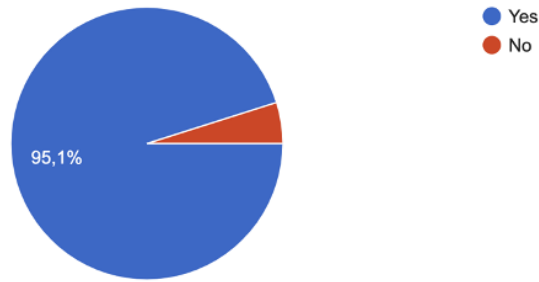


Figure 1.18

Figure 1.18 shows that after the definition and benefits provided to the sample group %95.1 of the participants stated that they would consider buying fruits and vegetables which have been grown with vertical farming. Only a minority of %4.9 states that they would not consider buying.

The Percentage that is Willing to Be Paid by Value and Benefit

For vegetables and fruits produced in a more nutritious, sustainable and environmentally friendly way, how much percent more than normal prices would you be willing to buy?

82 yanıt

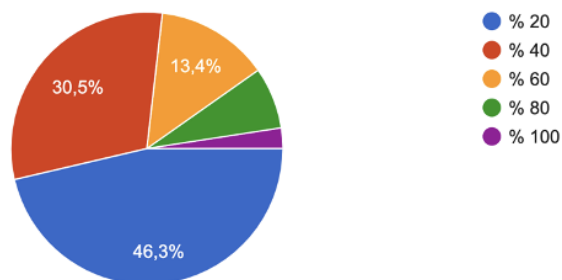


Figure 1.19

Figure 1.19 displays that 46.3 % of the participants are willing to pay %20 more when benefits and value provided to them are declared. 30.5 % of the participants are willing to pay % 40 more and 13.4 % of the participants are willing to pay % 60 more. 7.3 % of the participants willing to pay % 80 more and 2.4 % of the participants are willing to pay 100 % more when benefits and value provided to them are declared.

Growing Fruits and Vegetables at Home

Have you ever grown vegetable and fruit at home?

82 yanıt

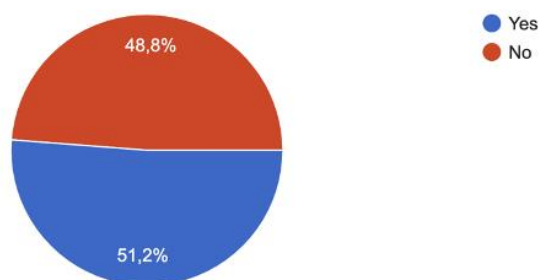


Figure 1.20

As seen in Figure 1.20, 51.2 % of the participants had grown vegetables and fruits at home and 48.8 % of the participants had never grown vegetables and fruits at home.

Demand for The In-House Machine For Growing Fruits And Vegetables At Home With Vertical Farming

Scaling from 1 to 5 would you like to grow vegetables and fruits at home with vertical farming which will provide harvesting fresh all year round, w...mewhat like 4: I would like 5: I would strongly like)
82 yanit

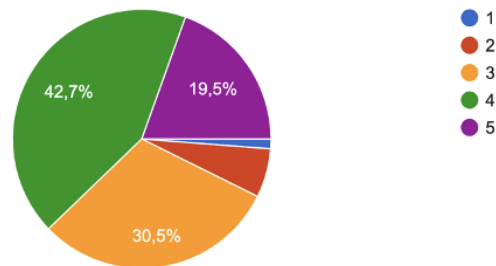


Figure 1.21

Figure 1.21 displays that 19.5 % of the participants are strongly likely to produce with vertical farming at home. 42.7 % like to produce with vertical farming at home, %42.7 somewhat like to produce and 6.1 % don't like to and 1.2 % strongly do not like to grow fruits and vegetables with vertical farming at home. Approximately there is a 60 % demand for the in-house machine.

The Size of the Machine

If you wanted to purchase vertical farming technology and the growing facility to your home which size would you prefer it?
82 yanit

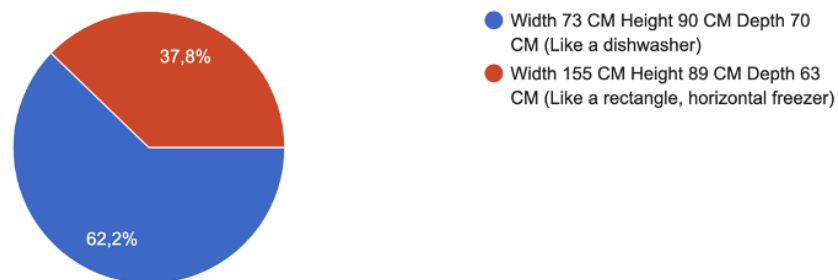


Figure 1.22

As seen in Figure 1.22, 62.2% of the participants prefer a vertical farming machine in the size of a dishwasher and 37.8 % of the participants prefer a vertical farming machine in the size of a horizontal freezer.

Bundle Pricing and Subscribing Will

Would you like to receive monthly seeds by paying extra 100-200 euros annually by subscribing?

82 yanıt

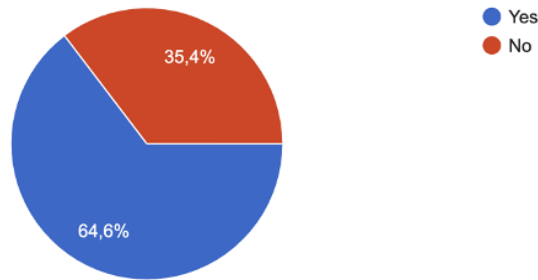


Figure 1.23

As seen in Figure 1.23, 64.6 % of the participants are willing to subscribe for receiving monthly seeds and 35.4 % of the participants are not willing to subscribe to receive monthly seeds.

Demand of the Fruits and Vegetables to Grow in House

Please select the fruits and vegetables that you would like to grow in your house

82 yanit

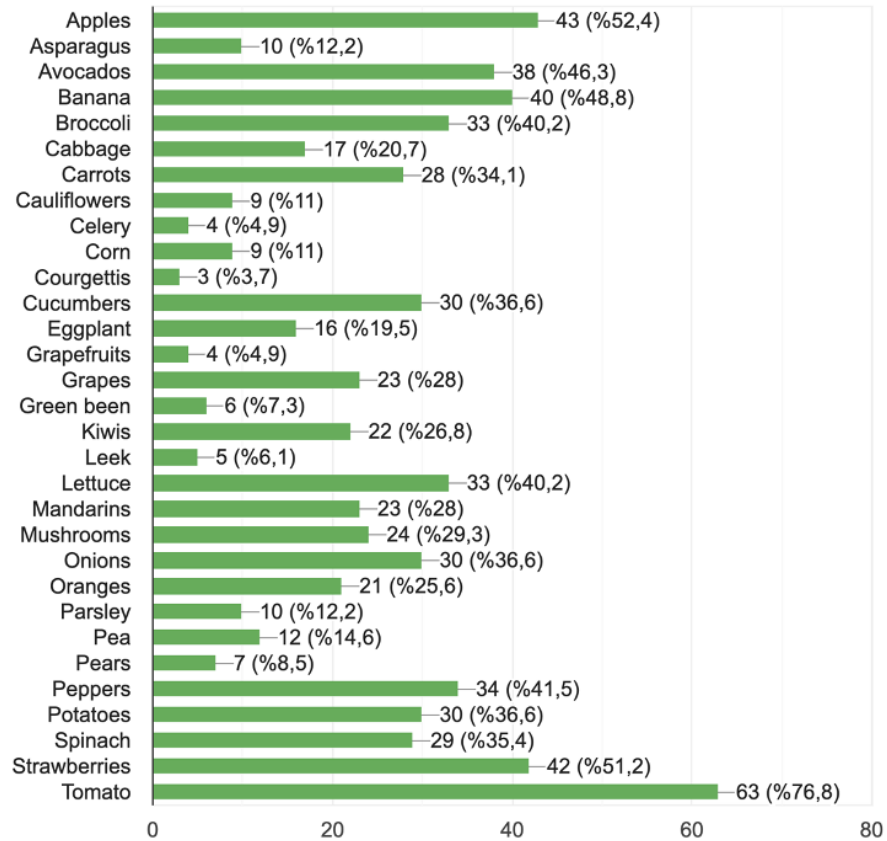


Figure 1.24

Figure 1.24 displays the fruits and vegetables that participants are willing to grow in houses. Assuming demand for fruits and vegetables to grow in the house are remaining above thirty percent, most preferred fruits and vegetables respectively are tomatoes, apples, strawberries, avocados, bananas, broccoli, carrots, cucumbers, lettuce, onions, peppers, potatoes and spinach.

Summary and Results

Demographics

- Gender participants are mostly skewed to male participants.

- The most dominant age group was 25-35.
- Participants of the research were mostly highly educated with master's degrees and were employed.
- Majority of the participants were single and were at the bachelor stage of the family life cycle.
- Most of the participants have low income according to the median salary of Spain, 2.720 Euros.
- Participant's ethnicity were respectively Turkish, Spanish, French, Italian and German.

Geographics:

- All the participants were currently living in Spain.

Behavioral:

- Most participants cooked for themselves respectively at least 5 times a week, everyday and twice a week.
- Almost all of the participants do grocery shopping either once a week or twice a week from supermarkets and local stores mostly.
- Monthly spending on fruits and vegetables are mostly up to 200 euros and the top 11 items that purchased the most are tomato, banana, onions, potatoes, apples, avocados, mushrooms, strawberries, carrots, peppers and lettuce.
- Almost all of the participants are aware of organic fruits and vegetables and prefer to buy organic.

AIDA Model:

Feed Yourself Fruits and Vegetables

- Most of the participants have heard about vertical farming. However only approximately 60% of the participants have heard about it and it can not be said that awareness is high but it is above average.
- When awareness and interest towards vertical farming has been provided to participants, 95 % of the participants create desire and demand towards fruits and vegetables grown by vertical farming.
- For the fruits and vegetables that have been grown by vertical farming, a 20 % - 40 % price increase is accepted by the majority of the participants. Demand hardly changes with a small change in price so that there is inelastic demand. Participants are less sensitive to price changes due to high quality and benefit sought.

Feed Yourself Vertical Farming Machine – Growithome

- Approximately 60 % of the participants are willing to grow fruits and vegetables at home with a vertical farming machine. There is a demand.
- The size of a dishwasher is preferred among most of the participants.
- Majority of the participants are interested in subscribing to the annual seed package. There is an opportunity on bundle pricing.
- Tomatoes, apple, strawberries, avocados, bananas, broccoli, carrots, cucumber, lettuce onions, peppers and spinach seed preferences must be made available to the consumer.

The results of a preliminary study showed that the potential demand toward both fruits and vegetables of Feed Yourself and vertical farming machines in GrowItHome is high. If the benefits of the Feed Yourself Fruits and Vegetables are represented to

the customers with integrated marketing communications efforts then its possible that demand will be inelastic. Moreover, consumers are interested in cooking and go to supermarkets frequently so that for Feed Yourself Fruits and Vegetables supermarkets should be the retailer. Also due to frequent visit supermarkets can be used as a medium for GrowItHome communications. Average spending on fruits and vegetables should be considered while deciding on the price of an in house vertical farming machine. The target market should be determined by using demographic, geographic and behavioral segmentation. The AIDA model should be implemented.

Competitive Position of The Vertical Farming Industry

Strength:

- Abandoned urban properties and buildings can be used to produce food and land usage can be reduced.
- In vertical farming 4047 square meter is equivalent to 16188 – 24282 square meters of traditional farming lands in terms of production.
- By using LED lights crop production can be done all seasons in a year.
- Seasonal changes do not affect production in vertical farming.
- Water ability does not affect production in vertical farming.
- Vertical farming production uses less water than traditional farming.
- Reduces fossil fuel usage because there aren't any agricultural machines and inorganic fertilizers used in vertical farming.
- Vertical farming reduces transportation because it can be established anywhere and by reducing transportation it saves energy and environment.
- Oxygen levels can be increased by planting trees in agricultural areas.
- Vertical Farming can reduce the increasing urban waste.
- Can produce enough for the increasing population and prevent famine.

Weaknesses:

- The cost of space, light, carbon dioxide and water.
- The additional cost of the equipment required for plant growth systems.
- Electricity prices that vary according to the region.
- Requiring highly educated employees with higher wages.
- Failure to obtain organic certification in the EU.

Opportunities:

- Increasing consumer awareness about balanced and healthy nutrition.
- Transition of developing countries to developed countries.
- Lack of land to feed the increasing population.
- Global climate change raises awareness toward eco-friendly production and sustainability and makes the vertical farming industry more accepted socially and politically.
- Developments in the renewable energy industry can reduce the high energy usage of vertical farming.
- The increase in lands that have lost their fertility
- There are few brands in the industry and those brands did not make customer engagement yet.

Threats:

- Skepticism of vertical farming due to lack of research and academic journals.

- Due to high costs, industry can not make mass production, reach economies of scale so that the market opportunity is limited.
- Consumer's perception of vertical farming produced goods as artificial fruits and vegetables.
- Governmental funding and investments on substitutes of vertical farming which will lead traditional farmers to decrease the price.

Competitive Advantage

Porter's Five Forces

Vertical farming is an emerging industry that is almost newly recreated, formed by technological innovations, changes in demand and emergence of customer needs. There is still a first-mover advantage in the industry as pre-emption of strategically valuable assets as geographical location and marketing positions. Also, customer switching costs can be created.

Entry Barriers

Barriers of entry are the attributes of an industry that increases the cost of entry. Vertical farming industry's entry barriers are high. Unit cost of production is high and volume of the production is low. It is difficult to maintain economies of scale. Vertical farming requires technology however it is a proprietary technology which is patented. Cost of developing vertical farming technology is high. Moreover, capital requirements are high.

Threat of Rivalry

In terms of intensity of competition, there are few numbers of competing firms and competing firms are the same size and have the same influence. Moreover, there is a lack of product differentiation.

Threat of Substitutes

Threat of substitutes is high because all of the traditional farming, greenhouse agriculture also produces fruits and vegetables. And these substitutes place a ceiling on prices and reduce the profit potential. However, in terms of indoor vertical farming machines, the threat of substitutes is low.

Threat of Suppliers

In terms of Feed Yourself, the threat of suppliers is high. The Supplier industry is dominated by a small number of firms. Also most of the technology suppliers do not produce and sell to retailers however there is a supplier threat that they can make forward vertical integration.

Threat of Buyers

There are a small number of buyers in the industry and switching costs are low. Buyers can integrate backwards.

Proposed Business

Product & Service

Feed Yourself company focuses on vertical farming technologies and will launch two business types under the same company. The company's product mix will

consist of two product lines; Feed Yourself Vegetables and Fruits and Feed Yourself GrowItHome Vertical Farming Machines. The head office of the company that will manufacture and merchandise will be established in Barcelona, Spain. It will also have a warehouse in Spain, in Vigo, one of the free zone regions. The port of Vigo is a free zone port. Vigo was chosen for the warehouse because it has a free zone under the EU Customs Union. The EU Customs Union allows free circulation of goods within the EU. Manufacturing facility will be in Rotterdam, Netherlands. Rotterdam has the largest port in Europe. It is the northern entry point for cargo brought from all over the world to Europe. As it has been shown in the Chart 3. Netherlands EUR per kWh electricity prices is on average and moreover, due to its advantages of having the biggest port in the EU and development in transportation of products, the Netherlands was chosen.

Operational Plan

Product Line 1: Feed Yourself - Fruits and Vegetables

Feed Yourself - Fruits and Vegetables will be produced at its production facility in Rotterdam, using vertical farming techniques, hydroponic type growth system and building-based construction type. The technology and the equipment of the production facility will be purchased from an American company, ZipGrow. The grown fruits and vegetables will be packaged in sustainable packages, then labeled and sold to supermarket retailers in Spain and the Netherlands. The marketing research examined that grocery shopping is most commonly made with supermarkets. According to the European Commission regulations, fruits and vegetables grown with vertical farming in the European Union cannot be certified as organic. For this reason, it will be investigated how many times more nutritious the products produced by vertical farming are compared to traditional agriculture, by getting services from independent research companies. The result of this research will be affixed conspicuously on the packages in order to create value to customers. Also to point out the freshness of the products, the date that each of the fruit and vegetables had been harvested will be affixed conspicuously on the packages. These product features will help Feed Yourself Fruits and Vegetables to differentiate the brand from competition. Core Benefit: Environment friendly, sustainable vegetables and fruits who are more nutritious in terms of vitamins, fibers, and minerals.

Actual Product:

Brand name: Feed Yourself - Fruits and Vegetables

Quality level: High

Packaging: Sustainable Packaging

Features: Grown by vertical farming, sustainable and more nutritious.

Augmented Product: The goal of Feed Yourself fruits and vegetables are to introduce consumers to fruits and vegetables produced by vertical farming, while making a profit. Thus, GrowItHome machines, which is the brand extension of Feed Yourself, will be introduced in order to change consumers' behavior, perception and attitude.

Feed Yourself Fruit and Vegetables Product Line Length:

Feed Yourself companies, company orientation strategy is marketing and product concept. So that the company focused on its targeted customers' needs and wants.

According to quantitative research (see Figure 1.24), products of the Feed Yourself fruits and vegetables line have been determined by production capacity and efficiency. During the first two years after the establishment, the company will produce only 10 different types of fruits and vegetables. After two year, with new market research, the company will reevaluate its length of product line Feed Yourself fruits and vegetables and make decisions of stretching, filling, and deleting. Fruits and Vegetables which will be produced and introduced to the market in two the first two years are;

- Tomato
- Onions
- Mushrooms
- Strawberries
- Peppers
- Cucumbers
- Oranges
- Spinach
- Broccoli
- Apples

Product Line 2: Feed Yourself GrowItHome Vertical Farming Machines

Feed Yourself GrowItHome Vertical Farming Machines will be imported from the manufacturer Shenzhen Leisure Technology Co. Ltd. which is in Shenzhen, Guangdong-China and the products will be merchandised in Netherlands and Spain. However, if online orders come from other European Union countries, products will be sold. According to the agreement to be made, the manufacturer will be obliged to add the logo of the brand to the products it will produce for the Feed Yourself company.

In the first phase, 100 machines will be purchased and placed in the warehouse in Vigo. 20 of the 100 products purchased will remain in the warehouse as promotional products and the remaining 80 will be distributed to the agreed supermarkets, showrooms, and places where the product will be promoted. During this process, orders for an additional 200 products will be created. Then, sales will be observed, and a new order request will be created in line with these results.

Core Benefit: Grow your environment friendly, sustainable vegetables and fruits which are more nutritious in terms of vitamins, fibers, and minerals in your home.

Actual Product:

Brand name: Feed Yourself - GrowItHome

Quality level: High

Features: Growing fruits and vegetables at home with an app controlled high technology vertical farming machine which is more sustainable and nutritious.

Feed Yourself GrowItHome Vertical Farming Machines Product Line Length:

The market research concluded that consumers want a small vertical farming machine in their houses. So that the machine size will be just like a dishwasher, width 73 cm, height 90 cm and depth 70 cm. White color and black color machines will be the two options.

Business Model Canvas

Key Partners:

Key partners of Feed Yourself company will be ZipGrow Inc., Shenzhen Leisure Technology Co. Ltd., Mercadona Grocery Chain (Spain), Albert Heijn (Netherlands), TBWA Advertising Agency, DFH Global Logistic, Euro Sender Logistic, Pena Fraga Law firm.

Key Activities:

Manufacturing fruits and vegetables with vertical farming technology and reaching customers through grocery retailers and merchandising vertical farming in door machines. By using the AIDA model, changing consumer behavior and creating brand awareness, brand equity and developing brand image for the company.

Key Resources:

Manufacturing facilities, offices, warehouses, machines, vehicles, distribution networks as physical resources, certifications, brand patents, vertical farming proprietary knowledge, as intellectual resources, agriculture engineers with vertical farming knowledge, marketers, accounters, sales people, as human resources and capital as cash, lines of credit and hiring key employees as financial resources are required.

Value Proposition:

Feed Yourself is reducing the use of water, producing faster and more harvesting agricultural products by using vertical farming technology with the principle of an environmentally friendly and sustainable world and bringing more nutritious and organic fruits and vegetables to consumers home both by producing and by enabling the technology and equipment of vertical farming crops produced at consumers homes.

Customer Relationship:

Self service, personal assistance through apps and creating communities that can interact with other vertical farming making households are the three types of relationship that's been aimed to be created with targeted segments.

Customer Segments:

After analyzing the market, it's been observed that mass and niche types of customer segmentation should be conducted for Feed Yourself companies. Targeting of the company Feed Yourself will be 25-35 years old, single females and males who have low and middle income, lives in Spain and Netherland who are caring about their health, environment friendly production and sustainability.

Channels:

For fruits and vegetables retailers will be the channels and for the GrowitHome the channel will be the website and showrooms which are located in two cities (Madrid and Barcelona) in Spain and two cities (Amsterdam and Rotterdam) in the Netherlands.

Cost Structure:

Feed Yourself company will have both cost driven and value driven costs. Feed Yourself Fruits and Vegetables cost structure will be creating economies of scale. Most important costs will be the cost of the machines for GrowItHome, equipment and technology costs for Feed Yourself Fruits and Vegetables, moreover, office,

showrooms, warehouse, shelf spaces and buildings will be the major costs. However, during the production phase electricity will also cost a lot. Other variables of costs will be marketing expenses, customer relations management team and production employees.

Cost Structure and Revenue Plan

The Feed Yourself company has 2 product lines. So that revenue stream of the company is more than one. Markup, subscription, web sales, direct sales and retail sales. For the GrowItHome mark up sales will be used by purchasing the machine from China and according to the costs it will be marked up to 60%. Also web sales of the machines and direct sales in the show rooms will be used. For Feed Yourself Fruits and Vegetables subscription of receiving seed and selling the fruits and vegetables to retail stores will create retail sales revenue stream. Shelf spaces will be required and by renting those shelves and spaces products will be available for consumers.

In my market research through a survey, participants stated that they will be willing to pay 20-40 % more for the fruits and vegetables which are grown by vertical farming. According to results it's been decided that for Grow Yourself Fruits and Vegetables value added pricing will be applied. Consumers will buy if the perceived value is bigger than the price. So that with communication and advertising perceived value should be created for the customers and the prices of all fruits and vegetables will be more than %40 of traditional farming grown fruits and vegetables average prices. (Average prices had been calculated according to the highest market shared supermarket prices, Mercadona in Spain and Albert Heijn in Netherlands.)

Spain and Netherlands Research:

Name	Unit / Kg	Traditional Farming Average Price	Value Added	Feed Yourself F & V Price
Apple	1 Unit	0,39 €	% 40	0,54 €
Tomato	500 G	1, 59 €	% 40	2,22 €
Onions	1 KG	1,19 €	% 40	1,26 €
Mushroom	250 G	1,58 €	% 40	2,21 €
Strawberries	500 G	4 €	% 40	5,6 €
Peppers	1 Unit	0,18 €	% 40	0, 25 €
Cucumbers	1 KG	1,60 €	% 40	2,24 €
Oranges	1 Unit	0,56 €	% 40	0,78 €
Lettuce	Package 6 Unit	1,85 €	% 40	2, 59 €
Broccoli	1 Unit	1,20 €	% 40	1,68 €

Cost per Unit of Grow It Home Machines:

Unit Price: 990 €

Transportation Cost for Each Machine: 89 €

Taxes (% 15): 161,85 €

Total Cost Per Unit: 1240, 85 €

For the Feed Yourself company each unit will cost 1240,85 euros. The selling price of the machines per unit will be 1990 Euros (€) for EU countries.

Organization Management Structure

Organization structure will be applied for the Feed Yourself company because it is a start-up. There will be 9 workers in the head office in Barcelona. Which consists of a CEO, a finance manager, a marketing and sales manager and an operations manager. Each of the managers will have a supervisor under it and for helping them and there will be an office & CEO assistant. However, in the warehouse in Vigo there will be one operation manager and 6 warehouse staff workers. Lastly, in the manufacturing facility in Rotterdam there will be 15 employees. 10 will be responsible for vertical farming and one will be the head of the operations. The last three will work as staff in the manufacturing facility.

IT, market research, advertising and media agency, legal consultancy will be outsourced.

Logistics Overview

The equipment needed for manufacturing in Rotterdam will be delivered from Ontario, Canada. Moreover, the Feed Yourself company will manufacture its own goods in the facility which is in Rotterdam. GrowitHome machines manufacturers facilities are in China. So in order to outline the logistics of the company, first of all the equipment for the manufacturing facility will be taken by FedEx and will be taken to Toronto. In Toronto the equipment will be loaded to a ship and delivered to Rotterdam Port. At the Rotterdam Port Fedex companies own delivery service will bring the equipment to the warehouse. Moreover, the foods that will be grown in the Netherlands will be delivered to Vigo by a ship. Lastly the machines that have the manufacturer in China will also send the machines to Vigo warehouse and all of the distributions to Europe will be made from Vigo warehouse.

After Sales services

Since the machines we will be selling to households will have an advanced technology, they may have breakdowns. Besides they will require maintenance or user errors may occur. For these reasons there will be a service department formed.

Initially 3 service points will be opened. These locations will be in Barcelona, Madrid, Rotterdam. To cut costs, the service point in Rotterdam will be within the production facility located there. Rotterdam is less than an hour to the capital Amsterdam, so there won't be any extra office needed except Rotterdam.

In case of need, these service offices can be reached either through the application used by the machine owners or by telephone number that can be reached 24/7. It will be checked whether there is a usage error through the live help. If the problem still persists, a service appointment will be created. Depending on the distance between

the service centre and house, the appointment will be tried to be given in a way that will not exceed 3 days.

The service offices and teams will not be established by the launching of the company. Through the demand in the showrooms with the first 100 machines, data that we collected in our P.R events and other marketing activities. The popularity of the company at that time will provide us with an estimate of how many machines we will sell. Accordingly, after-sales service activities will take shape, because the demand of the machines will affect the investment to be made in the after-sales service.

Marketing Plan

In order to apply the AIDA model in a short notice, Integrated Marketing Communication will be used. One machine will be placed at each of the supermarkets that will sell Feed Yourself products. Special branded shelves will be purchased from the supermarkets and the concept of vertical farming will be explained to customers through special packaging's and POP's. There will also be PR events. Vertical agricultural machines will be placed in the most popular shopping centers of each country and in the most visited places of each country, and this settlement will be made with a special event. And the participants will be asked to observe the machine during this time. In addition, social media and digital campaigns will try to raise awareness of vertical agriculture. While there was no TV commercial in the first 2 years, all the ongoing advertising efforts will continue without a break. In addition, the social media channel will be used for the whole of Europe, as the advertising fees on social media are low. In the first two years, mass marketing will be used as it is aimed to create a mass perception change and creation. No specific target audience selection will be made.

Actions to Operationalize and Commercialize the Business

The business is planned to be launched in 2021 September by aiming to establish the operational business and prepare for the pilot phase and order machines by reaching out to everyone, set up meetings, and control each of the processes.

Actions to be taken

- Setup the Business as a legal entity
- Signing the contracts
- Registering the Business in the Spain/Netherlands government
- Renting the Office
- Renting the Warehouse
- Renting the manufacturing facility
- Requesting the loan
- Building facility
- Starting producing
- Ordering machines
- Determine and confirm the distribution channels
- Establishing relations with Supermarkets
- Finding the IT partners
- Finding advertising, media and legal agency

- Preparing and signing the agreements with the distribution channels and with agencies

In October 2021, the main goal is to start the pilot phase for the first growth trials by Making experiments on growing the food

Actions to be taken

- Following up the experiment
- Get the certificates for the ready products
- Sending samples to Authorities
- Making the first pilot purchase
- Talking to advertising and media agency
- Having meetings with the law consultants
- Setup the logistics arrangements with the distribution
- Making an agreement with a web designer and IT

In November 2021, we will be dealing with the authorizations and first results evaluation. By this time, Pilot performance evaluation will be received. Development will be done if needed

Actions to be taken

- Continue on experiment
- Get the certificates for the ready products
- Continue sending samples to authorities
- Listening to the media and advertising agencies presentation and make agreement
- Following up on the authorization process
- Finishing the agreements with supermarkets and sign
- Managing the storage of the machines in the warehouse

In December 2021, first extensive growth activity will be evaluated and start to prepare for the second growth operation. After finishing the first phase for the products, all the required certificates will be completed. A website will be launched while starting all marketing activities. The ready foods will be shipped to the warehouse in Vigo

4. Financial Analysis

Projected Sales

Sales Projections ('000 euros)					
	2022	2023	2024	2025	2026
Vegetable and fruit sales	8.000	9.600	11.520	13.824	16.589
Machine Sales	3.000	3.600	4.320	5.184	6.221
Seed Sales	1.000	1.200	1.440	1.728	2.074
TOTAL SALES	12.000	14.400	17.280	20.736	24.883

The above chart projects the sales forecast between 2022 and 2026. The total expected sales is consistent with the sum of vegetables & fruit sales, machines sales and seed sales (on demand). Since the company has mainly 3 different income resources, it is expected that the business will grow by double at the end of 2026. However, the first 2 years are crucial like many other startups.

Projected start-up expenses

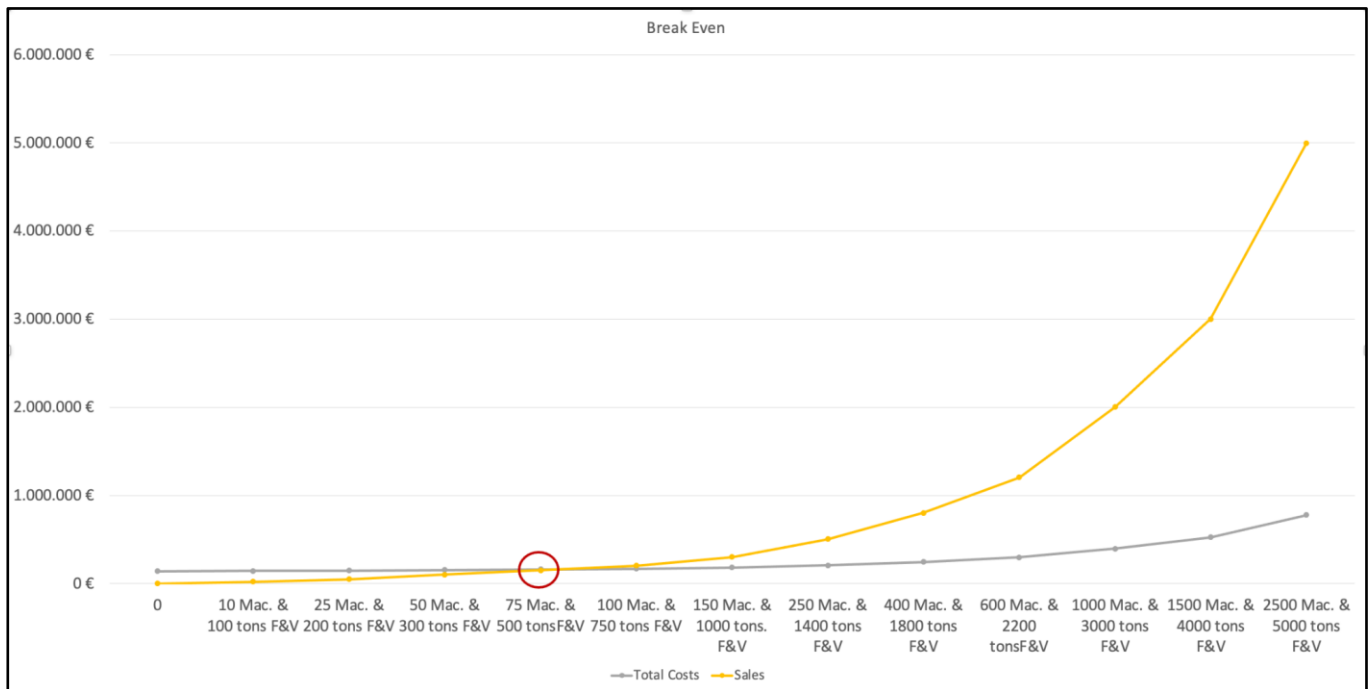
Projected Startup Expenses (euros):	
Equipment Installation in Rotterdam	240.000
Licenses	50.000
Vigo Warehouse investment	100.000
Office space in Barcelona	40.000
Marketing	30.000
Working Capital	100.000
Office Furniture and Supplies	50.000
Consultants	20.000
TOTAL STARTUP EXPENSES	630.000
Financing:	
5 year long-term loan at 0.2% per annum	1.000.000

The above chart indicates expected start up expenses which is important for the investors.

Projected Balance Sheet

Projected Balance Sheets ('000 euros)					
	2022	2023	2024	2025	2026
Assets:					
Cash and Cash Equivalentents	350	684	1.931	2.107	2.679
Accounts Receivable	1.200	1.440	1.728	2.074	2.488
Inventory	2.000	2.400	2.880	3.456	4.147
Supplies	700	840	1.008	1.210	1.452
Fixed Assets, net	2.100	2.520	3.024	3.629	4.355
TOTAL ASSETS	6.350	7.884	10.571	12.475	15.121
Liabilities:					
Accounts Payable	900	1.080	1.296	1.555	1.866
Accrued Liabilities	600	720	864	1.037	1.244
Income Tax Payable	600	884	1.111	1.383	1.711
Long Term Loan	800	600	400	200	-
TOTAL LIABILITIES	2.900	3.284	3.671	4.175	4.821
Shareholders' Equity					
Capital	100	100	100	100	100
Retained Earnings	3.350	4.500	6.800	8.200	10.200
TOTAL SHAREHOLDERS' EQUITY	3.450	4.600	6.900	8.300	10.300
TOTAL LIAB and EQUITY	6.350	7.884	10.571	12.475	15.121

Break Even



The break even point indicates where the company is making neither a profit nor a loss. Any number below the break-even point signifies a loss while any number above it shows a profit.

It is predicted that the break level will be reached at the point where the company sells 75 machines and 500 tons of fruit and vegetables. This point means that the total cost of 161000 euros will be covered by sales. After this point, it is predicted that the profit of the company will increase exponentially.

Projected Income Statement

Projected Income Statements ('000 euros)					
	2022	2023	2024	2025	2026
TOTAL SALES	12.000	14.400	17.280	20.736	24.883
Expenses:					
Seeds	2.000	2.400	2.880	3.456	4.147
Purchase cost of Machines from China	1.500	1.800	2.160	2.592	3.110
Rent Expense for Rotterdam Facility	216	217	218	219	220
Rent Expense for Barcelona Headquarter office	54	54	55	55	55
Rent Expense for Vigo Warehouse	30	30	30	30	31
Salary Expenses (all)	630	633	636	639	643
Marketing expenses	1.026	1.031	1.036	1.041	1.047
Electricity, Utilities and other	700	840	1.008	1.210	1.452
Financial Expenses	202	242	291	349	419
Depreciation	76	76	76	76	76
TOTAL EXPENSES	6.434	7.324	8.390	9.668	11.199
Income Before Tax	5.566	7.076	8.890	11.068	13.684
Less: Tax(25%)	1.392	1.769	2.222	2.767	3.421
Net Income	4.175	5.307	6.667	8.301	10.263

Statement of Changes in Equity

Statement of Changes in Equity ('000 euros):					
	2022	2023	2024	2025	2026
Retained earnings, beginning	-	3.350	4.500	6.800	8.200
Net Income	4.175	5.307	6.667	8.301	10.263
Dividends	825	4.157	4.367	6.901	8.263
Retained earnings, ending	3.350	4.500	6.800	8.200	10.200

5. Conclusion

This paper presents a business plan for Feed Yourself Company which has the business goal to change consumer behavior toward producing fruits and vegetables and create demand on vertical farming. The long term goal of the company is to make every household own a vertical farming machine at their home.

It is necessary to emphasize once again the impact of the pandemic. According to Fortune Business Insights report on vertical farming, in 2020 the global vertical farming market size will be 3.04 billion dollars. The global Covid-19 pandemic had a positive impact on all regions. The report outlined that there had been %19.1 growth in the market. It's been forecasted that the market will witness 25.2% CAGR growth till 2028 and will have a market value of 17.59 billion dollar. (Fortune Business Insights, 2021).

Product & Service

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Vision Statement

Changing customary behavior of consumers towards agriculture and to place a vertical agricultural machine in every house, in order to ensure that each household produces its own fruits and vegetables for more sustainable and nutritious production of food.

Mission Statement

At Feed Yourself, we sell fruit and vegetables grown by applying vertical farming technology and sell vertical farming machines which are suitable for domestic growing of greengrocery to reduce overuse the resources of the world, to make farming sustainable and provide more nutritious and organic fruits and vegetables for every household.

Unique Selling Proposition (USP)

“Grow or purchase fruits and vegetables which are almost 30 times more nutritious and grown sustainable for your health and the health of earth.”

Feed Yourself allows people higher their life standards by allowing them to feed themselves with extremely nutritious foods and enabling them to grow their own food at homes.

When other vertical farming companies in the industry are examined, companies either produce with vertical farming technology and offer the products to the market or sell the technology and industrial product that enables this production to be done indoor (households) or outdoor (manufacturers or companies). However, Feed Yourself will make both merchandising and manufacturing to show the beneficial features of vertical farming. Which will be the first vertical agriculture company to do both manufacturing and merchandising under the same brand name. Also, the company distinguishes itself from other companies by aiming to increase this awareness with its marketing activities.

Customer Segments:

After analyzing the market, it's been observed that mass and niche types of customer segmentation should be conducted for Feed Yourself companies. Targeting of the company will be 25-35 years old, single females and males who have low / middle income, lives in Spain and Netherlands who are caring about their health, environment friendly production and sustainability.

Channels:

For fruits and vegetables retailers will be the channels and for the GrowItHome the channel will be the website and showrooms which are located in two cities (Madrid and Barcelona) in Spain and two cities (Amsterdam and Rotterdam) in the Netherlands.

Operational Plan

Product Line 1: Feed Yourself - Fruits and Vegetables

Feed Yourself - Fruits and Vegetables will be produced at its production facility in Rotterdam, using vertical farming techniques, hydroponic type growth system and building-based construction type. The technology and the equipment of the production facility will be purchased from an American company, ZipGrow.

The grown fruits and vegetables will be packaged in sustainable packages, then labeled and sold to supermarket retailers in Spain and the Netherlands. The marketing research examined that grocery shopping is most commonly made with supermarkets. According to the European Commission regulations, fruits and vegetables grown with vertical farming in the European Union cannot be certified as organic. For this reason, it will be investigated how many times more nutritious the products produced by vertical farming are compared to traditional agriculture, by getting services from independent research companies. The result of this research will be affixed conspicuously on the packages in order to create value to customers.

Product Line 2: Feed Yourself GrowItHome Vertical Farming Machines

Feed Yourself GrowItHome Vertical Farming Machines will be imported from the manufacturer Shenzhen Leisure Technology Co. Ltd. which is in Shenzhen, Guangdong-China and the products will be merchandised in Netherlands and Spain. However, if online orders come from other European Union countries, products will be sold. In the first phase, 100 machines will be purchased and placed in the warehouse in Vigo. 20 of the 100 products purchased will remain in the warehouse as promotional products and the remaining 80 will be distributed to the agreed supermarkets, showrooms, and places where the product will be promoted. During this process, orders for an additional 200 products will be created. Then, sales will be observed, and a new order request will be created in line with these results.

Cost Structure

Feed Yourself company will have both cost driven and value driven costs. Feed Yourself Fruits and Vegetables cost structure will be creating economies of scale. Most important costs will be the cost of the machines for GrowItHome, equipment and technology costs for Feed Yourself Fruits and Vegetables, moreover, office, showrooms, warehouse, shelf spaces and buildings will be the major costs. However, during the production phase electricity will also cost a lot. Other variables of costs will be marketing expenses, customer relations management team and production employees.

Cost Structure of the Products and Revenue Plan

Machines for houses

GrowItHome	
Unit Price	EUR 990
Transportation Cost/Machine	EUR 89
Taxes (15%)	EUR 161
Total Cost per. Unit	EUR 1.240
Selling Price	EUR 1.990
Profit	EUR 750

Fruit and Vegetables

In my market research through the survey, participants stated that they will be willing to pay 20-40 % more for the fruits and vegetables which are grown by vertical farming. According to results, the prices of all fruits and vegetables will be more than %40 of traditional farming grown fruits and vegetables average prices. (Average prices had been calculated according to the highest market shared supermarket prices, Mercadona in Spain and Albert Heijn in Netherlands.)

Name	Unit / Kg	Traditional Farming Average Price	Value Added	Feed Yourself F & V Price	Selling Price of the product in KG.
Apple	1 Unit	€ 0,39	40%	€ 0,55	€ 2,16
Tomato	500 G	€ 1,59	40%	€ 2,23	€ 4,44
Onions	1 KG	€ 1,19	40%	€ 1,67	€ 1,26
Mushroom	250 G	€ 1,58	40%	€ 2,21	€ 8,84
Strawberries	500 G	€ 4,00	40%	€ 5,60	€ 11,20
Peppers	1 Unit	€ 0,18	40%	€ 0,25	€ 2,50
Cucumbers	1 KG	€ 1,60	40%	€ 2,24	€ 2,24
Oranges	1 Unit	€ 0,56	40%	€ 0,78	€ 3,90
Lettuce	Pack of 6 unit	€ 1,85	40%	€ 2,59	€ 5,18
Broccoli	0.5 KG	€ 1,20	40%	€ 1,68	€ 3,36

Actions to Operationalize and Commercialize the Business

The business is planned to be launched in 2021 September by aiming Establish the operational business and prepare for the pilot phase and order machines by reaching out to everyone, set up meetings, and control each of the processes.

Actions to be taken

- Setup the Business as a legal entity
- Signing the contracts
- Registering the Business in the Spain/Netherlands government
- Renting the Office
- Renting the Warehouse
- Renting the manufacturing facility
- Requesting the loan
- Building facility
- Starting producing
- Ordering machines
- Determine and confirm the distribution channels
- Establishing relations with Supermarkets
- Finding the IT partners
- Finding advertising, media and legal agency
- Preparing and signing the agreements with the distribution channels and with agencies

In October 2021, the main goal is to start the pilot phase for the first growth trials by Making experiments on growing the food

Actions to be taken

- Following up the experiment
- Get the certificates for the ready products
- Sending samples to Authorities
- Making the first pilot purchase
- Talking to advertising and media agency
- Having meetings with the law consultants
- Setup the logistics arrangements with the distribution
- Making an agreement with a web designer and IT

In November 2021, we will be dealing with the authorizations and first results evaluation. By this time, Pilot performance evaluation will be received. Development will be done if needed

Actions to be taken

- Continue on experiment
- Get the certificates for the ready products
- Continue sending samples to authorities
- Listening to the media and advertising agencies presentation and make agreement
- Following up on the authorization process
- Finishing the agreements with supermarkets and sign
- Managing the storage of the machines in the warehouse

In December 2021, first extensive growth activity will be evaluated and start to prepare for the second growth operation. After finishing the first phase for the products, all the required certificates will be completed. A website will be launched while starting all marketing activities. The ready foods will be shipped to the warehouse in Vigo

Research Limitations

Due to conducting the research with snowball sampling technique the researcher had low control over the sampling method and cannot be sure of the true distribution of the population and of the sample. Also, representativeness of the sample is not guaranteed due to the fact that some of the participants were out of Europe and were students of Geneva Business School. The sample was only a small subgroup of the entire population. Moreover, qualitative and quantitative product specific research should be outsourced before the actual implementation of the business plan. According to the findings, the marketing mix should be updated.

More than a business which aims to gain profits, in order to continue to feed the population, the harvesting and producing method needs to be changed to vertical farming. Moreover, throughout the paper it's been argued that this method of producing is the most sustainable way to produce. The market research which was conducted by the writer of the article cleared out that there is a lack of awareness towards vertical farming. If the company can increase the awareness then the demand will increase either.

The long-term goal of Feed Yourself company is to expand to all of Europe and then to the Middle East. But in the first place, the first target countries for both business models will be Spain and the Netherlands. Consumer analysis was made for Europe, Spain and the Netherlands. Consumer Behavior of EU, Spain, and Netherlands

Limitations of The Business Plan

High initial cost and accessibility of the expertise

Since Vertical Farming requires advanced technology, the initial installation costs are high priced. In addition to this, due to technology being rather new an expert has to plan the setting up in order to use the space in the most efficient way and accessibility of the experts in this area may be troublesome. Also, since the machines require maintenance, spare parts to be changed are quite expensive as well.

Energy Consumption

Compared to traditional farming, energy consumption of vertical farming technology is overrun. Because every layer of the vertical farms has to be covered with lighting due to this electricity bills will be quite high. It is the major part of the operation cost.

High Labor Cost

Since the vertical farming systems are advanced and complex, there is need of qualified workers for monitoring constantly, therefore labor cost will be high.

Not Mature Technology

The idea behind the technology has a promising future, it is still at early stages of its development. Vast amount of time and money has to be invested in order to feed the masses, make it more sustainable and lower the costs. Even though it will bring the advantages of being a pioneer in the industry, it may also bring some disadvantages because of its early stage. For instance the technology invested can be outdated in the foreseeable future.

Recommendations

Feed Yourself makes all its operations, organizations, and investments in order to change consumer behavior, increase awareness and demand toward farming. By selling domestic vertical farming production devices, it is aimed to change the habits of consumers. In the long term, it is aimed to have vertical agricultural machines in the homes of individuals, such as the washing machine or dishwasher in most homes, and to consume fruits and vegetables with high nutritional value by using less resources. In order to change the customary fruit and vegetable production and purchasing habits of the consumers, the company will produce fruits and vegetables with vertical farming and will show the benefits of this production method to the consumers from the first source. It will explain the benefits of production by actually producing with vertical farming to consumers, both through marketing activities and through the experience they will have when purchasing and consuming fruits and vegetables produced by vertical farming. After the consumers are convinced of the benefits of this new generation agricultural production method, they will be motivated to produce the fruits and vegetables they consume by themselves.

In the EU, vertical farming products cannot be certified as organic. Obstacles on this subject should be removed as soon as possible. While vertical farming products are considered organic in North America and Asian countries, unfortunately they are not defined as organic in Europe. This situation may negatively affect the perception of customers in Europe towards vertical farming products. Incentives should be offered to vertical farming companies by governments and support should be given to companies' marketing activities.

The ultimate goal of every other company in the sector should be giving more importance and investment to their marketing activities. If the popularity of vertical farming in the world and the customer sentiment to Vertical Farming will increase,

every company in the sector will start to get more of their share as a result of the market growth.

“The number and size of vertical farms in Europe is at present still rather small, but in recent years they have experienced rapid expansion.” (Butturini M. 2020)
Awareness of vertical agriculture needs to be increased for sustainable resource use and consumption of foods with high nutritional value. In addition, with the increase in awareness, easily accessible opportunities should be offered to consumers.

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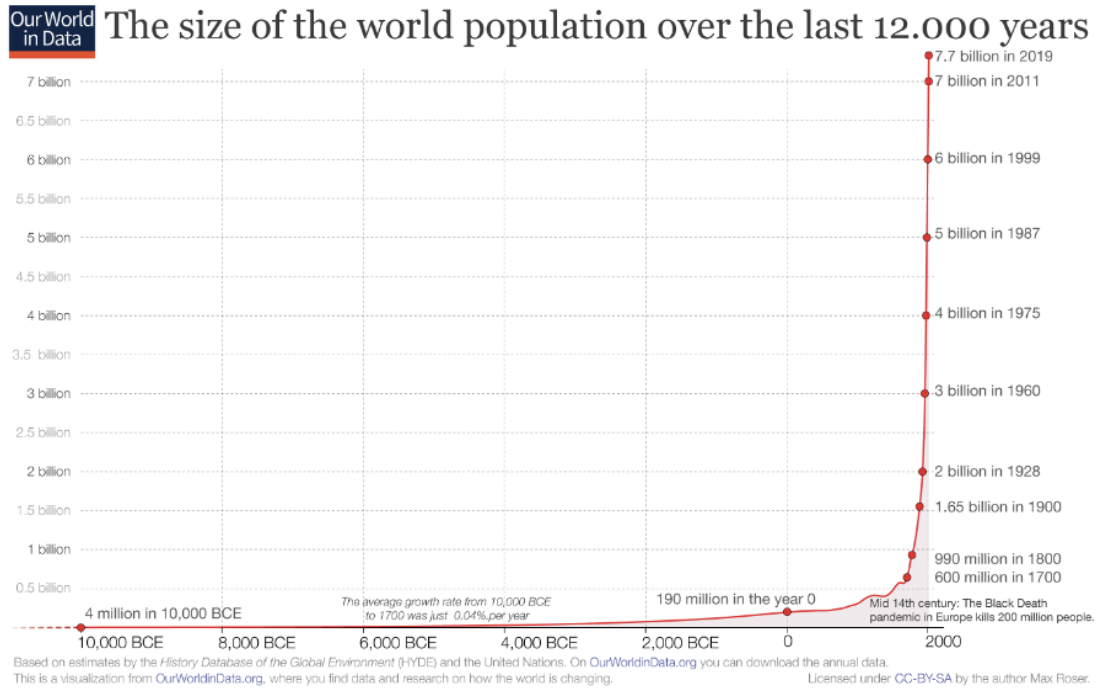
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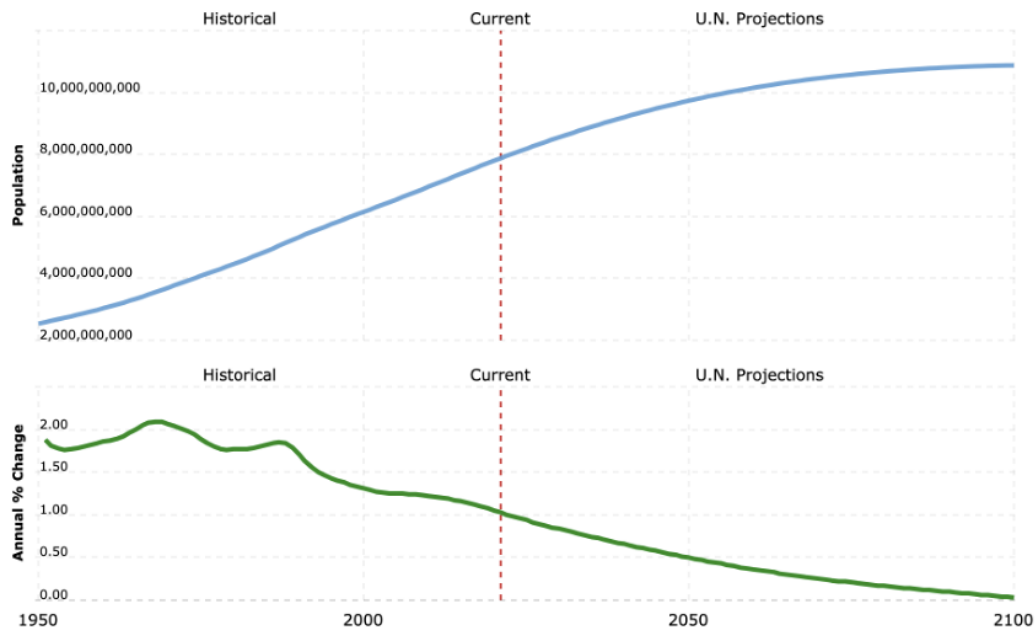
Appendices

Chart 1: The Size of the World Population Over The Last 12,000 Years



Resource: <https://ourworldindata.org/world-population-growth>

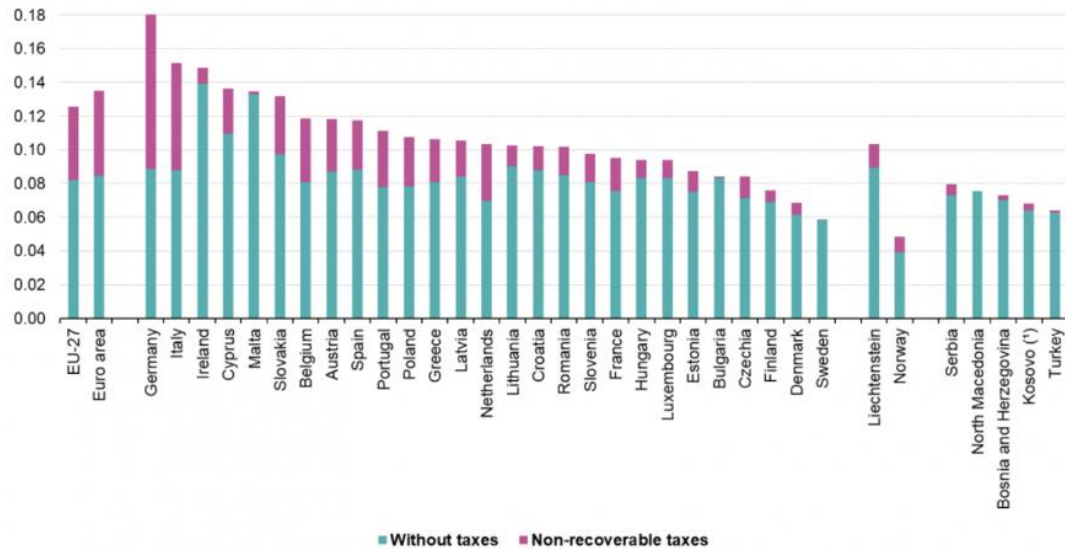
Chart 2: Population Growth Rate



Resource: <https://www.macrotrends.net/countries/WLD/world/population>

Chart 3: Electricity prices for non-household consumers, second half 2020

Electricity prices for non-household consumers, second half 2020
(EUR per kWh)

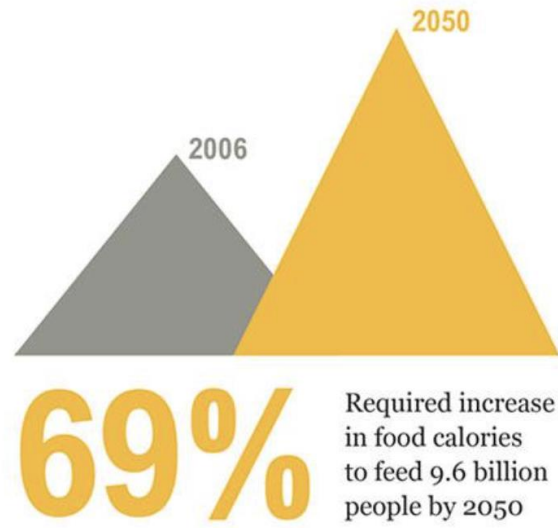


(*) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.
Source: Eurostat (online data codes: nrg_pc_205)



Resource: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity price statistics#Electricity prices for non-household consumers](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_price_statistics#Electricity_prices_for_non-household_consumers)

Chart 4:



Resource:

<https://www.wri.org/insights/global-food-challenge-explained-18-graphics>