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# PICCOLA IMPRESA

SMALL BUSINESS

RIVISTA INTERNAZIONALE DI STUDI E RICERCHE

Proceedings 6<sup>th</sup> PISB Workshop

NEW PERSPECTIVES AND  
INTERDISCIPLINARY APPROACHES TO  
ENTREPRENEURSHIP

19-20 May 2023



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# *Full Papers*

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# What can we learn from the first ‘like meat’ business Made in Italy? New Business Models for the Vegan Production

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## Abstract

Recent years have seen a rise in the popularity of vegan or plant-based consumption/production, which is deemed to reduce environmental burden (Fresán & Sabaté, 2019) since the impacts of animal products can markedly exceed those of vegetable substitutes (Poore & Nemecek, 2018).

Our research focuses on sustainable business models applied to vegan production with the aim of scrutinising how companies positively impact people, the planet, and sustainable economic performance. Surprisingly, academic studies by management scholars on this matter are very rare, and we have discovered that most contributions come from researchers with knowledge and expertise in other disciplines such as environmental science or agricultural and biological sciences.

In light of the above-mentioned literature gap, first, our research offers an understanding of how sustainable business models can be applied to vegan production. Namely, we elucidate the concept of Circular Bioeconomy and its applications through biocyclic vegan production and cultured meat production.

Then we focused on a paradigmatic case study, a small Italian company that produced the first “vegan meat” Made in Italy, to find out if all the theoretical concepts we have previously discussed can be used as a lens to understand the dynamics of the sector.

Our research has not only theoretical implications calling for an interdisciplinary approach to advance management research in this field but also managerial implications for vegan food production, which is undergoing a phase of evolution both in terms of technologies and markets.

**Keywords** – Sustainable Business Model, Vegan food production, Circular BioEconomy

**Paper type** – Academic Research Paper



## **1. Background**

The concept of vegan was “invented” in 1944 by Donald Watson, a founder of The Vegan Society. It refers to a vegetarian diet that excludes eggs, dairy products and all other animal-derived ingredients. Watson wanted to underline the importance of using not only alternative non-animal products in general but also encouraging a vegan lifestyle that avoids the use of any kind of product with any animal ingredients or components (Judge & Wilson, 2015). The “veganism style” is not new but has raised awareness and attention in the last few years (Statista, 2018). It is not applied only to food but also to general products, like cosmetics or hygiene products, and it is considered a real lifestyle that produces less harm for animals and the planet (Beardsworth, 1991; Loh et al., 2021; Gendel-Guterman& Derqui, 2021).

Due to customers’ growing attention to health and climate change, the global vegan food market is expected to grow in the following years, passing from \$23.31 billion in 2020 to \$61.35 billion in 2028 (Fortune Business Insights, 2020).

In Europe, the biggest and most important companies in this market are: Danone SA, Hain Celestial Group, Inc, Conagra Brands, Inc., Beyond Meat, Inc., and Nestle SA; companies like these sell their products to retailers, which are mainly supermarkets/hypermarkets, online websites, convenience stores, etc. Most consumers make their purchases in supermarkets or big retail stores, but since the pandemic started in 2020, e-commerce for vegan products has also grown, based on data provided by Google AdWords, which has shown a growth of 47% of vegan product searches since 2020 (Saari et al., 2021). In summary, the market for vegan food is continuously expanding and is influenced by customers’ choices driven by both health and environmental concerns (Apostolidis & McLeay, 2016; Dedehayir, 2017; Carfi et al., 2018; Cooper et al., 2022).

In addition to these statistics and market trends, this paper will discuss the application of business models based on the newest and recent Circular Economy principles for vegan production with a focus mainly on the food system and the small business sector.

The purpose of our study is to investigate if innovative companies focusing on vegan production engage circularity in their activities and strategies, multiplying their opportunities to not only produce less harm for the environment, but also increasing economic and social value.

Hence, the main research question of our research is the following:

- What are the main key aspects of new business models applied to vegan food production?

Our research applies an exploratory research approach to analyse the application of sustainable strategies derived from the Circular Economy to vegan production.

Subsequently, we focused on a paradigmatic case study, a small Italian company that produces and sells vegan products, to find out if the theoretical concepts we have discussed can be applied in the business model of a pioneering vegan business.

Our contribution as management scholars is to delve into a hot topic issue, such as the production of vegetal substitutes and alternative proteins.

In this still gray field, the application of technological and process innovations to business activity must follow principles of responsibility and impact assessment that consider individual and collective and private and public interests. Food production is a key issue for humankind's survival and represents what we call a wicked problem. Producing alternative proteins may be an option to reduce environmental impact and respond to the problem of food scarcity, but the phenomenon must be studied in depth, and from a multidisciplinary and interdisciplinary perspective. Without a thorough understanding of the short, medium and long-term impact, the risk is that the interests of a few will prevail over those of the community.

The reminder of the paper is structured as follows: section two presents the research design and the methodological issues we faced; section three illustrates how companies that produce plant-based food, or companies that decide to shift their strategy towards a sustainable vegan one, can reduce the harmful effects of their processes and generate positive impacts on the environment and human health; in section 4 those concepts are used as a lens to analyse a paradigmatic case study; conclusions are drawn in section 5.

## **2. Research Design and Methodology**

A preliminary literature review was conducted by using the following keywords: “vegan production” and “circular economy” or “vegan company” and “business model” or “sustainable production”. These keywords were selected to find as much information and research, and as many case studies as possible, both on the SCOPUS database and google scholar platform.

Surprisingly, academic studies by management scholars on this topic are very rare, and we have discovered that most contributions come from researchers in other disciplines such as environmental science or agricultural and biological sciences.

In light of this literature gap, our research, based on secondary data (i.e., academic and grey literature), offers an understanding of how new business models may be applied by vegan companies. The circular economy, in fact, has various variants and applications (Brown et al., 2021; Alcade et al., 2022; Hofmann et al., 2022) which lead to the possibility of developing new models applied to vegan companies.

The outcome of our study is an “explanatory journey”, which starting from the Circular Economy applications, combined with the Green Economy principles, leads to new business models for vegan companies. These concepts will be our lens in the analysis of a paradigmatic case study that will help us to answer our RQs.

The case study we selected is the Italian vegan start-up Joy Srl., which was founded in Piegario (PG) by the Musacchio family in 2014 in order to bring a healthy, sustainable and 100% plant-based diet to Italy through a collaboration with the Wageningen University and the development of a facility of High Moisture Wet Extrusion. These factors have led to the creation of the first “vegan meat” Made in Italy.

Data on the case study were collected and put together from different sources, such as interviews, articles, videos, etc. In particular, materials have been found through web research on the main website and social network pages.

Moreover, articles and journal papers have been collected to study its past successes and actions related to its strategy and work, which aided us in obtaining a clearer overview of the company.

Lastly, a semi-structured interview with the owner of the company has been carried out. Semi-structured interviews are characterised by a high level of flexibility and the capability of disclosing important and hidden information and, furthermore, are useful to introduce more detail and richness thanks to their more open-ended nature (George, 2022).

### **3. New Business Models for Sustainable Development Applied to Vegan Production**

Since new production systems, which are based on the application of the Circular Economy principles have been implemented in the vegan sector in the last decade, in the

following section, the main features of new business models for sustainable development will be briefly depicted before analysing the deployment of specific technology used in vegan food production.

### **3.1. Circular Economy, Bioeconomy and Circular Bioeconomy**

One of the most powerful tools and keys to changing the way of producing and doing business has been the passage from the old business models and the old producing mechanisms and processes to the new concept of “Circular Economy” (CE), which has been defined as “*an economic system that emerges to oppose the linear open-ended system (produce, consume, dispose), with the aim to accomplish sustainable development, simultaneously creating environmental quality, economic prosperity and social equity to the benefit of current and future generations*” (Homrich et al., 2018; Reike et al., 2018). Connected to this concept, we can consider “bioeconomy”, which essentially relies on biological inputs that are used in production instead of fossil fuels and non-renewable resources. “Bio-based economy” or “knowledge-based bio-economy” (BE) underlines the importance and power of biological resources from land and sea for the manufacturing of products, by substituting fossil fuels with the biomass integrated with biotechnology innovations.

Bioeconomy products consist of biomass and low-value products (i.e., biofuels) and high-value products, such as bio-based chemicals or compounds (McCormick and Kautto, 2013).

If we think about the application of a BE in management production, for example, food production, there must be proper management of the resources, which is often characterised by a high level of uncertainty, in order to be truly sustainable.

Indeed, the use of biomass for unsustainable food production can lead to negative effects on the environment, such as deforestation, and on society; for this reason, institutions must release proper regulations and policies not only globally but also in Europe, in particular, as BE policies tend to prioritise economic value rather than environmental and social value (European Commission, 2018).

A BE, as understood from its definition, can be linked to the CE and transformed into “circular bioeconomy” (CBE), which refers to the concept of bioeconomy integrated with elements of CE (Institute for European Environmental Policy; Kershaw et al., 2021; Muscat et al., 2021).

Since we are discussing vegan production, the Plant Based Products Council, which is the leading organisation that promotes sustainable products derived from nature, firmly promotes the circular bioeconomy through the creation of renewable products at the market scale and supports policies that ensure vegan products become part of the circular bioeconomy. Taken together, these actions reduce carbon emissions, improve water quality, enrich our soil health and curtail solid waste destined for landfills (Plant Based Products Council, 2022).

Some initiatives, such as “The Economics of Ecosystems and Biodiversity”, state that all three concepts (Circular Economy, Green Economy and BioEconomy) are linked by the interest and effort to preserve nature and, in general, are applied based on the same concepts (D’Amato, 2021). It is necessary for these models to be adopted by companies to substitute the old ones, so they can face environmental issues and meet the new requirements established by policy makers and institutions.

For this aim, the inclusion of these principles in a company business model applied to vegan production can ensure positive impacts on the planet and society.

### ***3.2 Biocyclic-vegan Production***

In the following section, we will discuss a new trend named the “biocyclic-vegan” label that was introduced in Germany in 2017. It basically refers to the exclusion of any animal by-product during production.

The concept is based on a vegan approach and, indeed, in 2016, the producer association “Biocyclic-vegan cultivation” was founded. Their task is to support the biocyclic vegan agriculture by following the guidelines provided by The International Federation of Organic Agriculture Movements - Organics International (IFOAM Organics International).

This new production methodology is based on the combination of organic agriculture and stock-free agriculture, which emphasises the importance of using natural resources and, meanwhile, enables them to ensure their availability in the future, meaning that they do not have to be depleted.

Essentially, it is primarily based on excluding materials such as horn meal, blood meal and composted manure from farming in the land cultivation, and, as it aims to re-establish a healthy life cycle, coherent with the concept of a closed-loop approach, it is followed by a compensation for the resources that are used to guarantee their availability in the future.

Biocyclic-vegan production, in particular in the agriculture sector, is strictly based on the total exclusion of animal products and farm animals, a strategy which strives to persist in the following years, in particular in Germany.

The first countries in which vegan biocyclic was introduced and applied are Germany, Austria and Switzerland. They are also the ones which have followed the labelling guidelines since 2016, to be transparent about their production methods (Jürkenbeck et al., 2019)

### **3.3 Alternative Meat (plant-based and cultured meat) Production**

Since it is expected that animal products will be requested even more by consumers, there is an urgency to increase the production and distribution of alternative products, especially alternative meat products made through innovative food technologies able to reproduce the taste and texture of real meat and meat-based products.

The University of Nottingham (2018) has defined alternative protein as follows: *“Alternative protein, such as plant-based meat substitute, or edible insects, provides a substantial amount of protein, but requires less natural inputs (e.g., water) to produce, compared to the most common and conventional protein sources (i.e., meat and fish). They are also called ‘novel food proteins’ and are composed of different sequences of amino acids, which are responsible for building lean body tissues and human health.”*

An alternative protein of plant-based meat basically refers to alternatives to meat-based protein, which replace and replicate it not only in the taste and texture, but also in nutritional characteristics, by trying to be even more economically convenient than meat, contribute to the environment and decrease the negative health impacts derived from meat production (Wild et al., 2014; BCG, 2021).

One of the most important reasons to produce alternative protein and to adopt a different diet consists in the awareness of human health.

Meat causes diseases such as cancer and obesity in relation to its high level of saturated fat and cholesterol, while AP proposes funnelling its same nutritional benefits related to the level of protein and essential nutrients with relatively low levels of cholesterol, saturated fats and nitrates. (Chen & Eriksson, 2019)

Cultured meat, instead, is produced by culturing animal cells in vitro using tissue engineering techniques and is presented by its advocates as a good alternative for consumers who want to be more responsible regarding the increasing demand for food by

the growing human population but do not wish to change their diet (Chriki & Hocquette, 2020; Reis et al., 2020).

Alternative meat (i.e., plant-based and cultured meat) produces smaller negative environmental impacts with smaller GHG emissions, land use and water, but at the same time, since it involves activities which are highly processed and request a huge amount of energy, it can also be a threat for the environment (Tuomisto & Teixeira de Mattos, 2011).

This new production system is expected to acquire more attention from companies due to the growth of the demand for protein and the expected failure of traditional meat production, which would allow for the creation of new opportunities (Mancini & Antonioli, 2022).

Shifting to new sectors, plant-based meat can offer farmers the opportunity to diversify or completely change to the production of plants, algae, mycoprotein, seaweed, etc., and, at the same time, provide opportunities to companies by enlarging their offering and their markets (Luiz Morais-da-Silva et al. 2022).

However, not all scholars agree on the positive impacts of the production of alternative meat on people and the planet. Despite the promising purposes of these products, at the same time, there are doubts about the processing activities of AP, which can be considered as “ultra-processed food” (Monteiro et al., 2019). Indeed, health care institutes recognise that processed food can be linked to some health issues and diseases such as obesity, diabetes, etc, related to the presence of additives or flavour enhancers.

Moreover, by analysing a study conducted on the effects of the production of cultured meat, (Tuomisto & Teixeira de Mattos 2011) it has been seen that, by calculating the energy input of cultured meat, this could be relatively high due to the additional processes involved; however, this high energy consumption could be decreased by adding and improving various technologies. Table 1 summarises positive and negative aspects of the production of alternative meat.

**Table 1.** Positive and negative sides of the production of alternative meat

	<i>Health</i>	<i>Economic</i>	<i>Environmental</i>
<i>Positive</i>	Benefits that come from the reduction of meat consumption.	Possibilities for companies to expand their market; possibilities for farmers to enlarge their offering by diversifying or completely changing	Reduction of GHGs

<i>Negative</i>	Ultra-processed food which is doubted to be healthier	Increase in land use in order to grow the inputs necessary	A huge amount of energy used
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### 3.4. A Summary of Different Vegan Production Systems

In order to answer our RQs, table 2 summarises the characteristics of the three main vegan and plant-based productions, which incorporate principles of Circular Economy, Green Economy and BioEconomy in their business models. Other than proper vegan products, it has been important to also take into account the newest production system for cultured meat, which is done by using the same principles of AP products (i.e., bicyclic-vegan products), with the involvement of technologies to recreate protein products and alternatives to the real meat.

**Table 2.** A picture of different vegan productions

<i>Type</i>	<i>Description</i>	<i>Benefits</i>	<i>Categories</i>
<i>Biocyclic-vegan</i>	excluding materials such as horn meal, blood meal and composted manure from farming in the land cultivation	using natural resources and enabling them to ensure their availability in the future, which means that they do not have to be depleted. aims to re-establish a healthy life cycle	Algae protein; yeast; mycoprotein
<i>Plant-based</i>	Protein products made from natural resources, alternative to real meat in texture, flavours and aspect.	Eco-friendly, sustainable, and healthy affordability	more nutritious and more Pulses/legumes; Seeds; cereals; Seaweed. e.g. Pea, soy, chia seed, etc.
<i>Cultured meat</i>	cellular agriculture and is molecularly identical to conventional meat but produced through bioprocesses from animal cells extracted through biopsies	environmental and health benefits, reduced risk of contamination and food borne illness, as well as being more ethically acceptable	In vitro cultured meat cells



## 4 The Case Study of the Italian Vegan Start-up Joy Srl

Our next step is to understand if the application of the circular economy in vegan production is effective in terms of business sustainability.

Beyond the insight into new technologies for the production of alternative proteins, we will describe the business model of the small enterprise selected as an innovative start-up in plant-based production. Hence, for the purpose of our study, we have conducted a semi-structured interview with the entrepreneur, on the basis of the following research questions:

Materials, resources	Where do you find raw materials? What are the main resources used in the process? Is it sustainable? Is it harmful for our health?
Technologies and innovations	How do you produce the plant-based products? How does your technological process work? Is your production system sustainable?
Distribution channels, Revenues streams, costs Future expectations	What are your main distribution channels? Do you collaborate with other companies? What are your business costs? What are your future projects and expectations?

### 4.1 The Context

The selected case study is the Italian vegan start-up Joy Srl., which was founded in Piegario (PG) by the Musacchio family in 2014 to bring a healthy, sustainable and 100% plant-based diet to Italy through a collaboration with the Wageningen University and the development of a facility of High Moisture Wet Extrusion. These factors have led to the to the creation of the first “vegan meat” Made in Italy.

Looking back, the founder of the company, stopped eating meat when he was 19 years old and later with his wife and family opened a hotel, where they offered only vegetarian food to the customers. In 2002, the English Vegetarian Society even rewarded this Hotel with the “Best Vegetarian Hotel Award”. Given that the world has started to be more oriented to vegan food and that new technologies have been created to produce alternative products to the traditional ones, the entrepreneur decided to create Joy Srl. in 2014.

In 2019 a food line based on plant-based protein products called “Food Evolution” was launched (available at: About – Food Evolution). The first product proposed by the company was the “impossible chicken”, which is a plant-based chicken produced by a technology able to reproduce the same texture of real meat with the same flavour.

This product is made with soy protein, vegetable fibres, sunflower oil, flavourings, spices and aromatic herbs. These seem like basic ingredients, but the secret lies in the technology as explained by the small entrepreneur in an interview done in 2019:

*“The products are made by using a technology developed in the Netherlands at the Wageningen University. It stretches the protein cell into a filament. It's like making pasta: a mechanical and thermal process but with gigantic machinery. You can have a product with the same taste and texture as meat, but 100% plant-based. [...] This technology — he adds — allows the thermocoagulation of the product; that is, it is not altered if it is soaked in a sauce or oil (Vegolosi.it, 2021).*

As it happens, since Food Evolution was the first Italian and European company to produce “fake meat” through this new process, an insight into this type of technology is useful to understand why their products are sustainable for the environment and reflect the principles of the Circular Economy.

In 2019 the products produced by the company with this technology were restricted from 8 products (3 vegetarian and 5 vegan) to products that are only 100% vegan (i.e., fake chicken, beef, bacon, etc.), a choice primarily made due to the increase in their request.

Indeed, they have stated that their fake chicken is 100% vegan, gluten-free and has a high percentage of protein (from 22% to 25%). Furthermore, in 2019, all of their products obtained the “Quality Award 2019” (available at: Joy presenta la linea Food Evolution | Distribuzione Moderna, 2019).

The current company products, which are 100% vegan and include fake chicken, beef and burgers, are made of simple ingredients, such as extruded soy protein (water, soy protein 35%, vegetable fibre, natural flavour), sunflower oil, yeast extracts, salt seasoning, natural flavours and spices (Food evolution website, 2022).

In 2021 TuttoFood rewarded the firm with second place in the innovation prize for their fake chicken meat called “ParePollo” in the category “Better Future Award 2021” organised by the Gdo Week and Mark Up.

Their products have become popular due to an increased demand from not only vegetarians and vegans but also omnivores who care about the environment, animal welfare and their own health (available at: Gli straccetti ParePollo di Food Evolution vincono il premio Innovazione al TuttoFood 2021 - VEGANOK).

Based on an interview done with VEGANOK in 2019, the founder said that, in order to get omnivores to approach or switch to this diet, it is not effective to provide only basic

products, such as tofu, tempeh, seitan or legumes; it is necessary to produce alternative products which are as similar as possible to meat, and which replicate the same texture, flavours and experience of real meat, with the main difference that is not as harmful as meat-products (VEGANOK Speciale azienda: Food Evolution la vegan meat 100% italiana – VEGANOK TV).

The company is now also working on producing and developing products called “fake-fish” because the entrepreneur believes that it is necessary to provide not only meat substitutes but also fish substitutes to people that are used to consuming them (Table 3).

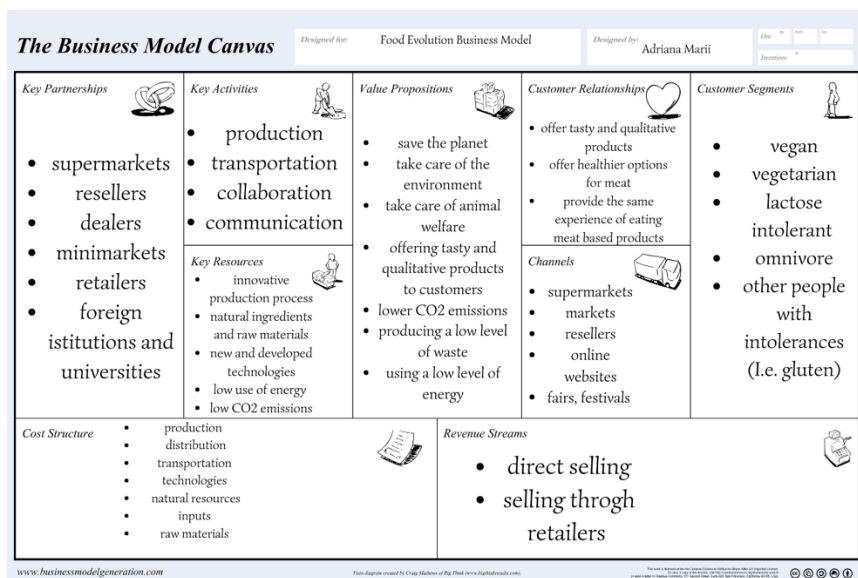
*“What has happened in the last year and a half with the pandemic should have taught us that investing in plant-based products, by now, has become an obligation. However, we must make sure that the products become better; push innovation on quality and mainstream consumers: it is the only way for the plant-based counter at the supermarket to be successful (interview made by Vegolosi.it)*

**Table 3.** *Chronological excursus of the most important events*

Year	Event
<b>2017</b>	Foundation of Joy Srl., a company which produces only vegetarian and vegan products.
<b>2019</b>	Restriction from 8 products (3 vegetarian and 5 vegan) to products that are only 100% vegan (i.e., fake chicken, beef, bacon, etc.)
<b>2019</b>	All of their products have obtained the “Quality Award 2019”
<b>2020</b>	Their products started to be sold in big supermarket chains, such as Esselunga
<b>2021</b>	TuttoFood rewarded the firm with second place in the innovation prize for their fake chicken meat called “ParePollo” in the category “Better Future Award 2021”

#### **4.2 A Sustainable Business Model for Vegan Production**

In the figure below is the Business Model Canvas of the company which underlines the most important key elements connected to the Circular Economy Model.



Overall, based on the entrepreneur’s interview, the company is working on respecting the ecosystem by minimising their CO2 emissions and using innovative technologies and natural ingredients which replace the use of harmful and fossil raw materials.

#### 4.2.1. Products and Market

*“Soy is, by far, the cheapest legume that exists, and, to produce our products, we use the cheapest production material that exists, and the most protein-based one, to satisfy the requests of consumers, and, most of all, the health and nutritional requirements that people need [...] Humans need the protein to live, and this is the most controversial part of the animal production industry. Indeed, if we give the animal the protein (i.e., soy) and then we eat the animals, we lose a high percentage of the power and the benefits of the protein contained in the legume” (interview).*

The philosophy of the firm is based on the necessity to make real changes by being proactive and being part of the system, especially to make the real revolution through being present in supermarkets and interfacing with the large associations of producers, with the large-scale retail trade (e.g., Vegolosi.it, 2021).

Considering the retailers, their products are sold both through online and offline channels.

In April 2020 their products started to be sold in big supermarket chains, such as Esselunga ([Esselunga: in arrivo la carne vegetale Food Evolution | Distribuzione](#))

[Moderna](#), 2020), vegan mini-markets or markets (i.e., “Vivi Bistrot Roma”, “De Gustibus”, “IVegan Roma”, and “Aliper”) ([Store Locator – Food Evolution](#)).

#### 4.2.2 The Process

In 2019 it was made an interview on “NX-Food” in which the founder declared that they managed *“to create a ‘meat-like’ structure which is absolutely unique, and that their industrial line meets the top efficiency criteria and features the most advanced technology and hygienic conditions (i.e., high care chamber production).*

To make the “fake meat” the owner explained again that they use *“this process with a high percentage of water in order to knead the protein flour; then, the proteic cellular has to be stretched at around 120-150 degrees in order to pre-cook the product. Afterward, the product goes through a laminator (i.e., a very cold stainless-steel tube), where the exchange of temperature, from really cold to hot makes, the cell close and the result is a product with high fibers. Indeed, this product has the exact texture of the meat due to the high presence of these fibers with close cells, which makes the product highly resistant”.*

Overall, *“The process is similar to the one that is used to make pasta” (i.e., for example, the one that uses Barilla), and to debunk the myth of the “highly processed food” he affirms that it is a false belief because “every food, even basic pasta, is processed.”*

The company is actually independent in its activities since they do everything in its plant in Perugia; for this reason, they do not collaborate or rely on other companies.

#### 4.2.3 Weakness of the Business Model

The founder provided a quick summary of how the plant-based market has developed by saying that it began to be “popular” when, a few years ago, people started to invest in big companies, such as Beyond Meat, which led people to continue to invest even more in the following years. However, this mechanism was not applied in Italy, and still nowadays, there is not enough return on investment to develop the market like in the US.

*“The value of the total plant-based Italian market is only € 50 million, which is really low considering the fact that it also includes big and famous companies, such as Valsoia, Kioene, Findus, etc”.*

For example, Food Evolution has been working on producing a vegan sausage for two years but is still not able to put it on the market because there is not enough financing

from outside the company. *“There is still a high amount of greenwashing which makes it difficult for investors to see what is really sustainable and what is not.”*

*“The company, at its foundation, decided to invest around €10 million to build their establishment in Perugia to be able to produce high-quality products independently. Other firms, on the contrary, decided to invest their money in marketing advertising and the production of their products in other countries where the cost of production is lower. Food evolution would now require more €4 million to also develop marketing, but nowadays it does not have a sufficient amount of money”.*

This is a main weakness of the company because, in order to reach more consumers and sell more products, the company should increase Italian people’s awareness to show them that these kinds of products exist.

The owner added that a lot of people comply with the fact that plant-based products are more expensive than meat. The prices of plant-based products sometimes are higher than the meat ones because the amortisation costs are split on a smaller production. *“But people do not consider that in order to produce meat products there are a lot of investments involved to support it, but they are distributed over a large amount of production, which reduces the final cost of the product for the consumers”.*

During the interview, the owner said openly that the company is now suffering from a high decrease in sales, which results in a lower income in comparison to previous years.

#### **4 Discussion and Conclusions**

This case study has helped us to integrate a new business model, based on vegan food production, with the uncovering of the high moisture extrusion production system.

By analysing the processes and the strategies applied by the company, we can assert that they are working through a circular model since they have aimed to optimise the economic processes of production and consumption in the use of the resources that underlie all the products.

Furthermore, the process of high moisture extrusion can be associated with the “circular bioeconomy” (CBE), which we have seen refers to the concept of bioeconomy integrated with elements of CE (Institute for European Environmental Policy).

We could say that the example of Food Evolution has confirmed our initial statements since the starting point of our study focused on the possibility of using new technologies and the overall effects on the environment.

Firstly, it is possible to produce products by using mostly natural raw materials (i.e., legumes, vegetables, soy, etc.) and natural resources; moreover, it may reduce the amount of CO<sub>2</sub> emissions which, as said before, are mainly methane and nitrous oxide. Hence, the reduction of emissions and negative consequences on the environment has been confirmed by the production of fake meat. However, as it happens when new technologies are applied, there are some new environmental impacts to take into consideration, since some scholars advocate that this process will require more energy levels and the consumption would be on the higher side in order to maintain the moisture content.

This leads us to the open question of whether this process can be included in the concept of “responsible innovation”, which can be realised with the contribution of circular bioeconomy through the usage of innovations and technologies, across sociotechnical systems, knowledge-producing and decision-making capacities, yet involving a broader range of actors, such as societal stakeholders, humanities, and sciences, with the aim of balancing social and environmental issues (Kershaw et al., 2021).

This case study has helped us to integrate our analysis with the perspective of the vegan production applied by a small Italian company and revealed some of the weak points of the business. First and foremost, there is a need for funding to support a business that has not yet reached break-even volumes. It is evident that if we want small start-ups to be able to survive independently, without being swallowed up by large multinationals, policies that support companies with plant-based products, and stimulate more investments, should be implemented.

Our study opens up future research in three different but interrelated directions:

- First, as our case study shows that the application of new sustainable business models is not a sufficient condition for a business to be economically sustainable. This is especially true when new technologies require considerable investments; small entrepreneurs alone do not have the financial resources to be able to realise innovative projects. This aspect is worthy of an in-depth study and offers insights both with regard to the search for partnerships between large and small companies and the evaluation of public policies to support particular sectors of our economy.
- Then, our need for an in-depth analysis is related to the technological production process of AP products, especially of the high moisture extrusion applied not only by the Food Evolution company but also by the majority of vegan food

producers. This process appears to be sustainable since it produces fake meat and leads to the reduction of intensive farming, which is connected to the production of CO<sub>2</sub> emissions. However, at the same time, the process requires a consumption of energy levels, for which the precise amount is still unknown. The data that we have available right now are still not sufficient enough to provide proper answers to these questions.

- Finally, there is still an ongoing discussion about alternative meat and its real effects on the environment and human health, being “ultra-processed” food.

To deepen this debate, we deem future research should embed an interdisciplinary approach with inputs from scholars in biotechnology, human nutrition, medicine and management.

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