



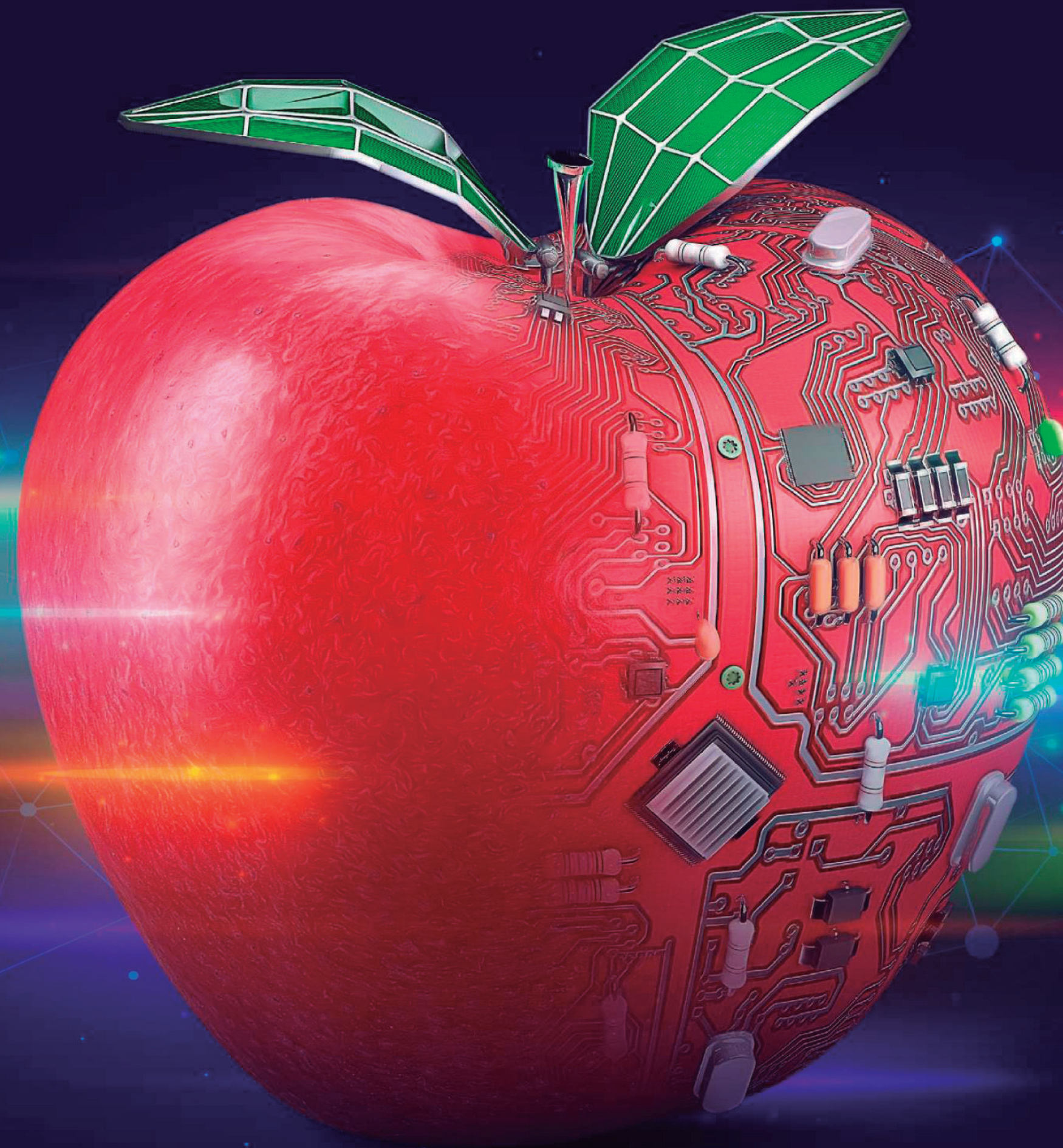
**FOOD 4
FUTURE**

**BILBAO FOODTECH
WORLD SUMMIT**

15-17 JUNE 2021

BILBAO - BEC

#F4F2021



FOOD4FUTURE SUMMIT 2021

FINDINGS

WHAT WILL YOU FIND IN THIS REPORT?

- / **Brief informative descriptions** of the most relevant aspects dealt with at F4FWS 2021.
- / A holistic **view** of what is moving in the food system.
- / **Inspiration**, through company innovations and businesses to respond to the changing context and meet new market demands.
- / Some **powerful questions** for reflection, to coordinate change, stand back and activate new prospects... which take us to F4FWS 2022.

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WHY THE FOOD 4 FUTURE SUMMIT AND WHAT HAPPENED AT THE FIRST ONE IN 2021

The agrofood industry is one of the most important sectors worldwide. It has been immersed in an unprecedented transformation process: a food-tech revolution with a great deal of innovation, though also with many challenges to face in order to become a more digitalised, sustainable and competitive sector in coming years.

Disruptive innovations, advanced technologies and new business models are trying to respond to major challenges affecting the sector, such as demographic growth of the population or sustainability, where digitalisation and the surge of new ingredients are positioned as some of the industry's main areas of development. The impact pursued is clear: **care of the planet and of people's state of health and wellbeing, thereby helping achieve several of the United Nations Sustainable Development Goals.** The first concerns the streamlining of current supply chains and production processes to improve efficiency and generate positive impact in the surroundings. The second concerns changing consumer priorities and promoting new more sustainable and healthy forms of consumption.

Many things are happening very quickly, which are and will be key to defining the future of food. And the food value chain is situated in a key moment full of opportunities to change the future. That is why **Food4Future, a global movement for the food revolution** was born. Food4Future is much more than an event; the summit is only an annual meeting point for all actors who want to be part of that change.



ROGELIO POZO
CEO AZTI

Food4Future has also demonstrated that **this is 'the time' for the food sector and food-tech: investors are keen to enter the sector**, they want to join in food processing and support disruptive projects in this area: alternative proteins, new ingredients created by precision fermentation, nutrition based on '-omic' sciences, more sustainable packaging, 3D printing of food, fast pathogen detection methods, etc. Also, new businesses are emerging which will act as job sources for the entire food value chain.

HIGHLIGHTS OF F4F2021

THE HUMAN BEING AND FOOD

Diversity and flexible adaptation is the basis of our society. Our species has survived because we are able to have different diets and make adjustments based on places. We humans are constantly evolving – culture genetics, etc. We have common basic needs, though our identifying traits come from the local context in which we move: genetic evolution, culture and geography.

How we feed ourselves depends on three factors:

- What we choose as food, based on different criteria (nutrition, safety, health, culture, religion, etc).
- What is available for us (geographic, productivity, land, etc). Variety as the basis of food production and consumption.

Where are we going?

- Access to sufficient and safe food as a fundamental human right.
- Shift to healthier diets.
- Processing in food production: more efficient, reduction of environmental impact (gas emissions, pollution, water and ground use, food wastage, etc).
- Variety as the basis of food production and consumption. Diversification of production in species (plant and animal) and manners of production.

A holistic approach is needed to achieve a healthy planet and food system. And science and technology doubtless play a huge role in realising that aim.

The behaviour of companies and people must change to make progress in this food revolution.

IS INNOVATION PROFITABLE?

Innovation is beneficial and profitable. It can help brands grow and capitalise on trends. But only if it is systemic in the organisation: continual, innovation as strategy and as investment.

It is important to understand in terms of the development of products and services when the time is right to launch innovations on the market: if done too soon, the market probably won't be ready, because it doesn't understand the innovation; if too late, the solution may no longer be so innovative and have a lot of competition.

Innovation is profitable when it begins to be tested and improved, continually pivoting to scale up. Regarding alternatives to animal protein, there has been clear evolution in both innovative concepts (first products with long lists of ingredients and the shift to fewer ingredients and healthier formulas) and production cost. This doubtless impacts product end-prices, which people can increasingly afford, making the innovation more accessible.

One of the greatest current innovation opportunities stems from the collaboration between startups and corporations. But their aims are entirely different: the corporation tends toward control, while the startup tends to disrupt what already exists.

When an emerging company considers the reasons for working with a corporation, the main motive is to enhance its technological capability. From the company's standpoint, **the main benefits of working with a startup** could be:

- To identify new business models, new opportunities;
- To reduce the risk of innovation, by sharing it and cutting the cost of generating innovation;
- To speed up innovation processes and time-to-market;
- To boost internal creativity;
- To enhance companies' competitive position.

How should a corporation and a startup collaborate?

- Findings (to boost visibility): support for the ecosystem, capture, challenges, real cases.
- Development (to know the ecosystem): pilot projects and design alliances, incubators, accelerators, corporate venturing.

- Associations (active collaborations and knowledge): commercial agreements in production, distribution and co-branding and corporate risk fund (investments).
- Integration (benefits and growth): mergers and acquisitions and spinoffs.



Sustainability

Sustainability is still the food sector's Achilles' heel. And it has become an 'added value' and a must in strategies for the sector.

Given the state of climate emergency in which we find ourselves, the world needs to 'do more with less' and to shift from a degenerative approach to a regenerative one.

Sustainability is acting as the main axis of the food chain. The European Union is pursuing a clear objective: to transform the way of producing and consuming food to reduce the environmental footprint of food systems, to boost resilience vis-à-vis the crisis and at the same time ensure the availability of healthy and affordable food for the current population and future generations.

With the aim of progressing toward a sustainable food system from a holistic standpoint, it is important to consider three axes: environmental (positive or neutral impact on the environment), social (benefit for society) and economic (that it be profitable).

Lower CO₂ emissions is the goal the food sector most desires. Improved efficiency of processes (minimising energy consumption and use of resources) and the fight against food wastage are some of the main challenges considered at the Food4Future congress. Furthermore, the switch to circular consumption and production models is becoming a survival imperative for companies and individuals. The goal: to place value on waste as a source of resources.

The other major axis dealt with at length at Food4Future concerns the new protein sources. In this regard, besides the protein alternatives to meat which are revolutionising the sector (obtained from plants, insects, cell cultures or by fermentation), the marine path is being explored as an alternative source with respect to protein from land. The European 'blue bio-economy' growth strategy calls for achieving healthy seas and sustainable use of their resources, with novel initiatives such as the use of algae and marine phanerogams or research and innovation around cellular aquaculture.

Finally, it is not just necessary for companies to take action, seeking the 'positive impact', rather, they have to act to communicate and convince people who consume, encouraging changed atti-

80% of consumers consider that manufacturers and distributors are responsible for managing waste and supporting the environment. And the companies have to work this and communicate it.

(Source: NielsenIQ).

tudes and more sustainable choice with solid criteria based on science in the complex world of sustainability declarations.

In the next several years collaboration and innovation will intensify to create business models that reconnect industrial processes with the cycles of nature; more investment will be made in designing products and processes that have a regenerative effect for the planet.

THE CONSUMER AND SUSTAINABILITY

Concern about the planet's future is changing views about food. The new trends indicate a consumer profile that is more selective when purchasing and more demanding with respect to environmental protection, animal wellbeing and social responsibility of brands. The adoption of a flexitarian approach to food (with growing demand for plant-based products), a greater propensity to acquire food that is local or from nearby or the positive value of labels that provide information about the carbon footprint of food products are some manifestations of this change.

The carbon footprint is one of the current trends in food innovation and this is reflected in the upsurge of products that respect the environment which include declarations about their positive impact and aim to make citizens more aware of what they are buying.

SUSTAINABLE BUYING

- Half of households (49%) around the world affirm that the COVID-19 pandemic has made **sustainability even more important for them**. The percentage of eco-active households grew from 16% in 2019 to 22% in 2021. This study also indicates that the market for environmentally sustainable food will double in the next five years. (Kantar, "Who Cares Who Does" study).
- Consumers from all of Europe have indicated their **willingness to support local companies** (in Spain, especially those over 45 years old) (Mintel).
- After the health crisis, 52% of Spanish consumers declare that they will pay more attention to **brands committed to society** (AECOC Shoperview).

There are four decisive axes when it comes to making sustainable purchases: plastic, wastage of food and resources (buying the right amounts, saving and family financial problems), changes in

diet (according to Lantern, 13% of the adult population identify as veggie – vegan, vegetarian or flexitarian – an incipient trend, though many products are on the market) and proximity (consumption of local brands and products from nearby, purchases in neighbourhood shops or directly from suppliers).

MOTIVES AND BARRIERS REGARDING NEW PROTEIN SOURCES

A study conducted in the framework of the Future Protein project, financed by EIT Food, revealed interesting data about motivational factors as well as barriers for the consumption of novel and alternative protein sources such as those coming from insects, hemp, macro-algae and micro-algae and lentils, etc.

The study was carried out in the year 2020 in three countries (Spain, Germany and Denmark), with interviews of a total of 1,500 consumers.

The **common factors that move consumption of these new proteins** are:

- Taste and flavour: found in the top three motives in all the countries;
- Nutritional aspect: also among the top three motives in all the countries;
- Price;
- Environmental sustainability and naturalness – third position in Spain and Germany and seventh in Denmark.

Among the main **barriers to consumption of alternative proteins** are:

- High prices: holds the top position in all the countries, approximately from 55% to 59% of survey respondents);

- Convenience: limited availability in shops and lack of knowledge about how to prepare meals;
- Sensory aspects: consumers don't like the texture, flavour, etc;
- There is no local production.

Among the new proteins, those of plant origin are the most consumed. Chickpeas, lentils, soy, peas, chia seeds and algae were some of the most common new protein sources that the survey respondents were willing to try. In Spain, they were reticent about trying hemp and microalgae, and insects are not seen as a sustainable protein source. Vegetable proteins are what they consume the most and insects are not considered sustainable.

HOW TO WIN THE CONSUMER OVER TO SUSTAINABLE OPTIONS?

Citizens are convinced that sustainable food options have to form part of their shopping basket, though there is still a gap between intention and action. Conscientious consumers are doubtless on the rise and this may be due to growing awareness and concern about the impact on health and quality of life of the deteriorated environment in which we live (contaminated oceans, pollution, plastics, etc).

The big challenge for motivating the consumer to make sustainable purchases is to convert intention into action. Some formulas connect this to the necessary improvement of our ecosystems and daily life. Also mentioned are positive strategies for compensation and incentives for sustainable behaviours.

Some **recommendations** from companies that have faced this challenge and obtained good results are:

- Define your 'pole star' – have a purpose beyond a product portfolio. People hope you have a positive impact and make a difference as a company;
- Switch from saying to doing – carry out real specific actions (**the Bolton case:** tuna with 100% Responsible Certification since 2020);

- Begin a movement – get everyone involved, build ecosystems that give a voice to employees, consumers, customers, etc. And challenge them to take action with your brands;
- Extreme transparency to build trust. If you don't facilitate access to data, consumers will look for it in other sources elsewhere!

Communication also plays a vital role in the sale of sustainability. According to the Kantar consultancy, many efforts by brands regarding sustainability are not perceived. We have a great deal of information, but we need direct and transparent communication, which the companies are doing to be more sustainable. Information based on rigour, data and science.

The challenge is for people to understand the information and act in consequence. It has been deemed necessary to have tools to make more informed choices. And the lack of understanding causes the inevitable loss of trust.

But communication must above all be fluid; there should be interaction and not just traditional bi-directional communication: all actors should be empowered to play an active role in the change.

ALTERNATIVE PROTEINS, THE NEW LEAD PLAYERS OF THE FOOD PANORAMA

There are currently four fundamental pillars in the development of alternative proteins:

- Cell cultures;
- Plant-based;
- Insects;
- Fermented ingredients (by cultivating algae, bacteria, fungi and yeast).

Alternative proteins are not 'the solution', they are only part of the solution, where consumption cultures must in parallel shift to a culture of vegetable product consumption.

	Cell cultures	Plant-based	Insects
Pros	<ul style="list-style-type: none"> - Animals not involved in their processing. - Require less land and water than conventional meat. - Reduced greenhouse gas emissions. - Food safety. - Ready technology. 	<ul style="list-style-type: none"> - Diverse ingredients. - No regulatory barriers. - Good consumer acceptance. 	<ul style="list-style-type: none"> - Very high nutritional profile. - Much and easy availability. - Good technological properties. - Neutral flavour.
Cons	<ul style="list-style-type: none"> - Still developing scalability and achievement of affordable prices. - Authorisation in Europe will still take time. - Generates reticence among consumers. 	<ul style="list-style-type: none"> - Limitation of essential amino-acids. - Low protein digestion. - Less appealing sensory perception. - Lack of novelty. 	<ul style="list-style-type: none"> - Lack of regulatory clarity and speed. - User perception regarding insects in food.

PLANT-BASED PROCESSING

Plant-based diets have substantially increased around the world in recent years.

The food innovation panorama shows us that **plant-based** is a revolution that is taking place with a notable increase in the launch of new plant-based products that imitate products of animal origin. While dairy analogues and meat product analogues have been the lead players so far, they are currently giving way to other more disruptive innovations such as fish and shellfish analogues.

The adoption of a flexitarian approach to food (diets based mainly on plants) will be key in coming years if we want to achieve the climate goals set for 2030 at European level. But the food solutions based on plants or cell agriculture will not be the 'magic' solution to slow down climate change.

In Europe the plant-based market increased by 49% in 2019-2020, with Germany, the United Kingdom and Spain the leading countries in consumption.

The main ingredients of the plant-based economy are cereals, seeds, legumes and algae. Soy is at present the plant protein most used in the world; other important ingredients are wheat and legumes.

Among the main levers promoting this dynamic process and promising market are social movement, government support and financing.

One of the sectors with more potential and future projection is the plant-based meat sector, which according to forecasts will eventually account for 10% of the market for meat in 2025 and 60% of the total market for meat in 2040. However, there are still major controversies, more in the business than in the social realm, concerning the relegated role assigned to traditional meat in diets in coming years.

Why consume meat substitutes, if we can consume that same raw material fresh and without processing? Convenience and the time of consumption make consumers seek new ways and formats for consuming an ingredient.

10.8% of the Spanish consider themselves flexitarians (4.2 million people), 39% more than 2 years ago. They limit the consumption of products of animal origin, without eliminating them entirely from the diet, the main reasons being health, animal wellbeing and sustainability.

(Lantern, The Green Revolution 2021).

Will traditional livestock farming end up disappearing? Or will that production sector have to be reinvented and a global balance between consumption and production sought, enabling this industry to make a real transition toward a sustainable and less intensive model?

THE PROMISING INSECT PROTEIN MARKET

The use of insects as a raw material points to an interesting future in the food panorama. Insect farming is a new production model that has to be integrated as part of a global chain. This industry is expected to generate 100,000 jobs in Europe by 2030.

Why insects? Some of the main arguments.

- More efficient and sustainable alternative protein source (advantageous production conditions).
- Classified as a super-food.
- Promotes the bio-economy and circular economy in agriculture and industry.
- Towards zero waste and positive environmental impact.
- Reinforced by new European Novel Food regulations.

Regarding applications, 80% is for animal feed.

For human food, dehydrated insects have been approved as a topping and as ingredients for snacks or very specific preparations. The insect species that has been approved is *Tenebrio molitor*, which counts three main nutrients: protein, chitin, fats.

One of the challenges for this sector is conditioned by restrictive European regulations, for despite their approval as a novel food, it is expected to take several years for such products and ingredients to be standardised and introduced in greater volume in the European market.

Following the first approval in Europe of *Tenebrio molitor* larva in different food categories, new products have begun to be launched which contain flour made from this insect, such as a snack in Portugal (*Tasty Mealworm Snack de Inseto Tenebrio Molitor com Pimenta Cayenne*) which states that it is sustainable, tasty and protein-rich.

This will be followed by the rest of the pending authorisations, as long as they have a favourable report from the European Food Safety Authority (EFSA). Eleven insect derivatives are being eval-

uated by the EFSA and another four are in the documentary analysis phase.



Health and Wellbeing

The pandemic has heightened the value buyers place on healthy food as well as the safety and quality of food. But the purchase of food and drinks has a strong emotional component, which means that taste is not negotiable.

The driving force for health, wellbeing and food use is the alarming global prevalence of chronic disorders associated to diet, where the approach to proper eating is now preventive.

- Some 41% of Spanish adults plan to follow a diet that reduces the risk of suffering from disorders associated to lifestyle, such as diabetes (Mintel).
- Some 48% of the Spanish consider that healthy food is too expensive to be bought habitually (Mintel, July 2020).

Obtaining better levels of health among the population has implications at different levels, from the **reformulation of food products** to improve their nutritional profile and reduce the level of processing, to promotion of the consumption of fresh, local and in-season products or the ability to ensure universal access to food products needed for inclusion in a balanced diet. Functionality is also becoming a value driver and is inspiring product innovation in areas such as support for immunity, intestinal health or support for mental wellbeing and relaxation of consumers.

But without a doubt the hot topic at Food4Future in this area was **personalised nutrition**, a clear and promising strategy (very linked to technology) to progress to a food system totally adjusted to individual needs. One of the main challenges for the evolution toward a food system model based on precision nutrition involves the gathering of data and knowledge, where science plays a significant role in achieving advances in the areas of genetics and the micro-biome, etc.

And once again with respect to citizens, success will come from the hand with the know-how able to clearly transfer this knowledge so it can be used to make decisions to improve health. Yet it



is still an ambitious goal, to eventually be able to shift the impact of diet, with obvious improvement in people's state of health and wellbeing. If science needs data on persons, what could be better than involving them in scientific processes to boost their confidence?

Another challenge dealt with at Food4Future was the necessary joining of the concepts of health and convenience.

THE NEW HEALTH AWARENESS OF CONSUMERS

According to data from the AECOC Shopper View platform, for the consumer, healthy food use means:

- Prevention of disease (92%);
- Care and improvement of physical state (91%);
- Care and improvement of image (85%);
- Care and improvement of the spirit and mental health (86%). This is not a direct benefit explicitly sought; it is more in indirect form.

7 of every 10 people search for information about health and eating habits; the most-used information sources are word-of-mouth, websites and medical doctors, etc.

27% spend more on fresh products.

24% spend more on food complements.

Ecological products and those from nearby are among the priorities of shoppers to have healthier eating habits (50% buy more products from nearby (km 0)).

56% search for functional foods that bring benefits.

35% search for products that help the immune system.

Once again in this area of health there is an evident need to transmit true and trustworthy information that comes from science to citizens. And it should be simple and clear, understandable for the pedestrian consumer. One of the lines indicated for knowledge transfer regarding scientific evidence while at the same time building a relationship of trust with people is to get them involved in the scientific research (the case of the **American Gut Project**, a citizens' science project open to the public).

CONVENIENCE AND HEALTH

Convenience and health are two concepts that remain far away in our perceptions, although major development efforts are being undertaken, and are one of the current challenges regarding food use.

Snacking is maximum convenience, where the crucial factor on which product development pivots is sensorial (fundamentally taste), though it is apparently distanced from the health concept. Some actions being taken in the sector by some companies to bring traditional snacks closer to a healthier concept involve:

- A clean label (few ingredients and natural ingredients);
- Inclusion of more fruit and vegetables;
- Eco/bio;
- 'Free of' label;
- Nutriscore -1.

Healthy Snacks project: for two years flours based on cereals, fruit and super-foods have been combined – products with a health aura. Extruded and baked, so they can make sense as a snack.

Some of the challenges being worked on concern what ingredients supply what functionalities.

Also interesting was the discussion on the influence of eating culture and cuisine, with respect to health and the consumption of certain kinds of products. Older people are more likely to include healthy food and diet and kitchen culture routines, etc, and have a more holistic view of eating, because it is what they have *experienced*: "eat everything so that you lack nothing". However, the younger generations do not have such a holistic concept; they have lost the most comprehensive view of diet and healthy habits, because it is what they have *learned*: "I exclude some food categories which I will not consume".

PERSONALISED NUTRITION, A SHORT-TERM FUTURE FOOD PROSPECT

The advance toward more personalised nutrition in accordance with each person's needs and his or her ethical values is clear. We are evolving toward precision nutrition, where more knowledge about our genes, our micro-biome, and real-time monitoring of what happens in our body will help optimise our diet and prevent certain disorders with high prevalence in society such as obesity, diabetes or cardiovascular diseases.

When speaking about personalised food or nutrition, the key is to think about how food can help us prevent dysfunctions or disorders. We should work on prevention before eventually working on management.

The progress toward precision nutrition requires information (data) about people's health. Personalised nutrition includes many techniques that can be applied at different specification levels.

Digitalisation

The food sector needs to change the production system and progress toward more efficient, connected and versatile systems; technology is a crucial tool to that end. The technological revolution has definitively arrived at food and will require a process of gradual introduction.

Appropriate digitalisation and connectivity of processes along with the so-called 4.0 technologies allow the interchange of objective information throughout the food supply chain, enabling a new connected and smart value chain concept, where production is adjusted to a predictive model and to demand cycles, so that food wastage and the environmental footprint can be reduced and food quality and safety improved.

At Food4Future digitalisation was dealt with from different approaches, from the use of big data and artificial intelligence to resolve the main challenges of agriculture, including the impact of robotics and human/machine symbiosis on value generation and advanced traceability, to the use of digital platforms, cyber-security and data sovereignty.

Progress toward the **smart factory** was the main thrust of the content on this subject, where discussions focused on cultural change in organisations, experience in working with startups to speed up digital change in companies as well as decisions based on data generation and management. Some lessons were learned from the shared experience: make technologies easy to understand, implement and visualise the benefit, make data accessible and valid, obtain early feedback and streamline processes.

To convert to a **data**-driven company has become one of the pillars for the digital transformation, where data is transformed into one of the main assets of an organisation, although security and mistrust continue are still barriers of the data economy.

Digitalisation is also the driving force that moves e-commerce and omni-channel retailing, strategies which should be prioritised for the sector. **New business models** that require traceability and transparency, to build trust among the different actors in an on-

line world while at the same time improving the user experience, are at the centre of the strategy.

Linked to this more experiential part, the internet of the senses, Tokyo University professor Adrian Cheek presented different multisensory projects which they are involved in and discussed how to digitalise the senses and make it possible, for example, to actually experience smell via mobile devices.



CASE STUDIES AND IMPACT SOLUTIONS

Many interesting projects and initiatives were presented at Food4Future. We showcase some of them:

“THE AMERICAN GUT PROJECT”

A citizens' science platform open to the public which aims to study the microbes that colonise human niches and their relationship with health and lifestyles.

BEST FARMERS

A platform to enhance the value, visibility and recognition of the world's producers. The website contains detailed information about the producers: history, values, where and how to buy their products directly. Also, a network of chefs who act as product prescribers; once a year an event is held, where prizes are awarded in various categories.

BICO DE XEADO

From the Provincial Agricultural Cooperative of A Coruña. Reinventing the dairy sector through the production and direct marketing of artisanal ice cream made with milk from its farm.

BOLTON FOOD

Encouraging consumers toward sustainable purchasing of fish products.

MSC (Marine Stewardship Council)

Its Week of Sustainable Fishing campaign: an example of how to successfully inform consumers about sustainability. A positive communication initiative around traceable fish from sustainable fisheries. Organised with the collaboration of a network of ambassadors who communicate the same message at the same time. Complex topics converted into simple and understandable messages that are able to connect with citizens.

AIR PROTEIN

A disruptive form of producing protein. The meat alternative uses proteins made from air by means of a process that transforms CO2 into an ingredient with the same nutritional profile as animal protein.

FEDEPESCA

The transformation of the retail fishing business in Spain to provide incentives and facilitate the consumption of fresh fish by all generations through e-commerce, new products that generate new consumption occasions or by means of new business models, such as, for example, hybrid shop concepts with the possibility of tasting fish on the business premises.



FoodTech Innovation Awards 2021

These were the innovations awarded prizes in the context of Food4Future ExpoFoodTech:

CHEMOMETRIC BRAIN

For its quality control software that uses artificial intelligence and machine learning to identify the components of any ingredient or food product in powder, liquid, solid or gel in only a few seconds.

BLENDHUB

For the deployment of a comprehensive network of localised food production centres that supports anyone who launches food and nutrition products in a faster, safer and cheaper form, offering infrastructure as service.

DEEP DETECTION

For Photonai, a multi-power x-ray camera with photon count designed to detect foreign bodies, defects and imperfections with higher resolution and less transmitted energy than what is possible in current manufacturing.

HEALTHY FOOD IBÉRICA

For Verdeo, a solid fat based on olive oil.

NUCAPS NANOTECHNOLOGY

For its food protein nano-capsules for oral administration of bioactive ingredients, drugs and probiotics.



Startup Forum

At Food4Future various cases of collaboration between companies and startups were presented, transmitting the needs to create startup ecosystems that pivot around the corporations that drive innovation and provide implementation speed.

After mapping 2,000 food-tech startups worldwide, more than 200 were presented, of which 20 were selected to present their disruptive value proposals. Of those, 16 presented their innovative solutions and had the opportunity to connect with the sector.

The winner of the Food4Future Prize for the best startup was Cocuus, for its 3D-printed artificial meat chops.

16 emerging companies – 16 disruptive solutions to meet the challenges of the agrofood industry.

COCUUS

The problem

Need for industrial solutions to produce alternative proteins.

The solution

Bio-printing and biosynthesis of new food. Geriatric hospital printing.

Its MimETHICA platform was designed for large-scale bio-printing of plant-based products, analogous to traditional animal protein ones.

Business model: sale and leasing of royalties and machinery.



FOOD SOURCING SPECIALISTS

The problem

Global challenge of a plastic-free future. Growing demand for sustainable alternatives.

The solution

Flexible film made of plant material, compostable at home, for dry and semi-liquid products. Long service life (12 months).

B2B model.

AGRICOLUS

The problem

Environmental and financial sustainability of agricultural businesses.

The solution

Cloud platform for smart and precision agriculture based on data capture in the land being monitored; predicts and makes decisions.

Business model based on an annual subscription model.



PROPOS AI SOLUTION

The problem

Need to streamline and improve the buying experience at point of sale. Automated point-of-sale processes with low contact in the pandemic context.

The solution

Real-time recognition of food with artificial vision and autonomous payment model for the food service/hotel industry and retail. The buying experience is improved while automating data generation for customers and other stakeholders (suppliers, etc).

B2B model.

BIOTECH FOODS

The problem

Impact of traditional meat production systems in the area of climate, health and animal wellbeing, health risks of meat-rich diets, while global meat consumption continues to rise.

The solution

Technology for meat cultivation in laboratory, by means of which high-quality protein is obtained, an alternative to traditional meat protein.

B2B model: alliances with the food industry to create new foods.

COLOR SENSING

The problem

Wastage of food in the food supply chain: quality control of packaging, cold chain, returns, expiration, etc. There is no traceability of the real state of product preservation during the respective shelf life.

The solution

Smart labels for packaged food products and automatically readable algorithms that help monitor freshness of products throughout their shelf life and cut costs and generate more value for producers and retailers by minimising food wastage.

B2B business model.

CASE STUDIES AND IMPACT SOLUTIONS

MEFOOD OMICS

The problem

Epidemic of obesity and other disorders associated to a poor diet. Need for solutions that increase adherence to healthier diets and changes in behaviour.

The solution

Personalised nutrition system meant to improve health by using real information about persons. Multilevel system according to available personal information which evolves with the behaviour of each individual. Integrates '-omic' sciences with technology (artificial intelligence and machine learning). B2B and B2C products.

B2B: platform for health professionals, helps design new customised products for the food industry and the hotel/food service sector.

B2C: app and personalised kits.

DYNAMEAT

The problem

Not much flexibility in menus and prices of restaurant services. The offering stagnates.

The solution

Smart menus and dynamic prices that optimise and customise what end-customers are offered, maximising restaurant profitability by optimising income based on data (demand, etc).

Business model: monthly fee depending on the restaurant's invoicing.

OSCILLUM

The problem

Food safety and food wastage.

The solution

Smart labels that acts as a decision-making tool for industry, retailers and consumers, a sustainable indicator (avoids food wastage) and food safety tool (expiration, bad state) which can extend the life of products.

NUCAPS

The problem

Difficulty of including and absorbing ingredients of high nutritional value.

The solution

Technology for nano-encapsulation of bioactive and probiotic compositions with food proteins (natural, healthy and biodegradable) that enhance stability, shelf life and controlled release of active ingredients, etc, boosting their absorption up to thirty-fold. Final product: dry easy-to-dissolve powder.

These capsules can be used in different foods to improve their nutritional profile without altering their flavour or smell.

B2B model: developers for makers of ingredients, foods and nutritional supplements, etc.

PALAU PROJECTS

The problem

Lack of transparency and trust in prices, impact of products on health and the planet.

The solution

Platform which after scanning the product at point of sale enables analysis of its ecological, nutritional and financial impact. The benefit for the end-customer is reinforced trust and physical (optimised diet), emotional (helps cut back emissions) and financial (saved money) improvement.

B2C and B2B model (retailers).

VOLSTSTONE

The problem

The food sector has many instances of inefficiency, because data is not collected efficiently in real time to facilitate decision-making.

The solution

System of high-resolution cameras for the food industry which detect errors and problems in production lines in real time to reduce shrinkage and wastage of raw materials and plastic.

B2B model.



MACCO ROBOTICS

The problem

Productivity and labour conditions of people in the hotel sector. To minimise risks of contact and transmission of COVID-19 in restaurants/catering.

The solution

Robots that enable food and drinks to be safely prepared and which are programmed to take orders from the kitchen or bar to tables, as well as to disinfect different spaces.

Robots that boost productivity and operating hours and increase the profit margin of these sectors (reducing the cost of preparing food). It is a hygienic and stress-free solution.

B2B model.

BIOBEE MICROELEXtrONICS

The problem

There is currently no systematic traceability of critical parameters in a high-value product such as cured ham. Controls are conducted with destructive random tests in laboratory.

The solution

The first device that measures the critical parameters of cured ham, such as salt content, fat coverage, etc, enabling data to be obtained quickly and non-destructively; 100% of production can be tested.

INSEK LABEL BIOTECH

The problem

We are eating the world to feed ourselves! New sources of food and alternatives to traditional meat protein are needed.

The solution

New protein concentrates with very specific properties based on the insect *Tenebrio molitor*, recently approved for the food (beverages, gels and spreads and food for children, the elderly and sportspersons), nutraceutical and pharmaceutical sectors.

Concentrated markets: B2B focus.

DATA VALUE MANAGEMENT

The problem

Production process inefficiencies that lead to production line shrinkage in the food industry.

The solution

Platform for data analysis and exploitation to boost knowledge (data transformed into relevant information for decision-making), process automation, predictive systems and made-to-measure projects.

Detection of stoppages and micro-stoppages in AI production lines.

Detection and prediction of production line shrinkage.

CASE STUDIES AND IMPACT SOLUTIONS

Tips for inspiration



LEAVE THE OFFICE

Get close to consumers/customers. There is a great deal of information in the interviews and reports, but we know that people tend to say one thing and do otherwise... Observe things and 'live' their situations from close by.



CONSUMER/CUSTOMER CENTRIC

Try to find the pain points in their lives. Don't ask them "what do you want (what can I do for you)?" Rather, ask them "what problems do you have?"

Ask yourself whether what you are building for your customer, etc, is relevant (unique and different proposal, in line with his/her problems). Is it accepted?



MAKE FRIENDS WITH TECHNOLOGY AND BIG DATA

Trends, market figures, insights, technological surveillance, etc. Technology helps us speed up data capture.



THE RIGHT COMPANY

Surround yourself with people who have the right mentality for moving forward: collaborative, creative, curious, etc. Help build capacities in this regard; seek out and build appropriate alliances outside your organisation.



THE SPIRIT OF GENEROSITY

Large corporations usually want to protect their knowledge. Spread the collaborative mindset and share both internally and externally. Open up to new forms of working together and sharing. Share your mistakes (not just your successes).



FROM PLANS TO ACTION

Begin to find problems when you start doing things.



KEYS TO THE SUCCESS OF EXPONENTIAL ORGANISATIONS

Oriented for that purpose: MTP (massive transformative purpose) approach. ExO Attributes MTP+SCALE+IDEAS.



TOWARDS F4F 2022

Powerful questions for reflection, to coordinate change, stand back and activate new prospects, etc, which take us to F4FWS 2022

Do you know about the **changed habits** of people who consume, so you can meet their **new demands**? What **trends** define the consumer of the future?

Is your strategy aligned with the **Sustainable Development Goals** of the United Nations?

Obesity, malnutrition and unequal access to **healthy food**. What is the solution?

Does your company help citizens make a **healthier and/or more sustainable choice** of food?

To what extent do you believe that buying decisions revolve around **benefits for the environment and personal health**, compared to price and taste?

Can **sustainable aquaculture** help achieve the United Nations SDGs? Or will **insects** be the key?

Do you believe that a tax on carbon in food could help **minimise climate change**? What other actions could the government and the food industry take to achieve the necessary change?

Ultra-fast logistics or sustainable logistics? Where is the balance?

Will **industry 5.0** be the new revolution? Will robots replace humans in agrofood production?

Can the blockchain change the world and by itself resolve most **traceability problems** within the food system?

Are you a **company with a purpose**? Do you publicise in a simple manner your **social and environmental commitment**?

Are you familiar with **future demands** that may derive from large distribution or the legislative environment and which **may impact your business**?

MANIFESTO

Safe, sustainable and healthy food for all PEOPLE

(POWERED BY AZTI)

Food has shaped the world and its human development over the course of history and will continue doing so in the future. Evolutionary biology shows that food is a decisive evolutionary factor in our transformation, which should make us think about where we want to take our future development. At the BILBAO Food4Future World Summit we put forward the following Manifesto to take action:



SAFE FOOD

SUSTAINABLE FOOD

HEALTHY FOOD

1

All people have the same right to receive **food that is safe and healthy in quantity and quality**, to assure their wellbeing and a decent and active life.

2

The shift from an exclusively financial value chain to a **food value chain** is necessary and urgent. Integral eating habits whereby people at all times have access to food that is safe, genuine, nutritive and healthy, and systems used to produce food that are sustainable and ethical, protect the environment and protect workers' human rights.

3

Education and training of people should be the priority of the food system, through social commitment and the aim of companies and institutions to achieve protection of and respect for natural ecosystems, animal wellbeing and people's health. These goals need to accompany awareness about healthy and responsible eating habits among the population and especially among young people, with a view to ensuring a sustainable food ecosystem that can benefit the entire current and future population.

4

The demographic challenge is the great transformer of future food use. **The food supply** must be **guaranteed** for all people everywhere in the world.

5

It is clearly impossible to feed 9 billion people with the current eating habits in the developed world if we do not reinvent production methods and food preservation and distribution. Scientific knowledge and technological advances are the levers needed **for food processing in all respective links**.

6

Sustainability is the great challenge regarding food. More food must be produced with less greenhouse gas emissions, a smaller hydric footprint, and which assures the ecosystems' health. New more sustainable protein sources need to be developed along with more efficient production processes that consume less water, use less energy and are more renewable, generate less food waste and recover and enhance the value of by-products, integrating them once again in the food production chain.

7

These commitments require **new technologies and production and transformation processes as well as agro-livestock inputs with less impact on the health of live organisms and more sustainable materials** for food packaging and preservation.

8

It is urgent for the **digital revolution** to be extended to food, the aim being to achieve sustainability through efficiency, to connect with consumers by offering availability, convenience and transparency and generating trust in food.

9

Food should **help achieve better levels of health among the population**, from a varied offering that enables more personalised nutrition in accordance with the needs of each person and their cultural values.

10

Advances in scientific knowledge and technology have accelerated at all levels and it should be ensured that they can reach all small and medium sized companies, facilitating equal opportunities involving the whole ecosystem (from farm to table) in the food processing that the world requires.



NETWORK



KNOWLEDGE



BUSINESS OPPORTUNITIES

PERFORMING STUNNING EXHIBITIONS TO YOUR BUSINESS SUCCESS

- BILBAO** info@nebext.com
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