BCC Innovation

2021 Annual Report

bcc innovation
basque culinary center

BCC Innovation

BCC Innovation is a technological center focused on the gastronomy industry. Its mission is to research and generate applied knowledge on gastronomy and the culinary experience. This knowledge is then transferred to all actors in the food value chain and to society in general. Inspiring new companies is also one of its objectives.

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research, innovation and entrepreneurship

Introduction

A year full of exciting projects has come to a close. It is truly an honor to research, innovate and develop initiatives that comprehensively affect the well-being of our society. We use gastronomy to improve people's health. Take for example our projects designed to facilitate healthier ageing and disease prevention. In view of this objective, we put strategies into practice that empower a range of demographics in the kitchen, working with them to nourish their capacity to follow a diet suited to their personal needs.

> Empowering the gastronomy industry

As actors in the food ecosystem, it is our responsibility to build a more sustainable gastronomy-food value chain. We take on this challenge from different angles: designing organic and sustainable food, using technology to reduce waste, valorizing coproducts, and taking action to nurture regional biodiversity.

At the same time, we must not forget that gastronomy is, above all, about enjoyment. This hedonist nature means that food development must be healthy, sustainable and delicious. Regarding our sensory work, we conduct real-world consumer testing to better understand tastes and preferences with the goal of adapting to new consumer needs and surprising them as well. Incorporating 4.0 technology opens up new possibilities when it comes to learning more about what we like and why we make the choices we do.

And since it simply unavoidable, we are also promoting digitalization within the industry. Progress has been made in smart restaurant design, in terms of both consumer interactions and internal management.

These are just some ingredients that contribute to the

the impact of our team's work. And this team does not stop growing and incorporating new disciplines. Through such fusion we are able to provide our clients with a holistic view of food and gastronomy.

Let us also note that this has been a very special year for us. 2021 marked the 10th anniversary of Basque Culinary Center. Over the course of ten years our educational mission has consolidated into the Faculty of Gastronomic Sciences, our technology center was founded in 2018, and another initiative called GOE - Gastronomy Open Ecosystem, has begun to take shape. This initiative is designed to strengthen the organization 's capacity to attract talent from around the world and, at the same time, reinforce our open innovation theory to bring in top industry players to work with us to build the future of gastronomy.

Let us also highlight BCC Innovation's active role in work groups that design and implement gastronomy and food policies as part of the Basque Country regional government's Food Global Ecosystem strategy. The ultimate goal is to position the Basque Country strategically on the international food scene.

Meanwhile, 2021 was not without difficulties, both in terms of health and macroeconomics. Nevertheless, thanks to the trust of our clients and partners and the resilience of the BCC Innovation team, we have made significant progress developing our center: in terms of business volume, the impact of our research, scientific publications, forging new connections and alliances, and more.

New challenges await us in 2022. We have started this year off with energy and enthusiasm for building a delicious, healthy, and sustainable future together.

Joxe Mari Aizega
General Diresctor of the Basque CUlinary Center

Begoña Rodríguez
Director of BCC Innovation

About us

The mission of BCC Innovation is to generate applied knowledge about gastronomy and culinary experience with the goal of transferring it to the entire value chain and society as a whole. Its objectives also include supporting the creation of new companies in the gastronomy and food industries.

The team of professionals at BCC Innovation strikes the perfect balance between creativity and science. Chefs with a wealth of international casual-dining and Michelin-starred restaurant experience work side by side with experts from other disciplines such as nutrition, engineering, environmental science, biotechnology, food technology and business administration. This eclectic mix of individuals comprises the team who make a unique institution like ours possible.

BCC Innovation is the first technology center in the world to specialize in gastronomy. In 2018 it joined the Basque Science and Technology network. In a very short period of time this young organization has managed to make a name for itself in its ecosystem.

For R&D&I activities, the BCC Innovation facilities include fully equipped kitchens with the latest technology to develop prototypes, laboratories (for physicochemical and instrumental analysis and microbiological and sensory analysis), an experimental garden, and space for real-world testing to better understand end consumers and experiment with 4.0 technology. In short, it has all the infrastructure necessary to implement projects capable of transforming the industry.

It is also located within a highly innovator environment: Basque Culinary Center. Our parent organization brings together complementary visions of gastronomy: internationally renowned chefs, multi-national food companies, knowledge-generating organizations, and various government administrations (Basque Country Regional Government, Gipuzkoa Provincial Government and Donostia-San Sebastian City Council). What's more, contact and connections with the talent found in BCC's Faculty of Gastronomic Sciences represents an added bonus for our projects.

BCC Innovation: the numbers

+70

R&D&I projects with companies from the food and HoReCa industries

+10

Events with BCC Innovation participation

+10

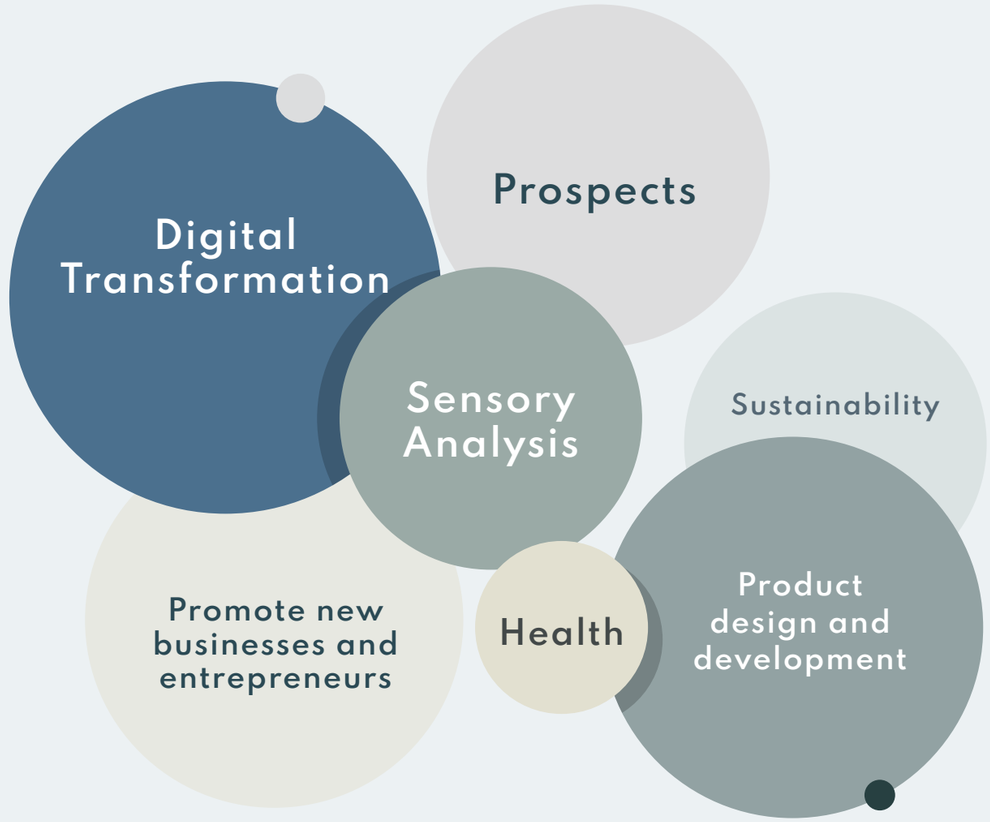
Presentations at national and international scientific conferences

+15

Scientific publications

+25

Of our own information sessions with over 4,000 in attendance



Our Work areas

Work areas

This report presents an overview of the objectives of the different work areas at our technology center, as well as some of the projects developed in 2021.

Health

Sustainability

CUlinary Science

Sensory Analysis

Digital Transformation

Delicious and healthy gastronomy

As the population progressively ages, a profound demographic transformation is bound to take place. At present, the world population is estimated to be 7.7 billion; and it is expected to reach 8.5 billion people by 2030 and 9.7 billion by 2050, according to the World Population Prospects 2019 report, published by the United Nations Department of Economic and Social Affairs Population Division. What's more, the number of people age 80 and over is predicted to triple, from 143 million in 2019 to 426 million in 2050 [1].

This trend is already palpable in the Basque Country where 23% of residents are over 65, which is 3% higher than the national average [2].

Unfortunately, this increase in life expectancy does not correlate with higher quality of life during those additional years. In fact, 46% of elderly people are estimated to have some kind of functional dependency due to disability or sudden onset chronic disease [3]. Thus, we must be conscientious of the fact that chronic disease, that is chronic non-communicable diseases (CNCDs), and their prevalence are on the rise [4]. The numbers presented by the World Health Organization (WHO) reflect the gravity of this situation and indicate an estimated 41 million deaths per year, which means 71% of annual worldwide deaths are caused by this type of disease [4].

With the goal of fostering healthy ageing by preventing disease and promoting healthy lifestyles, several different projects are underway at the technology center within our Healthy Gastronomy area of research.

This area of work aims to promote healthy eating habits across society. Research has found that in order to successfully change habits, in addition to offering adequate nutritional guidelines (nutrition education), people also need to feel empowered in the kitchen, which requires culinary skills education or training. Such a holistic strategy or approach not only favors acquiring new healthy eating habits, it also increases the likelihood that those habits will be maintained for longer periods of time. It is also important to emphasize not just what is being consumed (healthy eating guidelines), but how it is being eaten as well (healthy cooking techniques).

Another core area of work at BCC Innovation is Personalized and Precision Gastronomy.

This area dives deep into understanding the internal factors (genetics, intestinal microbiota, metabolome, epigenome) and external (environmental) factors responsible for the wide range of responses different individuals can have in reaction to the same diet or eating habits. With this approach, in addition to the knowledge acquired through new omics technology, the goal is to integrate all this information to improve the personalization and precision of dietary plans and adapt them to individuals' unique characteristics.

And lastly, the area of Therapeutic Gastronomy aims to offer nutritional-culinary guidelines to address the dietary needs of different health conditions, nurturing durability and the best possible prognosis.

Delicious and healthy gastronomy

Sukalmena in Age

In a society with consistently increasing longevity, elderly people take center stage in the United Nations' new plan for a Decade of Healthy Aging 2020-2030 [5].

One of the primary goals of public health is to improve the quality of life of people with chronic non-communicable diseases (CNCDs) using new strategies to promote healthy eating habits and lifestyles and actively involving affected individuals in the process.

The Sukalmena In-Age project, financed by the Basque Government's Department of Agriculture, Fisheries and Food Policy, was created to analyze the impact of a new strategy based on merging two important components: culinary skills and nutritional knowledge. A feasibility study was conducted with adults who are overweight or obese to determine the potential of culinary nutrition as an strategy for promoting healthy aging.

The results obtained in this project and in other studies within this line of research lay the foundation for population-based programs focused on designing healthy eating guidelines for different sectors of society.

CITA GO-ON

In the coming decades, the progressive aging of the population will be accompanied by a massive increase in disabilities and dependency among the elderly. Hence, there is an urgent need to implement effective measures in the field of disease prevention and to promote active and healthy ageing. If we fail to do so, the shift in the population's age will translate into a notable increase in the number of dependent people who need significant care and attention. Such a change could undermine the sustainability of our welfare state.

Among the leading causes of disability and dependence in elderly people are those illnesses that lead to dementia, such as Alzheimer. National estimates predict that the number of dependant people will significantly increase: from 850,000 in 2020 to about 2 million in 2050 (3.99% of the total population) [6]. Caring for a person with dementia usually requires the involvement of more than one family member, one of whom – usually a women – often ends up leaving the workforce. This means that effectively preventing dementia would significantly reduce the percentage of dependent retired and unemployed people.

To address this issue, BCC Innovation has participated in the CITA GO-ON project led by the CITA Alzheimer Foundation, an exemplary initiative in Europe, that demonstrates the effectiveness of multimodal intervention to mitigate risk factors and modify the lifestyles of people at risk for cognitive impairment . Volunteers in this study participated in a multidomain intervention program including: monitoring risk factors and comorbidities, physical exercise, cognitive training, social-emotional intervention, and nutritional-culinary intervention.

The Health and Gastronomy area of BCC Innovation implemented the nutritional-culinary program which aimed to shape the eating and culinary habits of over 1,000 participants with the goal of generating positive changes that prevent cognitive decline.

This three-year project was financed by the Ministry of Science and Innovation through the national R&D&I program focused on Societal Challenges within the National Plan for Scientific and Technical Research and Innovation 2017-2020

[1] United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019: Highlights. ST/ESA/SER.A/423.

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Creating a more sustainable world

The international food production system threatens the stability and resilience of our planet and its ecosystem as it constitutes a driving force behind environmental degradation and transgresses every planetary limit. The current food system does not work well for all people, let alone the environment. What's more, not only are current food production practices unsustainable in the long term, almost a third of food actually goes to waste. Meanwhile, almost 10% of the world's population goes hungry.

The food system lies at the heart of our time's most pressing issues: climate, ecological, social, and health crises.

Sustainable food means feeding the entire population in such a way that benefits people, the planet, and the land, thereby serving indirectly or directly to achieve the United Nations sustainable development goals. At the technology center, we understand that gastronomy is a motor for change and that it is key to achieving a truly sustainable value chain, from producer to consumer. For this reason, we are engaged in various projects that combat food waste and aim to better understand how the food system operates, in order to determine specific

Circular economy is an economic concept that is inherently intertwined with the idea of sustainability. Its objective is for the value of products, materials, and resources to be maintained within the economy as long as possible, while also reducing waste to a bare minimum. During product or service development and projection, we focus on preventive strategies, such as eco-innovation, to reduce environmental impact throughout the life cycle phases (production, use, and end of life) and facilitate reuse or recycling once the cycle comes to an end. In addition, digitalization acts as a key catalyst in a circular economy, as it allows the food chain's efficiency, safety, quality, traceability and sustainability to be improved.

Thus, our sustainability work aims to:

- Dive deeper into initiatives and practices necessary to achieve zero-waste gastronomy.
- Utilize digital technology to achieve a successful sustainable model .
- Integrate elements of ecodesign into products.
- Identify gastronomy products that can help preserve biodiversity.
- Research best practices to reduce the environmental impact of products, processes, and services.

Creating a more sustainable world

Building a green gastronomic city

The project "Building a green gastronomic city" (funded by EITFood and EITCommunity) is part of the New European Bauhaus (NEB): an environmental, social, and cultural initiative that brings different disciplines together to design future ways of living incorporating art, culture, social inclusion, science, and technology.

This project has helped create an atmosphere of debate and communication where different actors from the Donostia-San Sebastían gastronomy-food chain, such as producers, suppliers, chefs, experts, and consumers, have been involved in identifying challenges and solutions to reactivate the local gastronomy scene and educate residents in sustainability, without loosing sight of aesthetics and inclusivity, which are pillars of the New European Bauhaus (NEB) initiative.

Through qualitative techniques such as focus groups, these different actors have been working, individually and collectively, to determine which gastronomy awareness actions and campaigns would be effective and useful for transmitting the city's cultural legacy. At the same time, this process makes participants more aware and informed of the challenges the food system faces. The result of these co-designing activities was the "Gastrokultur" sessions: this pilot project was tested at our facilities on November 21st.

The Gipuzkoa Archetype

Evaluating a regional food system

This project was financed by the Gipuzkoa Provincial Council during the 2021 financial year. The region's food system was evaluated in order to determine which measures could reshape the Gipuzkoa food industry into a circular economy .

The goal is to identify a representative business model to comprehend its context, including geography, resources, income, key economic drivers, food production and consumption, carbon footprint and possible future climate change scenarios. This project will continue throughout the coming years.

> How can our regional food system become a circular economy?

Culinary Science

Or howto create delicious gastronomy

This area responds to various industry trends:

Paradigm shift: alternative protein and new ways of eating.

According to market trend studies, changes in our consumption habits, and consequently in our diets, point to two areas with the most growth potential: veganism and flexitarianism. This finding has been corroborated by a report by the consulting firm Lantern [7]. The explanations behind this finding are various:

- Meat consumption is declining across the globe based on concern for sustainability, animal welfare, the environment, and personal health.
- Omnivores are becoming flexitarians and looking for meat substitutes.
- Plant-based food represents a new experience: the range of vegan products is expanding and shifting its focus away from strictly vegan consumers.

Origins and transparency.

We have observed a clear trend in favor of products with “cleaner” labels that include the product’s origins and prioritize ingredients of local provenance. Today’s consumers prefer ingredients that seem natural , locally-sourced and healthy. More than numbers, it is about concepts like sustainability, transparency, and health, with the ultimate goal of the “Clean Label 2.0” as defined by Mintel [8]. In this field, our research explores compounds from nature, like wild plants for example, that can offer innovation and options for products to incorporate more “label-friendly” ingredients.

Curiousity about new ingredients and healthy eating.

Consumers are increasingly interested in eating healthily and sustainably. By now this trend has gained traction in most developed countries. As Raquel P.F. Guiné noted in her article published in MDPI [9], many individuals are willing to try unfamiliar or new foods if they are accompanied by health claims. Meanwhile, other messages about sustainability or biodiversity, for example, can also have a positive effect on product choice. Let us also mention the shift in beverage consumption: alcoholic beverages are increasingly being replaced by low alcohol content or non-alcoholic drinks. This sector is expected to grow 31% between 2021 and 2024, according to the IWSR [10].

BCC Innovation develops products boasting high gastronomic value defined by optimal organoleptic characteristics. Its approach is healthy, convenient, and personalized and tells a story – all of which meet the needs of today’s market.

Market trends, like the aforementioned, are also analyzed in order to create innovative and avant-garde products. Our multidisciplinary team (chefs, technicians and scientists) are given free range to pull from the best of the restaurant and food industries. It should be noted that our chefs' disruptive approach to gastronomy and food, combined with the creative freedom characterizing their careers, enables them to create products with a genuine raison d'être.

Culinary Science

New technology spurs innovation in dried fruit

In 2021 a specialized food design project was conducted to evaluate the behavior of dry food products. These particular products were the result of an innovative method of industrial dehydration for fresh fruit and vegetables.

This R&D project focused on evaluating products made with industrial transformation and dehydration processes. On the one hand, feedback was generated on the gastronomic quality of the product and possibilities for improvement. While on the other hand, different preparation methods were utilized to evaluate the raw material.

The primary objective of the project was to understand the behavior of the company's dry food products (whole, chopped, and powdered) in different formats with high gastronomic value, and assess the organoleptic and technological properties of each one. Tasty, nutritious, and appetizing prototypes were developed and optimized. The resulting products were compared to similar products from other brands on the market that use traditional dehydration processes.

In order to incorporate these results into the market as high-value ingredients in the gastronomy-food sectors, different lines of research were set into motion:

- Explore and examine their use as ingredients with technological properties that contribute to a clean-label or low-sugar product.
- Analyze opportunities for different sectors such as the food industry, HoReCa, end consumer, etc.
- Develop recipes and audiovisual material for product promotion.
- Identify differences in organoleptic qualities compared to the competition's products,

Creating a collection of ready-to-eat and ready-to-heat snacks

An industry-leading multi-national company that makes traditional Mexican food sought out collaboration with BCC Innovation to create a collection of versatile snacks and mini-meals designed to use novelty to stand out on supermarket shelves. BCC Innovation's expertise in culinary innovation and the creativity of its team of chefs with experience in various types of cuisines and gastronomic cultures played a key role in generating these disruptive products.

Guided by market trends, the project conceived, designed, and developed contemporary prototypes and created new consumer experiences for customers. These unique proposals can be to be sold fresh, frozen, or at room temperature.

These prototypes were created with a global perspective of the end consumer and fall into the following categories:

- Ready-to-eat: convenience products for immediate consumption without heating or cooking
- Ready-to-heat: products that require very minimal preparation with short cooking times and minimal equipment.

> Offering novel consumer experiences through unique proposals

Product Valorization in Ecuador

We have actively participated in the transfer of knowledge for a renowned client: the Gastronomy Innovation Network of Ecuador. The mission of this network is to become the first market accelerator for gastronomy and food prototypes to make a positive social and environmental impact on the country.

The network consists of three founding gastronomy laboratories: Iche Lab (FUEGOS Foundation), Canopy Lab (EcoDecision) and Urku Mikuna (Salinas Salesian Family Foundation), which are located in the country's three different bioregions: the coast, the Andes, and the Amazon.

[7] https://www.eitfood.eu

[8] Mintel: La agencia de inteligencia de mercado líder en el mundo | Mintel.com

[9] MDPI - Publisher of Open Access Journals

[10] https://www.theiwsr.com/

Sensory analysis

An essential tool for understanding consumers

Current trends shows that consumers are very interested in healthy and sustainable diets. But they are not willing to sacrifice the feelings of pleasure and well-being associated with those products and experiences already suited to their tastes and preferences.

Understanding the processes associated with food choice and perception is crucial: Why do we like what we like? When and where do we tend to choose certain foods?

Food itself is just one variable; individual characteristics and consumption contexts are also topics of research at BCC Innovation. Our sensory analysis area aims to answer the following questions:

- How can we contribute to food design that fosters a healthier, more sustainable and delicious food system?
- What technologies can contribute to understanding consumers? How can digital transformation help us comprehend food perception?
- Besides the product itself, what other variables have a direct impact on food choice?

BURU(T)SEN

Project coordinated by the BCC Innovation team in collaboration with Be Food Lab and Ibermática.

The main objective of the project is to generate and develop knowledge about the relationship between people's implicit (neuronal and physiological) and explicit (self-reported) responses to different food properties. On one hand, devices were utilized to track variations in skin conductivity related to subconscious responses to different stimuli. On the other hand, electroencephalography technology was also used, which is capable of identifying variations in the electrical signals of neurons in the cerebral cortex. Based on these technologies' findings and their relationship with consumer responses, we were able to study taste, texture, and other properties of new dried fruit snacks. BURU(T)SEN is a pilot project to generate knowledge about the impact that different food attributes have on acceptance and choice.

The results of this project, in terms of using new technology and artificial intelligence tools and advanced data analytics to process data, have helped to identify brain response patterns to sweetness and other smell and taste stimuli.

The project is funded by the Basque Government's Department of Economic Development, Sustainability and the Environment through an aid program for Research, Development and Innovation Projects in Agricultural, Food and Fishing.

BEGI-DIGITALA

Project coordinated by the BCC Innovation team and financed by the Basque Government. The objective is to examine how presenting different types of information on food impacts restaurant customers' choices using eyetracking technology.

Today's society has a strong bond with the tradition of "eating out" and socializing in these contexts. This is why understanding how restaurant customers make choices can offer tremendous insight and serve as an opportunity to promote healthier and more sustainable eating.

With this idea in mind, different layouts were made of the same menu and given to a group of consumers in a real restaurant to evaluate if the information regarding nutrition, preparation, or sensory characteristics, etc. caught their attention, and if it had any effect on their choices.

Preliminary results indicate that eyetracking technology eliminates the need for self-reported data. This means that valuable information can be collected in a straighforward manner, without interrupting or altering the normal restaurant dining routine. In addition, it was found that the information presented on the menu had a direct impact on diners' choices. This finding should inspire revamped menus designed to foster choices that are more appropriate and beneficial for diners and restaurants.

Digital Transformation

According the 2021 State of Hospitality report by Lightspeed, using technology to automate certain tasks is a key way HoReCa companies are preparing for the future.

Commonly held views of digital transformation are shifting, moving away from the perception that technology will displace human jobs, since it has proven to offer resources capable of improving quality of life, that of both business owners and customers.

87% of service industry business owners agreed that adopting new technologies over the past two years has played a critical role in the survival of their business. 42% of European restaurants (in France, Germany, and Holland) that participated in this study plan to incorporate new technology in the coming two to three years. Among the most widely adopted technologies are online ordering and delivery.

According Gartner's last three annual reports on technological trends predicted to significantly impact the workplace, the following could directly affect the HoReCa industry: virtual assistants, voice technology, smart spaces, collaborative worker platforms, bots, the Internet of things, augmented reality, and virtual reality.

With the goal of guiding the industry's digital transformation towards a more delicious, sustainable and healthy future through experimentation, innovation, and co-creation of technological solutions, at LABe Digital Gastronomy Lab we are engaged in various projects in the digital transformation area of research.

LABe - Digital Gastronomy Lab, a one-of-a-kind initiative

With support from the Gipuzkoa Provincial Government, the Basque Country Regional Goverment and the San Sebastián City Council.

As we are conscientious of the technological revolution underway in culinary and restaurant management, since LABe Digital Gastronomy Lab was founded in 2019, its team has worked collaboratively in an ecosystem of businesses, service industry companies, startups, and tech centers to prototype, test, and co-design new services, solutions, technologies and products focused on improving the workplace and conditions for restaurant workers: including chefs, cooks, servers, and managers. Based on what we have learned in our past experiences, in 2021 LABe opened its experimentation and testing activities for interested restaurant customers to participate as well.

During the two years of this project, more than 20 experiences have been launched and tested in a real-life context using cutting-edge digital technology to streamline, automate and monitor restaurant processes. Let us mention just few of the projects implemented at our lab. For back-of-house infrastructure, TSpoon Lab tested its pricing and purchase management program. Irisbond created eyetracking technology capable of analyzing the relationship between menu layout and customer choice. ByFlow tested a 3D food printer, and Alacarte explored how to reduce the alcohol content of wine.

The co-development of new technology-based products and services is another core activity at LABe. The lab has collaborated with other tech centers to address the needs of both food and industrial companies. The research areas gaining the most traction deal with equipment and app design for smart interconnected kitchens using the Internet of Things, optimizing restaurant management operations, automating processes through voice technology, or using AI application to create recipes and preparation methods. For example, we have co-developed technology that is currently being patented. It is designed to make sous-vide cooking and blast chilling more efficient.

In line with current consumer trends projecting a significant increase in the consumption of fermented products, we have co-developed a prototype of a fermentation machine that produces solid foods (tempeh, koji, etc.) in safe and controlled conditions. The machine can be managed remotely via a cloud platform to program and initiate recipes. It also offers real-time remote monitoring and controls different variables, such as temperature and ambient humidity.

Meanwhile, we have taken on a significant innovation challenge for an industrial company: conceptualizing and designing the specific functionalities and benefits to be gained by using intelligent and interconnected equipment capable of responding to the everyday needs of professional kitchens users. Such modifications would maximize the potential of 4.0 technology for the standard use of industrial kitchen machinery. The project was developed according to the design thinking framework, which puts the user at the heart of innovation.

We have also launched a “digital table”. This initiative is designed to be implemented in the dining room. It brings the general public into close contact with innovative solutions by creating a playful learning opportunity to conduct testing using interactive technology. This digital table is available for reservation on the LABe restaurant website, where the chatbot Sukai is available to answer questions through voice or written messaging. In the future this table will also allow mobile phone access to 3D images of some menu items using Eat-Me’s augmented reality technology and holograms by SuperHolo’s hologram fan technology. Meanwhile, in the prototyping area, V-Frame recently installed an indoor vertical garden, which means that some on the vegetables grown on-site will be incorporated into the healthy menu on offer.

Other areas

Prospects

Entrepreneurship

Prospects in Gastronomy

BCC Innovation has mainstreamed the concept of futures and the use of prospecting tools in order to generate ideas with a network of experts in gastronomy value chain innovation .

These types of reflections make valuable contributions to business strategies and regional policies, fostering innovation while promoting economic and social development.

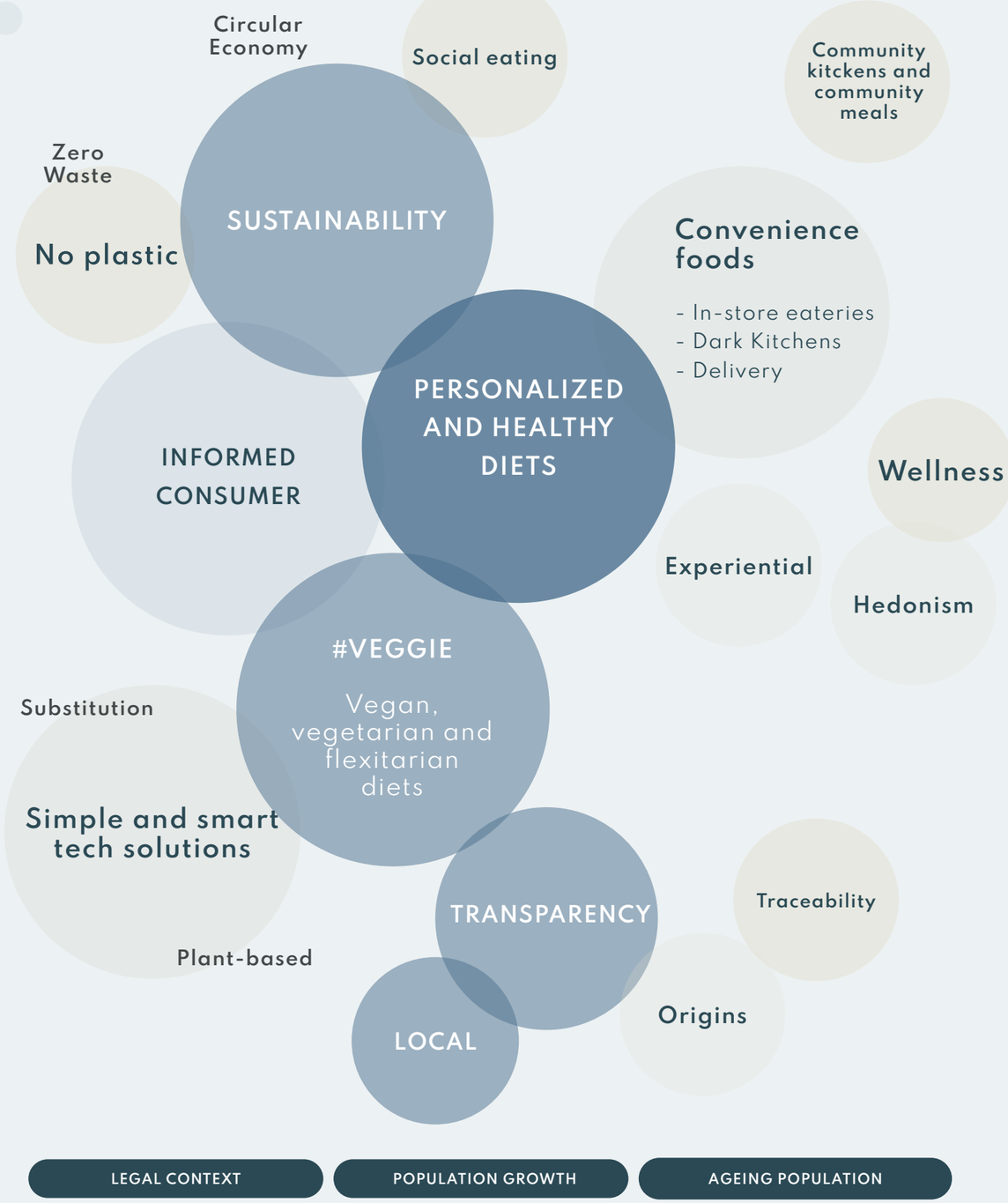
In this vein, in collaboration with the San Sebastian Department of Strategy, we hosted brainstorming sessions on the city's 2030 strategic objectives for gastronomy. The goal of this event was to strengthen the city's position among the world's top gastronomy destinations. Several initiatives were proposed that are designed to highlight the cultural values of San Sebastian's gastronomy (gastronomic societies, popular gastronomy, etc.) as key components of local identity and vehicles for intergenerational relationships, intercultural integration, social inclusion, and the city brand.

Working with Food Tech and Res Tech entrepreneurs

Culinary Action On the Road was launched this year and is our first international road show-style event , with stops in Madrid, Biarritz, Copenhagen and Tel Aviv. In each location different food-related startups were evaluated in a pitch contest run with the help of local collaborators. The winners from each city will compete in San Sebastian in March 2022.

It is worth noting that in 2021 European startups generated €2.7 billion in earnings (€695 million in Spain). This figure attests to the dynamic growth underway in the sector at present. To support this melting pot of new players in the industry, we offer our accelerator program and inroads into research and innovation at our technological center which empowers startups to scale up.

Market divers



Healthy Gastronomy

Personalized and **Precision** Gastronomy

Therapeutic Gastronomy

Multimodal strategies for **reformulating eating habits**

Impact of **context, individual , and product on consumer choice**

4.0 Technology for a more efficient value chain

Ecodesign I **Zero** Waste

Voice technology and **processing natural language**

Biodiversity: wild plants and traditional varieties

Circular economy in the gastronomy-food system

Reducing t he environmental footprint of products, services and processes

Developing new smart **Res Tech** technology

Predictive analysis, machine learning and recommendation engines

“Clean label” registration and processing: bioactive compounds

Novel foods: new foods and ingredients

High gastronomy value cuinary techniques: ageing, fermentation and commercial enzymes

Development of new **“plant-based” food products**

New technology to analyze the relationship between **implicit and explicit consumer**

Novel **cultivated** foods

Fermented drinks **and non-alcoholic distilled beverages**

Alternative Proteins

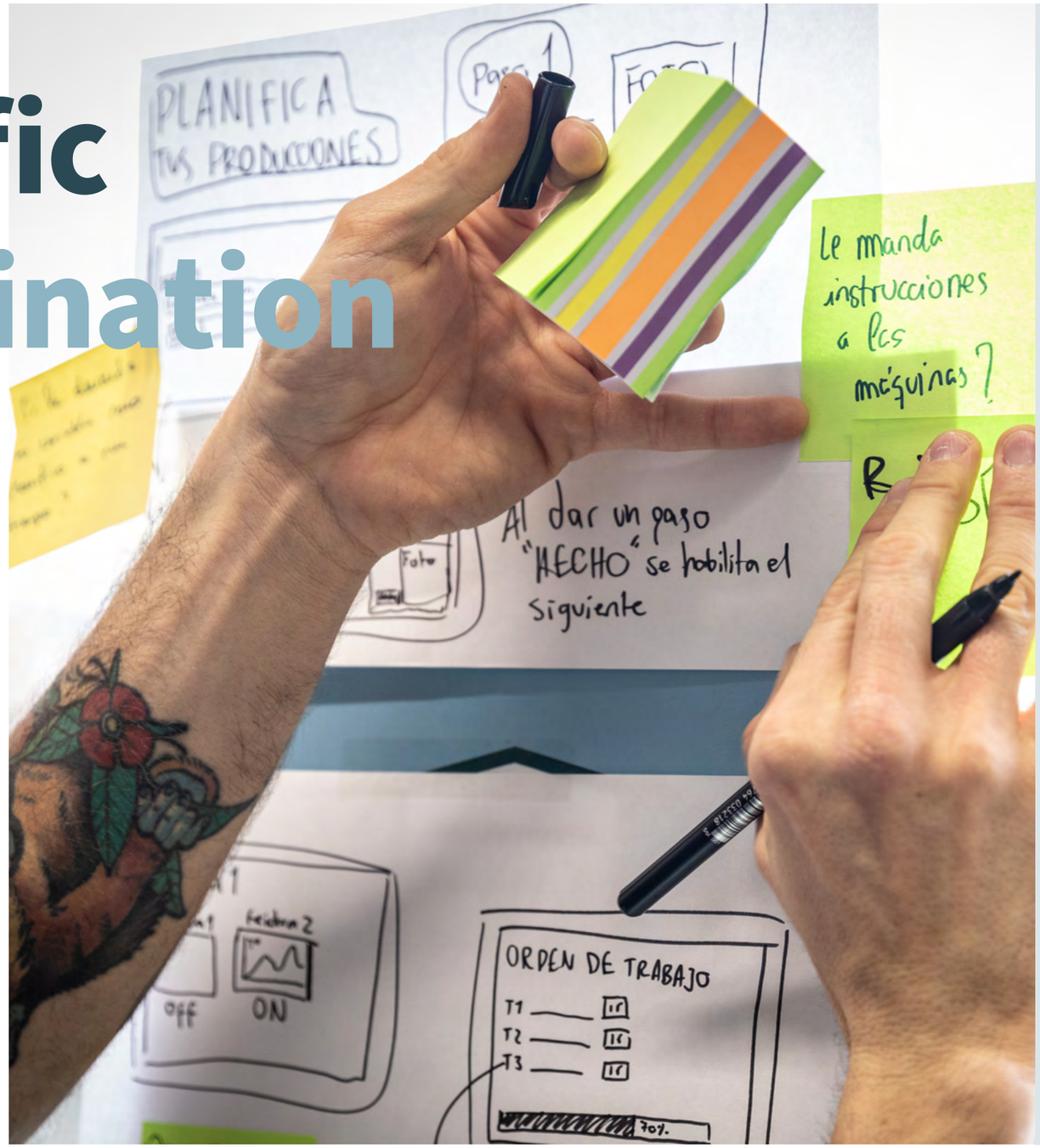
Probiotics and **pre**biotics

Prospects and Strategic foresight: the recipe for the future

Gastronomic identity

Regional **development**

Scientific Dissemination



For a technological center, sharing knowledge with society as a whole is fundamental. Thus, BCC Innovation has hosted two such events this year.

Events

Fairs

Conferences

Media appearances

Gastronomy as a motor of sustainability

The 10th Sustainability Conference was organized in collaboration with the Gipuzkoa Provincial Government. This conferences aims to forge public-private alliances to promote the message of sustainability throughout society. In recent years the traditional format of gastronomy events has shifted and now seeks to do more than just share expert knowledge with the general public. The new and improved event format aims to engage the public in activities to enrich the exchange of perspectives and opinions. Thus, this year's activities were designed to integrate the public's participation through dynamic workshops.

During the event, a diverse cast of international experts gave presentations on issues related to food culture, climate neutrality in livestock farming, zero waste gastronomy, repurposing food scraps, designing resilient businesses, and more.

Gastronomy: the health of the future

BCC Innovation organized an event to gather different aspects of nutrition, culinary medicine and cooking around the same table. With the help of international experts, the objective was to visualize gastronomy as a transformative health tool by sharing experiences, visions, and research from the field..

Other initiatives

Digital Gastronomy Talks

Digital Gastronomy Talks, nueva iniciativa para trasladar al sector horeca los avances tecnológicos que a nivel internacional se están produciendo dirigidos al sector.

Se han desarrollado 12 ediciones de Digital Gastronomy Talks con una serie de mesas redondas con diferentes agentes del ecosistema RestTech para dar visibilidad a los proveedores de nuevas soluciones tecnológicas con el objetivo último de impulsar la transformación digital del sector horeca.

Working with innovation specialists:

- Culinary pioneers working in product development
- Consumers are at the center of food and gastronomy: new research methods and technologies.

Participation in the Food 4 Future summit

- Bilbao Foodtech Expo. At our stand, some members of our research team spoke with different actors from the ecosystem about our value proposition as a tech center and explained how we research and develop new innovative solutions to boost competitiveness within the food industry through gastronomy.

HIP – Horeca Professional Expo

- During this event focused on innovation, digital transformation and trends in the HoReCa sector, we hosted the 3rd edition of the Digital Gastronomy Startup Forum – by LABe Digital Gastronomy Lab – in March 2021.
- This forum is on the look-out for disruptive projects that impact the back-office and front-office of the gastronomy and service industries of the future: technology like Big Data, Artificial Intelligence, Data Analytics, IoT, Robotics and Blockchain, just to name a few.
- More than 50 applications were received for the 3rd edition. Five finalists were selected to present their proposals in Madrid: Reimagine Kitchen, Swear it, Recycap, Alacarte (testing done at LABe), and Janby Digital Kitchen. The winning startup was the Gipuzkoa-based group Janby Digital Kitchen and their digital sous-vide cooking method that uses QR codes to automatically configure each step of the cooking process.

In 2021 the impact of the BCC Innovation team was not limited to general and specialized Spanish publications in the gastronomy, food, new technology and innovation industries. Our sphere of influence surpassed national borders and expanded abroad, appearing in international media outlets. Editors and collaborators in countries like Holland and Japan featured some of our projects and initiatives for their readers.

Smart Kitchen Summit Japan

EUROSENSE 2021

Women in Gastronomy conference at Universidad delxtlahuaca, Mexico

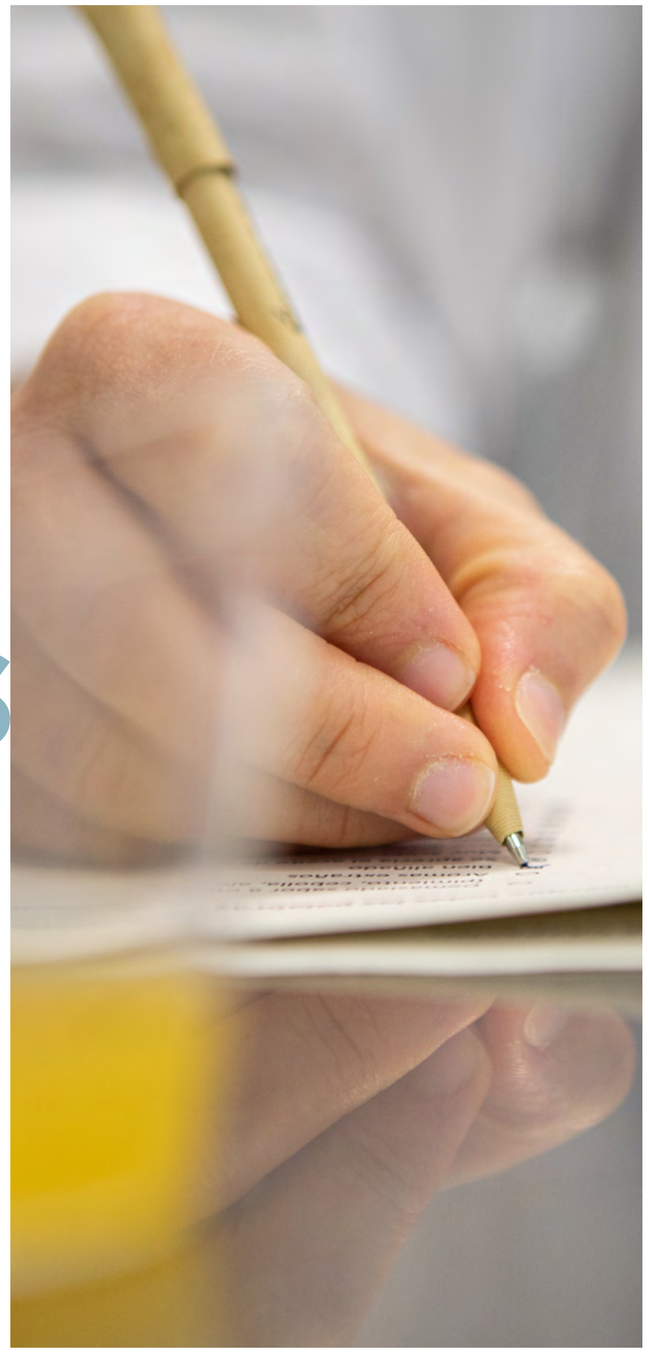
EFFoST International Conference


El laboratorio de la restauración: así se transforma la gastronomía


Erich Eichstetter, del BCC Innovation, protagoniza un encuentro online


ENTREVISTA A LAURA VÁZQUEZ ARAÚJO, EXPERTA EN ANÁLISIS SENSORIAL

2022 3 Key Points



Citizen science, technology, and international interconnectivity

Human beings are the real protagonists of knowledge generation, creativity, and innovation. For example, well-known methodologies such as design thinking place people at the heart of any innovation process. According to this approach, innovation is pursued by trying to understand and respond to the real needs of users. In this same vein, so-called “citizen science” seeks to actively engage everyday people in both scientific research and public policy design. A notable case in point is the new Horizon Europe program which assigns tremendous significance to this idea. For all these reasons, in 2022 at BCC Innovation we hope to include all kinds of people in our activities in genuinely meaningful ways.

Over the course of the coming year we will continue exploring new intersections between gastronomy and technology with LABe as our home base. Concepts like blockchain, artificial intelligence, augmented reality and more are becoming increasingly ingrained in our cultural heritage as a tech center. 4.0 technology offers infinite possibilities and they can all contribute , in one way or another, to our goal of boosting company competitiveness throughout the entire value chain. There will always be more to discover in the realm of technology, which is why it is one of the main issues on our agenda.

And last but not least, we hope to further consolidate our relationships with numerous international institutions, while at the same time, forging new alliances. Making connections across knowledge bases is one of the pillars of innovation. For this reason, we systematically aim to work side by side with pioneering entities wherever they may be. BCC Innovation has proven to be a beacon for talent, a gathering place where a variety of disciplines, actors, and approaches have come together since its inception with an international mission. We will continue to pursue our mission in 2022.

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