

April 2022. Sector snapshot

The agri-food sector in Catalonia

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ACCIÓ
Government of Catalonia



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PRODECA Knowledge and Strategy Area

Barcelona, April 2022

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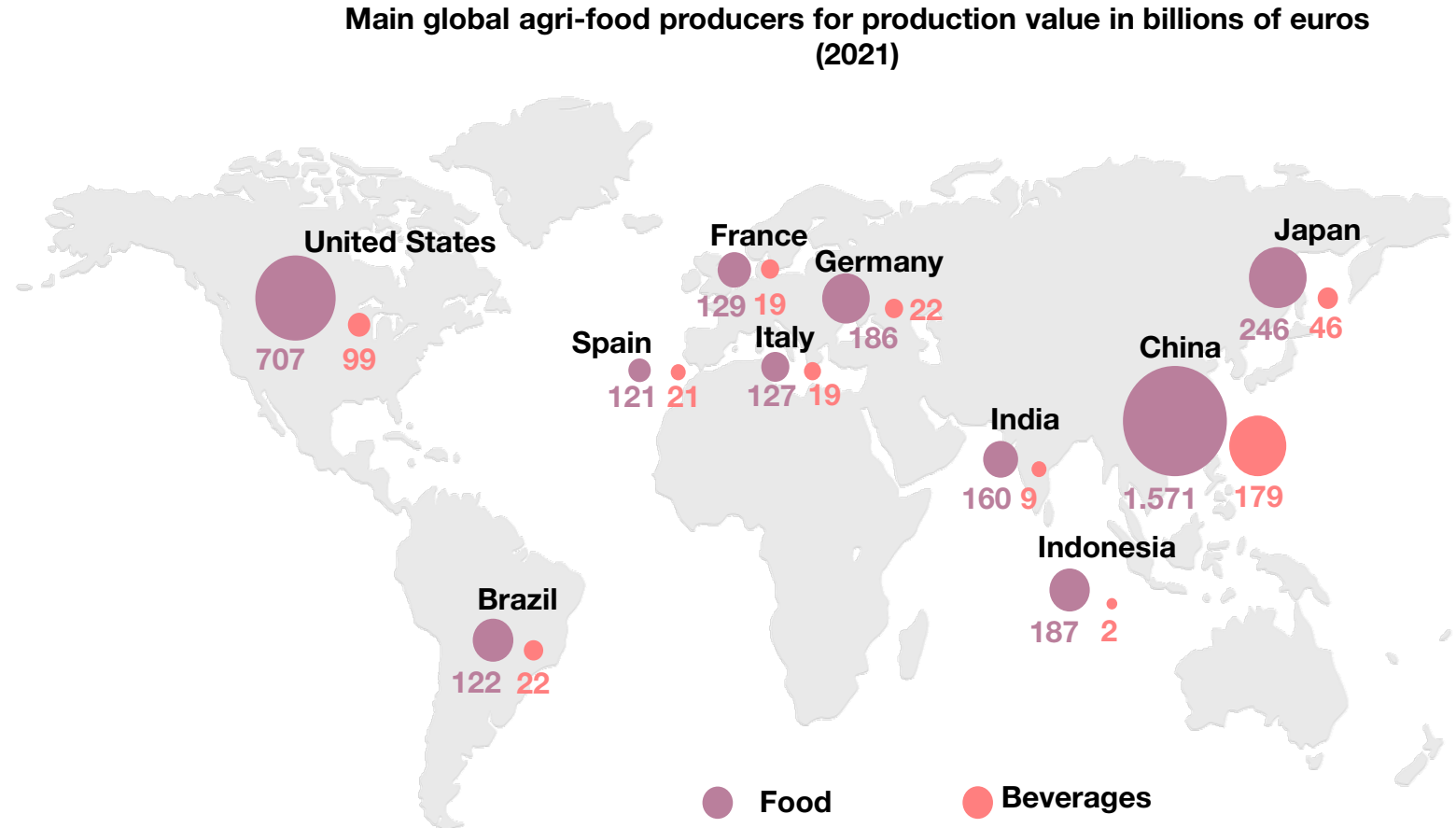
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1. Global over-view of the agri-food industry

The world's agri-food industry

- Global agri-food production is valued at **6,505 billion euros** in **2021**.
- **China is the leading producer within the global agri-food industry**, with a production value higher than the combined value of the next five countries.
- The **United States, Japan, Germany and Brazil** round out the Top 5 of the world's leading agri-food producers.



Source: PRODECA, based on Euromonitor 2021

Main global agri-food companies



Source: PRODECA, based on Orbis (code 10: Elaboration of food products + code 11: Preparation of drinks. Companies sorted by turnover)

2. The agri-food industry in Catalonia

Value chain of the Catalan agri-food sector



Segments considered within the framework of this study of the Catalan agri-food sector (except for the "Wholesale" and "Specialised services" segments)

Catalonia, a leading destination for agri-food companies

Principal sector of Catalan industry in turnover



Turnover
43,088 M€

(+13% vs. 2017)



Employees
177,031

(+1.9% vs. 2017)

19.2% of Catalan GDP

Leading export region in Spain

- Catalonia is **Spain's 1st agri-food export region**, ahead of Andalusia since 2020.
- It accounts for **16% of Catalonia's agri-food exports**.
- Its exports growth is **higher than the national average** (12.3% of Catalonia compared to 10.70% in Spain).

Top-level support ecosystem

- **Top-level research centres** dedicated to **technological innovation** in food processing.
- **More than 1,900 startups** are based in Catalonia, with **120 startups in the agri-food sector**.

Superior logistics infrastructure

- **Logistics network** that serves **400 million consumers in Europe** and the Mediterranean/Africa **in less than 48 hours**.
- The **Port of Barcelona** and the **Port of Tarragona** are **indisputable leaders in agri-food product transport**, in Europe and the Mediterranean.

Agri-food leaders choose Catalonia

- Catalonia is an **attractive and leading location for agri-food FDI** in Western Europe, ranking **5th region** in number of projects.

Main agri-food companies investing in Catalonia:



A clear magnet for attracting talent

- The highest level of **avant-garde creativity** has positioned Catalonia on a prestigious **international stage**.
- **8 university degrees**, **6 university master's degrees** and **4 dual vocational training courses**, as well as a wide offer of continuous education.

Source: ACCIÓ

Principal sector of Catalan industry

Total Catalan agri-food sector¹ → 43,088 M€ in turnover in 2019 (+13% vs. 2017) – **19.2% of Catalan GDP**

Primary sector²



4,690 M€ in turnover



57,427 agricultural holdings



55,022 employees

Food and drinks industry³



30,090 M€ in turnover



4,253 companies



90,579 employees

Ancillary industry⁴



8,308 M€ in turnover



658 companies



31,430 employees

Additional information: Sales and distribution channels⁵

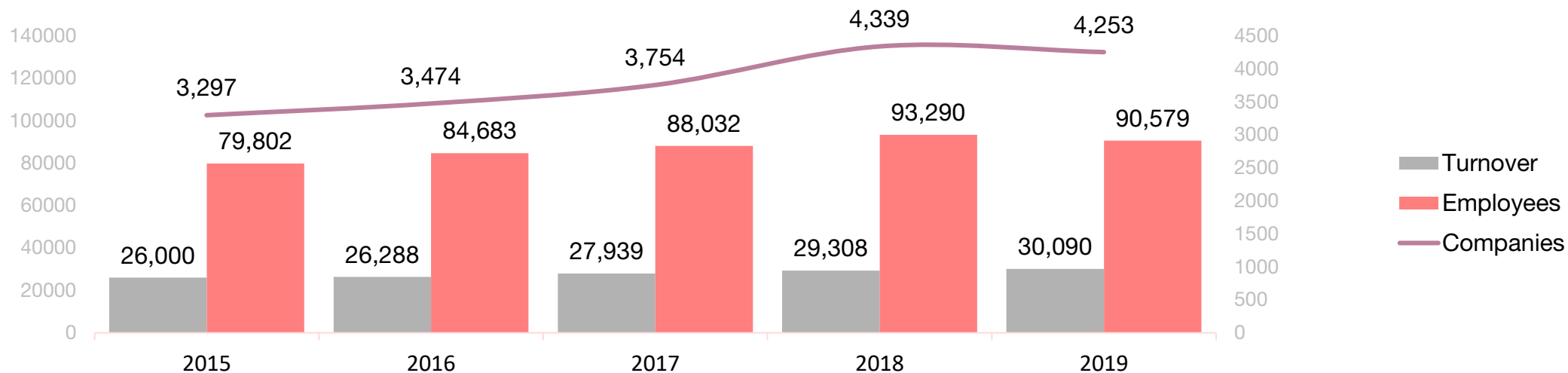
		Horeca	Food retailers	Wholesalers and food intermediaries
	Turnover	10,175 M€	20,083 M€	22,999 M€
	Companies	49,028	30,895	7,215
	Employees	211,595	141,553	49,805

Note 1: Corresponds to the sum of the primary sector + Food and drinks industry + Ancillary industry

Source: ACCIÓ, based on ² Idescat – “Survey on the structure of farms 2016” + maritime fishing data 2016, ³ INE – “Structural statistics of companies 2019: industrial sector”, ⁴ own elaboration based on data from Orbis, ⁵ INE – “Structural statistics of companies 2019: services sector”

The food and drinks industry in Catalonia continues to grow, showing a 16% turnover increase over the last five years

Evolution of the main variables of the food and drinks industry in Catalonia



- The Catalan food and drinks industry has increased **its turnover** by **15.7%** since 2015. Similarly, in the same period, **the number of companies** increased by **29.0%** and **the number of employees** by **13.5%**.
- In 2019, the Catalan food and drinks industry accounted for **23.0%** of the turnover of Spain's total food and drinks industry, 14.2% of the number of companies and 19.9% of the number of employees.
- Likewise, in 2019 the Catalan food and drinks industry accounted for **23.3%** of the total turnover of the Catalan manufacturing industry, 12.2% of the number of companies and 20.1% of the number of employees.

Source: ACCIÓ, based on INE

Main companies in the Catalan agri-food industry value chain

Primary sector



Food and drinks industry



Ancillary industry

Ingredients and additives



Fertilisers/seeds



Farm machinery



Packaging



Packaging machinery



Food processing machinery



Specialized logistics



Food waste management



Sales channel

Horeca



Retail



Wholesalers



[...] that has world-class scientific facilities and technological research centres, [...]

The basic and applied research groups supporting technology transfer and a complete network of scientific and technological centres form the basis of Catalonia's research and innovation programme.

Agri-food research centres accredited by TECNIO



Research groups and agri-food technology centres (TECNIO)



Other research centres:



Fundació Torribera (UB)

Top-level scientific infrastructures



ALBA Synchrotron,
the largest particle accelerator
in southern Europe



IDIADA
automotive testing facility



Biomedical Research Park,
leader in southern Europe in
biomedical research



Institute of Photonic Sciences,
one of the best research
institutions in the world



Centre for Omic Sciences (COS),
centre of reference in
Europe for Omic Sciences



Mare Nostrum (BSC),
3rd Supercomputer of
Southern Europe

Source: ACCIÓ

[...] as well as globally pioneering research centres in gastronomy and nutrition

The Alícia Foundation, a research centre focused on gastronomy and eating habits



- The Alícia Foundation, from the Catalan **Ali-mentació** and **Cien-Cia**, is a research centre dedicated to **culinary technological innovation**, the improvement of eating habits and the evaluation of food and gastronomic heritage.
- With the participation and collaboration of top professionals, including renowned chefs and leading scientists, Alícia's **main objective** is a **healthy diet for all**.



elBullifoundation: feeding creativity

elBulli**foundation**

- *elBullifoundation* it is a private, family-run foundation, promoted by Ferran Adrià and Juli Soler, with a vision based on the desire to promote innovation and creativity through the language of cooking, preserving the legacy and spirit of the prestigious Restaurant El Bulli for society; researching and experimenting to enhance talent and help everyone find their own limits.



Source: ACCIÓ, based on the Alícia Foundation and elbullifoundation

Main EU startup hub, with 120 startups in the agri-food sector

More than 1,902 startups located in Catalonia (2021)

2nd EU hub preferred by founders
for creating a startup

*Startup Heatmap Europe,
2021*

5th EU startup
hub

*StartupBlink,
2021*

120 startups in the agri-food sector (agritech and foodtech)



Nota: Illustrative sample of some of the agri-food startups

Source: ACCIÓ, based on the Barcelona & Catalonia Startup Hub 2021 and Dealroom

Catalonia is southern Europe's largest intermodal logistics centre, serving the entire agri-food value chain, [...]

Catalonia is home to **two of the main Mediterranean ports**, a **high-speed train station**, an **award-winning international airport** and a motorway network perfectly connected to the rest of the European road system.

Main international ports of Barcelona and Tarragona



- **4M passengers and 95MT in freight traffic.**
- Connection with **more than 825 ports** worldwide.
- The **Port of Barcelona** is the **3rd** most productive in **Europe**.
- **Tarragona** has an **international port** plus an airport and a 100ha logistics activities area.

Barcelona - El Prat, a world-class airport



- 100 airlines fly to **200 different destinations** in **57 countries** around the world.
- The **air freight facilities**, with 47.1 hectares, is integrated into a logistics platform unique in Europe: an area with a 7km radius and **2,000 hectares dedicated to logistics.**

An extensive rail and road network



- Catalonia is the **main European region** in terms of **road infrastructure** with four or more lanes (48.7 km/ 1,000 km²)
- An **wide-ranging rail network** of almost 1,800 km connecting Catalonia's main cities of to the rest of Spain and France, including 400 km of high speed railways.

The **excellent geostrategic position** of Catalonia means **efficient intercontinental connections** with **Asia** and **America** and **easy and fast distribution in southern Europe and North Africa**. The **logistics network** can reach **400 million** consumers in **Europe** and the **Mediterranean/Africa** in **less than 48 hours***.

Source: ACCIÓ, based on CIMALSA and Port of Barcelona

[...] and which has two highly equipped international ports, specialized in the agri-food sector



FACILITIES	
Land area (2020)	1,112 ha
Logistics area (2020)	212 ha
Draught (2020)	Up to 16 m
Container traffic (2020)	3.0 MTEU
Total traffic (2020)	59.5 Mt
Agricultural and food traffic (2020)	12.5 Mt

- The Port of Barcelona has **the largest range of logistics and transport services in Spain and southern Europe**. All means of transport are available within a radius of 5 km from the Port.
- Specific infrastructures and services, such as Mercabarna wholesale market, the Port and Barcelona Airport all work together to consolidate Barcelona as a **key hub for fresh produce in Europe and the Mediterranean**.



FACILITIES	
Land area (2020)	543 ha
Logistics area (2020)	92 ha
Draught (2020)	Up to 19 m
Container traffic (2020)	43,787 TEU
Total traffic (2020)	26.8 Mt
Agricultural and food traffic (2020)	4.7 Mt

- The Port of Tarragona is located in a **unique geostrategic location** and is one of Spain's main ports and a leading port in Europe.
- The Port of Tarragona maintains **indisputable leadership in the movement of agri-food products, both in Spain and the Mediterranean**, contributing to this economic activity thanks to specialized services and infrastructures that promote importation.

Source: ACCIÓ, based on the "Annual Report 2020" and "Statistical traffic data" of the Port of Barcelona and the "Annual Report 2020" of the Port of Tarragona

Catalan agri-food exports break records, up 12.3%

12,878 M €

Catalan agri-food exports (2021)

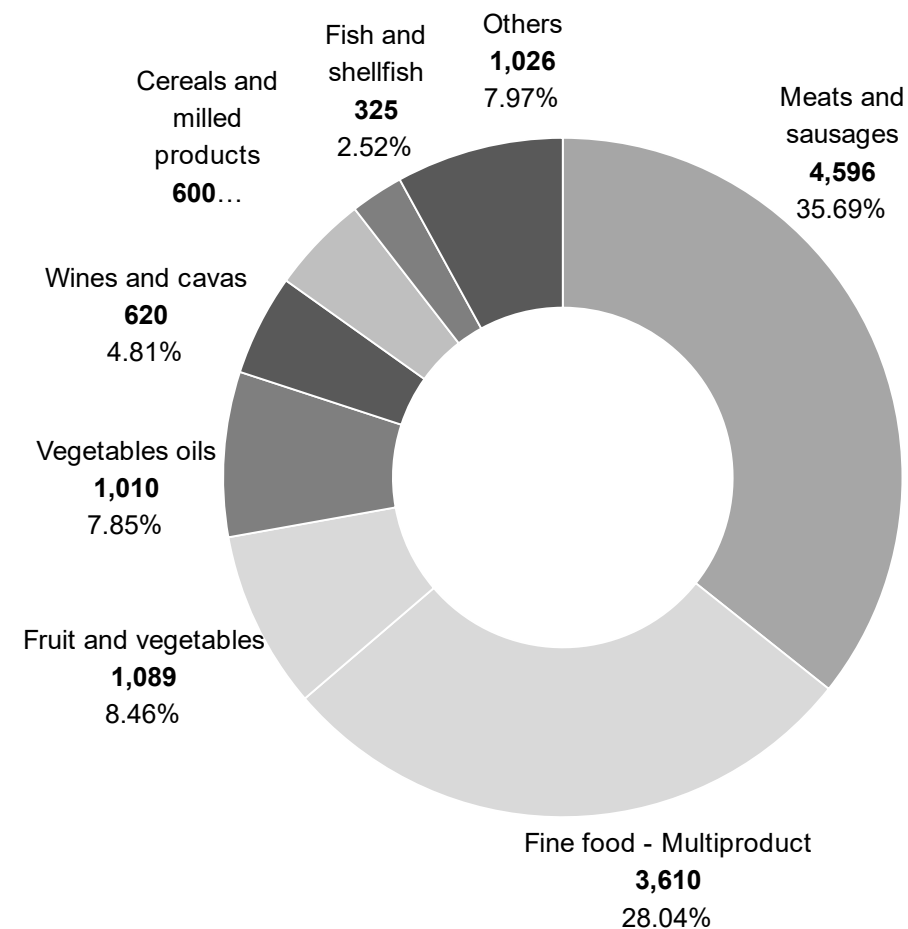
16% of Catalan exports

21.78% of Spanish agri-food exports

2,745

Regular exporting companies for agri-food products (2021)

Some of the most significant regular exporters



Source: PRODECA, based on the summary of Catalan agri-food exports 2021 with data from AEAT

60 international business opportunities for Catalan food companies



For more information about these opportunities: [International business opportunity recommender](#)

Source: ACCIÓ based on the 2021 “Global Map of International Business Opportunities”

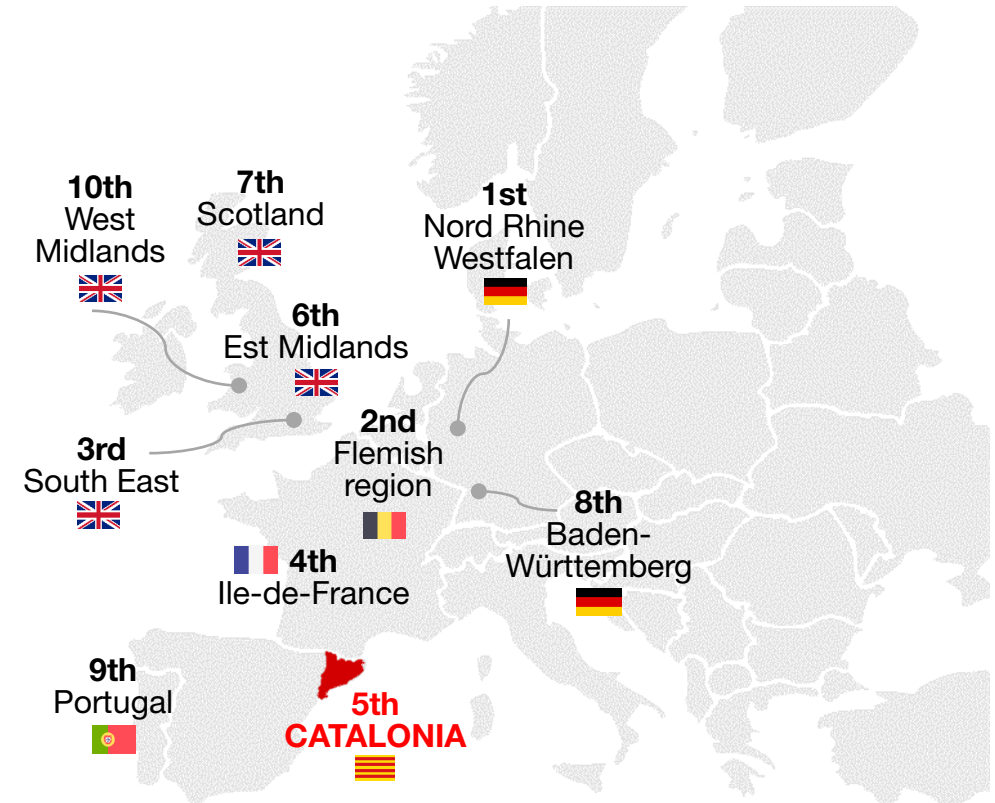
Catalonia, a leading international destination for agri-food FDI

- During the period 2017-2021, **36 FDI projects were registered in Catalonia**, representing an **increase of 80%** over the previous five-year period (2012-2016). These projects represent a capital investment of **€595 M** (+16% vs. previous five-year period) and a total of **2,161 jobs** (+15% vs. previous five-year period).
- Catalonia is the **5th western European region** in number of **projects**, the **10th** in **job creation** and the **13th** in **capital investment** in the agri-food industry.

Companies investing in Catalonia during the period 2017-2021



Agri-food sector. FDI in western European regions, ordered by number of projects (2017-2021)



Source: ACCIÓ, based on fDi Markets, 2017 – 2021

Leaders in the agri-food sector choose Catalonia to locate their technological hubs

PepsiCo will invest in a new digital hub in Barcelona that will serve as a Centre of Excellence



"We have strategically chosen Barcelona and Dallas because they are really innovative cities with **top-notch talent, top-notch educational systems** and fully developed regional infrastructures. Our Digital Hubs will support PepsiCo's efforts to be an even faster, stronger and better company. By creating an agile and dedicated environment where innovation thrives, **our talent will have the opportunity to lead projects that will reach a global scale** and have a significant impact for PepsiCo for many years to come."

Athina Kanioura, Director of Strategy and Transformation at PepsiCo

Lidl installs its European centre of digital excellence in Barcelona



The German distribution chain Lidl has installed a **European centre of digital excellence** in the city centre of the Catalan capital out of which it serves the rest of Europe. Lidl Digital occupies 3,200 square metres, acting as an international support centre within the framework of its digital strategy.

Out of these offices, **e-commerce and customer relationship management services** are provided at a regional level in Europe.

Nestlé has created more than 100 jobs at its Global IT Hub in Barcelona since the start of the pandemic



Currently, it concentrates some **600 experts with skills covering the full gamut of computing fields**, from connected equipment to artificial intelligence, as well as next generation technology and digital finance, among others. **With employees from 50 different countries and 40% of women in leadership positions**, the Global IT Hub supports IT products and services in all Nestlé markets and brands. "Although it seemed that the pandemic made the world stop, our ICT centre continued to grow. More than ever, technology is at the heart of everything we do, and we will continue to evolve in the context of our new reality and new ways of working, our search for professionals in all technological areas is ongoing".

Cristina Ghetti, head of Nestlé's Global IT Hub in Spain

Source: ACCIÓ

A wide range of university studies and world-renowned gastronomy that attracts talent from all over the world

uni
versi
tats

Wide range of agri-food training in Catalonia:

- 8 specialised bachelor's degrees 6 specialised university master's degrees
- 4 Dual VT qualifications 2 specialised food centres
- 18 continuous training courses in agri-food

Catalonia is gastronomy

The most avant-garde creativity has elevated **Catalonia and its cuisine to the highest levels of international prestige**, attracting visitors from all four corners of the world just to taste the best in Catalan gastronomy.

This universal recognition has been achieved thanks to an imaginative culinary approach throughout Catalonia, **pioneered by famous chefs who haven't been recognised with Michelin stars** and many other prestigious awards, and who are undoubtedly the leading exponents of contemporary Catalan cuisine.



Ferran Adrià



Carme Ruscalleda



The Roca Brothers



Jordi Cruz

Attracting talent to Barcelona

One of the best places in the world to live and work. A magnet for young professionals and researchers from all over Europe

1st Southern Europe Region for the future 2020-2021

FDI Int, 2020

Barcelona is the 3rd best city in Europe

Resonance Consulting, 2021

3rd city in digital infrastructure

Nesta, 2020

5th favourite city to work in the world

Boston Consulting Group, 2019

5th city of the world in terms of liveability

Global Power City Index, 2020



Source: ACCIÓ, based on the report "Catalonia is gastronomy" of the Catalan Tourism Board and the statistics of the Department of Education of the Catalan Government

3. Future trends and challenges of the agri-food industry in Catalonia

Future trends and challenges of the agri-food industry in Catalonia (I)

SUSTAINABILITY



Sustainably produced foods:
based on circular bioeconomy and precision agriculture.



Ecological food: natural products without insecticides, herbicides, fertilizers, chemicals



Reduction and elimination of food waste, from increasing self-supply + incorporation of new techniques (blockchain, photonics) + food upcycling.



Plant proteins and cultivated meat:
expand the food offer of these new foods, with an enriched nutritional profile and good organoleptic characteristics.



Food traceability:
to identify sustainable foods and ensure the authenticity of food, via blockchain technologies



Reduction of single use plastic and of plastic packaging.



Local Km0 food :
Back to local sources to reduce impact in costs and transport + obtain fresher and quality food → Change of model to local production systems and smaller distribution.



Product lifecycle analysis
to evaluate the environmental impact associated with a food product (product weight, energy consumption, etc.)

HEALTHY EATING AND NUTRITION OF THE FUTURE



Disease reduction
related to food (obesity, diabetes, cardiovascular diseases, etc.).



Healthy/functional products:
natural or with added components (probiotics, prebiotics, proteins, fibre, etc.).



Food as a treatment:
search for mental and emotional well-being via food.



Nutrigenetics:
personalized food and personalized diets.

Future trends and challenges of the agri-food industry in Catalonia (II)

AGRIFOODTECH



Agri-food innovation driven by technology

- **Agricultural technologies – Agritech:** use of technology in agriculture with the aim of improving performance and efficiency, with respect to the environment and adaptation to climate change. Among its applications, we can find:
 - ✓ Crop automation systems.
 - ✓ New cultivation systems: vertical farms, indoor farming, hydroponic, aquaponic crops, etc.
 - ✓ Water technologies: reuse of water for irrigation.
 - ✓ Microelectronics and integrated chips to guarantee the safety, origin and traceability of food.
- **Food technologies – Foodtech:** explores how to take advantage of technological advances to improve efficiency and sustainability in the design, production, choice, delivery and enjoyment of food. Among its applications we can find:
 - ✓ New products made using 3D printing.
 - ✓ Frontier materials: new ingredients and encapsulated nano flavour enhancers.
 - ✓ Omics: foodomics (elaboration of functional foods and nutritional supplements) and genomics (genetic modification of foods to make them more resistant to pests or environmental changes, improving their characteristics, etc.)



Industry 4.0 food: digitization of agri-food production

- Main technologies of Industry 4.0 used in agri-food production:
 - ✓ **IoT and sensors:** predictive/preventive maintenance, quality control and control of fields and crops.
 - ✓ **Big Data + IA:** preventive maintenance to avoid production stoppages and reduction of maintenance costs.
 - ✓ **DLT/Blockchain:** guarantee of origin and traceability, waste reduction.
 - ✓ **Cybersecurity:** avoid process stoppages due to external causes.
 - ✓ **Connectivity:** mobile private networks and variable monitoring.
 - ✓ **Photonics/Quantum:** sensors to detect strange materials, quality controls, automate inspection processes.
 - ✓ **New Space:** monitoring of crops, fish farms, soil fertility.
 - ✓ **Robots/Cobots:** non-ergonomic activities and picking/manufacturing.
 - ✓ **Additive manufacturing (3D printing):** personalised machinery and food printing from fresh ingredients.
 - ✓ **Simulation:** design and control of manufacturing processes (digital twins).
 - ✓ **Automation:** Monitoring for machinery, devices and processes.
 - ✓ **Drones:** spraying of crops and precision agriculture.
 - ✓ **VR/AR:** training and maintenance of production change routines.
 - ✓ **Cloud:** crop and herd management, images, data, etc..

Future trends and challenges of the agri-food industry in Catalonia (III)

Examples of Catalan companies applying new technologies to agri-food:

Natural Machines, 3D food printing



The Catalan company Natural Machines has developed a **3D food printer** called Foodini, **an appliance and mini-kitchen factory** that can be located at several individual locations, cutting manufacturing costs for industrial customers and distribution. Customers from various industries are using Foodini to 3D print their food and ingredients: **restaurants, food suppliers, food manufacturers, and education, research, nutrition and health companies.**

Modpow, water saving in crops



The Barcelona-based company Modpow offers a **software service, integrated with wireless sensors**, which allows crop yields to be improved by **saving water and energy**. Since the soil in the fields is not homogeneous, with drier areas and wetter areas, sensor-based technologies help to plan the amount and frequency of irrigation in each area, optimizing production. ModpoW DataLoggers have multiple ports for connecting sensors that, once installed, **send data to the cloud continuously.**

New Meat's 3D printed vegetable steaks



The Barcelona startup Nova Meat is working on a **technology** that will give a **fibrous, muscley texture** to a **vegetable protein based** product, meaning people won't have to give up the experience of eating a cut of meat. The **technology** they have patented is **micro extrusion** that enables, in a way very similar to 3D tissue printing, use of plant-based ingredients to mimic muscle. Research has begun on texture because it is the most complicated aspect to achieve, but **they are also working on taste and appearance.**

Cubiq Foods, cultivated fats



A startup from Granollers **applying technology to develop and produce fats** that adapt to the needs of industrial customers who want to produce healthy foods. The company has developed **three technological processes: an oil/water emulsion; omega-3 microencapsulation techniques; and a cell culture platform for special fats** (cellular-based omega-3). Its platforms adjust hardness, texture and flavour, as well as fat content in custom product applications.

Source: ACCIÓ

Future trends and challenges of the agri-food industry in Catalonia (IV)

Examples of Catalan agri-food companies using Industry 4.0 technologies:

EcoStruxure System for automating cleaning



Schneider has developed a **comprehensive and sustainable solution for Nestlé Waters to reduce necessary down time for on-site cleaning processes**, improving the traceability of cleaning and production operations. The implemented system, called EcoStruxure, has a flexible architecture that adapts to software and automation limitations and allows onsite monitoring and diagnosis of the cleaning process. Thanks to this system, **operational down time has been cut by 20% and productivity has improved.**

AI technology for controlling bread humidity



IRIS is a Deep-Tech Engineering specialized in real-time Monitoring Systems and Application of **Artificial Intelligence in production processes** to boost improvement in quality and efficiency in industry. It has recently developed **NIR technology (infrared spectroscopy)** applied to the bread and pastry industry, which is able to **optimize moisture levels of products** to control the manufacturing process and correct any deviation in real time. In the industrial bakery and pastry sector, the humidity of the bread and pastry dough is **a parameter requiring strict control**, since changes in the humidity of the product affect phenomena such as honeycombing, crust type or consistency.

eFoodPrint, *Big Data* for harvest forecasting



eFoodPrint provides crop prediction **models with algorithmics and Big Data technology**, in order to optimize decision making, stocks and logistics, and anticipate the needs of field and warehouse personnel based on volume predictions and harvest dates. **It is a system that allows you to extract agricultural information from different sources** (such as ERP, Hesperides, eFoodPrint ENV, digital field notebooks ... etc.) and combine it to create personalized and dynamic reports on quality, technical and economic results.

Atlantis Cattle, IoT for herd geolocation



Atlantis Cattle is an innovative solution **using an app to geolocate and monitor livestock grazing freely in the mountains**. It consists of **an IoT device and an app (Android)**. The IoT device is portable and integrated into the animal's collar. This device has **several sensors, geolocation and a long-life battery**. The app lets you geolocate livestock in real time, control temperatures and lets you know if the animal leaves specified territorial limits; it also includes heat maps to control grazing patterns..

Source: ACCIÓ

Thank you

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accio.gencat.cat
catalonia.com

 @accio_cat

 @catalonia_ti

See the report here:

<http://catalonia.com/industries-in-catalonia/sectors/food-industries/>

